铝合金用硬质合金铣刀系列

Carbide End Mills for Aluminum Alloy

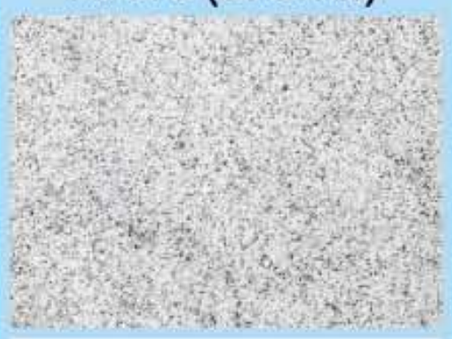
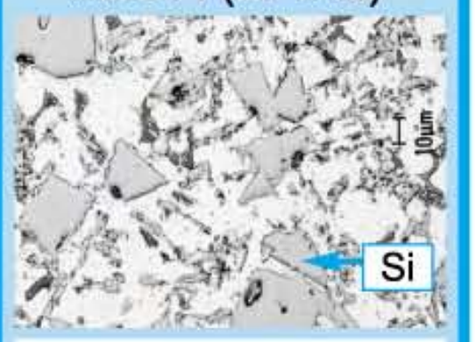
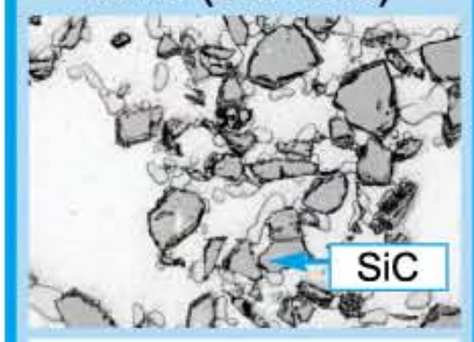
新DLC涂层圆弧角3刃短刃型新登场！

直壁加工3刃短刃型尺寸追加！

Introducing DLC coated end mills and CA-CR-ETS!

Additional sizes are available for CA-MFE and CA-ETS!

选择高性价比刀具的标准
Guidelines for selecting tools that enshures high cost performance

	铝合金 Expanding materials	低硅（13%以下）铝铸件 Low Si content casting alloy, die casting (Si < 13%)	高硅（13%以下）铝铸件 High Si content casting alloy, die casting (Si ≧13%)	MMC（金属基复合材料） (Metal Matrix Composite) (SiC≧ 20%)
显微镜组织 Surface Structure	A7075 (Si 0.4%) 	ADC12 (Si 11%) 	ADC14 (Si 17%) 	MMC (SiC 25%) 
	Al固溶体的基体 Aluminum solid solution matrix	Al固溶体的基体 +Si扁平板状结晶 +CuAl2针状结晶 Aluminum solid solution matrix + Si flat shaped crystals + CuAl2 needle shaped crystals	Al固溶体的基体 +Si扁平板状结晶 +CuAl2针状结晶 Aluminum solid solution matrix + Si flat shaped crystals + CuAl2 needle shaped crystals	Al固溶体的基体 +SiC粒子 +Si扁平板状结晶 Aluminum solid solution matrix + SiC particles + Si flat shaped crystals
被削性能 Machinability	非常好 Very Good	Si的硬度为1000HV的Si含量较少，被削性能不错。 The hardness of Si is HV1000. However, the machinability remains good because the quantity of Si is rather small.	Si的硬度为1000HV左右由于硅含量高，工具磨损快。 Since the hardness of Si is HV1000 and is abundant in Al casting, the tool's wear will progress quickly.	SiC的硬度为3000HV左右，非常难切削。 Since the hardness of SiC is HV3000, it is a very difficult material to machine.

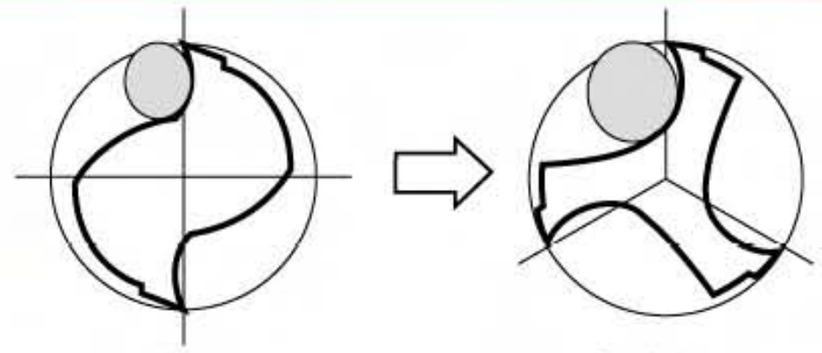
要求 Request	湿式切削 Wet cutting	干式切削 半干式切削 Dry cutting Semi-Dry cutting	高速切削 High speed machining	高精度加工 High precison machining	工具的长寿命 Long tool life
涂层 Coating	无涂层 Bright finish		新DLC涂层 New DLC Coating		超微结晶金刚石涂层 Ultra Fine Diamond coating

耐溶性（高）
Welding resistance（high）
耐磨性（高）
Wear resistance（high）

3刃系列的特长
Features of 3 Flutes End mill

1 易于排出切屑的大容屑槽
Wide chip room

采用3枚刃提高了工具刚性和加工能力！
Better Rigidith and better performance with 3 flutes design

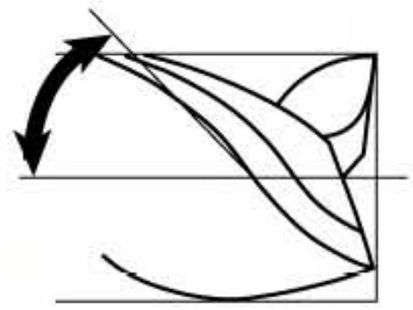


以往的2刃型
Conventional (2 flutes)

高效率型
High performance design

2 切削刃锋利
Sharp Cutting edge

•径方向、轴方向都是锋利的大切削角！
Positive,high rake angle design on both axial and radial area
•外周前交面、外周退刀面优良的研磨面，
切削情况良好！
Better surface finish on radial cutting face and secondary relief,for better performance



强弧型螺旋角
Strong helix angle

大前角
Larger rake angle

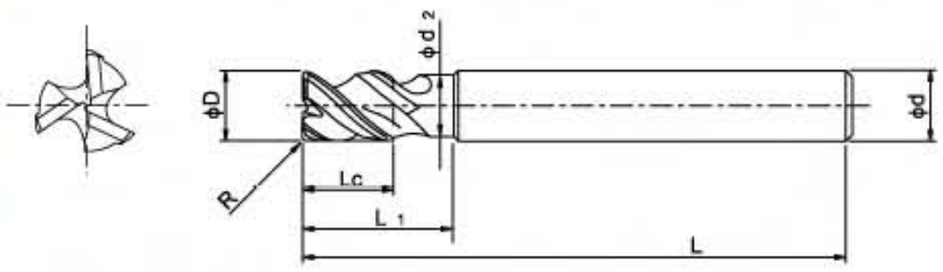
3 动平衡良好的底刀形状
Special end teeth design for the balance

即使高速旋转也能稳定加工
Stable machining capability on high speed rotation

3刃 铝合金用 强力型
3 Flutes. for High Speed Pocket operation.for Aluminum Alloy

CA-PKE

●材　质 Tool Material	硬质合金 Carbide
●螺旋角 Helix Angle	约40° About
●外径公差 Tolerance for Milling Diameter	0~-0.020mm
也可用于加工铜	Also suitable for copper.



（单位：mm）(Unit:mm)

商品号No. EDP No.	外径×角度 Mill Dia. × R	全长 L	刃长 Lc	有效长 L1	柄径 d	颈径 d2	库存 Stock
8533033	3×R0.5	50	4.5	9	6	2.7	●
8533043	4×R0.5	50	6	12	6	3.6	●
8533053	5×R0.5	60	7.5	15	6	4.5	●
8533063	6×R0.5	60	9	15	6	5.4	●
8533065	6×R1	60	9	15	6	5.4	●
8533083	8×R0.5	70	12	20	8	7.2	●
8533085	8×R1	70	12	20	8	7.2	●
8533103	10×R0.5	80	15	25	10	9	●
8533105	10×R1	80	15	25	10	9	●

可实现高效的型腔加工！
排屑性能超群！

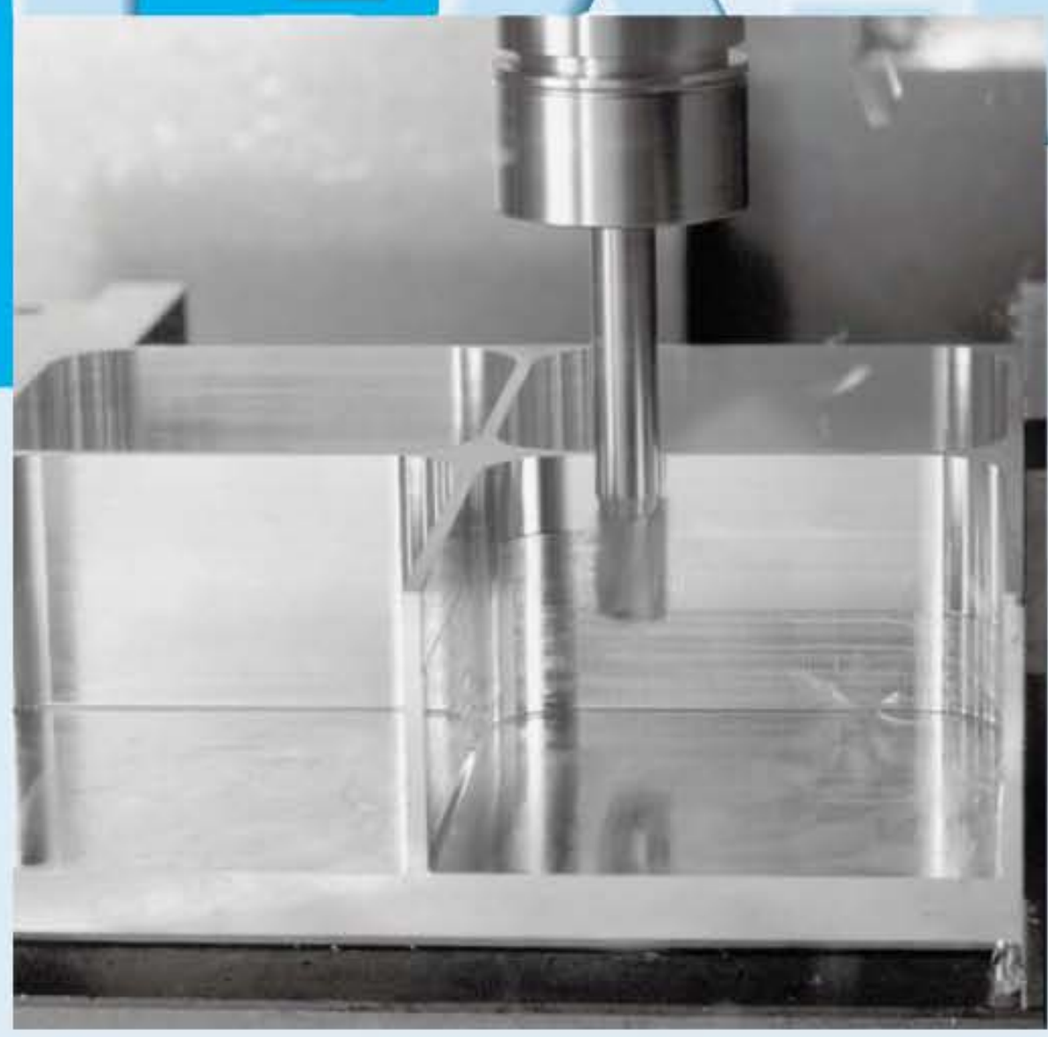
Highly efficient machining and excellentchip disposal in pocket milling operation!
.短刃、长颈带圆弧角的形状在型腔加工中发挥出超群的效果
.可以用在各种加工方法中。
Highly rigid type with short cutting length and long neck.
It can be used for various cutter passes.

（单位：mm）(Unit:mm)

商品号No. EDP No.	外径×角度 Mill Dia. × R	全长 L	刃长 Lc	有效长 L1	柄径 d	颈径 d2	库存 Stock
8533123	12×R0.5	90	18	30	12	11	●
8533125	12×R1	90	18	30	12	11	●
8533163	16×R0.5	115	24	40	16	15	●
8533165	16×R1	115	24	40	16	15	●
8533169	16×R3	115	24	40	16	15	●
8533203	20×R0.5	125	30	50	20	19	●
8533205	20×R1	125	30	50	20	19	●
8533209	20×R3	125	30	50	20	19	●

●=标准库存品●=Standard stock item.

CA-MFE



即使是幅度很宽的立直壁也能通过阶梯式切削实现高效率、高精度的加工！柄侧端面的R圆弧有效地抑制了接刀痕的产生。

Highly efficient machining with high precision in a wide cavity wall by step milling!
The corner radius on shank side prevents cutting marks between steps.

.可实现高精度、高能率的直壁精加工
.细长柄式样可任意调整悬长长度
.可对应多种切削方式

It can perform highly precise and efficient milling of deep wall areas.
Due to a long, slim shank, over-hang length can be adjusted.
It can be used in various types of cutter pass.

3刃 铝合金用 直壁对应型

3 Flutes for Deep Wall for Aluminum Alloy

CA-MFE

●材　质 Tool Material	硬质合金 Carbide
●螺旋角 Helix Angle	约40° About
●外径公差 Tolerance for Milling Diameter	0~–0.020mm
也可用于加工铜	Also suitable for copper.

※柄侧端面的R是为了防止接刀痕的，并不是完全的R型。

Since radius chamfering is also provided on the end faces of the shark side,no line is marked on the boundary section during step milling.This is partial radius.

（单位：mm）(Unit:mm)

商品号 No. EDP No.	外径×角度 Mill Dia. × R	全长 L	刃长 Lc	柄径 d	库存 Stock
NEW 8532080	8×–	110	12	6	●
NEW 8532083	8×R0.5	110	12	6	●
NEW 8532085	8×R1	110	12	6	●
8532100	10×–	130	15	8	●
8532103	10×R0.5	130	15	8	●
8532105	10×R1	130	15	8	●
NEW 8532107	10×R2	130	15	8	●
NEW 8532109	10×R3	130	15	8	●
8532120	12×–	150	18	10	●
8532123	12×R0.5	150	18	10	●
8532125	12×R1	150	18	10	●
NEW 8532126	12×R1.5	150	18	10	●
NEW 8532127	12×R2	150	18	10	●
NEW 8532129	12×R3	150	18	10	●
8532140	14×–	160	21	12	●
8532145	14×R1	160	21	12	●
NEW 8532146	14×R1.5	160	21	12	●
NEW 8532147	14×R2	160	21	12	●

（单位：mm）(Unit:mm)

商品号 No. EDP No.	外径×角度 Mill Dia. × R	全长 L	刃长 Lc	柄径 d	库存 Stock
8532149	14×R3	160	21	12	●
NEW 8532160	16×–	170	24	14	●
NEW 8532165	16×R1	170	24	14	●
NEW 8532169	16×R3	170	24	14	●
8532180	18×–	180	27	16	●
8532185	18×R1	180	27	16	●
NEW 8532186	18×R1.5	180	27	16	●
NEW 8532187	18×R2	180	27	16	●
8532189	18×R3	180	27	16	●
NEW 8532200	20×–	190	30	18	●
NEW 8532205	20×R1	190	30	18	●
NEW 8532209	20×R3	190	30	18	●
8532220	22×–	200	33	20	●
8532225	22×R1	200	33	20	●
NEW 8532226	22×R1.5	200	33	20	●
NEW 8532227	22×R2	200	33	20	●
8532229	22×R3	200	33	20	●

●=标准库存品●=Standard stock item.

CA-ETS

可实现良好的精加工面
和高精度、高效率的加工。

Excellent surface finish and accuracy are achieved while maintaining a highly efficient milling.

.防振效果好的3刃泛用型

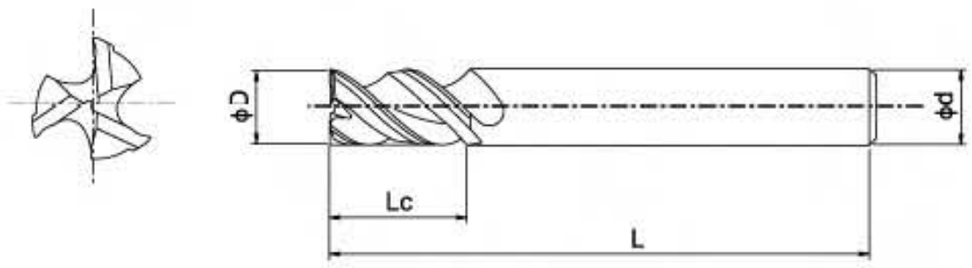
Odd Number of flute (3 flutes) Multi Purpose type to minimize vibration.

