

Micro Grain Solid Carbide End Mill

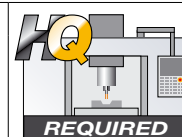
EPPLN-CR-TH | Epoch TH Power Mill Long Neck CR | Recommended Cutting Conditions

5D & 8D			D3			D4			D5		
EPPLN-CR-TH			EPPLN-CR-TH			EPPLN-CR-TH			EPPLN-CR-TH		
Side milling	Slotting	2D/3D HSC	Side milling (a _p x a _e)	Slotting	2D/3D HSC	Side milling (a _p x a _e)	Slotting	2D/3D HSC	Side milling (a _p x a _e)	Slotting	2D/3D HSC
>a _p <a _e	<a _p >a _e		>a _p <a _e	<a _p >a _e		>a _p <a _e	<a _p >a _e		>a _p <a _e	<a _p >a _e	
I Construction Steel Carbon Steels Alloy Steels (~200HB)	V _c (m/min)		156	84	77	264	156	84	77	264	
	n (min ⁻¹)		16,600	8,900	8,100	28,000	12,400	6,700	6,100	21,000	
	f _z (mm/tooth)		0.035	0.025	0.025	0.100	0.050	0.035	0.035	0.135	
	V _f (mm/min)		2,320	890	810	11,200	2,480	940	850	11,340	
	a _p (mm)		3.6	2.4	2.4	0.2-0.5	4.8	3.2	3.2	0.2-0.5	
II Alloy Steels Case Hardened Steels Heat Treatable Steels (200~300HB)	a _e (mm)		0.3	1.5	3	0.2-0.5	0.4	2	4	0.2-0.5	
	V _c (m/min)		124	72	67	208	124	72	67	208	
	n (min ⁻¹)		13,200	7,600	7,100	22,100	9,900	5,700	5,300	16,600	
	f _z (mm/tooth)		0.030	0.020	0.020	0.090	0.040	0.030	0.030	0.120	
	V _f (mm/min)		1,580	610	570	7,960	1,580	680	640	7,970	
III Alloy Steels (30~45HRC)	a _p (mm)		3.6	2.4	2.4	0.2-0.5	4.8	3.2	3.2	0.2-0.5	
	a _e (mm)		0.3	1.5	3	0.2-0.5	0.4	2	4	0.2-0.5	
	V _c (m/min)		94	42	38	160	94	42	38	160	
	n (min ⁻¹)		9,900	4,400	4,100	17,000	7,400	3,300	3,100	12,700	
	f _z (mm/tooth)		0.021	0.015	0.015	0.060	0.028	0.025	0.025	0.090	
IV Tool Steels (hot&cold) Hardened Steels (45~55HRC)	V _f (mm/min)		830	260	250	4,080	830	330	310	4,570	
	a _p (mm)		3.6	1.2	1.2	0.1-0.3	4.8	1.6	1.6	0.1-0.3	
	a _e (mm)		0.3	1.5	3	0.1-0.3	0.4	2	4	0.1-0.3	
	V _c (m/min)		72	28	32	136	72	28	32	136	
	n (min ⁻¹)		7,600	3,000	3,400	14,400	5,700	2,200	2,500	10,800	
V Hardened Steels (55~70HRC)	f _z (mm/tooth)		0.015	0.013	0.013	0.043	0.020	0.018	0.018	0.064	
	V _f (mm/min)		460	160	180	2,480	460	160	180	2,760	
	a _p (mm)		3.6	0.48	0.48	0.1-0.3	4.8	0.64	0.64	0.1-0.3	
	a _e (mm)		0.15	1.5	3	0.1-0.3	0.2	2	4	0.1-0.3	
	V _c (m/min)		48			88	48			88	
