



HARTMETALL

BOHRWERKZEUGE



ISO-CODES

P	Stahl, hochlegierter Stahl
M	Rostfreier Stahl
K	Grauguss, Sphäroguss und Temperguss
N	Aluminium und andere Nichteisenmetalle
S	Sonder-, Super- und Titanlegierungen
H	Gehärteter Stahl und Hartguss

Auf den Produktseiten finden Sie zu jedem Werkzeug Empfehlungen zur Eignung für die Anwendungsgruppen bzw. die Angaben von max. Zugfestigkeit und Härte:

- optimal geeignet
- bedingt geeignet
- nicht geeignet



PIKTOGRAMME

SCHNEIDSTOFF	VHM				HM							
	Vollhartmetall				Hartmetall							
BESCHICHTUNG	blank	vernickelt	TiN	TiAlN nano	AlTiN nano	Al-TiN	TiAlN	TiCN	Al-TiN+			
Ø-TOLERANZ	h5	h6	h7	h8	m7							
BOHRTIEFE	1,5xD	3xD	4xD	5xD	7xD	8xD	10xD	12xD	15xD			
	20xD	25xD	30xD	40xD	50xD	75xD	80xD	~3xD	~5xD			
SCHNEIDRICHTUNG	 rechts											
SCHAFTFORM	Cyl	HA	HE	MK								
SPITZENWINKEL	90°	118°	120°	130°	135°	140°	142°	145°				
NORM	DIN 6539	DIN 6537K	DIN 6537L	DIN 8037	DIN 8041	WN						
TYP	Werksnorm											
	SuperV-F	SuperV-U	SuperV-IK-U	SuperV-VA	SuperV-95-GG	SuperV-IK-F	SuperV-95-GN	SuperV-T	SuperV-83-GAL	N	TBE-VHM	
	SuperV-NX	SuperV-IK-NX	SuperV-M	SuperV-AP mini	SuperV-AP mini U	SuperV-AP mini VA	SuperV-AP mini AL	SuperV-AP mini NC	SuperV-APmaxi	SuperT-AL	SuperT-N	SuperT-NX

P	M	K	N	S	H	Typ	Schaftform	Bohrtiefe	Schneidstoff	Oberfläche	Norm	d1/mm	Katalog-Nr.	Progr. Seite
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Spiralbohrer extra kurz



•	•	•	•	•		N	zyl.	~3xD	VHM	blank	DIN 6539	1,000 - 15,000	71184	132
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•	•	•	•	•		N	zyl.	~3xD	VHM	TiAlN-nano	DIN 6539	1,000 - 12,000	51184	134
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Spiralbohrer kurz



•	•	•	•	•		N	zyl.	~5xD	VHM	blank	Werksnorm	1,000 - 12,000	71290	135
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NC-Anbohrer



•	•	•	•	•		N	HA		VHM	blank	Werksnorm	5,000 - 20,000	71190	137
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•	•	•	•	•		N	HA		VHM	blank	Werksnorm	5,000 - 20,000	71191	138
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•	•	•	•	•		N	HB		VHM	blank	Werksnorm	4,000 - 20,000	71189	139
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Spiralbohrer mit HM-Schneiden



○	•	○	○	•		N	zyl.		HM	blank	DIN 8037	3,000 - 20,000	71180	140
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○	•	○	○	○		N	MK		HM	blank	DIN 8041	11,000 - 33,000	71380	141
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Zentrierbohrer ohne Fläche



•	○	•	•	○		N			VHM	blank	Werksnorm	1,000 - 6,300	71616	142
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Arbeitsrichtwerte für VHM-Bohrer

