High speed steel milling cutters

Slot drills (2-fluted)

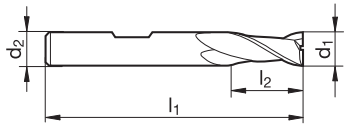
Catalog no. 74231

N | DIN 327 | M42 | bright | e8/h10 | R | B | 30°

P	M	K	N	S	H
●	●	●	●		

Application recomm. p. 580

- extra short
- centre cutting
- for materials with tensile strengths of up to approx. 1200 N/mm²



d1 mm	Tolerance d1	d2 mm	l1 mm	l2 mm	Z	Code no.
1.000	h10	6.000	47.000	2.000	2	1.000
1.500	h10	6.000	47.000	3.000	2	1.500
2.000	e8	6.000	48.000	4.000	2	2.000
2.500	e8	6.000	49.000	5.000	2	2.500
3.000	e8	6.000	49.000	5.000	2	3.000
3.500	h10	6.000	50.000	6.000	2	3.500
4.000	e8	6.000	51.000	7.000	2	4.000
4.500	h10	6.000	51.000	7.000	2	4.500
5.000	e8	6.000	52.000	8.000	2	5.000
5.500	h10	6.000	52.000	8.000	2	5.500
6.000	e8	6.000	52.000	8.000	2	6.000
7.000	e8	10.000	60.000	10.000	2	7.000
8.000	e8	10.000	61.000	11.000	2	8.000
9.000	h10	10.000	61.000	11.000	2	9.000
10.000	e8	10.000	63.000	13.000	2	10.000
12.000	e8	12.000	73.000	16.000	2	12.000
14.000	e8	12.000	73.000	16.000	2	14.000
16.000	e8	16.000	79.000	19.000	2	16.000
18.000	e8	16.000	79.000	19.000	2	18.000
20.000	e8	20.000	88.000	22.000	2	20.000
25.000	e8	25.000	102.000	26.000	2	25.000

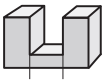
Application recommendations for HSS End Mills

Feed column

tool-Ø mm	Code-letter	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W
	2.00	0.001	0.001	0.001	0.002	0.002	0.004	0.005	0.006	0.007	0.008	0.010	0.012	0.014	0.016	0.018	0.020
	3.00	0.002	0.002	0.003	0.003	0.004	0.007	0.010	0.010	0.010	0.015	0.016	0.013	0.019	0.022	0.024	0.030
	5.00	0.005	0.006	0.007	0.009	0.010	0.014	0.020	0.020	0.022	0.025	0.026	0.026	0.028	0.030	0.032	0.038
	6.00	0.006	0.008	0.009	0.011	0.013	0.017	0.024	0.025	0.027	0.031	0.029	0.033	0.039	0.036	0.041	0.047
	8.00	0.010	0.012	0.014	0.016	0.019	0.024	0.032	0.032	0.035	0.042	0.042	0.047	0.053	0.052	0.058	0.064
	10.00	0.013	0.015	0.018	0.021	0.025	0.030	0.038	0.039	0.044	0.050	0.053	0.059	0.065	0.066	0.073	0.080
	12.00	0.010	0.018	0.022	0.026	0.030	0.036	0.046	0.048	0.052	0.059	0.063	0.072	0.079	0.085	0.090	0.100
	16.00	0.020	0.023	0.027	0.032	0.038	0.045	0.054	0.058	0.063	0.071	0.079	0.088	0.095	0.100	0.110	0.120
	20.00	0.023	0.028	0.033	0.038	0.045	0.057	0.066	0.073	0.080	0.090	0.097	0.100	0.110	0.120	0.130	0.140
	25.00	0.030	0.035	0.040	0.045	0.055	0.065	0.075	0.100	0.120	0.130	0.140	0.150	0.165	0.170	0.180	0.190

Feed f (mm/tooth)

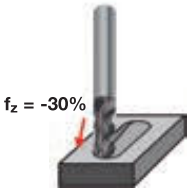
a_e = Width of cut
a_p = Cutting depth



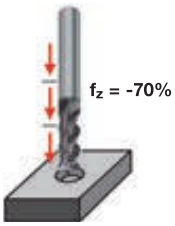
a_e = 1.0 x D

Feed rate codes in bold are the preferred choice for the respective material group.

Oblique plunging and slot milling
For oblique plunging the feed rate (v_f = mm/min) should be reduced as illustrated.
In addition, chip evacuation is required for drilling depths in excess of 1 x D. This also applies to the transition to radial machining.
slot milling
a_p = cut. depth 0.5 x D = f_z 100%
a_p = cut. depth 1.0 x D = f_z 75%



Drilling
For drilling the feed rate (v_f = mm/min) should be reduced as illustrated.
In addition, chip evacuation is required for larger drilling depths in excess of 0.5 x D.



