

F Technical Information for Solid Endmill for Aluminum

Good chip evacuation

Solid Endmills for Aluminum

- Minimum cutting load and built-up edge
- Good surface finish
- DLC coating
 - Higher hardness (Hv3000-7000), longer tool life comparing uncoated endmill
 - Excellent lubrication by low friction co-efficient ($\mu < 0.1$)
 - Good chip evacuation
- Superior in Aluminum, Aluminum alloys, Copper and Copper alloys

➤ Copper & aluminum machining

- Built-up edge
- Low heat resistance could create unnecessary stress or accuracy problem after machining
- Scratch due to low hardness
- Low tool life due to flank wear

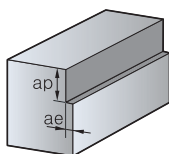
➤ Trouble shooting for copper & aluminum machining

- Use a higher rake, sharp edge, oil (MQL) mist to decrease cutting load and built-up edge
- Increase V_c and reduce the depth of cut for a better surface finish

➤ Recommended cutting condition (SSEA2000)

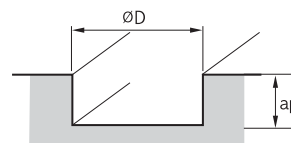
Workpiece Condition Diameter (Ø)	Shouldering				Slotting			
	Aluminum alloy (A7075)		Aluminum alloy (cast) (AC4B)		Aluminum alloy (A7075)		Aluminum alloy (cast) (AC4B)	
	R.P.M n (min ⁻¹)	Feed vf (mm/min)	R.P.M n (min ⁻¹)	Feed vf (mm/min)	R.P.M n (min ⁻¹)	Feed vf (mm/min)	R.P.M n (min ⁻¹)	Feed vf (mm/min)
1	40,000	480	40,000	368	40,000	368	40,000	280
2	40,000	880	38,000	680	38,000	680	32,000	440
3	32,000	1,120	25,000	760	25,000	760	21,000	480
4	24,000	1,200	19,000	800	19,000	800	13,000	520
5	19,000	1,280	15,000	880	15,000	800	13,000	560
6	16,000	1,520	13,000	960	13,000	880	11,000	600
8	12,000	1,520	9,500	960	9,500	960	8,000	640
10	9,500	1,520	7,600	960	7,600	960	6,400	640
12	8,000	1,520	6,400	960	6,400	960	5,300	640
16	6,000	1,520	4,800	960	4,800	800	4,000	576
20	4,800	1,200	3,800	800	3,800	776	3,200	528

Application tip



■ Shouldering depth (ap) and radial depth (ae)

- $ae: \leq 0.2D$ ($D < \varnothing 3$)
 $\leq 0.5D$ ($D \geq \varnothing 3$)
- $ap: \leq 2.0D$



■ Slotting depth (ap)

- $ap: \leq D$ (max: 12mm)

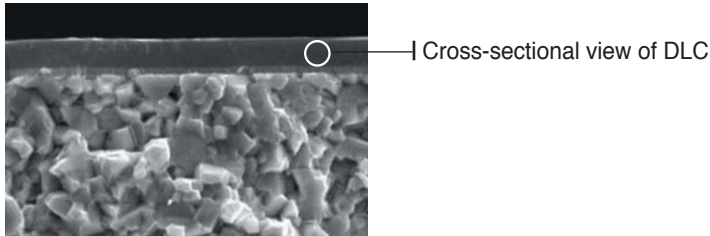
※ Workpiece should be clamped rigidly In case of vibrations, reduce R.P.M and feed rate by the same ratio



DLC coated grades

Features

- Hardness of film is up to Hv 7000, tool life is 3~6times of cemented carbide cutting tool
- Good surface finish can be acquired due to the lubrication effect that led from low friction co-efficient (<0.1)
- Suitable for Non-ferrous material machining



Application

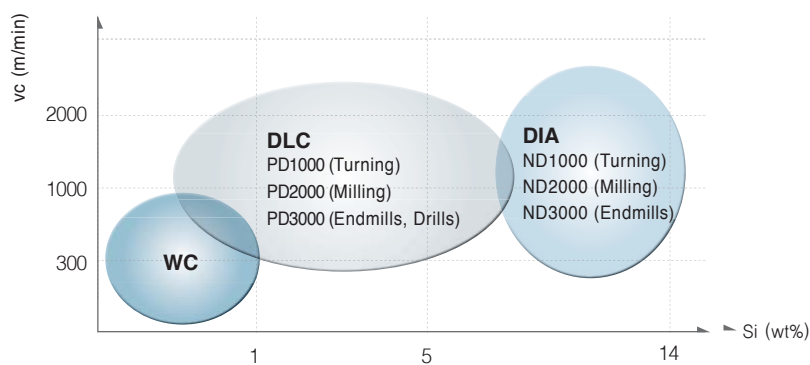
- For aluminum, carbon, plastic, wood/Insert, drill, endmill

Cutting performance (Built-up edge / surface finish, FMACM3100R)

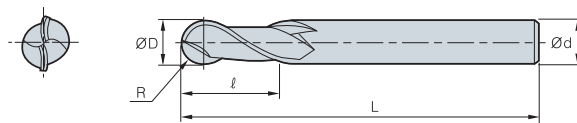
Grade	View	Top face	Major cutting edge	Surface finish of workpiece
Uncoated				
DLC				

- Workpiece: AC2B
- Cutting length: 12m • Cutting condition: $v_c = 1500\text{m/min}$, $f_z = 0.15\text{mm/t}$, $a_p = 2\text{mm}$, Dry

Application range



SSBEA2000 (Ball)



ØD	Tolerance
All	0~-0.03

(mm)

Designation	R	ØD	Ød	ℓ	L
SSBEA 2010	0.5	1	6	3	70
2015	0.75	1.5	6	4	70
2020	1	2	6	6	70
2025	1.25	2.5	6	8	70
2030	1.5	3	6	10	70
2035	1.75	3.5	6	10	70
2040	2	4	6	12	70
2045	2.25	4.5	6	15	80
2050	2.5	5	6	15	80
2055	2.75	5.5	6	15	80
2060	3	6	6	15	80
2065	3.25	6.5	8	20	90
2070	3.5	7	8	20	90
2075	3.75	7.5	8	20	90
2080	4	8	8	20	90
2085	4.25	8.5	10	25	100
2090	4.5	9	10	25	100
2100	5	10	10	25	100
2110	5.5	11	12	30	110
2120	6	12	12	30	110
2130	6.5	13	16	35	120
2140	7	14	16	35	120
2150	7.5	15	16	40	120
2160	8	16	16	40	120
2170	8.5	17	20	40	130
2180	9	18	20	45	130
2190	9.5	19	20	45	130
2200	10	20	20	45	130

Special endmills order: SSBEA2000-L

Ex.1) 2 flutes, diameter: 6.3.I: 17, L: 60 SSBEA3063 17-60L

Ex.2) 2 flutes, diameter: 6.3.standard type SSBEA3063

Technique of machining copper/aluminum steel

- With high rake angle cutting edge, sharp tools and oil mist, able to minimize cutting load and built-up-edge
- Applying higher cutting speed and shallower depth, able to make surface finishing and productivity improved

