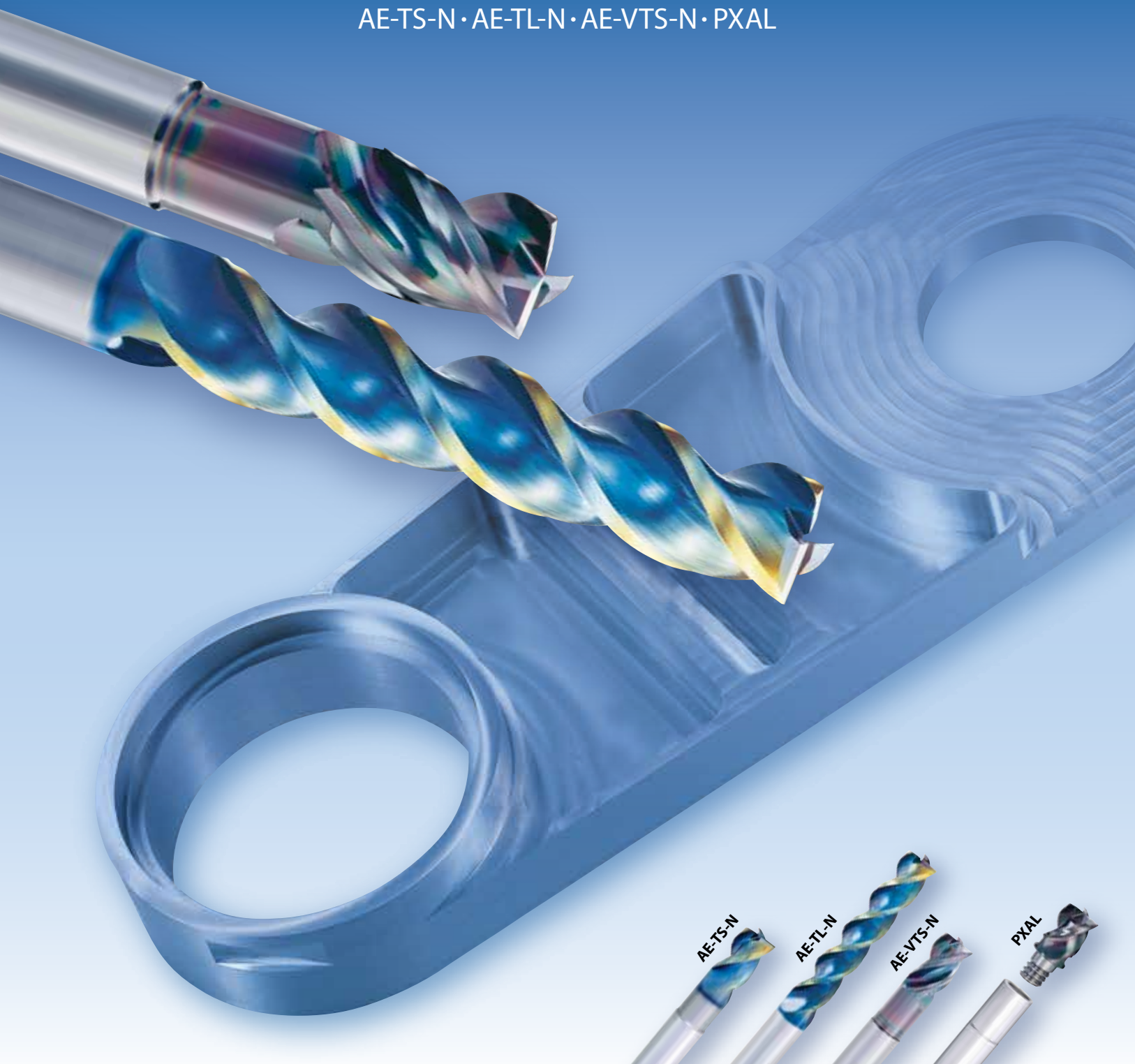




DLC Coated End Mills for Non-ferrous Materials

非铁金属加工用DLC铣刀

AE-TS-N · AE-TL-N · AE-VTS-N · PXAL



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短刃型 Short

- 1.5D刃长(颈长3D) 1.5 x D flute length (Neck length 3 x D)
- $\phi 3 \sim \phi 12$
- DLC-SUPER HARD 涂层 Coating

AE-TS-N P.5



长刃型 Long

- 3D/5D刃长 3 x D / 5 x D flute length
- $\phi 3 \sim \phi 12$
- DLC-SUPER HARD 涂层 Coating

AE-TL-N P.5



高性能 — 对应多种加工的高性能型 — High Performance High performance type that supports a wide range of applications

短刃型 Short

- 1.5D刃长(颈长3D) 1.5 x D flute length (Neck length 3 x D)
- $\phi 3 \sim \phi 12$
- DLC-IGUSS 涂层 Coating

AE-VTS-N P.13



可换头式铣刀PXM Exchangeable Head End Mill

- 1D刃长 1 x D flute length
- $\phi 10 \sim \phi 25$
- DLC-IGUSS 涂层 Coating

PXAL P.19



Application 加工形态

加工形态 Application		槽铣 Slot Milling	侧铣 Side Milling	螺旋线加工 Helical Milling	轮廓加工 Contour Milling	斜线加工 Ramping	深壁加工 Deep Side Milling	钻削加工 Plunging	余摆线加工 Trochoidal Milling
标准 Standard	AE-TS-N 短刃型 Short	◎	☆	◎	◎	◎	☆	◎	☆
	AE-TL-N 3D刃长 3 x D flute length	○	☆	◎	○	○	☆	○	☆
	AE-TL-N 长刃型 Long	△	☆	○	△	△	☆	△	☆
高性能 High Performance	AE-VTS-N 短刃型 Short	☆	☆	☆	☆	☆	☆	☆	☆
	PXAL 可换头式 Exchangeable Head	☆	☆	☆	☆	☆	☆	☆	☆

(适用) △ → ○ → ◎ → ☆ (最佳)
(Fair) (Best)



DLC涂层改变了非铁金属加工！

DLC coating revolutionizes the processing of non-ferrous materials!

DLC涂层表面光滑！通过表面的平滑度，对需求耐溶着性和润滑性的铝合金等非铁金属发挥出众的威力。

OSG's DLC coating gives a shiny surface! This shiny and smooth surface optimizes end mill performance particularly in non-ferrous materials such as aluminum alloys, which require welding resistance and lubricity.

■ 结合用途分为2种DLC涂层

Two types of DLC coatings to accommodate specific application needs

DLC-IGUSS：厚涂层型，使用寿命长

Thick coating type for long tool life

厚涂层型可抑制刃尖磨损，实现工具的高耐久性和长寿命化。

Thick coating type suppresses wear on the cutting edge to enable high durability and long tool life.

适用工具:AE-VTS-N・PXAL

Applicable tools

DLC-SUPER HARD：薄涂层型，重视锋利性

Thin coating type with emphasis on sharpness

对基材的附着性高，实现高锋利性和高耐溶着性。

High adhesion to the base material to enable sharp cutting performance and high welding resistance.

适用工具:AE-TS-N・AE-TL-N

Applicable tools

涂层名称 Name of Coating	涂层色 Coating Color	涂层种类 Coating Type	硬度 (GPa) Hardness	氧化开始温度(°C) Oxidation Temperature	摩擦系数 Coefficient of Friction	标准涂层厚度 (μm) Coating Thickness	成膜温度 (°C) Coating Temperature	表面粗糙度 Surface roughness	耐磨损性 Wear Resistance	耐溶着性 Welding Resistance	韧性 Toughness
DLC-IGUSS	干涉色 Interference Color	DLC (SP ³ リッチ) SP ³ Rich	60	550	0.10	0.8	400	☆	◎	☆	○
DLC-SUPER HARD	干涉色 Interference Color	DLC (SP ³ リッチ) SP ³ Rich	60	550	0.10	0.2	400	☆	◎	☆	○

(标准) ○ → ◎ → ☆ (最佳)
(Good) (Best)

■ 耐磨损性和耐溶着性

Abrasion resistance and welding resistance

OSG的DLC涂层耐磨损性和耐溶着性高，易溶着的非铁金属加工中可实现工具寿命和加工的稳定化。

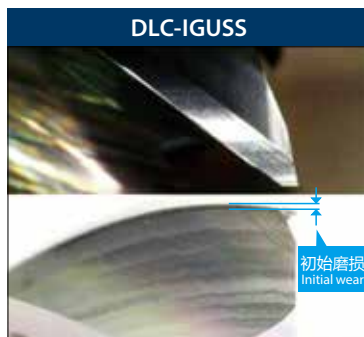
OSG's DLC coating has high wear resistance and anti-adhesion properties, which enable stable tool life in non-ferrous material applications with high tendency to weld.

耐磨损性 Wear Resistance

A5052的加工

Milling in A5052

使用工具 Tool	硬质合金3刃平头铣刀 φ10 Carbide Square End Mill 3 Flutes
加工材料 Work Material	A5052
切削速度 Cutting Speed	200m/min (6,370min ⁻¹)
进给速度 Feed	0.08mm/t (1,530mm/min)
切削深度 Depth of Cut	a _p = 5mm a _e = 8mm
切削油剂 Coolant	气冷式 Air Blow
使用机械 Machine	立式加工中心 Vertical Machining Center
切削长度 Milling Length	50m



耐溶着性 Welding Resistance

摩擦试验后的表面状况

Surface condition after pin-on-disc test



试验材料 Test Material	A7075
试验环境 Test Environment	大气中 Open atmosphere

对应广泛的加工方法

Suitable for a wide range of applications

切削油剂：MQL[※]
Coolant

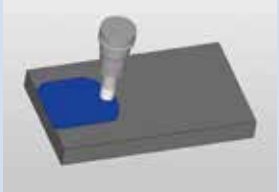
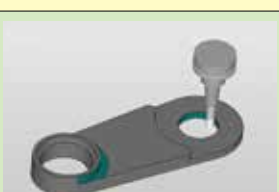
刀柄：热膨胀刀柄
Holder：Shrink Fit

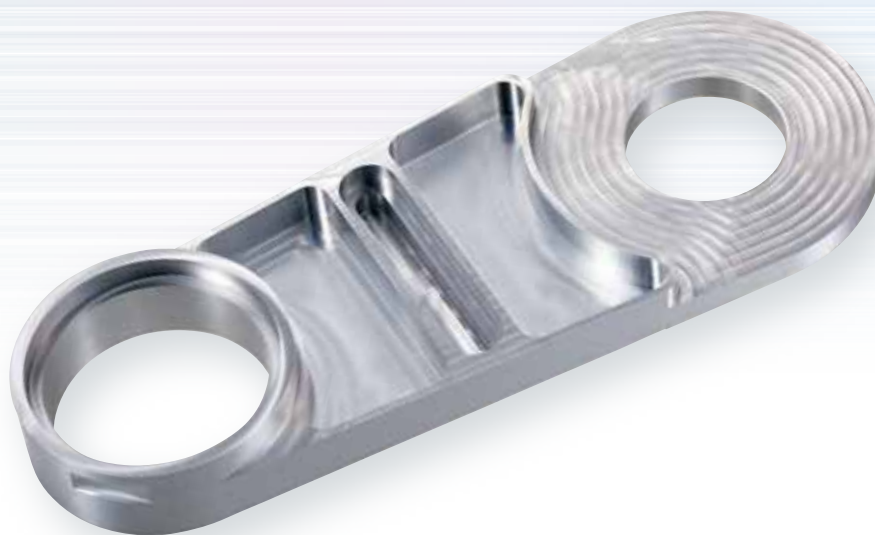
使用机械：5轴加工机
Machine: Five-axis Machining Center