3刃 铝合金用 短刃型

3 Flutes Short for Aluminum Alloy

CA-ETS

●材　质 Tool Material	硬质合金 Carbide
●螺旋角 Helix Angle	约40° About
●外径公差 Tolerance for Milling Diameter	0~–0.020mm
也可用于加工铜	Also suitable for copper.



（单位：mm）(Unit:mm)

商品号No. EDP No.	外径×角度 Mill Dia. × R	全长 L	刃长 Lc	柄径 d	库存 Stock
8502806	3	50	8	6	●
NEW 8502807	3.5	50	8	6	●
8502808	4	50	11	6	●
NEW 8502809	4.5	50	11	6	●
8502810	5	50	13	6	●
NEW 8502811	5.5	50	13	6	●
8502812	6	50	13	6	●
NEW 8502813	6.5	60	16	8	●
NEW 8502814	7	60	16	8	●
NEW 8502815	7.5	60	16	8	●
8502816	8	60	19	8	●
NEW 8502817	8.5	70	19	10	●
NEW 8502818	9	70	19	10	●
NEW 8502819	9.5	70	19	10	●

（单位：mm）(Unit:mm)

商品号No. EDP No.	外径×角度 Mill Dia. × R	全长 L	刃长 Lc	柄径 d	库存 Stock
8502820	10	70	22	10	●
NEW 8502850	10.5	75	22	12	●
NEW 8502821	11	75	22	12	●
NEW 8502851	11.5	75	22	12	●
8502822	12	75	26	12	●
NEW 8502823	13	85	26	12	●
NEW 8502824	14	85	26	12	●
NEW 8502825	15	90	26	16	●
8502826	16	100	32	16	●
NEW 8502827	17	100	32	16	●
NEW 8502828	18	100	32	16	●
NEW 8502829	19	100	32	20	●
8502830	20	105	38	20	●

●=标准库存品●=Standard stock item.

形状尺寸表 Dimensions

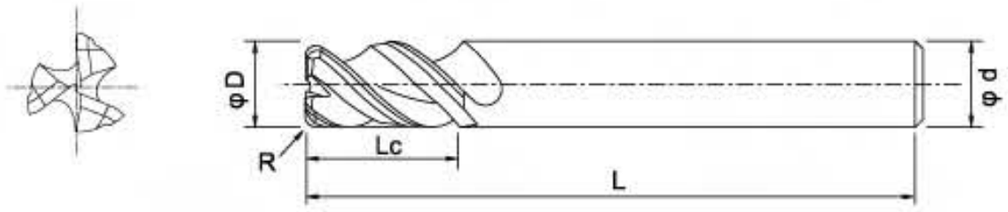
3刃 铝合金用 圆弧角R短刃型

3Flutes • Short with corner radius • for Aluminum Alloy

NEW

CA-CR-ETS

- 材　质 / Tool Material：硬质合金 / Carbide
- 螺旋角 / Helix Angle：约40° / About
- 外径公差 / Tolerance for Milling Diameter：0~–0.020mm
- 也可用于加工铜：Also suitable for copper.



（单位：mm）(Unit:mm)

商品号No. EDP No.	外径×圆弧角 Mill Dia.×R	全长 L	刃长 Lc	柄径 d	库存 Stock
8502231	3× R0.2	50	8	6	○
8502233	3× R0.5	50	8	6	○
8502241	4× R0.2	50	11	6	○
8502243	4× R0.5	50	11	6	○
8502245	4× R1	50	11	6	○
8502251	5× R0.2	50	13	6	○
8502253	5× R0.5	50	13	6	○
8502255	5× R1	50	13	6	○
8502262	6× R0.3	50	13	6	○
8502263	6× R0.5	50	13	6	○
8502265	6× R1	50	13	6	○
8502282	8× R0.3	60	19	8	○
8502283	8× R0.5	60	19	8	○
8502285	8× R1	60	19	8	○
8502287	8× R1.5	60	19	8	○
8502289	8× R2	60	19	8	○
8502302	10× R0.3	70	22	10	○
8502303	10× R0.5	70	22	10	○

（单位：mm）(Unit:mm)

商品号 No. EDP No.	外径×圆弧角 Mill Dia.×R	全长 L	刃长 Lc	柄径 d	库存 Stock
8502305	10× R1	70	22	10	○
8502307	10× R1.5	70	22	10	○
8502309	10× R2	70	22	10	○
8502313	10× R3	70	22	10	○
8502333	12× R0.5	75	26	12	○
8502335	12× R1	75	26	12	○
8502337	12× R1.5	75	26	12	○
8502339	12× R2	75	26	12	○
8502343	12× R3	75	26	12	○
8502375	16× R1	100	32	16	○
8502377	16× R1.5	100	32	16	○
8502379	16× R2	100	32	16	○
8502383	16× R3	100	32	16	○
8502415	20× R1	105	38	20	○
8502417	20× R1.5	105	38	20	○
8502419	20× R2	105	38	20	○
8502423	20× R3	105	38	20	○

○=库存中心标准库存品○=Inventory center stock item.

2刃 铝合金用 短刃型

2 Flutes • Short • for Aluminum Alloy

CA-RG-EDS

- 材　质 / Tool Material：硬质合金 / Carbide
- 螺旋角 / Helix Angle：30°
- 外径公差 / Tolerance for Milling Diameter：0~–0.030mm
- 也可用于加工铜：Also suitable for copper.

（单位：mm）(Unit:mm)

商品号 No. EDP No.	外径 Mill Dia.	全长 L	刃长 Lc	柄径 d	库存 Stock
8502010	1	40	2.5	4	●
8502015	1.5	40	4	4	●
8502020	2	40	6	4	●
8502025	2.5	40	8	4	●
8502030	3	45	8	6	●
8502035	3.5	45	10	6	○
8502040	4	45	11	6	●
8502045	4.5	45	11	6	○
8502050	5	50	13	6	●
8502055	5.5	50	13	6	○
8502060	6	50	13	6	●
8502065	6.5	60	16	8	○
8502070	7	60	16	8	○
8502075	7.5	60	16	8	○
8502080	8	60	19	8	●
8502085	8.5	70	19	10	○

（单位：mm）(Unit:mm)

商品号 No. EDP No.	外径 Mill Dia.	全长 L	刃长 Lc	柄径 d	库存 Stock
8502090	9	70	19	10	○
8502095	9.5	70	19	10	○
8502100	10	70	22	10	●
8502105	10.5	75	22	12	○
8502110	11	75	22	12	○
8502115	11.5	75	22	12	○
8502120	12	75	26	12	●
8502130	13	85	26	12	○
8502140	14	85	26	12	○
8502150	15	90	26	16	○
8502160	16	100	32	16	●
8502170	17	100	32	16	○
8502180	18	100	32	16	○
8502190	19	100	32	20	○
8502200	20	105	38	20	●

●=标准库存品●=Standard stock item.
○=库存中心标准库存品○=Inventory center stock item.

2刃 铝合金用 长刃型
2 Flutes · Long · for Aluminum Alloy

CA-RG-EDL

- 材 质 / Tool Material: 硬质合金 / Carbide
- 螺旋角 / Helix Angle: 30°
- R公差 / Tolerance for Milling Diameter: 0~–0.030mm

也可用于加工铜 Also suitable for copper.

（单位：mm）(Unit:mm)

商品号No. EDP No.	外径 Mill Dia.	全长 L	刃长 Lc	柄径 d	库存 Stock
8502630	3	50	12	6	●
8502635	3.5	50	14	6	○
8502640	4	50	17	6	●
8502645	4.5	50	17	6	○
8502650	5	60	20	6	●
8502655	5.5	60	20	6	○
8502660	6	60	20	6	●
8502665	6.5	70	24	8	○
8502670	7	70	24	8	○
8502675	7.5	70	24	8	○

（单位：mm）(Unit:mm)

商品号No. EDP No.	外径 Mill Dia.	全长 L	刃长 Lc	柄径 d	库存 Stock
8502680	8	70	28	8	●
8502685	8.5	80	28	10	○
8502690	9	80	28	10	○
8502695	9.5	80	28	10	○
8502700	10	80	34	10	●
8502705	10.5	90	34	12	○
8502710	11	90	34	12	○
8502715	11.5	90	34	12	○
8502720	12	90	40	12	●

●=标准库存品●=Standard stock item.
○=库存中心标准库存品○=Inventory center stock item.

2刃 铝合金用 球头型
2 Flutes.Ball-end.for Aluminum Alloy

CAP-EBD

- 材 质 / Tool Material: 硬质合金 / Carbide
- 螺旋角 / Helix Angle: 30°
- R公差 / Tolerance for Milling Diameter: ±0.01mm

也可用于加工铜和塑料
Also suitable for copper & Plastics

（单位：mm）(Unit:mm)

商品号No. EDP No.	R×外径 R× Mill Dia.	全长 L	刃长 Lc	柄径 d	库存 Stock
8503410	R0.5 × 1	60	2.5	4	○
8503412	R0.6 × 1.2	60	3	4	○
8503414	R0.7 × 1.4	60	3.5	4	○
8503415	R0.75× 1.5	60	4	4	○
8503416	R0.8 × 1.6	60	4	4	○
8503418	R0.9 × 1.8	60	4.5	4	○
8503420	R1 × 2	60	5	6	○
8503425	R1.25× 2.5	70	6	6	○
8503430	R1.5 × 3	70	8	6	○

（单位：mm）(Unit:mm)

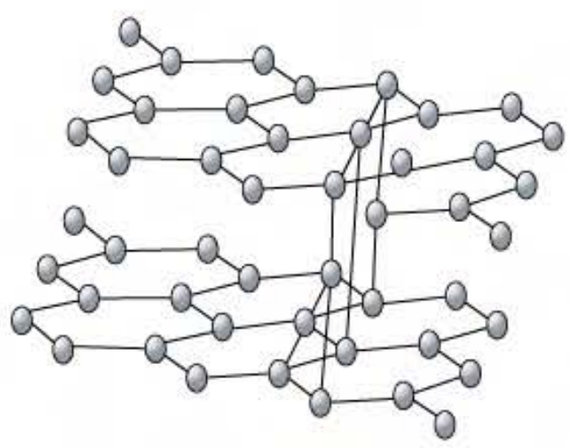
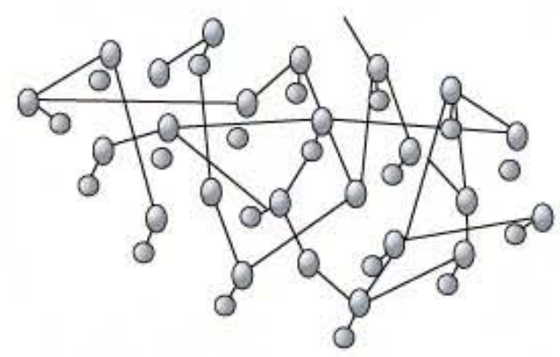
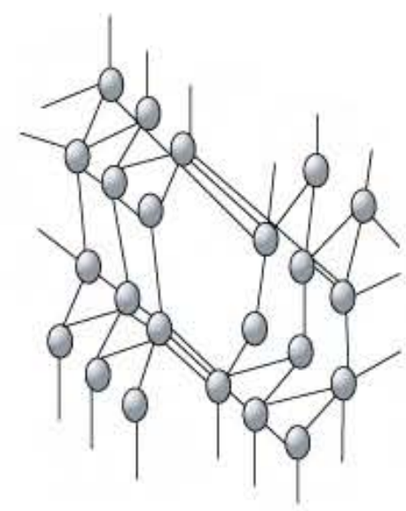
商品号No. EDP No.	R×外径 R× Mill Dia.	全长 L	刃长 Lc	柄径 d	库存 Stock
8503435	R1.75× 3.5	70	8	6	○
8503440	R2 × 4	80	8	6	○
8503450	R2.5 × 5	90	10	6	○
8503460	R3 × 6	90	12	6	○
8503480	R4 × 8	110	14	8	○
8503500	R5 × 10	125	18	10	○
8503520	R6 × 12	140	22	12	○
8503560	R8 × 16	160	30	16	○
8503600	R10 × 20	180	38	20	○

○=库存中心标准库存品○=Inventory center stock item.

最适于铝合金加工的
Ideal for flattening Aluminum Alloys!

新DLC涂层！
New Diamond Like Carbon coating!

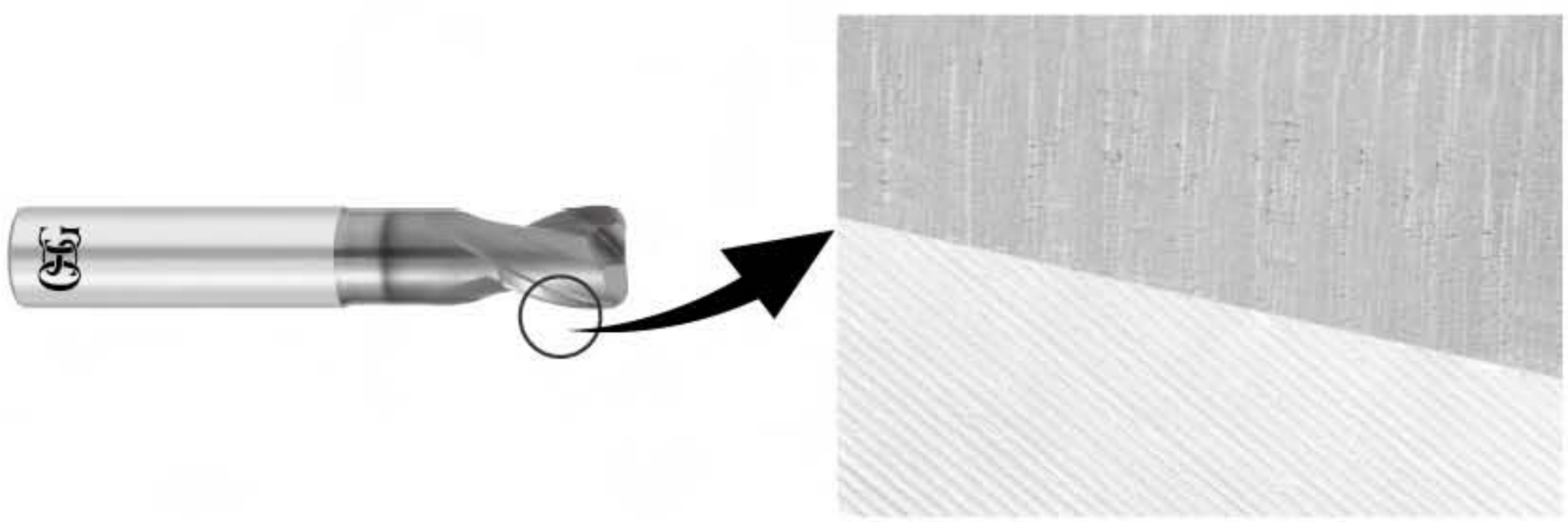
OSG的DLC涂层表面十分光滑！
由于表面光滑，因而在对于耐溶性和润滑性要求较高的铝合金加工可以发挥无穷的威力。
OSG's DLC coating gives shiny surface!
This shiny & smooth surface optimises end mill performance part iculary in flattening Aluminum Alloy that requires welding resistance and lubricity.

石墨 Graphite	D L C	金刚石 Diamond
		
结晶构造 Crystal construction	非结晶构造 Amorphous construction	结晶构造 Crystal construction

非结晶构造=没有特定结晶方向面的构造
Amorphous construction:Refers to a structure that is free of grain boundaries, and not a polycrystalline structure.

切削刃锋利（约1μm）！
Thin coating layer (approx. 1μm)!
Sharp cutting edge!

精加工面十分光滑！
Smooth and superb surface finish!



本样本登载的产品（涂层产品除外）皆可追加新DLC涂层
The New DLC coating is available for all items on this leaflet (except coated products) as an additional modification service.

