

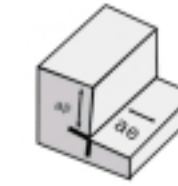


Technical Data

Materials groups		DIN	JIS	Mpa (N/mm ²)	HB	HRC
P	P1	CK10 CK15 ST44-2 ST37-2	S10C S15C SM400 STKM12C	≤ 500	≤ 150	
	P2	CK35 CK40 Ck45	S35C S40C S45C	≤ 800	≤ 238	≤ 22.2
	P3	CK55 37Cr4 X210Cr12	S55C SCR435 SKD1	≤ 1100	≤ 325	≤ 35
	P4	16MnCr5 20CrMo5 25CrMo4 42CrMo4	SCR415 SCM421 SCM430 SCM440	≤ 1400	≤ 415	≤ 45
M	M1	X10CrNiS18-9 X5CrNi18-9 X2CrNi19-11 X5CrNiMo17-13-3 X2CrNiMo17-13-2	SUS303 SUS304 SUS304L SUS316	≤ 800	≤ 238	≤ 22.2
	M2	X5CrNi13-4 X17CrNi16-2 X105CrMo17 X2CrNiMoN25-7-4	SCS5 SUS431 SUS440C SCS14A	≤ 1100	≤ 325	≤ 35
	M3	X7CrNiAl17-7 X5CrNiCuNb16-4	SUS631 SCS630	≤ 1400	≤ 415	≤ 45
K	K1	GG15 GG20 GG25 GG30 GG35 GG40	FC15 FC20 FC25 FC30 Fc40	≤ 500	≤ 150	
	K2	GG50 GG60 GG70 GG80	FCD500 FCD600 FCD700	≤ 800	≤ 238	≤ 22.2
	K3	ADI800 ADI1000 ADI1200	FCD800 FCD1000 FCD1200	≤ 1100	≤ 325	≤ 35
N	N1	Al99.9MgSi AlMg1 AlMg3Si AlZnMgCu1.5	A1200 A6060 A6061 A7075			
	N2	GD-AlSi12(Cu) G-AlSi12 G-AlSi9 G-AlSi12CuNiMg	ADC12 ADC3 ADC10 ADC8A	≤ 500	≤ 150	
	N3	CuZn20 CuZn33 CuNi18Zn 19Pb CuSn10	C2400 C2680 C7941 C6140	≤ 800	≤ 238	≤ 22.2
	N4	PVC POM PMMA Bakelit				
	N5	GFK CFK AFK				
S	S1	X15CrNiSi20-12 X15CrNiSi25-20 Ti99.3 Ti99.2	SUH309 SUH310	≤ 1100	≤ 325	≤ 35
	S2	X12NiCrSi36-16 X10NiCrAlTi33-20	SUH330 NCF800	≤ 1400	≤ 415	≤ 45
	S3	NiCr22Mo9Nb NiCr19FeNbMo	Inconel625 Inconel718 (USA)	≤ 1700	≤ 494	≤ 50
H	H1	Weldox1100				≤ 50
	H2	55NiCrMoV6	SKT4			≤ 55
	H3	X155CrVMo12-1	SKD11			≤ 60
	H4	X21CrW12	SKD2			≤ 65



