

Inserts	material group	country / standard			
		USA	Germany/Italy		France
Face Mills	HB	AISI/SAE	W.Nr.	DIN	BS
					AFNOR
End Mills	Plain-Carbon Steel				
	180-240	1015	1.1141	Ck15	080M15
	180-240	1015	1.0401	C15	080M15
	150-200	1020	1.0402	C22	055 M 15
	150-200	1025	1.1158	Ck25	(070 M 26)
	170-230	1035	1.0501	C35	060A35
	170-220	1035	1.1183	Cf35	080A35
	210-280	1035	1.1157	40Mn4	150M36
	190-240	1045	1.1191	Ck45	080M46
	190-240	1045	1.0503	C45	080M46
	200-250	1050	1.1213	Cf53	070M55
	210-270	1055	1.0535	C55	070M55
	210-270	1055	1.1203	Ck55	070M55
	230-270	1060	1.0601	C60	060 A 62
	230-290	1060	1.1221	Ck60	060A62
	300-330	1095	1.1274	Ck101	5770-95
	160-230	1140	1.0726	35S20	212M36
	130-230	1215	1.0736	9SMn36	
	200-260	1330	1.1170	28Mn6	150M28
	200-270	1335	1.1167	36Mn5	150 M 36
	290-320	9255	1.0904	55Si7	250A53
	120-220	11L08	1.0722	10SPb20	
	130-220	12L13	1.0718	9SMnPb28	
	130-230	12L14	1.0737	9SMnPb36	
	Low-Alloy Steel				
	160-220	2515	1.5680	12Ni19	Z 18 N 5
	210-280	3135	1.5710	36NiCr6	640A35
	250-360	3415	1.5732	14NiCr10	
	200-290	4130	1.7218	25CrMo4	708 A 25
	230-330	4137	1.7220	34CrMo4	708A37
	230-330	4140	1.7223	41CrMo4	708M40
	240-360	4140	1.7225	42CrMo4	708M40
	270-360	4340	1.6582	34CrNiMo6	817M40
	140-180	4520	1.5423	16Mo5	
	210-270	5015	1.7015	15Cr3	523M15
	200-330	5115	1.7131	16MnCr5	527 M 17
	210-290	5132	1.7033	34Cr4	530A32
	210-230	5140	1.7045	42Cr4	530 A 40
	240-330	5140	1.7035	41Cr4	530M40
	320-330	5155	1.7176	55Cr3	525 A 58
	240-360	6150	1.8159	50CrV4	735A51
	210-330	8620	1.6523	21NiCrMo2	805M20
	320-330	9262	1.7108	60SiCr7	
	240-330	9840	1.6511	36CrNiMo4	817 M 37
	150-200	A350LF5	1.5622	14Ni6	
	200-260	A353	1.5662	X8Ni9	3603-509 LT
	270-370	3415;3310	1.5752	14NiCr14	655M13
	140-180	A 182 F 22	1.7380	10CrMo9 10	3606-622
	140-180	A 182-F 11	1.7335	13CrMo4 4	1502 620-540
	140-170	A204 GrA	1.5415	15Mo3	1503-243
	290-300	E 71400	1.8509	41CrAlMo7	905M39
	200-330		1.7262	15CrMo5	
	150-200		1.7715	14MoV6 3	1503-660-460
	300-400		1.6587	17CrNiMo6	
	300-430		1.7361	32CrMo12	



											sfm						
C	Si	Mn	P	S	Cr	Al	Cu	Mo	V	others	300	450	600	750	900	1050	1200
0.14	0.4	0.5	0.035	0.035													
0.15	0.4	0.45	0.045	0.045													
0.2	0.4	0.55	0.045	0.045	0.4					Mo .10: Ni .40(Cr+Mo+Ni) .63							
0.25	0.4	0.575	0.035	0.035	0.4					Mo .10: Ni .40							
0.35	0.4	0.65	0.045	0.045	0.4					Mo .10: Ni .40							
0.36	0.25	0.7	0.025	0.035													
0.4	0.375	0.95	0.035	0.035													
0.45	0.4	0.65	0.035	0.035	0.4					Mo .08: Ni .40							
0.46	0.4	0.65	0.045	0.045	0.4					Mo .10: Ni .40							
0.54	0.25	0.55	0.025	0.035													
0.56	0.4	0.75	0.045	0.045	0.4					Mo .10: Ni .40(Cr+Mo+Ni) .63							
0.58	0.4	0.75	0.035	0.035	0.4					Mo .10: Ni .40							
0.61	0.4	0.8	0.045	0.045	0.4					Mo .10: Ni .40(Cr+Mo+Ni) .63							
0.61	0.4	0.75	0.035	0.035	0.4					Mo .10: Ni .40							
1.0	0.25	0.5	0.035	0.035													
0.35	0.4	0.95	0.06	0.2													
0.14	0.05	1.25	0.11	0.37													
0.29	0.4	1.5	0.035	0.035	0.4					Mo .10: Ni .40							
0.38	0.4	1.37	0.035	0.035													
0.6	2.0	1.0	0.03	0.035	0.25												
0.1	0.4	0.9	0.06	0.2													
0.14	0.05	1.15	0.11	0.3													
0.14	0.05	1.25	0.11	0.37													
0.15	0.35	0.55	0.02	0.01					0.05	Ni 5.00							
0.36	0.25	0.65	0.035	0.035	0.55					Ni 1.50							
0.14	0.25	0.55	0.035	0.035	0.775					Ni 2.50							
0.25	0.4	0.8	0.035	0.035	1.1			0.225									
0.35	0.4	0.8	0.035	0.035	1.1			0.225									
0.41	0.3	0.65	0.025	0.035	1.1												
0.41	0.4	0.75	0.035	0.035	1.1			0.225									
0.35	0.4	0.65	0.035	0.035	1.55			0.225		Ni 1.55							
0.16	0.3	0.7	0.04	0.04				0.55									
0.16	0.3	0.5	0.035	0.035	0.55	0.02											
0.17	0.4	1.2	0.035	0.035	0.95												
0.35	0.4	0.75	0.035	0.035	1.05												
0.41	0.37	0.65	0.025	0.035	1.05												
0.42	0.4	0.75	0.035	0.035	1.05												
0.55	0.4	0.9	0.03	0.03	0.85												
0.52	0.4	0.95	0.035	0.035	1.05				0.18								
0.2	0.4	0.825	0.035	0.035	0.55			0.2		Ni .55							
0.6	1.7	0.85	0.03	0.03	0.3												
0.36	0.4	0.65	0.035	0.035	1.1			0.275		Ni 1.10							
0.18	0.225	0.45	0.035	0.035						Ni 1.50							
0.1	0.35	0.55	0.02	0.01				0.1	0.05	Ni 9.25							
0.17	0.4	0.55	0.035	0.035	0.75					Ni 3.25							
0.12	0.5	0.65	0.03	0.025	2.25		0.3	1									
0.13	0.35	0.75	0.03	0.025	1		0.3	0.5									
0.16	0.35	0.7	0.03	0.025	0.3			0.3		Ni .30							
0.42	0.4	0.67	0.03	0.035	1.65	1.0		0.3									
0.15	0.25	0.95	0.035	0.035	1.15			0.25									
0.15	0.25	0.6	0.035	0.035	0.5			0.6	0.27								
0.185	0.4	0.75	0.025	0.015	1.7	0.05	0.3	0.2		Ni 1.60							
0.32	0.4	0.55	0.035	0.035	3			0.4		Ni .60							

