

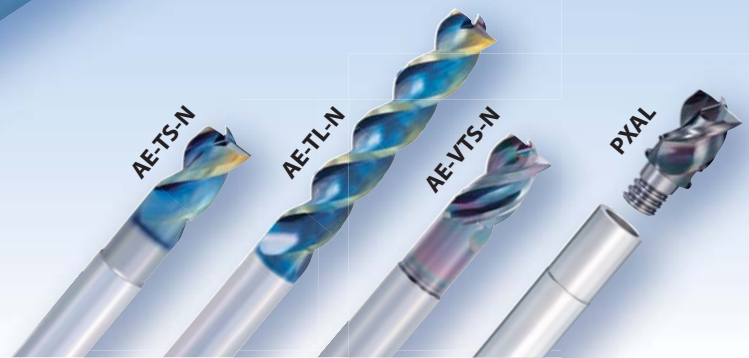
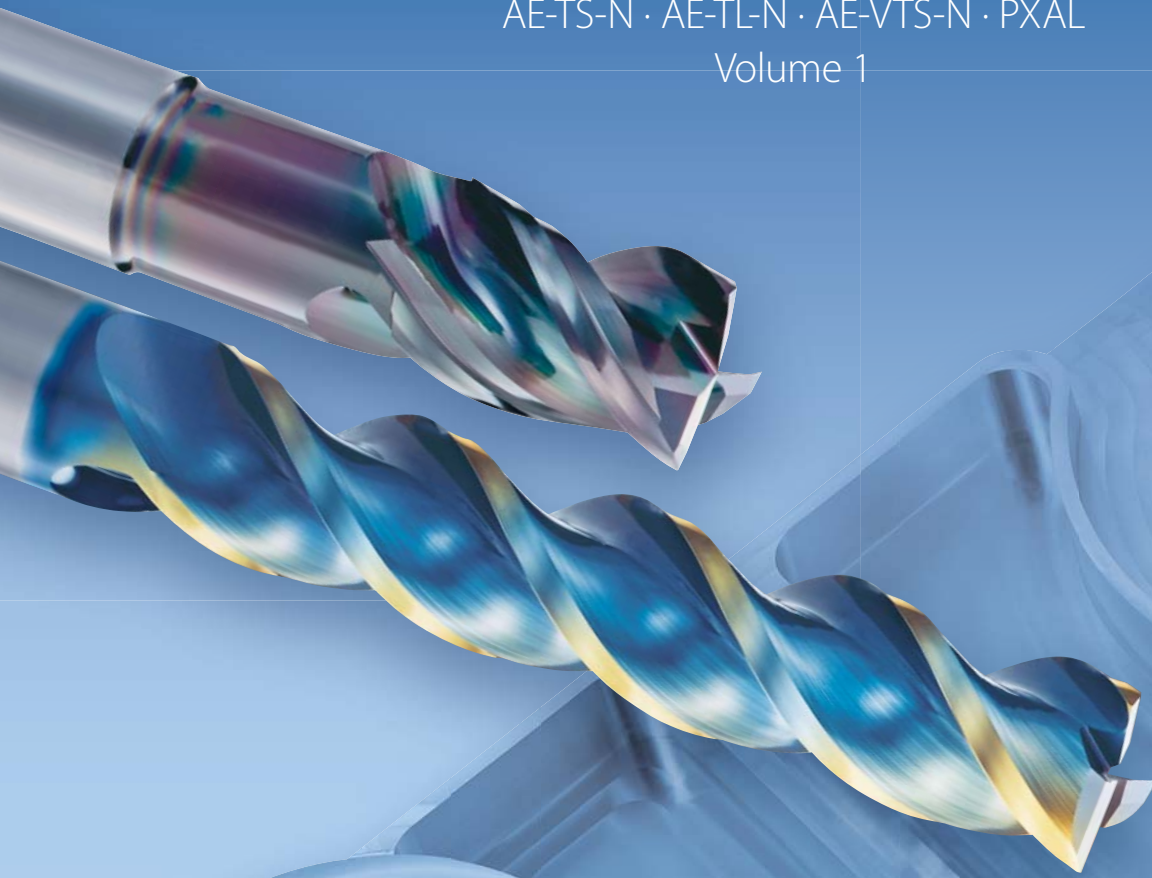