Lubricants:
cutting oil, highly activated
soluble oil (emulsion)
air only

Material group	Materials examples, **new designations** (old designation in brackets) Figures in bold = material no. to DIN EN	Tensile strength MPa (N/mm²)	Hardness	Coolant
General purpose steels	**1.0035** S185(St33),**1.0486** P275N(StE285),**1.0345** P235GH(H1),**1.0425** P265GH(H2)	≤500		■
	1.0050 E295 (St50-2), **1.0070** E360 (St70-2), **1.8937** P500NH (WStE500)	>500-850		■
Free-cutting steels	**1.0718** 11SMnPb30 (9SMnPb28), **1.0736** 11SMn37 (9SMn36)	≤850		■
	1.0727 46S20 (45S20), **1.0728** (60S20), **1.0757** 46SPb20 (45SPb20)	850-1000		■
Unalloyed tempering steels	**1.0402** C22, **1.1178** C30E (Ck30)	≤ 700		■
	1.0503 C45, **1.1191** C45E (Ck45)	700-850		■
	1.0601 C60, **1.1221** C60E (Ck60)	850-1000		■
Alloyed tempering steels	**1.5131** 50MnSi4, **1.7003** 38Cr2, **1.7030** 28Cr4	850-≤1000		■
	1.5710 36NiCr6, **1.7035** 41Cr4, **1.7225** 42CrMo4	1000-1200		■
Unalloyed case hardened steels	**1.0301** (C10), **1.1121** C10E (Ck10)	≤750		■
Alloyed case hardened steels	**1.7043** 38Cr4	850-≤1000		■ ■
	1.5752 15NiCr13 (15NiCr13), **1.7131** 16MnCr5, **1.7264** 20CrMo5	1000-1200		■ ■
Nitriding steels	**1.8504** 34CrAl6	≥850-≤1000		■
	1.8519 31CrMoV9, **1.8550** 34CrAlNi7	>1000-1200		■ ■
Tool steels	**1.1750** C75W, **1.2067** 102Cr6, **1.2307** 29CrMoV9	≤850		■
	1.2080 X210Cr12, **1.2083** X42Cr13, **1.2419** 105WCr6, **1.2767** X45NiCrMo4	>850-1000		■ ■
High speed steels	**1.3243** S 6-5-2-5, **1.3343** S 6-5-2, **1.3344** S 6-5-3	≥650-1000		■
Spring steels	**1.5026** 55Si7, **1.7176** 55Cr3, **1.8159** 51CrV4 (51CrV4)		≤330 HB	■ ■
Hardened steels	–		≤40-48 HRC	■
			>48-60 HRC	■
Stainless steels, sulphured	**1.4005** X12CrS13, **1.4104** X14CrMoS17, **1.4105** X6CrMoS17, **1.4305** X8CrNiS18-9	≤850		■
austenitic	**1.4301** X5CrNi18-10 (V2A), **1.4541** X6CrNiTi18-10, **1.4571** X6CrNiMoTi 17-12-2 (V4A)	≤850		■
martensitic	**1.4057** X20CrNi 17 2 (X17CrNi16-2), **1.4122** X39CrMo17-1, **1.4521** X2CrMoTi18-2	≤850		■
Cast iron	**0.6010** EN-GJL-100(GG10), **0.6020** EN-GJL-200(GG20)	850-≤1000		■ □
	0.6025 EN-GJL-250(GG25), **0.6035** EN-GJL-350(GG35)	1000-1200		■ □
Spheroidal graphite iron and malleable cast iron	**0.7050** EN-GJS-500-7(GGG50), **0.8035** EN-GJMW-350-4(GTW35)		≤240 HB	■
	0.7070 EN-GJS-700-2(GGG70), **0.8170** EN-GJMB-700-2(GTS70)		<300 HB	■
Chilled cast iron	–		≤350 HB	■
New Cast iron GGV	**EN-GJV250** (GGV25), **EN-GJV350** (GGV35)			■ □
	EN-GJV400 (GGV40), **EN-GJV500** (GGV50), SiMo6			■ □
New Cast iron ADI	**EN-GJS-800-8** (ADI800), **EN-GJS-1000-5** (ADI1000)	800-1000		■ □
	EN-GJS-1200-2 (ADI1200), **EN-GJS-1400-1** (ADI1400)	1200-1400		■ □
Special alloys	Nimonic, Inconel, Monel, Hastelloy	≤1200		■
Ti and Ti-alloys	**3.7024** Ti99,5, **3.7114** TiAl5Sn2,5, **3.7124** TiCu2	≤850		■
	3.7154 TiAl6Zr5, **3.7165** TiAl6V4, **3.7184** TiAl4Mo4Sn2,5, - TiAl8Mo1V1	>850-1200		■
Aluminium and Al-alloys	**3.0255** Al99,5, **3.2315** AlMgSi1, **3.3515** AlMg1	≤400		■
Al wrought alloys	**3.0615** AlMgSiPb, **3.1325** AlCuMg1, **3.3245** AlMg3Si, **3.4365** AlZnMgCu1,5	≤450		■
Al cast alloys ≤ 10 % Si	**3.2131** G-AlSi5Cu1, **3.2153** G-AlSi7Cu3, **3.2573** G-AlSi9	≤600		■
> 10 % Si	**3.2581** G-AlSi12, **3.2583** G-AlSi12Cu, - G-AlSi12CuNiMg	≤600		■
Magnesium alloys	**3.5200** MgMn2, **3.5812.05** G-MgAl8Zn1, **3.5612.05** G-MgAl6Zn1	≤450		!
Copper, low alloyed	**2.0070** SE-Cu, **2.1020** CuSn6, **2.1096** G-CuSn5ZnPb	≤400		■ ■
Brass, short-chipping	**2.0380** CuZn39Pb2, **2.0401** CuZn39Pb3, **2.0410** CuZn43Pb2	≤600		■ ■
long-chipping	**2.0250** CuZn20, **2.0280** CuZn33, **2.0332** CuZn37Pb0,5	≤600		■ ■
Bronze, short-chipping	**2.1090** CuSn7ZnPb, **2.1170** CuPb5Sn5, **2.1176** CuPb10Sn	≤600		■ ■
	2.0790 CuNi18Zn19Pb	>600-850		■
Bronze, long-chipping	**2.0916** CuAl5, **2.0960** CuAl9Mn, **2.1050** CuSn10	≤850		■
	2.0980 CuAl11Ni, **2.1247** CuBe2	>850-1000		■
Duroplastics	Epoxy resin, Resopal, Pertinax, Moltopren		–	□
Thermoplastics	Plexiglas, Hostalen, Novodur, Makralon		–	■ □
Kevlar	Kevlar		–	□
Glass/carbon-concentr. plastics	GFK/CFK		–	□