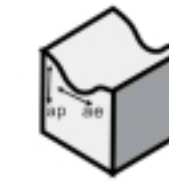
Technical Data



A
Ae=0.3D
Ap=2D



B
Ae=1D
Ap=1D



C
Ae=0.04D
Ap=0.5D



Materials groups	A/B/C	Vc M/min	Fz mm/z										INDEX											
			D2	D4	D6	D8	D10	D12	D16	D20	D25	301 302	300 303 304 347	306 307	305 308 309	311 346 348 358	310 361 362	312 313 331 332 359 360	342 343 344 345 375 340 341	363 364 375 376	383 384 385 386			
P1	A	120-200	0.02	0.03	0.04	0.05	0.07	0.08	0.1	0.12	0.15													
	B	100-150	0.016	0.024	0.032	0.04	0.056	0.064	0.08	0.096	0.12													
P2	A	100-180	0.02	0.03	0.04	0.05	0.07	0.08	0.1	0.12	0.15													
	B	80-140	0.016	0.024	0.032	0.04	0.056	0.064	0.08	0.096	0.12													
P3	A	90-160	0.02	0.03	0.04	0.05	0.07	0.08	0.1	0.12	0.15													
	B	80-120	0.016	0.024	0.032	0.04	0.056	0.064	0.08	0.096	0.12													
P4	A	80-140	0.016	0.024	0.032	0.04	0.056	0.064	0.08	0.096	0.12													
	B	80-100	0.013	0.02	0.026	0.032	0.045	0.052	0.064	0.08	0.096													
	C	120-200	-	-	0.3	0.4	0.45	0.5	0.6	0.7	0.8													
M1	A	80-110	0.015	0.025	0.03	0.04	0.05	0.06	0.08	0.1	0.12													
	B	70-100	0.012	0.02	0.024	0.032	0.04	0.05	0.056	0.08	0.1													
M2	A	70-100	0.015	0.025	0.03	0.04	0.05	0.06	0.08	0.1	0.12													
	B	60-80	0.012	0.02	0.024	0.032	0.04	0.05	0.056	0.08	0.1													
M3	A	50-80	0.012	0.02	0.024	0.032	0.04	0.05	0.056	0.08	0.1													
	B	50-70	0.01	0.016	0.02	0.025	0.032	0.04	0.05	0.064	0.08													
	C	80-110	-	-	0.3	0.4	0.45	0.5	0.6	0.7	0.8													
K1	A	120-150	0.02	0.03	0.04	0.05	0.07	0.08	0.1	0.12	0.15													
	B	110-140	0.016	0.024	0.032	0.04	0.056	0.064	0.08	0.096	0.12													
K2	A	110-140	0.02	0.03	0.04	0.05	0.07	0.08	0.1	0.12	0.15													
	B	100-120	0.016	0.024	0.032	0.04	0.056	0.064	0.08	0.096	0.12													
K3	A	100-120	0.016	0.024	0.032	0.04	0.056	0.064	0.08	0.096	0.12													
	B	90-110	0.013	0.02	0.028	0.032	0.045	0.055	0.064	0.08	0.1													
N1	A	300-800	0.024	0.028	0.042	0.056	0.08	0.1	0.15	0.18	0.22													
	B	300-600	0.02	0.025	0.035	0.05	0.06	0.08	0.12	0.15	0.18													
N2	A	300-800	0.024	0.028	0.042	0.056	0.08	0.1	0.15	0.18	0.22													
	B	300-600	0.02	0.025	0.035	0.05	0.06	0.08	0.12	0.15	0.18													
N3	A	250-600	0.02	0.025	0.035	0.05	0.06	0.08	0.12	0.15	0.18													
	B	200-500	0.016	0.02	0.03	0.04	0.05	0.07	0.1	0.12	0.15													
N4	A	300-800	0.03	0.035	0.045	0.06	0.09	0.11	0.17	0.2	0.24													
	B	300-600	0.025	0.03	0.032	0.05	0.075	0.09	0.15	0.18	0.2													
N5	A	80-200	0.016	0.02	0.03	0.04	0.05	0.07	0.1	0.12	0.15													
	B	60-160	0.013	0.016	0.025	0.032	0.04	0.056	0.08	0.1	0.12													
S1	A	20-50	0.012	0.018	0.03	0.035	0.045	0.05	0.07	0.09	0.11													
	B	20-40	0.01	0.015	0.025	0.03	0.04	0.05	0.06	0.075	0.09													
	C	25-60	-	-	0.3	0.4	0.45	0.5	0.6	0.7	0.8													
S2	A	20-45	0.01	0.015	0.025	0.03	0.04	0.05	0.06	0.075	0.09													
	B	20-40	0.008	0.012	0.02	0.025	0.035	0.04	0.05	0.06	0.072													
	C	20-45	-	-	0.3	0.4	0.45	0.5	0.6	0.7	0.8													
S3	A	20-40	0.008	0.012	0.02	0.025	0.035	0.04	0.05	0.06	0.072													
	B	20-35	0.007	0.01	0.016	0.02	0.03	0.035	0.04	0.05	0.06													
	C	20-40	-	-	0.3	0.4	0.45	0.5	0.6	0.7	0.8													
H1	A	80-140	0.015	0.02	0.025	0.035	0.04	0.05	0.06	0.08	0.09													
	C	80-140	-	-	0.3	0.4	0.45	0.5	0.6	0.7	0.8													
H2	A	70-120	0.012	0.015	0.02	0.03	0.035	0.04	0.05	0.065	0.08													
	C	70-120	-	-	0.3	0.4	0.45	0.5	0.6	0.7	0.8													
H3	A	60-100	0.008	0.012	0.016	0.025	0.03	0.035	0.05	0.6	0.07													
	C	60-100	-	-	0.2	0.3	0.35	0.4	0.5	0.6	0.7													
H4	A	50-80	0.005	0.01	0.014	0.02	0.025	0.03	0.04	0.05	0.06													
	C	50-80	-	-	0.2	0.3	0.35	0.4	0.5	0.6	0.7													



Technical Data

Materials groups		DIN	JIS	Mpa (N/mm ²)	HB	HRC
P	P1	CK10 CK15 ST44-2 ST37-2	S10C S15C SM400 STKM12C	≤500	≤150	
	P2	CK35 CK40 Ck45	S35C S40C S45C	≤800	≤238	≤22.2
	P3	CK55 37Cr4 X210Cr12	S55C SCR435 SKD1	≤1100	≤325	≤35
	P4	16MnCr5 20CrMo5 25CrMo4 42CrMo4	SCR415 SCM421 SCM430 SCM440	≤1400	≤415	≤45
M	M1	X10CrNiS18-9 X5CrNi18-9 X2CrNi19-11 X5CrNiMo17-13-3 X2CrNiMo17-13-2	SUS303 SUS304 SUS304L SUS316	≤800	≤238	≤22.2
	M2	X5CrNi13-4 X17CrNi16-2 X105CrMo17 X2CrNiMoN25-7-4	SCS5 SUS431 SUS440C SCS14A	≤1100	≤325	≤35
	M3	X7CrNiAl17-7 X5CrNiCuNb16-4	SUS631 SCS630	≤1400	≤415	≤45
K	K1	GG15 GG20 GG25 GG30 GG35 GG40	FC15 FC20 FC25 FC30 Fc40	≤500	≤150	
	K2	GG50 GG60 GG70 GG80	FCD500 FCD600 FCD700	≤800	≤238	≤22.2
	K3	ADI800 ADI1000 ADI1200	FCD800 FCD1000 FCD1200	≤1100	≤325	≤35
N	N1	Al99.9MgSiAlMg1 AlMg3SiAlZnMgCu1.5	A1200 A6060 A6061 A7075			
	N2	GD-AlSi12(Cu) G-AlSi12 G-AlSi9 G-AlSi12CuNiMg	ADC12 ADC3 ADC10 ADC8A	≤500	≤150	
	N3	CuZn20 CuZn33 CuNi18Zn 19Pb CuSn10	C2400 C2680 C7941 C6140	≤800	≤238	≤22.2
	N4	PVC POM PMMA Bakelit				
	N5	GFK CFK AFK				
S	S1	X15CrNiSi20-12 X15CrNiSi25-20 Ti99.3 Ti99.2	SUH309 SUH310	≤1100	≤325	≤35
	S2	X12NiCrSi36-16 X10NiCrAlTi33-20	SUH330 NCF800	≤1400	≤415	≤45
	S3	NiCr22Mo9Nb NiCr19FeNbMo	Inconel625 Inconel718 (USA)	≤1700	≤494	≤50
H	H1	Weldox1100				≤50
	H2	55NiCrMoV6	SKT4			≤55
	H3	X155CrVMo12-1	SKD11			≤60
	H4	X21CrW12	SKD2			≤65