Vorschubreihen										
Code-Buchstabe	A	B	C	D	E	F	G	H	I	
Werkzeug-Ø mm	0,50	0,004	0,006	0,007	0,008	0,010	0,012	0,014	0,016	0,019
	1,00	0,006	0,008	0,012	0,014	0,016	0,018	0,020	0,023	0,025
	2,00	0,020	0,025	0,032	0,040	0,050	0,063	0,080	0,100	0,125
	2,50	0,025	0,032	0,040	0,050	0,063	0,080	0,100	0,125	0,160
	3,15	0,032	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,160
	4,00	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,200
	5,00	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,250
	6,30	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,250	0,315
	8,00	0,063	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,315
	10,00	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,400
	12,50	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,500
	16,00	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,500	0,630
	20,00	0,125	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,630
	25,00	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,800	0,800
	31,50	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,800	1,000
	40,00	0,200	0,250	0,315	0,400	0,500	0,630	0,800	1,000	1,250
	50,00	0,250	0,310	0,400	0,500	0,630	0,800	1,000	1,250	1,250
	63,00	0,315	0,400	0,500	0,630	0,800	1,000	1,250	1,600	1,600
	80,00	0,400	0,500	0,630	0,800	1,000	1,250	1,600	1,600	2,000

Werkzeuge mit **fett gedruckten** Vorschubreihen-Codebuchstaben sind für die entsprechende Werkstoffgruppe vorrangig einzusetzen.

K, P, K/P

Die universelle Einsetzbarkeit unserer neuen K-Hartmetalle hat u.a. auch zur Folge, dass wir die HM-Anwendungsgruppen nur noch mit K bzw. K/P definieren.

Kühlmitteleinsatz:

- Schneidöl, hochaktiviert
- Bohrölemulsion
- ohne Schmiermittel
- nur Luftkühlung