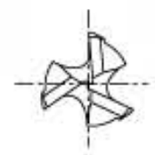
新DLC涂层 3刃 铝合金用 强力型

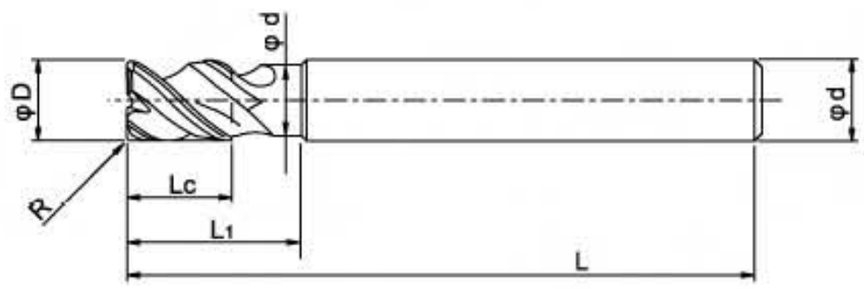
New DLC Coated · 3 Flutes · for High Speed Pocket operation · for Aluminum Alloy

NEW

DLC-PKE

- ●材 质 Tool Material: 硬质合金 Carbide
- ●表面处理 Surface treatment: DLC 涂层 DLC Coating
- ●螺旋角 Helix Angle: 约40° About
- ●外径公差 Tolerance for Milling Diameter: 0 ~ – 0.020mm





也可用于加工铜和塑料 Also suitable for copper & plastics.

(单位：mm)(Unit:mm)

商品号No. EDP No.	外径×R×全长 Mill Dia.×R× L	刃长 Lc	柄径 d	有效长 L1	颈径 d2	库存 Stock
8528533	3× R0.5× 50	4.5	6	9	2.7	○
8528543	4× R0.5× 50	6	6	12	3.6	○
8528553	5× R0.5× 60	7.5	6	15	4.5	○
8528563	6× R0.5× 60	9	6	15	5.4	○
8528565	6× R1 × 60	9	6	15	5.4	○
8528583	8× R0.5× 70	12	8	20	7.2	○
8528585	8× R1 × 70	12	8	20	7.2	○
8528603	10× R0.5× 80	15	10	25	9	○
8528605	10× R1 × 80	15	10	25	9	○

(单位：mm)(Unit:mm)

商品号No. EDP No.	角度×外径×全长 Mill Dia.×R×L	刃长 Lc	柄径 d	有效长 L1	颈径 d2	库存 Stock
8528623	12× R0.5× 90	18	12	30	11	○
8528625	12× R1 × 90	18	12	30	11	○
8528663	16× R0.5× 115	24	16	40	15	○
8528665	16× R1 × 115	24	16	40	15	○
8528669	16× R3 × 115	24	16	40	15	○
8528703	20× R0.5× 125	30	20	50	19	○
8528705	20× R1 × 125	30	20	50	19	○
8528709	20× R3 × 125	30	20	50	19	○

○=库存中心标准库存品○=Inventory center stock item.

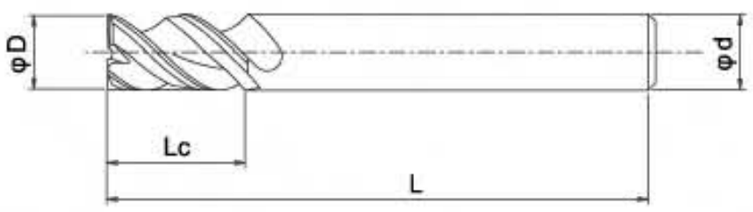
新DLC涂层 3刃 铝合金用 短刃型

New DLC Coated · 3 Flutes · Short · for Aluminum Alloy

NEW

DLC-ETS

- ●材 质 Tool Material: 硬质合金 Carbide
- ●表面处理 Surface treatment: DLC 涂层 DLC Coating
- ●螺旋角 Helix Angle: 约40° About
- ●外径公差 Tolerance for Milling Diameter: 0 ~ – 0.020mm



也可用于加工铜和塑料 Also suitable for copper & plastics.

(单位：mm)(Unit:mm)

商品号No. EDP No.	外径 Mill Dia	全长 L	刃长 Lc	柄径 d	库存 Stock
8528306	3	50	8	6	○
8528308	4	50	11	6	○
8528310	5	50	13	6	○
8528312	6	50	13	6	○
8528316	8	60	19	8	○

(单位：mm)(Unit:mm)

商品号No. EDP No.	外径 Mill Dia.	全长 L	刃长 Lc	柄径 d	库存 Stock
8528320	10	70	22	10	○
8528322	12	75	26	12	○
8528326	16	100	32	16	○
8528330	20	105	38	20	○

○=库存中心标准库存品○=Inventory center stock item.

形状尺寸表 Dimensions

新DLC涂层 2刃 铝合金用 短刃型

New DLC Coated · 2 Flutes · Short · for Aluminum Alloy

NEW

DLC-EDS

- 材　质 / Tool Material：硬质合金 / Carbide
- 表面处理 / Surface treatment：DLC 涂层 / DLC Coating
- 螺旋角 / Helix Angle：30°
- 外径公差 / Tolerance for Milling Diameter：0 ~ −0.020mm

也可用于加工铜和塑料　　Also suitable for copper & plastics.

（单位：mm）(Unit:mm)

商品号No. EDP No.	外径 Mill Dia.	全长 L	刃长 Lc	柄径 d	库存 Stock
8528005	0.5	40	1	4	○
8528006	0.6	40	1.2	4	○
8528008	0.8	40	1.6	4	○
8528010	1	40	2	4	○
8528012	1.2	40	2.4	4	○
8528014	1.4	40	2.8	4	○

（单位：mm）(Unit:mm)

商品号No. EDP No.	外径 Mill Dia.	全长 L	刃长 Lc	柄径 d	库存 Stock
8528015	1.5	40	3	4	○
8528016	1.6	40	3.2	4	○
8528018	1.8	40	3.6	4	○
8528020	2	40	4	4	○
8528025	2.5	40	5	4	○
8528030	3	40	6	4	○

○=库存中心标准库存品○=Inventory center stock item.

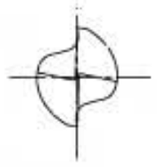
新DLC涂层 2刃 铝合金用 长颈 短刃型

New DLC Coated · 2 Flutes · Long neck · Short · for Aluminum Alloy

NEW

DLC-LN-EDS

- 材　质 / Tool Material：硬质合金 / Carbide
- 表面处理 / Surface treatment：DLC 涂层 / DLC Coating
- 螺旋角 / Helix Angle：30°
- 外径公差 / Tolerance for Milling Diameter：0 ~ −0.020mm



也可用于加工铜和塑料　　Also suitable for copper & plastics.

（单位：mm）(Unit:mm)

商品号No. EDP No.	外径×有效长 Mill Dia.× L1	全长 L	刃长 Lc	柄径 d	颈径 d2	库存 Stock
8528101	0.5× 2.5	60	0.7	6	0.45	○
8528102	1 × 5	60	1.5	6	0.95	○
8528103	1.5× 7.5	60	2.3	6	1.45	○
8528104	2 × 10	60	3	6	1.95	○
8528105	2.5× 12.5	70	3.7	6	2.4	○

（单位：mm）(Unit:mm)

商品号No. EDP No.	外径×有效长 Mill Dia.× L1	全长 L	刃长 Lc	柄径 d	颈径 d2	库存 Stock
8528106	3×15	70	4.5	6	2.85	○
8528108	4×20	80	6	6	3.85	○
8528110	5×25	90	7.5	6	4.85	○
8528112	6×30	90	9	6	5.85	○

○=库存中心标准库存品○=Inventory center stock item.

新DLC涂层 3刃 铝合金用 球头型

New DLC Coated ・2 Flutes・Ball-end・for Aluminum Alloy

NEW

DLC-EBD

- 材　质 / Tool Material：硬质合金 / Carbide
- 表面处理 / Surface treatment：DLC 涂层 / DLC Coating
- 螺旋角 / Helix Angle：30°
- 外径公差 / Tolerance for Milling Diameter：±0.01mm

也可用于加工铜和塑料　　Also suitable for copper & plastics.

（单位：mm）(Unit:mm)

商品号No. EDP No.	R	全长 L	刃长 Lc	柄径 d	库存 Stock
8528401	R0.5	50	2.5	4	○
8528402	R1	50	5	6	○
8528403	R1.5	60	8	6	○
8528404	R2	70	8	6	○
8528406	R3	90	12	6	○

（单位：mm）(Unit:mm)

商品号No. EDP No.	R	全长 L	刃长 Lc	柄径 d	库存 Stock
8528408	R4	100	14	8	○
8528410	R5	100	18	10	○
8528412	R6	110	22	12	○
8528416	R8	140	30	16	○
8528420	R10	160	38	20	○

○=库存中心标准库存品○=Inventory center stock item.

新DLC涂层 3刃 铝合金用 长颈 球头型

New DLC Coated ・2 Flutes・Long neck・Ball-end・for Aluminum Alloy

NEW

DLC-LN-EBD

- 材　质 / Tool Material：硬质合金 / Carbide
- 表面处理 / Surface treatment：DLC 涂层 / DLC Coating
- 螺旋角 / Helix Angle：30°
- 外径公差 / Tolerance for Milling Diameter：±0.01mm

也可用于加工铜和塑料　　Also suitable for copper & plastics.

（单位：mm）(Unit:mm)

商品号No. EDP No.	R×有效长 R× L1	全长 L	刃长 Lc	颈径 d2	柄径 d	库存 Stock
8528201	R0.5× 5	60	1.5	0.95	6	○
8528202	R1 × 10	60	3	1.95	6	○

（单位：mm）(Unit:mm)

商品号No. EDP No.	R×有效长 R× L1	全长 L	刃长 Lc	颈径 d2	柄径 d	库存 Stock
8528203	R1.5× 15	80	4.5	2.85	6	○
8528204	R2 × 20	80	6	3.85	6	○

○=库存中心标准库存品○=Inventory center stock item.

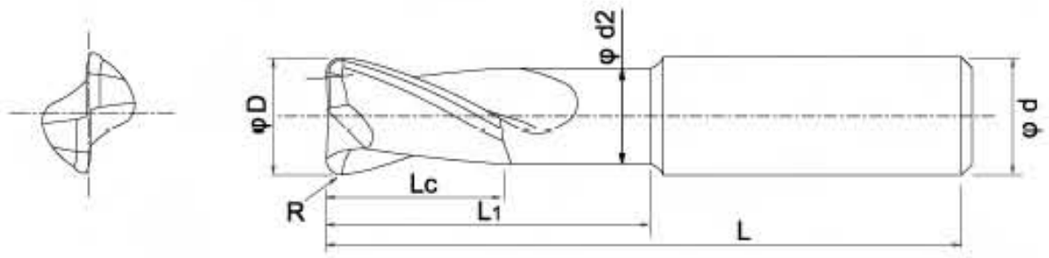
新DLC涂层 2刃 铝合金用 短刃型（超高速型）

New DLC Coated · 2 Flutes · Short · for Aluminum Alloy(for ultra high speed)

NEW

DLC-AIR-EDS

- 材　质 / Tool Material：硬质合金 / Carbide
- 表面处理 / Surface treatment：DLC 涂层 / DLC Coating
- 螺旋角 / Helix Angle：约25° / About
- 外径公差 / Tolerance for Milling Diameter：0 ~ −0.030mm



（单位：mm）(Unit:mm)

商品号No. EDP No.	外径×R Mill Dia.× R	全长 L	刃长 Lc	柄径 d	有效长 L1	颈径 d2	库存 Stock
8528822	12× R1	90	14	12	40	11	○
8528823	12× R1.6	90	14	12	40	11	○
8528826	12× R3	90	14	12	40	11	○
8528862	16× R1	100	18	16	45	14.4	○
8528863	16× R1.6	100	18	16	45	14.4	○
8528866	16× R3	100	18	16	45	14.4	○

（单位：mm）(Unit:mm)

商品号No. EDP No.	外径×R Mill Dia.× R	全长 L	刃长 Lc	柄径 d	有效长 L1	颈径 d2	库存 Stock
8528902	20× R1	110	22	20	56	18	○
8528903	20× R1.6	110	22	20	56	18	○
8528906	20× R3	110	22	20	56	18	○
8528952	25× R1	110	27	25	56	23.4	○
8528953	25× R1.6	110	27	25	56	23.4	○
8528956	25× R3	110	27	25	56	23.4	○

○=库存中心标准库存品○=Inventory center stock item.

最适合高硅铝合金的加工！
Ideal for high Si contained Aluminum Alloys!

超微结晶金刚石涂层
Ultra Fine Diamond Coating!

世界首次开发的超微结晶金刚石涂层（PAT.P.）。与以往的金刚石涂层相比拥有明显的艳丽光泽。拥有如此光泽的金刚石涂层世界上仅有OSG。

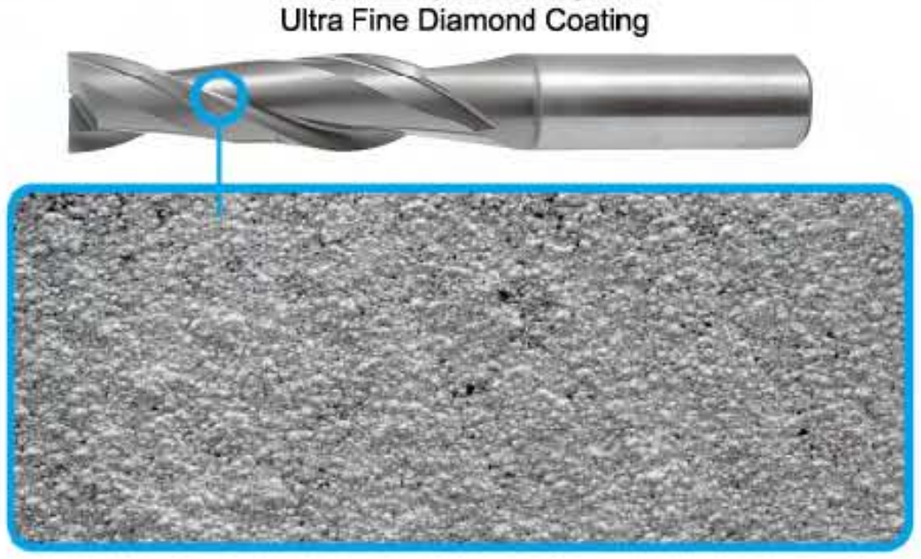
OGS's new (patent pending) diamond coating is made from ultra fine diamond crystals in an innovative new process. This coating can be easily distaguished from other diamond coatings by its shiny finish. This new OSG diamond coating will give better finish and better performance and is only available from OSG.

说明 Notes

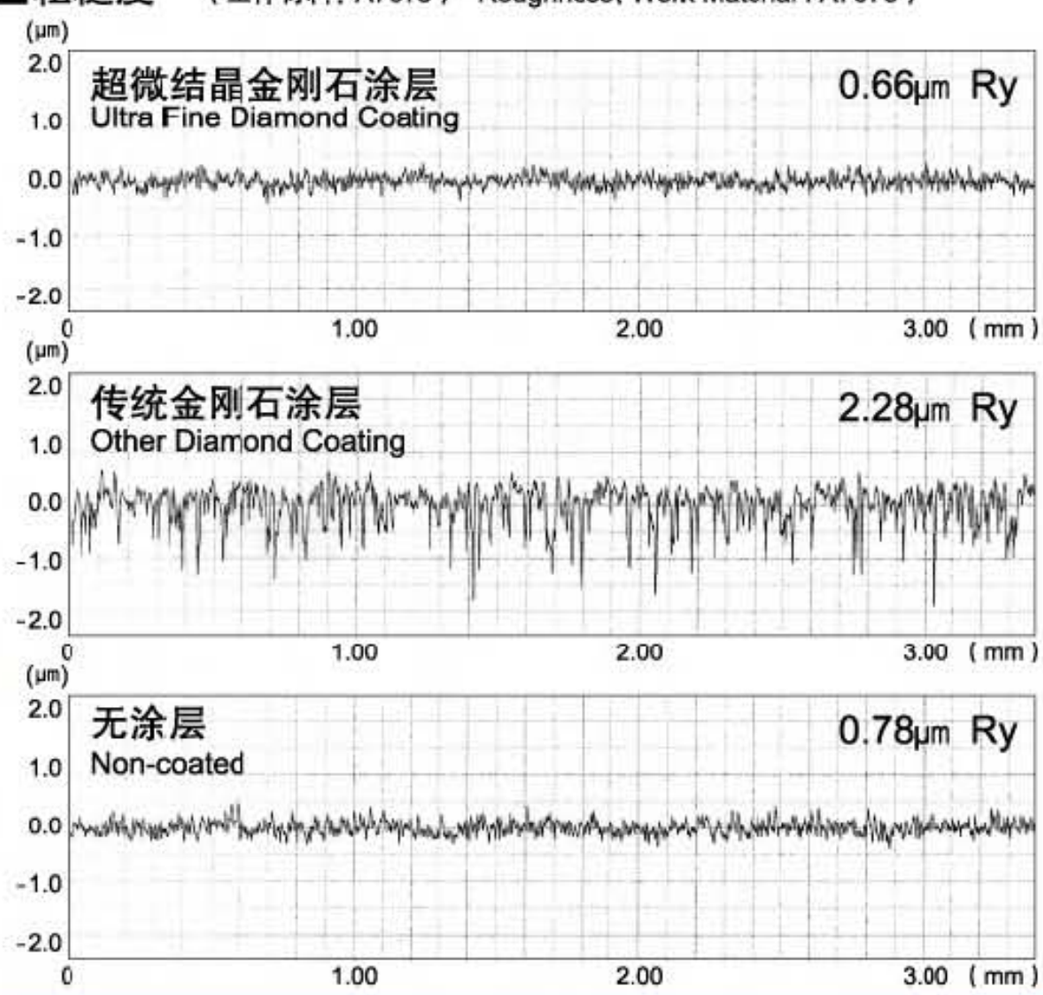
金刚石涂层在石墨加工中显示出优势，但在铜铝合金等非铁合金的加工中出现问题。新开发的超微结晶金刚石涂层加工过的工件表面粗糙度可以媲美无涂层的产品。

Existing diamond coatings perform well in graphite milling. However, problems with surface finish occur when milling non-ferrous materials such as aluminum alloys and copper. OSG's new diamond coating can achieve surface finish as good as any non-coated endmill.

