

<b>P</b>	Steel
<b>M</b>	Stainless Steel
<b>K</b>	Cast Iron

<b>N</b>	Non-Ferrous
<b>S</b>	High-Temp Alloys

<b>H</b>	Hardened Materials
<b>C</b>	CFRP Materials

material group	description	content	tensile strength RM (MPa)*	hardness (HB)	hardness (HRC)	material number
<b>P0</b>	Low-Carbon Steels, Long Chipping	C <0,25%	<530	<125	-	-
<b>P1</b>	Low-Carbon Steels, Short Chipping, Free Machining	C <0,25%	<530	<125	-	C15, Ck22, ST37-2, S235JR, 9SMnPb28, GS38
<b>P2</b>	Medium- and High-Carbon Steels	C >0,25%	>530	<220	<25	ST52, S355JR, C35, GS60, Cf53
<b>P3</b>	Alloy Steels and Tool Steels	C >0,25%	600–850	<330	<35	16MnCr5, Ck45, 21CrMoV5-7, 38SMn28
<b>P4</b>	Alloy Steels and Tool Steels	C >0,25%	850–1400	340–450	35–48	100Cr6, 30CrNiMo8, 42CrMo4, C70W2, S6525, X120Mn12
<b>P5</b>	Ferritic, Martensitic, and PH Stainless Steels	-	600–900	<330	<35	100Cr6, 30CrNiMo8, 42CrMo4, C70W2, S6525, X120Mn12
<b>P6</b>	High-Strength Ferritic, Martensitic, and PH Stainless Steels	-	900–1350	350–450	35–48	X102CrMo17, G-X120Cr29
<b>M1</b>	Austenitic Stainless Steel	-	<600	130–200	-	X5CrNi 18 10, X2CrNiMo 17 13 2, G-X25CrNiSi18 9, X15CrNiSi 20 12
<b>M2</b>	High-Strength Austenitic Stainless and Cast Stainless Steels	-	600–800	150–230	<25	X2CrNiMo 13 4, X5NiCr 32 21, X5CrNiNb 18 10, G-X15CrNi 25-20
<b>M3</b>	Duplex Stainless Steel	-	<800	135–275	<30	X8CrNiMo27 5, X2CrNiMoN22 5 3, X20CrNiSi25 4, G-X40CrNiSi27 4
<b>K1</b>	Grey Cast Iron	-	125–500	120–290	<32	GG15, GG25, GG30, GG40, GTW40
<b>K2</b>	Low- and Medium-Strength Ductile Irons (Nodular Irons) and Compacted Graphite Irons (CGI)	-	<600	130–260	<28	GGG40, GTS35
<b>K3</b>	High-Strength Ductile Irons and Austempered Ductile Iron (ADI)	-	>600	180–350	<43	GGG60, GTW55, GTS65
<b>N1</b>	Wrought Aluminium	-	-	-	-	AlMg1, Al99.5, AlCuMg1, AlCuBIPb, AlMgSi1, ALMgSiPb
<b>N2</b>	Low-Silicon Aluminium Alloys and Magnesium Alloys	Si <12,2%	-	-	-	GAISiCu4, GDAISi10Mg
<b>N3</b>	High-Silicon Aluminium Alloys and Magnesium Alloys	Si >12,2%	-	-	-	G-ALSi12, G-ALSi17Cu4, G-ALSi21CuNiMg
<b>N4</b>	Copper-, Brass-, Zinc-Based on Machinability Index Range of 70–100	-	-	-	-	CuZn40, Ms60, G-CuSn5ZnPb, CuZn37, CuSi3Mn
<b>N5</b>	Nylon, Plastics, Rubbers, Phenolics, Resins, Fibreglass	-	-	-	-	Lexan®, Hostalen™, Polystyrol, Makrolon®
<b>N6</b>	Carbon, Graphite Composites, CFRP	-	-	-	-	CFK, GFK
<b>N7</b>	Metal Matrix Composites (MMC)	-	-	-	-	-
<b>S1</b>	Iron-Based, Heat-Resistant Alloys	-	500–1200	160–260	25–48	X1NiCrMoCu32 28 7, X12NiCrSi36 16, X5NiCrAlTi31 20, X40CoCrNi20 20
<b>S2</b>	Cobalt-Based, Heat-Resistant Alloys	-	1000–1450	250–450	25–48	Haynes® 188, Stellite 6,21,31
<b>S3</b>	Nickel-Based, Heat-Resistant Alloys	-	600–1700	160–450	<48	INCONEL® 690, INCONEL 625, Hastelloy®, NIMONIC® 75
<b>S4</b>	Titanium and Titanium Alloys	-	900–1600	300–400	33–48	Ti1, TiAl5Sn2, TiAl6V4, TiAl4Mo4Sn2
<b>H1</b>	Hardened Materials	-	-	-	44–48	GX260NiCr42, GX330NiCr42, GX300CrNiSi952, GX300CrMo153, Hardox® 400
<b>H2</b>	Hardened Materials	-	-	-	48–55	-
<b>H3</b>	Hardened Materials	-	-	-	56–60	-
<b>H4</b>	Hardened Materials	-	-	-	>60	-
<b>C1</b>	CFRP, CFRP/CFRP	-	-	-	-	-
<b>C2</b>	CFRP/Non-Ferrous	-	-	-	-	-
<b>C3</b>	CFRP/High Temp	-	-	-	-	-
<b>C4</b>	CFRP/Stainless Steel	-	-	-	-	-
<b>C5</b>	CFRP/Non-Ferrous/High-Temp	-	-	-	-	-

**P0** ■ Workpiece Materials Listing • Steel • P0  
 P0 Low-Carbon Steels, Long Chipping      Content: C <.25%      Tensile Strength RM (MPa)\*: <530      Hardness (HB): <125

AISI**	DIN	BTS	JIS	UNS	EN	AFNOR	UNI	SIS	SAE	ASTM	Material Number	Manufacturer Reference
1013	US1 34-1	-	-	G10130	-	-	-	1233	-	-	-	1.0055
1010	C 10	045 M 10	S 10 C	G10100	C 10	XC 10	C 10	-	-	-	-	1.0301
1008	DD 11 (SIW 22)	HR 3	SPHD	-	DD 11	1 C	-	-	-	-	-	1.0332
1020	C 22	050 A 20	S 22 C	G10200	1 C 22	C 20	C 20	1450	-	-	-	1.0402
1025	C 25	070 M 26	S 22 C	G10250	1 C 25	C 25	C 25	-	-	-	-	1.0406
1012	B 500 H	-	S 12 C	G10120	B 500 B	XC 12	B 500 B	1332	-	-	-	1.0439
1018	C16.8	080 A 17	-	G10180	-	-	-	-	-	-	-	1.0453
1108	10 S 20	210 M 15	-	G 11080	10 S 20	10 F 1	CF 10 S 20	-	-	-	-	1.0721
1010	Ck 10	040 A 10	S 10 C	G10100	2 C 10	XC 10	C 10	1265	-	-	-	1.1121
1022	20 Mn 5	120 M 19	SMn 420	G 10220	20 M 5	20 M 5	G 22 Mn 3	-	-	-	-	1.1133
1015	Ck 15	080 M 15	S 15 C	G 10150	2 C 15	XC 15	C 15	1370	-	-	-	1.1141
1021	22 B 2	-	SWRCHB 220	G10210	C 22 BE 69	21 B 3	-	-	-	-	-	1.5508
-	PS 275 TM	S 275 M	-	-	S 275 M	S 275 M	S 275 M	-	-	-	-	1.8818
-	DI-MC 355 B	-	-	-	S 355 M	E 355	S 355 M	-	-	-	-	1.8823
-	DI-MC 420 B	S 420 M	-	-	S 420 M	E 420	S 420 M	-	-	-	-	1.8825
-	S 460 M	S 460 M	-	-	S 460 M	E460, S460M	S460M	-	-	-	-	1.8827
-	BTSIE 355 TM	S 355 ML	-	-	S 355 ML	E 355	S 355 ML	-	-	-	-	1.8834
-	BTSIE 420 TM	S 420 MI	-	-	S 420 ML	E 420	S 420 ML	-	-	-	-	1.8836
-	St E 320-3Z	-	-	-	S 320 GD + ZA	-	-	-	-	-	-	1.0250

**P1** ■ Workpiece Materials Listing • Steel • P1  
 P1 Low-Carbon Steels, Short Chipping, Free Machining      Content: C <.25%      Tensile Strength RM (MPa)\*: <530      Hardness (HB): <125

AISI**	DIN	BTS	JIS	UNS	EN	AFNOR	UNI	SIS	SAE	ASTM	Material Number	Manufacturer Reference
-	R St 34-2/ S 205 G2T	34/20CR	-	K02502	-	-	-	-	-	-	-	1.0034
-	St 33	HR 15	SS 330	K01400	-	A 33	Fe 320	-	-	-	-	1.0035
A 570 Gr. 33	US1 37-2	4360-40 B	SS 34	K 02502	S 235 JR G1	E 24-2	Fe 360 BFU	1311	-	-	-	1.0036
-	St 37-2	HS 37/23	STKR 400	K02702	S 235 JR	E 28-2	Fe 430 C	1412	-	-	-	1.0037
A 570 Gr. 36	R St 37-2/S235 JRG2	4260-40 C	SS 34	K 02502	S235 JR G 2	E 24-2 NE	Fe 360 BFN	1312	-	-	-	1.0038
-	S 235 JRH	S 235 JRH	-	-	S235JRH	E 24-2	S 235 JRH	-	-	-	-	1.0039
-	R St 42-1	-	-	K02507	-	-	-	-	-	-	-	1.0077
-	S235J2G3/Fe 360 D1	S 235 J 2 G 3	-	K01501	S 235 J2 G3	E 24-4	S 235 J2G3	1313	-	-	-	1.0161
-	C 10 Pb	-	-	-	C 10 GPb	-	-	-	-	-	-	1.0302
-	QSt 32-3	-	SWRCH6R	-	CB 4 FF KD	-	CB 4 F U	-	-	-	-	1.0303
-	St 35.8	-	STPT 38	K01201	-	-	-	-	-	-	-	1.0305
-	St 37-2	360	STKM 12 A	K02504	S 235 JR	E 24-2	Fe 360	1412	-	-	-	1.0308
-	C10D	-	SWRM 10	-	C 10 D	FM 10	C 10 D	-	-	-	-	1.0310
-	C12D	-	SWRM 12	-	C 12 D	-	C 12 D	-	-	-	-	1.0311
-	R St 15	FeP05	-	-	Fe P05	FeP05	FeP05	-	-	-	-	1.0312
-	D 6-2	0 1 5 A 03	SWRM 6	G10050	C 4 D	-	3 CD 5	-	-	-	-	1.0314
-	St 37.8	-	STB 35	-	-	-	Fe 37	-	-	-	-	1.0315
-	St 13	CR 3	SPCD	-	-	-	-	-	-	-	-	1.0333
-	D D 13 (SIW 24)	H S 3	SPHE	-	D D 13	3C	-	-	-	-	-	1.0335
-	US1 4/DC 04 G	-	-	-	D C 04 G 1	-	-	-	-	-	-	1.0336
-	Ro St 4/DC 04 GT	-	-	-	DC 04 GT	-	-	-	-	-	-	1.0337
-	St 4	DC 04/FeP04	SPCE	-	Fe P04	Fe 14	DC04/FeP04	-	-	-	-	1.0338
-	DC01Cu	-	-	-	DC 01 Cu	-	-	-	-	-	-	1.0344
-	RR St 3	CR 3	SPCD	-	Fe P03	F 13	DC 03/FeP 03	-	-	-	-	1.0347
-	U H I/P 195GH	-	SGV 480	-	P 195 Gh	-	-	-	-	-	-	1.0348
-	St 14 Cu 3	-	-	-	DC 04 Cu	-	-	-	-	-	-	1.0354
-	-	3 CR	-	-	D D 12	D D 12	-	-	-	-	-	1.0398
1015	C 15	080 M 15	S 15 C	G10170	C 15	C 12	C 15	1350	-	-	-	1.0401
-	LSt 45.8	-	-	-	C 16	-	C 16	-	-	-	-	1.0407
-	C15D	-	SWRM 15	-	C 15 D	FM 15	C 15 D	-	-	-	-	1.0413
-	C20D	-	SWRM 20	-	C 20 D	FM 20	C 20 D	-	-	-	-	1.0414
-	C26D	-	SWRH 27	-	C 26 D	FM 26	C 26 D	-	-	-	-	1.0415
-	C18D	-	SWRM 17	-	C 18 D	FM 18	C 18 D	-	-	-	-	1.0416
-	RSt 44-2	440	-	G10160	-	-	-	-	-	-	-	1.0419
-	P265 NB	-	SG 295	-	P 265 NB	BS 2	-	-	-	-	-	1.0423
-	P 265 GH	151-400	SG 30	K02801	P 265 GH	A42CP	P 265 GH	1430	-	-	-	1.0425
-	C 22.3	-	-	-	C 22 G 1	-	-	-	-	-	-	1.0427
-	BSt 420 S	-	-	-	Fe B 400	-	-	-	-	-	-	1.0428
-	C 21	-	SFVC 1	K03504	P 305 GH	-	-	-	-	-	-	1.0432
-	GS-45	A1	SC 450	J03001	GE 230	E23-45M	-	1305	-	-	-	1.0446
-	TSIE 275 (S 275 NL)	40EE	-	-	S 275 NL	S 275 NL	S 275 NL	-	-	-	-	1.0491
-	St 42.8	-	STPT 42	-	-	-	Fe 42	-	-	-	-	1.0498
-	S 335 N (SIE 355)	50 E	-	-	S 355 N	E 355	S 355 N	2134	-	-	-	1.0545
-	S 355 NL (TSIE 355)	50 E E	-	-	S 355 NL	E 355	S 355 N L	2135	-	-	-	1.0546
-	R 7 S 6/C 7 RG 2	-	-	-	C 7 RG 2	-	-	-	-	-	-	1.0709
B1112	9 S 20	220 M 07	SUM 21	G 11120	-	-	CF 9 S 22	-	-	-	-	1.0711
1213	9 SMn 28/11 SMn 30	230 M 07	SUM 22	G 12130	11 SMn 28	S 250	CF 9 SMn 28	1912	-	-	-	1.0715
12L13	9 SMnPb 28	-	SUM 22 L	G 12134	11 SMnPb 28	S 250 Pb	CF 9 SMnPb 28	1914	-	-	-	1.0718
-	15 S 22/15 S 20	En32M	SUM 32	-	15 S 22	-	-	1922	-	-	-	1.0723
-	15 SMn 13	15 SMn 13	-	-	15 SMn 13	15 SMn 13	-	-	-	-	-	1.0725
1215	9 SMn 36/11 S Mn 37	240 M 07	SUM 25	G 12150	11 SMn 37	S 300	CF 9 SMn 36	-	-	-	-	1.0736
12L14	9 SMnPb 36/11 SMnPb 37	-	-	G 12144	11 SMnPb 37	S 300 Pb	CF 9 SMnPb 36	1926	-	-	-	1.0737
-	11 SMnPbTe 37	11 SMn 37	-	-	11 SMn 37	-	-	-	-	-	-	1.0738
-	15 SPb 20/15 SPb 22	-	-	-	15 SPb 22	-	-	-	-	-	-	1.0753
-	36 SMn 14	36SMn14	-	-	36SMn14	36SMn14	-	-	-	-	-	1.0764
-	C10D2	-	-	-	C 10 D 2	FM 10	C 10 D 2	-	-	-	-	1.1114
-	Cq 10 (C 10 C)	-	SWRCH 10 K	-	C 10 KD	-	-	-	-	-	-	1.1122
-	C15D2	-	-	-	C 15 D 2	FM 15	C 15 D 2	-	-	-	-	1.1126
-	C 18D2	-	-	-	C 18 D 2	FM 18	C 18 D 2	-	-	-	-	1.1129

(continued)





**P3** ■ Workpiece Materials Listing • Steel • P3 (continued)  
 P3 Alloy Steels and Tool Steels      Content: C >.25%      Tensile Strength RM (MPa)\*: 600–850      Hardness (HB): <330 (HRC): <35