Inserts

Face Mills

End Mills

Die and Mold

Slotting

Thread Milling

Widia Cutters

Vintage Cutters

Accessories

Technical Data

Mat'l Database

Index

Inserts	material group	country / standard				
		USA	Germany/Italy		U.K.	France
Face Mills	HB	AISI/SAE	W.Nr.	DIN	BS	AFNOR
	High-Speed Steels					
	200-230	52100	1.3505	100Cr6	535A99	100C6
	240-330	A 128	1.3401	X120Mn12		Z120M12
End Mills	240-300	M2	1.3343	S 6-5-2	BM2	Z85WDCV 06-05-04-02
	240-300	M7	1.3348	S 2-9-2		Z100DCWV 09-04-02-02
	240-320	T1	1.3355	S 18-0-1	BT1	Z80WCV 18-04-01
	250-320	T4	1.3255	S 18-1-2-5	BT4	Z80WKCV 18-05-04-01
Die and Mold	250-320		1.3243	S 6-5-2-5	BM 35	Z85WDKCV 06-05-05-04-02
	High-Alloy Steel and High-Alloy Tool Steel					
	230-260	A2	1.2363	X100CrMoV51	BA2	Z100CDV5
	220-240	A6				
Slotting	240-280	A7				
	260-270	D2	1.2379	X155CrVMo12-1	BD2	Z160CDV12
	260-270	D3	1.2080	X210Cr12	BD3	X200Cr12
	360-500	H10	1.2365	X 32 CrMoV 3 3	BH10	32 CDV 12-28
Thread Milling	360-470	H11	1.2343	X38CrMoV5-1	BH11	Z 38 CDV 5
	330-380	H12	1.2606	X37CrMoW5-1	BH12	Z35CWDV5
	360-530	H13	1.2344	X40CrMoV51	BH13	Z40CDV5
	380-500	H19	1.2678		BH19	
Widia Cutters	360-530	H21	1.2581	X30WCrV9 3	BH21	Z30WCV9
	230-260	L3	1.2067	102Cr6	BL3	Y100C6
	240-260	L6	1.2713	55NiCrMoV6	BHH 224/5	55NCDV7
	240-260	M3	1.3342	SC6-5-2		Z90WDCV06-05-04-02
Vintage Cutters	200-210	O1	1.2510	100MnCrW4	BO1	90MnWCrV5
	230-240	O7				
	230-240	S1	1.2542	45WCrV7	BS1	45 WCV 20
	200-220	S7				
Accessories	200-250	W110	1.1545	C105W1		
	200-230	W112	1.1563	C125W		
	230-260	W210	1.2833	100V1	BW2	Y1105V
	260-270		1.2601	X165CrMoV12		
Technical Data	260-270		1.2436	X210CrW12		Z 210 CW 12-01
	230-260		1.2419	105WCr6		105WC13
Mat'l Database	material group	country / standard				
		USA	Germany/Italy		U.K.	France
Index	HB	AMS	W.Nr.	DIN		AFNOR
	Stainless Steel Ferritic, Martensitic, and PH Stainless Steel					
	230-240		1.4027	G-X20Cr14	420C29	Z20C13M
	210-240		1.4034	X 46 Cr13	420S45	Z 44 C 14
	260-330		1.4086	GX 120 Cr29	452C11	
	<255		1.4568	X7CrNiAl177	301S81	Z 9 CAN 17-07
	300-420	13-8 PH	1.4534			
	280-400	15-5 PH	1.4540	X4CrNiCuNb164		Z6CNU15.05
	280-400	15-7 PH	1.4532	X7CrNiMoAl157		Z8CND15.07
	120-180	403	1.4000	X6Cr13	403S17	Z 8 C 12
	<185	405	1.4002	X 6 CrAl 13	405S17	Z 8 CA 12
	140-200	410	1.4006	X12Cr13	410S21	Z 10 C 13
	130-180	410 S	1.4001	X7Cr14	403S17	Z 8 C 13 FF
	180-240	416	1.4005	X12CrS13	416S21	Z 11 CF 13
	230-290	420	1.4021	X20Cr13	420S37	Z 20 C 13
	140-200	430	1.4016	X6Cr17	430S17	Z 8 C 17
	200-260	430F	1.4104	X12CrMoS17		Z10CF17
	260-290	431	1.4057	X17CrNi16-2	431S29	Z15CNI6.02
	140-200	434	1.4113	X6CrMo17-1	434S17	
	275-360	630	1.4542	X5CrNiCuNb164		Z7CNU16.04