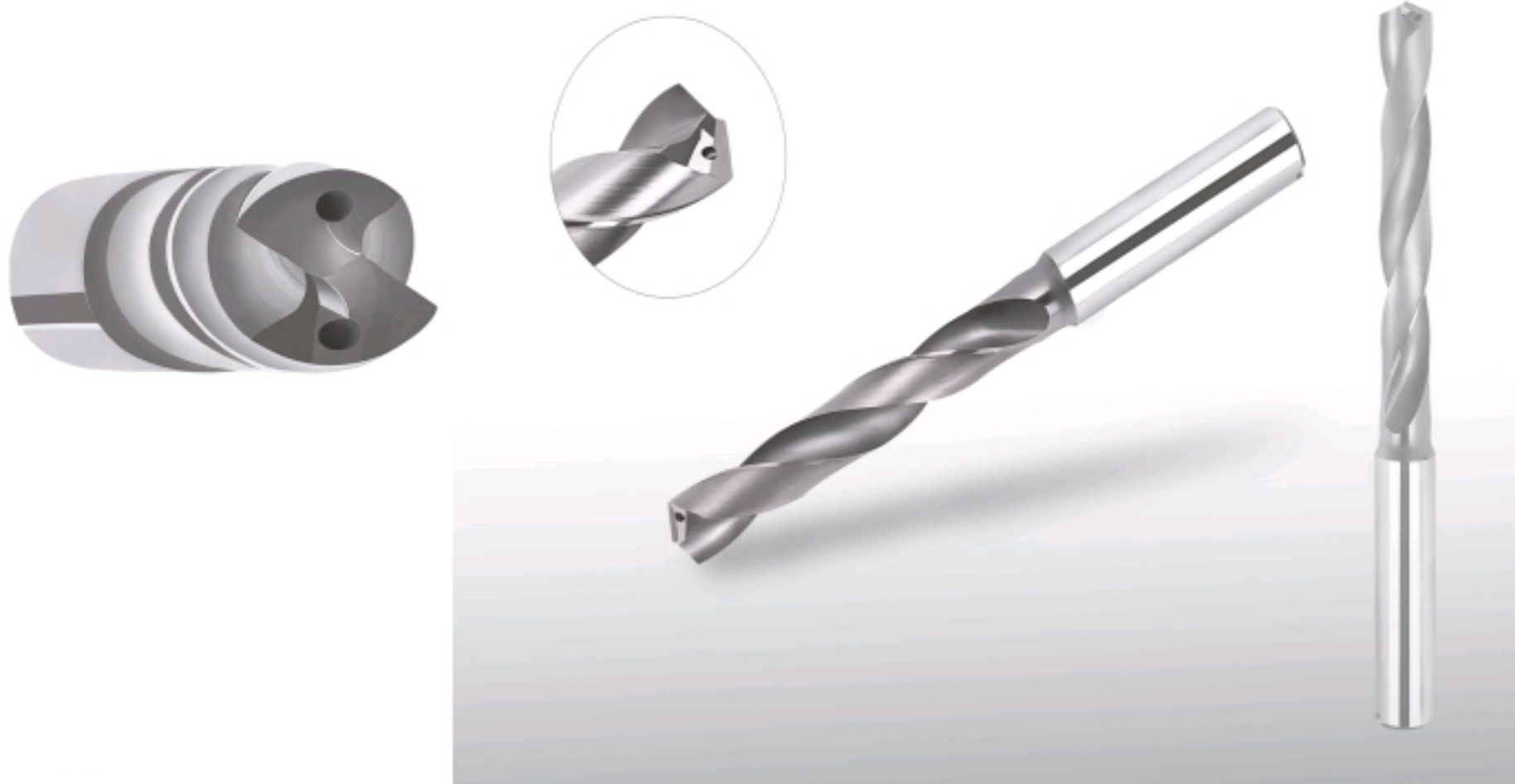


Technical Data

				<div><div>A</div><div>B</div></div>													INDEX																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																										
Materials groups	A/B	Number of passes	Vc M/min	Fz mm/z													400...	402...	404...	406...	410...	411...	412...	413...	414...	415...	420...	421...	422...	423...	426...	430...	431...	440...	441...	442...	443...	444...	445...	450...	451...	452...	453...	454...	455...	456...	460...	461...	462...	463...	464...	465...	466...	467...	446...	447...																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																			
				D1	D1.5	D2	D3	D4	D6	D8	D10	D12	D14	D16	D20																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												
P1	A	1-2	60-120	0.04	0.04	0.045	0.06	0.08	0.10	0.12	0.15	0.18																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															