AISI**	DIN	BTS	JIS	UNS	EN	AFNOR	UNI	SIS	SAE	ASTM	Material Number	Manufacturer Reference
--	ZStE 420/H 420	46/40HR, HS, CS	--	--	H 400 LA	H 400 LA	--	--	--	--	1.0556	--
--	P355 NB	--	SG 365	--	P 355 NB	BS 4	--	--	--	--	1.0557	--
--	W St E 355	P 355 NH	--	K01600	P 355 NH	P 355 NH	Fe E 355 KW	--	--	--	1.0565	--
--	T St E355	P 355 NL1	SLA 37	--	P 355 NL1	P 355 NL1	Fe E 355 KT	--	--	--	1.0566	--
--	P355 QH1	P 355 QH	--	--	P 355 QH	P 355 QH	--	--	--	--	1.0571	--
--	S 355 J 2 G 4	S 355 J 2 G 4	--	--	S 355 J 2 G 4	S 355 J 2 G 4	S 355 J 2 G 4	--	--	--	1.0577	--
--	L 360 MB	--	--	--	L 360 MB	L 360 MB	--	--	--	--	1.0578	--
--	St 52.4	--	STS 49	--	--	--	--	--	--	--	1.0581	--
--	L 360 NB/SfE 360.7	--	--	--	L360NB	L 360 NB	--	--	--	--	1.0582	--
--	S 355 J 2 G 3 Cu/St 52-3 Cu3	--	--	--	S 355 J2 G3 Cu + CR	--	--	--	--	--	1.0585	--
--	C50D	--	--	--	C 50 D	FM 50	C 50 D	--	--	--	1.0586	--
--	QSt 52-3 Cu 3	--	--	--	S 355 J2 G3 Cu C	--	--	--	--	--	1.0587	--
--	D 53-2	--	SWRH 52 B	--	C 52 D	FM 52	C 52 D	--	--	--	1.0588	--
--	S 355 J 2 G 4 Cu	--	--	--	S 355 J2 G4 Cu	--	--	--	--	--	1.0592	--
--	S355k2G3/Fe 510 DD1 (MULTIST)	S 355 K 2 G 3	SM 520 C	K02505	S 355 K 2 G 3	E36-4	S 355 K 2 G 3	--	--	--	1.0595	--
--	S355k2G4/Fe 510 DD 2 (MULTIST)	S 355 K 2 G 4	--	--	S 355 K 2 G 4	S 355 K 2 G 4	S 355 K 2 G 4	--	--	--	1.0596	--
--	C62D	--	SWRH 62 B	--	C 62 D	FM 62	C 62 D	--	--	--	1.0611	--
--	C66D	--	--	--	C 66 D	FM 66	C 66 D	--	--	--	1.0612	--
--	C68D	--	SWRH 67 B	--	C 68 D	FM 68	C 68 D	--	--	--	1.0613	--
--	C70D	--	--	--	C 70 D	FM 70	C 70 D	--	--	--	1.0615	--
--	C72D	--	SWRH 72 B	--	C 72 D	FM 72	C 72 D	--	--	--	1.0617	--
--	GS-C 25	--	SCPH 1	--	GP 240 GH	GP 240 GH	GP 240 Gh	--	--	--	1.0619	--
--	C80D	--	--	--	C 80 D	FM 80	C 80 D	--	--	--	1.0622	--
--	C82D	--	SWRH 82 B	--	C 82 D	FM 82	C 82 D	--	--	--	1.0626	--
--	35 SPb 20	35 SPb 20	--	--	35 SPb 20	35 SPb 20	--	--	--	--	1.0756	--
--	45 SPb 20	--	--	--	46 SPb 20	--	--	--	--	--	1.0757	--
--	38 SMnPb 28	38 SMnPb 28	--	--	38 SMnPb 28	38 SMnPb 28	--	--	--	--	1.0761	--
--	44 SMn 28	44 SMn 28	--	--	44 SMn 28	44 SMn 28	--	--	--	--	1.0762	--
--	44 SMnPb 28	44 SMnPb 28	--	--	44 SMnPb 28	44 SMnPb 28	--	--	--	--	1.0763	--
--	36 SMnPb 14	36 SMnPb 14	--	--	36 SMnPb 14	36 SMnPb 14	--	--	--	--	1.0765	--
--	QSt E 690 TM (S 700 MC)	--	--	--	S 700 MC	S 690 MC	--	S 700 MC	--	--	1.0966	--
--	QSt E 260 N 7 S 260 NC	--	AE 275 NC	--	S 260 NC	--	--	S 260 NCX	--	--	1.0971	--
--	QSt E 300 TMS 315 MC	43 F35 HR, HS, CS	--	--	S 315 MC	E 315 D	--	S 315 MCX	--	--	1.0972	--
--	QSt E 300 N 7/ S 315 NC	--	AE 340 NC	--	S 315 NC	--	--	S 315 NC	--	--	1.0973	--
--	QSt E340 TM	HR 40/30	--	--	S 340 MC	E 335 D	--	--	--	--	1.0974	--
--	QSt E340 N	--	--	--	S 340 NC	--	Fe E 355 TD	--	--	--	1.0975	--
--	QSt E 360TM	--	--	--	S 355 MC	E 355 D	Fe E 355 TM	--	--	--	1.0976	--
--	QSt E360 N	--	--	--	S 355 NC	--	Fe E 355 TD	--	--	--	1.0977	--
--	QSt E380 TM	--	--	--	S 380 MC	E 390 D	--	--	--	--	1.0978	--
--	QSt E380 N	--	--	--	S 380 NC	--	Fe E 380 TD	--	--	--	1.0979	--
--	QSt E420 TM	HR 50 F 45	--	--	S 420 MC	E 430 D	Fe E 420 TM	--	--	--	1.0980	--
--	QSt E 420 N	--	--	--	S 420 NC	--	Fe E 420 TD	--	--	--	1.0981	--
--	QSt E 460 TM	50/45 HR	--	--	S 460 MC	E 445 D	--	--	--	--	1.0982	--
--	QSt E 460 N	--	--	--	S 460 NC	--	Fe E 460 TD	--	--	--	1.0983	--
--	QSt E500 TM	--	--	--	S 500 MC	E 490 D	Fe E 490 TM	2662	--	--	1.0984	--
--	QSt E500 N	--	--	--	S 500 NC	--	--	--	--	--	1.0985	--
--	QSt E550 TM	60/55 HS	--	--	S 550 MC	E 560 D	Fe E 560 TM	--	--	--	1.0986	--
--	QSt E550 N	--	--	--	S 550 NC	--	--	--	--	--	1.0987	--
--	ESTE 285	P 275 NL 2	STK 400	--	P 275 NL 2	P 275 NL 2	P 275 NL 2	--	--	--	1.1104	--
--	ESTE 315	--	--	--	S 315 NL 1	--	--	--	--	--	1.1105	--
--	ESTE 355	P 355 NL 2	STK 500	--	P 355 NL 2	P 355 NL 2	P 355 NL 2	--	--	--	1.1106	--
--	C5D2	--	--	--	C 5 D 2	FM 6	C 5 D 2	--	--	--	1.1111	--
--	C8D2	--	--	--	C 8 D 2	FM 8	C 8 D 2	--	--	--	1.1113	--
--	C 10 E W/RS D 11	--	--	--	C 10 EW	--	--	--	--	--	1.1115	--
--	C32D2	--	--	--	C 32 D 2	FM 32	C 32 D 2	--	--	--	1.1143	--
--	C36D2	--	--	--	C 36 D 2	FM 36	C 36 D 2	--	--	--	1.1145	--
--	C40D2	--	--	--	C 40 D 2	FM 40	C 40 D 2	--	--	--	1.1153	--
--	C42D2	--	--	--	C 42 D 2	FM 42	C 42 D 2	--	--	--	1.1154	--
--	C46D2	--	--	--	C 46 D 2	FM 46	C46D 2	--	--	--	1.1162	--
--	C 25 R	C 25 R	--	--	C 25 R	C 25 R	C 25 R	--	--	--	1.1163	--
--	C48D2	--	--	--	C 48 D 2	FM 48	C48 D 2	--	--	--	1.1164	--
--	20 Mn 6	150 M 19	--	--	--	20 M 5	20 Mn 6	--	--	--	1.1169	--
--	C50D2	--	--	--	C 50 D 2	FM 50	C50D 2	--	--	--	1.1171	--
--	C 30 R	C 30 R	C 30 R ( 3 C 30)	--	C 30 R	C 30 R	C 30 R	--	--	--	1.1179	--
--	C3D1	--	--	--	C 3 D 1	--	C 3 D 1	--	--	--	1.1187	--
--	C40R/Cm 40	C 40 R	--	--	C 40 R	C 40 R	C 40	--	--	--	1.1189	--
--	Ck 45	080 M 46	S 45 C	--	2 C 45	XC 42	C 40	1672	--	--	1.1191	--
--	Cq 45	--	SWRCH45K	--	C 45 KD	--	--	--	--	--	1.1192	--
--	C 45 R	080 M 46	S 50 C	--	C 45 R	XC 48 H1u	C 45 R	1672	--	--	1.1201	--
--	C52D2	--	--	--	C 52 D 2	FM 52	C 52 D 2	--	--	--	1.1202	--
--	C 53 R/Cm 53	--	--	--	C 53 R	--	--	--	--	--	1.1205	--
--	C 10 R	C 10 R	--	--	C 10 R	C 10 R	--	--	--	--	1.1207	--
--	C 16 R	C 16 R	--	--	C 16 R	C 16 R	--	--	--	--	1.1208	--
--	C58D2	--	--	--	C 58 D 2	FM 58	C 58 D 2	--	--	--	1.1212	--
--	C62D2	--	--	--	C 62 D 2	FM 62	C 62 D 2	--	--	--	1.1222	--
--	Cm 60	C 60 R	--	--	C 60 R	C 60 R	C 60 R	--	--	--	1.1223	--
--	C60D2	--	--	--	C 60 D 2	FM 60	C 60 D 2	--	--	--	1.1228	--
--	C68D2	--	--	--	C 68 D 2	FM 68	C 68 D 2	--	--	--	1.1232	--
--	C66D2	--	--	--	C 66 D 2	FM 66	C 66 D 2	--	--	--	1.1236	--
--	C50R	C 50 R	--	--	C 50 R	FM 50	C 50 R	--	--	--	1.1241	--
--	C72D2	--	--	--	C 72 D 2	FM 72	C 72 D 2	--	--	--	1.1242	--
--	C70D2	--	--	--	C 70 D 2	FM 70	C 70 D 2	--	--	--	1.1251	--
--	C78D2	--	--	--	C 78 D 2	FM 78	C 78 D 2	--	--	--	1.1252	--
--	C76D2	--	--	--	C 76 D 2	FM 76	C 76 D 2	--	--	--	1.1253	--
--	C80D2	--	--	--	C 80 D 2	FM 80	C 80 D 2	--	--	--	1.1255	--

NOTE: For legend, see page Y217.

(continued)

**P3** Workpiece Materials Listing • Steel • P3 (continued)

P3 Alloy Steels and Tool Steels

Content: C >.25%

Tensile Strength RM (MPa)\*: 600–850

Hardness (HB): <330 (HRC): <35

AISI**	DIN	BTS	JIS	UNS	EN	AFNOR	UNI	SIS	SAE	ASTM	Material Number	Manufacturer Reference
--	C82D2	--	--	--	C 82 D 2	FM 82	C 82 D 2	--	--	--	1.1262	--
--	C86D2	--	--	--	C 86 D 2	FM 86	C 86 D 2	--	--	--	1.1265	--
--	C88D2	--	--	--	C 88 D 2	--	C 88 D 2	--	--	--	1.1272	--
--	C92D2	--	--	--	C 92 D 2	--	C 92 D 2	--	--	--	1.1282	--
--	C98D2	--	--	--	C 98 D 2	--	C 98 D 2	--	--	--	1.1283	--
--	46 MnVS 6	--	--	--	46 MnVS 6	--	--	--	--	--	1.1304	--
--	C 90 U	--	--	--	C90U	--	--	--	--	--	1.1535	--
--	85 Cr 1	--	--	--	--	Y1 100 C 2	--	--	--	--	1.2004	--
--	140 Cr 3	--	SKS 8	--	140 Cr 2	Y2 140 C	--	--	--	--	1.2008	--
--	21 MnCr 5	--	SCR 420 H	--	21 MnCr 5	20 NC 5	--	--	--	--	1.2162	--
--	40 CrMnNiMo 8 6 4	--	--	--	40 CrMnNiMo 8-6-4	--	--	--	--	--	1.2738	--
--	16 CrNiMo 6	820A16	--	--	--	16 NCD 6	16NiCrMo6	--	--	--	1.3531	--
--	100 CrMn 7 3	--	--	--	100 CrMnMo 7	100 CD 7	--	--	--	--	1.3536	--
--	100 CrMo 7	--	SUS 4	K19965	100 CrMo 7	100 CD 7	100CrMo7	--	--	--	1.3537	--
--	100 CrMnMo 8	--	--	--	--	100 CrMnMo 8	--	--	--	--	1.3539	--
--	46 Si 7	--	--	--	45 Si	46 S 7	--	--	--	--	1.5024	--
--	55 Si 7	250 A 53	--	G92550	56 Si 7	55 S 7	55 Si 8	2085	--	--	1.5026	--
--	37 MnSi 5	--	--	--	--	38 MS 5	--	F.130.A	--	--	1.5122	--
--	15 MnMoV 4 5	--	--	--	15 MnMoV 4-5	15 MDV 4.05	--	--	--	--	1.5402	--
--	11 MnMo 4 5	--	--	K11123	11 MnMo 45 KE	--	--	--	--	--	1.5425	--
--	13 MnMo 6 5	--	--	K11424	11 MnMo 65 KE	--	--	--	--	--	1.5426	--
--	35 B 2	--	SWRCHB 237	--	C 35 B	35 B 3	--	--	--	--	1.5511	--
--	24 Ni 8	--	SCPL 21	J22501	G 9 Ni 10	22 N 8	G9Ni10	--	--	--	1.5633	--
--	10 NiCr 5 4	10NiCr5-4	--	--	10 NiCr 5-4	10 NiCr 5-4	--	--	--	--	1.5805	--
--	18 MnMoNi 5 5	--	--	--	18 MnMoNi 5-5	--	--	--	--	--	1.6308	--
--	20 MnMoNi 4 5	--	SQV 2 B	K12539	20 MnMoNi 4-5	--	--	--	--	--	1.6311	--
--	15 MnCrMoNiV 5 3	--	--	--	15 MnCrMoNiV 5-3	--	--	--	--	--	1.6920	--
--	17 CrS 3	17 CrS3	--	--	17 CrS 3	17 CrS 3	--	--	--	--	1.7014	--
--	28 CrS 4	--	--	--	28CrS4	28CrS4	--	--	--	--	1.7036	--
--	34 CrS 4	34 CrS 4	--	--	34 CrS 4	34 CrS 4	34 CrS 4	--	--	--	1.7037	--
--	41 CrS 4	41 CrS 4	--	--	41 CrS 4	41 CrS 4	41 CrS 4	2245	--	--	1.7039	--
--	38 Cr 4	--	--	--	38 Cr 4	--	38 Cr 4	--	--	--	1.7043	--
--	16 CrMo 4	18 CrMo4	SCM 418 H	--	18 CrMo 4	15 CD 3.5	18 CrMo 4	--	--	--	1.7242	--
--	12 CrMo 11 10	--	--	--	--	--	--	--	--	--	1.7305	--
--	22 CrMoS 3 5	--	--	--	22 CrMoS 3-5	22 CrMoS 3-5	--	--	--	--	1.7333	--
--	12 CrMo 19 5	3606-625	SCMV 6	K41545	X 12 CrMo 5	Z 10 CD 5.05	16 CrMo 20 5	--	--	--	1.7362	--
--	X 7 CrMo 6 1	B 5	--	S50281	CM 5-IG	--	--	--	--	--	1.7373	--
--	51 CrMoV 4	--	--	--	51 CrMoV 4	51 CDV 4	51 CrMoV 4	--	--	--	1.7701	--
--	21 CrMoV 5 7	--	--	K14073	21 CrMoV 5-7	20 CDV 5.07	--	--	--	--	1.7709	--
--	20 CrMoVTiB 4 10	--	--	--	20 CrMoVTiB 4-10	20 CrMoVTiB 4-10	--	--	--	--	1.7729	--
--	PS 275 TMK	S 275 ML	--	--	S 275 ML	S 275 ML	S 275 ML	--	--	--	1.8819	--
--	S 500 M	--	--	--	S 500 M	--	--	--	--	--	1.8829	--
--	BTSiE 460 TM	S 460 ML	--	--	S 460 ML	E 460	S 460 ML	--	--	--	1.8838	--
--	S 500 ML	--	--	--	S 500 ML	--	--	--	--	--	1.8839	--
--	S 275 MH	--	--	--	S 275 MH	--	S 275 MH	--	--	--	1.8843	--
--	S 275 MLH	--	--	--	S 275 MLH	--	S 275 MLH	--	--	--	1.8844	--
--	S 355 MH	--	--	--	S 355 MH	--	S 355 MH	--	--	--	1.8845	--
--	S 355 MLH	--	--	--	S 355 MLH	--	S 355 MLH	--	--	--	1.8846	--
--	S 420 MH	--	--	--	S 420 MH	--	S 420 MH	--	--	--	1.8847	--
--	S 420 MLH	--	--	--	S 420 MLH	--	S 420 MLH	--	--	--	1.8848	--
--	S 460 MH	--	--	--	S 460 MH	--	S 460 MH	--	--	--	1.8849	--
--	SiE 460	S 460 N	--	--	S 460 N	E 460	S 460 N	--	--	--	1.8901	--
--	TSiE 460	S 460 L	--	--	S 460 NL	E460	S 460 NL	--	--	--	1.8903	--
--	S 550 Q	--	--	--	S 550 Q	E 550	S 550 Q	--	--	--	1.8904	--
--	S 460 Q	55 F	--	--	S 460 Q	E 460	S 460 Q	--	--	--	1.8908	--
--	S 420 NL/TSiE 420	S 420 NL	STK 540	K02002	S 420 NL	E 420 T-I	Fe E 420 KT	--	--	--	1.8912	--
--	S 620 Q	--	--	--	S 620 Q	E 620	S 620 Q	--	--	--	1.8914	--
--	T Si E 460/P460NL1	P 460 NL 1	--	K02900	P 460 NL1	E 460 T-I	Fe E 460 KT	--	--	--	1.8915	--
--	S 460 QL1	55 F	--	--	S 460 QL 1	--	--	--	--	--	1.8916	--
--	T Si E 500	--	--	K02001	--	E 500 T-I	--	--	--	--	1.8917	--
--	ESiE 460/P460NI2	P 460 NL 2	--	--	P 460 NL 2	P 460 NL 2	P 460 NL 2	--	--	--	1.8918	--
--	ESiE 500/S500NL1	--	--	--	S 500 NL 1	--	--	--	--	--	1.8919	--
--	TSiE 690 VA/S690G1QL	--	--	--	S 690 G 1 QL	--	--	--	--	--	1.8920	--
--	TSiE 690 VB/S690G2QL	--	--	K11646	S 690 G 2 QL	--	--	--	--	--	1.8921	--
--	S 690 G 4 QL/TSiE 690 VC	--	--	--	S 690 G 4 QL	--	--	--	--	--	1.8922	--
--	S 590 QL/TSiE 590 V	--	--	--	S 590 QL	--	--	--	--	--	1.8923	--
--	S 500 Q (SiE 500 V)	--	--	--	S 500 Q	E 500	S 500 Q	2614	--	--	1.8924	--
--	S 890 QL 1 (ESiE 90 V)	--	--	--	S 890 QL 1	--	--	--	--	--	1.8925	--
--	S 690 QL (TSiE 690 V)	--	--	SHY 685 NS	S 690 QL	--	--	--	--	--	1.8928	--
--	S 690 Q/SiE 690 V	--	--	SHY 685 N	S 690 Q	E 690	S 690 Q	--	--	--	1.8931	--
--	WSt E 420/P420NH	S 420 NL	STK 540	K02002	S 420 NL	S 420 NL	Fe E 420 KW	--	--	--	1.8932	--
--	S 960 QL/TSiE 960 V	--	--	--	S 960 QL	--	--	--	--	--	1.8933	--
--	WSt E 460/P460NH	P 460 NH	--	K02900	P 460 NH	P 460 NH	Fe E 460 KW	--	--	--	1.8935	--
--	S 960 Q	--	--	--	S 960 Q	E 960 T-A3	S 960 Q	--	--	--	1.8941	--
--	S 355 J 0 WP	WR 50 A	--	--	S 355 J0 WP	E 36 W-A3	S 355 J0 WP	--	--	--	1.8945	--
--	S 355 J 2 WP	S 355 J 2 WP	--	--	S 355 J2 WP	E36W-A4	S 355 J2 WP	--	--	--	1.8946	--
--	L 415 QB	--	--	--	L 415 QB	L 415 QB	--	--	--	--	1.8947	--
--	L 360 QB	--	--	--	L 360 QB	L 360 QB	--	--	--	--	1.8948	--
--	L 450 QB	--	--	--	L 450 QB	L 450 QB	--	--	--	--	1.8952	--
--	S 460 NH (FGS 47)	--	--	--	S 460 NH	--	S 460 NH	--	--	--	1.8953	--
--	L 485 QB	--	--	--	L 485 QB	--	--	--	--	--	1.8955	--
--	S 460 NLH/FGS 47	--	--	--	S 460 NLH	--	S460NLH	--	--	--	1.8956	--
--	L 555 QB	--	--	--	L 555 QB	--	--	--	--	--	1.8957	--
--	9 CrNiCuP 3 2 4	WR 50 A	SPA-H	K11430	--	--	--	--	--	--	1.8962	--
--	WTSi 52-3	WR 50 C	SMA 58 W	K11430	S 355 J 2 G 1 W	E 36 W-A2	--	--	--	--	1.8963	--
--	S 355 J 2 G 2 W	S 355 J 2 G 2 W	--	--	S 355 J 2 G 2 W	S 355 J 2 G 2 W	S 355 J 2 G 2 W	--	--	--	1.8965	--

(continued)



P3

Workpiece Materials Listing • Steel • P3 (continued)

P3 Alloy Steels and Tool Steels

Content: C >.25%

Tensile Strength RM (MPa)\*: 600-850

Hardness (HB): <330 (HRC): <35

Table with 13 columns: AISI\*\*, DIN, BTS, JIS, UNS, EN, AFNOR, UNI, SIS, SAE, ASTM, Material Number, Manufacturer Reference. Rows include various steel grades like S 420 NL, S 960 Q, S 355 J 2 WP, etc.

P4

Workpiece Materials Listing • Steel • P4

P4 Alloy Steels and Tool Steels

Content: C>.25%

Tensile Strength RM (MPa)\*: 850-1400

Hardness (HB): 350-450 (HRC): 35-48

Table with 13 columns: AISI\*\*, DIN, BTS, JIS, UNS, EN, AFNOR, UNI, SIS, SAE, ASTM, Material Number, Manufacturer Reference. Rows include various steel grades like A 570 Gr. 40, S 235 J0/Fe 360 C, S 275 J0, etc.

(continued)