DLC Coated End Mills for Non-ferrous Materials

# AE-N SERIES

AE-TS-N · AE-TL-N · AE-VTS-N · PXAL

Volume 1



## Standard specification suitable for non-ferrous material processing

**AE-TS-N** Short .....PAGE 8



- 1,5xD flute length (Neck length 3 x D)
- Ø 3 ~ Ø 12
- DLC-Super Hard Coating

**AE-TL-N** Long .....PAGE 9



- 3xD/5xD flute length
- Ø 3 ~ Ø 12
- DLC-Super Hard Coating

## High performance type that supports a wide range of applications

**AE-VTS-N** Short .....PAGE 17



- 1,5xD flute length (Neck length 3 x D)
- Ø 3 ~ Ø 12
- DLC-IGUSS Coating

**PXAL** PXM Exchangeable Head End Mill .....PAGE 23



- 1xD flute length
- Ø 10 ~ Ø 25
- DLC-IGUSS Coating

Milling | Solid carbide

## APPLICATION

Application		Slot Milling	Side Milling	Helical Milling	Contour Milling	Ramping	Deep Side Milling	Plunging	Trochoidal Milling	
Standard	AE-TS-N Short	○	☆	○	○	○	☆	○	☆	
	AE-TL-N Long	3 x D flute length	○	☆	○	○	○	☆	○	☆
		5 x D flute length	△	☆	○	△	△	☆	△	☆
High Performance	AE-VTS-N Short	☆	☆	☆	☆	☆	☆	☆	☆	
	PXAL Exchangeable Head	☆	☆	☆	☆	☆	☆	☆	☆	

△ → ○ → ◎ → ☆  
(Fair) (Best)

# FEATURES OF DLC COATING

## DLC coating revolutionizes the processing of non-ferrous materials!

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.

## Two types of DLC coatings to accommodate specific application needs

### DLC-IGUSS

- Thick coating type for long tool life
- Thick coating type suppresses wear on the cutting edge to enable high durability and long tool life.
- Applicable tools : AE-VTS-N • PXAL

### DLC-SUPER HARD

- Thin coating type with emphasis on sharpness
- High adhesion to the base material to enable sharp cutting performance and high welding resistance.
- Applicable tools : AE-TS-N • AE-TL-N

Name of Coating	Coating Color	Coating Type	(GPa) Hardness	Oxidation Temperature (C°)	Coefficient of Friction	(µm) Coating Thickness	Coating Temperature (C°)	Surface roughness	Wear Resistance	Welding Resistance	Toughness
DLC-IGUSS	Interference Color	DLC(SP <sup>3</sup> Rich)	60	550	0.10	0.8	400	☆	◎	☆	○
DLC-SUPER HARD	Interference Color	DLC(SP <sup>3</sup> Rich)	60	550	0.10	0.2	400	☆	◎	☆	○

(Good) ○ → ◎ → ☆ (Best)

## Abrasion resistance and welding resistance

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.

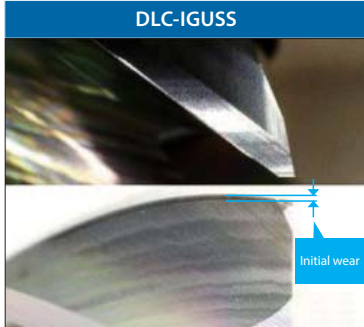

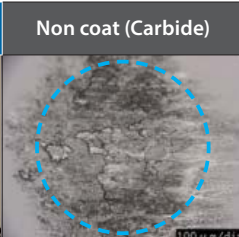
### Wear resistance

Milling in A5052

Tool	Carbide Square End Mill 3 Flutes
Work Material	A5052
Cutting Speed	200m/min (6.370 min <sup>-1</sup> )
Feed	0,08mm/t (1.530mm/min)
Depth of Cut	ap = 5mm ae = 8mm
Coolant	AirBlow
Machine	Vertical Machining Center
Machine Length	50m

### Welding resistance

Surface condition after pin-on-disc test

	DLC-IGUSS	DLC-SUPER HARD	Non coat (Carbide)
			
Test Material	A7075		
Test Environment	Open atmosphere		



# CUTTING DATA ON ALUMINUM PART PROCESSING

## Suitable for a wide range of applications

<b>Coolant</b>	MQL	<b>Holder</b>	Shrink Fit	<b>Machine</b>	5 axis Machining center
<b>Max. RPM</b>	25.000 min <sup>-1</sup>	<b>Work Material</b>	A5052	<b>Main Spindle</b>	HSK63

MQL is used for taking a video.