最高转速：25,000min⁻¹
Maximum RPM

加工材料：A5052
Work Material

主轴类型：HSK63
Main Spindle

工序编号 Process	加工部位 Milling Part	加工方法 Milling Method	加工内容 Milling Process	使用工具 Tool
①	上面 Top	平面加工 Face Milling 	粗加工 Roughing	PXAL250C25-03R100
②	全体 Overall	等高线加工 Contour Milling 	粗加工 Roughing	PXAL200C20-03R100
③	上面 Top	平面加工 Face Milling 	精加工 Finishing	AE-TS- N $\phi 12 \times 36$
④	孔侧面 Boss, Hole Side	侧面加工 Side Milling 	精加工 Finishing	
⑤	孔上方 Hole Top	平面加工 Face Milling 	精加工 Finishing	AE-VTS- N $\phi 12 \times 36$



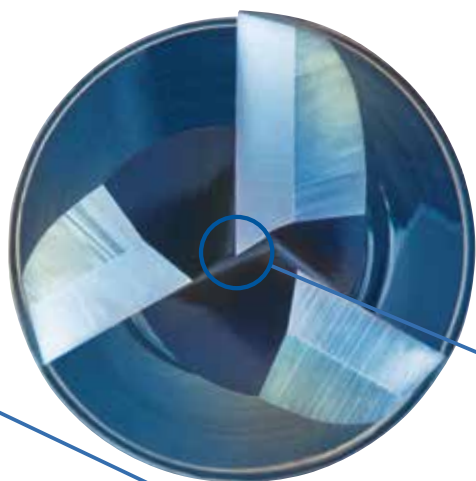
工序编号 Process	加工部位 Milling Part	加工方法 Milling Method	加工内容 Milling Process	使用工具 Tool
⑥	沉孔部 Counterbore Wall	侧面加工 Side Milling	精加工 Finishing	AE-VTS- N $\phi 12 \times 36$
⑦	槽部 Groove	型腔加工 Pocket Milling	粗加工 Roughing	
			精加工 Finishing	
⑧	底部 Bottom	型腔加工 Pocket Milling	粗加工 Roughing	AE-VTS- N $\phi 10 \times 30$
			精加工 Finishing	
⑨	键槽 Slot	槽加工(5轴) Slot Milling 5-axis	精加工 Finishing	AE-TS- N $\phi 10 \times 30$
⑩	外周・沉孔下层 Outer circumference, lower counterbore	侧面加工 Side Milling	精加工 Finishing	AE-TL- N $\phi 8 \times 40$

非铁金属加工用硬质合金铣刀
Carbide End Mills for Non-Ferrous Materials

AE-TS-N • AE-TL-N

适用于非铁金属加工的标准式样

Standard specification suitable for non-ferrous material processing



大芯厚

Large core design

高刚性，防止振动
High rigidity prevents chattering

带中心刃

Center cutting edge

可钻削加工
Can be used for plunging

新型沟槽形状

New flute form

良好的排屑性
Facilitates excellent chip evacuation

兼具刚性与锋利性的刃尖式样

Cutting edge specification that achieves both rigidity and sharpness

实现高耐久性和良好的加工面精度
Achieves high durability and good surface finish

Superior Surface Quality

加工面
品质

DLC-SUPER HARD 涂层

DLC-SUPER HARD Coating

通过涂层表面的平滑度，对需求耐溶着性和润滑性的铝合金等的非铁金属发挥出众的威力。此外，良好的锋利性可抑制毛刺，实现优异的加工面品质。

Due to the smoothness of the coating surface, it is extremely effective for non-ferrous materials such as aluminum alloys that require welding resistance and lubricity. Furthermore, its excellent sharpness and ability to suppress burrs enable superior surface finish.





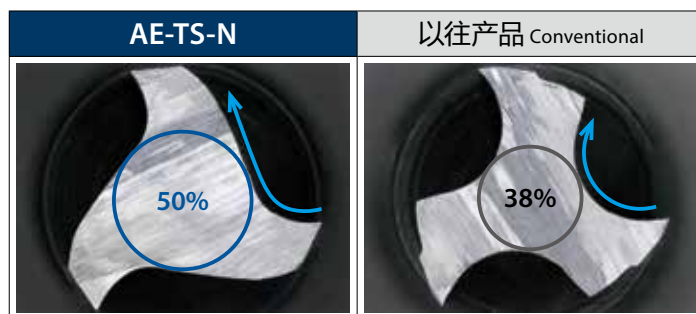
兼具刚性与排屑性

Balancing rigidity and chip evacuation capability

通过大芯厚来提高刚性，抑制振动。

另外，采用良好排屑性的新型沟槽形状，兼顾刚性与排屑性。

Rigidity is enhanced by increasing the core thickness, which enables the suppression of chattering. By adopting an optimal flute form, high rigidity can be maintained while ensuring trouble-free chip evacuation.



箭头：排屑示意图
Arrow: indicates chip discharge direction

加工数据 Cutting Data

高品质
High Quality

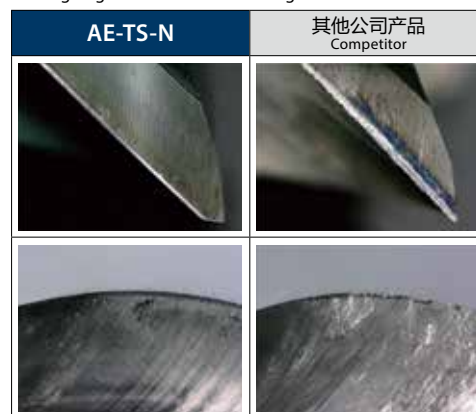
高耐溶着性 High welding resistance

采用 DLC 涂层，即使气冷加工也可发挥高耐溶着性。

By adopting the DLC coating, high welding resistance is achieved even with air blow.

使用工具 Tool	AE-TS-N φ10×30	其他公司无涂层产品 Non-coated Competitor φ10 3刃 Flutes
加工材料 Work Material	A7075	
切削方法 Milling Method	槽铣 Slot Milling	
切削速度 Cutting Speed	300m/min (9,550min ⁻¹)	
进给速度 Feed	1,432mm/min (0.05mm/t)	
切削深度 Depth of Cut	ap=10mm	
切削油剂 Coolant	气冷式 Air Blow	
使用机械 Machine	立式加工中心 (BT40) Vertical Machining Center	

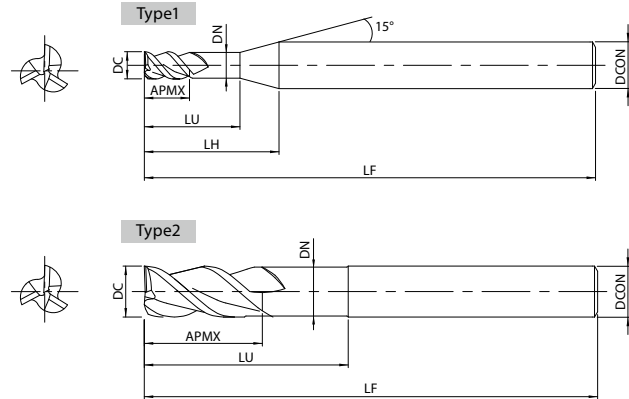
加工11m时的刃尖状态
Cutting edge condition after milling 11 m



AE-TS-N



涂层可能会有颜色不均的情况, 但这并不影响刀具的性能。
End mills may have some discoloration, but it does not cause any performance problems.



1.5D刃长(颈长3D)

1.5 x D flute length (Neck length 3 x D)

单位:mm Unit:mm

商品号 EDP No.	外径×颈长 DC×LU	全长 LF	刃长 APMX	LH	柄径 DCON	颈径 DN	形状 Type	库存 Stock
8557330	3 × 9	55	4.5	14.9	6	2.85	1	○
8557331	4 × 12	55	6	16	6	3.8	1	○
8557332	5 × 15	55	7.5	17.1	6	4.8	1	○
8557333	6 × 18	60	9	—	6	5.8	2	○
8557334	8 × 24	70	12	—	8	7.7	2	○
8557335	10 × 30	75	15	—	10	9.7	2	○
8557336	12 × 36	80	18	—	12	11.7	2	○

○ = 标准库存品 ○ = Standard stock item

标识说明 Guide for Icons

1 材质 Tool Materials

CARBIDE 硬质合金
Tungsten Carbide

3 螺旋角 Helix Angle

约40° 表示铣刀沟槽的螺旋角
Helix angle of flute for end mills

6 切削条件 Cutting Condition

SPEED FEED 表示切削条件基准表所在页码
Indicates page no. for recommended conditions.

2 表面处理 Surface Treatment

DLC DLC 涂层
DLC Coating

DLC-IGUSS DLC-IGUSS 涂层
DLC-IGUSS Coating

4 外径的许容差 Tolerance for milling diameter

约40° 表示铣刀的外径
Tolerance for milling diameter

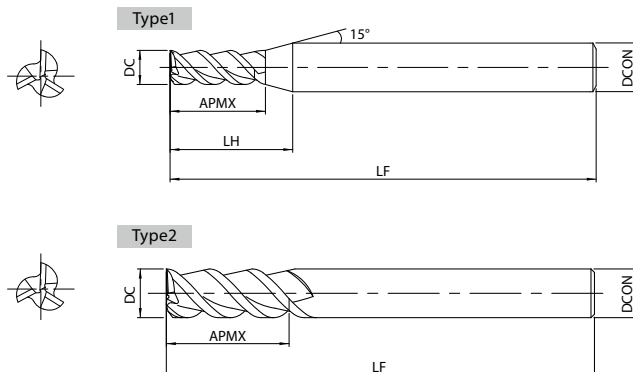
5 热缩 Shrink

SHRINK FIT 推荐使用热膨胀刀柄
Suitable for the shrink holder system

AE-TL-N



涂层可能会有颜色不均的情况，但这并不影响刀具的性能。
End mills may have some discoloration, but it does not cause any performance problems.



3D刃长 3 x D flute length

单位:mm Unit:mm

商品号 EDP No.	外径×刃长 DC×APMX	L/D	全长 LF	LH	柄径 DCON	形状 Type	库存 Stock
8557340	3 × 9	3	55	17	6	1	○
8557341	4 × 12	3	55	18.1	6	1	○
8557342	5 × 15	3	55	19.3	6	1	○
8557343	6 × 18	3	60	—	6	2	○
8557344	8 × 24	3	70	—	8	2	○
8557345	10 × 30	3	75	—	10	2	○
8557346	12 × 36	3	80	—	12	2	○

· 标识说明请参阅P.7.

· See p.7 for explanation of icons.

○ = 标准库存品 ○ = Standard stock item

5D刃长 5 x D flute length

单位:mm Unit:mm

商品号 EDP No.	外径×刃长 DC×APMX	L/D	全长 LF	LH	柄径 DCON	形状 Type	库存 Stock
8557350	3 × 15	5	55	23	6	1	○
8557351	4 × 20	5	60	26.1	6	1	○
8557352	5 × 25	5	65	29.3	6	1	○
8557353	6 × 30	5	75	—	6	2	○
8557354	8 × 40	5	90	—	8	2	○
8557355	10 × 50	5	100	—	10	2	○
8557356	12 × 60	5	110	—	12	2	○

· 标识说明请参阅P.7.

· See p.7 for explanation of icons.