Technical Data



Materials groups		DIN	JIS	Mpa (N/mm ²)	HB	HRC
P	P1	CK10 CK15 ST44-2 ST37-2	S10C S15C SM400 STKM12C	□500	□150	-
	P2	CK35 CK40 Ck45	S35C S40C S45C	≤800	≤238	□22.2
	P3	CK55 37Cr4 X210Cr12	S55C SCR435 SKD1	≤1100	≤325	≤35
	P4	16MnCr5 20CrMo5 25CrMo4 42CrMo4	SCR415 SCM421 SCM430 SCM440	≤1400	≤415	-
M	M1	X10CrNiS18-9 X5CrNi18-9 X2CrNi19-11 X5CrNi17Mo-13-3 X2CrNiMo17-13-2 X5CrNi13-4 X17CrNi16-2 X105CrMo17 X2CrNiMoN25-7-4	SUS303 SUS304 SUS304L SUS316 SUS316L	□800	□238	□22.2
	M2		SCS5 SUS431 SUS440C SCS14A	≤1100	≤325	≤35
	M3	X7CrNiAl17-7 X5CrNiCuNb16-4	SUS631 SCS630	≤1400	≤415	≤45
K	K1	GG15 GG20 GG25 GG30 GG35 GG40	FC15 FC20 FC25 FC30 Fe40	□500	□150	-
	K2	GG50 GG60 GG70 GG80	FCD500 FCD600 FCD700	≤800	≤238	□22.2
	K3	ADI800 ADI1000 ADI1200	FCD800 FCD1000 FCD1200	≤1100	≤325	≤35
N	N1	Al99.9MgSi AlMg1 AlMg3Si AlZnMgCu1.5	A1200 A6060 A6061 A7075	-	-	-
	N2	CD-AlSi12(Cu) G-AlSi12 G-AlSi9 G-AlSi12CuNiMg	ADC12 ADC3 ADC10 ADC8A	-	-	-
	N3	CuZn20 CuZn33 CuNi16Zn19Pb Cu8Ni10	C2400 C2680 C7941 C6140	□500	□150	-
	N4	PVC POM PMMA Bakelite		-	-	-
	N5	GFK CFK AFK		-	-	-
S	S1	X15CrNiSi20-12 X15CrNiSi25-20	SUH309 SUH310	□1100	□325	□35
	S2	X12NiCrSi36-16 X10NiCrAlTi33-20	SUH330 NCF800	≤1400	≤415	≤45
	S3	NiCr22Mo9Nb NiCr19FeNbMo	Inconel625 Inconel718 (USA)	≤1700	≤494	≤50
H	H1			-	-	□50
	H2			-	-	≤55
	H3			-	-	≤60
	H4			-	-	≤65



Technical Data

CODE GROUP		Feed table F mm/rev									
		A	B	C	D	E	F	G	H	I	J
Drills φmm	0.1	0.0008	0.0010	0.0012	0.0014	0.0016	0.0018	0.0020	0.0025	0.0030	0.0040
	0.3	0.0024	0.0030	0.0036	0.0042	0.0048	0.0054	0.0060	0.0075	0.0090	0.0120
	0.5	0.0040	0.0050	0.0060	0.0070	0.0080	0.0090	0.0100	0.0125	0.0150	0.0200
	1.0	0.0080	0.0100	0.0120	0.0140	0.0160	0.0180	0.0200	0.0250	0.0300	0.0400
	2.0	0.0160	0.0200	0.0240	0.0280	0.0320	0.0360	0.0400	0.0500	0.0600	0.0800
	3.0	0.0240	0.0300	0.0360	0.0420	0.0480	0.0540	0.0600	0.0750	0.0900	0.1200
	4.0	0.0320	0.0400	0.0480	0.0560	0.0640	0.0720	0.0800	0.1000	0.1200	0.1600
	5.0	0.0400	0.0500	0.0600	0.0700	0.0800	0.0900	0.1000	0.1250	0.1500	0.2000
	6.0	0.0480	0.0600	0.0720	0.0840	0.0960	0.1080	0.1200	0.1500	0.1800	0.2400
	8.0	0.0640	0.0800	0.0960	0.1120	0.1280	0.1440	0.1600	0.2000	0.2400	0.3200
	10.0	0.0800	0.1000	0.1200	0.1400	0.1600	0.1800	0.2000	0.2500	0.3000	0.4000
	12.0	0.0816	0.1020	0.1224	0.1428	0.1632	0.1836	0.2040	0.2550	0.3060	0.4080
	16.0	0.1088	0.1360	0.1632	0.1904	0.2176	0.2448	0.2720	0.3400	0.4080	0.5440
	20.0	0.1360	0.1700	0.2040	0.2380	0.2720	0.3060	0.3400	0.4250	0.5100	0.6800