											sfm						
C	Si	Mn	P	S	Cr	Al	Cu	Mo	V	others	300	450	600	750	900	1050	1200
0.99	0.25	0.35	0.025	0.015	1.55	0.05	0.3	0.1									
1.2	0.4	12.5	0.1	0.04	1.5												
0.9	0.45	0.4	0.03	0.03	4.2			5	1.9	W 6.35							
1.02	0.45	0.4	0.03	0.03	3.9			8.6	2	W 1.75							
0.75	0.45	0.4	0.03	0.03	4.2				1.1	W 18.00							
0.8	0.45	0.4	0.03	0.03	4.2			0.7	1.55	Co 4.75; W 18.0							
0.92	0.45	0.4	0.03	0.03	4.2			5	1.9	Co 4.75; W 6.35							
1.0	0.3	0.55	0.035	0.035	5.2			1	0.2								
0.7	0.5	2.2			1.1			1.2									
2.45	0.5	0.8			5.4			1.2	4.5	W1.0							
1.55	0.3	0.3	0.03	0.03	11.5			0.7	1								
2.05	0.25	0.275	0.03	0.03	11.5												
0.31	0.25	0.3	0.03	0.03	3.0			2.8	0.55								
0.39	1.10	0.4	0.03	0.03	5.1			1.25	0.38								
0.36	1.1	0.45	0.035	0.035	5.3			1.45	0.275	W 1.30							
0.4	1.1	0.4	0.03	0.03	5.2			1.35	1								
0.45	0.4	0.4	0.025	0.025	4.5			0.5	1.95	Co 4.50; W 4.50							
0.3	0.225	0.3	0.035	0.035	2.65				0.35	W 8.50							
1.0	0.25	0.35	0.03	0.03	1.5												
0.55	0.3	0.8	0.03	0.03	0.7			0.3	0.1	Ni 1.65							
1.15	0.3	0.3			4.1			5.5	2.75	W6.25							
0.9	0.3	1.15			0.5					W0.5							
1.2	0.6	1.0			0.65			0.3		W1.5							
0.45	1.0	0.3	0.035	0.035	1.05				0.18	W 2.0							
0.5	0.6	0.55			3.25			1.5	0.35								
1.05	0.2	0.2	0.02	0.02													
1.3	0.2	0.25	0.03	0.03													
1.0	0.2	0.25	0.025	0.025				0.125									
1.65	0.325	0.3	0.03	0.03	11.5			0.6	0.35	W .50							
2.15	0.25	0.3	0.03	0.03	11.5					W .70							
1.05	0.25	0.95	0.03	0.03	1.0				1.15								

											cutting speed range Vc ft/min.						
Cr	Ni	C	Mn	Si	P	S	Mo	Cu	Ti	others	150	300	450	600	750	900	1050
13.5	1.0	0.2	1.0	1.0	0.045	0.03											
13.5		0.5	1.0	1.0	0.045	0.03											
28.0		1.15	1.0	2.0	0.045	0.03											
17.0	7.0	0.045	0.5	0.5	0.02	0.02				Al 1.15							
13.0	8.0						2.2			Al 1.2							
14.8	4.5	0.03	0.5	0.5	0.02	0.015		3.5		Cb 0.3							
15.0	7.0	0.045	0.5	0.5	0.02	0.015	2.5			Al 1.15							
12.0		0.15	0.5	0.50	0.02	0.01											
13.0		0.08	1.0	1.0	0.04	0.015											
12.0		0.15	0.5	0.50	0.02	0.01	0.5	0.5									
14.0		0.08	1.0	1.0	0.045	0.03											
13.0		0.15	1.25	1.0	0.07	0.07	0.60										
12.5		0.20	1.0	1.0	0.04	0.04											
16.0		0.08	1.0	1.0	0.04	0.03											
17.0		0.12	1.25	1.0	0.06	0.15	0.5										
16.0	2.0	0.20	1.0	1.0	0.04	0.03											
17.0		0.08					0.75										
16.3	4.0	0.035	0.5	0.5	0.02	0.015		4.0		Cb 0.3							

Inserts

Face Mills

End Mills

Die and Mold

Slotting

Thread Milling

Widia Cutters

Vintage Cutters

Accessories

Technical Data

Mat'l Database

Index

Inserts	material group	country / standard				
		USA	Germany/Italy		U.K.	France
Face Mills	HB	AMS	W.Nr.	DIN		AFNOR
	Austenitic Stainless Steel					
	130-140		1.4312	GX 10 CrNi 18-8	302C25	Z10CN18.9M
End Mills	130		1.4552	GX 5 CrNiNb 19-11	347C17	Z 6 CNNb 18.10 M
	140-200		1.4581	GX5CrNiMoNb19-11-2	318C17	Z 4CNDNb 18.12 M
	120-180		1.4865	G-X40NiCrSi38 18	330C11	
	150-170	ASTM A240				
Die and Mold	240-270	ASTM A240				
	330-360	ASTM A693				
	230-290	CA 6-NM	1.4313	X3 CrNiMo 13-4	425C11	Z4CND13.4M
	140-200	CF-8	1.4308	GX5 CrNi 19-10	304C15	Z6CN18.10M
Slotting	140-200	CF-8M	1.4408	GX5 CrNiMo 19-11-2	316C16	
	150-230	UNS N 08904	1.4539	X 1 NiCrMoCuN25-20-5		Z 2 NCDU 25-20
	210-290	301	1.4310	X 10 CrNi 18-8	301S21	Z 11 CN 17-08
	150-210	303	1.4305	X 8 CrNiS 18-9	303S22	Z 8 CNF 18-09
Thread Milling	150-210	304	1.4301	X5CrNi18 9	304S16	Z6CN18.09
	140-210	304L	1.4306	X2CrNi19 11	304S11	Z 3 CN 19-11 FF
	170-230	304LN	1.4311	X2CrNiN18 10	304S61	Z 3 CN 18-07Az
	150-210	305	1.4303	X 4 CrNi18-12	305S17	Z 5 CN 18-11 FF
Widia Cutters	150-230	309	1.4828	X15CrNiSi20 12	309S24	Z 9 CN 24-13
	170-240	310	1.4841	X15CrNiSi25 20	314S25	Z 15 CNS 25-20
	150-230	310S	1.4845	X12CrNi25 21	310S24	Z12CN25 20
	160-220	316	1.4401	X5CrNiMo 17 12 2	316S13	Z6CND17.11
Vintage Cutters	<215	316	1.4436	X 5 CrNiMo 17-13-3	316S33	Z6CND18-12-03
	<215	316L	1.4404	X 2 CrNiMo 17-12-2	316S11	Z2CND17.12
	150-210	316L	1.4435	X2CrNiMo18-14-3	316S11	Z 3 CND 17-13-03
	180-240	316LN	1.4429	X2CrNiMoN17 13 3	316S63	Z 3 CND 17-12 Az
Accessories	150-220	316Ti	1.4571	X6CrNiMoTi17 12 2	320S18	Z6NDT17.12
	150-210	317L	1.4438	X 2 CrNiMo 18-15-4	317S12	Z 2 CND 19-15-04
	150-230	318	1.4583	X10CrNiMoNb18 12		
	150-220	321	1.4541	X6CrNiTi18 10	321S31	Z6CNT18.10
Technical Data	150-230	321	1.4878	X12CrNiTi18 9	321S51	Z 6 CNT 18-10
	170-240	330	1.4864	X12NiCrSi36 16	NA 17	Z 20 NICS 33-16
	160-230	347	1.4550	X6CrNiNb18 10	314S20	Z6CNNb18.10
	140-200	405	1.4724	X10CrAl13	403S17	Z 13 C 13
Mat'l Database	160-220	446	1.4762	X10CrAl 24		Z 12 CAS 25
	Austenitic / Ferritic Stainless Steel (Duplex)					
	200-270	329	1.4460	X 3 CrNiMoN 27-5-2		Z 5 CND 27-05 Az
	<290	S31500	1.4417	GX 2 CrNiMoN 25-7-3		
Index	<270	S31803	1.4462	X 2 CrNiMoN 22-5-3	318S13	Z 3 CND 22-05 Az
	<260	S32304	1.4362	X 2CrNiN 23-4		
	160-230		1.4821	X20CrNiSi254	X15CrNiSi254	Z20CNS25.04
	Austenitic / Ferritic Stainless Steel (Super Duplex)					
	<302	S32550				
	<310	S32750	1.4410	X 2 CrNiMoN 25-7-4		Z5CND20.12M
	<270	S32760				
	material group	country / standard				
		USA	Germany/Italy		U.K.	France
	HB	AMS	W.Nr.	DIN		AFNOR
	Gray Cast Iron					
	175	No 20 B	0.6010	GG 10	Grade 100	Ft 10 D
	185	No 25 B	0.6015	GG 15	Grade 150	Ft 15 D
	205	No 30 B	0.6020	GG 20	Grade 220	Ft 20 D
	220	No 35 B	0.6025	GG 25	Grade 260	Ft 25 D
	230	No 45 B	0.6030	GG 30	Grade 300	R 30 D
	235	No 50 B	0.6035	GG 35	Grade 350	Ft 35 D
	250	No 55 B	0.6040	GG 40	Grade 400	Ft 40 D