Slot drilling

Catalog no.	74231 74280	74243 74282	54275 64640 64604	64670 64641	54080 54180	74244	74294	64671	54294	54276	54825	54845	74816	54816
Tool mat.	M42		M42			M42		M42			HSS-E-PM		M42	M42
Std.	327 D	844 K	327 D	844 K	Stock	844 L		844 L		Stock	844 K		844 K	844 K
Type	N		N			N		N			NRf		NR	NR
Page	652/658	654/660	680/653/659	655/661	664/665	656	663	657	662	681	673	677	674	675

v_c m/min	Feed col.	Feed col.	v_c m/min	Feed col.	Feed col.	v_c m/min	Feed col.	v_c m/min	Feed col.	Feed col.	v_c m/min	Feed col.	v_c m/min	Feed col.	Feed col.
28	M	61	M	22	K	49	K			90	O	34	M	61	N
25	L	55	L	20	K	44	K			80	N	30	K	55	L
25	L	55	L	20	K	44	K			80	N	30	K	55	L
22	M	50	M	18	K	40	K			75	M	28	J	50	K
28	L	61	L	22	K	49	K			90	N	34	K	61	L
26	L	55	L	21	K	44	K			80	N	30	K	55	L
22	M	50	M	18	K	40	K			75	M	28	J	50	K
22	M	50	M	18	K	40	K			75	M	28	J	50	K
17	M	39	M	14	K	31	K			60	L	22	I	39	J
28	L	61	L	22	K	49	K			90	N	34	K	61	L
22	L	50	L	18	K	40	K			75	N	28	K	50	L
17	M	39	M	14	K	31	K			60	M	22	J	39	K
22	L	50	L	18	K	40	K			75	N	28	K	50	L
17	L	39	L	14	K	31	K			60	L	22	I	39	J
28	L	61	L	22	K	49	K			90	N	34	K	61	L
11	L	28	L	9	K	22	K			40	L	15	I	28	J
11	M	28	M	9	K	22	K			40	M	15	J	28	K
11	L	22	L							33	L			22	J
18	M	42	M							65	M	23	J	42	K
14	L	39	L							60	L	21	I	39	J
14	L	39	L							60	M	21	J	39	K
20	L	50	L	16	K	40	K			75	N	28	K	50	L
14	L	42	L	11	K	34	K			65	M			42	K
20	L	50	L	16	K	40	K			75	N	28	K	50	L
14	L	42	L	11	K	34	K			65	M			42	K
11	L	31	L							45	K			31	I
5	L	9	L							14	L			9	J
11	L	25	L							36	L	13	I	25	J
7	L	11	L							17	K			11	I
154	N	220	N												
110	N	198	N												
88	M	132	M												
44	N	121	N												
66	O	143	O												
61	N	99	N												
61	N	99	N												
39	M	94	M												
39	M	94	M												
33	L	72	L												
33	M	72	M												
17	L	44	L												