INDEX	503...504... 505...	506...		511...513... 515...	543...545... 548...550...	523...524... 525...528...	555...560... 565...570...	583...		584...585...		586...						
Data.	Vc m/min	F	Vc m/min	F	Vc m/min	F	Vc m/min	F	Vc m/min	F	Vc m/min	F	Vc m/min	F	Vc m/min	F		
P1	60-80	B	80-100	C	80-150	G	100-180	I	120-180	J	80-120	I	-	-	100-180	H	40-80	H
P2	60-80	B	80-100	C	80-150	G	100-180	I	120-180	J	80-120	I	-	-	100-180	H	40-70	H
P3	50-70	A	70-90	B	80-120	F	100-150	H	110-150	I	70-100	H	-	-	100-150	G	30-60	G
P4	-	-	50-70	A	60-100	E	70-120	F	80-120	H	50-80	F	50-80	D	70-120	E	30-60	
M1	-	-	50-70	B	50-80	F	60-80	H	60-90	J	70-100	H	-	-	60-80	G	25-50	G
M2	-	-	50-60	B	50-70	F	50-70	F	50-80	J	60-80	F	-	-	50-70	D	45-90	D
M3	-	-	40-50	A	40-60	D	45-60	D	45-70	H	40-60	E	40-70	D	45-60	C	-	
K1	80-100	C	100-130	D	120-180	H	130-200	J	130-200	J	100-150	J	-	-	130-200	H	45-90	F
K2	80-100	C	100-130	D	120-180	H	130-200	J	130-200	J	100-150	J	-	-	130-200	H	35-80	F
K3	70-90	B	90-120	C	100-150	G	110-180	I	110-180	I	80-120	I	-	-	110-180	G	35-65	G
N1	100-150	D	-	-	150-300	I	180-350	J	180-350	J	100-150	J	-	-	180-350	I	50-100	H
N2	100-150	D	100-150	E	150-300	I	180-350	J	180-350	J	100-150	J	-	-	180-350	I	50-80	H
N3	90-120	C	90-120	D	150-250	H	180-300	I	180-300	I	100-130	I	-	-	180-300	I	50-80	H
N4	90-120	C	-	-	120-200	H	150-250	I	150-250	I	100-130	I	-	-	150-250	I	50-80	H
N5	80-100	B	80-100	C	100-150	G	120-200	G	120-200	G	-		-	-	120-200	G	-	F
S1	-	-	20-40	B	25-50	C	25-50	D	25-50	H	25-40	D	-	-	25-50	D	-	-
S2	-	-	20-30	A	25-40	B	25-40	C	25-40	G	20-40	C	-	-	25-40	C	-	-
S3	-	-	15-25	A	15-30	A	15-30	B	15-30	F	-	-	-	C	15-30	B	-	-
H1	-	-	30-45	A	-	-	-	-	-	-	-	-	40-70	C	40-70	C	-	-
H2	-	-	-	-	-	-	-	-	-	-	-	-	30-50	B	-	-	-	-
H3	-	-	-	-	-	-	-	-	-	-	-	-	25-40	-	-	-	-	-
H4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Technical Data



F	D	0.02	0.03	0.04	0.05	0.1	0.15	0.2
	INDEX D...	800...D0.2	810...811...	800...800...D0.2 D0.5/0.6/0.8	800...D1.0 /1.5/2.0/2.5 805...D2 806...D2 815... 816...	800, 801... D2.8/3.5/4.0 805...D2.8 806...D2.8 840...D3.0	800, 801... D5.0/6.0/6.8 805...D4/D5 806...D4/D5 835... 836... 840...D4.0	800...D7.8 801...820... 822...825... 826...845... 846...840... D5/D6.0/7.0 841... D5/D6.0/7.0
	mm/rev	0.003-0.005	0.004-0.007	0.006-0.01	0.008-0.012	0.015-0.025	0.02-0.04	0.03-0.05
Material	DIN	JIS	Mpa (N/mm²)	HB	HRC	Vc(m/min)		
						AIR	T2-TIN	TIALN
						801... 806... 811... 816... 826... 836... 841... 846...	800... 835... 845...	805... 810... 815... 820... 822... 825... 840...
P	P1	CK10 CK15 ST44-2 ST37-2	S10C S15C SM400 STKM12C	□500	□150	-	60-150	60-150
	P2	CK35 CK40 Ck45	S35C S40C S45C	≤800	≤238	□22.2	60-150	60-150
	P3	CK55 37Cr4 X210Cr12	S55C SCR435 SKD1	≤1100	≤325	≤35	50-120	50-120
	P4	16MnCr5 20CrMo5 25CrMo4 42CrMo4	SCR415 SCM421 SCM430 SCM440	≤1400	≤415		40-100	40-100
M	M1	X10CrNiS18-9 X5CrNi18-9 X2CrNi19-11 X5CrNiMo17-13-3 X2CrNiMo17-13-2	SUS303 SUS304 SUS304L SUS316	□800	□238	□22.2	40-100	40-100
	M2	X5CrNi13-4 X17CrNi16-2 X105CrMo17 X2CrNiMoN25-7-4	SCS5 SUS431 SUS440C SCS14A	≤1100	≤325	≤35	40-80	40-80
	M3	X7CrNiAl17-7 X5CrNiCuNb16-4	SUS631 SCS630	≤1400	≤415	≤45	30-60	30-60
K	K1	GG15 GG20 GG25 GG30 GG35 GG40	FC15 FC20 FC25 FC30 FC40	□500	□150	-	60-100	60-100
	K2	GG50 GG60 GG70 GG80	FCD500 FCD600 FCD700	≤800	≤238	□22.2	60-100	60-100
	K3	ADI800 ADI1000 ADI1200	FCD800 FCD1000 FCD1200	≤1100	≤325	≤35	50-80	50-80
N	N1	Al99.9MgSi AlMg1 AlMg3Si AlZnMg	A1200 A6060 A6061 A7075	□400			100-300	120-400
	N2	GD-AlSi12(Cu) G-AlSi12 G-AlSi9 G-AlSi12CuNiMg	ADC12 ADC3 ADC10 ADC8A	□400			100-300	120-400
	N3	CuZn20 CuZn33 CuNi18Zn19Pb CuSn10	C2400 C2680 C7941 C6140	□800	□150		100-240	100-300
	N4	PVC POM PMMA Bakelite					100-240	100-300
	N5	GFK GFK AFK					80-150	80-150
S	S1	X15CrNiSi20-12 X15CrNiSi25-20	SUH309 SUH310	□1100	□325	□35	20-60	20-60
	S2	X12NiCrSi36-16 X10NiCrAlTi33-20	SUH330 NCF800	≤1400	≤415	≤45	20-50	20-50
	S3	NiCr22Mo9Nb NiCr19FeNbMo	Inconel625 Inconel718 (USA)	≤1700	≤494	≤50	20-40	20-40
H	H1	Weldox1100			□50		50-100	60-120
	H2	55NiCrMoV6	SKT4		≤55		50-80	60-100
	H3	X155CrVMo12-1	SKD11		≤60		40-60	50-80
	H4	X21CrW12	SKD2		≤65		-	-