											cutting speed range Vc ft/min.						
Cr	Ni	C	Mn	Si	P	S	Mo	Cu	Ti	others	150	300	450	600	750	900	1050
18.0	9.0	0.12	1.5	2.0	0.045	0.03											
19.0	10.5	0.07	1.5	1.5	0.04	0.03											
19.0	11.5	0.06	1.5	1.5	0.045	0.03	2.25										
18.8	38.0	0.4	1.0	1.75	0.045	0.03				W 4.75							
26.0		0.003					1.0										
22.0	5.5						3.0			N 0.16							
16.5	4.3	0.08					2.8										
13.0	4.5	0.07	1.5	1.0	0.035	0.025	0.7										
19.0	10.0	0.07	1.5	2.0	0.045	0.03											
19.0	11.0	0.07	1.5	1.5	0.045	0.03	2.5										
20.5							4.5	1.5									
17.0	7.0	0.14	2.0	1.0	0.045	0.03											
19.5	10.5	0.16	1.5	2.0	0.04	0.3	0.6										
19.5	9.0	0.08	1.5	2.0	0.04	0.04											
19.0	10.0	0.015	1.0	0.5	0.023	0.015											
18.0	10.0	0.03	2.0	1.0	0.045	0.03				N 0.16							
18.0	11.5	0.12	2.0	1.0	0.04	0.03											
23.5	14.0	0.20	1.5	2.0	0.04	0.04											
24.5	20.5	0.18	2.0	1.5	0.04	0.03	0.5	0.5									
25.0	20.5	0.15	2.0	0.75	0.045	0.03											
17.0	13.0	0.08	2.0	0.75	0.04	0.03	1.5	0.50									
17.5	12.0	0.05	2.0	1.0	0.045	0.015	2.75			N .11							
17.5	11.5	0.030	2.0	1.0	0.045	0.015	2.25										
17.0	12.0	0.015	1.0	0.5	0.023	0.015	2.5										
17.5	13.0	0.03	2.0	1.0	0.045	0.025	2.75			N 0.16							
17.5	12.0	0.08	2.0	1.0	0.045	0.03	2.25		5.0								
19.0	13.0	0.015	1.0	1.0	0.023	0.015	3.5										
18.0	14.0	0.08	2.0				2.0										
18.0	9.5	0.08	2.0	1.0	0.04	0.03			0.40								
18.0	10.5	0.12	2.0	1.0	0.045	0.03			0.40	Al 0.40							
15.0	35.0	0.15	1.0	2.5	0.04	0.04											
18.0	11.0	0.08	2.0	1.0	0.045	0.03											
12.0		0.08	1.0	0.50	0.04	0.03				Al 0.10-0.30							
25.0		0.12	1.0	1.0	0.04	0.03				Al 1.50							
25.5	3.5	0.1			0.04	0.03	1.0										
25.0	7.25	0.03	1.5	1.0	0.03	0.02	3.5			N .20: Cu1.00: W 1.00							
22.0	5.5	0.03	2.0	1.0	0.035	0.015	3.0			N .20							
23.0	4.5	0.03	2.0	1.0	0.035	0.015	0.35			Cu .35: N .10							
25.5	4.5	0.15	2.0	1.1	0.04	0.015				N .11							
25.5	5.5	0.04	1.5	1.0	0.04	0.03	3.4	2.0		N .2							
25.0	7.0	0.03	2.0	1.0	0.035	0.015	4			N .30							
25.0	7.0	0.03	1.0	1.0	0.03	0.01	3.5	0.75		N .25: W.75							

											cutting speed range Vc ft/min.						
Si	Fe	Cu	Mn	Mg	Cr	Zn	Ni	V	Ti	others	350	750	1000	1500	2000	3000	4000