○ = 标准库存品 ○ = Standard stock item

AE-TS-N 切削条件基准表 Cutting Condition

槽铣 Slot Milling

加工材料 Work Material	铝合金延伸材·镁合金 Aluminum Alloy Expanding Material · Magnesium Alloy A5052 · A7075 · AZ91 · AZ80A		铝合金铸件 Aluminum Alloy Casting AC4C · ADC		铜合金 Copper Alloy C1100	
切削速度 Cutting Speed (m/min)	300		300		150	
外径×颈长 DC×LU	转速 Speed (min ⁻¹)	进给速度 Feed (mm/min)	转速 Speed (min ⁻¹)	进给速度 Feed (mm/min)	转速 Speed (min ⁻¹)	进给速度 Feed (mm/min)
3 × 9	32,000	1,720	32,000	1,720	16,000	960
4 × 12	24,000	1,780	24,000	1,780	12,000	1,030
5 × 15	19,200	1,840	19,200	1,840	9,600	1,090
6 × 18	16,000	1,900	16,000	1,900	8,000	1,160
8 × 24	12,000	2,030	12,000	2,030	6,000	1,300
10 × 30	9,600	2,150	9,600	2,150	4,800	1,430
12 × 36	8,000	2,270	8,000	2,270	4,000	1,560
切削深度 Depth of Cut	ap 1D				ap 0.5D	

1. 上表是在悬伸量为刀具径4倍情况下的参考值。
2. 请使用高刚性、高精度的机械、刀柄。
3. 此切削条件表适用于使用水溶性切削油剂的加工。
4. 请根据切削深度、机械刚性等使用状况，调整转速和进给速度。
5. 对加工精度有要求的情况下，请适当下调转速，进给速度及切削深度。
6. 悬伸较长的情况下，请参考“根据悬伸量变化的切削条件调整参考值”来调整转速及进给速度。（参照 p.10）
7. 加工镁合金时，请务必使用切削油剂厂家推荐的切削油剂。另外，请注意切屑的处理与管理，以免造成火灾。

1. The above milling condition is a guideline for the overhang length is 4× D.
2. Use a rigid and precise machine and holder.
3. The indicated speeds and feeds are for milling with water-soluble coolant.
4. Please adjust the speed and feed when the cutting depth is large or when machines with low rigidity are used.
5. Reduce speed and feed as well as depth of cut when high precision is required.
6. Adjust the speed and feed accordingly when the overhang length is longer than specified (refer to p.10).
7. Please always use the appropriate cutting fluid recommended by the cutting fluid manufacturer in the machining of magnesium alloys. Be cautious with the cutting chips as they are highly flammable and may pose a serious fire risk if not properly handled.

侧铣 Side Milling

加工材料 Work Material	铝合金延伸材·镁合金 Aluminum Alloy Expanding Material · Magnesium Alloy A5052 · A7075 · AZ91 · AZ80A		铝合金铸件 Aluminum Alloy Casting AC4C · ADC		铜合金 Copper Alloy C1100	
切削速度 Cutting Speed (m/min)	300		300		150	
外径×颈长 DC×LU	转速 Speed (min ⁻¹)	进给速度 Feed (mm/min)	转速 Speed (min ⁻¹)	进给速度 Feed (mm/min)	转速 Speed (min ⁻¹)	进给速度 Feed (mm/min)
3 × 9	32,000	2,150	32,000	2,150	16,000	640
4 × 12	24,000	2,230	24,000	2,230	12,000	690
5 × 15	19,200	2,300	19,200	2,300	9,600	740
6 × 18	16,000	2,380	16,000	2,380	8,000	800
8 × 24	12,000	2,540	12,000	2,540	6,000	940
10 × 30	9,600	2,690	9,600	2,690	4,800	1,070
12 × 36	8,000	2,840	8,000	2,840	4,000	1,150
切削深度 Depth of Cut			ap 1.5D	ae 0.2D		

1. 上表是在悬伸量为刀具径4倍情况下的参考值。
2. 请使用高刚性、高精度的机械、刀柄。
3. 此切削条件表适用于使用水溶性切削油剂的加工。
4. 请根据切削深度、机械刚性等使用状况，调整转速和进给速度。
5. 对加工精度有要求的情况下，请适当下调转速，进给速度及切削深度。
6. 悬伸较长的情况下，请参考“根据悬伸量变化的切削条件调整参考值”来调整转速及进给速度。（参照 p.10）
7. 加工镁合金时，请务必使用切削油剂厂家推荐的切削油剂。另外，请注意切屑的处理与管理，以免造成火灾。

1. The above milling condition is a guideline for the overhang length is 4× D.
2. Use a rigid and precise machine and holder.
3. The indicated speeds and feeds are for milling with water-soluble coolant.
4. Please adjust the speed and feed when the cutting depth is large or when machines with low rigidity are used.
5. Reduce speed and feed as well as depth of cut when high precision is required.
6. Adjust the speed and feed accordingly when the overhang length is longer than specified (refer to p.10).
7. Please always use the appropriate cutting fluid recommended by the cutting fluid manufacturer in the machining of magnesium alloys. Be cautious with the cutting chips as they are highly flammable and may pose a serious fire risk if not properly handled.



钻削加工 Plunging

加工材料 Work Material	铝合金延伸材·镁合金 Aluminum Alloy Expanding Material · Magnesium Alloy A5052 · A7075 · AZ91 · AZ80A		铝合金铸件 Aluminum Alloy Casting AC4C · ADC		铜合金 Copper Alloy C1100	
切削速度 Cutting Speed (m/min)	80		80		60	
外径×颈长 DC×LU	转速 Speed (min ⁻¹)	进给速度 Feed (mm/min)	转速 Speed (min ⁻¹)	进给速度 Feed (mm/min)	转速 Speed (min ⁻¹)	进给速度 Feed (mm/min)
3 × 9	8,500	400	8,500	400	6,400	120
4 × 12	6,400	400	6,400	400	4,800	120
5 × 15	5,100	400	5,100	400	3,800	120
6 × 18	4,200	450	4,200	450	3,100	130
8 × 24	3,200	500	3,200	500	2,400	150
10 × 30	2,550	500	2,550	500	1,900	150
12 × 36	2,100	500	2,100	500	1,600	150
切削深度 Depth of Cut	ap 1D				ap 0.5D	

1. 上表是在悬伸量为刀具径4倍情况下的参考值。
2. 请使用高刚性，高精度的机械、刀柄。
3. 此切削条件表适用于使用水溶性切削油剂的加工。
4. 请根据切削深度、机械刚性等使用状况，调整转速和进给速度。
5. 对加工精度有要求的情况下，请适当下调转速，进给速度及切削深度。
6. 悬伸较长的情况下，请参考“根据悬伸量变化的切削条件调整参考值”来调整转速及进给速度。（参照 p.10）
7. 切屑缠绕时，请下调转速和进给速度。
8. 加工镁合金时，请务必使用切削油剂厂家推荐的切削油剂。另外，请注意切屑的处理与管理，以免造成火灾。

1. The above milling condition is a guideline for the overhang length is 4×D.
2. Use a rigid and precise machine and holder.
3. The indicated speeds and feeds are for milling with water-soluble coolant.
4. Please adjust the speed and feed when the cutting depth is large or when machines with low rigidity are used.
5. Reduce speed and feed as well as depth of cut when high precision is required.
6. Adjust the speed and feed accordingly when the overhang length is longer than specified (refer to p.10).
7. When the chips wind around the end mill, reduce the speed and feed.
8. Please always use the appropriate cutting fluid recommended by the cutting fluid manufacturer in the machining of magnesium alloys. Be cautious with the cutting chips as they are highly flammable and may pose a serious fire risk if not properly handled.

根据悬伸量变化的切削条件调整参考值(DC ≥ φ6) Cutting Condition Guide for Changes in Overhang Length

	加工材料 Work Material	铝合金延伸材·镁合金 Aluminum Alloy Expanding Material · Magnesium Alloy A5052 · A7075 · AZ91 · AZ80A		铝合金铸件 Aluminum Alloy Casting AC4C · ADC		铜合金 Copper Alloy C1100	
	悬长 L/D	转速 Speed (min ⁻¹)	进给速度 Feed (mm/min)	转速 Speed (min ⁻¹)	进给速度 Feed (mm/min)	转速 Speed (min ⁻¹)	进给速度 Feed (mm/min)
槽铣 Slot Milling	5	70%		70%		70%	
	6	50%		50%		50%	
侧铣 Side Milling	5	70%		70%		70%	
	6	50%		50%		50%	
钻削 Plunging	5	80%		80%		80%	
	6	60%		60%		60%	

AE-TL-N 切削条件基准表 Cutting Condition

3D刃长 3 × D flute length

槽铣 Slot Milling

加工材料 Work Material	铝合金延伸材·镁合金 Aluminum Alloy Expanding Material · Magnesium Alloy A5052 · A7075 · AZ91 · AZ80A		铝合金铸件 Aluminum Alloy Casting AC4C · ADC		铜合金 Copper Alloy C1100	
切削速度 Cutting Speed (m/min)	240		240		120	
外径×刃长 DC×APMX	转速 Speed (min ⁻¹)	进给速度 Feed (mm/min)	转速 Speed (min ⁻¹)	进给速度 Feed (mm/min)	转速 Speed (min ⁻¹)	进给速度 Feed (mm/min)
3 × 9	25,600	1,380	25,600	1,380	12,800	770
4 × 12	19,200	1,420	19,200	1,420	9,600	820
5 × 15	15,360	1,470	15,360	1,470	7,680	870
6 × 18	12,800	1,520	12,800	1,520	6,400	930
8 × 24	9,600	1,620	9,600	1,620	4,800	1,040
10 × 30	7,680	1,720	7,680	1,720	3,840	1,140
12 × 36	6,400	1,820	6,400	1,820	3,200	1,250
切削深度 Depth of Cut	ap 1D				ap 0.5D	

1. 请使用高刚性、高精度的机械、刀柄。
2. 此切削条件表适用于使用水溶性切削油剂的加工。
3. 请根据切削深度、机械刚性等使用状况，调整转速和进给速度。
4. 对加工精度有要求的情况下，请适当下调转速，进给速度及切削深度。
5. 加工镁合金时，请务必使用切削油剂厂家推荐的切削油剂。另外，请注意切屑的处理与管理，以免造成火灾。

1. Use a rigid and precise machine and holder.
2. The indicated speeds and feeds are for milling with water-soluble coolant.
3. Please adjust the speed and feed when the cutting depth is large or when machines with low rigidity are used.
4. Reduce speed and feed as well as depth of cut when high precision is required.
5. Please always use the appropriate cutting fluid recommended by the cutting fluid manufacturer in the machining of magnesium alloys. Be cautious with the cutting chips as they are highly flammable and may pose a serious fire risk if not properly handled.

侧铣 Side Milling

加工材料 Work Material	铝合金延伸材·镁合金 Aluminum Alloy Expanding Material · Magnesium Alloy A5052 · A7075 · AZ91 · AZ80A		铝合金铸件 Aluminum Alloy Casting AC4C · ADC		铜合金 Copper Alloy C1100	
切削速度 Cutting Speed (m/min)	240		240		120	
外径×刃长 DC×APMX	转速 Speed (min ⁻¹)	进给速度 Feed (mm/min)	转速 Speed (min ⁻¹)	进给速度 Feed (mm/min)	转速 Speed (min ⁻¹)	进给速度 Feed (mm/min)
3 × 9	25,600	1,720	25,600	1,720	12,800	770
4 × 12	19,200	1,780	19,200	1,780	9,600	780
5 × 15	15,360	1,840	15,360	1,840	7,680	790
6 × 18	12,800	1,900	12,800	1,900	6,400	810
8 × 24	9,600	2,030	9,600	2,030	4,800	830
10 × 30	7,680	2,150	7,680	2,150	3,840	860
12 × 36	6,400	2,270	6,400	2,270	3,200	880
切削深度 Depth of Cut	ap 3D		ae 0.1D			

1. 请使用高刚性、高精度的机械、刀柄。
2. 此切削条件表适用于使用水溶性切削油剂的加工。
3. 请根据切削深度、机械刚性等使用状况，调整转速和进给速度。
4. 对加工精度有要求的情况下，请适当下调转速，进给速度及切削深度。
5. 加工镁合金时，请务必使用切削油剂厂家推荐的切削油剂。另外，请注意切屑的处理与管理，以免造成火灾。

1. Use a rigid and precise machine and holder.
2. The indicated speeds and feeds are for milling with water-soluble coolant.
3. Please adjust the speed and feed when the cutting depth is large or when machines with low rigidity are used.
4. Reduce speed and feed as well as depth of cut when high precision is required.
5. Please always use the appropriate cutting fluid recommended by the cutting fluid manufacturer in the machining of magnesium alloys. Be cautious with the cutting chips as they are highly flammable and may pose a serious fire risk if not properly handled.



