

EMXR-TH | EMXN-TH | Epoch Mirus Series | Recommended Cutting Conditions



		EMXR-TH D6				EMXR-TH D8				
		Side milling	Slotting	Ramping	2-Way Profiling	Side milling	Slotting	Ramping	2-Way Profiling	
I	Carbon Steels. Alloy Steels Cast Irons: EN-JL(GG) Ductile Cast Iron: EN-JS(GGG) (~300HB)	V _c (m/min)	170	145	145	170	170	145	145	170
	n (min ⁻¹)	9,000	7,700	7,700	9,000	6,800	5,800	5,800	6,800	
	f _z (mm/tooth)	0.043	0.035	0.027	0.054	0.061	0.049	0.038	0.076	
	V _f (mm/min)	1,550	1,080	830	1,940	1,660	1,140	880	2,070	
	a _p (mm)	6	6	20° recommendable (max. 30°)	6	8	8	20° recommendable (max. 30°)	8	
	a _e (mm)	3	6	6	3	4	8	8	4	
	Q (cm ³ /min)	27.9	38.9	-	34.9	53.1	73.0	-	66.2	
II	Tool Steels Alloy Steels (30~45HRC)	V _c (m/min)	140	110	110	140	140	110	110	
	n (min ⁻¹)	7,400	5,800	5,800	7,400	5,600	4,400	4,400	5,600	
	f _z (mm/tooth)	0.028	0.022	0.018	0.035	0.039	0.031	0.025	0.049	
	V _f (mm/min)	830	510	420	1040	870	550	440	1100	
	a _p (mm)	6	3	10° recommendable (max. 15°)	3	8	4	10° recommendable (max. 15°)	4	
	a _e (mm)	1.5	6	6	1.5	2	8	8	2	
	Q (cm ³ /min)	7.5	9.2	-	4.7	13.9	17.6	-	8.8	
III	Tool Steels Pre-Hardened Steels (45~55HRC)	V _c (m/min)	105	85	85	105	105	85	105	
	n (min ⁻¹)	5,600	4,500	4,500	5,600	4,200	3,400	3,400	4,200	
	f _z (mm/tooth)	0.022	0.018	0.014	0.028	0.031	0.024	0.019	0.039	
	V _f (mm/min)	490	320	250	630	520	330	260	660	
	a _p (mm)	6	1.8	3° recommendable (max. 5°)	1.5	8	2.4	3° recommendable (max. 5°)	2	
	a _e (mm)	0.75	6	6	0.75	1	8	8	1	
	Q (cm ³ /min)	2.2	3.5	-	0.7	4.2	6.3	-	1.3	

For Stainless Steels (20~40HRC), Heat Resisting Steels, Titanium, Inconel, Nickel & Cobalt Alloys: Epoch Mirus Type N is recommended