**P4**
**Workpiece Materials Listing • Steel • P4 (continued)**

P4 Alloy Steels and Tool Steels

Content: C &gt; .25%

Tensile Strength RM (MPa)\*: 850–1400

Hardness (HB): 350–450 (HRC): 35–48

AISI**	DIN	BTS	JIS	UNS	EN	AFNOR	UNI	SIS	SAE	ASTM	Material Number	Manufacturer Reference
-	StE 240.7	-	-	-	L 245 NB	L 245 NB	-	-	-	-	1.0457	-
-	H11/L 235 GA	-	-	-	L 235 GA	-	-	-	-	-	1.0458	-
-	L 245 GA/RRStE 240.7	-	-	-	L 245 GA	TS E 250	-	-	-	-	1.0459	-
-	St E255	-	-	K01800	-	-	-	-	-	-	1.0461	-
-	TSIE 255	-	-	K11535	-	-	-	-	-	-	1.0463	-
-	15 Mn 3 Al	-	-	-	C 14 GAl	-	-	-	-	-	1.0468	-
-	21 Mn 4	-	-	-	-	-	20 Mn 4	-	-	-	1.0469	-
-	19 Mn 6/P 355 GH	P 355 GH	SGV 46	K03300	P355GH	A 52 CP	Fe E355-2	2101	-	-	1.0473	-
-	17 Mn 4/P 295 GH	224-460B	SG 37	K03501	P 295 GH	A 48 CP	Fe E 295	2102	-	-	1.0481	-
-	19 Mn 5	224-460	SG 37	K 03102	-	A 52 CP; AP; FP	Fe 460- 2 KW	-	-	-	1.0482	-
-	L 290 AG	-	-	-	L290GA	TS E 290	-	-	-	-	1.0483	-
-	L 290 NB	-	-	-	L290NB	L 290 NB	-	-	-	-	1.0484	-
-	21 Mn 6	-	-	K12320	-	-	-	-	-	-	1.0485	-
-	St E 285	P 275 N	SM 41 A	K 01802	P 275 N	P 275 N	Fe E 285 KG	-	-	-	1.0486	-
-	W St E 285	P 275 N	-	K 01802	P 275 NH	P 275 N	Fe E 285 KW	-	-	-	1.0487	-
-	T St E 285	P 275 NL 1	SLA 235 A	K 01803	P 275 NL 1	P 275 NL 1	Fe E 285 KT	-	-	-	1.0488	-
-	H 300/ZSt E 300	H280LA	-	-	H 280 LA	E 280 C	-	-	-	-	1.0489	-
-	S 275 NH	S 275 NH	-	-	S 275 NH	-	S 275 NH	-	-	-	1.0493	-
-	S 275 NLH	S275NLH	-	-	S 275 NLH	-	S275NLH	-	-	-	1.0497	-
-	L 360 GA	-	-	-	L 360 GA	-	-	-	-	-	1.0499	-
-	C 35 Pb/C 35 GPb	-	-	-	C 35 Pb	-	-	-	-	-	1.0502	-
-	St E 315/P 315N	-	SM 50 A	K11506	P 315 N	-	Fe E 315 KG	-	-	-	1.0505	-
-	W St E 315	-	SNC 1	K02404	P 315 NH	-	Fe E 315 KW	2107	-	-	1.0506	-
-	St 55	-	STKM 16A	-	-	-	Fe 540	-	-	-	1.0507	-
-	T St E315	-	SLA 325 A	K02404	P 315 NL	-	-	2106	-	-	1.0508	-
-	C 40 Pb	-	-	-	C 40 G Pb	-	-	-	-	-	1.0512	-
-	C38D	-	SWRH 37	-	C 38 D	FM 38	C 38 D	-	-	-	1.0516	-
-	C48D	-	SWRH 48	-	C 48 D	FM 48	C 48 D	-	-	-	1.0517	-
-	C56D	-	-	-	C 56 D	FM 56	C 56 D	-	-	-	1.0518	-
-	StSch 700 (R 0 700)	-	-	-	R 0700	-	-	-	-	-	1.0521	-
-	StSch800 (R 0 800)	-	-	-	R 0800	-	-	-	-	-	1.0524	-
-	Cf 45 Pb	-	-	-	-	-	C 46	-	-	-	1.0526	-
-	C32D	-	SWRH 32	K02701	C 32 D	FM 32	C 32 D	-	-	-	1.0530	-
-	GL-A 40 (S 390 G 1 S)	-	-	-	S 390 G 1 S	-	-	-	-	-	1.0532	-
-	S 355 NH	S 355 NH	-	-	S 355 NH	-	S 355 NH	-	-	-	1.0539	-
-	C42D	-	SWRH 42 B	-	C 42 D	FM 42	C 42 D	-	-	-	1.0541	-
-	Schienen 60 F(R 0600/ St Sch 60)	-	-	-	R 0600	-	-	-	-	-	1.0544	-
-	S 355 JO H	50 C	-	-	S 355 JO H	-	S 355 JO H	-	-	-	1.0547	-
-	ZStE 340/H 340	H 320 LA	-	-	H 320 LA	E 315 C	-	-	-	-	1.0548	-
-	S 335 NLH	50 EE	-	-	S 355 N LH	-	S 355 N L H	-	-	-	1.0549	-
-	GS-52	A2	-	-	GE 260	-	-	-	-	-	1.0552	-
-	S 355 JO	En 50 C;S 355 JO	SM 520 M	-	S 355 JO	S 355 JO; E 38-3	S 355 JO; Fe 510 C FN	-	-	-	1.0553	-
-	GS-70	50 C	-	-	S 355 JO C	E 38-3	Fe 510 C	-	-	-	1.0554	-
-	GS-62	-	-	-	S 355 G 1	-	-	-	-	-	1.0555	-
-	ZStE 420/H 420	46/40HR,HS,CS	-	-	H 400 LA	H 400 LA	-	-	-	-	1.0556	-
-	P355 NB	-	SG 365	-	P 355 NB	BS 4	-	-	-	-	1.0557	-
-	GS-62.3	-	-	-	S 355 G 0 2	-	-	-	-	-	1.0559	-
A 633 Gr. C	St E 355	P 355 N	SM 50 YB	K12000	P 355 N	E 355 R/FP	Fe E 355 KG	2132	-	-	1.0562	-
-	N 80	-	-	-	-	-	-	-	-	-	1.0564	-
-	W St E 355	P 355 NH	-	K01600	P 355 NH	P 355 NH	Fe E 355 KW	-	-	-	1.0565	-
-	T St E355	P 355 NL1	SLA 37	-	P 355 NL1	P 355 NL1	Fe E 355 KT	-	-	-	1.0566	-
-	32 Mn 3	-	-	-	-	-	-	-	-	-	1.0567	-
-	P355 QH1	P 355 QH	-	-	P 355 QH	P 355 QH	-	-	-	-	1.0571	-
-	ZStE 460/H 460	-	-	-	-	-	-	-	-	-	1.0574	-
-	S 355 J 2 G 4	S 355 J 2 G 4	-	-	S 355 J 2 G 4	S 355 J 2 G 4	S 355 J 2 G 4	-	-	-	1.0577	-
-	L 360 MB	-	-	-	L 360 MB	L 360 MB	-	-	-	-	1.0578	-
-	St 52.4	-	STS 49	-	-	-	-	-	-	-	1.0581	-
-	L 360 NB/StE 360.7	-	-	-	L360NB	L 360 NB	-	-	-	-	1.0582	-
-	S 355 J 2 G 3 Cu/St 52-3 Cu3	-	-	-	S 355 J2 G3 Cu + CR	-	-	-	-	-	1.0585	-
-	C50D	-	-	-	C 50 D	FM 50	C 50 D	-	-	-	1.0586	-
-	QSt 52-3 Cu 3	-	-	-	S 355 J2 G3 Cu C	-	-	-	-	-	1.0587	-
-	D 53-2	-	SWRH 52 B	-	C 52 D	FM 52	C 52 D	-	-	-	1.0588	-
-	FSIE 355 OS 3/S355G03	-	-	K12000	S 355 G03	-	-	-	-	-	1.0591	-
-	S 355 J 2 G 4 Cu	-	-	-	S 355 J2 G4 Cu	-	-	-	-	-	1.0592	-
-	S355K2G3/Fe 510 DD1 (MULTIST)	S 355 K 2 G 3	SM 520 C	K02505	S 355 K 2 G 3	E36-4	S 355 K 2 G 3	-	-	-	1.0595	-
-	S355K2G4/Fe 510 DD 2 (MULTIST)	S 355 K 2 G 4	-	-	S 355 K 2 G 4	S 355 K 2 G 4	S 355 K 2 G 4	-	-	-	1.0596	-
-	C 30 Pb	-	-	-	C 3 0 GPb	-	-	-	-	-	1.0598	-
-	C 60 Pb	-	-	-	C 60 GPb	-	-	-	-	-	1.0602	-
-	C 67 GPb/C 67 Pb	-	-	-	C 67 GPb	-	-	-	-	-	1.0606	-
-	C 75 GPb/C 75 Pb	-	-	-	C 75 GPb	-	-	-	-	-	1.0607	-

NOTE: For legend, see page Y217.

(continued)





**P4**

**Workpiece Materials Listing • Steel • P4** (continued)

P4 Alloy Steels and Tool Steels

Content: C>.25%

Tensile Strength RM (MPa)\*: 850–1400

Hardness (HB): 350–450 (HRC): 35–48

AISI**	DIN	BTS	JIS	UNS	EN	AFNOR	UNI	SIS	SAE	ASTM	Material Number	Manufacturer Reference
-	S 275 MH	-	-	-	S 275 MH	-	S 275 MH	-	-	-	1.8843	-
-	S 275 MLH	-	-	-	S 275 MLH	-	S 275 MLH	-	-	-	1.8844	-
-	S 355 MH	-	-	-	S 355 MH	-	S 355 MH	-	-	-	1.8845	-
-	S 355 MLH	-	-	-	S 355 MLH	-	S 355 MLH	-	-	-	1.8846	-
-	S 420 MH	-	-	-	S 420 MH	-	S 420 MH	-	-	-	1.8847	-
-	S 420 MLH	-	-	-	S 420 MLH	-	S 420 MLH	-	-	-	1.8848	-
-	S 460 MH	-	-	-	S 460 MH	-	S 460 MH	-	-	-	1.8849	-
-	S 460 MLH	-	-	-	S 460 MLH	-	S 460 MLH	-	-	-	1.8850	-
-	FSIE 355 OS 4/ S420G5Q	-	-	-	S 420 G 2	-	-	-	-	-	1.8853	-
-	P 550 QL	-	-	-	P 550 QL	-	-	-	-	-	1.8878	-
-	SIE 460	S 460 N	-	-	S 460 N	E 460	S 460N	-	-	-	1.8901	-
A 633 Gr. E	St E 420	S 420 N	SM 50 C	K02002	FeE 420 KGN	E 420-I	Fe E 420 KG	2143	-	-	1.8902	-
-	TSIE 460	S 460 L	-	-	S 460 NL	E460	S 460 NL	-	-	-	1.8903	-
-	S 550 Q	-	-	-	S 550 Q	E 550	S 550 Q	-	-	-	1.8904	-
A 633 Gr. E	St E 460	P 460 N	SM 53 B	K02900	P 460 N	E 460-I	Fe E 460 KG	2143	-	-	1.8905	-
-	BGH 8906	55 F	-	-	S 460 QL	S 460 QL	S 460 QL	-	-	-	1.8906	-
-	St E 500	-	SM 58	K02001	-	-	-	-	-	-	1.8907	-
-	S 460 Q	55 F	-	-	S 460 Q	E 460	S 460 Q	-	-	-	1.8908	-
-	S 420 NL/TSIE 420	S 420 NL	STK 540	K02002	S 420 NL	E 420 T-I	Fe E 420 KT	-	-	-	1.8912	-
-	ESIE 420/ S420NL1	-	STK 540	-	-	-	-	-	-	-	1.8913	-
-	S 620 Q	-	-	-	S 620 Q	E 620	S 620 Q	-	-	-	1.8914	-
-	T St E 460/ P460NL1	P 460 NL 1	-	K02900	P 460 NL1	E 460 T-I	Fe E 460 KT	-	-	-	1.8915	-
-	S 460 QL1	55 F	-	-	S 460 QL 1	-	-	-	-	-	1.8916	-
-	T St E 500	-	-	K02001	-	E 500 T-I	-	-	-	-	1.8917	-
-	ESIE 460/ P460NL2	P 460 NL 2	-	-	P 460 NL 2	P 460 NL 2	P 460 NL 2	-	-	-	1.8918	-
-	ESIE 500/ S500NL1	-	-	-	S 500 NL 1	-	-	-	-	-	1.8919	-
-	TSIE 690 VB/ S690G2QL	-	-	K11646	S 690 G 2 QL	-	-	-	-	-	1.8921	-
-	S 690 G 4 QL/ TSIE 690 VC	-	-	-	S 690 G 4 QL	-	-	-	-	-	1.8922	-
-	S 590 QL/TSIE 590 V	-	-	-	S 590 QL	-	-	-	-	-	1.8923	-
-	S 500 Q (SIE 500 V)	-	-	-	S 500 Q	E 500	S 500 Q	2614	-	-	1.8924	-
-	S 890 QL 1 (ESIE 90 V)	-	-	-	S 890 QL 1	-	-	-	-	-	1.8925	-
-	S 690 QL (TSIE 690 V)	-	SHY 685 NS	-	S 690 QL	-	-	-	-	-	1.8928	-
-	TSIE 690 VD/ S690G3QL	-	-	-	S 690 G 3 QL	-	-	-	-	-	1.8929	-
-	S 690 Q/SIE 690 V	-	SHY 685 N	-	S 690 Q	E 690	S 690 Q	-	-	-	1.8931	-
-	WSt E 420/ P420NH	S 420 NL	STK 540	K02002	S 420 NL	S 420 NL	Fe E 420 KW	-	-	-	1.8932	-
-	S 960 QL/TSIE 960 V	-	-	-	S 960 QL	-	-	-	-	-	1.8933	-
-	WSt E 460/ P460NH	P 460 NH	-	K02900	P 460 NH	P 460 NH	Fe E 460 KW	-	-	-	1.8935	-
-	P420 QH	-	-	-	P 420 QH	-	-	-	-	-	1.8936	-
-	TSIE 770 V/ S770QL	-	-	-	S 770 QL	-	-	-	-	-	1.8938	-
-	ESIE 790 V/ S790QL1	-	-	-	S 790 QL 1	-	-	-	-	-	1.8939	-
-	S 960 Q	-	-	-	S 960 Q	E 960 T-II	S 960 Q	-	-	-	1.8941	-
-	S 550 G 1 QL 1/ ESIE 350 VA	-	-	-	S 550 G 1 QL 1	-	-	-	-	-	1.8944	-
-	S 355 J 0 WP	WR 50 A	-	-	S 355 J0 WP	E 36 W-A3	S 355 J0 WP	-	-	-	1.8945	-
-	S 355 J 2 WP	S 355 J 2 WP	-	-	S 355 J2 WP	E36W-A4	S 355 J2 WP	-	-	-	1.8946	-
-	L 415 QB	-	-	-	L 415 QB	L 415 QB	-	-	-	-	1.8947	-
-	L 360 QB	-	-	-	L 360 QB	L 360 QB	-	-	-	-	1.8948	-
-	L 450 QB	-	-	-	L 450 QB	L 450 QB	-	-	-	-	1.8952	-
-	S 460 NH (FGS 47)	-	-	-	S 460 NH	-	S 460 NH	-	-	-	1.8953	-
-	ESIE620VA/S 620 G 1 QL 1	-	-	-	S 620 G 1 QL 1	-	-	-	-	-	1.8954	-
-	L 485 QB	-	-	-	L 485 QB	L 485 QB	-	-	-	-	1.8955	-
-	S 460 NLH/FG S 47	-	-	-	S 460 NLH	-	S460NLH	-	-	-	1.8956	-
-	L 555 QB	-	-	-	L 555 QB	L 555 QB	-	-	-	-	1.8957	-
-	9 CrNiCuP 3 2 4	WR 50 A	SPA-H	K11430	-	-	-	-	-	-	1.8962	-
-	WTSI 52-3	WR 50 C	SMA 58 W	K11430	S 355 J 2 G 1 W	E 36 W-A2	-	-	-	-	1.8963	-
-	ESIE 690 VA	-	-	-	S 690 G1 QL1	-	-	-	-	-	1.8964	-
-	S 355 J 2 G 2 W	S 355 J 2 G 2 W	-	-	S 355 J 2 G 2 W	S 355 J 2 G 2 W	S 355 J 2 G 2 W	-	-	-	1.8965	-
-	S 355 K 2 G 1 W	S 355 K 2 G 1 W	SMA 490 CW	-	S 355 K2 G 1 W	S 355 K2 G 1 W	S 355 K 2 G 1 W	-	-	-	1.8966	-
-	S 355 K 2 G 2 W	S 355 K 2 G 2 W	-	-	S 355 K2G2W	S 355 K 2 G 2 W	S 355 K 2 G 2 W	-	-	-	1.8967	-
-	QSIE 600 TM/S 600 MC	-	-	-	S 600 MC	E 620 D	S 600 MC	-	-	-	1.8969	-
-	SIE 415.7/L 415 NB	-	-	-	L 415 NB	L 415 NB	-	-	-	-	1.8972	-
-	SIE 415.7 TM/L 415 MB	-	-	-	L 415 MB	L 415 MB	-	-	-	-	1.8973	-
-	S 700 MC (QSIE 690 TM)	-	-	-	S 700 MC	E 690 D	S 700 MC	-	-	-	1.8974	-
-	L 450 MB/SIE 445.7 TM	-	-	-	L 450 MB	L 450 MB	-	-	-	-	1.8975	-
-	S 650 MC (QSIE 650 TM)	-	-	-	S 650 MC	E 620 D	S 650 MC	-	-	-	1.8976	-
-	L 485 MB/SIE 480.7 TM	-	-	-	L 485 MB	L 485 MB	-	-	-	-	1.8977	-
-	SIE 550.7 TM/L 555 MB	-	-	-	L 555 MB	L 555 MB	-	-	-	-	1.8978	-

(continued)



**P5** ■ Workpiece Materials Listing • Steel • P5 (continued)

P5 Ferritic, Martensitic, and PH Stainless Steels

Tensile Strength RM (MPa)\*: 600–900

Hardness (HB): <330 (HRC): <35

AISI**	DIN	BTS	JIS	UNS	EN	AFNOR	UNI	SIS	SAE	ASTM	Material Number	Manufacturer Reference
–	X 215 Cr 12	–	–	–	–	–	–	–	–	–	1.4721	–
H-12	X 10 CrAl 13	BH 12	SUS 405	T20812	X 10 CrAl 13	Z 10 C 13	X 10 CrAl 12	–	–	–	1.4724	–
430	X 10 CrAl 18	(430 S 15)	SUH 21	S43000	–	Z 10 CAS 18	(X 8 Cr 17)	–	–	–	1.4742	–
446	X 10 CrAl 25	–	SUH 442	S44600	X 10 CrAl 24	Z 10 CAS 24	X 16 Cr 26	2322	–	–	1.4762	–
–	GX 40 CrNiSi 27 4	–	–	J92605	–	–	–	–	–	–	1.4823	–
–	X 12 CrNi 22 12	311 S 94	SUS Y 309	S30980	X 15 CrNi 23 13	–	X 16 CrNi 23 14	–	–	309	1.4829	–
–	X 9 CrNiSiNc 21 11 2	–	–	–	X 9 CrNiSiNc 21-11-2	–	–	–	–	–	1.4835	–
314	X 15 CrNiSi 25 20	314 S 25	SUH 310	S31400	X 15 CrNiSi 25 20	Z 15 CNS 25 20	X 16 CrNiSi 25 20	–	–	–	1.4841	Cronifer® 2520
–	X 12 CrNi 25 20	310 S 94	–	S31080	X 12 CrNi 26 21 KE	Z 12 CN 26-21	–	–	–	–	1.4842	–
–	CrNi 25 20	–	SCS 18	S31400	–	–	–	–	–	–	1.4843	–
310 S	X 12 CrNi 25 21	310 S 24	SUS 310 S	S31008	X 8 CrNi 25 21	Z 12 CN 25 20	X 6 CrNi 25 20	2361	–	–	1.4845	ATI 310S™
HK	X 40 CrNiSi 25 20	310 C 40	SCH 21	J94204	–	–	GX 40 CrNi 26 20	–	–	–	1.4848	–
–	GX 40 NiCrSiNb 38-18	–	–	–	3072.76	–	–	–	–	–	1.4849	–
–	GX 10 NiCrNb 32 20	–	–	J95151	–	–	–	–	–	–	1.4859	–
330	X 12 NiCrSi 35 16	NA 17	SUH 330	N08330	X 12 NiCrSi 35 1 6	Z 12 NCS 37.18	–	–	–	–	1.4864	–
–	X40NiCrSi38-18	330 C 40	SCH15/SCH16	J94605	330C11/330C40/331C40	–	GX50NiCr39-19	–	–	–	1.4865	–
–	GX 50 CrNi 30-30	–	–	N08801	–	Z5NCT3220	–	–	–	–	1.4868	–
B163	X 10 NiCrAlTi 32 20	NA 15	NCF800(TP)	–	NA15(H)	Z10NC32.21	–	–	B163	–	1.4876	B163
–	X 6 NiCrNbCe 32 27	–	–	–	X 6 NiCrNbCe 32-27	–	–	–	–	–	1.4877	–
–	X 12 NiCrSi 35 19	–	–	N08830	X1 0 NiCrSi 35 19	–	–	–	–	–	1.4886	330
–	X 10 NiCrSiNb 35 22	–	–	–	X10NiCrSiNb35-22	–	–	–	–	–	1.4887	–
–	X 10 CrMoV 9 1	–	–	S59180	X 10 CrMoV 9-1	–	–	–	–	–	1.4903	–
–	X 20 CrMoV 12 1	–	–	–	X 20 CrMoV 11-1	–	X 20 CrMoV 12 01 KW	2317	–	–	1.4922	–
–	GX 22 CrMoV 12 1	–	–	–	G-X 22 CrMoV 12 1	GX23CrMoV12-1	G X 23 CrMoV 12-1	–	–	–	1.4931	–
422	X 20 CrMoWV 12 1	–	SUH 616	S42200	–	–	X 22 CrMoWV 12 1	–	–	–	1.4935	–
661	X 12 CrCoNi 21 20	–	SUH 661	R30155	–	–	–	–	–	–	1.4971	–
R30155	X 12 CrCoNiMoWnb 21 20 20	–	–	R30155	X 12 CrCoNiMoWnb 21 20 20	Z 12 CKNDWnb 21.20.20	N-155	–	–	–	1.4974	–
–	X 40 CoCrNi 20 20	–	–	–	–	Z 42 CNKDWnb	–	–	–	–	1.4977	–
403	X 6 Cr 13	403 S 17	SUS 403	S 40300	X 6 Cr 13	Z 6 C 13	X 6 Cr 13	2301	–	A240	1.4000	ATI 410S™
439	X 6 CrTi 17	–	SUS 430 LX	S 43035	X 8 CrTi 1 7	Z 8 CT 1 7	X 6 CrTi 17	–	–	–	1.4510	430 Ti
–	X 22 CrMoV 1 -1 = ST12T	–	–	–	–	–	–	–	–	A437-76 Grade B4B	–	ATI FV448™
409 Cb	–	–	–	–	–	–	–	–	–	–	–	ATI 409Cb™
436 S	–	–	–	–	–	–	–	–	–	–	–	ATI 436S™
439 HP	–	–	–	S43035	–	–	–	–	–	–	–	ATI 439 HP™
441 HP	–	–	–	–	–	–	–	–	–	–	–	ATI 441 HP™
–	–	–	–	S44735	–	–	–	–	–	A240	–	AL 29-4C®
–	–	–	–	–	–	–	–	–	–	B625	–	ATI E-BRITE®
403Cb	–	–	–	–	–	–	–	–	–	–	–	T656
420 modified	–	–	–	–	–	–	–	–	–	–	–	Stavax ESR
–	–	–	–	–	–	–	–	–	–	–	–	420HC
–	–	–	–	–	–	–	–	–	–	–	–	CPM 154
–	–	–	–	–	–	–	–	–	–	–	–	CPM® S30V®
–	–	–	–	–	–	–	–	–	–	–	–	CPM® S35VN®
420 V	–	–	–	–	–	–	–	–	–	–	–	CPM® S90V®
–	–	–	–	–	–	–	–	–	–	–	–	M390
422	–	–	–	S42200	–	–	–	–	–	–	–	616