超微结晶金刚石涂层
Ultra Fine Diamond Coating



■粗糙度 （工件材料：A7075） Roughness(Work Material : A7075)

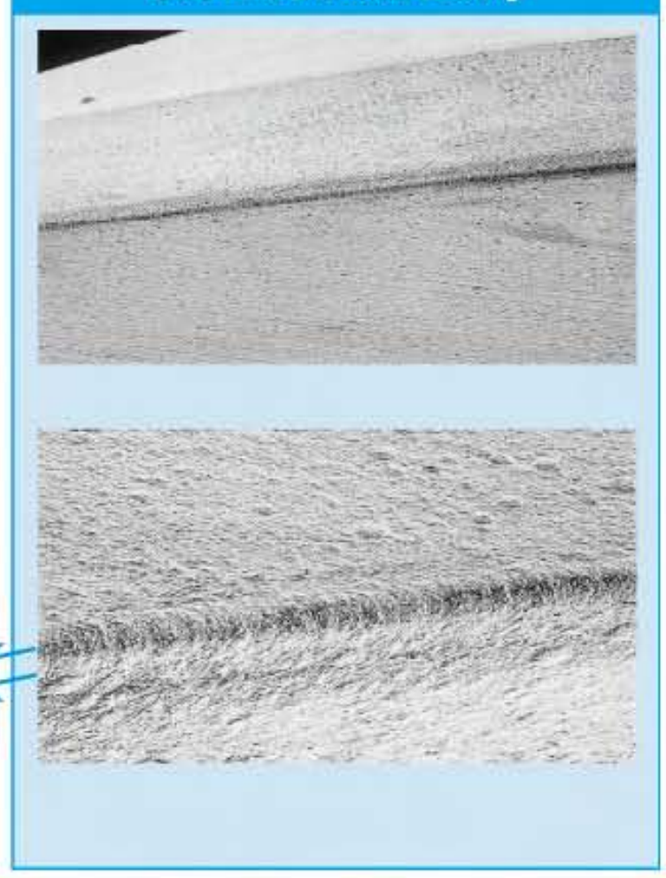


刃尖锐利无圆弧角
Sharp cutting edge!

■刃尖的比较

传统金刚石涂层
Other Diamond Coating

超微结晶金刚石涂层
Ultra Fine Diamond Coating



● 从漂亮到更漂亮！
超微结晶金刚石涂层
使金刚石结晶变的
如此漂亮！

From fine to ultra fine!
Ultra fine diamond coating contains very fine diamond crystals !

● 切削面锋利！
Sharp cutting edge

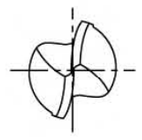
本样本登载的产品（涂层产品除外）皆可追加超微结晶金刚石涂层。
The Ultra Fine Diamond coating is available for all items on this leaflet (except coated products) as an additicnal modification service.

形状尺寸表 Dimensions

超微结晶金刚石涂层 2刃 球头型
Diamond Coated · 2 Flutes · Ball-end

DIA-EBD

- ●材　质 Tool Material：硬质合金 Carbide
- ●表面处理 Surface Treatmen：超微结晶金刚石涂层 Uitra Fine Diamond Coating
- ●螺旋角 Helix Angle：30°



也可以加工石墨。 Also suitable for graphite.

（单位：mm）(Unit:mm)

商品号No. EDP No.	R×外径 R× Mill Dia.	全长 L	刃长 Lc	柄径 d	库存 Stock
8504110	R0.5 × 1	60	2.5	4	○
8504120	R1 × 2	60	5	6	○
8504130	R1.5 × 3	70	8	6	○
8504140	R2 × 4	80	8	6	○
8504150	R2.5 × 5	90	10	6	○

（单位：mm）(Unit:mm)

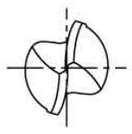
商品号No. EDP No.	R×外径 R× Mill Dia.	全长 L	刃长 Lc	柄径 d	库存 Stock
8504160	R3 × 6	90	12	6	○
8504180	R4 × 8	110	14	8	○
8504200	R5 × 10	125	18	10	○
8504220	R6 × 12	140	22	12	○

○=库存中心标准库存品○=Inventory center stock item.

超微结晶金刚石涂层 2刃 长颈 球头型
Diamond Coated · 2 Flutes · Long Neck · Ball-end

DIA-LN-EBD

- ●材　质 Tool Material：硬质合金 Carbide
- ●表面处理 Surface Treatmen：超微结晶金刚石涂层 Uitra Fine Diamond Coating
- ●螺旋角 Helix Angle：30°



也可以加工石墨。 Also suitable for graphite.

（单位：mm）(Unit:mm)

商品号No. EDP No.	R×有效长 R× L1	全长 L	刃长 Lc	柄径 d	颈径 d2	库存 Stock
8505211	R0.5× 5	60	1.5	6	0.95	○
8505212	R0.5× 10	60	1.5	6	0.95	○
8505222	R1 × 10	60	3	6	1.95	○
8505224	R1 × 20	60	3	6	1.95	○
8505233	R1.5× 15	70	4.5	6	2.85	○

（单位：mm）(Unit:mm)

商品号No. EDP No.	R×有效长 R× L1	全长 L	刃长 Lc	柄径 d	颈径 d2	库存 Stock
8505236	R1.5× 30	70	4.5	6	2.85	○
8505244	R2 × 20	80	6	6	3.85	○
8505247	R2 × 40	80	6	6	3.85	○
8505255	R2.5× 25	90	7.5	6	4.85	○
8505258	R2.5 × 50	100	7.5	6	4.85	○

○=库存中心标准库存品○=Inventory center stock item.

超微结晶金刚石涂层 2刃 锥颈 球头型
Diamond Coated 2 Flutes Pencil Neck Ball-end

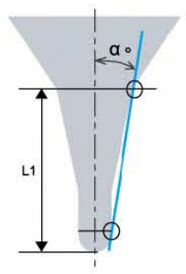
NEW SIZES

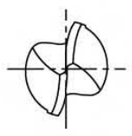
DIA-PC-EBD

- ●材　质 Tool Material：硬质合金 Carbide
- ●表面处理 Surface Treatmen：超微结晶金刚石涂层 Uitra Fine Diamond Coating
- ●螺旋角 Helix Angle：30°

※如图所示有效斜角α是指颈首部和刃部相连接所形成的实际干涉的角。

※Effective angle (α°) refers to the angle connecting between the conical neck and the cutting edge diameter as shown in the figure. Please select the tool according to the machining angle.





也可以加工石墨。 Also suitable for graphite.

（单位：mm）(Unit:mm)

	商品号No. EDP No.	R×斜角×有效长 R×β×L1	全长 L	刃长 Lc	柄径 d	颈径 d2	颈平行部 L2	有效角度 α°	库存 Stock
NEW	8504963	R0.5 × 1° × 30	100	2.5	6	1.9	4	0° 52′	○
NEW	8504964	R0.5 × 1° × 40	100	2.5	6	2.3	4	0° 54′	○
NEW	8504965	R0.5 × 1° × 50	100	2.5	6	2.6	4	0° 55′	○
NEW	8504966	R0.5 × 1° × 60	120	2.5	6	3	4	0° 56′	○
NEW	8504967	R0.5 × 1° × 70	140	2.5	6	3.3	4	0° 56′	○
NEW	8504968	R0.5 × 1° × 80	140	2.5	6	3.7	4	0° 57′	○
	8504900	R0.5 × 1° × 90	150	2.5	6	4	4	0° 57′	○
NEW	8504976	R1 × 1° × 60	120	5	6	3.9	7	0° 53′	○
NEW	8504978	R1 × 1° × 80	140	5	6	4.5	7	0° 55′	○
	8504902	R1 × 1° × 100	160	5	6	5.3	7	0° 56′	○
NEW	8504989	R1.5 × 1° × 90	160	8	8	5.8	10.5	0° 53′	○
	8504903	R1.5 × 1° × 120	180	8	8	6.9	10.5	0° 55′	○
	8504904	R2 × 1° × 120	180	8	10	7.9	10.5	0° 55′	○
	8504906	R3 × 1° × 150	220	12	12	10.8	14.5	0° 55′	○

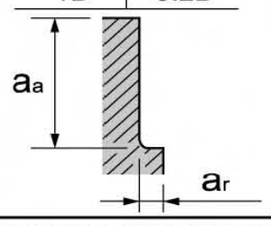
○=库存中心标准库存品○=Inventory center stock item.

Recommended milling conditions 切削条件基准表

CA-PKE · DLC-PKE

侧面切削 SIDE MILLING

加工材质	变形铝合金 A7075				铸造铝合金 <Si13%				镁合金.铜合金 AZ91.AZ80A.C1100			
WORK MATERIAL	Aluminum alloy expanding material A7075				Aluminum alloy casting. Die casting <Si13%				Magnesium alloy. Copper alloy AZ91.AZ80A.C1100			
	标准条件 REGULAR MILLING		高速切削用 HIGH SPEED MILLING		标准条件 REGULAR MILLING		高速切削用 HIGH SPEED MILLING		标准条件 REGULAR MILLING		高速切削用 HIGH SPEED MILLING	
刀具尺寸 (mm)	回转速度 (min^{-1})	进给速度 (mm/min)	回转速度 (min^{-1})	进给速度 (mm/min)	回转速度 (min^{-1})	进给速度 (mm/min)	回转速度 (min^{-1})	进给速度 (mm/min)	回转速度 (min^{-1})	进给速度 (mm/min)	回转速度 (min^{-1})	进给速度 (mm/min)
MILL DIA. (mm)	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)
3	21,000	1,100	40,000	2,100	21,000	1,100	24,000	1,250	7,950	325	17,000	625
4	15,500	1,250	32,000	2,550	15,500	1,250	19,200	1,550	5,950	365	14,300	800
5	12,500	1,300	32,000	3,250	12,500	1,275	19,200	1,950	4,750	385	12,700	925
6	10,500	1,400	26,500	3,500	10,500	1,400	15,900	2,150	3,950	400	10,600	960
8	7,950	1,500	20,000	3,750	7,950	1,500	12,000	2,250	2,950	460	8,000	1,130
10	6,350	1,700	16,000	4,300	6,350	1,700	9,600	2,580	2,350	475	6,350	1,150
12	5,300	1,750	13,300	4,400	5,300	1,750	8,000	2,650	1,950	510	5,300	1,250
16	3,950	1,750	10,000	4,400	3,950	1,750	6,000	2,650	1,450	510	4,000	1,250
20	3,150	1,750	8,000	4,400	3,150	1,750	4,800	2,650	1,150	510	3,200	1,250
切深量 DEPTH OF CUT	aa 1D, ar 0.2D		aa 1D, ar 0.1D		aa 1D, ar 0.2D		aa 1D, ar 0.1D		aa 1D, ar 0.2D		aa 1D, ar 0.1D	

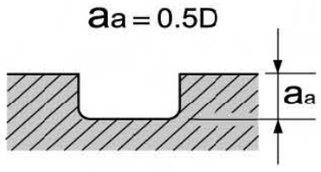


※与工件的表面精度相比更重视加工效率时,
可将进给速度提高至上表的1.5倍。
1.请使用刚性和精度高的机械,夹具。
2.请使用水溶性切削油剂。
3.可根据切深量,机械刚性等使用状况调整转速和进给速度。
4.加工镁合金时请牢记,谨慎选择切削油剂,严格管理切屑。

※ If the chip disposal is a greater concern than the surface finish on work material, the feeding speed should be increased by 50%.
1. Use a rigid and precise machine and holder.
2. Use a water soluble cutting fluid.
3. Please adjust the speed and feed when the cutting depth is large or when machines with low rigidity are used.
4. Please note the following points on machining Mg alloy.
To select appropriate cutting fluid, consult with lubricant manufacturers.
Chips must be handled carefully.

槽切削 SLOTTING

被削材	变形铝合金 A7075				铸造铝合金 <Si13%				镁合金.铜合金 AZ91.AZ80A.C1100	
WORK MATERIAL	Aluminum alloy expanding material A7075				Aluminum alloy casting. Die casting <Si13%				Magnesium alloy. Copper alloy AZ91.AZ80A.C1100	
	标准条件 REGULAR MILLING		高速切削用 HIGH SPEED MILLING		标准条件 REGULAR MILLING		高速切削用 HIGH SPEED MILLING		标准条件 REGULAR MILLING	
刀具尺寸 (mm)	回转速度 (min^{-1})	进给速度 (mm/min)	回转速度 (min^{-1})	进给速度 (mm/min)	回转速度 (min^{-1})	进给速度 (mm/min)	回转速度 (min^{-1})	进给速度 (mm/min)	回转速度 (min^{-1})	进给速度 (mm/min)
MILL DIA. (mm)	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)
3	21,000	770	40,000	1,450	21,000	770	24,000	880	7,950	325
4	15,500	810	32,000	1,700	15,500	810	19,200	1,000	5,950	375
5	12,500	860	32,000	2,200	12,500	860	19,200	1,350	4,750	385
6	10,500	950	26,500	2,400	10,500	950	15,900	1,450	3,950	400
8	8,000	1,000	20,000	2,500	8,000	1,000	12,000	1,500	2,950	460
10	6,350	1,150	16,000	2,800	6,350	1,150	9,600	1,700	2,350	475
12	5,300	1,200	13,300	2,950	5,300	1,200	8,000	1,800	1,950	510
16	3,950	1,200	10,000	3,000	3,950	1,200	6,000	1,800	1,450	510
20	3,150	1,200	8,000	3,000	3,150	1,200	4,800	1,800	1,150	510
切深量 DEPTH OF CUT	aa = 0.5D		aa = 0.25D		aa = 0.5D		aa = 0.25D		aa = 0.5D	aa = 0.25D



※ 与工件的表面精度相比，更重视加工效率时，
可将进给速度提高至上表的1.5倍。
<标准条件>
坡度加工时，请将斜角控制在30° 以内。
<高速条件>
坡度加工时，进给速度2，000mm/min以下，斜角30° 以内。
1. 请使用刚性精度高的机械，夹具。
2. 请使用水溶性切削油剂。
3. 可根据切深量，机械刚性等使用状况调整转速和进给速度。
4. 加工镁合金时请牢记，谨慎选择切削油剂，严格管理切屑。

※ If the chip disposal is a greater concern than the surface finish on work material, the feeding speed should be increased by 50%.
< Regular Milling >
The recommended maximum ramping angle is 30 degrees or lower when using for ramping machining.
< High Speed Milling >
The recommended feeding speed for ramping machining is less than 2000mm/min, and the recommended maximum ramping angle is 30 degrees or lower.
1. Use a rigid and precise machine and holder.
2. Use a water soluble cutting fluid.
3. Please adjust the speed and feed when the cutting depth is large or when machines with low rigidity are used.
4. Please note the following points on machining Mg alloy.
To select appropriate cutting fluid, consult with lubricant manufacturers.
Chips must be handled carefully.