		EMXN-TH D6				EMXN-TH D8			
		Side milling	Slotting	Ramping	2-Way Profiling	Side milling	Slotting	Ramping	2-Way Profiling
I	Carbon Steels. Alloy Steels Cast Irons: EN-JL(GG) Ductile Cast Iron: EN-JS(GGG) (~300HB)	V _c (m/min)	160	130	130	160	160	130	130
	n (min ⁻¹)	8,500	6,900	6,900	8,500	6,400	5,200	5,200	6,400
	f _z (mm/tooth)	0.043	0.034	0.027	0.054	0.061	0.049	0.038	0.076
	V _f (mm/min)	1,460	940	750	1,840	1,560	1,020	790	1,950
	a _p (mm)	6	6	15° recommendable (max. 20°)	6	8	8	15° recommendable (max. 20°)	8
	a _e (mm)	3	6	6	3	4	8	8	4
	Q (cm ³ /min)	26.3	33.8	-	33.1	49.9	65.3	-	62.4
II	Tool Steels Alloy Steels (30~45HRC)	V _c (m/min)	125	100	100	125	125	100	100
	n (min ⁻¹)	6,600	5,300	5,300	6,600	5,000	4,000	4,000	5,000
	f _z (mm/tooth)	0.028	0.022	0.017	0.035	0.039	0.031	0.024	0.049
	V _f (mm/min)	740	470	360	920	780	500	380	980
	a _p (mm)	6	3	7° recommendable (max. 10°)	3	8	4	7° recommendable (max. 10°)	4
	a _e (mm)	1.5	6	6	1.5	2	8	8	2
	Q (cm ³ /min)	6.7	8.5	-	4.1	12.5	16.0	-	7.8
III	Tool Steels Pre-Hardened Steels (45~55HRC)	V _c (m/min)	95	75	75	95	95	75	95
	n (min ⁻¹)	5,000	4,000	4,000	5,000	3,800	3,000	3,000	3,800
	f _z (mm/tooth)	0.023	0.018	0.014	0.028	0.031	0.025	0.019	0.039
	V _f (mm/min)	460	290	220	560	470	300	230	590
	a _p (mm)	6	1.8	3° recommendable (max. 5°)	1.5	8	2.4	3° recommendable (max. 5°)	2
	a _e (mm)	0.75	6	6	0.75	1	8	8	1
	Q (cm ³ /min)	2.1	3.1	-	0.6	3.8	5.8	-	1.2
IV	Stainless Steels (20~40HRC)	V _c (m/min)	55	40	40	55	55	40	55
	n (min ⁻¹)	2,900	2,100	2,100	2,900	2,200	1,600	1,600	2,200
	f _z (mm/tooth)	0.017	0.014	0.011	0.020	0.023	0.018	0.014	0.029
	V _f (mm/min)	190	110	90	230	200	120	90	250
	a _p (mm)	6	4.8	3° recommendable (max. 5°)	1.5	8	6.4	3° recommendable (max. 5°)	2
	a _e (mm)	2.25	6	6	0.75	3	8	8	1
	Q (cm ³ /min)	2.6	3.2	-	0.3	4.8	6.1	-	0.5
V	Heat Resisting Steels Titanium, Inconel Nickel & Cobalt Alloys	V _c (m/min)	40	30	30	40	40	30	40
	n (min ⁻¹)	2,100	1,600	1,600	2,100	1,600	1,200	1,200	1,600
	f _z (mm/tooth)	0.011	0.009	0.007	0.013	0.015	0.012	0.009	0.019
	V _f (mm/min)	90	60	40	110	100	60	40	120
	a _p (mm)	6	1.8	3° recommendable (max. 5°)	1.5	8	2.4	3° recommendable (max. 5°)	2
	a _e (mm)	0.75	6	6	0.75	1	8	8	1
	Q (cm ³ /min)	0.4	0.6	-	0.1	0.8	1.2	-	0.2

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EMXR-TH D 10				EMXR-TH D 12			
Side milling	Slotting	Ramping	2-Way Profiling	Side milling	Slotting	Ramping	2-Way Profiling
170	145	145	170	170	145	145	170
5,400	4,600	4,600	5,400	4,500	3,800	3,800	4,500
0.077	0.061	0.048	0.095	0.086	0.070	0.054	0.108
1,660	1,120	880	2,050	1,550	1,060	820	1,940
10	10	20° recommendable (max. 30°)	10	12	12	20° recommendable (max. 30°)	12
5	10	10	5	6	12	12	6
83.0	112.0	-	102.5	111.6	152.6	-	139.7
140	110	110	140	140	110	110	140
4,500	3,500	3,500	4,500	3,700	2,900	2,900	3,700
0.049	0.039	0.031	0.061	0.056	0.044	0.034	0.069
880	550	430	1,100	830	510	390	1,020
10	5	10° recommendable (max. 15°)	5	12	6	10° recommendable (max. 15°)	6
2.5	10	10	2.5	3	12	12	3
22.0	27.5	-	13.8	29.9	36.7	-	18.4
105	85	85	105	105	85	85	105
3,300	2,700	2,700	3,300	2,800	2,300	2,300	2,800
0.039	0.032	0.024	0.049	0.045	0.037	0.028	0.055
510	350	260	650	500	340	260	620
10	3	3° recommendable (max. 5°)	2.5	12	3.6	3° recommendable (max. 5°)	3
1.25	10	10	1.25	1.5	12	12	1.5
6.4	10.5	-	2.0	9.0	14.7	-	2.8



PLEASE NOTE:

The values in these tables (page 6-8) 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.



Modification if too high:

- Keep f_z stable.
- Reduce rpm to set best result on non-HQ machines.