**P6**
**Workpiece Materials Listing • Steel • P6**

 P6 High-Strength Ferritic, Martensitic, and PH Stainless Steels Tensile Strength RM (MPa)\*: 900–1350  
 Hardness (HB): 350–450 (HRC): 35–48

AISI**	DIN	BTS	JIS	UNS	EN	AFNOR	UNI	SIS	SAE	ASTM	Material Number	Manufacturer Reference
–	17-7 PH	301 S 81	SUS 631	S17700	X 7 CrNiAl 17-7	X7CrNiAl17-7; Z9CrNiAl17-07	X 7 CrNiAl 17-7	2388	–	A693	1.4564	ATI 17-7™
–	GX 22 CrNi 17	ANC 2	–	J91803	–	Z 20 CN 17.2 M	–	–	–	CB30	1.4059	–
–	GX 30 CrSi 6	–	–	–	–	–	–	–	–	–	1.4710	–
–	GX 4 CrNi 13 4	–	–	–	GX 4 CrNi 13-4	GX 4 CrNi 13-4	GX 4 CrNi 13-4	–	–	–	1.4317	–
–	GX 40 CrSi 17	–	–	–	–	–	GX 35 Cr 17	–	–	–	1.4740	–
–	GX 40 CrSi 24	–	SCH 1	–	–	–	GX 35 Cr 13	–	–	–	1.4745	–
–	GX 40 CrSi 28	452 C 11	SCH 2	J92605	–	–	GX 35 Cr 28	–	–	CC50	1.4776	–
–	X 105 CrCoMo 18 2	–	–	–	–	–	–	–	–	–	1.4528	N690
440 C	X 105CrMo 17	–	SUS 440C	S44004	X 105 CrMo 17	Z 100 CD 17	X 105 CrMo 17	–	–	–	1.4125	ATI 440C™
–	X 110 CrMoV 15	–	SUS 430 LX	–	–	Z 4 CN b 17	X 6 CrNb 17	–	–	–	1.4111	–
5718.9	X 12 CrNiMo 12	S.151	–	S64152	–	Z12CNDV12	–	–	–	–	1.4939	ATI Jethete™ M152
–	X 12 CrNiMoV 12 3	–	–	–	X 12 CrNiMoV 12-3	X 12 CrNiMoV 12-3	–	–	–	–	1.4938	T522
–	X 15 TN	–	–	–	420S25	Z40CDV16-02	X40CrMoVN16-2	–	–	F899	1.4123	X 15 TN
15-5 PH	X 15 U 5 W	–	–	S15500	–	Z6CNU15.05	–	–	–	A564/ A693/A705	1.4545	ATI 15-5™
–	X 19 CrMoNbVN 11 1	–	–	–	–	Z 21 CDBVN 11	–	–	–	–	1.4913	Jethete X19
431	X 19 CrNi 17 2	431 S 29	SUS 431	S 43100	X 19 CrNi 17 2	Z 15 CN 16.02	X 16 CrNi 16	2321	–	–	1.4057	431 (HT)
–	X 20 CrMo 17 1	–	–	–	–	–	–	–	–	–	1.4115	B17MoFe
420F Mod	X 22 CrMoNiS 13 1	–	–	–	–	–	–	–	–	–	1.4121	Bioline 4C27A
–	X 22 CrMoV 12 1	762	–	–	X 22 CrMoV 12-1	Z 21 CDV 12	X 22 CrMoV 12 1	–	–	–	1.4923	Jethete X20
420	X 29 CrS 13	416 S 37	SUS 416	–	X 29 CrS 13	Z29CrS13	X 29 CrS 13	–	–	–	1.4029	–
–	X 3 CrNiCuTi 12 9	–	–	S45500	–	–	X 6 CrNiNb 18 11	–	–	–	1.4543	ATI 455™
13-8 PH	X 3 CrNiMoAl 13 8 2	–	–	S13800	–	Z4CNDAT 13 09	–	–	–	–	1.4534	ATI 13-8Mo™
420 F	X 30 Cr 13	420 S 45	SUS420J2	S42020	X 30 Cr 13	Z 30 C 13	X 30 Cr 13	2304	–	CA40	1.4028	–
–	X 30CrMoN 15 1	–	–	–	420S45	Z33C13	–	2304	–	–	1.4108	N360
–	X 35 CrMo 17	–	–	–	X 39 CrMo 17 1	X39CrMo17-1	X 35 CrMo 17	–	–	–	1.4122	–
–	X 4 CrNiCuNb 16 4	–	–	J92200	–	Z 4 CNUNb 16.4 M	–	–	–	–	1.4540	–
415 M	X 4 CrNiMo 16 5 1	–	–	–	X 4 CrNiMo 16 5 1	Z 6 CND 16.05.01	–	2387	–	–	1.4418	APX4
–	X 40 CrNi 25 21	310 S 98	SCH 13	–	–	–	–	–	–	–	1.4846	–
–	X 40 CrSiMo 10 2	–	SUH3	–	X 40 CrSiMo 10-2	Z40CSD10	–	–	–	–	1.4731	–
420	X 45 Cr 13	(420 S45)	–	–	X 45 Cr 13	Z 40 C 14	X 40 Cr 14	–	–	–	1.4034	–
–	X 45 CrMoV 15	–	–	–	X 50 CrMoV 15	Z 50 CD 15	X 50 CrMo V 15	–	–	–	1.4116	UGI 4116N
HNV3	X 45 CrSi 9 3	–	SUH1	–	401S45	Z45CS9	X45CrSi8	–	HNV3	–	1.4718	–
HNV 2	X 45 SiCr 4	–	–	S64006	–	–	–	–	–	–	1.4704	–
CA 6-NM	X 5 CrNi 134	425 C 11	SCS 5	J91540	X 3 CrNiMo 13 4	Z 4 CDN 13.4	X 6 CrNi 13 04	2385	–	–	1.4313	–
630	X 5 CrNiCuNb 16 4	–	SUS 630	–	X 5 CrNiCuNb 16-4	Z6CNU17.04	–	–	–	CB7Cu	1.4542	UGIMA® 4542
17-4 PH	X 5 CrNiCuNb 17 4 4	–	SUS 630	S17400	X 5 CrNiCuNb 16-4	X5CrNiCuNb16.4	–	–	–	A693	1.4548	–
–	X 5 CrNiMoCuNb 14 5	–	–	–	X 5 CrNiMoCuNb 14-5	X 5 CrNiMoCuNb 14-5	X 5 CrNiMoCuNb 14-5	–	–	–	1.4594	–
–	X 50 CoCrNi 20 20	–	–	–	–	–	–	–	–	–	1.4978	–
EV8	X 53 CrMnNiN 2 9	349 S 54	SUH35/SUH36	S63008	349S54	Z52CMN21.09	X53CrMnNiN21-9	–	EV8	–	1.4871	–
–	X 55 CrMo 14	–	–	–	–	Z 50 CD 13	–	–	–	–	1.4110	–
–	X 60 CrMnMoVNBn 21 10	–	–	–	–	Z 60 CMDVNB 21-10 Az	–	–	–	–	1.4785	–
440 A	X 65 CrMo 14	–	SUS 440A	S44002	X 70 CrMo 15	Z 70 CD 14	–	–	–	–	1.4109	ATI 440A™
–	X 7 CrNiAl 17 7	301 S 81	SUS 631	S17700	X 7 CrNiAl 17-7	X7CrNiAl17-7; Z9CrNiAl17-07	X 7 CrNiAl 17-7	2388	–	A693	1.4568	–
632	X 7 CrNiMoAl 15 7	–	–	S15700	–	–	–	–	–	–	1.4574	PH 15-7 Mo®
–	X 8 CrCoNiMo 10 6	Z 9 CKD 11	–	–	S152	Z10CKD10	–	–	–	–	1.4911	ATI FV535™
15-7 PH	X 8 CrNiMoAl 15 7 2	–	–	S15700	X 8 CrNiMoAl 15-7-2	Z8CNDAT15.07	X 8 CrNiMoAl 15-7-2	–	–	A693	1.4532	ATI 15-7™
HNV 6	X 80 CrNiSi 20	443 S 65	SUH 4	S65006	X 80 CrNiSi 20	Z 80 CSN 20.02	X 80 CrSiNi 20	–	–	–	1.4747	–
–	X 85 CrMoV 18 2	–	–	–	X 85 CrMoV 18 2	Z 85 CDMV 18.02	X 85 CrMoV 19 3	–	–	–	1.4748	–
440 B	X 90 CrMoV 18	409 S 1 9	SUS 440 B	S44003	X 90 CrMoV 18	Z 3 CT 1 2	X 6 Cr Ti 1 2	–	–	–	1.4112	–
–	X45CrNiW18-9	331 S 40	SUH31	–	X 45 CrNiW 18 9	Z35CNWS14.14	X45CrNiW18-9	–	–	–	1.4873	–

NOTE: For legend, see page Y217.





**M2**
**Workpiece Materials Listing • Stainless Steel • M2 (continued)**
*M2 High-Strength Austenitic Stainless and Cast Stainless Steels Tensile Strength RM (MPa)\*: 600–800*
*Hardness (HB): 150–230 (HRC): <25*

AIISI**	DIN	BTS	JIS	UNS	EN	AFNOR	UNI	SIS	SAE	ASTM	Material Number	Manufacturer Reference
-	X 1 CrNiMoN 25 22 2	-	-	-	725 LN	DMV 25.22.2	X 1 CrNiMoN 25-22-2	-	-	-	1.4466	-
-	X 1 NiCrMoCuN 25 20 6	-	-	-	-	-	-	-	-	-	1.4529	Uranus B26 6Mo
-	GX 2 NiCrMoCuN 25 20	-	-	J94650	GX 2 CrNiMoCuN 25-20-6	-	-	-	-	-	1.4536	-
-	X 1 CrNiMoCuN 25 25 5	-	-	-	X 1 CrNiMoCuN 25-25-5	X 1 CrNiMoCuN 25-25-5	X 1 CrNiMoCuN 25-25-5	-	-	-	1.4537	-
321	X 6 CrNiTi 18 10	321 S 12	SUS 321	S32100	X 6 CrNiTi 18 10	Z 6 CNT 18.10	X 6 CrNiTi 18 11	2337	-	-	1.4541	ATI 321™
321	A 700	304 S 31	-	J92630	-	Z 10 CNT 18 11	X 6 CrNiTi 18 11	-	-	-	1.4544	-
-	X 1 CrNiMoCuN 20 18 7	X 1 CrNiMoCuN 20 18 7	-	S31254	X 1 CrNiMoCuN 20-18-7	X 1 CrNiMoCuN 20-18-7	X 1 CrNiMoCuN 20-18-7	-	-	-	1.4547	Uranus B25 6Mo
-	X 2 NiCrAlTi 32 20	-	NCF 800 TB	-	-	-	-	-	-	-	1.4558	-
-	X 1 NiCrMoCuN 31 27 4	-	-	-	X 1 NiCrMoCu 31 27 4	X 1 NiCrMoCuN 31-27-4	X 1 NiCrMoCuN 31-27-4	2584	-	-	1.4563	-
-	X 3 CrNiCu 18 9 4	394 S 17	SUS XM7	-	X3CrNiCu18-9-4	304CU	304K	-	-	-	1.4567	-
316 Ti	X 6 CrNiMoTi 17 12 2	320 S 31	SUS 316Ti	-	X 6 CrNiMoTi 17 12 2	Z 6 CNDT 17.12	X 6 CrNiMoTi 17 12	2350	-	-	1.4571	ATI 316Ti™
-	GX 5 CrNiMoNb 23 9	-	-	-	-	-	-	-	-	-	1.4572	-
316 Ti	X 10 CrNiMoTi 18 12	320 S 33	SUS 316Ti	S31635	-	-	X 6 CrNiMoTi 17 13	-	-	-	1.4573	-
318	X 10 CrNiMoNb 18 12	-	-	-	-	-	X 6 CrNiMoNb 17 13	-	-	-	1.4583	-
-	X 2 CrNiCu 19 10	-	-	-	X 2 CrNiCu 19-10	TX 304L	-	-	-	-	1.4650	-
-	XCrNiMoCuN24-22-8	-	-	S32654	-	-	-	-	-	-	1.4652	654 SMO®
-	153 MA	-	-	S30415	X 6 CrNiSiN 19 10	-	-	-	-	-	1.4618	153 MA™
-	X 20 CrNiSi 25 4	-	-	S44635	X 15 CrNiSi 25 4	Z 20 CNS 25.04	X 20 CrNiSi 25 4	-	-	-	1.4821	-
309	X 15 CrNiSi 20 12	309 S 24	SUH 309	S30900	X 15 CrNiSi 20 12	Z 15 CNS 20.12	X 16 CrNiSi 25,20	-	-	-	1.4828	ATI 309™
309 S	X 7 CrNi 23 14	309 S 24	SUS 309 S	J93400	X 12 CrNi 23 13	Z 15 CN 24.13	X 6 CrNi 23 14	-	-	-	1.4833	-
-	353 MA	-	-	S35315	X 6 NiCrSiN 35-25	-	-	-	-	-	1.4854	353 MA®
-	X 8 NiCrSi 38 18	NA 17	-	NO8330	-	Z 12 NCS 37.18	-	-	-	-	1.4862	-
-	X 33 CrNiMnN 23 8	-	-	-	X 33 CrNiMnN 23-8	X 33 CrNiMnN 23-8	-	-	-	-	1.4866	-
EV 12	X 55 CrMnNiN 20 8	-	-	S63012	X 55 CrMnNiN 20-8	Z 55 CMN 20.08 Az	-	-	-	-	1.4875	-
321	X 12 CrNiTi 18 9	321 S 20	SUS 321	S32100	X 10 CrNiTi 18 10	Z 6 CNT 18.12	X 6 CrNiTi 18.11	2337	-	-	1.4878	ACX315
EV 11	X 70 CrMnNiN 21 6	-	-	S63011	-	-	X 70 CrMnNiN 21 6	-	-	-	1.4881	-
-	X 50 CrMnNiNbN 21 9	-	-	-	X 50 CrMnNiNbN 21-9	Z 50 CMNNb 21.09	-	-	-	-	1.4882	-
-	X 7 CrNiNb 18 10	-	SUS347H	S34709	X7CrNiNb18-10	X7CrNiNb18-10	-	-	-	-	1.4912	-
316 H	X 6 CrNiMo 17 13	316 S 51	-	S31609	X 6 CrNiMo 17 12 2	Z 6 CND 17-13 B	-	-	-	-	1.4919	-
321 H	X 8 CrNiTi 18 10	-	-	-	X 6 CrNiTiB 18-10	Z 6 CNT 18-10 B	X 6 CrNiTiB 11	-	-	-	1.4941	-
A660	X 4 NiCrTi 25 15	HR251	SUH 660	S66286	-	Z 6 NCTDV 25.15 B	-	-	-	-	1.4943	Discalloy
-	X 6 CrNiWb 16 16	-	-	-	-	-	-	-	-	-	1.4945	-
-	X 6 CrNi 18 11	304 S 51	-	S30480	X 6 CrNi 18 10	Z 6 CN 18-09	X 5 CrNi 18 10 KW	2333	-	-	1.4948	-
-	X 6 CrNi 25 20	-	-	-	310 H	-	-	-	-	-	1.4951	-
-	X 8 CrNiNb 16 13	347 S 51	-	-	-	-	-	-	-	-	1.4961	-
-	Esshete 12 50	-	-	S21500	X 10 CrNiMoMnNbVB 15-10-1	X 10 CrNiMoMnNbVB 15-10-1	-	-	A213	-	1.4982	Esshete 1250
-	X 8 CrNiMoNb 16 16	-	-	-	X 7 CrNiMoNb 16-16	-	-	-	-	-	1.4986	-
301	X 12 CrNi 17 7	301 S 21	SUS 301	S30100	X 12 CrNi 17 7	Z 12 CN 17.07	X 12 CrNi 17 07	2331	-	-	1.4310	ATI 301™
-	GX 40 CrNi 27 4	-	-	J92615	-	-	GX 35 CrNi 28 05	-	-	-	1.4340	-
304	X 5 CrNi 18 9	304 S 31	SUS 304	S30400	1	Z6CN18.09	X5CrNi1810	2332/2333	-	A276	1.4350	ATI 304™
-	X 15 CrNiMn 18 8	307 S 98	-	-	X 15 CrNiMn 18 08 KE	Z 8 CNM 19-09-07	-	-	-	-	1.4370	-
S32750	GX 10 CrNiMo 18 9	-	SCS 14 A	S32750	X 2 CrNiMoN 25-7-4	Z 5 CND 20.10 M	X 2 CrNiMoN 25-7-4	-	-	-	1.4410	-
-	X 5 CrNiMo 18 11	315 S 16	-	-	-	-	-	2340	-	-	1.4420	-
347	X 6 CrNiNb 18 10	347 S 17	SUS 347	S34700	X 6 CrNiNb 18 10	Z 6 CNnb 18.10	X 6 CrNiNb 18 11	2338	-	-	1.4550	ATI 347™
316 Cb	X 6 CrNiMoNb 17 12 2	318 S 17	-	-	X 6 CrNiMoNb 17 12 2	Z 6 CNDNb 17.12	X 6 CrNiMoNb 17 12	-	-	-	1.4580	-
-	X 3 CrNiMoN 17 13	-	-	-	X 3 CrNiMoN 17-13-3	-	X 2 CrNiMoN 17 12	-	-	-	1.4910	-
-	X 6 CrNi 23 13	-	-	-	309 H	-	-	-	-	-	1.4950	-
A286	X 6 NiCrTiMoVB 25-15-2	286 S 31	-	S66286	X 6 NiCrTiMoVB 21-15-2	-	-	-	-	-	1.4980	Incoloy A 286
XM-19	-	-	-	S20910	-	-	-	-	-	F1314	-	ATI XM-19™
303 plus X	-	-	-	S30310	-	-	-	-	-	XM-5	-	303 plus X
-	X 2 CrNi 18 13 3	-	-	-	-	-	-	-	-	-	-	Staybrite® 4435NcU
218	-	-	-	S21800	-	-	-	-	-	-	-	Nitronic 60
201LN	-	-	-	S20153	-	-	-	-	-	-	-	ATI 201LN™-MIL
-	X 2 CrNiMoN 17 13 3	-	-	-	-	Z 2 CND 17.13	X 2 CrNiMoN 17 13 3	-	-	-	-	AL 316LXN
-	-	-	-	S31675	-	-	-	-	F1586	-	-	ATI REX 734™
-	-	-	-	-	-	-	-	-	-	-	-	P558
-	X 1 NiCrMoCu 22 24 6	-	-	-	-	-	-	-	-	-	-	Uranus B66
-	-	-	-	-	-	-	-	-	-	-	-	ATI Datalloy 2®
-	-	-	-	-	-	-	-	-	-	-	-	ATI Staballoy® AG17®
-	-	-	-	-	-	-	-	-	-	-	-	P530
-	X 1 NiCrMoCu 31 27 4	-	-	NO8028	-	-	-	-	-	-	-	Uranus B28
-	-	-	-	-	-	-	-	-	-	-	-	P750
-	-	-	-	-	-	-	-	-	-	-	-	P750-I
-	X 4 CrNiMoN 21 9 4	-	-	-	-	-	-	-	F1586	-	-	M30NW
-	-	-	-	-	-	-	-	-	-	-	-	P550
-	-	-	-	-	-	-	-	-	-	-	-	P580
-	-	-	-	-	-	-	-	-	-	-	-	P650
-	-	-	-	-	-	-	-	-	-	-	-	ATI Datalloy HP™

NOTE: For legend, see page Y217.