VI Stainless Steels (20~40HRC)	n (min ⁻¹)		5,100			9,300	3,800			7,000	
	f _z (mm/tooth)		0.011			0.030	0.014			0.045	
	V _f (mm/min)		210			1,120	210			1,260	
	a _p (mm)		3.6			0.05-0.3	4.8			0.05-0.3	
	a _e (mm)		0.12			0.05-0.3	0.16			0.05-0.3	
VII Heat Resisting Steels Titanium, Inconel Nickel & Cobalt Alloys (25~60HRC)	V _c (m/min)		104	48	44	160	104	48	44	160	
	n (min ⁻¹)		11,000	5,100	4,700	17,000	8,300	3,800	3,500	12,700	
	f _z (mm/tooth)		0.030	0.010	0.010	0.085	0.040	0.015	0.015	0.128	
	V _f (mm/min)		1,320	200	190	5,780	1,330	230	210	6,500	
	a _p (mm)		3.6	1.2	1.2	0.2-0.5	4.8	1.6	1.6	0.2-0.5	
VIII Cast Irons: EN-JL(GG) Ductile Cast Iron: EN-JS(GGG) (EN-JL ~ 120HB) (EN-JS ~ 240HB)	a _e (mm)		0.15	1.5	3	0.2-0.5	0.2	2	4	0.2-0.5	
	V _c (m/min)		48	32	29	96	48	32	29	96	
	n (min ⁻¹)		5,100	3,400	3,100	10,200	3,800	2,500	2,300	7,600	
	f _z (mm/tooth)		0.015	0.010	0.010	0.043	0.020	0.015	0.015	0.064	
	V _f (mm/min)		310	140	120	1,750	300	150	140	1,950	
IX Aluminium Copper Alloys	a _p (mm)		3.6	0.72	0.72	0.05-0.3	4.8	0.96	0.96	0.05-0.3	
	a _e (mm)		0.15	1.5	3	0.05-0.3	0.2	2	4	0.05-0.3	
	V _c (m/min)		156	62	58	240	156	62	58	240	
	n (min ⁻¹)		16,600	6,600	6,100	25,500	12,400	5,000	4,600	19,100	
	f _z (mm/tooth)		0.035	0.035	0.035	0.100	0.050	0.050	0.050	0.150	
	V _f (mm/min)		2,320	920	850	10,200	2,480	1,000	920	11,460	
	a _p (mm)		3.6	1.2	1.2	0.2-0.5	4.8	1.6	1.6	0.2-0.5	
	a _e (mm)		0.3	1.5	3	0.2-0.5	0.4	2	4	0.2-0.5	
	V _c (m/min)		208	156	144	280	208	156	144	280	
	n (min ⁻¹)		22,100	16,600	15,300	29,700	16,600	12,400	11,500	22,300	
	f _z (mm/tooth)		0.035	0.025	0.025	0.100	0.050	0.035	0.035	0.150	
	V _f (mm/min)		3,090	1,660	1,530	11,880	3,320	1,740	1,610	13,380	
	a _p (mm)		3.6	2.4	2.4	0.2-0.5	4.8	3.2	3.2	0.2-0.5	
	a _e (mm)		0.3	1.5	3	0.2-0.5	0.4	2	4	0.2-0.5	
	V _c (m/min)		208	156	144	280	208	156	144	280	
	n (min ⁻¹)		22,100	16,600	15,300	29,700	16,600	12,400	11,500	22,300	
	f _z (mm/tooth)		0.035	0.025	0.025	0.100	0.050	0.035	0.035	0.150	
	V _f (mm/min)		3,090	1,660	1,530	11,880	3,320	1,740	1,610	13,380	
	a _p (mm)		3.6	2.4	2.4	0.2-0.5	4.8	3.2	3.2	0.2-0.5	
	a _e (mm)		0.3	1.5	3	0.2-0.5	0.4	2	4	0.2-0.5	