3D刃长 $3 \times D$ flute length

钻削加工 Plunging

加工材料 Work Material	铝合金延伸材·镁合金 Aluminum Alloy Expanding Material · Magnesium Alloy A5052 · A7075 · AZ91 · AZ80A		铝合金铸件 Aluminum Alloy Casting AC4C · ADC		铜合金 Copper Alloy C1100	
切削速度 Cutting Speed (m/min)	70		70		50	
外径×刃长 DC×APMX	转速 Speed (min ⁻¹)	进给速度 Feed (mm/min)	转速 Speed (min ⁻¹)	进给速度 Feed (mm/min)	转速 Speed (min ⁻¹)	进给速度 Feed (mm/min)
3 × 9	7,500	350	7,500	350	5,300	100
4 × 12	5,600	350	5,600	350	3,980	100
5 × 15	4,460	350	4,460	350	3,180	100
6 × 18	3,680	400	3,680	400	2,650	110
8 × 24	2,800	450	2,800	450	1,990	120
10 × 30	2,230	450	2,230	450	1,590	120
12 × 36	1,840	450	1,840	450	1,330	120
切削深度 Depth of Cut	ap 1D				ap 0.5D	

1. 请使用高刚性，高精度的机械、刀柄。
2. 此切削条件表适用于使用水溶性切削油剂的加工。
3. 请根据切削深度、机械刚性等使用状况，调整转速和进给速度。
4. 对加工精度有要求的情况下，请适当下调转速，进给速度及切削深度。
5. 切屑缠绕时，请下调转速和进给速度。
6. 加工镁合金时，请务必使用切削油剂厂家推荐的切削油剂。另外，请注意切屑的处理与管理，以免造成火灾。

1. Use a rigid and precise machine and holder.
2. The indicated speeds and feeds are for milling with water-soluble coolant.
3. Please adjust the speed and feed when the cutting depth is large or when machines with low rigidity are used.
4. Reduce speed and feed as well as depth of cut when high precision is required.
5. When the chips wind around the end mill, reduce the speed and feed.
6. Please always use the appropriate cutting fluid recommended by the cutting fluid manufacturer in the machining of magnesium alloys. Be cautious with the cutting chips as they are highly flammable and may pose a serious fire risk if not properly handled.

5D刃长 $5 \times D$ flute length

侧铣 Side Milling

加工材料 Work Material	铝合金延伸材·镁合金 Aluminum Alloy Expanding Material · Magnesium Alloy A5052 · A7075 · AZ91 · AZ80A		铝合金铸件 Aluminum Alloy Casting AC4C · ADC		铜合金 Copper Alloy C1100	
切削速度 Cutting Speed (m/min)	100		100		50	
外径×刃长 DC×APMX	转速 Speed (min ⁻¹)	进给速度 Feed (mm/min)	转速 Speed (min ⁻¹)	进给速度 Feed (mm/min)	转速 Speed (min ⁻¹)	进给速度 Feed (mm/min)
3 × 15	10,600	640	10,600	640	5,300	200
4 × 20	8,000	690	8,000	690	4,000	210
5 × 25	6,400	730	6,400	730	3,200	230
6 × 30	5,300	780	5,300	780	2,600	240
8 × 40	4,000	870	4,000	870	2,000	260
10 × 50	3,200	960	3,200	960	1,600	290
12 × 60	2,700	1,050	2,700	1,050	1,300	320
切削深度 Depth of Cut	ap 5D		ae 0.1D			

1. 请使用高刚性，高精度的机械、刀柄。
2. 此切削条件表适用于使用水溶性切削油剂的加工。
3. 请根据切削深度、机械刚性等使用状况，调整转速和进给速度。
4. 对加工精度有要求的情况下，请适当下调转速，进给速度及切削深度。
5. 加工镁合金时，请务必使用切削油剂厂家推荐的切削油剂。另外，请注意切屑的处理与管理，以免造成火灾。

1. Use a rigid and precise machine and holder.
2. The indicated speeds and feeds are for milling with water-soluble coolant.
3. Please adjust the speed and feed when the cutting depth is large or when machines with low rigidity are used.
4. Reduce speed and feed as well as depth of cut when high precision is required.
5. Please always use the appropriate cutting fluid recommended by the cutting fluid manufacturer in the machining of magnesium alloys. Be cautious with the cutting chips as they are highly flammable and may pose a serious fire risk if not properly handled.

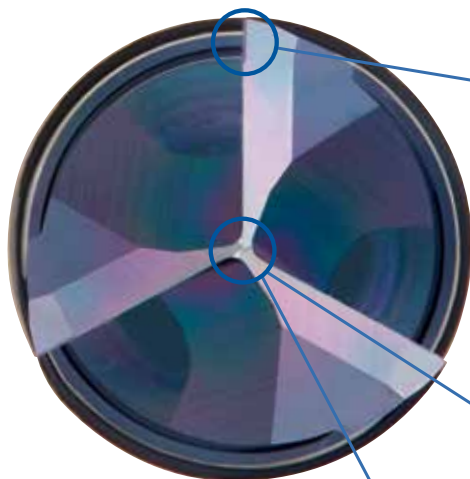


非铁金属加工用硬质合金铣刀 高性能型
Carbide End Mill for Non-Ferrous Materials High Performance Type

AE-VTS-N

对应多种加工! 高效率, 实现高品质加工

Suitable for a wide range of applications! High efficiency and high quality processing



修光刃式样

Flat cutting edge specification

实现更高精度的加工面品质
Achieves higher precision machined surface quality

大芯厚

Large core design

高刚性, 防止振动
High rigidity prevents chattering

带中心刃

Center cutting edge

可钻削加工
Can be used for plunging

不等导程、不等分割

Variable lead and unequal spacing teeth

抑制振动, 实现稳定・高效率加工
Stable and high efficiency milling is made possible by the suppression of chattering

连接中心的3枚切削刃

3 cutting edges that connect at the center

切削负荷在中心附近的切削刃之间是均等的, 可稳定且高转速加工*
The cutting load is equalized among the cutting edges with greater stability to enable high speed milling*

※钻削加工、斜线加工时有效
*Effective for plunging and ramping

Durability

耐久性

DLC-IGUSS 涂层

DLC-IGUSS Coating

通过涂层表面的平滑度, 对需求耐溶着性和润滑性的铝合金等的非铁金属发挥出众的威力。此外, 提高工具的寿命。

Due to the smoothness of the coating surface, it is extremely effective for non-ferrous materials such as aluminum alloys that require welding resistance and lubricity. Moreover, tool durability is also improved.



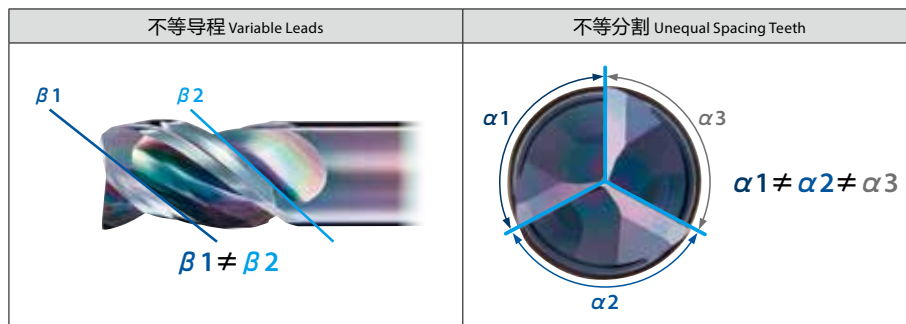


抑制振动

Suppression of Vibration

采用不等导程、不等分割，实现稳定·高效率加工

Variable lead and unequal spacing teeth geometry enable stable and high efficiency milling



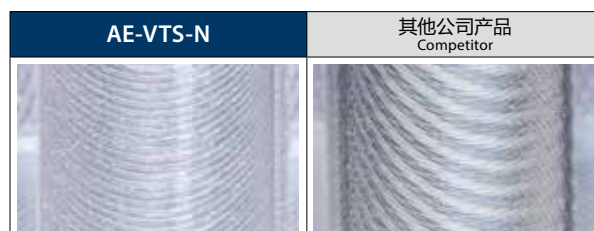
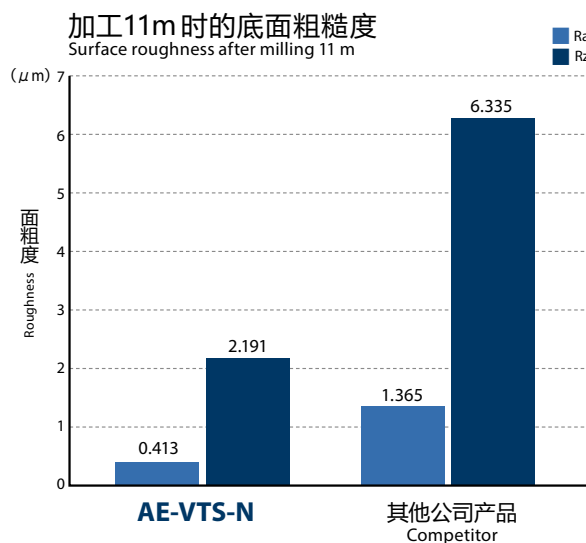
即使在高速切削条件下，也具有好的加工面品质

Good machined surface quality even under high speed cutting condition

DLC 涂层的耐溶着效果、不等导程·不等分割的抗振效果以及修光刃的效果，实现即使在高效率加工条件下也能有良好的加工表面

Due to the anti-welding effect of the DLC coating, the anti-vibration effect of the variable lead and unequal spacing teeth geometry, and the effect of the flat cutting edge specification, good machined surface can be achieved even under aggressive cutting condition.

使用工具 Tool	AE-VTS-N φ10×30	其他公司无涂层产品 Non-coated Competitor φ10 3刃 Flutes
加工材料 Work Material	A7075	
切削方法 Milling Method	槽铣 Slot Milling	
切削速度 Cutting Speed	408m/min (13,000min ⁻¹)	300m/min (9,550min ⁻¹)
进给速度 Feed	4,780mm/min (0.123mm/t)	1,432mm/min (0.05mm/t)
切削深度 Depth of Cut	ap = 10mm	
切削油剂 Coolant	水溶性切削油剂 Water-Soluble	
使用机械 Machine	立式加工中心 (BT40) Vertical Machining Center	

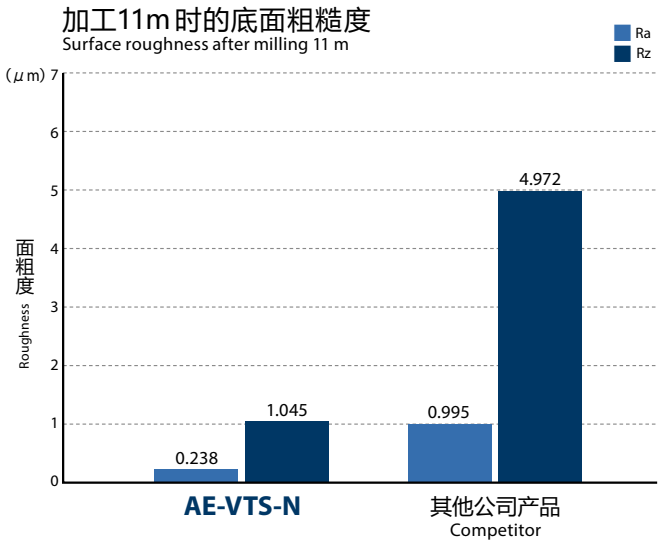


高品质
High Quality

优异的加工面品质 Excellent surface finish

DLC 涂层和修光刃的效果， 实现底面优异的加工面品质。
Due to the effect of the DLC coating and the flat cutting edge specification, excellent machined surface quality is achieved.