For Stainless Steels (20~40HRC), Heat Resisting Steels, Titanium, Inconel, Nickel & Cobalt Alloys: Epoch Mirus Type N is recommended

EMXN-TH D 10				EMXN-TH D 12			
Side milling	Slotting	Ramping	2-Way Profiling	Side milling	Slotting	Ramping	2-Way Profiling
160	130	130	160	160	130	130	160
5,100	4,100	4,100	5,100	4,200	3,400	3,400	4,200
0.076	0.061	0.048	0.095	0.087	0.069	0.054	0.108
1,550	1,000	790	1,940	1,460	940	730	1,810
10	10	15° recommendable (max. 20°)	10	12	12	15° recommendable (max. 20°)	12
5	10	10	5	6	12	12	6
77.5	100.0	-	97.0	105.1	135.4	-	130.3
125	100	100	125	125	100	100	125
4,000	3,200	3,200	4,000	3,300	2,700	2,700	3,300
0.049	0.039	0.030	0.061	0.055	0.044	0.034	0.069
780	500	380	980	730	480	370	910
10	5	7° recommendable (max. 10°)	5	12	6	7° recommendable (max. 10°)	6
2.5	10	10	2.5	3	12	12	3
19.5	25.0	-	12.3	26.3	34.6	-	16.4
95	75	75	95	95	75	75	95
3,000	2,400	2,400	3,000	2,500	2,000	2,000	2,500
0.039	0.031	0.024	0.048	0.044	0.035	0.028	0.055
470	300	230	580	440	280	220	550
10	3	3° recommendable (max. 5°)	2.5	12	3.6	3° recommendable (max. 5°)	3
1.25	10	10	1.25	1.5	12	12	1.5
5.9	9.0	-	1.8	7.9	12.1	-	2.5
55	40	40	55	55	40	40	55
1,800	1,300	1,300	1,800	1,500	1,100	1,100	1,500
0.027	0.023	0.018	0.035	0.032	0.026	0.020	0.039
190	120	90	250	190	110	90	230
10	8	3° recommendable (max. 5°)	2.5	12	9.6	3° recommendable (max. 5°)	3
3.75	10	10	1.25	4.5	12	12	1.5
7.1	9.6	-	0.8	10.3	12.7	-	1.0
40	30	30	40	40	30	30	40
1,300	1,000	1,000	1,300	1,100	800	800	1,100
0.018	0.015	0.012	0.023	0.021	0.017	0.013	0.026
90	60	50	120	90	50	40	110
10	3	3° recommendable (max. 5°)	2.5	12	3.6	3° recommendable (max. 5°)	3
1.25	10	10	1.25	1.5	12	12	1.5
1.1	1.8	-	0.4	1.6	2.2	-	0.5



BITTE BEACHTEN SIE:

Die Werte in diesen Tabellen (Seite 6-8) 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.



Bei zu hohen Werten:

- Halten Sie f_z konstant.
- Reduzieren Sie die Drehzahl, um auch mit Bearbeitungszentren geringerer Leistung beste Ergebnisse zu erzielen.

EMXR-TH | EMXN-TH | Epoch Mirus Series | Recommended Cutting Conditions



		EMXR-TH D 16				EMXR-TH D 20				
		Side milling	Slotting	Ramping	2-Way Profiling	Side milling	Slotting	Ramping	2-Way Profiling	
I	Carbon Steels.	V_c (m/min)	170	145	145	170	170	145	145	170
	Alloy Steels	n (min^{-1})	3,400	2,900	2,900	3,400	2,700	2,300	2,300	2,700
	Cast Irons: EN-JL(GG)	f_z (mm/tooth)	0.110	0.088	0.068	0.136	0.120	0.096	0.075	0.150
	Ductile Cast Iron: EN-JS(GGG)	V_f (mm/min)	1,500	1,020	790	1,850	1,300	880	690	1,620
	(~300HB)	a_p (mm)	16	16	20° recommendable (max. 30°)	12	20	20	20° recommendable (max. 30°)	12
		a_e (mm)	8	16	16	8	10	20	20	10
		Q (cm^3/min)	192.0	261.1	-	177.6	260.0	352.0	-	194.4
II	Tool Steels	V_c (m/min)	140	110	110	140	140	110	110	140
	Alloy Steels (30~45HRC)	n (min^{-1})	2,800	2,200	2,200	2,800	2,200	1,800	1,800	2,200
		f_z (mm/tooth)	0.070	0.056	0.044	0.088	0.076	0.061	0.049	0.096
		V_f (mm/min)	780	490	390	990	670	440	350	840
		a_p (mm)	16	8	10° recommendable (max. 15°)	6	20	10	10° recommendable (max. 15°)	6
		a_e (mm)	4	16	16	4	5	20	20	5
		Q (cm^3/min)	49.9	62.7	-	23.8	67.0	88.0	-	25.2
III	Tool Steels	V_c (m/min)	105	85	85	105	105	85	85	105
	Pre-Hardened Steels (45~55HRC)	n (min^{-1})	2,100	1,700	1,700	2,100	1,700	1,400	1,400	1,700
		f_z (mm/tooth)	0.056	0.044	0.036	0.069	0.062	0.050	0.040	0.077
		V_f (mm/min)	470	300	240	580	420	280	220	520
		a_p (mm)	16	4.8	3° recommendable (max. 5°)	3	20	6	3° recommendable (max. 5°)	3
		a_e (mm)	2	16	16	2	2.5	20	20	2.5
		Q (cm^3/min)	15.0	23.0	-	3.5	21.0	33.6	-	3.9