**M3** ■ Workpiece Materials Listing • Stainless Steel • M3

M3 Duplex Stainless Steel      Tensile Strength RM (MPa)\*: <800      Hardness (HB): 135–275 (HRC): <30

AISI**	DIN	BTS	JIS	UNS	EN	AFNOR	UNI	SIS	SAE	ASTM	Material Number	Manufacturer Reference	
–	GX 120 CrMo 29 2	–	–	–	–	–	–	–	–	F30M	1.4138	PK324	
–	X 2 CrNiNIN 21 5 1	–	–	S32101	–	–	–	–	–	–	1.4162	LDX2101	
–	GX 6 CrNiN 26 7	–	–	–	GX 6 CrNiN 26-7	–	–	–	–	–	1.4347	–	
S32304	X 2 CrNiN 23 4	–	–	S32304	SAF 2304	35 N	X 2 CrNiN 23-4	2327	–	A240	1.4362	ATI 2304™	
S31500	X 2 CrNiMoSi 19 5	–	–	S39215	GX 2 CrNiMoN 25-7-3	–	GX 2 CrNiMoN 25-7-3	2376	–	–	1.4417	–	
S31803	X 2 CrNiMoN 22 5 3	318 S 13	SUS 329J 3L	S31803, S32205	X 2 CrNiMoN 22 5 3	Z 3 CND 22.05 AZ	X 2 CrNiMoN 22-5-3	2377	F51	2205	1.4462	ATI 2205™	
–	GX 6 CrNiMo 24 8 2	–	–	–	–	–	–	–	–	–	1.4463	–	
–	GX 2 CrNiMoN 25 6 3	–	–	–	GX 2 CrNiMoN 25-6-3	–	GX 2 CrNiMoN 25-6-3	–	–	–	1.4468	–	
–	GX 2 CrNiMoN 26 7 4	–	–	J93404	GX 2 CrNiMoN 26-7-4	–	GX 2 CrNiMoN 26-7-4	–	–	–	1.4469	–	
–	X 2 CrNiMoCuWN 25 7 4	–	–	S32760	X 2 CrNiMoCuWN 25 7 4	–	X 2 CrNiMoCuWN 25-7-4	–	–	F 55	1.4501	F55	
2507	X 2 CrNiMoCuN 25 6 3	–	–	–	X 2 CrNiMoCuN 25-6-3	–	DMV25.7Cu	329SK	–	–	1.4507	Uranus 52N+	
–	GX 2 CrNiMoCuWN 25 8 4	–	–	–	X 6 CrNiCu 18 10 4 KD	Z 4 CNUD 17-11-03 FF	–	–	–	–	1.4508	–	
–	GX 2 CrNiMoCuN 25 6 3 3	–	–	–	GX 2 CrNiMoCuN 25-6-3-3	–	GX 2 CrNiMoCuN 25-6-3-3	–	–	–	1.4517	–	
–	X 4 CrNiMoNb 25 7	–	SCS 22	–	–	–	–	–	–	–	1.4582	PK343	
–	BGH 4593	–	–	–	GX 3 CrNiMoCuN 24 6 2 3	–	–	–	–	–	1.4593	Nordur®	
329	X 4 CrNiMo 27 5 2	–	SUS 329 J1	S32900	X 3 CrNiMo 27 5 2	–	X 2 CrNiMo 25-7-3	X 3 CrNiMo 27-5-2	2324	–	A240	1.4460	10RE51
–	GX 2 CrNiMoN 22 5 3	–	–	–	GX 2 CrNiMoN 22-5-3	–	GX 2 CrNiMoN 22-5-3	–	–	–	1.4470	–	
S32550	–	–	–	S32550	–	–	–	–	–	–	–	Ferrallium® alloy 255	
–	–	–	–	S32003	–	–	–	–	–	–	–	ATI 2003®	
–	–	–	–	S80211	–	–	–	–	–	–	–	ATI 2102™	
–	–	–	–	S32550	–	–	–	–	–	–	–	ATI 255™	
–	–	–	–	S34565	–	–	–	–	–	–	–	ATI 4565™	
–	X 2 CrNiMoN 25 6 3	–	–	–	–	–	–	–	–	–	–	Uranus 47N+	
–	–	–	–	–	–	–	F60	–	–	32760	–	Zeron® 100	

Cast Iron

**K1** ■ Workpiece Materials Listing • Cast Iron • K1

K1 Grey Cast Iron      Tensile Strength RM (MPa)\*: 125–500      Hardness (HB): 120–290 (HRC): <32

AISI**	DIN	BTS	JIS	UNS	EN	AFNOR	UNI	SIS	SAE	ASTM	Material Number	Manufacturer Reference
–	GG-150HB	–	–	–	GJL-HB 170	–	–	–	–	–	0.6012	–
A48-25 B	GG-15	Grade 150	FC 150	–	GJL-150	FGL 150	G 15	0115-00	–	A 48 Class 25	0.6015	–
–	GG-170HB	–	–	NO6985	GJL-HB 205	–	–	–	–	–	0.6017	–
–	GG-190HB	–	–	NO6022	GJL-HB 230	–	–	–	–	–	0.6022	–
A48-35 B	GG-25	Grade 260	FC 250	–	GJL-250	FGL 250	G 25	0125-00	–	A 48 Class 35	0.6025	–
–	GG-26	–	FC260	–	–	–	G 26	0126-00	–	–	0.6026	–
–	GG-220HB	–	–	W06027	GJL-HB 250	FGL 250	–	–	–	–	0.6027	–
–	GG-240HB	–	–	–	GJL-HB 275	–	–	–	–	–	0.6032	–
A48-50 B	GG-35	Grade 350	FC 350	–	GJL-350	FGL 350	G 35	0135-00	–	A 48 Class 50	0.6035	–
–	GG-260HB	–	–	–	GJL-HB 275	–	–	–	–	–	0.6037	–
A48-20 B	GG-10	Grade 100	FC 100	–	GJL-100	FGL 100	G 10	0110-00	–	A 48 Class 20	0.6010	–
A48-30 B	GG-20	Grade 220	FC 200	W06020	GJL-200	FGL 200	G 20	0120-00	–	A 48 Class 30	0.6020	–
A48-45 B	GG-30	Grade 300	FC 300	–	GJL-300	FGL 300	G 30	0130-00	–	A 48 Class 45	0.6030	–
A48-55 B	GG-40	Grade 400	–	–	GJL-400	FGL 400	–	0140-00	–	A 48 Class 55	0.6040	–
A48-40	–	–	–	–	–	–	–	–	–	A 48 Class 40	–	–
A48-60	–	–	–	–	–	–	–	–	–	A 48 Class 60	–	–
–	–	–	–	–	–	–	–	–	G1800	A 159 G1800	–	–
–	–	–	–	–	–	–	–	–	G3000	A 159 G3000	–	–
–	–	–	–	–	–	–	–	–	G10H18	A 159 G3000	–	–
–	–	–	–	–	–	–	–	–	G11H18	A 159 G3000	–	–
–	–	–	–	–	–	–	–	–	G3500	A 159 G3500	–	–
–	–	–	–	–	–	–	–	–	G11H20	A 159 G3500	–	–
–	–	–	–	–	–	–	–	–	G4000	A 159 G4000	–	–
–	–	–	–	–	–	–	–	–	G13H19	A 159 G4000	–	–
–	–	–	–	–	–	–	–	–	G12H21	A 159 G4000	–	–
–	–	–	–	–	–	–	–	–	G9H12	A 159 G1800	–	–
–	GG-26-Cr	–	–	–	–	–	–	–	–	–	–	–
–	GG-25-Cr	–	–	–	–	–	–	–	–	–	–	–

**K2****Workpiece Materials Listing • Cast Iron • K2**K2 Low- and Medium-Strength Ductile Irons (Nodular Irons) and Compacted Graphite Irons (CGI)  
Hardness (HB): 130–260 (HRC): <28

Tensile Strength RM (MPa)\*: &lt;600

AISI**	DIN	BTS	JIS	UNS	EN	AFNOR	UNI	SIS	SAE	ASTM	Material Number	Manufacturer Reference
–	GGL-NiMn137	L-NiMn 13 7	FCA NiMn 13 7	F43000	GJLA-XNiMn 13-7	L-NM 13 7	–	–	–	–	0.6652	–
A 436 Type 1	GGL-NiCuCr1562	L-NiCuCr 15 6 2	FCA-NiCuCr 15 6 2	F41000	GJLA-XNiCuCr 15-6-2	L-NUC 15 6 2	–	–	–	–	0.6655	–
A 436 Type 1b	GGL-NiCuCr1563	L-NiCuCr 15 6 3	FCA-NiCuCr 15 6 3	F41001	GJLA-XNiCuCr 15-6-3	L-NUC 15 6 3	–	–	–	–	0.6656	–
A 436 Type 2b	GGL-NiCr203	L-NiCr 20 3	FCA-NiCr 20 3	F41003	GJLA-XNiCr 20-3	L-NC 20 3	–	–	–	–	0.6661	–
–	GGL-NiSiCr2053	L-NiSiCr 20 5 3	FCA-NiSiCr 20 5 3	–	GJLA-XNiSiCr 20-5-3	L-NSC 20 5 3	–	–	–	–	0.6667	–
A 436 Type 3	GGL-NiCr303	L-NiCr 30 3	FCA-NiCr 30 3	F41004	GJLA-XNiCr 30-3	L-NC 30 3	–	–	–	–	0.6676	–
–	GGG-35.3	–	–	–	GJS-350-22	–	–	0717-15	–	–	0.7033	–
–	GGG-40.3	SNG 370/17	FCD 370	–	GJS-400-18	FGS 370-17	GSO 42/15	0717-15	–	–	0.7043	–
–	GGG-45	–	FCD 450	–	–	–	–	–	–	–	0.7045	–
–	–	–	–	–	–	FGS450.10	–	–	–	–	0.7049	–
–	GGG-65	–	–	–	–	–	–	–	–	–	0.7065	–
–	GGG-NiMn137	S-NiMn 13 7	FCDA-NiMn 13 7	–	GJSA-XNiMn 13-7	S-Mn 13 7	–	0772-00	–	–	0.7652	–
–	GGG-NiCrNb202	S2W	FCDA-NiCrNb 20 2	–	GJSA-XNiCrNb 20-2	–	–	–	–	–	0.7659	–
A 439 Type D-2B	GGG-NiCr203	S-NiCr 20 3	FCDA-NiCr 20 3	F43001	GJSA-XNiCr 20-3	–	–	–	–	–	0.7661	–
–	GGG-NiSiCr2052	S-NiSiCr 20 5 2	FCDA-NiSiCr 20 5 2	–	GJSA-XNiSiCr 20-5-2	S-NSC 20 5 2	–	–	–	–	0.7665	–
A 571 Type D-2M	GGG-NiMn234	S-NiMn 23 4	FCDA-NiMn 23 4	–	GJSA-XNiMn 23-4	S-NM 23 4	–	–	–	–	0.7673	–
A 439 Type D-3	GGG-NiCr303	S-NiCr 30 3	FCDA-NiCr 30 3	F43003	GJSA-XNiCr 30-3	S-NC 30 3	–	–	–	–	0.7676	–
A 439 Type D-3A	GGG-NiCr301	S-NiCr 30 1	FCDA-NiCr 30 1	F43004	GJSA-XNiCr 30-1	S-NC 30 1	–	–	–	–	0.7677	–
–	GGG-NiSiCr3055	–	FCDA-NiSiCr 30 5 5	–	GJSA-XNiSiCr 30-5-5	–	–	–	–	–	0.7679	–
A 439 Type D-5	GGG-Ni35	S-Ni 35	FCDA-Ni 35	F43006	GJSA-XNi 35	S-N 35	–	–	–	–	0.7683	–
A 439 Type D-5A	GGG-NiCr353	S-NiCr 35 3	FCDA-NiCr 35 3	F43007	GJSA-XNiCr 35-3	S-NC 35 3	–	–	–	–	0.7685	–
–	GGG-NiSiCr3552	–	FCDA-NiSiCr 35 5 2	–	GJSA-XNiSiCr 35-5-2	FGS Ni35 Si 5 Cr2	–	–	–	–	0.7688	–
–	GTW-35-04	W 35-04	FCMW 330 class 1	–	GJMW-35-0-4	MB 35-7	W 35-04	–	–	–	0.8035	–
–	GTW-S-38-1 2	W 38-12	–	–	GJMW-360-12	MB 300-12	–	–	–	–	0.8038	–
–	GTW-45-07	W 45-07	FCMWP 440 class 3	–	GJMW-450-7	MB 450-7	GMB 45	–	–	–	0.8045	–
–	GTW-55	–	–	–	–	–	GMB 55	–	–	–	0.8055	–
–	GTW-65	–	–	–	–	–	GMB 65	–	–	–	0.8065	–
32510	GTS-35-10	B 340/12	FCMP 330	–	GJMB-350-10	MN 350-10	–	815	–	–	0.8135	–
40010	GTS-45-06	P 440/7	FCMP 440	–	GJMB-450-6	MN 450 - 6	P 45-06	852	–	–	0.8145	–
50005	GTS-55-04	P 510/4	FCMP 490	–	GJMB-550-4	MN 550-4	P 55-04	854	–	–	0.8155	–
70003	GTS-65-02	P 570/3	FCMP 540	–	GJMB-650-2	MN 650-3	P 65-02	0858-00, 0856-00	–	–	0.8165	–
90001	GTS-70-02	P 690/2	FCMP 690	–	GJMB-700-2	MN 700-2	P 70-02	0862-03, 0864-03	–	–	0.8170	–
–	GGV-30	–	–	–	GJV-300	–	–	–	–	–	0.9991	–
A 436 Type 2	GGL-NiCr202	L-NiCr 20 2	FCA-NiCr 20 2	F41002	GJLA-XNiCr 20-2	L-NC 20 2	–	0523-00	–	–	0.6660	–
A 436 Type 4	GGL-NiSiCr3055	L-NiSiCr 30 5 5	FCA-NiSiCr 30 5 5	F41005	GJLA-XNiSiCr 30-5-5	L-NSC 30 5 5	–	–	–	–	0.6680	–
60-40-18	GGG-40	SNG 420/12	FCD 400 class 1	F32800	GJS-400-15	FGS400-12	GS400-12	0717-02	60-40-18	60-40-18	0.7040	–
65-45-12	GGG-50	SNG 500/7	FCD 500	F33100	GJS-500-7	FGS 500-7	GS 500/7	0727-02	65-45-12	65-45-12	0.7050	–
–	GGG-60	SNG 600/3	FCD 600-3	–	GJS-600-3	–	GS 600/3	–	80-55-06	80-55-06	0.7060	–
100-70-03	GGG-70	SNG 700/2	FCD 700	F34800	GJS-700-2	FGS 700-2	GS 700-2	0737-01	100-70-03	100-70-03	0.7070	–
120-90-02	GGG-80	SNG 800/2	FCD 800	F36200	GJS-800-2	FGS 800-2	GS 800-2	–	120-90-02	120-90-02	0.7080	–
A 439 Type D-2	GGG-NiCr202	L-NiCuCr 20 2	FCDA-NiCr 20 2	–	GJSA-XNiCr 20-2	L-NC 20 2	–	0523-00	–	–	0.7660	–
A 439 Type D-2C	GGG-Ni22	S-Ni 22	FCDA-Ni 22	F43002	GJSA-XNi 22	S-N 22	–	–	–	–	0.7670	–
A 439 Type D-4	GGG-NiSiCr3053	S-NiSiCr 30 5 3	FCDA-NiSiCr 30 5 4	F43005	GJSA-XNiSiCr 30-5-3	S-NSC 30 5 3	–	–	–	–	0.7680	–
–	GTW-40-05	W 40-05	FCMW 370	–	GJMW-400-5	MB 400-5	GMB 40	–	–	–	0.8040	–
–	GGV-40	–	–	–	GJV-400	–	–	–	–	–	0.9990	–
80-55-06	–	–	–	F33800	–	FGS 350-22	–	0732-03	D5506	–	–	–
–	–	–	–	–	–	–	–	–	D4018	–	–	–
–	–	–	–	–	–	–	–	–	D400	–	–	–
–	–	–	–	–	–	–	–	–	D4512	–	–	–
–	–	–	–	–	–	–	–	–	D450	–	–	–
–	–	–	–	–	–	–	–	–	M3210	–	–	–
–	–	–	–	–	–	–	–	–	M4504	–	–	–
–	–	–	–	–	–	–	–	–	M5003	–	–	–
–	–	–	–	–	–	–	–	–	M5503	–	–	–
–	–	–	–	–	–	–	–	–	M7002	–	–	–
–	–	–	–	–	–	–	–	–	D7003	–	–	–
–	GGV-45	–	–	–	GJV-450	–	–	–	M8501	A 602 M8501	–	–
–	GGG-SiMo3.08	–	–	–	–	–	–	–	–	–	–	–
–	GGG-SiMo4.10	–	–	–	–	–	–	–	–	–	–	–
–	GGG-SiMo5.10	–	–	–	–	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–	–	–	–	–	–
–	GGV-35	–	–	–	GJV-350	–	–	–	–	–	–	HPI C13 06
–	GGV-50	–	–	–	GJV-500	–	–	–	–	–	–	–

**K3****Workpiece Materials Listing • Cast Iron • K3**

K3 High-Strength Ductile Irons and Austempered Ductile Iron (ADI)

Tensile Strength RM (MPa)\*: &gt;600

Hardness (HB): 180–350 (HRC): &lt;43

AISI**	DIN	BTS	JIS	UNS	EN	AFNOR	UNI	SIS	SAE	ASTM	Material Number	Manufacturer Reference
–	–	–	–	–	–	–	–	–	–	A 897 125-80-10	–	–
–	–	–	–	–	–	–	–	–	–	A 897 150-100-7	–	–
–	–	–	–	–	–	–	–	–	–	A 897 175-125-4	–	–
–	–	–	–	–	–	–	–	–	–	A 897 200-150-1	–	–
–	–	–	–	–	–	–	–	–	–	A 897 230-185	–	–

NOTE: For legend, see page Y217.

**N1**

Workpiece Materials Listing • Non-Ferrous Metals • N1

N1 Wrought Aluminium

AISI**	DIN	BTS	JIS	UNS	EN	AFNOR	UNI	SIS	SAE	ASTM	Material Number	Manufacturer Reference
1080	Al99.8	-	1A	-	-	-	-	-	-	-	3.0128	-
1050	Al99.5	L 31	1B	-	-	A 59050 C	-	-	-	-	3.0255	-
-	SG-Al 99.5	-	-	-	-	-	-	-	-	-	3.0259	-
1070	Al99.7	-	-	-	-	-	4508	-	-	-	3.0275	-
3103	AlMn	-	N3	-	-	-	-	-	-	-	3.0515	-
3003	AlMnCu	-	-	-	-	-	-	-	-	-	3.0517	-
3005	AlMn1Mg0.5	-	-	-	-	-	-	-	-	-	3.0525	-
3004	AlMn1Mg1	-	-	-	-	-	-	-	-	-	3.0526	-
-	AlMgSiPb	-	-	-	-	-	-	-	-	-	3.0615	-
-	SG-Al 99.5Ti	-	-	-	-	-	-	-	-	-	3.0805	-
-	SG-Al 99.5 Ti	-	-	-	-	-	-	-	-	-	3.0805	-
2014	AlCuSiMn	-	H15	-	-	A-U4SG	3581	-	-	-	3.1255	-
2017	AlCuMg 1	-	-	-	AW-2017 A	A-U4G	3579	-	-	-	3.1325	-
2024	AlCuMg 2	-	L97	-	AW-2024	A-U4G1	-	-	-	-	3.1355	-
-	AlCuMgPb	-	-	-	-	-	-	-	-	-	3.1645	-
2011	AlCuBiPb	-	FC1	-	-	A-USPbBi	6362	-	-	-	3.1655	-
6082	AlMgSi 1	-	H30	-	AW-6005 A	A-SGMO.7	3571	-	-	-	3.2315	-
6060	AlMgSi0.5	-	-	-	-	-	-	-	-	-	3.3206	-
6063	AlMgSi0.7	-	H9	-	-	A-GS	3569	-	-	-	3.3206	-
6463	EAlMgSi0.5	-	91E	-	-	-	-	-	-	-	3.3207	-
5005	AlMg 1	-	N41	-	AW-6082	A-G0.6	5764-66	-	-	-	3.3315	-
5050	AlMg 1	-	-	-	-	-	-	-	-	-	3.3316	-
5052	AlMg2.5	-	2L56	-	-	A-G2.5C	4574	-	-	-	3.3523	-
5754	AlMg 3	-	N5	-	-	A-G3M	3575	-	-	-	3.3535	-
5454	AlMg2.5Mn	-	N51	-	-	A-G2.5MC	7789	-	-	-	3.3537	-
5086	AlMg4Mn	-	-	-	-	-	-	-	-	-	3.3545	-
-	SG-Al Mg 4.5 Mn Zr	-	-	-	-	-	-	-	-	-	3.3546	-
5083	AlMg4.5Mn	-	N8	-	-	A-G4.5MC	7790	-	-	-	3.3547	-
5056	AlMg5	-	N6	-	-	A-G5	3576	-	-	-	3.3549	-
-	AlMg 5	-	-	-	-	-	-	-	-	-	3.3555	-
7050	AlZnMgCu0.5	L 86	-	-	-	AZ 4 GU/9051	811-04	-	-	-	3.4144	-
7020	AlZn4.5Mg1	-	H17	-	-	A-Z5G	-	-	-	-	3.4335	-
7022	AlZnMgCu0.5	-	-	-	-	-	-	-	-	-	3.4345	-
-	AlZn5.5MgCu	-	-	-	-	-	-	-	-	-	3.4365	-
7075	AlZnMgCu 1.5	-	DTD5074	A97075	AL-P7075	A-Z5GU	3735	-	7075	-	3.4365	-
1000	Al99.5H	L31	-	-	-	A59050C	-	-	-	-	3.0250	-
-	Al99.8	-	-	-	-	-	-	-	-	-	3.0280	-
-	AlMg3Mn	-	-	-	-	-	-	-	-	-	-	-
2025	-	-	A 2025 FD	A92025	-	-	-	-	2025	B 247 2025	-	-
1100	-	-	-	-	-	-	-	-	-	-	-	-
3105	-	-	-	-	-	-	-	-	-	-	-	-
5657	AlMg0.8Si	-	-	-	-	-	-	-	-	-	-	-
6070	-	-	-	-	-	-	-	-	-	-	-	-
6262	-	-	-	-	-	-	-	-	-	-	-	-
7003	-	-	-	-	-	-	-	-	-	-	-	-
2050	-	-	-	-	-	-	-	-	-	-	-	-
7475	-	-	-	-	-	-	-	-	-	-	-	-
7175	-	-	-	-	-	-	-	-	-	-	-	-
7178	-	-	-	-	-	-	-	-	-	-	-	-
5251	AlMg2Mn3	-	N4	-	-	A-G2M	3574	-	-	-	-	-
6151	-	-	-	-	-	-	-	-	-	-	-	-
7001	-	-	-	-	-	-	-	-	-	-	-	-
7040	-	-	-	-	-	-	-	-	-	-	-	-