PLEASE NOTE:

The values in these tables are only recommended under the following conditions:

1. The use of a machining centre and toolholder with highest precision, concentricity and rigidity
2. All components – including machine and controller – are of the latest technology
3. In Case of deflection for long overhang please reduce V_c, f_z, a_p ~10–20%



REQUIRED

Micro Grain Solid Carbide End Mill

EPPLN-CR-TH | Epoch TH Power Mill Long Neck CR | Recommended Cutting Conditions

D6				D8				D10							
EPPLN-CR-TH				EPPLN-CR-TH				EPPLN-CR-TH							
															
Side milling (a _p x a _e)		Slotting	2D/3D HSC	Side milling (a _p x a _e)		Slotting	2D/3D HSC	Side milling (a _p x a _e)		Slotting	2D/3D HSC				
>a _p <a _e	<a _p >a _e			>a _p <a _e	<a _p >a _e			>a _p <a _e	<a _p >a _e						
156	84	77	264	156	84	77	264	156	84	77	264	V _c	(m/min)	I	
8,300	4,500	4,100	14,000	6,200	3,300	3,100	10,500	5,000	2,700	2,400	8,400	n	(min ⁻¹)		
0.080	0.060	0.060	0.240	0.105	0.080	0.080	0.320	0.120	0.100	0.100	0.390	f _z	(mm/tooth)		
2,660	1,080	980	13,440	2,600	1,060	990	13,440	2,400	1,080	960	13,100	V _f	(mm/min)		
7.2	4.8	4.8	0.2–0.5	9.6	6.4	6.4	0.2–0.5	12	8	8	0.2–0.5	a _p	(mm)		
0.6	3	6	0.2–0.5	0.8	4	8	0.2–0.5	1	5	10	0.2–0.5	a _e	(mm)	II	
124	72	67	208	124	72	67	208	124	72	67	208	V _c	(m/min)		
6,600	3,800	3,600	11,000	4,900	2,900	2,700	8,300	3,900	2,300	2,100	6,600	n	(min ⁻¹)		
0.070	0.050	0.050	0.210	0.095	0.065	0.065	0.280	0.115	0.085	0.085	0.350	f _z	(mm/tooth)		
1,850	760	720	9,240	1,860	750	700	9,300	1,790	780	710	9,240	V _f	(mm/min)		
7.2	4.8	4.8	0.2–0.5	9.6	6.4	6.4	0.2–0.5	12	8	8	0.2–0.5	a _p	(mm)	III	
0.6	3	6	0.2–0.5	0.8	4	8	0.2–0.5	1	5	10	0.2–0.5	a _e	(mm)		
94	42	38	160	94	42	38	160	94	42	38	160	V _c	(m/min)		
5,000	2,200	2,000	8,500	3,700	1,700	1,500	6,400	3,000	1,300	1,200	5,100	n	(min ⁻¹)		
0.045	0.038	0.038	0.120	0.055	0.050	0.050	0.150	0.065	0.063	0.063	0.180	f _z	(mm/tooth)		
900	330	300	4,080	810	340	300	3,840	780	330	300	3,670	V _f	(mm/min)	IV	
7.2	2.4	2.4	0.1–0.3	9.6	3.2	3.2	0.1–0.3	12	4	4	0.1–0.3	a _p	(mm)		
0.6	3	6	0.1–0.3	0.8	4	8	0.1–0.3	1	5	10	0.1–0.3	a _e	(mm)		
72	28	32	136	72	28	32	136	72	28	32	136	V _c	(m/min)		
3,800	1,500	1,700	7,200	2,900	1,100	1,300	5,400	2,300	900	1,000	4,300	n	(min ⁻¹)		
0.030	0.030	0.030	0.085	0.040	0.040	0.040	0.106	0.050	0.050	0.050	0.128	f _z	(mm/tooth)	V	
460	180	200	2,450	460	180	210	2,290	460	180	200	2,200	V _f	(mm/min)		
7.2	0.96	0.96	0.1–0.3	9.6	1.28	1.28	0.1–0.3	12	1.6	1.6	0.1–0.3	a _p	(mm)		
0.3	3	6	0.1–0.3	0.4	4	8	0.1–0.3	0.5	5	10	0.1–0.3	a _e	(mm)		