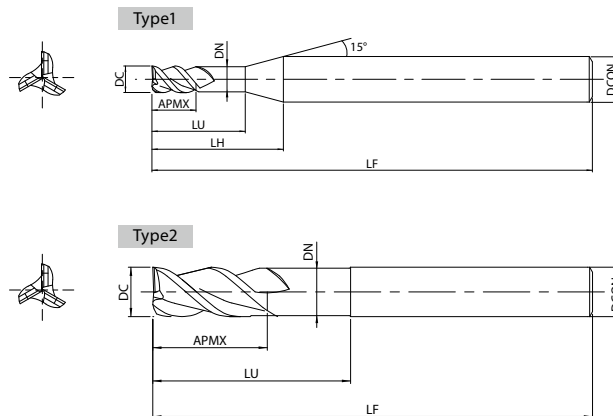
使用工具 Tool	AE-VTS-N φ10×30	其他公司无涂层产品 Non-coated Competitor φ10 3刃 Flutes
加工材料 Work Material	A7075	
切削方法 Milling Method	槽铣 Slot Milling	
切削速度 Cutting Speed	300m/min (9,550min ⁻¹)	
进给速度 Feed	1,432mm/min (0.05mm/t)	
切削深度 Depth of Cut	ap = 10mm	
切削油剂 Coolant	水溶性切削油剂 Water-Soluble	
使用机械 Machine	立式加工中心 (BT40) Vertical Machining Center	



AE-VTS-N



涂层可能会有颜色不均的情况, 但这并不影响刀具的性能。
End mills may have some discoloration, but it does not cause any performance problems.



1.5D 刃长(颈长3D) 1.5 x D flute length (Neck length 3 x D)

单位:mm Unit:mm

商品号 EDP No.	外径×颈长 DC×LU	全长 LF	刃长 APMX	LH	柄径 DCON	颈径 DN	形状 Type	库存 Stock
8557360	3 × 9	55	4.5	14.9	6	2.85	1	○
8557361	4 × 12	55	6	16	6	3.8	1	○
8557362	5 × 15	55	7.5	17.1	6	4.8	1	○
8557363	6 × 18	60	9	—	6	5.8	2	○
8557364	8 × 24	70	12	—	8	7.7	2	○
8557365	10 × 30	75	15	—	10	9.7	2	○
8557366	12 × 36	80	18	—	12	11.7	2	○

· 标识说明请参阅P.7。

· See p.7 for explanation of icons.

○ = 标准库存品 ○ = Standard stock item

AE-VTS-N 切削条件基准表 Cutting Condition

槽铣 Slot Milling

加工材料 Work Material	铝合金延伸材·镁合金 Aluminum Alloy Expanding Material · Magnesium Alloy A5052 · A7075 · AZ91 · AZ80A		铝合金铸件 Aluminum Alloy Casting AC4C · ADC		铜合金 Copper Alloy C1100	
切削速度 Cutting Speed (m/min)	300~400		300~400		150	
外径×颈长 DC×LU	转速 Speed (min ⁻¹)	进给速度 Feed (mm/min)	转速 Speed (min ⁻¹)	进给速度 Feed (mm/min)	转速 Speed (min ⁻¹)	进给速度 Feed (mm/min)
3 × 9	32,000	3,060	32,000	3,820	16,000	1,430
4 × 12	24,000	3,170	24,000	3,960	12,000	1,530
5 × 15	19,200	3,270	19,200	4,090	9,600	1,640
6 × 18	18,500	3,380	18,500	4,230	9,300	1,740
8 × 24	16,000	3,610	16,000	4,510	8,000	1,940
10 × 30	13,000	3,820	13,000	4,780	4,800	2,150
12 × 36	11,000	4,040	11,000	5,050	4,000	2,360
切削深度 Depth of Cut	ap 1D				ap 0.5D	

1. 上表是在悬伸量为刀具径4倍情况下的参考值。
2. 请使用高刚性、高精度的机械、刀柄。
3. 此切削条件表适用于使用水溶性切削油剂的加工。
4. 请根据切削深度、机械刚性等使用状况，调整转速和进给速度。
5. 对加工精度有要求的情况下，请适当下调转速，进给速度及切削深度。
6. 悬伸较长的情况下，请参考“根据悬伸量变化的切削条件调整参考值”来调整转速及进给速度。（参照p.18）
7. 加工镁合金时，请务必使用切削油剂厂家推荐的切削油剂。另外，请注意切屑的处理与管理，以免造成火灾。

1. The above milling condition is a guideline for the overhang length is 4×D.
2. Use a rigid and precise machine and holder.
3. The indicated speeds and feeds are for milling with water-soluble coolant.
4. Please adjust the speed and feed when the cutting depth is large or when machines with low rigidity are used.
5. Reduce speed and feed as well as depth of cut when high precision is required.
6. Adjust the speed and feed accordingly when the overhang length is longer than specified (refer to p.18).
7. Please always use the appropriate cutting fluid recommended by the cutting fluid manufacturer in the machining of magnesium alloys. Be cautious with the cutting chips as they are highly flammable and may pose a serious fire risk if not properly handled.

侧铣 Side Milling

加工材料 Work Material	铝合金延伸材·镁合金 Aluminum Alloy Expanding Material · Magnesium Alloy A5052 · A7075 · AZ91 · AZ80A		铝合金铸件 Aluminum Alloy Casting AC4C · ADC		铜合金 Copper Alloy C1100	
切削速度 Cutting Speed (m/min)	300~400		300~400		150~200	
外径×颈长 DC×LU	转速 Speed (min ⁻¹)	进给速度 Feed (mm/min)	转速 Speed (min ⁻¹)	进给速度 Feed (mm/min)	转速 Speed (min ⁻¹)	进给速度 Feed (mm/min)
3 × 9	32,000	3,820	32,000	3,820	16,000	1,600
4 × 12	24,000	3,960	24,000	3,960	12,000	1,700
5 × 15	19,200	4,090	19,200	4,090	9,600	1,830
6 × 18	18,500	4,230	18,500	4,230	9,300	1,950
8 × 24	16,000	4,510	16,000	4,510	8,000	2,180
10 × 30	13,000	4,780	13,000	4,780	6,400	2,400
12 × 36	11,000	5,050	11,000	5,050	5,300	2,650
切削深度 Depth of Cut	ap 1.5D		ae 0.2D		ap 1.5D ae 0.1D	

1. 上表是在悬伸量为刀具径4倍情况下的参考值。
2. 请使用高刚性、高精度的机械、刀柄。
3. 此切削条件表适用于使用水溶性切削油剂的加工。
4. 请根据切削深度、机械刚性等使用状况，调整转速和进给速度。
5. 对加工精度有要求的情况下，请适当下调转速，进给速度及切削深度。
6. 悬伸较长的情况下，请参考“根据悬伸量变化的切削条件调整参考值”来调整转速及进给速度。（参照p.18）
7. 加工镁合金时，请务必使用切削油剂厂家推荐的切削油剂。另外，请注意切屑的处理与管理，以免造成火灾。

1. The above milling condition is a guideline for the overhang length is 4×D.
2. Use a rigid and precise machine and holder.
3. The indicated speeds and feeds are for milling with water-soluble coolant.
4. Please adjust the speed and feed when the cutting depth is large or when machines with low rigidity are used.
5. Reduce speed and feed as well as depth of cut when high precision is required.
6. Adjust the speed and feed accordingly when the overhang length is longer than specified (refer to p.18).
7. Please always use the appropriate cutting fluid recommended by the cutting fluid manufacturer in the machining of magnesium alloys. Be cautious with the cutting chips as they are highly flammable and may pose a serious fire risk if not properly handled.



AE-VTS-N 切削条件基准表 Cutting Condition

标准
Standard

高性能
High Performance

短刃型
Short
AE-TS-N

长刃型
Long
AE-TL-N

短刃型
Short
AE-VTS-N

可换头式
Exchangeable Head
PXAL

钻削加工 Plunging

加工材料 Work Material	铝合金延伸材·镁合金 Aluminum Alloy Expanding Material · Magnesium Alloy A5052 · A7075 · AZ91 · AZ80A		铝合金铸件 Aluminum Alloy Casting AC4C · ADC		铜合金 Copper Alloy C1100	
切削速度 Cutting Speed (m/min)	150		150		75	
外径×颈长 DC×LU	转速 Speed (min ⁻¹)	进给速度 Feed (mm/min)	转速 Speed (min ⁻¹)	进给速度 Feed (mm/min)	转速 Speed (min ⁻¹)	进给速度 Feed (mm/min)
3 × 9	15,900	500	15,900	500	8,000	150
4 × 12	12,000	500	12,000	500	6,000	150
5 × 15	9,600	500	9,600	500	4,800	150
6 × 18	8,000	600	8,000	600	4,000	180
8 × 24	6,000	700	6,000	700	3,000	210
10 × 30	4,800	700	4,800	700	2,400	210
12 × 36	4,000	700	4,000	700	2,000	210
切削深度 Depth of Cut	ap 1D				ap 0.5D	

1. 上表是在悬伸量为刀具径4倍情况下的参考值。
2. 请使用高刚性，高精度的机械、刀柄。
3. 此切削条件表适用于使用水溶性切削油剂的加工。
4. 请根据切削深度、机械刚性等使用状况，调整转速和进给速度。
5. 对加工精度有要求的情况下，请适当下调转速，进给速度及切削深度。
6. 悬伸较长的情况下，请参考“根据悬伸量变化的切削条件调整参考值”来调整转速及进给速度。
7. 切屑缠绕时，请下调转速和进给速度。
8. 加工镁合金时，请务必使用切削油剂厂家推荐的切削油剂。另外，请注意切屑的处理与管理，以免造成火灾。

1. The above milling condition is a guideline for the overhang length is 4×D.
2. Use a rigid and precise machine and holder.
3. The indicated speeds and feeds are for milling with water-soluble coolant.
4. Please adjust the speed and feed when the cutting depth is large or when machines with low rigidity are used.
5. Reduce speed and feed as well as depth of cut when high precision is required.
6. Adjust the speed and feed accordingly when the overhang length is longer than specified.
7. When the chips wind around the end mill, reduce the speed and feed.
8. Please always use the appropriate cutting fluid recommended by the cutting fluid manufacturer in the machining of magnesium alloys. Be cautious with the cutting chips as they are highly flammable and may pose a serious fire risk if not properly handled.

根据悬伸量变化的切削条件调整参考值(DC ≥ φ6) Cutting Condition Guide for Changes in Overhang Length

	加工材料 Work Material	铝合金延伸材·镁合金 Aluminum Alloy Expanding Material · Magnesium Alloy A5052 · A7075 · AZ91 · AZ80A		铝合金铸件 Aluminum Alloy Casting AC4C · ADC		铜合金 Copper Alloy C1100	
	悬长 L/D	转速 Speed (min ⁻¹)	进给速度 Feed (mm/min)	转速 Speed (min ⁻¹)	进给速度 Feed (mm/min)	转速 Speed (min ⁻¹)	进给速度 Feed (mm/min)
槽铣 Slot Milling	5	70%		70%		70%	
	6	50%		50%		50%	
侧铣 Side Milling	5	70%		70%		70%	
	6	50%		50%		50%	
钻削 Plunging	5	80%		80%		80%	
	6	60%		60%		60%	



PXAL

对应大径加工，实现高品质加工面

Suitable for large-diameter milling with high surface quality



修光刃式样

Flat cutting edge specification

实现更高精度的加工面品质
Achieves higher precision machined surface quality

大芯厚

Large core design

高刚性，防止振动
High rigidity prevents chattering

带中心刃

Center cutting edge

可钻削加工
Can be used for plunging

采用适用于非铁金属的材料种类XP4625

Utilizes XP4625 grade suitable for non-ferrous metal applications

采用适合铝合金等非铁金属的材料种类，具有出色的耐磨损性和耐溶性，实现了工具的长寿命化。

By adopting a grade optimal for non-ferrous materials such as aluminum alloy, excellent wear resistance, welding resistance, and long tool life can be achieved.