Werkstoffgruppe	Werkstoffbeispiele, neue Bezeichnung (in Klammern alte Bezeichnung) Fettgedruckte Zahlen = Werkstoff-Nr. nach DIN EN	Zugfestigkeit MPa (N/mm ²)	Härte	Kühl- mittel
Allgemeine Baustähle	1.0035 S185(St33), 1.0486 P275N(StE285), 1.0345 P235GH(H1), 1.0425 P265GH(H2) 1.0050 E295 (St50-2), 1.0070 E360 (St70-2), 1.8937 P500NH (WStE500)	≤500 >500-850		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Automatenstähle	1.0718 11SMnPb30 (9SMnPb28), 1.0736 11SMn37 (9SMn36) 1.0727 46S20 (45S20), 1.0728 (60S20), 1.0757 46SPb20 (45SPb20)	≤850 850-1000		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Unlegierte Vergütungsstähle	1.0402 C22, 1.1178 C30E (Ck30) 1.0503 C45, 1.1191 C45E (Ck45) 1.0601 C60, 1.1221 C60E (Ck60)	≤ 700 700-850 850-1000		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Legierte Vergütungsstähle	1.5131 50MnSi4, 1.7003 38Cr2, 1.7030 28Cr4 1.5710 36NiCr6, 1.7035 41Cr4, 1.7225 42CrMo4	850-≤1000 1000-1200		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Unlegierte Einsatzstähle	1.0301 (C10), 1.1121 C10E (Ck10)	≤750		<input checked="" type="checkbox"/>
Legierte Einsatzstähle	1.7043 38Cr4 1.5752 15NiCr13 (15NiCr13), 1.7131 16MnCr5, 1.7264 20CrMo5	850-≤1000 1000-1200		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Nitrierstähle	1.8504 34CrAl6 1.8519 31CrMoV9, 1.8550 34CrAlNi7	≥850-≤1000 >1000-1200		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Werkzeugstähle	1.1750 C75W, 1.2067 102Cr6, 1.2307 29CrMoV9 1.2080 X210Cr12, 1.2083 X42Cr13, 1.2419 105WCr6, 1.2767 X45NiCrMo4	≤850 >850-1000		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Schnellarbeitsstähle	1.3243 S 6-5-2-5, 1.3343 S 6-5-2, 1.3344 S 6-5-3	≥650-1000		<input checked="" type="checkbox"/>
Federstähle	1.5026 55Si7, 1.7176 55Cr3, 1.8159 51CrV4 (51CrV4)		≤330 HB	<input checked="" type="checkbox"/>
Gehärtete Stähle	-		≤40-48 HRC >48-60 HRC	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Rostfreie Stähle, geschwefelt austenitisch martensitisch	1.4005 X12CrS13, 1.4104 X14CrMoS17, 1.4105 X6CrMoS17, 1.4305 X8CrNiS18-9 1.4301 X5CrNi18-10 (V2A), 1.4541 X6CrNiTi18-10, 1.4571 X6CrNiMoTi 17-12-2 (V4A) 1.4057 X20CrNi 17 2 (X17CrNi16-2), 1.4122 X39CrMo17-1, 1.4521 X2CrMoTi18-2	≤850 ≤850 ≤850		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Gusseisen	0.6010 EN-GJL-100(GG10), 0.6020 EN-GJL-200(GG20) 0.6025 EN-GJL-250(GG25), 0.6035 EN-GJL-350(GG35)	850-≤1000 1000-1200		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Kugelgraphit- und Temperguss	0.7050 EN-GJS-500-7(GGG50), 0.8035 EN-GJMW-350-4(GTW35) 0.7070 EN-GJS-700-2(GGG70), 0.8170 EN-GJMB-700-2(GTS70)		≤240 HB <300 HB	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Hartguss	-		≤350 HB	<input checked="" type="checkbox"/>
Neue Gusswerkstoffe GGV	EN-GJV250 (GGV25), EN-GJV350 (GGV35) EN-GJV400 (GGV40), EN-GJV500 (GGV50), SiMo6			<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Neue Gusswerkstoffe ADI	EN-GJS-800-8 (ADI800), EN-GJS-1000-5 (ADI1000) EN-GJS-1200-2 (ADI1200), EN-GJS-1400-1 (ADI1400)	800-1000 1200-1400		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Sonderlegierungen	Nimonic, Inconel, Monel, Hastelloy	≤1200		<input checked="" type="checkbox"/>
Titan und Titan-Legierungen	3.7024 Ti99,5, 3.7114 TiAl5Sn2,5, 3.7124 TiCu2 3.7154 TiAl6Zr5, 3.7165 TiAl6V4, 3.7184 TiAl4Mo4Sn2,5, - TiAl8Mo1V1	≤850 >850-1200		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Aluminium und Al-Legierungen	3.0255 Al99,5, 3.2315 AlMgSi1, 3.3515 AlMg1	≤400		<input checked="" type="checkbox"/>
Al-Knetlegierungen	3.0615 AlMgSiPb, 3.1325 AlCuMg1, 3.3245 AlMg3Si, 3.4365 AlZnMgCu1,5	≤450		<input checked="" type="checkbox"/>
Al-Gusslegierungen ≤ 10 % Si	3.2131 G-AlSi5Cu1, 3.2153 G-AlSi7Cu3, 3.2573 G-AlSi9	≤600		<input checked="" type="checkbox"/>
> 10 % Si	3.2581 G-AlSi12, 3.2583 G-AlSi12Cu, - G-AlSi12CuNiMg	≤600		<input checked="" type="checkbox"/>
Magnesium-Legierungen	3.5200 MgMn2, 3.5812.05 G-MgAl8Zn1, 3.5612.05 G-MgAl6Zn1	≤450		<input type="checkbox"/>
Kupfer, niedriglegiert	2.0070 SE-Cu, 2.1020 CuSn6, 2.1096 G-CuSn5ZnPb	≤400		<input checked="" type="checkbox"/>
Messing, kurzspanend	2.0380 CuZn39Pb2, 2.0401 CuZn39Pb3, 2.0410 CuZn43Pb2	≤600		<input checked="" type="checkbox"/>
langspanend	2.0250 CuZn20, 2.0280 CuZn33, 2.0332 CuZn37Pb0,5	≤600		<input checked="" type="checkbox"/>
Bronzen, kurzspanend	2.1090 CuSn7ZnPb, 2.1170 CuPb5Sn5, 2.1176 CuPb10Sn	≤600		<input checked="" type="checkbox"/>
langspanend	2.0790 CuNi18Zn19Pb	>600-850		<input checked="" type="checkbox"/>
Bronzen, langspanend	2.0916 CuAl5, 2.0960 CuAl9Mn, 2.1050 CuSn10 2.0980 CuAl11Ni, 2.1247 CuBe2	≤850 >850-1000		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
Kunststoffe, duroplastisch	Epoxidharz, Resopal, Pertinax, Moltopren		-	<input type="checkbox"/>
thermoplastisch	Plexiglas, Hostalen, Novodur, Makralon		-	<input checked="" type="checkbox"/>
Kunststoffe, aramidfaserverstärkt	Kevlar		-	<input type="checkbox"/>
glas-/kohlefaserverstärkt	GFK/CFK		-	<input type="checkbox"/>