**N2**

Workpiece Materials Listing • Non-Ferrous Metals • N2

N2 Low-Silicon Aluminium Alloys and Magnesium Alloys Content: Si <12,2%

AISI**	DIN	BTS	JIS	UNS	EN	AFNOR	UNI	SIS	SAE	ASTM	Material Number	Manufacturer Reference
-	SG-Al99.8	-	-	-	-	-	-	-	-	-	3.0286	-
-	G-AlCu 4 TiMg	-	-	-	-	-	-	-	-	-	3.1371	-
-	G-AlCu 4 TiMg	-	-	-	-	-	-	-	-	-	3.1371	-
-	G-AlCu 5 Ni 1.5	-	-	-	-	-	-	-	-	-	3.1754	-
-	G-AlCu 4 Ti	-	-	-	-	-	-	-	-	-	3.1841	-
-	G-AlSi 5 Cu 1	-	-	-	-	-	-	-	-	-	3.2131	-
-	G-AlSi 6 Cu 4	-	-	-	-	-	-	-	-	-	3.2151	-
-	G-AlSi 8 Cu 3	-	-	-	-	-	-	-	-	-	3.2161	-
-	G-AlSi 9 Cu 3	-	-	-	-	-	-	-	-	-	3.2163	-
-	G-AlSi 1 1	-	-	-	-	-	-	-	-	-	3.2211	-
-	SG-AlSi 5	-	-	-	-	-	-	-	-	-	3.2245	-
-	SG-AlSi 5	-	-	-	-	-	-	-	-	-	3.2245	-
-	G-AlSi 5 Mg	-	-	-	-	-	-	-	-	-	3.2341	-
4218 B	G-AlSi 7 Mg	-	-	-	-	-	-	-	-	-	3.2371	-
-	G-AlSi 9 Mg	-	-	-	-	-	-	-	-	-	3.2373	-
-	G-AlSi 10 Mg	-	-	-	-	-	-	-	-	-	3.2381	-
-	G-D AlSi 10 Mg	-	-	-	-	-	-	-	-	-	3.2382	-
A 360.2	G-AlSi 10 Mg(Cu)	LM 9	-	-	-	-	-	4253	-	-	3.2383	-
A 413.0	G-D AlSi 12	-	-	-	-	-	-	4247	-	-	3.2582	-
-	SG-AlSi 12	-	-	-	-	-	-	-	-	-	3.2585	-
-	G-D AlSi 12(Cu)	-	-	-	-	-	-	-	-	-	3.2982	-
6061	AlMgSiCu	-	H20	-	-	A-GSUC	6170	-	-	-	3.3211	-
-	G-AlMg 3 Si	-	-	-	-	-	-	-	-	-	3.3241	-
-	G-AlMg 5 Si	-	-	-	-	-	-	-	-	-	3.3261	-
-	G-D AlMg 9	-	-	-	-	-	-	-	-	-	3.3292	-
-	G-AlMg5Si(Cu,Mn)	-	-	-	-	-	-	-	-	-	3.3458	-
-	SG-AlMg 3	-	-	-	-	-	-	-	-	-	3.3536	-

(continued)

**N2** ■ Workpiece Materials Listing • Non-Ferrous Metals • N2 (continued)

N2 Low-Silicon Aluminium Alloys and Magnesium Alloys Content: Si <12,2%

AISI**	DIN	BTS	JIS	UNS	EN	AFNOR	UNI	SIS	SAE	ASTM	Material Number	Manufacturer Reference
-	G-AlMg 3	-	-	-	-	-	-	-	-	-	3.3541	-
-	SG-AlMg 4,5 Mn	-	-	-	-	-	-	-	-	-	3.3548	-
-	SG-AlMg 5	-	-	-	-	-	-	-	-	-	3.3556	-
-	G-AlMg 5	-	-	-	-	-	-	-	-	-	3.3561	-
ZE 41	G-MgZn 4 SE 1 Zr 1	MAG 5	-	-	MCMgZn 4 RE 1 Zr	G-Z 4 TR	-	-	-	-	3.5101	-
-	G-MgZn 5 Th 2 Zr 1	-	-	-	-	-	-	-	-	-	3.5102	-
EZ 33	MgSE 3 Zn 2 Zr 1	MAG 6	-	-	MCMgRE 3 Zn 2 Zr	G-TR 3 Z 2	-	-	-	-	3.5103	-
-	MgAl 9 Zn 1	-	-	-	-	-	-	-	-	-	3.5104	-
-	G-MgTh 3 Zn 2 Zr 1	-	-	-	-	-	-	-	-	-	3.5105	-
QE 22	G-MgAg 3 SE 2 Zr 1	MAG 12	-	-	MCMgRE 2 Ag 2 Zr	G-Ag 22,5	-	-	-	-	3.5106	-
-	G-D MgAl 6 Zn 1	-	-	-	-	-	-	-	-	-	3.5612	-
-	G-D MgAl 6	-	-	-	-	-	-	-	-	-	3.5662	-
AZ 81	G-MgAl 8 Zn 1	MAG 1	-	-	MCMgAl 8 Zn 1	G-A 9	-	-	-	-	3.5812	-
AZ 91	G-MgAl 9 Zn 1	MAG 7	-	-	MCMgAl 9 Zn 1	G-A 9 Z 1	-	-	-	-	3.5912	-
-	G-MgAl 8 Zn 1	-	-	-	-	-	-	-	-	-	3.5200	-
AS 41	G-D MgAl 4 Si 1	-	-	-	MCMgAl4Si	G-A4S 1	-	-	-	-	3.5470	-
-	G-AlZn10Si8Mg	-	-	-	-	-	-	-	-	-	-	-
AS 7 G	AlSi7Mg	-	-	-	-	-	-	-	-	-	-	-
2117	-	-	-	-	-	-	-	-	-	-	-	-
2218	AlCuMgNi2	-	-	-	-	-	-	-	-	-	-	-
2091	-	-	-	-	-	-	-	-	-	-	-	-
8090	-	-	-	-	-	-	-	-	-	-	-	-
2090	-	-	-	-	-	-	-	-	-	-	-	-
2224	-	-	-	-	-	-	-	-	-	-	-	-
2094	-	-	-	-	-	-	-	-	-	-	-	-
2095	-	-	-	-	-	-	-	-	-	-	-	-
2097	-	-	-	-	-	-	-	-	-	-	-	-
2098	-	-	-	-	-	-	-	-	-	-	-	-
2099	-	-	-	-	-	-	-	-	-	-	-	-
2195	-	-	-	-	-	-	-	-	-	-	-	-
2196	-	-	-	-	-	-	-	-	-	-	-	-
2197	-	-	-	-	-	-	-	-	-	-	-	-
2198	-	-	-	-	-	-	-	-	-	-	-	-
2297	-	-	-	-	-	-	-	-	-	-	-	-
2397	-	-	-	-	-	-	-	-	-	-	-	-
8017	-	-	-	-	-	-	-	-	-	-	-	-
8024	-	-	-	-	-	-	-	-	-	-	-	-
8091	-	-	-	-	-	-	-	-	-	-	-	-
8093	-	-	-	-	-	-	-	-	-	-	-	-
2199	-	-	-	-	-	-	-	-	-	-	-	-

**N3** ■ Workpiece Materials Listing • Non-Ferrous Metals • N3

N3 High-Silicon Aluminium Alloys and Magnesium Alloys Content: Si >12,2%

AISI**	DIN	BTS	JIS	UNS	EN	AFNOR	UNI	SIS	SAE	ASTM	Material Number	Manufacturer Reference
A 413.1	G-AISI 12(Cu)	LM 20	-	-	-	-	-	4260	-	-	3.2583	-
A 413.2	G-AISI 12	LM 6	-	-	-	-	-	4261	-	-	3.2581	-
-	G-AISI17Cu4Mg	-	-	-	-	-	-	-	-	-	-	-
-	GK-AISI18CuNiMg	-	-	-	-	-	-	-	-	-	-	-
-	GK-AISI21CuNiMg	-	-	-	-	-	-	-	-	-	-	-
-	GK-AISI12CuNiMg	-	-	-	-	-	-	-	-	-	-	-
-	GK-AISI25CuNiMg	-	-	-	-	-	-	-	-	-	-	-
-	G-AISI 21 CuNiMg	-	-	-	-	-	-	-	-	-	-	-
4032	-	-	-	-	-	-	-	-	-	-	-	-

**N4** ■ Workpiece Materials Listing • Non-Ferrous Metals • N4

N4 Copper-, Brass-, Zinc-Based on Machinability Index Range of 70-100

AISI**	DIN	BTS	JIS	UNS	EN	AFNOR	UNI	SIS	SAE	ASTM	Material Number	Manufacturer Reference
C 11000	E-Cu 58	C 101	-	-	-	Cn-a2	-	-	-	-	2.0065	-
C 81100	G-CuL 45	HCC 1	-	-	-	-	-	-	-	-	2.0082	-
C 81100	G-Cu L 50	HCC 1	-	-	-	-	-	-	-	-	2.0085	-
-	CuZn 40 MnPb	-	-	-	-	-	-	-	-	-	2.0241	-
C 26000	CuZn 30	CZ 102	C 2600	-	-	CuZn 30	-	-	-	-	2.0265	-
C 27200	CuZn 37	CZ 108	-	-	-	CuZn 37	C 2720	-	-	-	2.0321	-
-	CuZn 36 Pb 1.5	-	-	-	-	-	-	-	-	-	2.0331	-
-	S-CuZn40	-	-	-	-	-	-	-	-	-	2.0366	-
-	CuZn 39 Pb 3 + D567	-	-	-	-	-	-	-	-	-	2.0401	-
-	CuZn 40 Pb 2	-	-	-	-	-	-	-	-	-	2.0402	-
B-198	G-CuZn 15Si 4	-	-	-	-	-	-	-	-	-	2.0492	-
-	CuZn 40Al 1	-	-	-	-	-	-	-	-	-	2.0561	-
-	G-KCuZn 38 Al	-	-	-	-	-	-	-	-	-	2.0591	-
C 86500	G-CuZn 35 Al 1	HTB 1	-	-	-	U-Z 36 N 3	-	-	-	-	2.0592	-
-	G-KCuZn 37 Al 1	-	-	-	-	-	-	-	-	-	2.0595	-
C 86200	G-CuZn 34 Al 2	HTB 1	-	-	-	U-Z 36 N 3	-	-	-	-	2.0596	-
-	G-CuZn 25 Al 5	-	-	-	-	-	-	-	-	-	2.0598	-
-	S - CuNi 30 Fe	-	-	-	-	-	-	-	-	-	2.0837	-
-	CuNi 10 Fe 1 Mn	-	-	-	-	-	-	-	-	-	2.0872	-

NOTE: For legend, see page Y217.

(continued)

**N4**

**Workpiece Materials Listing • Non-Ferrous Metals • N4** *(continued)*

*N4 Copper-, Brass-, Zinc-Based on Machinability Index Range of 70–100*

AISI**	DIN	BTS	JIS	UNS	EN	AFNOR	UNI	SIS	SAE	ASTM	Material Number	Manufacturer Reference
–	S - CuNi 10 Fe	–	–	–	–	–	–	–	–	–	2.0873	–
–	CuNi 30 Mn 1 Fe	–	–	–	–	–	–	–	–	–	2.0882	–
–	SG-Cu Al 8	–	–	–	–	–	–	–	–	–	2.0921	–
–	SG-CuAl 8 Ni 2	–	–	–	–	–	–	–	–	–	2.0922	–
–	SG-CuAl 9 Ni5 Fe	–	–	–	–	–	–	–	–	–	2.0927	–
–	CuAl 10 Fe 3 Mn 2	CA 103	–	–	–	U-A 10 Fe	–	–	–	–	2.0936	–
–	SG-Cu Al 10 Fe	–	–	–	–	–	–	–	–	–	2.0937	–
C 63000	CuAl 10 Ni 5 Fe 4	Ca 104	–	–	–	U-A 10 N	–	–	–	–	2.0966	–
B-148-52	G-CuAl 10 Ni	–	–	–	–	–	–	–	–	–	2.0975	–
–	SG-Cu Sn	–	–	–	–	–	–	–	–	–	2.1006	–
–	SG-Cu Sn 6	–	–	–	–	–	–	–	–	–	2.1022	–
C 90800	G-CuSn 12	Pb 2	–	–	–	UE 12 P	–	–	–	–	2.1052	–
–	G-CuSn 12 Pb	–	–	–	–	–	–	–	–	–	2.1061	–
–	G-CuSn 10 Zn	–	–	–	–	–	–	–	–	–	2.1086	–
C 93200	G-CuSn 7 ZnPb	–	–	–	–	U-E 7 Z 5 Pb 4	–	–	–	–	2.1091	–
–	G-CuSn 6 ZnNi	LG 4	–	–	–	–	–	–	–	–	2.1093	–
C 83600	G-CuSn 5 ZnPb	LG 2	–	–	–	U-E 5 Pb 5 Z 5	–	–	–	–	2.1096	–
–	G-CuSn 2 ZnPb	–	–	–	–	–	–	–	–	–	2.1098	–
C 93700	G-CuPb 10 Sn	LB 2	–	–	–	U-E 10 Pb 10	–	–	–	–	2.1176	–
C 93800	G-CuPb 15 Sn	LB 1	–	–	–	U-Pb 15 E 8	–	–	–	–	2.1182	–
C 94100	G-CuPb 20 Sn	LB 5	–	–	–	U-Pb 20	–	–	–	–	2.1188	–
C 81500	G-CuCrF 35	CC1-FF	–	–	–	–	–	–	–	–	2.1292	–
C 18200	CuCrZr	CG 102	–	–	–	U-Cr 0.8 Zr	–	–	–	–	2.1293	–
–	SG-Cu Mn 13 Al 7	–	–	–	–	–	–	–	–	–	2.1367	–
–	SG-Cu Si 3	–	–	–	–	–	–	–	–	–	2.1461	–
CuSi 3 Mn	–	–	–	–	–	–	–	–	–	–	2.1525	–
–	OF-Cu	–	–	–	–	–	–	–	–	–	2.0040	–
B-120	E-Cu 57	–	–	–	–	–	–	–	–	–	2.0060	–
C 10300	SE-Cu	C 101	–	–	–	Cu-cl	–	–	–	–	2.0070	–
–	CuZn 5	–	–	–	–	–	–	–	–	–	2.0220	–
C 23000	CuZn 15	CZ 102	C 2300	–	–	CuZn 15	–	–	–	–	2.0240	–
–	G-CuZn 33 Pb	–	–	–	–	–	–	–	–	–	2.0290	–
–	CuZn 36 Pb 2	–	–	–	–	–	–	–	–	–	2.0330	–
–	G-CuZn 37 Pb	–	–	–	–	–	–	–	–	–	2.0340	–
–	CuZn 40	–	–	–	–	–	–	–	–	–	2.0360	–
–	CuZn 39 Pb 2	–	–	–	–	–	–	–	–	–	2.0380	–
–	CuZn 20 Al 2	–	–	–	–	–	–	–	–	–	2.0460	–
–	CuZn 37Al 1	–	–	–	–	–	–	–	–	–	2.0510	–
–	CuZn 40 Al 2	–	–	–	–	–	–	–	–	–	2.0550	–
–	G-CuZn 40 Fe	–	–	–	–	–	–	–	–	–	2.0590	–
–	G-CuAl 10 Fe	–	–	–	–	–	–	–	–	–	2.0940	–
C 90700	G-CuSn 10	CT 1	–	–	–	–	–	–	–	–	2.1050	–
C 91700	G-CuSn 12 Ni	–	–	–	–	–	–	–	–	–	2.1060	–
–	C35100	–	–	–	–	–	–	–	–	–	–	–
–	17665	–	–	C95500	–	–	–	–	–	–	–	–
–	MS60	–	–	–	–	–	–	–	–	–	–	–

**N5**

**Workpiece Materials Listing • Non-Ferrous Metals • N5**

*N5 Nylon, Plastics, Rubbers, Phenolics, Resins, Fibreglass*

AISI**	DIN	BTS	JIS	UNS	EN	AFNOR	UNI	SIS	SAE	ASTM	Material Number	Manufacturer Reference
–	LEXAN	–	–	–	–	–	–	–	–	–	–	–
–	HOSTALEN	–	–	–	–	–	–	–	–	–	–	–
–	Polystyrol	–	–	–	–	–	–	–	–	–	–	–
–	Makralon	–	–	–	–	–	–	–	–	–	–	–

**N6**

**Workpiece Materials Listing • Non-Ferrous Metals • N6**

*N6 Carbon, Graphite Composites, CFRP*

AISI**	DIN	BTS	JIS	UNS	EN	AFNOR	UNI	SIS	SAE	ASTM	Material Number	Manufacturer Reference
–	GFK	–	–	–	–	–	–	–	–	–	–	–
–	CFK	–	–	–	–	–	–	–	–	–	–	–
Graphite	–	–	–	–	–	–	–	–	–	–	–	–
CFRP	–	–	–	–	–	–	–	–	–	–	–	–

### S1 ■ Workpiece Materials Listing • High-Temp Alloys • S1

S1 Iron-Based, Heat-Resistant Alloys

Tensile Strength RM (MPa)\*: 500–1200

Hardness (HB): 160–260 (HRC): 25–48

AISI**	DIN	BTS	JIS	UNS	EN	AFNOR	UNI	SIS	SAE	ASTM	Material Number	Manufacturer Reference
-	X 10 Cr 25	-	-	-	-	-	-	-	-	-	1.3811	-
-	D 1 a	-	-	-	-	-	-	-	-	-	1.3915	-
-	D 3	BD 3	-	-	X 210 Cr 1 2	Z 200 C 12	X 205 Cr 12 KU	-	-	-	1.3916	-
-	RNi 12	-	-	-	-	-	-	-	-	-	1.3926	-
-	RNi 8	-	-	-	-	-	-	-	-	-	1.3927	-
-	GX 2 NiCoMoTi1 7 10	-	-	-	-	-	-	-	-	-	1.6351	Maraging
6501, 6512, 6520	X 2 NiCoMo 18 8 5	-	-	UNS K92890	S162	Z2NKD18.8	-	-	-	ASTM A646	1.6359	ATI VascoMax® C-250
-	X 2 NiCoMo 18-8-5	-	-	K92890	-	-	-	-	-	-	1.6359	Maraging
-	X 1 CrNiCoMo 13 8 5	-	-	-	-	-	-	-	-	-	-	Maraging
-	Ni 36	-	-	-	-	-	-	-	-	-	1.3910	Magnifer 36
-	Ni 46	-	-	-	-	-	-	-	-	-	1.3920	-
-	X 2 CrNiCoMo 12 8 5	-	-	-	-	-	-	-	-	-	1.6980	Maraging
ASTM B463	-	-	-	UNS N08020	-	-	-	-	-	ASTM B463	2.4660	20CB-3
ASTM A666	-	-	-	-	-	-	-	-	-	ASTM A666	-	6/21/09
ASTM B753	-	-	-	-	-	-	-	-	-	ASTM B753	-	AL 4750
S66286	-	-	NAS 660	UNS S66286	-	-	A-286	-	-	-	-	ATI A286™
-	-	-	-	UNS K92810	-	-	-	-	-	-	-	ATI VascoMax® C-200
6514	-	-	-	UNS K93120	-	-	-	-	-	-	-	ATI VascoMax® C-300
-	-	-	-	-	-	-	-	-	-	-	-	ATI VascoMax® C-350
-	-	-	-	-	-	-	-	-	-	-	-	ATI VascoMax® T-200
6518, 6519, 6591	-	-	-	-	-	-	-	-	-	-	-	ATI VascoMax® T-250
-	-	-	-	-	-	-	-	-	-	-	-	ATI VascoMax® T-300
5725	-	-	-	-	-	Z3NCT25	-	-	SAE 16-25-6	-	-	Discaloy 16-25-6
ASTM A638	-	-	-	-	-	Z3NCT25	-	-	Discaloy	ASTM A638	-	Discaloy 24
-	-	-	-	R30556	-	-	-	-	-	-	-	Haynes® 556
5768	X 12 CrCoNi 21 20	-	-	-	-	Z12CKNDWNB21.20.20	-	-	-	-	-	Haynes 556
ASTM F30	-	-	-	-	-	-	-	-	Invar	ASTM F30	-	Invar 42
5768	-	-	-	UNS R30155	-	Z12CNKDW20	-	-	-	-	-	Multimet N-155
-	-	-	-	-	-	-	-	-	-	-	-	Multimet N-156
5533	X 40 CoCrNi 20 20	-	-	-	-	Z42CKNDW	-	-	-	-	-	S 590
-	X 2 NiCrAlTi 32 20	-	-	-	-	-	-	-	-	-	-	Sanicro 30
AISI:665	-	-	-	-	-	Z8NCTDA2613	-	-	-	-	-	W-545