Process	Milling Part	Milling Method	Milling Process	Tool
①	Top	Face Milling 	Roughing	PXAL250C25-03R100
②	Overall	Contour Milling 	Roughing	PXAL200C20-03R100
③	Top	Face Milling 	Finishing	AE-TS- N Ø12x36
④	Boss, Hole Side	Side Milling 	Finishing	
⑤	Hole Top	Face Milling 	Finishing	AE-VTS- N Ø12x36

Milling | Solid carbide

# CUTTING DATA ON ALUMINUM PART PROCESSING



Process	Milling Part	Milling Method	Milling Process	Tool
⑥	Counterbore Wall	Side Milling 	Finishing	AE-VTS- N Ø12x36
⑦	Groove	Pocket Milling 	Roughing	
			Finishing	
⑧	Bottom	Pocket Milling 	Roughing	AE-VTS- N Ø10x30
			Finishing	
⑨	Slot	Slot Milling 5-axis 	Finishing	AE-TS- N Ø10x30
⑩	Outer circumference, lower counterbore	Side Milling 	Finishing	AE-TL- N Ø8x40

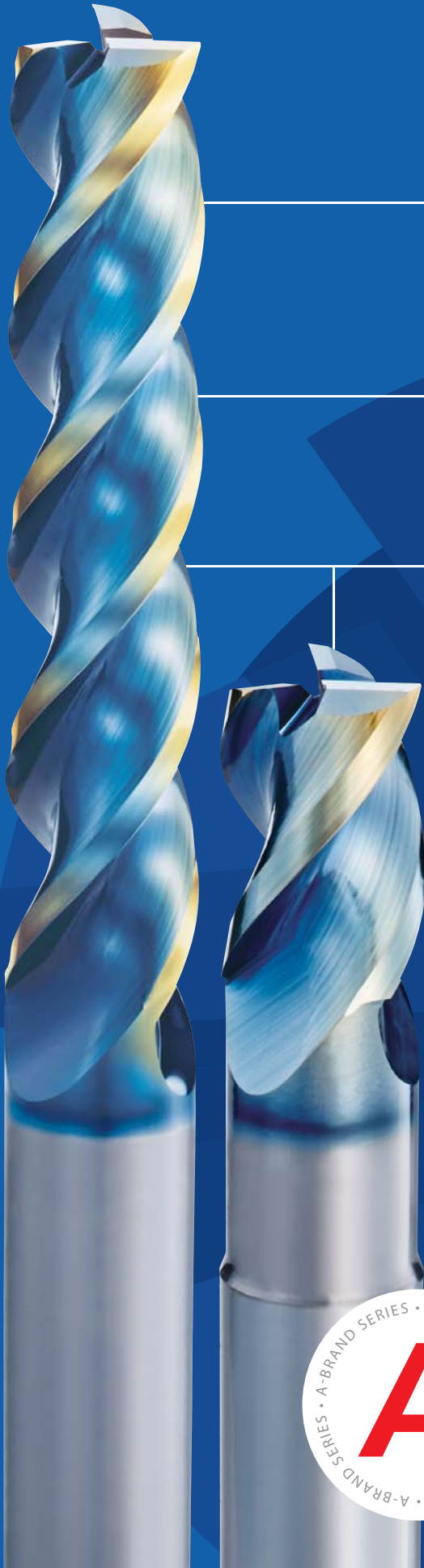
Milling | Solid carbide





# KEY FEATURES: AE-TS-N • AE-TL-N

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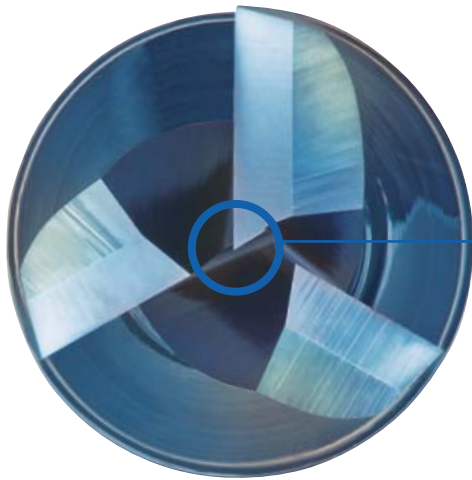


- 1** Cutting edge specification that achieves both rigidity and sharpness. Achieves high durability and good surface finish
- 2** New flute form. Facilitates excellent chip evacuation.
- 3** DLC-SUPER HARD Coating

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.