≤3×D Bohrtiefe

≤5×D

Katalog-Nr.	71184
Schneidstoff	VHM
HM-Anwendgsgr.	K10/K20
Oberfläche	blank
DIN/Form	6539
Typ	N
Innenkühlung	
Katalogseite	132

Katalog-Nr.	51184
Schneidstoff	VHM
HM-Anwendgsgr.	K/P
Oberfläche	TiAlN nano
DIN/Form	6539
Typ	N
Innenkühlung	
Katalogseite	134

Katalog-Nr.	71380	71180
Schneidstoff	HM	HM
HM-Anwendgsgr.	K10/K20	K10/K20
Oberfläche	blank	blank
DIN/Form	8041	8037
Typ	N	N
Innenkühlung		
Katalogseite	141	140

Katalog-Nr.	71290
Schneidstoff	VHM
HM-Anwendgsgr.	K10/K20
Oberfläche	blank
DIN/Form	WN
Typ	N
Innenkühlung	
Katalogseite	135



V _c m/min	Vorschubreihen- Code	V _c m/min	Vorschubreihen- Code	V _c m/min	Vorschubreihen- Code		V _c m/min	Vorschubreihen- Code
80	D	104	E				80	D
70	D	91	E				70	D
80	E	104	F	80	D	D	80	E
70	D	91	E	70	C	C	70	D
80	D	104	E				80	D
70	D	91	E				70	D
60	D	78	E				60	D
60	D	78	E				60	D
80	E	104	F				80	E
60	D	78	E				60	D
50	D	65	E				50	D
50	C	65	D				50	C
25	B	32	C	25	B	B	25	B
20	C	26	D	20	C	C	20	B
				10	B	B		
25	B	32	E				25	B
15	A	32	D				15	A
25	B	32	D				25	B
90	D	117	E	90	D	D	90	D
80	D	104	E	80	D	D	80	D
80	D	91	E	80	D	D	70	D
70	D	104	E	70	D	D	80	D
				10	A	A		
15	B	20	C				15	B
15	A	26	D				15	A
15	A	20	C				15	A
200	G	260	H				200	G
200	G	260	H				200	G
150	F	195	G				150	F
120	F	156	G				120	F
180	F	234	F				180	E
80	E	104	F				80	E
180	E	234	F	180	E	E	180	E
180	E	234	F	180	E	E	180	E
120	E	156	F				120	E
120	E	156	F				120	E
70	D	91	E				70	D
50	C	65	D				50	C
50	D	65	E				50	D
40	C	52	D				40	C
80	C	104	D				80	C

Hartmetall-Spiralbohrer

Spiralbohrer extra kurz

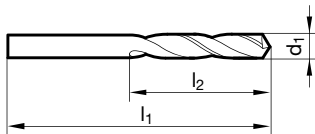


Katalog-Nr. 71184



P	M	K	N	S	H	Arbeitsrichtwerte Seite 52
•	•	•	•			

- Ausspitzung $\geq \varnothing 2,100$
- Flächenanschliff
- Hauptschneidenform gerade