### S2 ■ Workpiece Materials Listing • High-Temp Alloys • S2

S2 Cobalt-Based, Heat-Resistant Alloys

Tensile Strength RM (MPa)\*: 1000–1450

Hardness (HB): 250–450 (HRC): 25–48

AISI**	DIN	BTS	JIS	UNS	EN	AFNOR	UNI	SIS	SAE	ASTM	Material Number	Manufacturer Reference
-	CoCr 26 Ni 9 Mo	-	-	-	-	-	-	-	-	-	2.4681	-
-	CoCr 25 NiW	-	-	-	-	KC25WN	-	-	-	ASTM A567	2.4682	Stellite® 31 (X40)
-	CoCr 22 NiW	-	-	-	-	-	-	-	-	-	2.4683	-
-	CoCr 28 Mo	-	-	-	-	KC27D5NFe	-	-	-	ASTM F-75	2.4691	HS 21
-	CoCr 20 Ni 15 Mo	-	-	-	-	-	-	-	-	-	2.4711	-
-	CoCr 29 Mo	-	-	-	-	-	-	-	-	-	2.4723	-
-	CoCr 33 W	-	-	-	-	-	-	-	-	-	2.4775	-
-	CoCr 28	-	-	-	-	-	-	-	-	-	2.4778	-
-	CoCr 28 Nb	-	-	-	-	-	-	-	-	-	2.4779	-
-	-	-	-	-	-	-	-	-	-	ASTM F90	2.4964	F 90
-	-	-	-	R30605	-	KC20WN	-	-	-	-	2.4964	Haynes 25
-	CoCr 20 W 15 Ni	HR 240	-	R30605	-	KC20WN	-	-	-	5759	2.4964	L 605
-	CoCr 20 W 15 Ni	-	-	CAST Version of L605	-	KC20WN	-	-	-	5759	2.4964	Stellite 25
AMS 5399	NiCr 19 Co 11 MoTi	-	-	-	-	NC 19 KDT	-	-	-	-	2.4973	-
-	CoCr 20 Ni 20 W	-	-	-	-	-	-	-	-	5534	2.4979	S 816
-	CoCr20NiW	-	-	-	-	-	-	-	-	-	2.4989	-
-	-	-	-	R31537 & R31538	-	CoCr28Mo	-	-	-	ASTM F1537	-	F 1537
-	-	-	-	-	-	-	-	-	-	ASTM F562	-	F 562
-	-	-	-	-	-	-	-	-	-	ASTM F563	-	F 563
-	-	-	-	R30188	-	KC22N22W14Fe	-	-	-	-	-	Haynes 188
AISI 670	CoCr 20 W 15 Ni	-	-	-	-	KC20WN	-	-	-	-	-	HS 25
-	CoCr 26 Ni 14 Mo	-	-	-	-	-	-	-	-	5380	-	HS 30
-	CoCr 19 W 14 NiB	-	-	-	-	-	-	-	-	-	-	HS 36
-	-	-	-	-	-	-	-	-	-	-	-	L 251
-	CoCrW 10 TaZrB	-	-	-	-	KC21W10Ta9	-	-	-	-	-	MAR-M 302
-	CoCr 22 W 9 TaZrNb	-	-	-	-	KC21W9Ta	-	-	-	-	-	MAR-M 322
-	CoCr 24 Ni 10 WTaZrB	-	-	-	-	KC23N10W7Ta	-	-	-	-	-	MAR-M 509
-	-	-	-	-	-	KC20N20Ta7	-	-	-	-	-	MAR-M 905
-	CoCr 20 Ni 20 Ta	-	-	-	-	KC20N20Ta7	-	-	-	-	-	MAR-M 918
-	-	-	-	R30159	-	-	-	-	-	-	-	MP159
-	-	-	-	R30035	-	-	-	-	-	-	-	MP35N
-	-	-	-	-	-	KC33W13	-	-	-	-	-	Stellite 1
-	-	-	-	-	-	KC28W8	-	-	-	-	-	Stellite 12
-	-	-	-	-	-	KC22N22W14Fe	-	-	-	-	-	Stellite 188
-	-	-	-	-	-	KC26NW	-	-	-	-	-	Stellite 6
-	-	-	-	-	-	-	-	-	-	-	-	Stellite 8 (F75)
-	CoCr 25 Ni 20 MoWNB	-	-	-	-	KC25N20DFeWNB	-	-	-	-	-	V-36
-	CoCr 21 Mo 11 W	-	-	-	-	KC21W11ANbT	-	-	-	-	-	WI-52
-	-	-	-	-	-	KC25N10W7Fe	-	-	-	-	-	X 45
-	-	-	-	-	-	-	-	-	J-1570	-	-	-
-	K13C20N126Fe15D7	-	-	R3003 & R3008	-	K13C20N126Fe15D7	-	-	-	ASTM F1058	-	-

NOTE: For legend, see page Y217.

**S3** ■ Workpiece Materials Listing • High-Temp Alloys • S3

S3 Nickel-Based, Heat-Resistant Alloys      Tensile Strength RM (MPa)\*: 600–1700      Hardness (HB): 160–450 (HRC): <48

AISI**	DIN	BTS	JIS	UNS	EN	AFNOR	UNI	SIS	SAE	ASTM	Material Number	Manufacturer Reference
-	X 7 NiCrCoMo 54 20	-	-	-	-	-	-	-	-	-	1.2789	-
-	Ni 99,7 Mg 0,07	-	-	J24053	-	-	-	-	-	A 915 J24053	2.4053	-
-	LC-Ni 99,6	-	-	N02201	-	-	-	-	-	-	2.4061	-
-	-	-	-	N02200	-	-	-	-	-	-	2.4066	200
Nickel 200	Ni 99,2	NA 11	-	N02200	-	-	-	-	-	-	2.4066	-
-	-	-	-	N02201	-	-	-	-	-	-	2.4068	201
Nickel 201	LC-Ni 99	NA 12	-	-	-	-	-	-	-	-	2.4068	-
-	NiMn 1	-	-	-	-	-	-	-	-	-	2.4106	-
-	NiMn 1 C	-	-	-	-	-	-	-	-	-	2.4108	-
-	NiMn 1,5	-	-	-	-	-	-	-	-	-	2.4109	-
-	NiMn 3 Al	-	-	-	-	-	-	-	-	-	2.4122	-
-	NiMn 3 SiMg	-	-	-	-	-	-	-	-	-	2.4126	-
-	NiCr 2 Mn	-	-	-	-	-	-	-	-	-	2.4145	-
-	NiCr 2 MnSi	-	-	-	-	-	-	-	-	-	2.4146	-
-	NiCr 5 MnSi	-	-	-	-	-	-	-	-	-	2.4151	-
-	SG-NiTi 4	NA32	-	-	NA 32	-	-	-	-	-	2.4155	-
CZ-100	G-Ni 93 C	-	-	-	-	-	-	-	-	-	2.4175	-
-	NiCr 4 Mn	-	-	-	-	-	-	-	-	-	2.4199	-
M 35-1/2	G-NiCu 30 Nb	-	-	N24030	-	-	-	-	-	-	2.4365	-
-	EL-NiCu 30 Mn	-	-	N04402	-	-	-	-	-	-	2.4366	-
M 30-H	G-NiCu 30 Si 3	-	-	-	-	-	-	-	-	-	2.4367	-
M-255	G-NiCu 30 Si 4	-	-	-	-	-	-	-	-	-	2.4368	-
-	NiCu 30 Al	-	-	-	-	-	-	-	-	-	2.4374	-
-	NiCu 30 Al	NA 18	-	N05500	3072.76	NU 30 AT	-	-	-	-	2.4375	Monel® K500
-	SG-NiCu 30 MnTi	NA 33	-	-	-	-	-	-	-	-	2.4377	-
-	NiFe 16 CuCr	-	-	-	-	-	-	-	-	-	2.4501	-
-	G-NiMo 16 CrW	-	-	-	-	-	-	-	-	-	2.4537	-
-	NiCr 21 Mo 14 W	-	-	N26022	-	-	-	-	-	-	2.4602	INCONEL® alloy 622
-	NiCr 30 FeMo	-	-	-	-	-	-	-	-	-	2.4603	Hastelloy® G-30
-	-	-	-	N06059	-	-	-	-	-	ASTM B575	2.4605	Allcorr
-	NiCr 23 Mo 16 Al	-	-	-	-	-	-	-	-	-	2.4605	-
-	SG/UP-NiCr 23 Mo 16	-	-	-	-	-	-	-	-	-	2.4607	-
-	NiCr 26 MoW	-	-	-	-	-	-	-	-	-	2.4608	-
-	SG-NiMo 27	-	-	-	-	-	-	-	-	-	2.4615	-
-	NiMo 28	-	-	N10665	-	NiMo 28	-	-	-	-	2.4617	-
-	NiCr 22 Mo 6 Cu	-	-	-	-	-	-	-	-	-	2.4618	-
-	-	-	-	N06985	-	-	-	-	-	-	2.4619	Hastelloy G-3
-	NiCr 22 Mo 7 Cu	-	-	N06985	-	-	-	-	-	-	2.4619	-
-	SG-NiCr 23 Al	NA 49	-	-	-	-	-	-	-	-	2.4626	-
-	SG-NiCr 22 Co 12 Mo	NA 50	-	-	-	-	-	-	-	-	2.4627	-
-	NiCr 20 Ti	HR5	-	N06075	HR5, 203.4	NC 20 T	-	-	-	-	2.4630	Nimonic® 75
-	NiCr 20 TiAl	NA 20	NCF 80A	N07080	HR401, 601	NC 20 TA	-	-	-	-	2.4631	Nimonic 80A
-	NiCr 20 Co 18 Ti	NA 36	-	N07090	HR2, 202	NC20KTA	-	-	-	-	2.4632	Nimonic 90
-	NiCo 20 Cr 15 MoAlTi	-	-	N13021	HR3	NCKD20ATV	-	-	-	-	2.4634	Nimonic 105
-	NiCo 15 Cr 15 MoAlTi	HR4	-	-	HR401, 601	NCVK15ATD	-	-	-	-	2.4636	Nimonic 115
AISI 687	NiCo 15 Cr 15 MoAlTi	-	-	-	-	NCKD20AT	-	-	-	-	2.4636	Udimet® 700
-	NiCr 22 Mo 8 AlCuTi	-	-	-	-	-	-	-	-	-	2.4637	-
-	SG-NiCr 20	NA 34	-	-	-	-	-	-	-	-	2.4639	-
-	NiCr 21 Mo 6 Cu	-	NCF 600 TP	-	-	-	-	-	-	-	2.4641	-
-	NiCr 29 Fe	-	NCF 690	N06690	-	NC 30 Fe	-	-	-	-	2.4642	INCONEL® alloy 690
-	NiCr 25 FeAlYC	-	-	-	-	-	-	-	-	-	2.4644	-
-	NiCr 20 CoMoTi	NA 38	NCF 690	N07263	HR10	NCK 20 D	-	-	-	-	2.4650	Nimonic C263
-	EL-NiCr 26 Mo	-	-	-	-	-	-	-	-	-	2.4652	-
-	NiCr 19 Co 14 Mo 4 Ti	-	-	N07001	-	NC20K14Y	-	-	-	-	2.4654	Waspaloy
-	SG-NiCr 29 Mo	-	-	-	-	-	-	-	-	-	2.4656	-
-	NiCr 70 30	-	-	N06008	-	-	-	-	-	-	2.4658	-
-	SG-NiCr 30 Mo 5 W	-	-	-	-	-	-	-	-	-	2.4659	-
-	EL-NiCr 29 Mo 5 W	-	-	-	-	-	-	-	-	-	2.4661	-
-	NiFe 35 Cr 14 MoTi	-	-	N09901	-	Z8NCDDT42	-	-	-	-	2.4662	INCOLOY® 901
-	NiCr 13 Mo 6 Ti 3	-	-	N09901	-	Z8NCDDT42	-	-	-	-	2.4662	Nimonic 901
-	NiCr 23 Co 12 Mo	-	-	N06617	-	NC22K1209A	-	-	-	-	2.4663	INCONEL® alloy 617
-	NiCr 22 FeMo	-	-	N06002	HR6, 204	NC22FeD	-	-	-	-	2.4665	Hastelloy X
-	NiCr 22 Fe 18 Mo	NA 40	-	N06002	-	NC22FeD	-	-	-	-	2.4665	INCONEL alloy HX
-	NiCr 18 CoMo	-	-	-	-	NKCD20ATU	-	-	-	-	2.4666	Nimonic PK25
-	SG-NiCr 19 NbMoTi	NA 51	-	-	-	-	-	-	-	-	2.4667	-
-	NiCr 19 FeNbMo	-	-	N07718	HR8	NC 19 Fe Nb	-	-	-	-	2.4668	INCONEL alloy 718
-	NiCr 15 Fe 7 TiAl	-	-	N07750	-	NC 15 Fe 7 TA	-	-	-	-	2.4669	INCONEL alloy X750
-	G-NiCr 12 Al 6 MoNb	-	-	-	-	-	-	-	-	-	2.4671	-
-	G-NiCr 20 Co 20 MoTi	-	-	-	-	-	-	-	-	-	2.4672	-
-	NiCo 15 Cr 10 MoAlTi	-	-	N13100	-	NK15CAT	-	-	-	-	2.4674	IN 100
-	NiCo 15 Cr 10 MoAlTi	-	-	-	-	NK15C10A5T	-	-	-	-	2.4674	René 100
-	G-NiCo 15 Cr 10 AlTiMo	-	-	-	-	-	-	-	-	-	2.4674	-
-	G-NiCo 10 W 10 CrAlNb	-	-	-	-	-	-	-	-	-	2.4676	-
-	G-NiCr 50	-	-	-	-	-	-	-	-	-	2.4678	-
-	G-NiCr 35	-	-	-	-	-	-	-	-	-	2.4679	-
-	-	-	-	N10665	-	-	-	-	-	N7M	2.4685	Hastelloy B-2
CW-12 MW	G-NiMo 17 CrW	-	-	-	-	-	-	-	-	-	2.4686	-
-	NiCr 25 Mo 7 Ti	-	-	-	-	-	-	-	-	-	2.4693	-
-	NiCr 16 Fe 7 TiAl	-	-	N 07751	-	-	-	-	-	-	2.4694	INCONEL alloy 751
-	G-NiCr 20 Mo 15	-	-	-	-	-	-	-	-	-	2.4697	-
-	NiCr 22 W 14 Mo	-	-	-	-	-	-	-	-	-	2.4733	-
-	NiCr 20 AlY	-	-	-	-	-	-	-	-	-	2.4764	-
-	NiCr 17 AlWY	-	-	-	-	-	-	-	-	-	2.4765	-
-	SG-NiCr 20 Nb	NA 35	-	-	-	-	-	-	-	-	2.4806	-
-	G-NiCr 50 Nb	-	-	-	-	-	-	-	-	-	2.4813	-
-	NiCr 15 Fe	NA 14	NCF 600	N06600	3072.76	NC 15 Fe	-	-	-	-	2.4816	INCONEL alloy 600
-	G-NiMo 30	-	-	N10276	-	NC 15 D 14 KFe	-	-	-	-	2.4819	Hastelloy C-276
ASME SB575	NiMo 16 Cr 15 W	-	-	N10276	-	NC 17 D	-	-	-	-	2.4819	Nimonic C276

(continued)



**S3**

**Workpiece Materials Listing • High-Temp Alloys • S3 (continued)**

S3 Nickel-Based, Heat-Resistant Alloys

Tensile Strength RM (MPa)\*: 600–1700

Hardness (HB): 160–450 (HRC): <48

AISI**	DIN	BTS	JIS	UNS	EN	AFNOR	UNI	SIS	SAE	ASTM	Material Number	Manufacturer Reference
-	SG-NiCr 21 Mo 9 Nb	-	-	-	-	-	-	-	-	-	2.4831	-
-	NiCr 20 Mo 15	-	-	-	-	-	-	-	-	-	2.4836	-
-	SG-NiCr 20 Mo 15	-	-	-	-	-	-	-	-	-	2.4839	-
-	-	-	-	N06601	-	-	-	-	-	-	2.4851	Haynes® 601
-	NiCr 23 Fe	-	NCF 601	N06601	-	NC 23 Fe 14 A	-	-	-	-	2.4851	INCONEL alloy 601
-	NiFe 33 Cr 25 Co	-	-	-	-	-	-	-	-	-	2.4854	-
-	NiCr 19 Mo 9 Si	-	-	-	-	-	-	-	-	-	2.4855	-
ASME SB443	NiCr 22 Mo 9 Nb	-	-	N06625	-	NC 22 Fe DNb	-	-	-	-	2.4856	Haynes 625
ASME SB443.4	NiCr 22 Mo 9 Nb	NA 21	NCF 625	N06625	-	NC 22 Fe DNb	-	-	-	-	2.4856	INCONEL alloy 625
ASME SB163	NiCr 21 Mo	-	-	N08825	3072.76	NC21FeDU	-	-	-	-	2.4858	INCOLOY® 825
-	NiCr 60 15	-	-	-	-	-	-	-	-	-	2.4867	-
-	NiCr 80 20	-	-	-	-	-	-	-	-	-	2.4869	-
-	NiCr 20 AISI	-	-	-	-	-	-	-	-	-	2.4872	-
-	G-NiCr 28 W	-	-	-	-	-	-	-	-	-	2.4879	Centralloy® 4879
-	NiCr 17 Mo 17 FeW	-	-	N10002	-	NC17DWY	-	-	-	CW12MW	2.4883	Hastelloy C
-	G-NiMo 16 Cr	-	-	-	-	-	-	-	-	-	2.4883	-
-	SG-NiMo 16 cr 16 W	NA 48	-	-	-	-	-	-	-	-	2.4886	-
-	G-NiCr 13 MoAl	-	-	-	-	-	-	-	-	-	2.4888	-
-	NiCr 20 Ti	HR 5	-	N06621	-	NC 20 T	-	-	-	-	2.4951	-
-	NiCr 20 TiAl	NA 20	NCF 80 A	N07080	-	NC 20 TA	-	-	-	-	2.4952	-
-	NiFe 25 Cr 20 NbTi	-	-	-	NiFe 25 Cr 20 NbTi	-	-	-	-	-	2.4955	-
-	NiCr 20 Co 18 Ti	NA 19	-	N07090	-	-	-	-	-	-	2.4969	-
-	NiCr 22 W 12 Fe	-	-	-	-	-	-	-	-	-	2.4972	-
-	NiCr 19 Co 11 MoTi	-	-	N07041	-	NC19KDT	-	-	-	-	2.4973	René 41
-	NiFeCr 12 Mo	-	-	-	-	-	-	-	-	-	2.4975	-
-	NiCr 20 Mo	-	-	-	-	-	-	-	-	-	2.4976	-
-	NiCr 20 CoMo	-	-	-	-	-	-	-	-	-	2.4982	-
-	NiCr 18 Co	-	-	N07500	-	-	-	-	-	-	2.4983	Co500
AISI 684	NiCr 18 CoMoAlTi	-	-	N07500	-	NCK19DAT	-	-	-	-	2.4983	Udimet® 500
-	Ni 99.6	NA 46	-	-	-	-	-	-	-	-	2.4060	-
-	NiMn 2	-	-	-	-	-	-	-	-	-	2.4110	-
SZ-100	G-Ni 95	-	-	-	-	-	-	-	-	-	2.4170	-
-	G-Ni 93 Si	-	-	-	-	-	-	-	-	-	2.4180	-
-	NiCu 30 Fe	-	-	N04400	3072.76	NU30	-	-	-	-	2.4360	Monel® 400
-	NiCu 30 Ti	-	-	-	-	-	-	-	-	-	2.4370	Monel 60
-	NiFe 44	-	-	-	-	-	-	-	-	-	2.4420	Magnifer 53
-	NiFe 16 CuMo	-	-	-	-	-	-	-	-	-	2.4530	Perm 77
-	NiFeK 6040	-	-	-	-	-	-	-	-	-	2.4560	-
-	NiMo 16 Cr 16 Ti	NA 45	-	N26455	-	-	-	-	-	-	2.4610	Hastelloy C-4
-	-	-	-	-	-	20CB-3	-	-	-	ASTM B463	2.4660	INCOLOY 020
-	NiCr 20 CuMo	-	-	N08020	-	-	-	-	-	-	2.4660	-
-	G-NiCr 13 Al 16 MoNb	-	-	-	HC203	NC13AD	-	-	-	-	2.4670	Nimocast 713
-	G-NiCr 50 Nb	-	-	-	-	-	-	-	-	-	2.4680	-
-	NiMo 23 Cr 8 Fe	-	-	-	-	-	-	-	-	-	2.4710	-
-	NiMo 30	-	-	-	-	ND27FeV	-	-	-	N-12 MV	2.4810	Hastelloy B
-	NiCr 45 23	-	-	-	-	-	-	-	-	-	2.4890	-
-	-	-	-	N13017	-	NK17C15D5AT	-	-	-	-	-	Astroloy
-	-	-	-	-	-	-	-	-	-	-	-	Centralloy® 60HTD
AISI 686	-	-	-	-	-	NC15Fe10D5AT	-	-	-	-	-	GMR 235
-	NiCr 16 MoAl	-	-	-	-	NC15D5FeAT	-	-	-	-	-	GMR 235-D
-	-	-	-	-	-	-	-	-	-	CW6M	-	Hastelloy C-22
-	-	-	-	N06007	-	NC22Fe19D6KtA	-	-	-	-	-	Hastelloy G
-	-	-	-	N10003	-	-	-	-	-	-	-	Hastelloy N
-	-	-	-	N06635	-	NC15D14KFe	-	-	-	-	-	Hastelloy S
-	-	-	-	N10004	-	-	-	-	-	-	-	Hastelloy W
-	-	-	-	N07263	-	NC20K20D6T	-	-	-	-	-	Haynes® 263
-	-	-	-	-	-	-	-	-	-	-	-	Haynes 282
-	NiCr 15 Fe	-	-	N06600	-	-	-	-	-	-	-	Haynes 600
-	-	-	-	-	-	-	-	-	-	-	-	Haynes 75
-	NiCo 32 Cr 26 Mo	-	-	-	-	-	-	-	-	-	-	HS27
-	-	-	-	N06102	-	-	-	-	-	-	-	IN 102
ASME SB409	X 10 NiCrAlTi 32-20	-	-	N08800	3082.76	Z10NC3221	-	-	-	-	-	INCOLOY 800
-	-	-	-	-	-	Z4NC3221	-	-	-	-	-	INCOLOY 802
-	-	-	-	-	-	NC29Fe25	-	-	-	-	-	INCOLOY 804
-	NiFe 42 K 15 Nb	-	-	N19903	-	Z3NK28	-	-	-	-	-	INCOLOY 903
-	-	-	-	N19907	-	-	-	-	-	-	-	INCOLOY 907
-	-	-	-	N09925	-	-	-	-	-	-	-	INCOLOY 925
-	-	-	-	N09945	-	-	-	-	-	-	-	INCOLOY 945
ASME SB575	-	-	-	-	-	NiMo16Cr15	-	-	-	-	-	INCONEL alloy 22
-	-	-	-	-	-	-	-	-	-	-	-	INCONEL alloy 230
-	-	-	-	-	-	-	-	-	-	-	-	INCONEL alloy 600SP
-	-	-	-	-	-	-	-	-	-	-	-	INCONEL alloy 62
-	-	-	-	N06626	-	-	-	-	-	-	-	INCONEL alloy 625LCF
-	-	-	-	-	-	NC15A	-	-	-	-	-	INCONEL alloy 702
-	-	-	-	N09706	-	NFe10C16NbT	-	-	-	-	-	INCONEL alloy 706
-	-	-	-	N07718	-	-	-	-	-	-	-	INCONEL alloy 718 OP
-	-	-	-	-	-	NC16Fe8TM	-	-	-	-	-	INCONEL alloy 721
-	NiCr 16 FeTi	-	-	N07722	-	NC16FeTi	-	-	-	-	-	INCONEL alloy 722
-	-	-	-	R30783	-	-	-	-	-	-	-	INCONEL alloy 783
-	-	-	-	N09925	-	-	-	-	-	B983 N09925	-	INCONEL alloy 925
-	-	-	-	N10276	-	-	-	-	-	-	-	INCONEL alloy C-276
-	-	-	-	N07754	-	-	-	-	-	-	-	INCONEL alloy MA754
-	-	-	-	N07751	-	-	-	-	-	-	-	INCONEL alloy X751
-	-	-	-	K93600 K93603	-	-	-	-	-	ASTM F1684	-	INVAR® 36
-	NiCr 20 Co 18 Ti	-	-	-	-	-	-	-	-	-	-	Jessop G81
-	G-NiCr 19 Co	-	-	N07252	-	-	-	-	-	-	-	M 252
-	-	-	-	N04405	-	-	-	-	-	-	-	Monel® R405