Durability

耐久性

DLC-IGUSS 涂层

DLC-IGUSS Coating

通过涂层表面的平滑度，对需求耐溶性性和润滑性的铝合金等的非铁金属发挥出众的威力。此外，提高工具的寿命。

Due to the smoothness of the coating surface, it is extremely effective for non-ferrous materials such as aluminum alloys that require welding resistance and lubricity. Moreover, tool durability is also improved.

Lineup

种类
款式

丰富的形状款式

Abundant lineup in various shapes and styles

备有平头型、圆弧角型、细颈型等丰富的种类，可对应各式各样的加工。

An abundant lineup including square type, radius type, and reduced shank type are available to accommodate a wide range of applications.

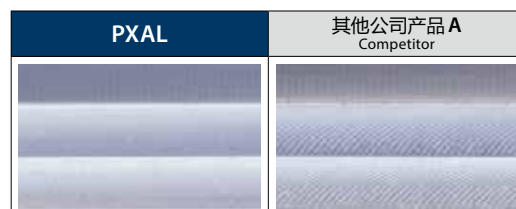
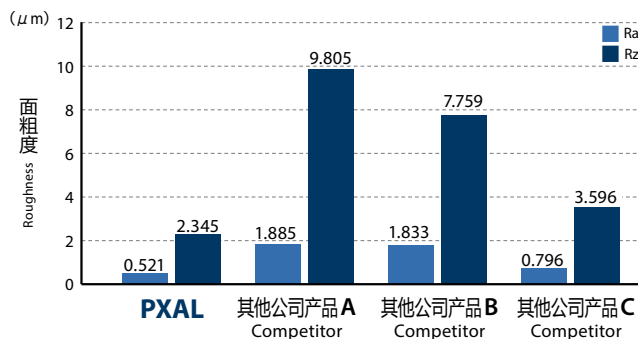


通过修光刃效果，提高加工面粗糙度

Improved surface roughness by the effect of the flat cutting edge specification

使用工具 Tool	刀头 Head: PXAL160C16-03R000 刀杆 Holder: PXMZ-C16SS16-S100	其他公司无涂层产品 A, B, C Non-coated Competitor
尺寸 Size	φ16	φ16 3刃 Flutes
加工材料 Work Material	A7075	
切削方法 Milling Method	侧铣 Side Milling	
切削速度 Cutting Speed	600m/min (12,000min ⁻¹)	
进给速度 Feed	5,400mm/min (0.15mm/t)	
切削深度 Depth of Cut	ap=8mm (0.5D) ae=4.8mm (0.3D)	
悬长 Overhang Length	50mm (L/D = 3.1)	
切削油剂 Coolant	水溶性切削油剂 Water-Soluble	
使用机械 Machine	立式加工中心 (BT40) Vertical Machining Center	

加工465m时的底面粗糙度 Bottom surface roughness after milling 465 m

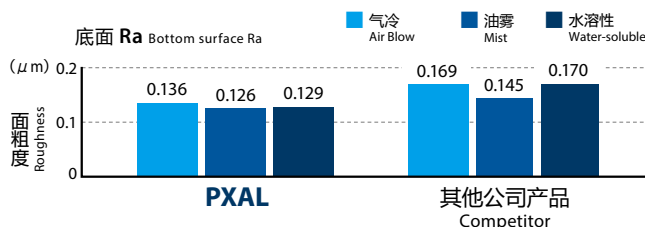
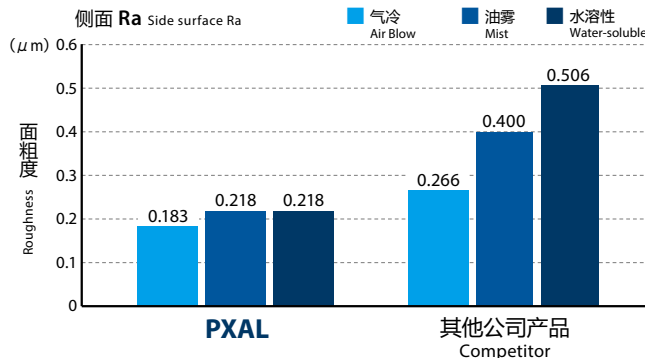


不论冷却种类都能实现良好的加工面粗糙度

Achieves good surface finish regardless of coolant type

使用工具 Tool	刀头 Head: PXAL160C16-03R000 刀杆 Holder: PXMZ-C16SS16-S100	其他公司无涂层产品 Non-coated Competitor
尺寸 Size	φ16	φ16 3刃 Flutes
加工材料 Work Material	A7075	
切削方法 Milling Method	侧铣 Side Milling	
切削速度 Cutting Speed	600m/min (12,000min ⁻¹)	
进给速度 Feed	2,700mm/min (0.075mm/t)	
切削深度 Depth of Cut	ap=8mm (0.5D) ae=4.8mm (0.3D)	
悬长 Overhang Length	50mm (L/D = 3.1)	
使用机械 Machine	立式加工中心 (BT40) Vertical Machining Center	

加工462m时的加工面粗糙度 Surface roughness after milling 462 m



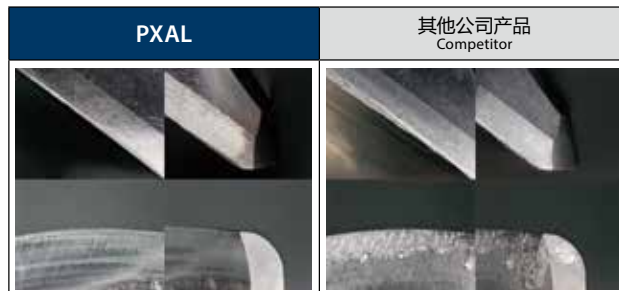
DLC 涂层抑制溶着

Welding suppression by DLC coating

使用工具 Tool	刀头 Head: PXAL160C16-03R010 刀杆 Holder: PXMZ-C16SS16-S100	其他公司无涂层产品 Non-coated Competitor
尺寸 Size	φ16 × R1	φ16 × R1 3刃 Flutes
加工材料 Work Material	A7075	
切削速度 Cutting Speed	600m/min (12,000min ⁻¹)	
进给速度 Feed	2,700mm/min (0.075mm/t)	
切削方法 Milling Method	侧铣 Side Milling	
切削深度 Depth of Cut	ap=8mm (0.5D) ae=4.8mm (0.3D)	
悬长 Overhang Length	50mm	
切削油剂 Coolant	无 (气冷式) None Air Blow	
使用机械 Machine	立式加工中心 (BT40) Vertical Machining Center	

加工300m时的刀尖状态

Cutting edge condition after milling 300 m

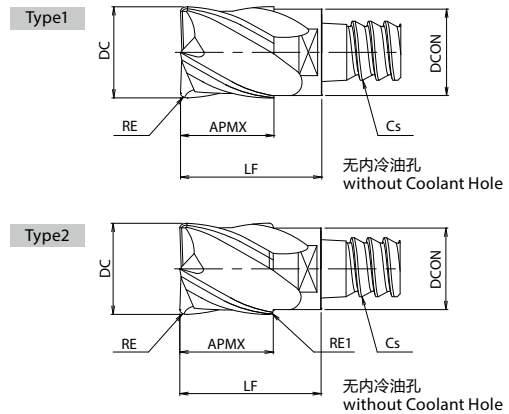


PXAL



涂层可能会有颜色不均的情况, 但这并不影响刀具的性能。
End mills may have some discoloration, but it does not cause any performance problems.

SPEED
FEED
P25-P29



无内冷油孔 without Coolant Hole

PXAL 平头·圆弧角型 Square·Corner Radius Type

单位:mm Unit:mm

商品号 EDP No.	名称 Designation	外径 DC	圆弧半径 RE	刃数 ZEP	刃长 APMX	全长 LF	颈径 DCON	螺旋角 FHA	安装规格 Cs	材质 Grades	形状 Type
7834930	PXAL100C10-03R000	10	0	3	10	16	9.8	45°	C10	XP4625	1
7834931	PXAL100C10-03R100		1								1
7834932	PXAL100C10-03R250		2.5								1
7834933	PXAL120C10-03R000	★12	0	3	12	18	9.8	45°		XP4625	2
7834934	PXAL120C12-03R000	12	0	3	12	18	11.7	45°	C12	XP4625	1
7834935	PXAL120C12-03R100		1								1
7834936	PXAL120C12-03R300		3								1
7834937	PXAL140C12-03R000	★14	0	3	14	20	11.7	45°		XP4625	2
7834938	PXAL160C16-03R000	16	0	3	16	23.5	15.7	45°	C16	XP4625	1
7834939	PXAL160C16-03R100		1								1
7834940	PXAL160C16-03R200		2								1
7834941	PXAL160C16-03R300		3								1
7834942	PXAL160C16-03R400		4								1
7834943	PXAL180C16-03R000	★18	0	3	18	25.5	15.7	45°		XP4625	2

库存种类都为C(即标准库存品) Stock are categorized as C (Standard stock item).

· 标识说明请参阅P.7。

· See p.7 for explanation of icons.



★ PXAL 细颈型 Reduced Shank Type

· 细颈型的刀具外径大于柄径，使其在模具零件等的深壁加工、型腔加工中最为适合。

· The outer diameter of the reduced shank type is larger than the shank diameter making it highly effective in the processing of die and mold applications that require vertical wall milling or pocketing.

例
Example



单位:mm Unit:mm

商品号 EDP No.	名称 Designation	外径 DC	圆弧半径 RE	刃数 ZEFP	刃长 APMX	全长 LF	颈径 DCON	螺旋角 FHA	安装规格 Cs	材质 Grades	形状 Type
7834944	PXAL200C20-03R000	20	0	3	20	27.5	19.6	45°	C20	XP4625	1
7834945	PXAL200C20-03R100		1								1
7834946	PXAL200C20-03R200		2								1
7834947	PXAL200C20-03R300		3								1
7834948	PXAL200C20-03R400		4								1
7834949	PXAL220C20-03R000	★ 22	0	3	22	29.5	19.6	45°		XP4625	2
7834950	PXAL250C25-03R000	25	0	3	25	35	24	45°	C25	XP4625	1
7834951	PXAL250C25-03R100		1								1
7834952	PXAL250C25-03R300		3								1
7834953	PXAL250C25-03R500		5								1

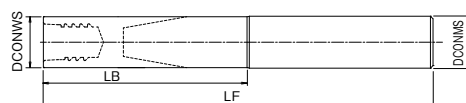
库存种类都为C(即标准库存品)。 Stock are categorized as C (Standard stock item).

PXMZ

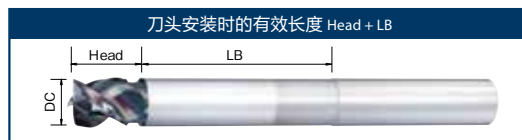
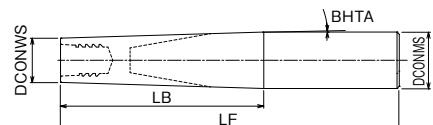


无内冷油孔 without Coolant Hole
硬质合金刀杆 Carbide Shank

Type1 无内冷油孔 without Coolant Hole



Type2 无内冷油孔 without Coolant Hole



单位:mm Unit:mm

商品号 EDP No.	名称 Designation	颈径 DCONWS	柄径 DCONMS	角度 BHTA	全长 LF	颈长 LB	刀头安装时的有效长度 Head + LB		安装 规格 CS	形状 Type
							PXAL 外径 DC			
							φ 10,12,16, 20,25	φ 12,14,18, 22 (细颈型) Reduced Shank Type		
7801830	PXMZ-C10SS10-S075CS	9.8	10	0°	75	17.3	33.3	35.3	C10	1
7801810	PXMZ-C10SS10-L100CS		10	0°	100	37.3	53.3	55.3		1
7801840	PXMZ-C10TP12-LL130CS		12	0.9°	130	67	83	85		2
7801831	PXMZ-C12SS12-S075CS	11.7	12	0°	75	24	42	44	C12	1
7801811	PXMZ-C12SS12-L100CS		12	0°	100	45.9	63.9	65.9		1
7801832	PXMZ-C12SS12-L115CS		12	0°	115	64.2	82.2	84.2		1
7801841	PXMZ-C12TP16-LL135CS		16	1.3°	135	83.8	101.8	103.8		2
7801833	PXMZ-C16SS16-S090CS	15.7	16	0°	90	39.2	62.7	64.7	C16	1
7801812	PXMZ-C16SS16-L130CS		16	0°	130	61.2	84.7	86.7		1
7801834	PXMZ-C16SS16-L135CS		16	0°	135	84.2	107.7	109.7		1
7801842	PXMZ-C16TP20-LL165CS		20	1.1°	165	115	138.5	140.5		2
7801835	PXMZ-C20SS20-S090CS	19.6	20	0°	90	39.1	66.6	68.6	C20	1
7801813	PXMZ-C20SS20-L150CS		20	0°	150	78.4	105.9	107.9		1
7801836	PXMZ-C20SS20-L180CS		20	0°	180	109.1	136.6	138.6		1
7801843	PXMZ-C20TP25-LL200CS		25	1.1°	200	140	167.5	169.5		2
7801814	PXMZ-C25SS25-L200CS	24	25	0°	200	96.6	131.6	—	C25	1

库存种类都为C(即标准库存品)。 Stock are categorized as C (Standard stock item).