d1 mm	inch	l1 mm	l2 mm	d1 mm	inch	l1 mm	l2 mm
1,000		26,000	6,000	5,100		62,000	26,000
1,100		28,000	7,000	5,200		62,000	26,000
1,200		30,000	8,000	5,300		62,000	26,000
1,300		30,000	8,000	5,400		66,000	28,000
1,400		32,000	9,000	5,500		66,000	28,000
1,500		32,000	9,000	5,600		66,000	28,000
1,600		34,000	10,000	5,700		66,000	28,000
1,700		34,000	10,000	5,800		66,000	28,000
1,800		36,000	11,000	5,900		66,000	28,000
1,900		36,000	11,000	6,000		66,000	28,000
2,000		38,000	12,000	6,100		70,000	31,000
2,100		38,000	12,000	6,200		70,000	31,000
2,200		40,000	13,000	6,300		70,000	31,000
2,300		40,000	13,000	6,350	1/4	70,000	31,000
2,380	3/32	43,000	14,000	6,400		70,000	31,000
2,400		43,000	14,000	6,500		70,000	31,000
2,500		43,000	14,000	6,600		70,000	31,000
2,600		43,000	14,000	6,700		70,000	31,000
2,700		46,000	16,000	6,800		74,000	34,000
2,780	7/64	46,000	16,000	6,900		74,000	34,000
2,800		46,000	16,000	7,000		74,000	34,000
2,900		46,000	16,000	7,100		74,000	34,000
3,000		46,000	16,000	7,140	9/32	74,000	34,000
3,100		49,000	18,000	7,200		74,000	34,000
3,170	1/8	49,000	18,000	7,300		74,000	34,000
3,200		49,000	18,000	7,400		74,000	34,000
3,300		49,000	18,000	7,500		74,000	34,000
3,400		52,000	20,000	7,600		79,000	37,000
3,500		52,000	20,000	7,700		79,000	37,000
3,570	9/64	52,000	20,000	7,800		79,000	37,000
3,600		52,000	20,000	7,900		79,000	37,000
3,700		52,000	20,000	7,940	5/16	79,000	37,000
3,800		55,000	22,000	8,000		79,000	37,000
3,900		55,000	22,000	8,100		79,000	37,000
3,970	5/32	55,000	22,000	8,200		79,000	37,000
4,000		55,000	22,000	8,300		79,000	37,000
4,100		55,000	22,000	8,400		79,000	37,000
4,200		55,000	22,000	8,500		79,000	37,000
4,300		58,000	24,000	8,600		84,000	40,000
4,370	11/64	58,000	24,000	8,700		84,000	40,000
4,400		58,000	24,000	8,730	11/32	84,000	40,000
4,500		58,000	24,000	8,800		84,000	40,000
4,600		58,000	24,000	8,900		84,000	40,000
4,700		58,000	24,000	9,000		84,000	40,000
4,760	3/16	62,000	26,000	9,100		84,000	40,000
4,800		62,000	26,000	9,200		84,000	40,000
4,900		62,000	26,000	9,300		84,000	40,000
5,000		62,000	26,000	9,400		84,000	40,000

d1 mm	inch	l1 mm	l2 mm	d1 mm	inch	l1 mm	l2 mm
9,500		84,000	40,000	11,500		95,000	47,000
9,600		89,000	43,000	11,910	15/32	102,000	51,000
9,700		89,000	43,000	12,000		102,000	51,000
9,800		89,000	43,000	13,000		102,000	51,000
9,900		89,000	43,000	15,000		111,000	56,000
10,000		89,000	43,000				
10,100		89,000	43,000				
10,200		89,000	43,000				
10,300		89,000	43,000				
10,500		89,000	43,000				
11,000		95,000	47,000				
11,110	7/16	95,000	47,000				

Hartmetall-Spiralbohrer

Spiralbohrer extra kurz



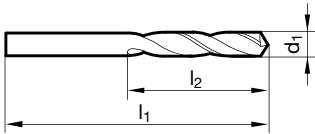
Katalog-Nr. 51184



P	M	K	N	S	H
•	•	•	•		

Arbeitsrichtwerte
Seite 52

- Ausspitzung $\geq \varnothing 2,100$
- Flächenanschliff
- Hauptschneidenform gerade
- höhere Verschleißfestigkeit