Inserts

Face Mills

End Mills

Die and Mold

Slotting

Thread Milling

Widia Cutters

Vintage Cutters

Accessories

Technical Data

Mat'l Database

Index

material group	country / standard				
	USA	Germany/Italy		U.K.	France
HB	ASTM/SAE	W.Nr.	DIN	BS	AFNOR
Ductile Cast Iron					
143-187	60-40-18	0.7033	GGG 35.3	350/22	FGS 350-22
156-217	65-45-12	0.7040	GGG 40	420/12	
187-255	80-55-06	0.7050	GGG 50	500/7	FGS 500-7
210-280	80-60-03	0.7060	GGG 60	600/3	FGS 600-3
241-302	100-70-03	0.7070	GGG 70	700/2	FGS 700-2
265-302	120-90-02	0.7080	GGG 80	900/2	FGS 900-2
Malleable Cast Iron					
150 max	32510	0.8135	GTS-35		MN 350-10
149-197	40010	0.8145	GTS-45		MN450-6
179-229	50005	0.8155	GTS-55	P50-05	
217-269	70003	0.8165	GTS-65	P60-03	
269-321	90001	0.8170	GTS-70	P70-02	Mn 700-2
230		0.8035	GTW-35-04	W340/3	MB35-7
220		0.8040	GTW-40-5	W410/4	MB40-10
220		0.8045	GTW-45-07		
165		0.8055	GTW-55		
180		0.8065	GTW-65		
material group	country / standard				
	USA	Germany/Italy		U.K.	France
HB	ASTM/SAE	W.Nr.	DIN	BS	AFNOR
Non-Ferrous					
20	1050	3.0255	Al99,5	1B	A5
80-160	2011	3.1655	AlCu6BiPb	FC1	A-U5PbBi
45-105	2017	3.1325	AlCu4MgSi		A-U4G
45-135	2024	3.1355	AlCu4Mg1	L97	A-U4G1
28-55	5005	3.3315	AlMg1	N41	A-G0,6
36-63	5050	3.3316	AlMg1,5	3L44	A-G1,5
47-88	5052	3.3523	AlMg2,5	2L56	A-G2,5C
65-120	5056	3.3549	AlMg5Cr	N6	
77-93	5083	3.3547	ASiMg4,5Mn	N8	A-G4,5MC
70-87	5086	3.3545	AlMg4		A-G4MC
62-81	5454		AlMg3Mn	N51	A-G2,5MC
60-95	5754	3.3535	AlMg3	N5	A-G3M
25-105	6063	3.3206	AlMg0,5Si	H9	
58-95	6351	3.2315	AlSiMg0,5Mn	H30	
53-105	7005				
132-147	7050	3.4345	AlZn6CuMgZr	L 86	AZ 4 GU/9051
60-150	7075	3.4365	AlZn5,5MgCu	DTD5074	A-Z5GU
-	360.0	3.2383	R2147AlSi10Mg	LM 9	
-	413.0	3.2582	R2147AlSi12		

Slotting

Mat'l Database

Inserts	material group	country / standard			
		USA	Germany/Italy		France
Face Mills	commercial designation	AMS	W.Nr.	DIN	AFNOR
	High-Temperature Alloys (Fe-Based)				
	20CB-3	ASTM B463			
	Aermet 100				
End Mills	AL 36	ASTM F1684			
	AL 42	ASTM F30			
	AL 4750	ASTM B753			
	AL-6XN Alloy	ASTM SB688			
	ALLOY 21-6-9	ASTM A666			
	Allvac 330	5592, 5716			
	Armco 18				
	Armco 20-45-5				
Die and Mold	Crusible A286	ASTM 368	1.4980		Z06 NCT 25
	Discaloy 16/25/6	5725			Z3 NCT 25
	Discaloy 24	ASTM A638			Z3 NCT 25
	Greek Ascoloy	5508			
Slotting	Haynes 556	5768		X12CrCoNi2120	
	Incoloy 800	ASME SB 409		X10NiCrAlTi3220	25 NC 3520
	Incoloy 801	5552		G-X50CrNi3030	
	Incoloy 802				
	Incoloy 803				
	Incoloy DS			X12NiCrSi3616	3072-76
Thread Milling	Jethete M-152	5718, 5719			Z12 CND 12
	N 155	5768			Z12 CNKDW 20
	N 156				
	S 590	5533		X40CoCrNi2020	Z42 CKNDW
	Sanicro 30			X2NiCrAlTi3220	
	Vasco 13-8 Mo	5629			
Widia Cutters	VascoMax C-200				
	VascoMax C-250	6501, 6512, 6520			
	VascoMax C-300	6514			
	VascoMax C-350				
Vintage Cutters	VascoMax T-200				
	VascoMax T-250	6518, 6519, 6591			
	material group	country / standard			
		USA	Germany/Italy		France
Accessories	commercial designation	AMS	W.Nr.	DIN	AFNOR
	High-Temperature Alloys (Co-Based)				
	Altemp S 816	5534		CoCr20Ni20W	
	HS 21	ASTM F-75		CoCr28Mo	3531
Technical Data	HS 25	AISI 670		CoCr20W15Ni	KC 20 WN
	HS 30			CoCr26Ni14Mo	
	HS 31	ASTM A567		CoCr25NiW	3146
	HS 36			CoCr19W14NiB	KC 25 NW
	Jetalloy 209				
	L 251				
Mat'l Database	L 605	5759		CoCr20W15Ni	KC 20 WN
	M 203				
	M 204				
	M 205				
	MAR M-322			CoCr22W9TaZrNb	
	MAR M-509			CoCr24Ni10WtaZrB	3146-3
Index	MAR M-905				
	MAR M-918			CoCr20Ni20Ta	
	MAR-M 302			CoCrW10TaZrB	



													cutting speed range Vc ft/min.					
Ni	Co	Cr	Mo	W	Si	Mn	C	Al	Ti	P	S	others	75	150	225	300	375	450
33.0		20.0	2.2									Cu 3.3						
11.25	13.4	3.2	1.2		0.03	0.1	0.23			0.003	0.002							
36.0																		
41.0																		
49.0																		
25.0		20.5	6.5				0.02					N 0.2						
6.5		21.0				6.0						No 0.3						
35.5		18.5			1.13	1.0	0.04			0.01	0.01	Cu 0.5						
3.7		17.2			0.47	12.5	0.06											
46.0		20.0	2.3		1.0	5.0	0.08					Nb 0.4						
25.0		14.0	1.3		0.5	1.3	0.05	0.2	2.1									
25.0		16.0	6.0		0.7	1.35	0.12		0.3			Nb 0.4						
26.0		13.5	2.7		0.8	0.9	0.04	0.1	1.7									
2.0		12.0		2.5			0.19											
20.0	20.0	21.0	3.0	2.5			0.1					Nb + Ta						
32.5		21.0			0.5	0.75	0.05	0.37	0.37		0.007	Cu 0.37						
32.0		20.5			0.5	0.8	0.05		1.1									
32.5		21.5			0.4	0.8	0.4											
35.0		25.0					0.08	0.15	0.15									
37.0		18.0			2.3	1.0	0.06											
2.5		12.0	1.7				0.15					V 0.3						
20.0	20.0	21.0	3.0	2.5	0.5	1.5	0.15					Nb 1.0						
33.0	24.0	17.0	3.0	2.0			0.33											
20.0	20.0	21.0	4.0	4.0			0.43											
34.0		22.0			0.55	0.55	0.03	0.3	0.5			Cu 0.1						
8.0		12.8	2.3		0.05	0.10	0.03	1.05		0.005	0.004							
18.5	8.5		3.25		0.05	0.05	0.01		0.2	0.005	0.005							
18.5	7.8		4.8		0.05	0.05	0.02	0.1	0.4	0.005	0.005							
18.5	8.8		4.8		0.05	0.05	0.02	0.1	0.73	0.005	0.005							
18.5	12.0		4.8		0.05	0.05	0.02	0.1	1.4	0.005	0.005							
18.5			3.0		0.05	0.05	0.01		0.7	0.005	0.005							
18.5			3.0		0.03	0.05	0.02	0.1	1.4	0.005	0.005							