For Stainless Steels (20~40HRC), Heat Resisting Steels, Titanium, Inconel, Nickel & Cobalt Alloys: Epoch Mirus Type N is recommended



		EMXN-TH D 16				EMXN-TH D 20				
		Side milling	Slotting	Ramping	2-Way Profiling	Side milling	Slotting	Ramping	2-Way Profiling	
I	Carbon Steels.	V_c (m/min)	160	130	130	160	160	130	130	160
	Alloy Steels	n (min^{-1})	3,200	2,600	2,600	3,200	2,500	2,100	2,100	2,500
	Cast Irons: EN-JL(GG)	f_z (mm/tooth)	0.108	0.087	0.068	0.136	0.120	0.096	0.075	0.150
	Ductile Cast Iron: EN-JS(GGG)	V_f (mm/min)	1,380	900	710	1,740	1,200	810	630	1,500
	(~300HB)	a_p (mm)	16	16	15° recommendable (max. 20°)	12	20	20	15° recommendable (max. 20°)	12
		a_e (mm)	8	16	16	8	10	20	20	10
		Q (cm^3/min)	176.6	230.4	-	167.0	240.0	324.0	-	180.0
II	Tool Steels	V_c (m/min)	125	100	100	125	125	100	100	125
	Alloy Steels (30~45HRC)	n (min^{-1})	2,500	2,000	2,000	2,500	2,000	1,600	1,600	2,000
		f_z (mm/tooth)	0.069	0.055	0.043	0.088	0.077	0.061	0.049	0.096
		V_f (mm/min)	690	440	340	880	620	390	310	770
		a_p (mm)	16	8	7° recommendable (max. 10°)	6	20	10	7° recommendable (max. 10°)	6
		a_e (mm)	4	16	16	4	5	20	20	5
		Q (cm^3/min)	44.2	56.3	-	21.1	62.0	78.0	-	23.1
III	Tool Steels	V_c (m/min)	95	75	75	95	95	75	75	95
	Pre-Hardened Steels (45~55HRC)	n (min^{-1})	1,900	1,500	1,500	1,900	1,500	1,200	1,200	1,500
		f_z (mm/tooth)	0.055	0.045	0.035	0.070	0.062	0.051	0.038	0.076
		V_f (mm/min)	420	270	210	530	370	240	180	460
		a_p (mm)	16	4.8	3° recommendable (max. 5°)	3	20	6	3° recommendable (max. 5°)	3
		a_e (mm)	2	16	16	2	2.5	20	20	2.5
		Q (cm^3/min)	13.4	20.7	-	3.2	18.5	28.8	-	3.5
IV	Stainless Steels (20~40HRC)	V_c (m/min)	55	40	40	55	55	40	40	55
		n (min^{-1})	1,100	800	800	1,100	900	600	600	900
		f_z (mm/tooth)	0.039	0.030	0.026	0.050	0.044	0.035	0.027	0.054
		V_f (mm/min)	170	100	80	220	160	80	60	190
		a_p (mm)	16	12.8	3° recommendable (max. 5°)	3	20	16	3° recommendable (max. 5°)	3
		a_e (mm)	6	16	16	2	7.5	20	20	2.5
		Q (cm^3/min)	16.3	20.5	-	1.3	24.0	25.6	-	1.4
V	Heat Resisting Steels	V_c (m/min)	40	30	30	40	40	30	30	40
	Titanium, Inconel	n (min^{-1})	800	600	600	800	600	500	500	600
	Nickel & Cobalt Alloys	f_z (mm/tooth)	0.026	0.020	0.017	0.033	0.029	0.023	0.018	0.036
		V_f (mm/min)	80	50	40	110	70	50	40	90
		a_p (mm)	16	4.8	3° recommendable (max. 5°)	3	20	6	3° recommendable (max. 5°)	3
		a_e (mm)	2	16	16	2	2.5	20	20	2.5
		Q (cm^3/min)	2.6	3.8	-	0.7	3.5	6.0	-	0.7

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