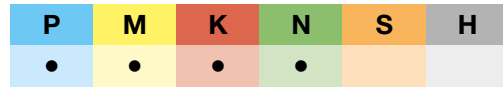
d1 mm	inch	l1 mm	l2 mm	d1 mm	inch	l1 mm	l2 mm
1,000		26,000	6,000	5,800		66,000	28,000
1,100		28,000	7,000	5,900		66,000	28,000
1,200		30,000	8,000	6,000		66,000	28,000
1,300		30,000	8,000	6,100		70,000	31,000
1,400		32,000	9,000	6,200		70,000	31,000
1,500		32,000	9,000	6,300		70,000	31,000
1,600		34,000	10,000	6,400		70,000	31,000
1,700		34,000	10,000	6,500		70,000	31,000
1,800		36,000	11,000	6,600		70,000	31,000
1,900		36,000	11,000	6,700		70,000	31,000
2,000		38,000	12,000	6,800		74,000	34,000
2,100		38,000	12,000	6,900		74,000	34,000
2,200		40,000	13,000	7,000		74,000	34,000
2,300		40,000	13,000	7,100		74,000	34,000
2,400		43,000	14,000	7,200		74,000	34,000
2,500		43,000	14,000	7,300		74,000	34,000
2,600		43,000	14,000	7,400		74,000	34,000
2,700		46,000	16,000	7,500		74,000	34,000
2,800		46,000	16,000	7,600		79,000	37,000
2,900		46,000	16,000	7,700		79,000	37,000
3,000		46,000	16,000	7,800		79,000	37,000
3,100		49,000	18,000	7,900		79,000	37,000
3,200		49,000	18,000	8,000		79,000	37,000
3,300		49,000	18,000	8,100		79,000	37,000
3,400		52,000	20,000	8,200		79,000	37,000
3,500		52,000	20,000	8,300		79,000	37,000
3,600		52,000	20,000	8,400		79,000	37,000
3,700		52,000	20,000	8,500		79,000	37,000
3,800		55,000	22,000	8,600		84,000	40,000
3,900		55,000	22,000	8,700		84,000	40,000
4,000		55,000	22,000	8,800		84,000	40,000
4,100		55,000	22,000	8,900		84,000	40,000
4,200		55,000	22,000	9,000		84,000	40,000
4,300		58,000	24,000	9,100		84,000	40,000
4,400		58,000	24,000	9,200		84,000	40,000
4,500		58,000	24,000	9,300		84,000	40,000
4,600		58,000	24,000	9,400		84,000	40,000
4,700		58,000	24,000	9,500		84,000	40,000
4,800		62,000	26,000	9,600		89,000	43,000
4,900		62,000	26,000	9,700		89,000	43,000
5,000		62,000	26,000	9,800		89,000	43,000
5,100		62,000	26,000	9,900		89,000	43,000
5,200		62,000	26,000	10,000		89,000	43,000
5,300		62,000	26,000	10,200		89,000	43,000
5,400		66,000	28,000	10,500		89,000	43,000
5,500		66,000	28,000	11,000		95,000	47,000
5,600		66,000	28,000	11,500		95,000	47,000
5,700		66,000	28,000	12,000		102,000	51,000

Hartmetall-Spiralbohrer

Spiralbohrer kurz

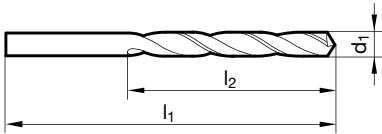


Katalog-Nr. 71290



Arbeitsrichtwerte
Seite 52

- Ausspitzung $\geq \varnothing 2,100$
- Flächenanschliff
- Hauptschneidenform gerade