													cutting speed range Vc ft/min.					
Ni	Fe	Cr	Mo	W	Si	Mn	C	Al	Ti	P	S	others	75	150	225	300	375	450
20.0	4.0	20.0	4.0	4.0	0.4	1.2			0.38									
3.0	1.0	27.0	5.0		0.6	0.6			0.25									
10.0	3.0	20.0		15.0	2.0	1.5			0.1									
16.0	1.0	24.0	6.0		0.6	0.6			0.4									
10.0	1.5	25.0		8.0	0.75	0.6			0.4									
10.0	2.0	18.0		15.0		1.5			0.4									
10.0	1.0	20.0		15.0				2.0	0.02									
10.0	1.0	19.0		14.0					0.4									
10.0	0.5	20.0		15.0		1.7	0.1											
24.5	1.0	19.5		12.0	1.0	0.8	2.15	24.5	0.07									
24.5		18.5		12.0	1.0	1.0			0.07									
24.5		18.5		12.0			2.75		0.07									
		21.5		9.0	0.1	0.1		0.75	1.0			Ta 4.5, Zr 2.25						
10.0	1.0	23.5		7.0	0.1	0.1		0.2	0.6			Ta 3.5, Zr 0.5						
20.0		20.0						0.5	0.05			Ta 7.5, Zr 0.1						
20.0	0.4	20.0			0.1	0.1			0.05			Ta 7.5, Zr 0.1						
		21.5		10.0					0.85			Ta 9.0						

Inserts

Face Mills

End Mills

Die and Mold

Slotting

Thread Milling

Widia Cutters

Vintage Cutters

Accessories

Technical Data

Mat'l Database

Index



Inserts

Face Mills

End Mills

Die and Mold

Slotting

Thread Milling

Widia Cutters

Vintage Cutters

Accessories

Technical Data

Mat'l Database

Index

material group	country / standard				
	USA	Germany/Italy		U.K.	France
commercial designation	AMS	W.Nr.	DIN		AFNOR
High-Temperature Alloys (Co-Based – cont'd.)					
MP35N					
Nickelvac TJA-1537	ASTM F1537				
Stellite SF1					KC 33 W13
Stellite SF12					KC 28 W8
StelliteSF 6	5387		CoCr25Ni20M0WNb		KC 26 NW
V-36			CoCr21Mo11W		
WI-52			CoCr25NiW	3146-2	
X 40	ASTM A567				
X 45					
X 50					

material group	country / standard				
	USA	Germany/Italy		U.K.	France
commercial designation	AMS	W.Nr.	DIN		AFNOR
High-Temperature Alloys (Ni-Based)					
AL 22	ASME SB575				
Allcor					
Astroloy					
Duranickel 310					
GMR 235	AISI:686				
GMR 235-D			NiCr16MoAl		
Hastelloy B	5396A		S-NiMo30		ND27FeV
Hastelloy B-2					
Hastelloy C	5388C		NiCr17Mo17FeW		NC17DWY
Hastelloy D					
Hastelloy N					
Hastelloy R235					
Hastelloy W					
Hastelloy X	5536	2.4665	NiCr22FeMo	HR6,204	NC22FeD
Haynes 75					
HS 27			NiCo32Cr26Mo		KC20WN
IN 100	5397		NiCo15Cr10MoAlTi		NK15CAT
IN 713					
Incoloy 020	ASME SB463	2.466			
Incoloy 804					
Incoloy 825	ASME SB424	2.4858	NiCr21Mo	3072-76	NC21FeDU
Incoloy 901	5660		NiFe35Cr14MoTi		Z8NCDT42
Incoloy 903					
Incoloy 925					
Inconel 600	5540	2.4816	NiCr15Fe	3072-76	NC15Fe
Inconel 601	5715	2.4851			
Inconel 617		2.4663			
Inconel 622		2.4602			
Inconel 625	ASME SB443	2.4856	NiCr22Mo9Nb		NC22FeDNB
Inconel 620		2.4642			
Inconel 700			NiCo28Cr15MoAlTi		NK27CADT
Inconel 702	5550				
Inconel 706	57-2				
Inconel 713	5391		G-NiCr13Al16MoNb	3146.3	NC13AD
Inconel 718	5383	2.4668	NiCr19Fe19NbMo	HR8	NC19FeNb
Inconel 718-OP					



													cutting speed range Vc ft/min.					
Ni	Co	Cr	Mo	WS	Si	Mn	C	Al	Ti	P	S	others	75	150	225	300	375	450
35.0		20.0	9.8				0.013											
0.2	0.25	28.0	6.0		0.5	0.5	0.06					N 0.2						
		33.0		13.0			2.5											
		29.0		9.0			1.8											
		26.0		5.0			1.0					Nb 6.0						
20.0	3.0	25.0	4.0	2.0	0.4	1.0			0.26			Nb 2.0						
1.0	2.0	21.0		11.0	0.25				0.45			Nb 2.0						
10.5	1.5	25.5		7.5	0.75	0.75			0.5									
10.5	2.0	25.5		7.0		0.7			0.25			B 0.01						
20.5	4.0	22.5		12.0					0.75									