# STANDARD SPECIFICATION SUITABLE FOR NON-FERROUS MATERIAL PROCESSING



## Large core design

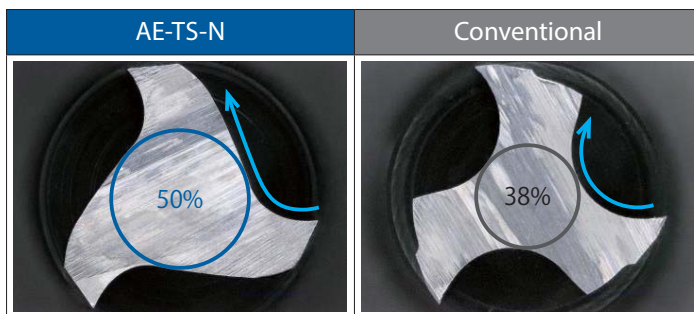
High rigidity prevents chattering

## Center cutting edge

Can be used for plunging

## Balancing rigidity and chip evacuation capability

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.



Arrow: indicates chip discharge direction

## CUTTING DATA

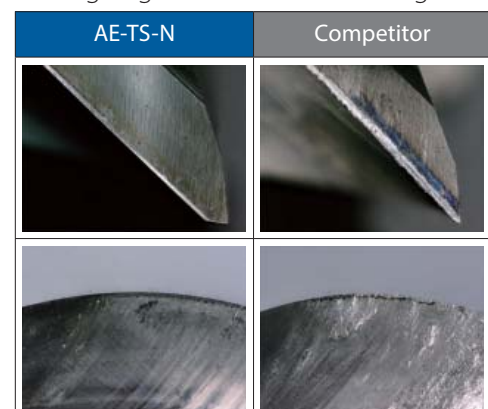
### High Quality

High welding resistance

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

Tool	AE-TS-N φ10×30	Non-coated Competitor φ10 3 Flutes
Work Material	A7075	
Milling Method	Slot Milling	
Cutting Speed	300m/min (9,550min <sup>-1</sup> )	
Feed	1,432mm/min(0.05mm/t)	
Depth of Cut	ap =10mm	
Coolant	AirBlow	
Machine	Vertical Machining Center	

Cutting edge condition after milling 11 m





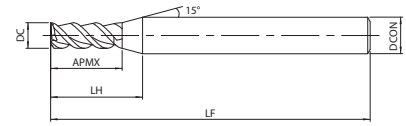


# AE-TL-N

Milling | Solid carbide



Type 1



Type 2



- First choice in quality and performance
- Carbide End Mill for Non-Ferrous Materials
- 3 flutes, Long type



## 3 x D flute length

EDP	DC x APMX	LF	LH	DCON	L/D	Type	Price
8557340	3 x 9	55	17	6	3	1	
8557341	4 x 12	55	18,1	6	3	1	
8557342	5 x 15	55	19,3	6	3	1	
8557343	6 x 18	60	-	6	3	2	
8557344	8 x 24	70	-	8	3	2	
8557345	10 x 30	75	-	10	3	2	
8557346	12 x 36	80	-	12	3	2	

## 5 x D flute length

EDP	DC x APMX	LF	LH	DCON	L/D	Type	Price
8557350	3 x 15	55	23	6	5	1	
8557351	4 x 20	60	26,1	6	5	1	
8557352	5 x 25	65	29,3	6	5	1	
8557353	6 x 30	75	-	6	5	2	
8557354	8 x 40	90	-	8	5	2	
8557355	10 x 50	100	-	10	5	2	
8557356	12 x 60	110	-	12	5	2	

Milling | Solid carbide



# CUTTING CONDITIONS

Milling | Endmills | Cutting conditions

## AE-TS-N

### Slot Milling

Cutting speed (m/min)	Aluminum Alloy Expanding Material • Magnesium Alloy A5052 • A7075 • AZ91 • AZ80A		Aluminum Alloy Casting AC4C • ADC		Copper Alloy C1100					
	300		300		150					
DC X LU	S (min <sup>-1</sup> )	F (mm/min)	S (min <sup>-1</sup> )	F (mm/min)	S (min <sup>-1</sup> )	F (mm/min)				
3 x 9	32.000	1.720	32.000	1.720	16.000	960				
4 x 12	24.000	1.780	24.000	1.780	12.000	1.030				
5 x 15	19.200	1.840	19.200	1.840	9.600	1.090				
6 x 18	16.000	1.900	16.000	1.900	8.000	1.160				
8 x 24	12.000	2.030	12.000	2.030	6.000	1.300				
10 x 30	9.600	2.150	9.600	2.150	4.800	1.430				
12 x 36	8.000	2.270	8.000	2.270	4.000	1.560				
Depth of cut	<table border="1"> <tr> <td>ap</td> <td>1D</td> </tr> </table>				ap	1D	<table border="1"> <tr> <td>ap</td> <td>0,5D</td> </tr> </table>		ap	0,5D
ap	1D									
ap	0,5D									