1. 请适当调整冷却喷嘴的位置，以免切屑卷曲缠绕。
2. 即使安装于PXMZ带内冷油孔刀杆上也可加工。

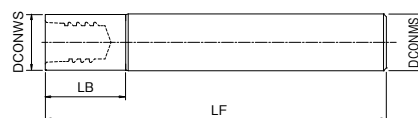
1. Adjust the position of the coolant nozzles accordingly so that the chips do not get tangled.
2. Also compatible with PXMZ shank holder with coolant hole.



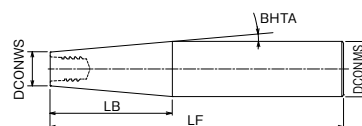
PXMZ



Type1 无内冷油孔 without Coolant Hole

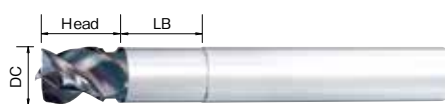


Type2 无内冷油孔 without Coolant Hole



无内冷油孔 without Coolant Hole 钢制刀杆 Steel Shank

刀头安装时的有效长度 Head + LB



单位:mm Unit:mm

商品号 EDP No.	名称 Designation	颈径 DCONWS	柄径 DCONMS	角度 BHTA	全长 LF	颈长 LB	刀头安装时的有效长度 Head + LB		安装 规格 Cs	形状 Type
							PXMZ 外径 DC			
							φ 10,12,16, 20,25	φ 12,14,18, 22 (细颈型) Reduced Shank Type		
7801800	PXMZ-C10SS10-S075	9.8	10	0°	75	12	28	30	C10	1
7801801	PXMZ-C12SS12-S100	11.7	12	0°	100	18	36	38	C12	1
7801821	PXMZ-C12TP20-S145		20	5°	145	47.4	65.4	67.4		2
7801802	PXMZ-C16SS16-S100	15.7	16	0°	100	23	46.5	48.5	C16	1
7801822	PXMZ-C16TP25-S155		25	5°	155	53.1	76.6	78.6		2
7801803	PXMZ-C20SS20-S120	19.6	20	0°	120	28	55.5	57.5	C20	1
7801823	PXMZ-C20TP32-S170		32	5°	170	70.8	98.3	100.3		2
7801804	PXMZ-C25SS25-S140	24	25	0°	140	34.5	69.5	—	C25	1

库存种类都为C(即标准库存品)。 Stock are categorized as C (Standard stock item).

- 请适当调整冷却喷嘴的位置，以免切屑卷曲缠绕。
- 即使安装于PXMZ带内冷油孔刀杆上也可加工。

- Adjust the position of the coolant nozzles accordingly so that the chips do not get tangled.
- Also compatible with PXMZ shank holder with coolant hole.

零件 Accessories

	商品号 EDP No.	名称 Designation	适用刀头外径 Applicable Head Dia.	安装规格 Cs	推荐安装扭矩 Recommended Tightening Torque
 扳手 Spanner	7801890	PXMP8-10	φ10, φ12 (细颈型)	C10	10N·m
			φ12, φ14	C12	12N·m
	7801891	PXMP13-16	φ16, φ18	C16	30N·m
			φ20, φ22	C20	50N·m
	7801892	PXMP21	φ25	C25	60N·m

PXM 专用扳手，扳手请另购。

There spanner are specifically for PXM, and sold separately from the cutters.

- 使用注意事项请参阅P.26。
- 安装扭矩请参考上表。
- 专用扭矩扳手请咨询本公司营业人员。

- Please refer to p.26 for cautions during use.
- Please refer to the table above for tightening torque.
- Contact your nearest OSG sales representative for details of our dedicated adjustable torque wrench for tightening inserts.



侧铣 Side Milling

$L/D \leq 3$

加工材料 Work Material	铝合金延伸材 Aluminum Alloy Expanding Material A5052·A7075	
外径 DC	转速 Speed (min ⁻¹)	进给速度 Feed (mm/min)
10	16,000	4,800
12	13,300	3,990
14	11,400	3,420
16	10,000	3,600
18	8,900	3,210
20	8,000	3,840
22	7,300	3,510
25	6,400	3,840
切削深度 Depth of Cut	$\overline{ap}$ 0.7D	$\overline{ae}$ 0.2D

$3 < L/D \leq 5$

加工材料 Work Material	铝合金延伸材 Aluminum Alloy Expanding Material A5052·A7075	
外径 DC	转速 Speed (min ⁻¹)	进给速度 Feed (mm/min)
10	9,600	2,310
12	8,000	1,920
14	6,900	1,660
16	6,000	1,730
18	5,400	1,560
20	4,800	1,850
22	4,400	1,690
25	3,900	1,880
切削深度 Depth of Cut	$\overline{ap}$ 0.7D	$\overline{ae}$ 0.08D

$5 < L/D \leq 7$

加工材料 Work Material	铝合金延伸材 Aluminum Alloy Expanding Material A5052·A7075	
外径 DC	转速 Speed (min ⁻¹)	进给速度 Feed (mm/min)
10	6,400	1,390
12	5,400	1,170
14	4,600	1,000
16	4,000	1,040
18	3,600	940
20	3,200	1,110
22	2,900	1,010
25	2,600	1,130
切削深度 Depth of Cut	$\overline{ap}$ 0.7D	$\overline{ae}$ 0.04D

槽铣 Slot Milling

$L/D \leq 3$

加工材料 Work Material	铝合金延伸材 Aluminum Alloy Expanding Material A5052·A7075	
外径 DC	转速 Speed (min ⁻¹)	进给速度 Feed (mm/min)
10	16,000	4,800
12	13,300	3,990
14	11,400	3,420
16	10,000	3,000
18	8,900	2,670
20	8,000	2,400
22	7,300	2,190
25	6,400	1,920
切削深度 Depth of Cut	$\overline{ap}$ 0.5D	

$3 < L/D \leq 5$

加工材料 Work Material	铝合金延伸材 Aluminum Alloy Expanding Material A5052·A7075	
外径 DC	转速 Speed (min ⁻¹)	进给速度 Feed (mm/min)
10	9,600	2,160
12	8,000	1,800
14	6,900	1,560
16	6,000	1,350
18	5,400	1,220
20	4,800	1,080
22	4,400	990
25	3,900	880
切削深度 Depth of Cut	$\overline{ap}$ 0.35D	

$5 < L/D \leq 7$

加工材料 Work Material	铝合金延伸材 Aluminum Alloy Expanding Material A5052·A7075	
外径 DC	转速 Speed (min ⁻¹)	进给速度 Feed (mm/min)
10	6,400	960
12	5,400	810
14	4,600	690
16	4,000	600
18	3,600	540
20	3,200	480
22	2,900	440
25	2,600	390
切削深度 Depth of Cut	$\overline{ap}$ 0.2D	

1. 请使用高刚性、高精度的机械、刀柄。
2. 请根据切削深度、机械刚性等使用状况，调整转速和进给速度。
3. 当悬长过长时，易发生振动，请适当调整转速、进给速度和切削深度。
4. 请考虑被夹具夹持的柄部(PXMZ)的悬长与刀头全长(LF)相加的悬长来选定切削条件。
5. 加工铜·铜合金时，请下调上表转速的20~40%，进给速度50~80%，切削深度(ap) 50 ~ 80%左右。
6. 加工镁合金时，请使用与铝合金延伸材相同的加工条件。请务必使用切削油剂厂家推荐的切削油剂。另外，请注意切屑的处理与管理，以免造成火灾。

1. Use a rigid and precise machine and holder.
2. Please adjust the speed and feed when the depth of cut is large or when machines with low rigidity are used.
3. Please adjust the cutting condition when the overhang length is longer.
4. Please consider the overhang length as the total length of replaceable head and overhang length of shank holder.
5. When milling copper and copper alloys, lower the rotational speed by 20 to 40%, feed rate by 50 to 80%, and cutting depth by ap 50 to 80% in accordance with the table above.
6. Please always use the appropriate cutting fluid recommended by the cutting fluid manufacturer in the machining of magnesium alloys. Be cautious with the cutting chips as they are highly flammable and may pose a serious fire risk if not properly handled.



紧固顺序 Tightening procedure



①清洗

Cleaning

将刀头和柄部之间的垃圾以及污垢擦干净

Remove dirt and chips from the connecting thread and shank



有空隙
With gap



无空隙◎
Without gap



②暂锁

Initial Tightening

手动锁紧

Tighten by hand

③最终锁紧

Final Tightening

使用专用扳手锁紧

Tighten with a spanner wrench

④确认

Confirmation

确认是否有空隙

Confirm that there is no gap

使用注意

Cautions during use

- 安装刀头时请使用 PXM 专用扳手。(非专用扳手不能使用。)
- 推荐安装扭矩请参考 P.24。
- 刀头与夹具端面安装时，请确认无空隙。
- 安装部脱油会使得安装更加困难，有可能达不到端面。所以请勿脱油。
- 请将扳手插入刀头凹槽处，慢慢回转。
- Only use the spanner wrenches that are designed specifically for the PXM (p.24) for attaching PXM heads .
- Please do not use alternative spanner wrenches sold on the market as a replacement.
- Please refer to p.24 for tightening torque.
- Please tighten until the head and the shank holder faces meet. Confirm that there is no gap.
- Degreasing the connecting thread may result in over tightening or a possible separation of the faces. Please do not degrease.
- Please make sure that the spanner wrench is inserted properly and turn it slowly during use.

标准
Standard

高性能
High Performance

短刃型
Short
AE-TS-N

长刃型
Long
AE-TL-N

短刃型
Short
AE-VTS-N

可换头式
Exchangeable Head
PXAL



PXMC

PXMC 夹具特点

PXMC Collet Features

● 小型 M/C 也能取得惊人的排屑性

Powerful chip evacuation even on small machining center

● 实现短悬长，刚性 UP 与理想的回转平衡性

The reduction of overhang length improves rigidity and rotational balance

● 丰富的刀头品种

- 适用于钢、不锈钢、铝
 - 从粗加工至精加工的广泛加工范围
- A wide variety of exchangeable heads
- Suitable for steel, stainless steel and aluminum
 - Wide processing range from roughing to finishing

● 与一体式刀柄相比，发生问题时只需更换夹具，具有超高性价比

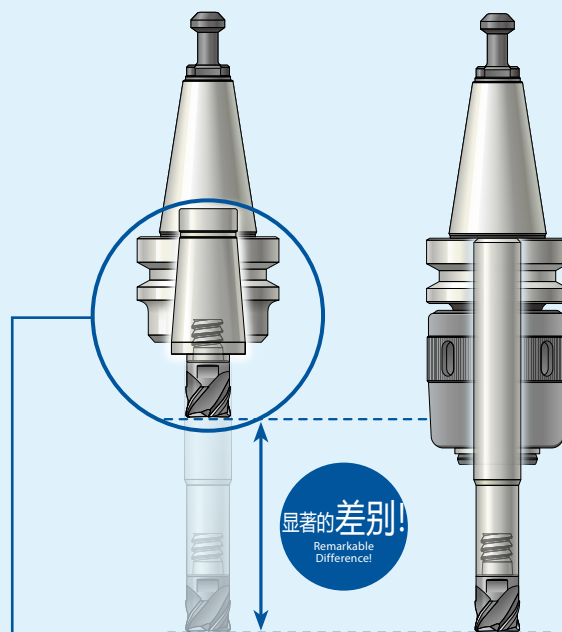
Greater cost performance compared to monoblock type holders, only need to change the collet in case of trouble.

