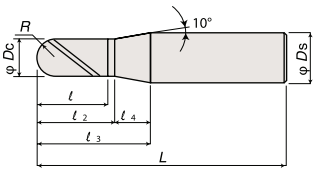
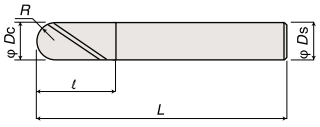
ดอกเอ็นมิลล์
EPOCH TH HARD BALL
EPBT2 ○○○ (-○)

2Flutes

A type



B type



Die-sinking | Profiling | Planing | Helical | Semi Finishing | Finishing | P (Steel) | H (High hardened) | M (Stainless) | S (Titanium alloy) | N (Non ferrous) | CARBIDE | TH COATED | 70 HRC | Helix angle 30°

R tolerance
R0.5～R6 : ±0.005
R8 ～R10 : ±0.01

h5
Ds ≦ 6 : 0～ -0.005
6 ＜ Ds ≦ 10 : 0～ -0.006
10 ＜ Ds ≦ 18 : 0～ -0.008
18 ＜ Ds : 0～ -0.009

(mm)

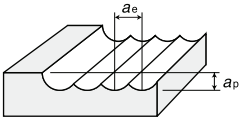
For high-hardness materials (Ideal for materials with hardnesses of 40HRC or higher)

Item Code	Stock	Size (mm)								Type
		R Ball radius	Dc Tool Dia.	ℓ Flute Length	ℓ2 Below Shank	ℓ3	ℓ4 Neck Taper Length	L Overall length	Ds Shank Dia.	
EPBT2010	●	0.5	1	1.5	2.5	11	8.5	50	4	A
EPBT2015	●	0.75	1.5	2.5	3.5	10.6	7.1	50	4	A
EPBT2020	●	1	2	3	4	15.3	11.3	50	6	A
EPBT2025	●	1.25	2.5	4	5	14.9	9.9	50	6	A
EPBT2030	●	1.5	3	4.5	5.5	14	8.5	70	6	A
EPBT2040-4	●	2	4	6	-	-	-	70	4	B
EPBT2040	●	2	4	6	7	12.7	5.7	70	6	A
EPBT2050	●	2.5	5	7.5	8.5	11.3	2.8	80	6	A
EPBT2060	●	3	6	9	-	-	-	90	6	B
EPBT2080	●	4	8	12	-	-	-	100	8	B
EPBT2100	●	5	10	15	-	-	-	100	10	B
EPBT2120	●	6	12	18	-	-	-	110	12	B
EPBT2160	●	8	16	24	-	-	-	140	16	B
EPBT2200	●	10	20	30	-	-	-	160	20	B

● : Stocked Items.

Recommended cutting conditions

EPBT



Roughing

Work material (Hardness)	Condition Range	Depth of cut (mm)	Cutting Conditions	R x Dc Tool Dia. (mm)									
				R0.5x1	R1x2	R1.5x3	R2x4	R3x6	R4x8	R5x10	R6x12	R8x16	R10x20
Tool Steels (25 ~ 35HRC) SKD	High Speed	ap=0.1Dc	min-1	50,000	48,000	32,000	24,000	16,000	12,000	10,000	8,000	6,000	4,800
		ae=0.3Dc	mm/min	1,800	3,170	3,260	3,360	3,360	3,600	3,600	3,100	2,580	2,060
	General	ap=0.1Dc	min-1	20,000	20,000	16,000	12,000	8,000	6,000	4,800	4,000	3,000	2,400
		ae=0.3Dc	mm/min	720	1,320	1,630	1,680	1,680	1,800	1,730	1,550	1,290	1,030
Pre-Harden Steels (35 ~ 45HRC) CENA 1, NAK80	High Speed	ap=0.1Dc	min-1	50,000	48,000	32,000	24,000	16,000	12,000	10,000	8,000	6,000	4,800
		ae=0.3Dc	mm/min	1,600	2,780	2,880	2,930	2,940	3,020	3,120	2,690	2,220	1,780
	General	ap=0.1Dc	min-1	20,000	20,000	16,000	12,000	8,000	6,000	4,800	4,000	3,000	2,400
		ae=0.3Dc	mm/min	640	1,160	1,440	1,460	1,470	1,510	1,500	1,340	1,110	890
Hardened Steels (45 ~ 55HRC) SKD61, SKT4	High Speed	ap=0.08Dc	min-1	50,000	38,000	25,000	19,000	13,000	10,000	7,600	6,400	4,800	3,800
		ae=0.24Dc	mm/min	1,500	1,980	2,100	2,170	2,240	2,320	2,170	1,970	1,630	1,290
	General	ap=0.1Dc	min-1	20,000	16,000	11,000	8,000	5,300	4,000	3,200	2,700	2,000	1,600
		ae=0.3Dc	mm/min	540	750	830	820	820	840	820	750	610	490
Hardened Steels (55 ~ 65HRC) SKD11, SKH51	High Speed	ap=0.05Dc	min-1	50,000	29,000	19,000	14,000	9,600	7,200	5,700	4,800	3,600	2,900
		ae=0.15Dc	mm/min	1,300	1,390	1,440	1,460	1,500	1,510	1,480	1,340	1,110	890
	General	ap=0.07Dc	min-1	20,000	13,000	8,500	6,400	4,200	3,200	2,500	2,100	1,600	1,300
		ae=0.21Dc	mm/min	470	560	580	600	590	600	590	530	440	360
Hardened Steels (65 ~ 72HRC) SKH, HAP	High Speed	ap=0.05Dc	min-1	38,000	19,000	13,000	10,000	6,400	4,800	3,800	3,200	2,400	1,900
		ae=0.15Dc	mm/min	990	910	990	1,040	1,000	1,010	990	900	740	590
	General	ap=0.07Dc	min-1	16,000	8,000	5,300	4,000	2,700	2,000	1,600	1,300	1,000	800
		ae=0.21Dc	mm/min	370	350	360	370	380	380	370	330	280	220