- The above milling condition is a guideline for the overhang length is 4xD.
- Use a rigid and precise machine and holder.
- The indicated speeds and feeds are for milling with water-soluble coolant.
- Please adjust the speed and feed when the cutting depth is large or when machines with low rigidity are used.
- Reduce speed and feed as well as depth of cut when high precision is required.
- Adjust the speed and feed accordingly when the overhang length is longer than specified (refer to p.10).
- 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.

### Side Milling

Cutting speed (m/min)	Aluminum Alloy Expanding Material • Magnesium Alloy A5052 • A7075 • AZ91 • AZ80A		Aluminum Alloy Casting AC4C • ADC		Copper Alloy C1100					
	300		300		150					
DC X LU	S (min <sup>-1</sup> )	F (mm/min)	S (min <sup>-1</sup> )	F (mm/min)	S (min <sup>-1</sup> )	F (mm/min)				
3 x 9	32.000	2.150	32.000	2.150	16.000	640				
4 x 12	24.000	2.230	24.000	2.230	12.000	690				
5 x 15	19.200	2.300	19.200	2.300	9.600	740				
6 x 18	16.000	2.380	16.000	2.380	8.000	800				
8 x 24	12.000	2.540	12.000	2.540	6.000	940				
10 x 30	9.600	2.690	9.600	2.690	4.800	1.070				
12 x 36	8.000	2.840	8.000	2.840	4.000	1.150				
Depth of cut	<table border="1"> <tr> <td>ap</td> <td>ae</td> </tr> <tr> <td>1,5D</td> <td>0,2D</td> </tr> </table>						ap	ae	1,5D	0,2D
ap	ae									
1,5D	0,2D									

- The above milling condition is a guideline for the overhang length is 4xD.
- Use a rigid and precise machine and holder.
- The indicated speeds and feeds are for milling with water-soluble coolant.
- Please adjust the speed and feed when the cutting depth is large or when machines with low rigidity are used.
- Reduce speed and feed as well as depth of cut when high precision is required.
- Adjust the speed and feed accordingly when the overhang length is longer than specified (refer to p.10).
- 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.

Milling | Solid carbide



# CUTTING CONDITIONS

Milling | Endmills | Cutting conditions

## AE-TS-N

### Plunging


	Aluminum Alloy Expanding Material • Magnesium Alloy A5052 • A7075 • AZ91 • AZ80A		Aluminum Alloy Casting AC4C • ADC		Copper Alloy C1100	
Cutting speed (m/min)	80		80		60	
DC X LU	S (min <sup>-1</sup> )	F (mm/min)	S (min <sup>-1</sup> )	F (mm/min)	S (min <sup>-1</sup> )	F (mm/min)
3 x 9	8.500	400	8.500	400	6.400	120
4 x 12	6.400	400	6.400	400	4.800	120
5 x 15	5.100	400	5.100	400	3.800	120
6 x 18	4.200	450	4.200	450	3.100	130
8 x 24	3.200	500	3.200	500	2.400	150
10 x 30	2.550	500	2.550	500	1.900	150
12 x 36	2.100	500	2.100	500	1.600	150

Depth of cut	<table border="1"> <tr> <td style="text-align: center;">ap</td> </tr> <tr> <td style="text-align: center;">1D</td> </tr> </table>				ap	1D	<table border="1"> <tr> <td style="text-align: center;">ap</td> </tr> <tr> <td style="text-align: center;">0,5D</td> </tr> </table>		ap	0,5D
ap										
1D										
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0,5D										

1. The above milling condition is a guideline for the overhang length is 4xD.
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.

