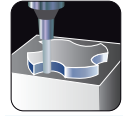


MILLING CONDITIONS

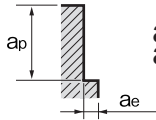
4 flute carbide end mill (see notes below for long series & coated)

SIDE MILLING



		HYP-EMS, CR-EMS, EML, EMXL											
		Aluminium		Cast Iron		Mild Steels Carbon Steels		Pre-hardened Steels Die & Alloy Steels				Hardened Steels	
				< 180 HB		< 180 HB		< 30 HRC		< 40 HRC		< 50 HRC	
Vc	100 ~ 120 m/min		30 ~ 45 m/min		30 ~ 45 m/min		25 ~ 35 m/min		25 ~ 35 m/min		15 m/min		
Ø	Speed (min ⁻¹)	Feed (mm/min.)	Speed (min ⁻¹)	Feed (mm/min.)	Speed (min ⁻¹)	Feed (mm/min.)	Speed (min ⁻¹)	Feed (mm/min.)	Speed (min ⁻¹)	Feed (mm/min.)	Speed (min ⁻¹)	Feed (mm/min.)	
1	31,500	630	14,000	245	11,000	120	8,000	85	8,000	50	4,800	20	
1.5	21,200	630	9,500	245	7,500	120	5,300	85	5,400	50	3,200	20	
2	16,000	630	7,100	350	5,500	120	4,000	85	4,000	50	2,400	20	
3	12,500	630	4,750	420	4,500	210	3,550	170	3,150	63	1,600	35	
4	9,500	665	3,550	420	3,550	245	2,650	170	2,360	63	1,200	35	
5	7,500	665	2,800	420	2,800	280	2,120	170	1,900	63	950	35	
6	6,300	665	2,360	420	2,360	280	1,700	170	1,600	63	800	35	
8	4,750	700	1,800	420	1,800	280	1,320	170	1,180	63	600	35	
10	3,750	700	1,400	440	1,400	310	1,060	170	950	63	480	35	
12	3,150	780	1,180	440	1,180	310	850	170	800	63	400	35	
16	2,360	780	900	525	900	350	670	200	600	63	300	35	
20	1,900	780	710	525	710	350	530	200	475	63	240	35	
25	1,500	700	560	525	560	350	425	200	375	50	190	28	

Maximum depth of cut

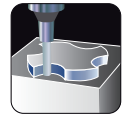


$$a_p = 1.5D$$

$$a_e = 0.1D$$

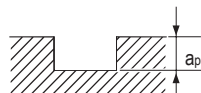
- (1) Reduce speeds & feeds 20-30% for HYP-EML (Long series).
- (2) Reduce speeds & feeds 40-50% for HYP-EMXL. (Extra long series).
- (3) Increase speeds & feeds 20-30% for HYP-EMS-XCEED (coated).
- (4) Column for Hardened Steels (40-50 HRC) is for XCEED coated tools only.

SLOTING



		HYP-EMS, CR-EMS, EML											
		Aluminium		Cast Iron		Mild Steels Carbon Steels		Pre-hardened Steels Die & Alloy Steels				Hardened Steels	
				< 180 HB		< 180 HB		< 30 HRC		< 40 HRC		< 50 HRC	
Vc	100 ~ 120 m/min		30 ~ 45 m/min		30 ~ 45 m/min		25 ~ 35 m/min		25 ~ 35 m/min		15 m/min		
Ø	Speed (min ⁻¹)	Feed (mm/min.)	Speed (min ⁻¹)	Feed (mm/min.)	Speed (min ⁻¹)	Feed (mm/min.)	Speed (min ⁻¹)	Feed (mm/min.)	Speed (min ⁻¹)	Feed (mm/min.)	Speed (min ⁻¹)	Feed (mm/min.)	
1	31,500	280	14,000	200	12,500	105	7,500	42	7,000	20	4,800	10	
1.5	21,200	280	9,500	200	8,500	125	6,500	50	5,000	28	3,200	15	
2	16,000	420	7,100	210	6,300	140	5,000	85	4,000	42	2,400	22	
3	11,200	420	4,750	225	4,250	140	3,200	110	2,600	42	1,600	22	
4	8,000	420	3,550	225	3,150	140	2,400	110	2,000	42	1,200	22	
5	6,300	420	2,800	225	2,500	140	2,000	110	1,600	42	950	22	
6	5,300	420	2,360	280	2,120	140	1,600	110	1,300	42	800	22	
8	4,000	420	1,800	330	1,600	140	1,200	110	1,000	42	600	22	
10	3,150	420	1,400	330	1,250	140	1,000	110	800	42	480	22	
12	2,650	420	1,180	330	1,060	140	820	110	700	42	400	22	
16	2,000	420	900	330	800	140	640	120	500	50	300	17	
20	1,600	420	710	330	630	140	500	120	400	50	240	14	
25	1,250	420	560	330	500	140	400	120	320	50	190	11	

Maximum depth of cut



D < 2	0.3D
2 < D	0.5D

- (1) Reduce speeds & feeds 20-30% for HYP-EML (Long series).
- (2) Reduce speeds & feeds 40-50% for HYP-EMXL. (Extra long series).
- (3) Increase speeds & feeds 20-30% for HYP-EMS-XCEED (coated).
- (4) Column for Hardened Steels (40-50 HRC) is for XCEED coated tools only.
- (5) Slotting is not recommended for HYP-EMXL.