Technical Data

Vickers HV 30	Brinell HB 30	Rockwell		Tensile strength R _m	
		HRB	HRC	N/mm²	kp/mm²
80	80	36,4	-	270	28
85	85	42,4	-	290	30
90	90	47,4	-	310	32
95	95	52,0	-	320	33
100	100	56,4	-	340	35
105	105	60,0	-	360	37
110	110	63,4	-	380	39
115	115	66,4	-	390	40
120	120	69,4	-	410	42
125	125	72,0	-	420	43
130	130	74,4	-	440	45
135	135	76,4	-	460	47
140	140	78,4	-	470	48
145	145	80,4	-	490	50
150	150	82,2	-	500	51
155	155	83,8	-	520	53
160	160	85,4	-	540	55
165	165	86,8	-	550	56
170	170	88,2	-	570	58
175	175	89,6	-	590	60
180	180	90,8	-	600	62
185	185	91,8	-	620	63
190	190	93,0	-	640	65
195	195	94,0	-	660	67
200	200	95,0	-	670	68
205	205	95,8	-	680	70
210	210	96,6	-	710	72
215	215	97,6	-	720	73
220	220	98,2	-	730	75
225	225	99,0	-	750	77
230	230	-	19,2	760	78
235	235	-	20,2	780	80
240	240	-	21,2	800	82
245	245	-	22,1	820	84
250	250	-	23,0	830	85
255	255	-	23,8	850	87
260	260	-	24,6	870	89
265	265	-	25,4	880	90
270	270	-	26,2	900	92
275	275	-	26,9	920	94
280	280	-	27,6	940	96
285	285	-	28,3	950	97
290	290	-	29,0	970	99
295	295	-	29,6	990	101
300	300	-	30,3	1010	103
310	310	-	31,5	1040	106
320	320	-	32,7	1080	110
330	330	-	33,8	1110	113
340	340	-	34,9	1140	117
350	350	-	36,0	1170	120
360	359	-	37,0	1200	123
370	368	-	38,0	1230	126
380	376	-	38,9	1260	129
390	385	-	39,8	1290	132
400	392	-	40,7	1320	135
410	400	-	41,5	1350	138
420	408	-	42,4	1380	144
440	423	-	44,0	1430	146
450	430	-	44,8	1460	149
460	-	-	45,6	-	-
470	-	-	46,3	-	-
480	-	-	47,0	-	-
490	-	-	47,7	-	-
500	-	-	48,3	-	-
510	-	-	49,1	-	-
520	-	-	49,7	-	-
530	-	-	50,4	-	-
540	-	-	51,0	-	-
550	-	-	51,6	-	-
560	-	-	52,2	-	-
570	-	-	52,8	-	-
580	-	-	53,3	-	-
590	-	-	53,9	-	-
600	-	-	54,4	-	-
610	-	-	55,0	-	-
620	-	-	55,5	-	-
630	-	-	56,0	-	-
640	-	-	56,5	-	-
650	-	-	57,0	-	-
660	-	-	57,5	-	-
670	-	-	58,0	-	-
680	-	-	58,5	-	-
690	-	-	59,0	-	-