切削条件基准表 Recommended milling conditions

CA-MFE

高速高精度的加工中心的基准条件表

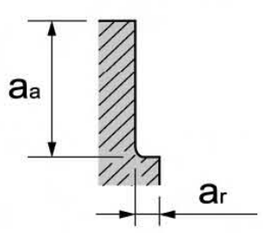
The conditions below are for high speed / high precision machining centers.

侧面切削 HIGH-SPEED SIDE MILLING

加工材质	变形铝合金 A7075		铸造铝合金 <Si13%		镁合金.铜合金 AZ91.AZ80A.C1100	
WORK MATERIAL	Aluminum alloy expanding material A7075		Aluminum alloy casting. Die casting <Si13%		Magnesium alloy. Copper alloy AZ91.AZ80A.C1100	
刀具尺寸 (mm)	回转速度 (min^{-1})	进给速度 (mm/min)	回转速度 (min^{-1})	进给速度 (mm/min)	回转速度 (min^{-1})	进给速度 (mm/min)
MILL DIA. (mm)	SPEED (min^{-1})	FEED (mm/min)	SPEED (min^{-1})	FEED (mm/min)	SPEED (min^{-1})	FEED (mm/min)
8	20,000	3,750	12,000	2,250	8,000	1,130
10	16,000	4,300	9,600	2,580	6,350	1,150
12	13,300	4,400	8,000	2,650	5,300	1,250
14	11,500	4,400	6,900	2,650	4,500	1,250
16	10,000	4,400	6,000	2,650	4,000	1,250
18	8,850	4,400	5,300	2,650	3,500	1,250
20	8,000	4,400	4,800	2,650	3,200	1,250
22	7,400	4,000	4,500	2,400	3,000	1,200

切深量 DEPTH OF CUT

a_a	a_r
1.2D	0.1D



※修正值
此条件表为铣刀悬长量为刃径4倍以下时的基准若悬长量较大时，请参照右表的系数降低加工条件.

The cutting conditions in this table are obtainable when the extension of the end mill is less than (D×4). If the tool extension increases, refer to the following coefficients and reduce the conditions accordingly.

■工具悬长量影响切深、转速、进给速度的系数。

工具悬长量 Depth of cut	切深量 Depth of cut		回转速度 Speed	进给速度 Feed
	a_a	a_r	比率	比率
刃径×4倍 D×4	1.2D	0.1D	100%	100%
刃径×5倍 D×5	1.2D	0.05D	60 ~ 80%	60 ~ 80%
刃径×6倍 D×6	1.2D	0.025D	40 ~ 60%	40 ~ 60%

1.请使用刚性和精度高的机械,夹具。
2.请使用水溶性切削油剂。
3.可根据切深量,机械刚性等使用状况调整转速和进给速度。
4.加工镁合金时请牢记,谨慎选择切削油剂,严格管理切屑。

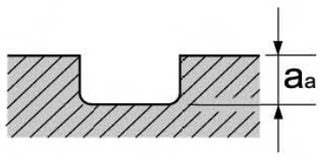
1. Use a rigid and precise machine and holder.
2. Use a water soluble cutting fluid.
3. Please adjust the speed and feed when the cutting depth is large or when machines with low rigidity are used.
4. Please note the following points on machining Mg alloy.
   To select appropriate cutting fluid, consult with lubricant manufacturers.
   Chips must be handled carefully.

高速槽切削 HIGH-SPEED SLOTTING

加工材质	变形铝合金 A7075		铸造铝合金 <Si13%	
WORK MATERIAL	Aluminum alloy expanding material A7075		Aluminum alloy casting. Die casting <Si13%	
刀具尺寸 (mm)	回转速度 (min^{-1})	进给速度 (mm/min)	回转速度 (min^{-1})	进给速度 (mm/min)
MILL DIA. (mm)	SPEED (min^{-1})	FEED (mm/min)	SPEED (min^{-1})	FEED (mm/min)
8	20,000	2,500	12,000	1,500
10	16,000	2,800	9,600	1,700
12	13,300	2,950	8,000	1,750
14	11,500	3,000	6,800	1,800
16	10,000	3,000	6,000	1,800
18	8,850	3,000	5,300	1,800
20	8,000	3,000	4,800	1,800
22	7,400	3,000	4,450	1,800

切深量 DEPTH OF CUT

$a_a = 0.1D$



※修正值
此条件表为铣刀悬长量为刃径4倍以下时的基准若悬长量较大时，请参照右表的系数降低加工条件.

The cutting conditions in this table are obtainable when the extension of the end mill is less than (D×4). If the tool extension increases, refer to the following coefficients and reduce the conditions accordingly.

■工具悬长量影响切深、转速、进给速度的系数。

工具悬长量 Depth of cut	切深量 Depth of cut	回转速度 Speed	进给速度 Feed
	a_a	比率	比率
刃径×4倍 D×4	0.1D	100%	100%
刃径×5倍 D×5	0.05D	60 ~ 80%	60 ~ 80%
刃径×6倍 D×6	0.025D	40 ~ 60%	40 ~ 60%

1.请使用刚性和精度高的机械,夹具.
2.请使用水溶性切削油剂.
3.可根据切深量,机械刚性等使用状况调整转速和进给速度.

1. Use a rigid and precise machine and holder.
2. Use a water soluble cutting fluid.
3. Please adjust the speed and feed when the cutting depth is large or when machines with low rigidity are used.

Recommended milling conditions 切削条件基准表

CA-ETS.CA-CR-ETS.DLC-ETS

侧面切削 SIDE MILLING

加工材质	变形铝合金 A7075		铸造铝合金 <Si13%		镁合金.铜合金 AZ91.AZ80A.C1100	
WORK MATERIAL	Aluminum alloy expanding material A7075		Aluminum alloy casting. Die casting <Si13%		Magnesium alloy. Copper alloy AZ91.AZ80A.C1100	
刀具尺寸 (mm)	回转速度 (min^{-1})	进给速度 (mm/min)	回转速度 (min^{-1})	进给速度 (mm/min)	回转速度 (min^{-1})	进给速度 (mm/min)
MILL DIA. (mm)	SPEED (min^{-1})	FEED (mm/min)	SPEED (min^{-1})	FEED (mm/min)	SPEED (min^{-1})	FEED (mm/min)
3	21,000	950	21,000	950	7,950	320
4	15,500	1,080	15,500	1,080	5,950	350
5	12,500	1,100	12,500	1,100	4,750	380
6	10,500	1,200	10,500	1,200	3,950	400
8	7,950	1,300	7,950	1,300	2,950	450
10	6,350	1,500	6,350	1,500	2,350	480
12	5,300	1,550	5,300	1,550	1,950	510
16	3,950	1,550	3,950	1,550	1,450	510
20	3,150	1,550	3,150	1,550	1,150	510

切深量 DEPTH OF CUT

a_a	a_r
1.5D	0.1D

1.请使用刚性和精度高的机械,夹具。
2.请使用水溶性切削油剂。
3.可根据切深量,机械刚性等使用状况调整转速和进给速度。
4.加工镁合金时请牢记,谨慎选择切削油剂,严格管理切屑。

1. Use a rigid and precise machine and holder.
2. Use a water soluble cutting fluid.
3. Please adjust the speed and feed when the cutting depth is large or when machines with low rigidity are used.
4. Please note the following points on machining Mg alloy.
   To select appropriate cutting fluid, consult with lubricant manufacturers.
   Chips must be handled carefully.

槽切削 SLOTTING

加工材质	变形铝合金 A7075		铸造铝合金 <Si13%		镁合金.铜合金 AZ91.AZ80A.C1100	
WORK MATERIAL	Aluminum alloy expanding material A7075		Aluminum alloy casting <Si13%		Magnesium alloy. Copper alloy AZ91.AZ80A.C1100	
刀具尺寸 (mm)	回转速度 (min^{-1})	进给速度 (mm/min)	回转速度 (min^{-1})	进给速度 (mm/min)	回转速度 (min^{-1})	进给速度 (mm/min)
MILL DIA. (mm)	Speed (min^{-1})	Feed (mm/min)	Speed (min^{-1})	Feed (mm/min)	Speed (min^{-1})	Feed (mm/min)
3	21,000	670	21,000	670	7,950	325
4	15,500	700	15,500	700	5,950	365
5	12,500	745	12,500	745	4,750	385
6	10,500	820	10,500	820	3,950	405
8	7,950	865	7,950	865	2,950	455
10	6,350	970	6,350	970	2,350	475
12	5,300	1,030	5,300	1,030	1,950	510
16	3,950	1,030	3,950	1,030	1,450	510
20	3,150	1,030	3,150	1,030	1,150	500

切深量 DEPTH OF CUT

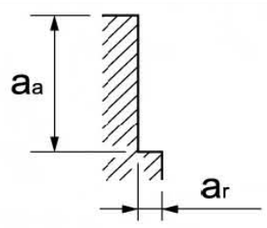
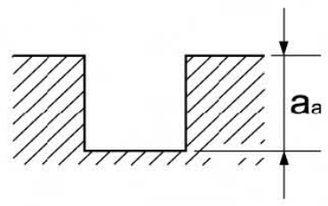
$a_a = 0.5D$

1.请使用刚性和精度高的机械,夹具。
2.请使用水溶性切削油剂。
3.可根据切深量,机械刚性等使用状况调整转速和进给速度。
4.加工镁合金时请牢记,谨慎选择切削油剂,严格管理切屑。

1. Use a rigid and precise machine and holder.
2. Use a water soluble cutting fluid.
3. Please adjust the speed and feed when the cutting depth is large or when machines with low rigidity are used.
4. Please note the following points on machining Mg alloy.
   To select appropriate cutting fluid, consult with lubricant manufacturers.
   Chips must be handled carefully.

切削条件基准表 Recommended milling conditions

CA-RG-EDS

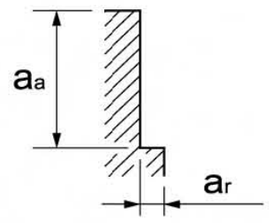
加工材质	侧面切削 SIDE MILLING				槽切削 SLOTTING			
	变形铝合金 A7075		镁合金.铜合金 AZ91.AZ80A.C1100		变形铝合金 A7075		镁合金.铜合金 AZ91.AZ80A.C1100	
WORK MATERIAL	Aluminum alloy expanding material A7075		Magnesium alloy.Copper alloy AZ91.AZ80A.C1100		Aluminum alloy expanding material A7075		Magnesium alloy.Copper alloy AZ91.AZ80A.C1100	
刀具尺寸 (mm)	回转速度 (min^{-1})	进给速度(mm/min)	回转速度 (min^{-1})	进给速度(mm/min)	回转速度 (min^{-1})	进给速度(mm/min)	回转速度 (min^{-1})	进给速度(mm/min)
MILL DIA.(mm)	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	32,000	220	23,500	220	32,000	220	23,500	220
2	32,000	420	11,500	215	23,500	310	11,500	215
3	21,000	700	7,950	250	15,500	515	7,950	250
4	15,500	725	5,950	280	11,500	540	5,950	280
5	12,500	760	4,750	295	9,500	575	4,750	295
6	10,500	830	3,950	310	7,950	630	3,950	310
8	7,950	890	2,950	350	5,950	665	2,950	350
10	6,350	995	2,350	365	4,750	745	2,350	365
12	5,300	1,050	1,950	390	3,950	790	1,950	390
14	4,500	1,050	1,700	395	3,400	795	1,700	395
16	3,950	1,050	1,450	390	2,950	795	1,450	390
18	3,500	1,050	1,300	390	2,650	795	1,300	390
20	3,150	1,050	1,150	385	2,350	785	1,150	385
切深量 DEPTH OF CUT	a_a 1.5D, a_r 0.1D				a_a=1D			

1.请使用刚性和精度高的机械,夹具。
2.请使用水溶性切削油剂。
3.加工镁合金时请牢记,谨慎选择切削油剂,严格管理切屑。

1. Use a rigid and precise machine and holder.
2. Use a water soluble cutting fluid.
3. Please note the following points on machining Mg alloy.
   To select appropriate cutting fluid, consult with lubricant manufacturers.
   Chips must be handled carefully.

CA-RG-EDL

SIDE MILLING

加工材质	变形铝合金 A7075		镁合金.铜合金 AZ91.AZ80A.C1100	
WORK MATERIAL	Aluminum alloy expanding material A7075		Magnesium alloy.Copper alloy AZ91.AZ80A.C1100	
刀具尺寸 (mm)	回转速度(min^{-1})	进给速度(mm/min)	回转速度(min^{-1})	进给速度(mm/min)
MILL DIA.(mm)	SPEED(min^{-1})	FEED(mm/min)	SPEED(min^{-1})	FEED(mm/min)
3	13,000	390	6,350	195
4	9,900	400	4,750	210
5	7,950	400	3,800	245
6	6,600	450	3,150	260
8	4,950	500	2,350	275
10	3,950	600	1,900	295
12	3,300	630	1,550	305
切深量 DEPTH OF CUT	a_a 2.5D, a_r 0.1D			

1.进行侧面加工时，根据表面精度要求可将进给速度按上表在0.5–1.5倍范围内调整。
2.请使用刚性好的设备和夹具。
3.请使用干式切削或水溶性切削液。
4.加工镁合金时请牢记,谨慎选择切削油剂,严格管理切屑。

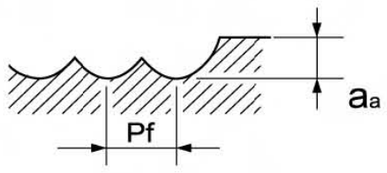
1. For side milling, alter the feed rate ($\frac{1}{2}$ to $1\frac{1}{2}$ times the listed rate) to meet surface roughness requirements.
2. Use a rigid and precise machine and holder.
3. We recommend dry milling or using a water soluble fluid.
4. Please note the following points on machining Mg alloy.
   To select appropriate cutting fluid, consult with lubricant manufacturers.
   Chips must be handled carefully.

Recommended milling conditions 切削条件基准表

CAP-EBD

侧面切削 SIDE MILLING

加工材质	变形铝合金 A7075				铸造铝合金 <Si13%				镁合金.铜合金 AZ91.AZ80A.C1100		钢合金 C1100	
WORK MATERIAL	Aluminum alloy expanding material A7075				Aluminum alloy casting. Die casting <Si13%				Magnesium alloy. Copper alloy AZ91.AZ80A.C1100		Copper alloy C1100	
	标准条件 REGULAR MILLING		高速切削用 HIGH SPEED MILLING		标准条件 REGULAR MILLING		高速切削用 HIGH SPEED MILLING		标准条件 REGULAR MILLING		高速切削用 HIGH SPEED MILLING	
刀具尺寸 MILL DIA. (mm)	回转速度 SPEED (min^{-1})	进给速度 FEED (mm/min)	回转速度 SPEED (min^{-1})	进给速度 FEED (mm/min)	回转速度 SPEED (min^{-1})	进给速度 FEED (mm/min)	回转速度 SPEED (min^{-1})	进给速度 FEED (mm/min)	回转速度 SPEED (min^{-1})	进给速度 FEED (mm/min)	回转速度 SPEED (min^{-1})	进给速度 FEED (mm/min)
R0.5× 1	32,000	845	50,000	1,200	32,000	845	50,000	1,200	32,000	845	50,000	1,200
R 1× 2	31,800	1,550	50,000	2,200	31,800	1,550	47,700	2,100	23,900	1,150	39,800	1,750
R1.5× 3	21,200	1,550	50,000	3,300	21,200	1,550	31,800	2,100	15,900	1,150	26,500	1,750
R 2× 4	15,900	1,550	39,800	3,500	15,900	1,550	23,800	2,100	11,900	1,150	19,900	1,750
R 3× 6	10,600	1,600	26,500	3,550	10,600	1,600	15,900	2,150	7,950	1,150	13,000	1,800
R 4× 8	7,950	1,950	19,500	4,500	7,950	1,950	11,900	2,650	5,950	1,450	9,900	2,250
R 5×10	6,350	1,750	15,500	4,050	6,350	1,750	9,550	2,450	4,750	1,300	7,950	2,000
R 6×12	5,300	1,650	13,000	3,750	5,300	1,650	7,950	2,250	3,950	1,200	6,600	1,900
R 8×16	3,950	1,500	9,900	3,550	3,950	1,500	5,950	2,100	2,950	1,150	4,950	1,800
R10×20	3,150	1,350	7,950	3,200	3,150	1,350	4,750	1,900	2,350	1,000	3,950	1,600
切深量 DEPTH OF CUT	a_a 0.1D, P_f 0.2D		a_a 0.05D, P_f 0.1D		a_a 0.1D, P_f 0.2D		a_a 0.05D, P_f 0.1D		a_a 0.1D, P_f 0.2D		a_a 0.02D, P_f 0.05D	



1.请使用刚性和精度高的机械，夹具。
2.请使用水溶性切削油剂。
3.当产生异常振动时，请降低转速和进给速度。
4.加工镁合金时请牢记，谨慎选择切削油剂,严格管理切屑。

1. Use a rigid and precise machine and holder.
2. Use a water soluble cutting fluid
3. When chattering occurs, reduce the speed and feed simultaneously.
4. Please note the following points on machining Mg alloy.
   To select appropriate cutting fluid, consult with lubricant manufacturers.
   Chips must be handled carefully.