PXMC 超短型

PXMC Collet Extra Short Type

以往组合

Conventional Combination



显著的差别!
Remarkable Difference!

PXM 刀头特点

PXM Exchangeable Head Features

活用整体铣刀的设计·实绩·专业技术的刀形

- 可对应各式各样的加工

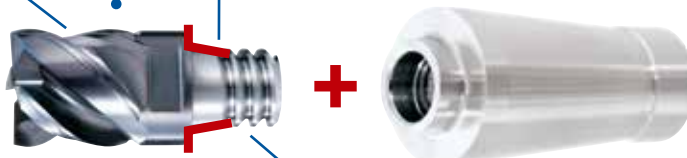
All the knowledge and know-how acquired by designing solid carbide end mills are found in these exchangeable heads. Various types are available to meet variety of machining methods.

端面 + 锥形 = 双面拘束

- 确保高刚性与精度
- 外周刃的振动精度：0.015mm 以下
- 更换刀头精度(轴向) $\pm 0.03\text{mm}$

End Face + Taper = Double Face Clamping

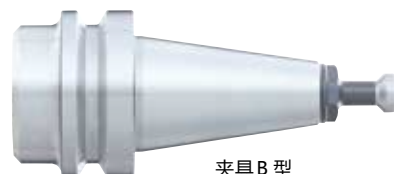
- High rigidity and accuracy of tightening
- High precision of run out $\leq 0.015\text{mm}$
- High head replacing accuracy = $\pm 0.03\text{mm}$



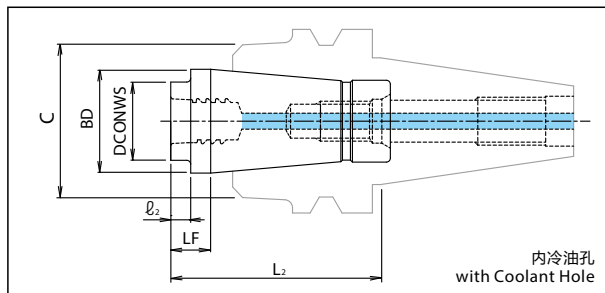
采用偏梯形螺纹

- 刀头的装卸更方便
- 更换刀具时间的短缩

Applying buttress screw makes easy and reduces time to desorb heads

短型
Short超短型
Extra Short夹具B型
Holder Type B

■形状尺寸表 Specification



单位:mm Unit:mm

类型 Type	商品号 EDP No.	名称 Designation	颈径 DCONWS	BD	LF	颈长 ℓ 2	刀头安装时的有效长度 Head + ℓ 2		安装 规格 Cs
							PXAL 外径 DC		
							φ 12,16,20, 25	φ 14, 18, 22 (细颈型) Reduced Shank Type	
超短型 Extra Short	7834001	PXMC-C1205	11.7	26	10.5	5	23	25	C12
	7834002	PXMC-C1605	15.7	26	10.5	5	28.5	30.5	C16
	7834003	PXMC-C2005	19.6	26	10.5	5	32.5	34.5	C20
	7834004	PXMC-C2505	24	26	10.5	5	40	—	C25
短型 Short	7834011	PXMC-C1230	11.7	26	35.5	30	48	50	C12
	7834012	PXMC-C1630	15.7	26	35.5	30	53.5	55.5	C16
	7834013	PXMC-C2030	19.6	26	35.5	30	57.5	59.5	C20
	7834014	PXMC-C2530	24	26	35.5	30	65	—	C25

库存种类都为C(即标准库存品)。 Stock are categorized as C (Standard stock item).

1. PXMC 是 "OSG PHOENIX PXM 系列" 刀头专用夹具。

1. The PXMC exchangeable head is designed specifically for the "OSG PHOENIX PXM" series.

■ PXMC对应HYPRO 热胀刀柄 产品一览 Product Listing of PXMC corresponding to the HYPRO Shrink System

单位:mm Unit:mm

类型 Type	商品号 EDP No.	名称 Designation	C	L2	
				超短型 Extra Short	短型 Short
夹具B型 Holder Type B	8910000	BT30-SLK12-35 P30T-1(MAS1)	38	45.5	70.5
	8910001	BT30-SLK12-35 P30T-2(MAS2)	38	45.5	70.5
	8910002	BT40-SLK12-45	38	55.5	80.5
	8910003	BT40-SLK12-75	38	85.5	110.5
	8910005	A63-SLK12-75	38	85.5	110.5
	8910006	A63-SLK12-135	38	145.5	170.5

1. 价格请咨询我司营业。

2. PXMC 夹具可与HYPRO 热胀刀柄互换。

1. Contact your local OSG sales representative for information regarding pricing.

2. The PXMC collet is compatible with the HYPRO Shrink Collet System.



PXAL+PXMC 超短型 PXAL + PXMC Extra Short Type

侧铣 Side Milling

加工材料 Work Material	铝合金延伸材 Aluminum Alloy Expanding Material A5052・A7075	
外径 DC	转速 Speed (min ⁻¹)	进给速度 Feed (mm/min)
12	10,000	3,000
14	10,000	3,000
16	10,000	3,000
18	8,900	3,210
20	8,000	2,880
22	7,300	3,510
25	6,400	3,080
切削深度 Depth of Cut		
	ap	ae
	0.7D	0.2D

槽铣 Slot Milling

加工材料 Work Material	铝合金延伸材 Aluminum Alloy Expanding Material A5052·A7075	
外径 DC	转速 Speed (min ⁻¹)	进给速度 Feed (mm/min)
12	10,000	3,000
14	10,000	3,000
16	10,000	3,000
18	8,900	2,670
20	8,000	2,400
22	7,300	2,190
25	6,400	1,920
切削深度 Depth of Cut	ap	
	0.5D	

PXAL+PXMC 短型 PXAL + PXMC Short Type

侧铣 Side Milling

加工材料 Work Material	铝合金延伸材 Aluminum Alloy Expanding Material A5052・A7075	
外径 DC	转速 Speed (min ⁻¹)	进给速度 Feed (mm/min)
12	10,000	2,700
14	10,000	2,700
16	10,000	2,700
18	8,900	2,890
20	8,000	2,600
22	7,300	3,160
25	6,400	2,770
切削深度 Depth of Cut		
	ap	ae
	0.7D	0.2D

槽铣 Slot Milling

加工材料 Work Material	铝合金延伸材 Aluminum Alloy Expanding Material A5052・A7075	
外径 DC	转速 Speed (min ⁻¹)	进给速度 Feed (mm/min)
12	10,000	2,700
14	10,000	2,700
16	10,000	2,700
18	8,900	2,410
20	8,000	2,160
22	7,300	1,980
25	6,400	1,730
切削深度 Depth of Cut	ap	
	0.5D	

1. 请根据切削深度、机械刚性等使用状况，调整转速和进给速度。
2. 加工铜·铜合金时，请下调上表转速的20~40%，进给速度50~80%，切削深度(ap) 50 ~ 80%左右。
3. 加工镁合金时，请使用与铝合金延伸材相同的加工条件。请务必使用切削油剂厂家推荐的切削油剂。另外，请注意切屑的处理与管理，以免造成火灾。

1. Please adjust speed and feed when the depth of cut is large or machines with low rigidity are used.
2. When milling copper and copper alloys, lower the rotational speed by 20 to 40%, feed rate by 50 to 80%, and cutting depth by ap 50 to 80% in accordance with the table above.
3. Please always use the appropriate cutting fluid recommended by the cutting fluid manufacturer in the machining of magnesium alloys. Be cautious with the cutting chips as they are highly flammable and may pose a serious fire risk if not properly handled.





①临时拧紧(BT30) Initial Tightening

清扫刀柄的安装部分，并插入。
转动拉钉，使其临时拧紧。

※ BT30以外的请参考下面。

Make sure the fastening portion of the collet is clean then insert it into the holder. Turn the pull stud to tighten.

*For models other than BT30 please refer to the instructions below.



④安装刀头 Mounting the Head

用手拧紧后，再用PXM专用扳手拧紧。

After screwing the head in by hand, use the PXM spanner wrench to tighten.



②最终拧紧 Final Tightening

用扳手拧紧
Tighten with a spanner wrench



③清扫 Cleaning

清除刀头、夹具之间的垃圾及污垢。
Remove dirt and chips from the connecting thread and collet

※ BT30以外的安装顺序 Mounting procedure for holders other than BT30

①在螺纹六角部插入六角扳手。

※有孔的拉钉(Φ6以上)时，
可将拉钉安装着进行操作。

Insert the hexagon socket wrench into the pull screw hexagonal section.

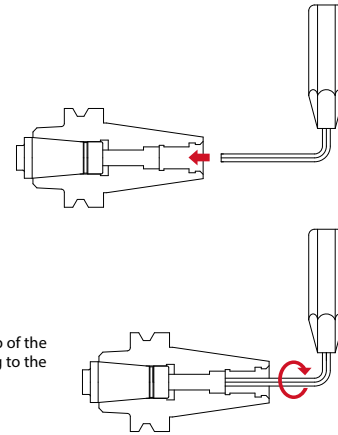
*For pull studs with holes (Φ6 or above), it is operational with the stud being attached.

②不转动夹具，在夹具的先端处握住扳手进行转动(右转)。按指定扭矩进行安装。

※推荐安装扭矩：18N·m

To prevent the collet from rotating, support the tip of the collet by hand, tighten with the wrench by turning to the right, then fastening to the required torque.

*Recommended tightening torque: 18N·m



使用上的注意 Cautions during use

- 安装刀头时使用PXM专用扳手。(非专用扳手不能使用。)
- 推荐安装扭矩请参考P.24。
- 刀头与夹具端面安装时，请确认无空隙。
- 安装部脱油会使得安装更加困难，有可能达不到端面。所以请勿脱油。
- 请将扳手插入刀头凹槽处，慢慢回转。

- Only use the spanner wrenches that are designed specifically for the PXM (p.24) for attaching PXM heads.
- Please do not use alternative spanner wrenches sold on the market as a replacement.
- Please refer to p.24 for tightening torque.
- Please tighten until the head and the collet faces meet. Confirm that there is no gap.
- Degreasing the connecting thread may result in over tightening or a possible separation of the faces. Please do not degrease.
- Please make sure that the spanner wrench is inserted properly and turn it slowly during use.

丰富的刀头种类! 可换头式铣刀 PXM

Abundant exchangeable milling heads! Exchangeable head end mill PXM

通过发挥与整体型相同加工性能的刀头部和刀头部的更换，实现刀体部的通用性，从而降低加工成本。
丰富的刀头种类对应多种多样的加工场景。

The PXM is an exchangeable head end mill series with the same high performance of a solid tool and the cost efficiency of an indexable tool. A single exchangeable head body is able to accommodate a wide range of exchangeable heads to meet various application needs.

形状类型 Available shapes

- 平头型
Square Type
- 粗加工型
Roughing Type
- 圆弧形型
Corner Radius Type
- 球头型
Ball Type

详情请参阅 OSG PHOENIX 样本。

Please see OSG PHOENIX Catalog for details.





shaping your dreams

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OSG Corporation

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