Vickers HV 30	Brinell HB 30	Rockwell		Tensile strength R _m	
		HRB	HRC	N/mm²	kp/mm²
700	-	-	59,5	-	-
720	-	-	60,4	-	-
740	-	-	61,2	-	-
760	-	-	62,0	-	-
780	-	-	62,8	-	-
800	-	-	63,6	-	-
820	-	-	64,3	-	-
840	-	-	65,0	-	-
860	-	-	65,7	-	-
880	-	-	66,3	-	-
900	-	-	66,9	-	-
920	-	-	67,5	-	-
940	-	-	68,0	-	-



Technical Data

	Through coolant tap with internal axial hole, for blind holes		Step angle 180°
	Through coolant forming tap with internal axial hole, for blind holes		Helix orientation left helix angle/right side cutting
	Through coolant forming tap with internal axial and radial holes, for through holes		Router profile fine
	Thread Mills with internal axial coolant		Router profile medium
	Thread Mills with internal radial coolant		Router profile rough
	Tap with straight flutes with interrupted thread		Tool face design forward and backward deburring tool 90°
	Tap with straight flutes and spiral point with interrupted thread		Tool face design quadrant mill
	Tap with 15°right hand spiral		Tool face design quadrant mill
	Tap with 15°left hand spiral		Norm DIN 352
	Tap with 40°right hand spiral and 2 flutes		Norm DIN 357
	Tap with 40°right hand spiral		Norm DIN 371
	Die		Norm DIN 372
	Back tapering		Norm DIN 376
	Tap with long shank		Norm DIN 2174
	Tap with through shank		Norm DIN 2181
	Tool face design drill bit		Norm DIN 2181-1
	Three-margin design		Norm DIN 2181-2
	Four-margin design		Norm DIN 2189
	Step angle 60°		Norm DIN 5156
	Step angle 90°		Norm DIN 5157
			Norm JIS B-4430



Technical Data

	Norm DIN 2184-1		Tolerance 3B
	Norm DIN 22568		Tolerance 2B
	Norm DIN 24231		Tolerance 2BX
	Norm DIN 40435		Medium Tolerance 2A
	Norm DIN 374		Tolerance 2A
	Length of design-short		Tolerance Class A
	Length of design-short		Diameter tolerance
	Length of design-long		Diameter tolerance
	Length of design-short		Tolerance for rotation accuracy 0,005mm
	Length of design-extra short		Tolerance h10
	Length of design-long		Tolerance h5
	Length of design-extra long		Tolerance h6
	Works standrad		Tolerance H7
	Tolerance 4H/ISO1		Tolerance h7
	Tolerance 6H/ISO2		Tolerance h8
	Tolerance 6G/ISO3		Tolerance m7
	Tolerance 7G		Radius tolerance
	Tolerance 6HX		Radius tolerance
	Tolerance 6GX		Radius tolerance
	Tolerance 7GX		Right hand cut
	Tolerance 6H+0.1mm		




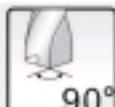


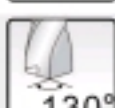
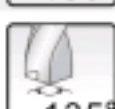



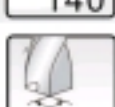


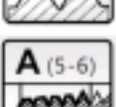

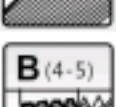

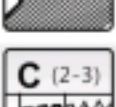

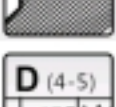

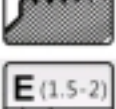
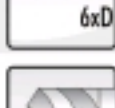

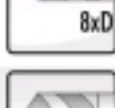

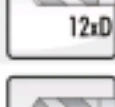
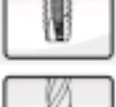
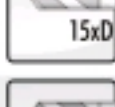

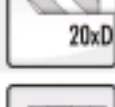
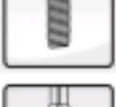
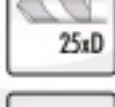
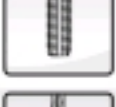
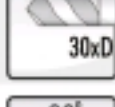



Technical Data

HM H	Geometry for hard materials		Spiral angle 35-38°
HM N	Geometry for normal materials(UNI)		Variable helix angle $a \neq b^\circ$
HM W	Geometry for soft materials		Unequal division
HM H-N	Geometry for materials hard to normal		Tool face design sharp-edged
HM N-H	Geometry for materials normal to hard		Tool face design protection chamfer
HM N-W	Geometry for materials normal to soft		Tool face design corner radius
HM W-N	Geometry for materials soft to normal		Tool face design ballnose
HSS	Material HSS		Tool face design frontal radius
HSSE	Material HSSE		2 Flutes
HSSE-PM	Material HSSE-PM		3 Flutes
Steel	Material Steel		4 Flutes
	Spiral angle 0°		5 Flutes
	Spiral angle 15°		6 Flutes
	Spiral angle 20°		Multi Flutes
	Spiral angle 25°		Internal cooling with frontal outlet Y-IC
	Spiral angle 30°		Internal cooling with lateral outlet Y-IC
	Spiral angle 35°		Internal cooling with frontal outlet
	Spiral angle 40°		Internal cooling with frontal outlet
	Spiral angle 45°		Internal cooling with frontal outlet at the drill bit
	Spiral angle 52°		Shank design HA
	Spiral angle 36-39°		Shank design HB
			Shank design HE