【Note】
① Use a highly rigid and accurate machine as possible.
② Use the appropriate coolant for the work material and machining shape.
③ These conditions are for general guidance; in actual machining conditions adjust the parameters according to your actual machine and work-piece conditions
④ If the rpm available is lower than that recommended please reduce the feed rate to the same ratio.

END MILL
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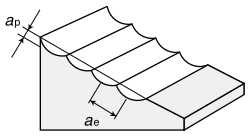

Finishing

Work material (Hardness)	Condition Range	ap: Finishing cut amount ae: Pick feed (mm)	Cutting Conditions	R x Dc Tool Dia. (mm)									
				R0.5x1	R1x2	R1.5x3	R2x4	R3x6	R4x8	R5x10	R6x12	R8x16	R10x20
Tool Steels (25 ~ 35HRC) SKD	High Speed	a_p=0.05 ~ 0.1	min^{-1}	50,000	32,000	25,000	22,000	16,000	12,000	10,000	8,000	6,000	4,800
		a_e=0.02Dc	mm/min	5,000	3,840	3,500	3,740	3,520	2,880	2,600	2,160	1,680	1,340
	General	a_p=0.05 ~ 0.1	min^{-1}	20,000	20,000	17,000	13,000	8,500	6,400	5,100	4,200	3,200	2,500
		a_e=0.02Dc	mm/min	2,000	2,400	2,380	2,210	1,870	1,540	1,330	1,130	900	700
Pre-Harden Steels (35 ~ 45HRC) CENA 1, NAK80	High Speed	a_p=0.05 ~ 0.1	min^{-1}	50,000	32,000	25,000	22,000	16,000	12,000	10,000	8,000	6,000	4,800
		a_e=0.02Dc	mm/min	5,000	3,840	3,500	3,740	3,520	2,880	2,600	2,160	1,680	1,340
	General	a_p=0.05 ~ 0.1	min^{-1}	20,000	20,000	17,000	13,000	8,500	6,400	5,100	4,200	3,200	2,500
		a_e=0.02Dc	mm/min	2,000	2,400	2,380	2,210	1,870	1,540	1,330	1,130	900	700
Hardened Steels (45 ~ 55HRC) SKD61, SKT4	High Speed	a_p=0.05 ~ 0.1	min^{-1}	50,000	32,000	24,000	20,000	13,000	10,000	8,000	6,600	5,000	4,000
		a_e=0.02Dc	mm/min	4,000	3,200	2,880	3,200	2,730	2,300	2,000	1,720	1,350	1,080
	General	a_p=0.05 ~ 0.1	min^{-1}	20,000	20,000	14,000	10,000	6,900	5,200	4,100	3,500	2,600	2,100
		a_e=0.02Dc	mm/min	1,600	2,000	1,680	1,600	1,450	1,200	1,030	910	700	570
Hardened Steels (55 ~ 65HRC) SKD11, SKH51	High Speed	a_p=0.05 ~ 0.1	min^{-1}	50,000	32,000	21,000	16,000	11,000	8,000	6,400	5,300	4,000	3,200
		a_e=0.02Dc	mm/min	2,500	2,880	2,520	2,400	2,200	1,760	1,540	1,330	1,040	830
	General	a_p=0.05 ~ 0.1	min^{-1}	15,000	15,000	13,000	9,600	6,400	4,800	3,800	3,200	2,400	1,900
		a_e=0.02Dc	mm/min	750	1,350	1,560	1,440	1,280	1,060	910	800	620	490
Hardened Steels (65 ~ 72HRC) SKH, HAP	High Speed	a_p=0.05 ~ 0.1	min^{-1}	48,000	24,000	16,000	12,000	8,000	6,000	4,800	4,000	3,000	2,400
		a_e=0.02Dc	mm/min	2,400	2,160	1,920	1,800	1,600	1,320	1,150	1,000	780	620
	General	a_p=0.05 ~ 0.1	min^{-1}	15,000	14,000	10,000	7,200	4,800	3,600	2,900	2,400	1,800	1,400
		a_e=0.02Dc	mm/min	750	1,260	1,200	1,080	960	790	700	600	470	360

【Note】 ① Use a highly rigid and accurate machine as possible.
② "a_e" (pick feed) figures in the above table are for general guidance. When making an actual selection, please refer to the cusp height table on A181.
③ Use the appropriate coolant for the work material and machining shape.
④ These conditions are for general guidance; in actual machining conditions adjust the parameters according to your actual machine and work-piece conditions.
⑤ If the rpm available is lower than that recommended please reduce the feed rate to the same ratio.