d1 mm	inch	l1 mm	l2 mm	d1 mm	inch	l1 mm	l2 mm
1,000		34,000	12,000	5,100		86,000	52,000
1,100		36,000	14,000	5,160	13/64	86,000	52,000
1,200		38,000	16,000	5,200		86,000	52,000
1,300		38,000	16,000	5,300		86,000	52,000
1,400		40,000	18,000	5,400		93,000	57,000
1,500		40,000	18,000	5,500		93,000	57,000
1,600		43,000	20,000	5,560	7/32	93,000	57,000
1,700		43,000	20,000	5,600		93,000	57,000
1,800		46,000	22,000	5,700		93,000	57,000
1,900		46,000	22,000	5,800		93,000	57,000
2,000		49,000	24,000	5,900		93,000	57,000
2,100		49,000	24,000	5,950	15/64	93,000	57,000
2,200		53,000	27,000	6,000		93,000	57,000
2,300		53,000	27,000	6,100		101,000	63,000
2,380	3/32	57,000	30,000	6,200		101,000	63,000
2,400		57,000	30,000	6,300		101,000	63,000
2,500		57,000	30,000	6,350	1/4	101,000	63,000
2,600		57,000	30,000	6,400		101,000	63,000
2,700		61,000	33,000	6,500		101,000	63,000
2,780	7/64	61,000	33,000	6,600		101,000	63,000
2,800		61,000	33,000	6,700		101,000	63,000
2,900		61,000	33,000	6,800		109,000	69,000
3,000		61,000	33,000	6,900		109,000	69,000
3,100		65,000	36,000	7,000		109,000	69,000
3,170	1/8	65,000	36,000	7,100		109,000	69,000
3,200		65,000	36,000	7,140	9/32	109,000	69,000
3,300		65,000	36,000	7,200		109,000	69,000
3,400		70,000	39,000	7,300		109,000	69,000
3,500		70,000	39,000	7,400		109,000	69,000
3,570	9/64	70,000	39,000	7,500		109,000	69,000
3,600		70,000	39,000	7,600		117,000	75,000
3,700		70,000	39,000	7,700		117,000	75,000
3,800		75,000	43,000	7,800		117,000	75,000
3,900		75,000	43,000	7,900		117,000	75,000
3,970	5/32	75,000	43,000	7,940	5/16	117,000	75,000
4,000		75,000	43,000	8,000		117,000	75,000
4,100		75,000	43,000	8,100		117,000	75,000
4,200		75,000	43,000	8,200		117,000	75,000
4,300		80,000	47,000	8,300		117,000	75,000
4,370	11/64	80,000	47,000	8,400		117,000	75,000
4,400		80,000	47,000	8,500		117,000	75,000
4,500		80,000	47,000	8,600		125,000	81,000
4,600		80,000	47,000	8,700		125,000	81,000
4,700		80,000	47,000	8,730	11/32	125,000	81,000
4,760	3/16	86,000	52,000	8,800		125,000	81,000
4,800		86,000	52,000	8,900		125,000	81,000
4,900		86,000	52,000	9,000		125,000	81,000
5,000		86,000	52,000	9,100		125,000	81,000

d1 mm	inch	l1 mm	l2 mm	d1 mm	inch	l1 mm	l2 mm
9,200		125,000	81,000	11,000		142,000	94,000
9,300		125,000	81,000	11,110	7/16	142,000	94,000
9,400		125,000	81,000	11,500		142,000	94,000
9,500		125,000	81,000	11,910	15/32	151,000	101,000
9,600		133,000	87,000	12,000		151,000	101,000
9,700		133,000	87,000				
9,800		133,000	87,000				
9,900		133,000	87,000				
10,000		133,000	87,000				
10,200		133,000	87,000				
10,300		133,000	87,000				
10,500		133,000	87,000				

Hartmetall-Spiralbohrer

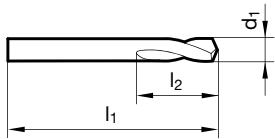
NC-Anbohrer



Katalog-Nr. 71190

N	WN	VHM	blank	90°	h6	R	HA
P	M	K	N	S	H		
•	•	•	•	•			

- Flächenanschliff
- nur zum Anbohren geeignet



d1 mm	l1 mm	l2 mm
5,000	62,000	14,000
6,000	66,000	16,000
8,000	79,000	21,000
10,000	89,000	25,000
12,000	102,000	30,000
16,000	115,000	37,500

d1 mm	l1 mm	l2 mm
20,000	131,000	45,000

Hartmetall-Spiralbohrer

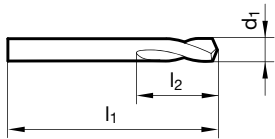
NC-Anbohrer



Katalog-Nr. 71191

N	WN	VHM	blank	120°	h6	R	HA
P	M	K	N	S	H		
•	•	•	•	•			

- Flächenanschliff
- nur zum Anbohren geeignet



d1 mm	l1 mm	l2 mm
5,000	62,000	14,000
6,000	66,000	16,000
8,000	79,000	21,000
10,000	89,000	25,000
12,000	102,000	30,000
16,000	115,000	37,500

d1 mm	l1 mm	l2 mm
20,000	131,000	45,000

Hartmetall-Spiralbohrer

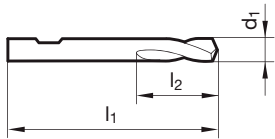
NC-Anbohrer



Katalog-Nr. 71189

N	WN	VHM	blank	142°	h6	R	HB
P	M	K	N	S	H		
•	•	•	•	•			

- Flächenanschliff
- nur zum Anbohren geeignet
- ab Ø 6 mm Schaft mit Spannfläche