NOTE: For legend, see page Y217.

(continued)

**S3**

**Workpiece Materials Listing • High-Temp Alloys • S3 (continued)**

S3 Nickel-Based, Heat-Resistant Alloys

Tensile Strength RM (MPa)\*: 600–1700

Hardness (HB): 160–450 (HRC): <48

AISI**	DIN	BTS	JIS	UNS	EN	AFNOR	UNI	SIS	SAE	ASTM	Material Number	Manufacturer Reference
–	NiFe 33 Cr 17 Mo	–	–	–	–	–	–	–	–	–	–	Nimocast PD16
–	–	–	–	–	HC202	NC20N13	–	–	–	–	–	Nimocast PE10
–	–	–	–	–	–	NC19K18Fe5TA	–	–	–	–	–	Nimonic® 95
ASME SB575	–	–	–	NO6022	–	–	–	–	–	–	–	Nimonic C22
–	NiCr 22 Fe 18 Mo	–	–	–	HR6, 204	NC22FeD	–	–	–	–	–	Nimonic PE13
–	NiFe 33 Cr 17 Mo	–	–	–	HR207	NW11AC	–	–	–	–	–	Nimonic PE16
–	NiCr 20 Co 16 MoTi	–	–	–	–	NC19KDUN	–	–	–	–	–	Nimonic PK33
–	–	–	–	NCF 3015	–	–	–	–	–	–	–	NiReVa 3015
AISI 686	–	–	–	–	–	–	–	–	–	–	–	R-235
AISI 690	–	–	–	–	–	Z6NKCDDT38	–	–	–	–	–	Refractaloy 26
–	–	–	–	–	–	NK10C8W7ATaTD	–	–	–	–	–	René 125
–	–	–	–	–	–	NK15C14D6AWT	–	–	–	–	–	René 65
–	–	–	–	–	–	NC15K15ADT	–	–	–	–	–	René 77
–	–	–	–	–	–	NC14K9T5DWA	–	–	–	–	–	René 80
–	–	–	–	–	–	NC14K8	–	–	–	–	–	René 95
–	NiTa 9 Co 8 W 6 CrAl	–	–	–	–	NTa9K7CBW5A5DT	–	–	–	–	–	TRW VIA
–	NiCr 19 NbMo	–	–	–	–	NC18Fe18Nb6DWT	–	–	–	–	–	Udimet® 630
–	–	–	–	–	–	NCK18TDA	–	–	–	–	–	Udimet 710
–	–	–	–	–	–	NC18K15TDA	–	–	–	–	–	Udimet 720

**S4**

**Workpiece Materials Listing • High-Temp Alloys • S4**

S4 Titanium and Titanium Alloys

Tensile Strength RM (MPa)\*: 900–1600

Hardness (HB): 300–400 (HRC): 33–48

AISI**	DIN	BTS	JIS	UNS	EN	AFNOR	UNI	SIS	SAE	ASTM	Material Number	Manufacturer Reference
R 50250	Ti-99.8	2 TA 1	–	UNS R50250	TA6, TA7, TA8, TA9	AIR:9182T35	–	–	–	ASTM B381F1	3.7025	ATI 30 CP Grade 1
R 50400	Ti-99.7	2 TA 2-5	–	UNS R50400	TA2.5	AIR:9182T40	–	–	–	ASTM B381F2	3.7035	ATI 40 CP Grade 2
–	SG-Ti 2	–	–	–	–	–	–	–	–	–	3.7036	–
R 50550	Ti-99.6	TA 3	–	UNS R50550	TA2, TA3, TA4, TA5	AIR:9182T50	–	–	–	ASTM B381F3	3.7055	ATI 55 CP Grade 3
R 50700	Ti-99.5	2 TA 6-9	–	UNS R50700	–	AIR:9182T60	–	–	–	ASTM B381F4	3.7065	ATI 70 CP Grade 4
–	TiNi 0.8 Mo 0.3	–	–	UNS R53400	–	–	–	–	Ti-3Al-1.5Mn	ASTM Grade 12	3.7105	–
Ti 5Al-2.5Sn	TiAl 5 Sn 2.5	–	–	UNS R54520	TA 14,17	T-A5E	–	–	Ti-5Al-2.5Sn	–	3.7115	ATI Grade 6
–	TiCu 2	2 TA 21-24	–	–	–	–	–	–	Ti-2Cu	–	3.7124	–
R 54620	TiAl 6 Sn 2 Zr 4 Mo 2 Si	–	–	UNS R54620	–	–	–	–	Ti-6Al-2Sn-2Zr-4Mo-2Si	–	3.7145	–
–	TiAl 6 ZrMo 0.5	TA 43	–	–	–	–	–	–	Ti-6-5-0.5	–	3.7155	–
R 56400	TiAl 6 V 4	TA 10-13	TC4	UNS R56400	TA10 TA11 TA12 TA13 TA28 TA56	TA6V	–	–	Ti-6Al-4V	–	3.7164	ATI 6-4™
–	TiAl 6 V4	–	TC4	UNS R56400	TA10 TA11 TA12 TA13 TA28 TA56	TA6V; AIR:9183	–	–	Ti-6Al-4V (Beta)	–	3.7164	–
R 56620	TiAl 6 V 6 Sn2	–	–	UNS R56620	–	–	–	–	Ti-6Al-6V-2Sn	–	3.7175	ATI 6-6-2™
–	TiAl 4 Mo 4 Sn 2	TA 45-51	–	–	–	–	–	–	Ti-4Al-4Mo-2Sn	–	3.7185	–
–	TiAl 3 V2.5	–	–	UNS R56320	–	–	–	–	Ti-3Al-2.5V	ASTM Grade 9	3.7195	ATI 3-2.5-MIL™
R 52250	Ti 1 Pd	TP 1	–	UNS R 52250	–	–	–	–	–	ASTM Grade 11	3.7225	–
R 52400	Ti 2 Pd	–	–	UNS R 52400	–	–	–	–	–	ASTM Grade 7	3.7235	–
–	Ti 3 Pd	–	–	–	–	–	–	–	–	–	3.7255	–
–	TiAl 5 Fe 2.5	–	–	–	–	–	–	–	Ti-5Al-2.5Fe	–	3.7110	–
–	TiV13Cr11Al3	–	–	–	–	–	–	–	Ti-13V-11Cr-3Al	–	–	11/13/03
–	Ti-10V-2Fe-3Al	–	–	–	–	–	–	–	Ti-10.2.3	–	–	ATI 10-2-3™
–	–	–	–	UNS R58153	–	–	–	–	Ti-15-333	–	–	ATI 15-333™
–	–	–	–	–	–	–	–	–	Ti-15Mo (Alpha + Beta)	–	–	ATI 15Mo™ (Alpha + Beta)
–	–	–	–	–	–	–	–	–	Ti-15Mo (Beta)	–	–	ATI 15Mo™ (Beta)
–	Ti5Al2Sn2Zr4Cr4Mo	–	–	UNS R58650	–	–	–	–	–	–	–	ATI 17™
–	TiAl 3 V 8 Cr 6 Mo 4 Z 4	–	–	–	–	–	–	–	Ti-3Al-8V-6Cr-4Mo-4Zr	ASTN Grade 19	–	ATI 38-644™
–	–	–	–	UNS R54250	–	–	–	–	Ti-425	ASTM B265	–	ATI 425®
–	–	–	–	–	–	–	–	–	Ti-425 MIL	–	–	ATI 425®-MIL
–	TiAl 4 Mo 4 Sn 2 Si 0.5	–	–	–	5103	T-A4DE	–	–	Ti-4Al-4Mo-2Sn-0.5Si	–	–	ATI 4-4-2™
–	–	–	–	–	–	–	–	–	Ti-45Nb	–	–	ATI 45Nb™
–	–	–	–	–	–	–	–	–	Ti-5Al-5V-5Mo-3Cr	–	–	ATI 5-5-5-3 PM™
–	–	–	–	–	–	–	–	–	Ti-6Al-2Sn-2Zr-2Mn-2Cr-0.2Si	–	–	ATI 6-2-2-2 PM™
–	–	–	–	UNS R54620	–	–	–	–	Ti-6Al-4Zr-2Mo-2Sn	–	–	ATI 6-2-4-2 PM™
–	TiAl6Zr4Mo2Sn2	–	–	UNS R54620 modified	–	–	–	–	Ti-6Al-4Zr-2Mo-2Sn-0.2Si	–	–	ATI 6-2-4-2-Si PM™
–	–	–	–	UNS R56260	–	–	–	–	–	–	–	ATI 6-2-4-6™
–	–	–	–	UNS R56401	–	–	–	–	Ti-6Al-4V ELI	–	–	ATI 6-4 ELI™
–	TiAl 6 V4	–	–	UNS R56400	TA10 TA11 TA12 TA13 TA28 TA56	TA6V; AIR:9183	–	–	Ti-6Al-4V MIL	–	–	ATI 6-4-MIL™
–	TiAl 6 V4	–	–	UNS R56400	TA10 TA11 TA12 TA13 TA28 TA56	TA6V; AIR:9183	–	–	Ti-6Al-4V MIL (HT)	–	–	ATI 6-4-MIL™
–	–	–	–	UNS R56700	–	–	–	–	Ti-6-7	ASTM F 1295	–	ATI 6-7™
–	TiAl8Mo1V1	–	–	UNS R54810	–	–	–	–	Ti-8Al-1Mo-1V	–	–	ATI 8-1-1™
–	–	–	–	–	–	–	–	–	Ti-15Mo-3Nb-3Al-0.2Si	ASTM Grade 21	–	Beta 21-S
–	–	–	–	–	–	–	–	–	Ti-12Mo-6Zr-2Fe	–	–	TMZF
–	TiAl7Nb	–	–	–	–	–	–	–	Ti-6Al-7Nb	–	–	–
–	TiAl7Mo4	–	–	–	–	–	–	–	–	ASTM B381	–	–
–	TiAl 4 Mo 4 Sn 4 Si 0.5	–	–	–	5203	–	–	–	Ti-4Al-4Mo-4Sn-0.5Si	–	–	–
–	TiAl6Zr5Mo0.5Si0.25	–	–	–	–	T.AGZ.50	–	–	Ti-6Al-5Zr-0.5Mo-0.25Si	–	–	–
–	TiAl6Zr5Mo4CuSi0.2	–	–	–	M201	–	–	–	Ti-6Al-5Zr-4Mo-Cu-0.2Si	–	–	–
–	–	–	–	–	–	–	–	–	Ti-5Al-5Mo-5V-1Cr-1Fe	–	–	–
–	–	–	–	UNS %58210	–	–	–	–	Ti Beta 21 S	ASTM Grade 21	–	–
Ti 98.8	Ti 98.8	–	–	–	–	–	–	–	–	–	–	–
Ti 99.9	Ti 99.9	–	–	–	–	–	–	–	–	–	–	–
–	TiAl 6 Sn 2 Zr 4 Mo 2	–	–	–	–	–	–	–	–	–	–	–

NOTE: For legend, see page Y217.

**H1**
**Workpiece Materials Listing • Hardened Steels and Irons • H1**
*H1 Hardened Materials Hardness (HRC): 44–48*

AISI**	DIN	BTS	JIS	UNS	EN	AFNOR	UNI	SIS	SAE	ASTM	Material Number	Manufacturer Reference
H 11	X 38 CrMoV 5 H1	BH 11	SKD 6	T20811	X 38 CrMoV 5 H1	Z 38 CDV 5	X 37 CrMoV 5 1 KU	–	–	–	1.2343	–
H11	X 38 CrMoV 5 H1	BH 11	SKD 6	T20811	X 38 CrMoV 5 H1	Z 38 CDV 5	X 37 CrMoV 5 1 KU	–	–	–	1.2343	–
H 13	X 40 CrMoV 5 1	BH 13	SKD 61	T20813	X 40 CrMoV 5 1	Z 40 CDV 5	X 40 CrMoV 5 1 1 KU	2242	–	–	1.2344	–
H 10	X 32 CrMoV 3 3	BH 10	SKD 7	T 20810	X 32 CrMoV 12H-28	32 DCV 28	30 CrMoV 12 27 KU	–	–	–	1.2365	–
H19	X 45 CrCoW 5 5 5	–	–	–	–	–	–	–	–	–	1.2678	–
A 532 I B NiCr-LC	GX 260 NiCr 42	Grade 2 A	0512-00	F45001	GJH-X260NiCr 4-2	–	–	0512-00	–	–	0.9620	–
L6	–	–	–	–	–	55 NCDV 07 (HT)	–	–	–	–	–	–

**H2**
**Workpiece Materials Listing • Hardened Steels and Irons • H2**
*H2 Hardened Materials Hardness (HRC): 48–55*

AISI**	DIN	BTS	JIS	UNS	EN	AFNOR	UNI	SIS	SAE	ASTM	Material Number	Manufacturer Reference
A 532 I A NiCr-HC	G-X 330 NiCr 42	Grade 2 B	0513-00	F45000	GJH-X330NiCr 4-2	FB Ni 4 Cr2 HC	–	0513-00	–	–	0.9625	–
H 21	X 30 WCrV 93	BH 21	SKD 5	T 20821	X 30 WCrV 9 3	Z 30 WCV 9	X 30 WCrV 9 3 KU	–	–	–	1.2581	–
H 12	X 37 CrMoV 5 1	BH 12	SKD 62	T20812	–	Z 35 CWDV 5	X 35 CrMoV 05 KU	–	–	–	1.2606	–
–	G-X 300 NiMo 3 Mg	–	–	–	GJH-X300NiMo 3 Mg	–	–	–	–	–	0.9610	–
A 532 I B NiCr-LC	GX 260 NiCr 42	Grade 2 A	0512-00	F45001	GJH-X260NiCr 4-2	–	–	0512-00	–	–	0.9620	–
A 532 III A 25% Cr	GX 260 Cr 27	Grade 3 D	0466-00	–	GJH-X260Cr 27	–	–	–	–	–	0.9650	–
–	X 2 NiCoMoTi 180905	–	–	–	–	Z 2 NKD 180905	–	–	–	–	–	Durimphy ATI K12 MIL
K12	–	–	–	–	–	–	–	–	–	–	–	–

**H3**
**Workpiece Materials Listing • Hardened Steels and Irons • H3**
*H3 Hardened Materials Hardness (HRC): 56–60*

AISI**	DIN	BTS	JIS	UNS	EN	AFNOR	UNI	SIS	SAE	ASTM	Material Number	Manufacturer Reference
A 532 IIC15% CrMo-HC	G-X 300CrMo 15 3	Grade 3 A	–	–	GJH-X300CrMo 15-3	–	–	–	–	–	0.9635	–
–	G-X 300 CrMoNi 15 2 1	Grade 3 B	–	F45005	GJH-X300CrMoNi15-2-1	–	–	–	–	–	0.9640	–
A 532 IID20% CrMo-LC	GX 260 CrMoNi 20 2 1	Grade 3 C	–	F45007	GJH-X260CrMoNi20-2-1	–	–	–	–	–	0.9645	–
A 532 III A 25% Cr	G-X 300 CrMo 27 1	Grade 3 E	–	–	GJH-X300CrMo 27-1	–	–	–	–	–	0.9655	–
A 2	X 100 CrMoV 5 1	SKD 12	–	–	BA 2	Z 100 CDV 5 (HT)	X 100 CrMoV 51 KU	2260	–	–	1.2363	–
D7 (HT)	–	–	–	T30407	–	Z 230 CVA 12 04	–	–	–	–	1.2378	–
O 2	90 MnCrV 8	BO 2	–	T31502	90 MnV 8	90 MnV 8	90 MnVCr 8 KU	–	–	–	1.2842	–
A 532 I D Ni-HiCr	G-X 300 CrNiSi 95 2	Grade 2 C	0457-00	F45003	GJH-X300CrNiSi 9-5-2	–	–	–	–	–	0.9630	Nihard type 4
S 1	60 WCrV 7	BS 1	–	–	6020 WCrV 8	55 WC 20	55 WCrV 8 KU	–	–	–	1.2550	–
S 1	60 WCrV 7	BS 1	–	–	60 WCrV 8	55 WC 20	55 WCrV 8 UK	–	–	–	1.2550	–
S 7	50 CrMoV 13 14	–	–	–	–	–	–	–	–	–	–	Cryodur 2357 ATI K12-MIL
K 12 (HT)	–	–	–	–	–	–	–	–	–	–	–	–

**H4**
**Workpiece Materials Listing • Hardened Steels and Irons • H4**
*H4 Hardened Materials Hardness (HRC): >60*

AISI**	DIN	BTS	JIS	UNS	EN	AFNOR	UNI	SIS	SAE	ASTM	Material Number	Manufacturer Reference
W 108	C 80 W 1	–	–	T72301	C 80 U	Y1 90	C 80 KU	1880	–	–	1.1525	–
D 2	X 155 CrVMo 12 1	BD 2	SKD 5S	T 30402	X 153 CrMoV 12	Z 160 CDV 12	X 155 CrVMo 12 1 KU	2310	–	–	1.2379	–
–	100 WV4	–	SKS 21	–	–	–	–	–	–	–	1.2515	–
D 3	X 210 Cr 12	BD 3	SKD 1	T30403	X 210 Cr 1 2	Z 200 C 12	X 205 Cr 12 KU	–	–	–	1.2080	–
O 7	110 WCrV 5	–	–	–	–	–	–	–	–	–	–	–
–	Mh97 + Pb	–	–	–	–	–	–	–	–	–	–	LAW 100 Pb

**Workpiece Materials Listing Legend**

\* 1 Mpa = 145 psi.

\*\* Includes ASTM and SAE material specifications.

AISI – American Iron and Steel Institute

AFNOR – French National Organisation for Standardisation

AMS – Aerospace Material Specifications

ASTM – American Society of Mechanical Engineers

BS – British Standards

DIN – German Institute for Standardisation

EN – European Standards

JIS – Japanese Industrial Standards

SAE – Society of Automotive Engineers

SIS – Swedish Standards Institute

UNI – Italian Organisation for Standardisation

UNS – Unified Numbering System