Technical Data

	Point angle 30°		BSP (G)	Rp	W	BSW	BSF	
	Point angle 60°		W80	Whit.S				
	Point angle 90°		ISO	M	MF	UNC	UNF	UNEF
	Point angle 118°		UNS	UN	MJ	UNJ	UNJC	UNJF
	Point angle 130°		Vg	EG	BSC	NPSM	FG	Rw
	Point angle 135°		NPTF	NPT				
	Point angle 140°		BSPT (RC)					
	Point angle 180°		Pg					
	Point angle Centering point		Chamfer form A:5-6 threads for through holes					
	Drilling length/min.using length		Chamfer form B:4-5 threads for through holes					
	Drilling length/min.using length		Chamfer form C:2-3 threads for through holes					
	Drilling length/min.using length		Chamfer form D:4-5 threads for through holes					
	Drilling length/min.using length		Chamfer form E;1.5-2 threads for blind hole					
	Drilling length/min.using length		Tap with straight flutes					
	Drilling length/min.using length		Tap with straight flutes and spiral point					
	Drilling length/min.using length		Tap with 45°right hand spiral					
	Drilling length/min.using length		Forming tap without oil grooves					
	Drilling length/min.using length		Forming tap with oil grooves					
	Drilling length/min.using length		Through coolant tap with internal axial hole, for blind holes					
	Tr		Through coolant tap with internal axial and radial holes,for through holes					



Technical Data

	Left hand cut		Application:Side milling Side milling
	Machining direction:xy Only horizontal direction in XY Richtung möglich		Application:sheet drilling
	Machining direction:xy(z) Machining in direction X Y and limited in Z direction		Application:difficult drilling
	Machining direction:xyz machining in all directions is allowed		Application:tube hole drilling
	Machining direction:z Only machining in Z direction is allowed		Application:blind hole
	Application:slot milling		Application:drilling with chamfer
	Application:side milling		Through
	Application:finishing		Through, up to 1xD1
	Application:trochoidal speed cutting		Through, up to 1.5xD1
	Application:profiling Profile cutting ae=ap		Through, up to 2.5xD1
	Application:helical interpolation; plunge angle up to 45°		Through, up to 3xD1
	Application:helical interpolation; plunge angle max.10°		Blind
	Application:article 900-chamfering Forward and backward deburring		Blind, up to 1.5xD1
	Application:article 904 Backward deburring		Blind, up to 2xD1
	Application:edge rounding		Blind, up to 2.5xD1
	Application:article 901-radius Forward and backward quadrant machining		
	Application:chamfer Chamfering or deburring		
	Application:double chamfer Both sides chamfering or deburring		
	Application:profile multimill Side milling and chamfering		
	Application:prism Milling a prism		
	Application:circle profile multimill Circular-side milling and chamfering		



Technical Data

	Blind, up to 3xD1		Stretching rate1200
	Blind and through		Stretching rate1300
	Blind and through, up to 1.5xD1		Stretching rate1400
	Blind and through, up to 2xD1		Hand tap
	Intersection Processing		Cooling by compressed -air processing
	Half Side Hole Processing		Cooling by cutting fluid
	Full tooth hole Processing		Finishing mills
	Irregular outlet surface Processing		Roughing mills
	Irregular inlet surface Processing		Manufacturing technology High Performance Cutting High Performance Cutting
	Different specifications of the same pitch		Manufacturing technology High Speed Cutting High Speed Cutting
	Universal pitch		Manufacturing technology High Trochoidal speed cutting Trochoidal Speed Cutting
	Short chipping		Blind and through, up to 2xD1
	Medium chipping		Blind and through, up to 2.5xD1
	Medium to long chipping		Blind and through, up to 3xD1
	Long chipping		Tapered hole
	Medium to long chipping		Material:Universal
	Plastic deformation without chip formation		Material:aluminium/non-ferrous metal
	The elongation rate is greater than or equal to 10%		Material:fibreglass/carbonfibre plastics/graphite
	Stretching rate500		Steel
	Stretching rate800		Material:Cast iron
	Stretching rate1100		



Technical Data

M	Material:Rost and acid constant steel		
S	Material:Inconel/titanium alloy		
Ni	Material:Inconel		
Ti	Material:Titanium alloy		
H	Hard machining		
HRC 40	HRC40		
HRC 45	HRC45		
HRC 50	HRC50		
HRC 55	HRC55		
HRC 60	HRC60		
HRC 65	HRC65		
HRC 70	HRC70		



Technical Data

Coating	Hardness	Max.working temp	Coefficient of ffcient	Coated thickness
TIN	2400HV	600°C	0.35	1-7um
TICN	3200HV	400°C	0.25	1-4um
TIALN	3500HV	800°C	0.4	1-4um
ALTIN	3800HV	900°C	0.6	1-5um
TIALCN	3800HV	800°C	0.15	2-4um
T3-TIN	3500HV	800°C	0.3	2-9um
T1-TICN	3700HV	500°C	0.3	2-9um
T4-W	3000HV	800°C	0.15	1-3um
T2-TIN	3400HV	700°C	0.5	2-9um
NANOSIT	3500HV	1000°C	0.25	1-4um
AIR	4400HV	1200°C	0.3	1-3um
AIR-H7	4600HV	1300°C	0.25	2-5um
DLC	2800HV	400°C	0.1	1-3um
DIAMOND	10000HV	800°C	0.15	0.5-1.5um
ALTIBN	3800HV	900°C	0.25	1-5um
TISIN	3900HV	1000°C	0.3	2-4um
NACO BLUE	4500HV	1200°C	0.3	2-3um