d1 mm	l1 mm	l2 mm
4,000	55,000	12,000
5,000	62,000	14,000
6,000	66,000	16,000
8,000	79,000	21,000
10,000	89,000	25,000
12,000	102,000	30,000

d1 mm	l1 mm	l2 mm
16,000	115,000	37,500
20,000	131,000	45,000

Hartmetall-Spiralbohrer

Spiralbohrer mit HM-Schneiden



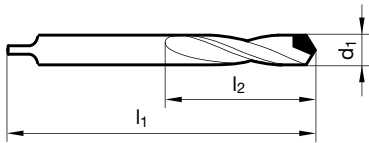
Katalog-Nr. 71180



P	M	K	N	S	H
○		○	○		

Arbeitsrichtwerte
Seite 52

- Ausspitzung $\geq \varnothing 3,000$
- Flächenanschliff
- HM-bestückt



d1 mm	l1 mm	l2 mm
3,000	50,000	20,000
3,500	56,000	25,000
4,000	56,000	25,000
4,500	63,000	28,000
5,000	63,000	28,000
5,500	71,000	32,000
6,000	71,000	32,000
6,500	71,000	32,000
7,000	80,000	40,000
7,500	80,000	40,000
8,000	80,000	40,000
8,500	90,000	50,000
9,000	90,000	50,000
9,500	90,000	50,000
10,000	100,000	56,000
10,500	100,000	56,000
11,000	100,000	56,000
11,500	112,000	63,000

d1 mm	l1 mm	l2 mm
12,000	112,000	63,000
13,000	112,000	63,000
14,000	125,000	71,000
14,500	125,000	71,000
15,000	125,000	71,000
16,000	140,000	80,000
20,000	160,000	90,000

Hartmetall-Spiralbohrer

Spiralbohrer mit HM-Schneiden



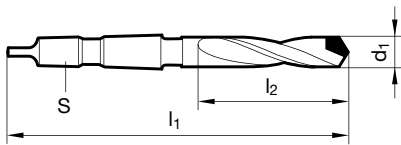
Katalog-Nr. 71380



P	M	K	N	S	H
○		●	○	○	○

Arbeitsrichtwerte
Seite 52

- Ausspitzung $\geq \varnothing 11,000$
- Flächenanschliff
- HM-bestückt



d1 mm	S	l1 mm	l2 mm
11,000	MK-1	140,000	50,000
12,500	MK-1	146,000	56,000
13,000	MK-1	146,000	56,000
13,500	MK-2	168,000	63,000
14,000	MK-2	168,000	63,000
15,000	MK-2	168,000	63,000
15,500	MK-2	175,000	70,000
16,000	MK-2	175,000	70,000
17,000	MK-2	175,000	70,000
17,500	MK-2	185,000	80,000
18,000	MK-2	185,000	80,000
20,000	MK-3	215,000	90,000

d1 mm	S	l1 mm	l2 mm
21,000	MK-3	215,000	90,000
22,000	MK-3	215,000	90,000
28,000	MK-4	260,000	110,000
30,000	MK-4	275,000	125,000
33,000	MK-4	290,000	140,000

VHM-Zentrierbohrer

Zentrierbohrer ohne Fläche

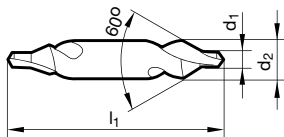


Katalog-Nr. 71616



P	M	K	N	S	H
●	○	●	●	○	

- Ausspitzung $\geq \varnothing 2,000$
- Kegelmantelschliff
- für Zentrierbohrungen nach DIN 332 Teil 1, Form A



d1 mm	d2 mm	l1 mm
1,000	3,150	31,500
1,250	3,150	31,500
1,600	4,000	35,500
2,000	5,000	40,000
2,500	6,300	45,000
3,150	8,000	50,000

d1 mm	d2 mm	l1 mm
4,000	10,000	56,000
5,000	12,500	63,000
6,300	16,000	71,000