切削条件基准表 Recommended milling conditions

DLC-EDS

加工材质	变形铝合金 A7075				铸造铝合金 <Si13%				镁合金.铜合金 AZ91.AZ80A.C1100		钢合金 C1100	
WORK MATERIAL	Aluminum alloy expanding material A7075				Aluminum alloy casting. Die casting <Si13%				Magnesium alloy. Copper alloy AZ91.AZ80A.C1100		Copper alloy C1100	
	标准条件 REGULAR MILLING		高速切削用 HIGH SPEED MILLING		标准条件 REGULAR MILLING		高速切削用 HIGH SPEED MILLING		标准条件 REGULAR MILLING		高速切削用 HIGH SPEED MILLING	
刀具尺寸 (mm)	回转速度 (min⁻¹)	进给速度 (mm/min)	回转速度 (min⁻¹)	进给速度 (mm/min)	回转速度 (min⁻¹)	进给速度 (mm/min)	回转速度 (min⁻¹)	进给速度 (mm/min)	回转速度 (min⁻¹)	进给速度 (mm/min)	回转速度 (min⁻¹)	进给速度 (mm/min)
MILL DIA. (mm)	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)
0.5	32,000	600	50,000	850	32,000	600	50,000	850	32,000	450	50,000	650
0.6	32,000	600	50,000	850	32,000	600	50,000	850	32,000	450	50,000	650
0.8	32,000	600	50,000	850	32,000	600	50,000	850	32,000	450	50,000	650
1	32,000	600	50,000	850	32,000	600	50,000	850	32,000	450	50,000	650
1.2	32,000	600	50,000	850	32,000	600	50,000	850	32,000	450	50,000	650
1.4	32,000	600	50,000	850	32,000	600	50,000	850	32,000	450	50,000	650
1.5	32,000	700	50,000	950	32,000	700	50,000	950	32,000	550	50,000	750
1.6	32,000	700	50,000	950	32,000	700	50,000	950	30,000	550	50,000	750
1.8	32,000	700	50,000	950	32,000	700	50,000	950	26,500	550	44,000	750
2	31,500	800	50,000	1,100	31,500	800	48,000	1,100	23,500	600	40,000	900
2.5	25,000	800	50,000	1,400	25,000	800	38,000	1,200	19,000	600	31,500	900
3	21,000	800	50,000	1,700	21,000	800	31,000	1,200	16,000	600	26,500	900
切深量 DEPTH OF CUT	侧面 Side Milling: aa 1.5D, ar 0.2D		侧面 Side Milling: aa 1.5D, ar 0.1D		侧面 Side Milling: aa 1.5D, ar 0.2D		侧面 Side Milling: aa 1.5D, ar 0.1D		侧面 Side Milling: aa 1.5D, ar 0.2D		侧面 Side Milling: aa 1.5D, ar 0.1D	
	槽 Slotting: aa=0.5D(D≤1 0.2D)		槽 Slotting: aa=0.25D(D≤1 0.2D以下)		槽 Slotting: aa=0.5D(D≤1 0.2D)		槽 Slotting: aa=0.25D(D≤1 0.2D以下)		槽 Slotting: aa=0.5D(D≤1 0.2D)		槽 Slotting: aa=0.25D(D≤1 0.2D以下)	

1.请使用刚性和精度高的机械，夹具。
2.请使用水溶性切削油剂。
3.镁合金切削时请注意切削油剂的选用，请咨询切削厂家。注意处理切屑。
4.加工高硅铝合金铸件时推荐使用金刚石涂层铣刀。

1. Use a rigid and precise machine and holder.
2. Use a water soluble cutting fluid for milling aluminum alloys.
3. Please note the following points on machining Mg alloy.
   To select appropriate cutting fluid, consult with lubricant manufacturers.
   Chips must be handled carefully.
4. Diamond coated end mill is recommended for machining
   Aluminium casting or die casting alloy with high Si.

DLC-LN-EDS

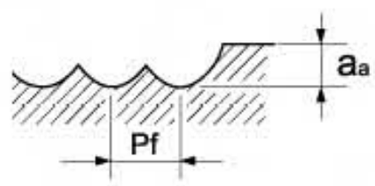
加工材质	变形铝合金 A7075				铸造铝合金 <Si13%				镁合金.铜合金 AZ91.AZ80A.C1100		钢合金 C1100	
WORK MATERIAL	Aluminum alloy expanding material A7075				Aluminum alloy casting. Die casting <Si13%				Magnesium alloy. Copper alloy AZ91.AZ80A.C1100		Copper alloy C1100	
	标准条件 REGULAR MILLING		高速切削用 HIGH SPEED MILLING		标准条件 REGULAR MILLING		高速切削用 HIGH SPEED MILLING		标准条件 REGULAR MILLING		高速切削用 HIGH SPEED MILLING	
刀具尺寸 (mm)	回转速度 (min⁻¹)	进给速度 (mm/min)	回转速度 (min⁻¹)	进给速度 (mm/min)	回转速度 (min⁻¹)	进给速度 (mm/min)	回转速度 (min⁻¹)	进给速度 (mm/min)	回转速度 (min⁻¹)	进给速度 (mm/min)	回转速度 (min⁻¹)	进给速度 (mm/min)
MILL DIA. (mm)	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)
0.5	32,000	400	50,000	550	32,000	400	50,000	550	32,000	300	50,000	450
1	32,000	400	50,000	550	32,000	400	50,000	550	32,000	300	50,000	450
1.5	32,000	600	50,000	800	32,000	600	50,000	800	32,000	450	42,000	600
2	25,500	600	39,500	800	25,500	600	39,500	800	24,000	450	34,500	600
2.5	20,000	600	31,500	800	20,000	600	31,500	800	20,000	450	25,000	600
3	17,000	700	26,500	950	17,000	700	26,500	950	17,000	500	21,000	650
4	12,500	700	20,000	950	12,500	700	20,000	950	12,500	500	16,000	650
5	10,000	800	16,000	1,100	10,000	800	16,000	1,100	9,500	600	12,500	800
6	8,500	900	13,000	1,250	8,500	900	13,000	1,250	8,000	650	10,500	900
切深量 DEPTH OF CUT	侧面 Side Milling: aa 1.5D以下, ar 0.2D		侧面 Side Milling: aa 1.5D以下, ar 0.1D		侧面 Side Milling: aa 1.5D以下, ar 0.1D		侧面 Side Milling: aa 1.5D以下, ar 0.1D		侧面 Side Milling: aa 1.5D以下, ar 0.1D		侧面 Side Milling: aa 1.5D以下, ar 0.1D	
	槽 Slotting: aa=0.5D(D≤1 0.2D)		槽 Slotting: aa=0.25D(D≤1 0.2D以下)		槽 Slotting: aa=0.5D(D≤1 0.2D)		槽 Slotting: aa=0.25D(D≤1 0.2D以下)		槽 Slotting: aa=0.5D(D≤1 0.2D)		槽 Slotting: aa=0.25D(D≤1 0.2D以下)	

1.请使用刚性和精度高的机械，夹具。
2.请使用水溶性切削油剂。
3.镁合金切削时请注意切削油剂的选用，请咨询切削厂家。注意处理切屑。
4.加工高硅铝合金铸件时推荐使用金刚石涂层铣刀。

1. Use a rigid and precise machine and holder.
2. Use a water soluble cutting fluid for milling aluminum alloys.
3. Please note the following points on machining Mg alloy.
   To select appropriate cutting fluid, consult with lubricant manufacturers.
   Chips must be handled carefully.
4. Diamond coated end mill is recommended for machining
   Aluminium casting or die casting alloy with high Si.

Recommended milling conditions 切削条件基准表

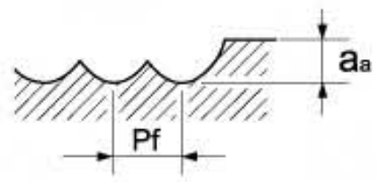
DLC-EBD

加工材质	变形铝合金 A7075				铸造铝合金 <Si13%				镁合金.铜合金 AZ91.AZ80A.C1100		钢合金 C1100	
WORK MATERIAL	Aluminum alloy expanding material A7075				Aluminum alloy casting. Die casting <Si13%				Magnesium alloy. Copper alloy AZ91.AZ80A.C1100		Copper alloy C1100	
	标准条件 REGULAR MILLING		高速切削用 HIGH SPEED MILLING		标准条件 REGULAR MILLING		高速切削用 HIGH SPEED MILLING		标准条件 REGULAR MILLING		高速切削用 HIGH SPEED MILLING	
刀具尺寸 (mm)	回转速度 (min⁻¹)	进给速度 (mm/min)	回转速度 (min⁻¹)	进给速度 (mm/min)	回转速度 (min⁻¹)	进给速度 (mm/min)	回转速度 (min⁻¹)	进给速度 (mm/min)	回转速度 (min⁻¹)	进给速度 (mm/min)	回转速度 (min⁻¹)	进给速度 (mm/min)
MILL DIA. (mm)	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)
R0.5	32,000	845	50,000	1,200	32,000	845	50,000	1,200	32,000	845	50,000	1,200
R1	31,800	1,550	50,000	2,200	31,800	1,550	47,700	2,100	23,900	1,150	39,800	1,750
R1.5	21,200	1,550	50,000	3,300	21,200	1,550	31,800	2,100	15,900	1,150	26,500	1,750
R2	15,900	1,550	39,800	3,500	15,900	1,550	23,800	2,100	11,900	1,150	19,900	1,750
R3	10,600	1,600	26,500	3,550	10,600	1,600	15,900	2,150	7,950	1,150	13,000	1,800
R4	7,950	1,950	19,500	4,500	7,950	1,950	11,900	2,650	5,950	1,450	9,900	2,250
R5	6,350	1,750	15,500	4,050	6,350	1,750	9,550	2,450	4,750	1,300	7,950	2,000
R6	5,300	1,650	13,000	3,750	5,300	1,650	7,950	2,250	3,950	1,200	6,600	1,900
R8	3,950	1,500	9,900	3,550	3,950	1,500	5,950	2,100	2,950	1,150	4,950	1,800
R10	3,150	1,350	7,950	3,200	3,150	1,350	4,750	1,900	2,350	1,000	3,950	1,600
切深量	aa 0.1D	Pf 0.2D	aa 0.05D	Pf 0.1D	aa 0.1D	Pf 0.2D	aa 0.05D	Pf 0.1D	aa 0.1D	Pf 0.2D	aa 0.02D	Pf 0.05D
DEPTH OF CUT												

1.请使用刚性和精度高的机械，夹具。
2.请使用水溶性切削油剂。
3.镁合金切削时请注意切削油剂的选用，请咨询切削厂家。注意处理切屑。
4.加工高硅铝合金铸件时推荐使用金刚石涂层铣刀。

1. Use a rigid and precise machine and holder.
2. Use a water soluble cutting fluid for milling aluminum alloys.
3. Please note the following points on machining Mg alloy.
   To select appropriate cutting fluid, consult with lubricant manufacturers.
   Chips must be handled carefully.
4. Diamond coated end mill is recommended for machining
   Aluminium casting or die casting alloy with high Si.

DLC-LN-EBD

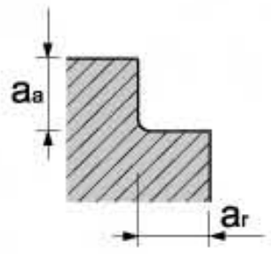
加工材质	变形铝合金 A7075				铸造铝合金 <Si13%				镁合金.铜合金 AZ91.AZ80A.C1100		钢合金 C1100	
WORK MATERIAL	Aluminum alloy expanding material A7075				Aluminum alloy casting. Die casting <Si13%				Magnesium alloy. Copper alloy AZ91.AZ80A.C1100		Copper alloy C1100	
	标准条件 REGULAR MILLING		高速切削用 HIGH SPEED MILLING		标准条件 REGULAR MILLING		高速切削用 HIGH SPEED MILLING		标准条件 REGULAR MILLING		高速切削用 HIGH SPEED MILLING	
刀具尺寸 (mm)	回转速度 (min⁻¹)	进给速度 (mm/min)	回转速度 (min⁻¹)	进给速度 (mm/min)	回转速度 (min⁻¹)	进给速度 (mm/min)	回转速度 (min⁻¹)	进给速度 (mm/min)	回转速度 (min⁻¹)	进给速度 (mm/min)	回转速度 (min⁻¹)	进给速度 (mm/min)
MILL DIA. (mm)	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)
R0.5	26,000	800	35,000	1,050	26,000	800	28,000	1,000	26,000	800	23,000	900
R1	25,000	1,050	35,000	1,400	25,000	1,050	28,000	1,200	19,000	800	23,000	900
R1.5	17,000	1,050	23,000	1,400	17,000	1,050	18,500	1,200	12,500	800	15,000	900
R2	12,500	1,050	17,500	1,400	12,500	1,050	14,000	1,200	9,500	800	11,500	900
切深量	aa 0.1D	Pf 0.2D	aa 0.05D	Pf 0.1D	aa 0.1D	Pf 0.2D	aa 0.05D	Pf 0.1D	aa 0.1D	Pf 0.2D	aa 0.02D	Pf 0.05D
DEPTH OF CUT												

1.请使用刚性和精度高的机械，夹具。
2.请使用水溶性切削油剂。
3.镁合金切削时请注意切削油剂的选用，请咨询切削厂家。注意处理切屑。
4.加工高硅铝合金铸件时推荐使用金刚石涂层铣刀。

1. Use a rigid and precise machine and holder.
2. Use a water soluble cutting fluid for milling aluminum alloys.
3. Please note the following points on machining Mg alloy.
   To select appropriate cutting fluid, consult with lubricant manufacturers.
   Chips must be handled carefully.
4. Diamond coated end mill is recommended for machining
   Aluminium casting or die casting alloy with high Si.

切削条件基准表 Recommended milling conditions

DLC-AIR-EDS

加工材质	变形铝合金 A7075	
WORK MATERIAL	Aluminum alloy expanding material A7075	
切削速度 Cutting Speed	1,000 ~ 3,000m/min	
刀具尺寸 (mm)	回转速度 (min^{-1})	进给速度 (mm/min)
MILL DIA. (mm)	SPEED (min^{-1})	FEED (mm/min)
12	35,000	9,100
16	35,000	12,000
20	35,000	15,000
25	30,000	15,000
切深量 DEPTH OF CUT	a_a: 0.6D, a_r: 0.6D	

1.此切削条件表适用于铝合金高速加工专用加工中心。
2.请使用切削液或空气将切屑强制排出。

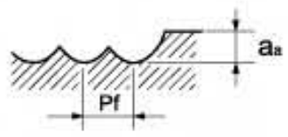
1. This cutting condition is fixed for a highly efficient machining center for Aluminum Alloy.
2. Chips most be removed forcibly by cutting fluid or air blow.

Recommended milling conditions 切削条件基准表

DIA-EBD

加工时产生的火花及破损引起的发热可能会导致燃烧或火灾。请注意防火。
Do not use flammable fluids for high-speed light milling. Sparks generated during operation or heat caused by tool breakage can cause fire.