48			88	48			88	48			88	V _c	(m/min)		
2,500			4,700	1,900			3,500	1,500			2,800	n	(min ⁻¹)	VI	
0.021			0.062	0.028			0.075	0.035			0.090	f _z	(mm/tooth)		
210			1,170	210			1,050	210			1,010	V _f	(mm/min)		
7.2			0.05–0.3	9.6			0.05–0.3	12			0.05–0.3	a _p	(mm)		
0.24			0.05–0.3	0.32			0.05–0.3	0.4			0.05–0.3	a _e	(mm)		
104	48	44	160	104	48	44	160	104	48	44	160	V _c	(m/min)	VII	
5,500	2,500	2,300	8,500	4,100	1,900	1,800	6,400	3,300	1,500	1,400	5,100	n	(min ⁻¹)		
0.070	0.025	0.025	0.170	0.095	0.033	0.033	0.213	0.120	0.042	0.042	0.255	f _z	(mm/tooth)		
1,540	250	230	5,780	1,560	250	240	5,450	1,580	250	240	5,200	V _f	(mm/min)		
7.2	2.4	2.4	0.2–0.5	9.6	3.2	3.2	0.2–0.5	12	4	4	0.2–0.5	a _p	(mm)		
0.3	3	6	0.2–0.5	0.4	4	8	0.2–0.5	0.5	5	10	0.2–0.5	a _e	(mm)	VIII	
48	32	29	96	48	32	29	96	48	32	29	96	V _c	(m/min)		
2,500	1,700	1,500	5,100	1,900	1,300	1,100	3,800	1,500	1,000	900	3,100	n	(min ⁻¹)		
0.030	0.023	0.023	0.085	0.040	0.032	0.032	0.107	0.050	0.040	0.040	0.128	f _z	(mm/tooth)		
300	160	140	1,730	300	170	140	1,630	300	160	140	1,590	V _f	(mm/min)		
7.2	1.44	1.44	0.05–0.3	9.6	1.92	1.92	0.05–0.3	12	2.4	2.4	0.05–0.3	a _p	(mm)	IX	
0.3	3	6	0.05–0.3	0.4	4	8	0.05–0.3	0.5	5	10	0.05–0.3	a _e	(mm)		
156	62	58	240	156	62	58	240	156	62	58	240	V _c	(m/min)		
8,300	3,300	3,100	12,700	6,200	2,500	2,300	9,500	5,000	2,000	1,800	7,600	n	(min ⁻¹)		
0.080	0.080	0.080	0.200	0.105	0.105	0.105	0.250	0.120	0.135	0.135	0.300	f _z	(mm/tooth)		
2,660	1,060	990	10,160	2,600	1,050	970	9,500	2,400	1,080	970	9,120	V _f	(mm/min)		
7.2	2.4	2.4	0.2–0.5	9.6	3.2	3.2	0.2–0.5	12	4	4	0.2–0.5	a _p	(mm)		
0.6	3	6	0.2–0.5	0.8	4	8	0.2–0.5	1	5	10	0.2–0.5	a _e	(mm)		
208	156	144	280	208	156	144	280	208	156	144	280	V _c	(m/min)		
11,000	8,300	7,600	14,900	8,300	6,200	5,700	11,100	6,600	5,000	4,600	8,900	n	(min ⁻¹)		
0.080	0.060	0.060	0.200	0.105	0.080	0.080	0.250	0.120	0.100	0.100	0.300	f _z	(mm/tooth)		
3,520	1,990	1,820	11,920	3,490	1,980	1,820	11,100	3,170	2,000	1,840	10,680	V _f	(mm/min)		
7.2	4.8	4.8	0.2–0.5	9.6	6.4	6.4	0.2–0.5	12	8	8	0.2–0.5	a _p	(mm)		
0.6	3	6	0.2–0.5	0.8	4	8	0.2–0.5	1	5	10	0.2–0.5	a _e	(mm)		

BITTE BEACHTEN SIE:

Die Werte in diesen Tabellen sind nur unter den folgenden Bedingungen empfohlen:

1. Die Verwendung eines Bearbeitungszentrums und Werkzeughalters höchster Präzision, Konzentrität und Stabilität.
2. Alle Komponenten – einschließlich Maschine und Steuerung – sind auf dem neuesten Stand der Technik.
3. Bitte reduzieren Sie im Falle der Deflektion bei großen Auskraglängen die Werte V_c , f_z , a_p um 10–20%.