													cutting speed range Vc ft/min.					
Fe	Co	Cr	Mo	W	Si	Mn	C	Al	Ti	P	S	others	75	150	225	300	375	450
2.5		20.6	13.9	2.65														
		31.0	10.0	2.0			0.02	0.25	0.25			Nb 0.4						
	17.0	15.0	5.0				0.04	4.0	3.5			B 0.025						
0.6			0.5		1.0	0.5		4.4	0.6									
10.0		15.5	5.2		0.4	0.2	0.15	3.0	2.0									
4.5		15.5	5.0				0.15	3.5	2.5			B0.05						
5.0	2.0	1.5	28.0		0.05	0.5	0.02					V 0.4						
1.0	0.5	0.5	16.0		0.05	0.5	0.01			0.02	0.015							
6.0	2.0	15.0	17.0	5.0			0.04											
2.0		1.0			9.0	1.0	0.1											
4.0		7.0	16.5				0.02					Cu 3.0						
10.0	2.5	15.5	5.5				0.15	2.0	2.5									
4.0		5.0	24.5				0.02											
18.0	1.5	22	9.0	0.6			0.1											
18.0		20.0					0.12	0.25	0.4			Cu 0.5						
2.0	31.5	26.0	6.0				0.4											
	15.0	10.0	3.0				0.18	5.5	4.7			V 1.0						
2.5		13.0	4.6		0.4	0.2	0.18	6.0	0.8			Nb 2.6						
37.0		20.0	2.5									Nb 0.6, Cu 3.5						
25.4		29.5			0.5	0.75	0.06	0.25	0.6			Cu 0.4						
30.0		21.5		3.0	0.5	0.65	0.03	0.2	0.9			Cu 2.25						
35.3		13.45	6.20		0.22	0.48	0.05		2.5									
42.0	15.0							0.7	1.4			Nb3.0						
28.0		21.0	3.0					0.3	2.1			Cu 1.8						
8.0		15.5					0.075											
14.0		23.0			0.2	0.5	0.05	1.3			0.008	Cu 0.5						
	12.5	22.0	9.0				0.07	1.0										
2.3		20.5	14.2	3.2														
2.5		21.5	9.0				0.05	0.3	0.3			Cb 3.7						
9.0		29.0			0.2	0.2	0.25				0.007	Cu 0.2						
0.7	28.5	15.0	3.7		0.3	0.1	0.12	3.0	2.2									
0.4		15.6			0.2	0.05	0.04	3.4	0.7									
		16.0					0.03		1.8			Cb 2.9						
		12.0	4.5				0.13	6.0	0.6									
17.2		19.0	3.1				0.02	0.5	0.9			Cb 5.2						
17.2		19.0	3.1				0.02	0.5	0.9			Cb 5.2						

Inserts

Face Mills

End Mills

Die and Mold

Slotting

Thread Milling

Widia Cutters

Vintage Cutters

Accessories

Technical Data

Mat'l Database

Index



Inserts
Face Mills
End Mills
Die and Mold
Slotting
Thread Milling
Widia Cutters
Vintage Cutters
Accessories
Technical Data
Mat'l Database
Index

material group	country / standard				
	USA	Germany/Italy		U.K.	France
commercial designation	AMS	W.Nr.	DIN		AFNOR
High-Temperature Alloys (Ni-Based – cont'd.)					
Inconel 720					
Inconel 721					
Inconel 722	5541		NiCr16FeTi		NC16Feti
Inconel 725					
Inconel 751		2.4694			
Inconel X-750	5542	2.4669	NiCr16FeTi		NC15FeTNb
Jessop G 81			NiCr20Co18Ti		
Jethete M-252	5551		G-NiCr19Co		
MAR-M 200			NiW13Co10Cr9AlTi		NKW10CATaHf
MAR-M 246			NiCo10W10Cr9AlTi		
MAR-M 421			NiCr16Co10WAlTi		
MAR-M 432			NiCo20Cr16WAlTi		
Monel 400	4544	2.4360	NiCu30Fe	3072-76	NU30
Monel K 500	4676	2.4375	NiCu30Al	3072-76	
Monel R 405	4674				
Nimocast 713	5391A		G-NiCr13Al16MoNb	HC203	NC13AD
Nimocast PD 16			NiFe33Cr17Mo		
Nimocast PE 10				HC202	NC20N13
Nimonic 105		2.4634	NiCo20Cr15MoAlTi	HR3	NCKD20ATV
Nimonic 115		2.4636	NiCo15Cr15MoAlTi	HR401,601	NCVK15ATD
Nimonic 75		2.4630	NiCr20Ti	HR5, 203-4	NC20T
Nimonic 80A		2.4631	NiCr20TiAl	HR401,601	NC20TA
Nimonic 86					
Nimonic 90		2.4632	NiCr20Co18Ti	HR2,202	NCK20TA
Nimonic 901	5660, 5661	2.4662	NiCr15MoTi		Z8NCDT42
Nimonic 95					
Nimonic C-22					
Nimonic C-263		2.4650	NiCr20CoMoTi	HR10	NCK20D
Nimonic C-276	ASME SB575	2.4819			
Nimonic PE 13	5536E		NiCr22Fe18Mo	HR6,204	NC22FeD
Nimonic PE 16			NiFe33Cr17Mo	HR207	NW11AC
Nimonic PK 25	5751A				NKCD20ATU
Nimonic PK 31					
Nimonic PK 33			NiCr20Co16MoTi	5057	NC19KDU/V
R-235					
Refractaloy 26	AISI:690				Z6NKCDDT38
Rene' 100			NiCo15Cr10MoAlTi		
Rene' 125					
Rene' 41	5712, 5713		NiCr19Co11MoTi	NC19KDT	
Rene' 63					
Rene' 77					
Rene' 80					
Rene' 95					NC14K8
TRW VIA			NiTa9Co8W6CrAl		
Udimet 500	AISI:684		NiCr18CoMoAlTi		NCK19DAT
Udimet 520					
Udimet 630			NiCr19NbMo		
Udimet 700	AISI:687		NiCo15Cr15MoAlTi		NCKD20AT
Udimet 710					NCK18TDA
Udimet 718	5583		NiCr19Fe19NbMo	HR8	NC19FeNb
Waspaloy	5544	2.4654	NiCr20Co14MoTi		NC20K14