加工材质	变形铝合金 A7075						铸造铝合金 <Si13%					
WORK MATERIAL	Aluminum alloy expanding material A7075						Aluminum alloy casting. Die casting <Si13%					
	标准条件 REGULAR MILLING		高速切削用 HIGH SPEED MILLING		干式切削用 DRY MILLIMG		标准条件 REGULAR MILLING		高速切削用 HIGH SPEED MILLING		干式切削用 DRY MILLIMG	
刀具尺寸 MILL DIA. (mm)	回转速度 SPEED (min^{-1})	进给速度 FEED (mm/min)	回转速度 SPEED (min^{-1})	进给速度 FEED (mm/min)	回转速度 SPEED (min^{-1})	进给速度 FEED (mm/min)	回转速度 SPEED (min^{-1})	进给速度 FEED (mm/min)	回转速度 SPEED (min^{-1})	进给速度 FEED (mm/min)	回转速度 SPEED (min^{-1})	进给速度 FEED (mm/min)
R0.5× 1	32,000	1,000	50,000	1,500	25,600	700	32,000	1,000	50,000	1,500	25,600	700
R1 × 2	31,800	1,550	50,000	2,200	25,500	1,050	31,800	1,550	44,700	2,100	25,500	1,050
R1.5× 3	21,200	1,550	50,000	3,300	17,000	1,050	21,200	1,550	31,800	2,100	17,000	1,050
R2 × 4	15,900	1,550	39,800	3,500	12,700	1,050	15,900	1,550	23,850	2,100	12,700	1,050
R2.5× 5	12,700	1,550	31,800	3,500	10,200	1,050	12,700	1,550	11,900	2,100	10,200	1,050
R3 × 6	10,500	1,550	26,500	3,500	8,400	1,050	10,500	1,550	15,900	2,100	8,400	1,050
R4 × 8	7,950	1,950	19,500	4,450	6,360	1,350	7,950	1,950	11,900	2,700	6,360	1,350
R5 ×10	6,350	1,750	15,500	4,000	5,080	1,200	6,350	1,750	9,550	2,400	5,080	1,200
R6 ×12	5,300	1,650	13,000	3,750	4,240	1,150	5,300	1,650	7,950	2,250	4,240	1,150
切深量 DEPTH OF CUT	aa: 0.1D, Pf: 0.2D		aa: 0.05D, Pf: 0.1D				aa: 0.1D, Pf: 0.2D		aa: 0.05D, Pf: 0.1D			



加工材质	铸造铝合金 Si >13%		钢合金 C1100					
WORK MATERIAL	Aluminum alloy casting Die casting Si >13%		Copper alloy C1100					
	标准条件 REGULAR MILLING		标准条件 REGULAR MILLING		高速切削用 HIGH SPEED MILLING		干式切削用 DRY MILLIMG	
刀具尺寸 MILL DIA. (mm)	回转速度 SPEED (min^{-1})	进给速度 FEED (mm/min)	回转速度 SPEED (min^{-1})	进给速度 FEED (mm/min)	回转速度 SPEED (min^{-1})	进给速度 FEED (mm/min)	回转速度 SPEED (min^{-1})	进给速度 FEED (mm/min)
R0.5× 1	32,000	635	32,000	845	50,000	1,300	25,600	590
R1 × 2	19,100	700	23,900	1,150	39,800	1,750	19,100	800
R1.5× 3	12,750	700	15,900	1,150	26,500	1,750	12,700	800
R2 × 4	9,550	700	11,900	1,150	19,900	1,750	9,500	800
R2.5× 5	7,650	700	9,500	1,150	15,900	1,750	7,200	800
R3 × 6	6,350	700	7,950	1,150	13,000	1,750	6,350	800
R4 × 8	4,750	850	5,950	1,450	9,900	2,250	4,750	1,000
R5 ×10	3,800	800	4,750	1,300	7,950	2,000	3,800	910
R6 ×12	3,200	750	3,950	1,200	6,600	1,850	3,150	840
切深量 DEPTH OF CUT	aa: 0.05D, Pf: 0.1D		aa: 0.1D, Pf: 0.2D		aa: 0.02D, Pf: 0.05D			

1.请使用刚性和精度高的机械，夹具。
2.请使用水溶性切削油剂。
3.高速切削条件是高速、高精度的加工中心用的基准条件。
4.在干式切削铝合金进行加工时，请使用干式切削条件。

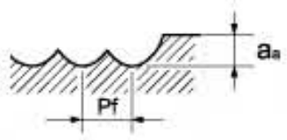
1. Use a rigid and precise machine and holder.
2. Use a water soluble fluid for regular and high speed milling.
3. The high speed conditions are for high speed and high precision machining centers.
4. Make sure to use the dry milling setting for dry milling on aluminum alloy.
   Also use an air blow when dry milling.

切削条件基准表 Recommended milling conditions

DIA-LN-EBD

加工时产生的火花及破损引起的发热可能会导致燃烧或火灾。请注意防火。
Do not use flammable fluids for high-speed light milling. Sparks generated during operation or heat caused by tool breakage can cause fire.

加工材质		变形铝合金 A7075						铸造铝合金 <Si13%					
WORK MATERIAL		Aluminum alloy expanding material A7075						Aluminum alloy casting. Die casting <Si13%					
		标准条件 REGULAR MILLING		高速切削用 HIGH SPEED MILLING		干式切削用 DRY MILLING		标准条件 REGULAR MILLING		高速切削用 HIGH SPEED MILLING		干式切削用 DRY MILLING	
外径 R	有效长 L1 (mm)	回转速度 SPEED (min⁻¹)	进给速度 FEED (mm/min)	回转速度 SPEED (min⁻¹)	进给速度 FEED (mm/min)	回转速度 SPEED (min⁻¹)	进给速度 FEED (mm/min)	回转速度 SPEED (min⁻¹)	进给速度 FEED (mm/min)	回转速度 SPEED (min⁻¹)	进给速度 FEED (mm/min)	回转速度 SPEED (min⁻¹)	进给速度 FEED (mm/min)
R0.5	5	25,600	800	50,000	1,050	20,400	410	25,600	800	30,000	630	15,300	308
	10	15,300	300	—	—	12,200	160	15,300	300	—	—	9,150	120
R1	10	25,400	1,050	40,000	1,550	20,300	750	25,400	1,070	24,000	925	15,225	563
	20	15,200	420	—	—	12,200	290	15,200	420	—	—	9,150	218
R1.5	15	16,900	1,050	40,000	2,300	13,500	750	16,900	1,070	24,000	1,380	10,125	563
	30	10,100	420	—	—	8,100	290	10,100	420	—	—	6,075	218
R2	20	12,700	1,050	31,800	2,450	10,100	750	12,700	1,070	19,080	1,470	7,575	563
	40	7,600	420	—	—	6,100	290	7,600	420	—	—	4,575	218
R2.5	25	10,100	1,050	25,400	2,450	8,100	750	10,100	1,070	15,240	1,470	6,075	563
	50	6,000	420	—	—	4,800	290	6,000	420	—	—	3,600	218
切深量 DEPTH OF CUT		aa: 0.1D, Pf: 0.2D		aa: 0.05D, Pf: 0.1D				aa: 0.1D, Pf: 0.2D		aa: 0.05D, Pf: 0.1D			



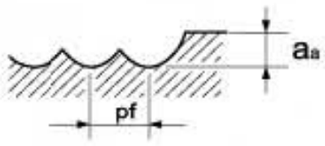
加工材质		铸造铝合金 Si >13%		钢合金 C1100					
WORK MATERIAL		Aluminum alloy casting. Die casting Si >13%		Copper alloy C1100					
		标准条件 REGULAR MILLING		标准条件 REGULAR MILLING		高速切削用 HIGH SPEED MILLING		干式切削用 DRY MILLING	
外径 R	有效长 L1 (mm)	回转速度 SPEED (min⁻¹)	进给速度 FEED (mm/min)	回转速度 SPEED (min⁻¹)	进给速度 FEED (mm/min)	回转速度 SPEED (min⁻¹)	进给速度 FEED (mm/min)	回转速度 SPEED (min⁻¹)	进给速度 FEED (mm/min)
R0.5	5	15,360	480	32,000	690	50,000	1,050	31,000	550
	10	9,180	180	22,400	260	—	—	15,300	210
R1	10	15,240	642	19,000	680	31,500	1,100	15,200	550
	20	9,120	252	13,300	260	—	—	9,150	210
R1.5	15	10,140	642	12,500	680	21,000	1,100	10,000	560
	30	6,060	252	8,750	260	—	—	6,000	210
R2	20	7,620	642	15,500	680	15,500	1,100	12,400	570
	40	4,560	252	10,850	260	—	—	7,450	210
R2.5	25	6,060	642	12,500	770	12,500	1,250	10,000	640
	50	3,600	252	8,750	300	—	—	6,000	240
切深量 DEPTH OF CUT		aa: 0.05D, Pf: 0.1D		aa: 0.1D, Pf: 0.2D				aa: 0.02D, Pf: 0.05D	

1.请使用刚性和精度高的机械，夹具。
2.请使用水溶性切削油剂。
3.高速切削条件是高速、高精度的加工中心用的基准条件。
4.在干式切削铝合金进行加工时，请使用干式切削条件。
5.使用有效长为刃径10倍的铣刀时，请控制切深。

1. Use a rigid and precise machine and holder.
2. Use a water soluble fluid for regular and high speed milling.
3. The high speed conditions are for high speed and high precision machining centers.
4. Make sure to use the dry milling setting for dry milling on aluminum alloy. Also use an air blow when dry milling.
5. Please reduce the cutting depth when effective neck length (L1) exceeds 10 times the tool diameter.

Recommended milling conditions 切削条件基准表

DIA-PC-EBD

加工材质 WORK MATERIAL	变形铝合金 Aluminium Alloy expanding material A7075	
外径 R	回转速度 SPEED (min^{-1})	进给速度 FEED (mm/min)
R0.5	16,000	150
R1	10,500	200
R1.5	7,500	300
R2	7,000	400
R3	6,500	450
切深量 DEPTH OF CUT		

aa	Pf
0.05D	0.1D

1.请使用刚性和精度高的机械，夹具。
2.请根据切削深度、设备刚性等情况可适当调整转速和进给速度。
3.对加工表面和精度要求较高时，请适当调整切深和进给速度。
4.安装铣刀时，请将径向跳动量控制在10μm以内。
5.请选择适合材料的切削液。

1. Use a rigid and precise machine and holder.
2. The general conditions are shown on the above table. Thus, the speed and the feed rate should be adjusted in accordance with the machining conditions such as shape of component, overhang of cutting tool, machine rigidity, etc.
3. To ensure good surface and accuracy of component, depth of cut and the feed rate should be adjusted accordingly.
4. Please prevent the runout of tool after chucking as much as possible (10μm maximum recommended).
5. Use suitable cutting fluids.

加工数据 Cutting Data

CA-PKE的进给量极限 CA-PKE Performance at highest feeding speed

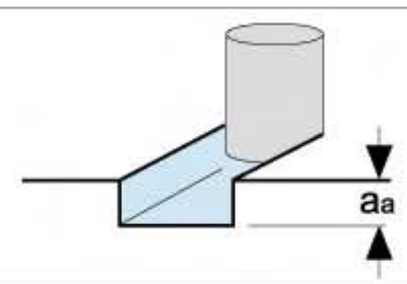
说明 Notes

这是一个改变切深量从确认进给量极限的试验。在所有的范围内我们都得到良好的切削效果。当轴向切深为8mm(0.5D)时进给速度可以达到12.5m/min,高效率加工得以实现。

We changed the milling depth to confirm the feeding speed limit. The milling was satisfactory within the area that was checked . Highly efficient machining at a feeding speed of 12.5m/min was possible for 8mm deep machining in the axial direction (0.5D).

使用工具 Tool	CA-PKE φ16xR1
加工材质 Work Material	A7075
切削速度 Cutting Speed	502m/min (10,000min $^{-1}$)
切削方法 Milling Method	槽切削 Slotting
进给速度 Feed	2.5 ~ 12.5m/min (0.25 ~ 1.25mm/rev)
切深量 Depth of Cut	aa = 8~16mm
切削油剂 Coolant	气冷式 Air Blow
使用设备 Machine	卧式加工中心(BT50) Horizontal Machining Center (BT50)

aa的切深量 mm Milling Depth aa mm	使用工具 Tool	进给速度 Feed				
		2.5m/min 0.25mm/rev	5m/min 0.5mm/rev	7.5m/min 0.75mm/rev	10m/min 1mm/rev	12.5m/min 1.25mm/rev
8mm (0.5D)	CA-PKE	○	○	○	○	○
	铝合金用2枚刃 2 flutes for aluminum	○	○	○	X (折损) (Breakage)	
12mm (0.75D)	CA-PKE	○	○	○	○	
	铝合金用2枚刃 2 flutes for aluminum	○	○	○	X (折损) (Breakage)	
16mm (1D)	CA-PKE	○	○	○		
	铝合金用2枚刃 2 flutes for aluminum	○	○	X (折损) (Breakage)		



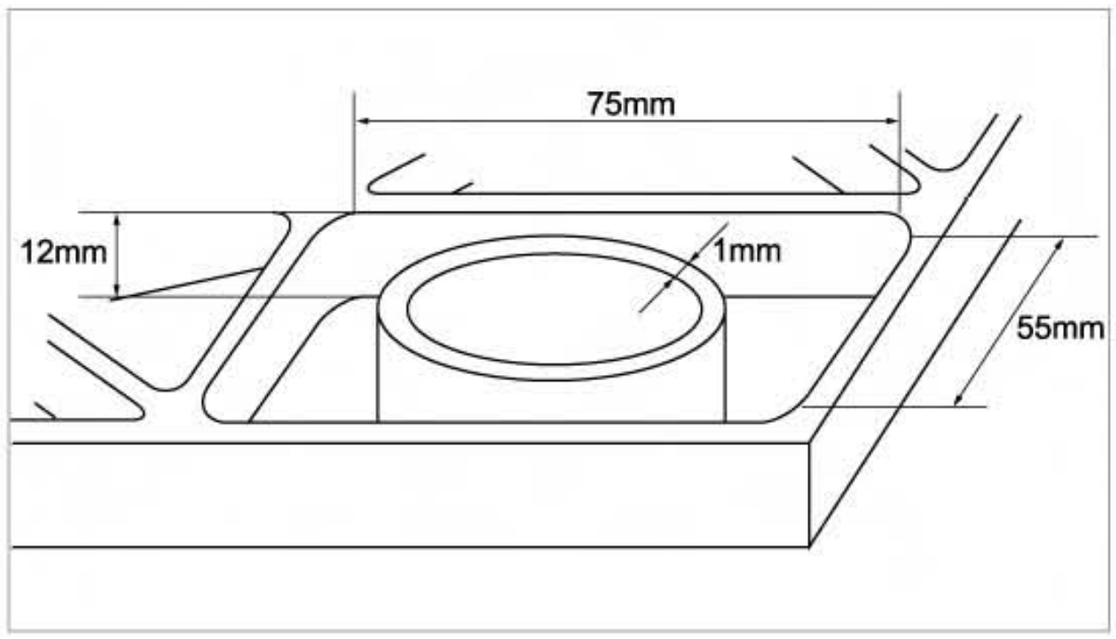
CA-PKE型腔加工 CA-PKE Pocket Milling

说明 Notes

即使是易振颤，壁厚仅有1mm的型腔加工，亦可得到高速高精度。

High speed and high precision machining is possible even for pocket milling that requires 1mm thin walls. Normally, chattering and vibration tend to occur during machining.