													cutting speed range Vc ft/min.					
Fe	Co	Cr	Mo	W	Si	Mn	C	Al	Ti	P	S	others	75	150	225	300	375	450
	14.7	18.0	3.0	1.25				2.5	5.0									
8.0		16.0			0.15	2.25	0.07	0.1	3.0			Cu0.2						
7.0		15.5					0.04	0.7	2.4									
7.5		21.0	8.0					0.3	1.5			Nb 3.5						
7.0		15.5			0.2	0.5	0.05	1.2	2.3		0.005	Cb 1.1,Cu 0.2						
7.0		15.5					0.04	0.7	2.5			Cb 0.95						
0.5	16.9	20.6			0.2	0.5	0.08	1.5	2.5									
2.5	10.0	19.0	9.75				0.15	1.0	2.5			B 0.007						
	10.0	9.0		12.5			0.15	5.0	2.0			Nb1.0						
	10.0	9.0	2.5	10.0			0.15	5.5	1.5			Ta1.5						
	10.0	15.5	1.7	3.5			0.15	4.25	1.75			Nb1.75						
	20.0	15.5		3.0			0.15	2.5	4.3			Nb2.0						
1.2					0.25		0.15				0.01							
1.0					0.25	0.7	0.1	2.7	0.6		0.01							
1.25					0.25	1.0	0.15					Cu31.5						
		13.5	4.5				0.12	6.0	0.9									
34.0		16.5	3.3				0.06	1.2	1.2									
3.0		20.0	6.0	2.5			0.03											
0.5	20.0	14.75	5.0		0.5	0.5	0.1	4.7	1.2			Cu						
	13.2	14.2	4.0				0.16	5	4			Zr						
4.0		20.0			0.45	0.45	0.45	0.1	0.35			Cu+S						
0.55		19.5			0.2	0.55	0.08	1.4	2.4			Cu+S						
		25.0	10.0									Ce 0.03						
0.3	18.0	19.5					0.065	1.4	2.4									
35.0		12.5	6.0				0.05		2.8			B 0.015						
5.0	18.0	19.5			1.0	1.0	0.1	2.0	3.5									
4.0	1.2	21.2	13.5	3.0	0.04	0.2	0.07			0.01		V 0.17						
	20.0	20.0	5.85				0.06	0.45	2.15									
5.0	0.5	15.5	16.0	3.5			0.01											
18.5	1.5	21.75	9.0	0.6	0.5	0.5	0.1											
1.2		16.5	3.5				0.05	1.2	1.2									
	19.5	19.0	4.0		0.75	0.75	0.08	2.9	2.9			B 0.01						
	14.0	20.0	4.5					0.4	2.3			Nb5						
0.5	14.0	18.0	7.0		0.25	0.25	0.05	2.1	2.0									
10.0	1.15	15.0	5.5		0.3	0.1	0.12	20	2.5									
16.0	20.0	18.0	3.2		1.0	0.8	0.03	0.2	2.8									
	15.0	10.0	3.0				0.18	5.5	4.7			V1.0						
	10.0	8.9	2.0	7.0			0.1	4.7	2.5			Hf1.05, Ta3.0						
3.0	11.0	19.0	9.75				0.06	1.6	2.5			B 0.007						
3.5	15.0	14.0	6.0	3.5	0.2	0.1	0.05	3.8	2.5									
0.4	15.0	15.0	4.2		0.1	0.1	0.07	4.3	3.3									
	9.5	14.0	4.0	4.0			0.17	3.0	5.0									
	8.0	14.0	3.5	3.5			0.15	3.5	2.5			Nb3.5						
	7.5	6.0	2.0	5.8			0.13	5.4	1.0			Nb0.5, Ta9.0						
	19.0		4.0		0.1	0.1	0.07	3.0	3.0									
	12.0	19.0	6.0	1.0				2.0	3.0									
18.0	18.0		3.0				0.03	0.5	1.0			Nb6.5						
	16.5	15.0	5.0				0.07	4.4	3.4									
	15.0	18.0	3.0	1.5			0.07	2.5	5.0									
18.0		18.0	3.0				0.05	0.6	1.0			Nb+ Ta5.2						
	13.0	19.5	4.3				0.05	1.40	3.0			Zr .07						

Inserts

Face Mills

End Mills

Die and Mold

Slotting

Thread Milling

Widia Cutters

Vintage Cutters

Accessories

Technical Data

Mat'l Database

Index

Inserts
Face Mills
End Mills
Die and Mold
Slotting
Thread Milling
Widia Cutters
Vintage Cutters
Accessories
Technical Data
Mat'l Database
Index

material group	country / standard				
	USA	Germany/Italy		U.K.	France
commercial designation	AMS	W.Nr.	DIN		AFNOR
Titanium Alloys-Alpha					
Ti-5Al-2.5Sn	ASTM: B 265		TiAl5Sn2	TA 14,17	T-A5E
Ti-7Al-4Mo	ASTM: B 381		TiAl7Mo4		
Ti-8Al-1Mo-1V	4915, 4933, 4972		TiAl8Mo1V1		
Ti-6Al-4Zr-2Mo-2Sn	4919, 4975, 4976		TiAl6Zr4Mo2Sn2		
Titanium Alloys-Alpha Beta					
Ti-6Al-4V	4906, 4920, 4928, 4965, 4967		TiAl6V4	TA 10-13; TA 28	T-A6V
Ti-6Al-6V-2Sn	4971		TiAl6V6Sn2		
Ti-4Al-4Mo-2Sn-0.5Si			TiAl4Mo4Sn2Si0.5	5103	T-A4DE
Ti-4Al-4Mo-4Sn-0.5Si			TiAl4Mo4Sn4Si0.5	5203	
Ti-7Al-4Mo	ASTM: B 381		TiAl7Mo4		
Ti-6Al-5Zr-0.5Mo-0.25Si			TiA6Zr5Mo0.5Si0.25		T-AGZ-50
Ti-6Al-5Zr+4Mo-Cu-0.2Si			TiAl6Zr5Mo4CuSi0.2	M201	
Allvac 3-2.5	4943, 4944				
Allvac 6-4ELI	4907, 4930, 4931				
Allvac 6-2-4-6	4981				
Allvac Ti-17	4995				
Titanium Alloys-Beta					
Ti-13V-11Cr-3Al	4917		TiV13Cr11Al3		
Ti-8Mo-8V-2Fe-3Al					
Ti-3Al-8V-6Cr-4Mo-4Zr					
Ti-11.5Mo-6Zr-4.5Sn					
Titanium Alloys-Pure					
Ti 99.5	ASTM: B381F4		Ti 99.5	TA 6	AIR: 9182 T60
Ti 99.6	ASTM: B381F3		Ti 99.6		AIR: 9182 T50
Ti 99.7	ASTM: B381F2		Ti 99.7	TA 2-5	AIR: 9182 T40
Ti 99.8	ASTM: B381F1		Ti 99.8	TA 1	AIR: 9182 T35



							cutting speed range Vc ft/min.					
Al	Sn	Mo	V	Zr	Si	others	75	150	225	300	375	450
5.0	2.5											
7.0		4.0										
8.0		1.0	1.0									
6.0	2.0	2.0		4.0								
6.0			4.0									
5.5	2.0		5.5									
4.0	2.0	4.0			0.55							
4.0	4.0	4.0			0.5							
7.0		4.0				Fe 0.3						
6.0		0.5		5.0	0.25							
6.0		4.0		5.0	0.2	Cu 1.0						
3.0			2.5			Fe 0.13						
6.0						Fe 0.2						
6.0	2.0	6.0		4.0		Fe 0.10						
5.0	2.0	4.0		2.0		Cr 4.0						
3.0			13.0			Cr 11.0						
3.0		8.0	8.0									
3.0		4.0	8.0	4.0		Cr 6.0						
	4.5	11.5		6.0								

Inserts

Face Mills

End Mills

Die and Mold

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Thread Milling

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Widia Cutters

Vintage Cutters

Accessories

Technical Data

Mat'l Database

Index