使用工具 Tool	CA-PKE φ10xR1	
加工材质 Work Material	A7075	
切削速度 Cutting Speed	628m/min (20,000min $^{-1}$)	
切削方法 Milling Method	铣孔加工 Drilling operation	铣腔加工 Contouring Milling
进给速度 Feed	2,000mm/min (0.1mm/rev)	10,000mm/min (0.5mm/rev)
切深量 Depth of Cut	aa = 3mm (无步进) (Non-Step)	aa = 3mm ar = 5mm
切削油剂 Coolant	水溶性切削液 Water Soluble	
使用设备 Machine	立式加工中心 (BT40) Vertical Machining Center (BT40)	



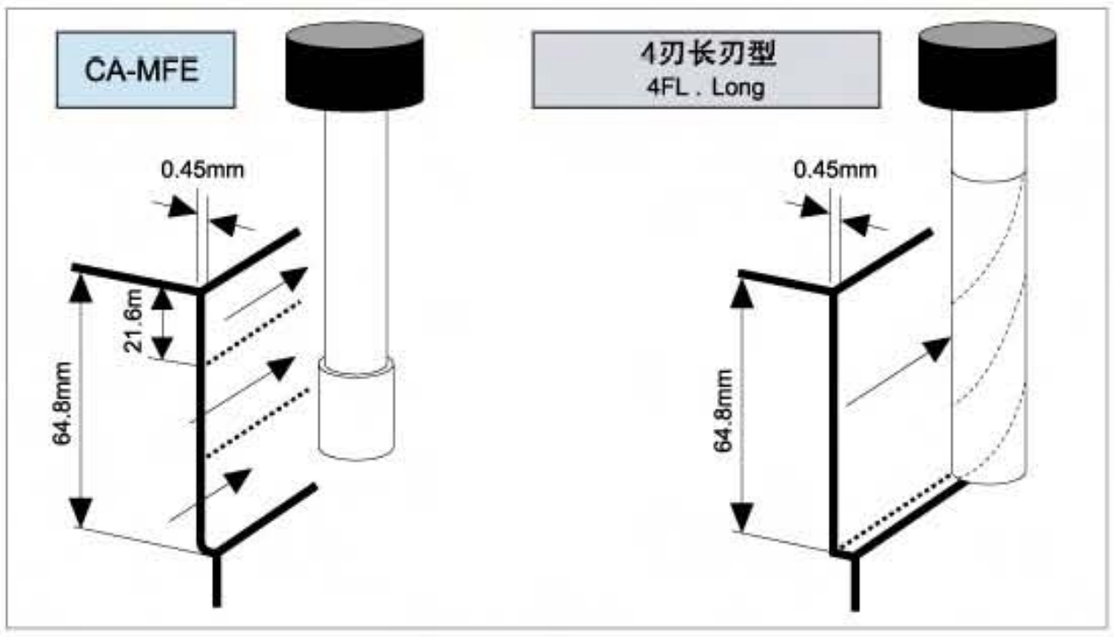
CA-MFE的侧面加工性能 CA-MFE Performance in side milling

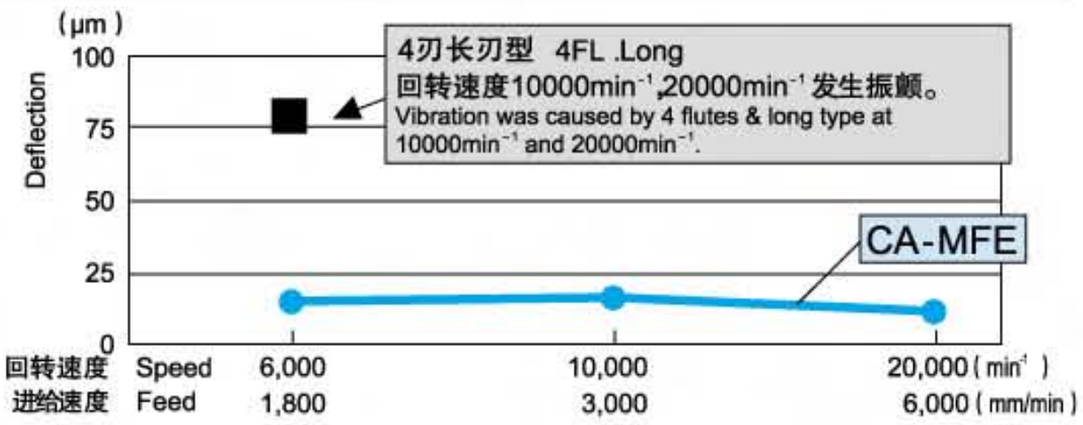
说明 Notes

使用CA–MFE在直壁上进行阶梯式加工，与使用长刃型铣刀（4刃长刃型）相比，可大幅度缩短加工时间，并提高加工精度。

The CA-MFE that enables step milling on the deep cavity wall can decrease the machining time and optimize precision, comparing with long type end mill (4 flutes & long cutting edge) that cuts up to the end of a component.

使用工具 Tool	CA-MFEφ18xR1	4刃长刃型φ18 4FL . Long
加工材质 Work Material	A7075	
回转速度 Speed	6,000 ~ 20,000min⁻¹	6,000min⁻¹
进给速度 Feed	1,800 ~ 6,000mm/min (0.3mm/rev)	1,400mm/min (0.23mm/rev)
切削方法 Milling Method	侧面阶梯式分3回（顺铣） Side milling with 3 steps (Down Cut)	侧面切削1回（顺铣） Side milling with 1 step (Down Cut)
切深量 Depth of Cut	a_a = 21.6mm a_r = 0.4 5 mm	a_a = 64.8mm a_r = 0.4 5 mm
悬长量 Overhang Length	90mm	
切削油剂 Coolant	水溶性切削油剂 Water Soluble	
使用设备 Machine	卧式加工中心(BT40) Horizontal Machining Center (BT40)	





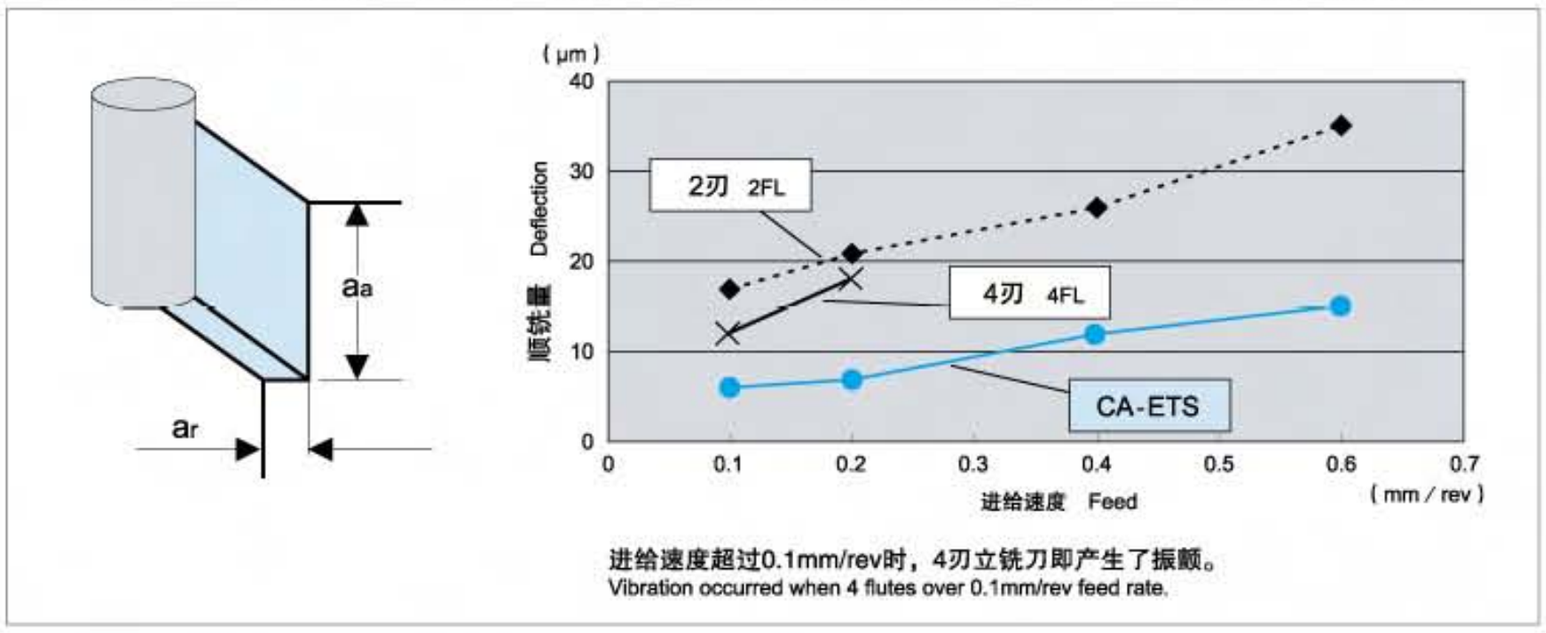
CA-ETS的侧面倾斜量 CA-ETS Deflection of the work piece

说明 Notes

在这个试验中，我们改变进给速度以确认加工的倾斜角度。在进给为0.3mm/rev时CA–ETS未发生振颤，倾斜量也比2刃、4刃要小。实现了高效率高精度加工。进给速度超过0.1mm/rev时，4刃立铣刀即产生了振颤。

We compared the deflection of the work piece at each feeding speed. There was no vibration occurred up to a feeding speed of 0.6 mm/rev, and the deflection was smaller than with 2 flutes and 4 flutes. Machining efficiency and precision were maximized. In the case of 4 flutes, vibration occurred at h igher than the feeding speed of 0.1mm/rev.

使用工具 Tool	CA-ETS φ10
加工材质 Work Material	A7075
切削速度 Cutting Speed	628m/min (20,000min⁻¹)
进给速度 Feed	2,000 ~ 12,000mm/min (0.1 ~ 0.6mm/rev)
切削方法 Milling Method	侧面切削1回（顺铣） Side Milling (Down Cut)
切深量 Depth of Cut	a_a = 15mm a_r = 1mm
切削油剂 Coolant	水溶性切削油剂 Water Soluble
使用设备 Machine	卧式加工中心(BT40) Horizontal Machining Center (BT40)



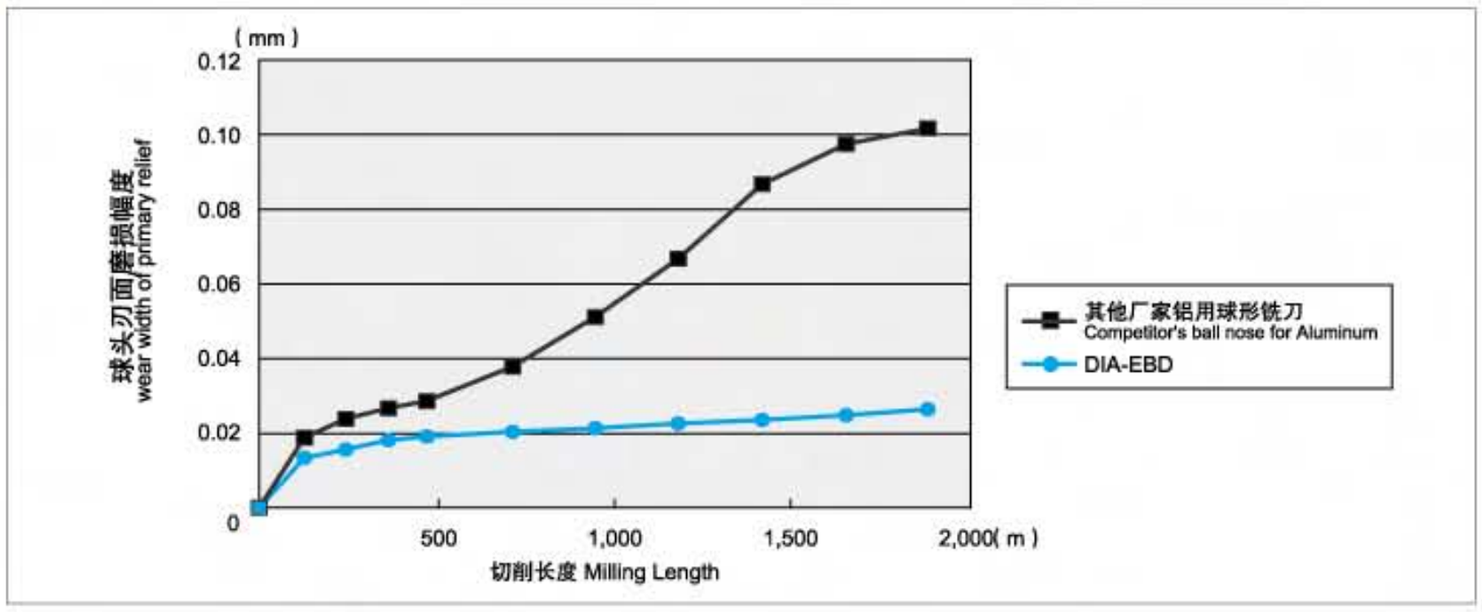
DIA-EBD ADC12 的切削性能 Performance of DIA-EBD in ADC12

说明 Notes

使用金刚石涂层的球头立铣刀加工ADC12，与其他公司的铝合金专用球头立铣刀相比，刀具寿命得以大幅度提高。

A ball nose end mill with Diamond coating has a much longer tool life than competitor's ball nose end mill for Aluminum.

使用工具 Tool	DIA-EBD R3×6
加工材质 Work Material	ADC12
切削速度 Milling Speed	20,000 min⁻¹
进给速度 Feed	3,000 mm/min
切深量 Milling Depth	a_a = 0.6 mm、Pf = 1.2 mm
切削油剂 Coolant	干式 Dry
使用设备 Machine	立式加工中心(BT40) Vertical Machining Center (BT40)



加工数据　Cutting Data

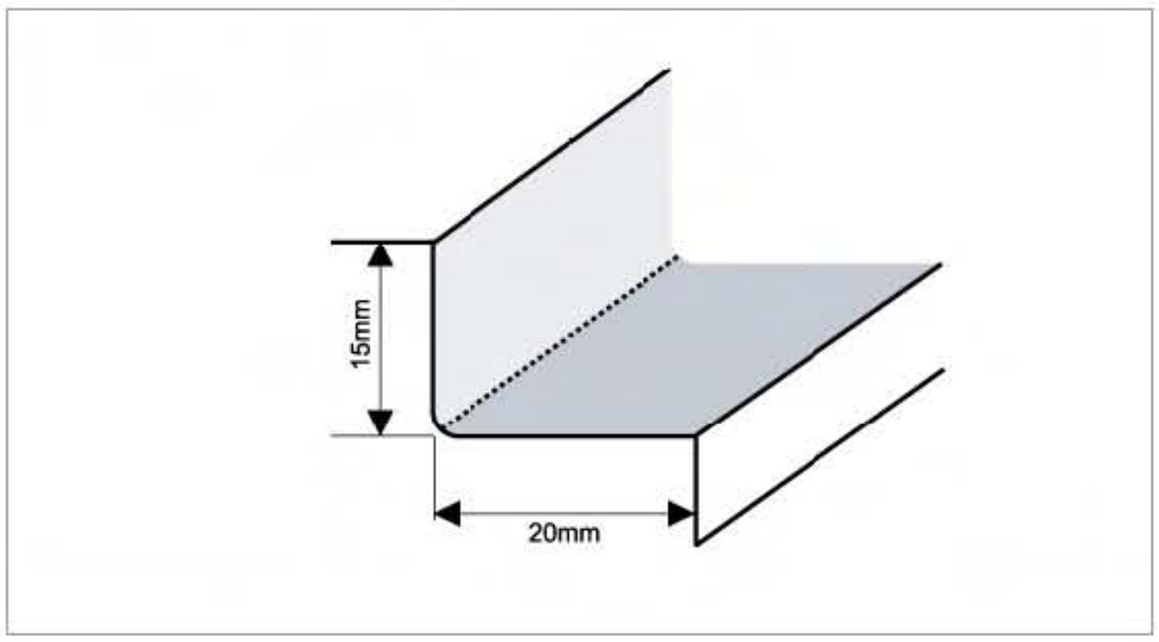
DLC-AIR-EDS的高速加工性能　Ultra high speed milling by DLC-AIR-EDS

说明 Notes

切削速度高达2,400m/min，切屑排出量为5,400cc/min。

Make your dream come true, with this amazing speed of 2,400m/min, and an outstanding chip discharge rate of 5,400cc/min.

使用工具 Tool	DLC-AIR-EDS φ25
加工材质 Work Material	A7075
切削速度 Cutting Speed	2,400m/min (30,000min $^{-1}$)
切削方法 Milling Method	侧面切削 Shoulder Milling
进给速度 Feed	18,000mm/min
切深量 Depth of Cut	a_a = 15mm　a_r = 20mm
切削油剂 Coolant	水溶性切削油剂 Water Soluble
使用设备 Machine	卧式加工中心 Horizontal Machining Center



本样本登载的产品（除涂层产品外），皆可追加新DLC涂层、超微结晶金刚石涂层。

The New DLC coating and the Ultra Fine Diamond coating are available for all items on this leaflet (except coated products) as an additional modification service.

安全须知

- 工具使用时有破损的危险，请务必使用保护罩、保护镜、安全靴等。
- 手不要直接碰刀刃。
- 请不要用手接触碎屑。
- 刀具的刀刃不良时请停止使用。
- 如发生异常声音及振动时请立刻停止使用。
- 请不要擅自修改工具。
- 加工前请确认工具尺寸。

Safe use of cutting tools

- Use safety cover, safety glasses and safety shoes during operation.
- Do not touch cutting edges with bare hands.
- Do not touch cutting chips with bare hands. Chips will be hot after cutting.
- Stop cutting when the tool becomes dull.
- Stop cutting operation immediately if you hear any strange cutting sounds.
- Do not modify tools.
- Please use correct tools for the operation.Check dimensions to ensure proper selection.

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