### Cutting Condition Guide for Changes in Overhang Length

DC ≥ Ø6

	Work Material	Aluminum Alloy Expanding Material • Magnesium Alloy A5052 • A7075 • AZ91 • AZ80A		Aluminum Alloy Casting AC4C • ADC		Copper Alloy C1100	
		L/D	S (min <sup>-1</sup> )	F (mm/min)	S (min <sup>-1</sup> )	F (mm/min)	S (min <sup>-1</sup> )
Slot milling	5		70%		70%		70%
	6		50%		50%		50%
Side milling	5		70%		70%		70%
	6		50%		50%		50%
Plunging	5		80%		80%		80%
	6		60%		60%		60%



# CUTTING CONDITIONS

Milling | Endmills | Cutting conditions

## AE-TL-N 3xD flute length

### Slot Milling

Cutting speed (m/min)	Aluminum Alloy Expanding Material • Magnesium Alloy A5052 • A7075 • AZ91 • AZ80A		Aluminum Alloy Casting AC4C • ADC		Copper Alloy C1100					
	S (min <sup>-1</sup> )	F (mm/min)	S (min <sup>-1</sup> )	F (mm/min)	S (min <sup>-1</sup> )	F (mm/min)				
240			240		120					
DC x APMX	S (min <sup>-1</sup> )	F (mm/min)	S (min <sup>-1</sup> )	F (mm/min)	S (min <sup>-1</sup> )	F (mm/min)				
3 x 9	25.600	1.380	25.600	1.380	12.800	770				
4 x 12	19.200	1.420	19.200	1.420	9.600	820				
5 x 15	15.360	1.470	15.360	1.470	7.680	870				
6 x 18	12.800	1.520	12.800	1.520	6.400	930				
8 x 24	9.600	1.620	9.600	1.620	4.800	1.040				
10 x 30	7.680	1.720	7.680	1.720	3.840	1.140				
12 x 36	6.400	1.820	6.400	1.820	3.200	1.250				
Depth of cut	<table border="1"> <tr> <td>ap</td> </tr> <tr> <td>1D</td> </tr> </table>			ap	1D	<table border="1"> <tr> <td>ap</td> </tr> <tr> <td>0,5D</td> </tr> </table>			ap	0,5D
ap										
1D										
ap										
0,5D										
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### Side Milling

Cutting speed (m/min)	Aluminum Alloy Expanding Material • Magnesium Alloy A5052 • A7075 • AZ91 • AZ80A		Aluminum Alloy Casting AC4C • ADC		Copper Alloy C1100					
	S (min <sup>-1</sup> )	F (mm/min)	S (min <sup>-1</sup> )	F (mm/min)	S (min <sup>-1</sup> )	F (mm/min)				
240			240		120					
DC x APMX	S (min <sup>-1</sup> )	F (mm/min)	S (min <sup>-1</sup> )	F (mm/min)	S (min <sup>-1</sup> )	F (mm/min)				
3 x 9	25.600	1.720	25.600	1.720	12.800	770				
4 x 12	19.200	1.780	19.200	1.780	9.600	780				
5 x 15	15.360	1.840	15.360	1.840	7.680	790				
6 x 18	12.800	1.900	12.800	1.900	6.400	810				
8 x 24	9.600	2.030	9.600	2.030	4.800	830				
10 x 30	7.680	2.150	7.680	2.150	3.840	860				
12 x 36	6.400	2.270	6.400	2.270	3.200	880				
Depth of cut	<table border="1"> <tr> <td>ap</td> <td>ae</td> </tr> <tr> <td>3D</td> <td>0,1D</td> </tr> </table>			ap	ae	3D	0,1D			
ap	ae									
3D	0,1D									
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# CUTTING CONDITIONS

Milling | Endmills | Cutting conditions

## AE-TL-N 3xD flute length

Plunging

	Aluminum Alloy Expanding Material • Magnesium Alloy A5052 • A7075 • AZ91 • AZ80A		Aluminum Alloy Casting AC4C • ADC		Copper Alloy C1100					
Cutting speed (m/min)	70		70		50					
DC x APMX	S (min <sup>-1</sup> )	F (mm/min)	S (min <sup>-1</sup> )	F (mm/min)	S (min <sup>-1</sup> )	F (mm/min)				
3 x 9	7.500	350	7.500	350	5.300	100				
4 x 12	5.600	350	5.600	350	3.980	100				
5 x 15	4.460	350	4.460	350	3.180	100				
6 x 18	3.680	400	3.680	400	2.650	110				
8 x 24	2.800	450	2.800	450	1.990	120				
10 x 30	2.230	450	2.230	450	1.590	120				
12 x 36	1.840	450	1.840	450	1.330	120				
Depth of cut	<table border="1"> <tr> <td>ap</td> </tr> <tr> <td>1D</td> </tr> </table>			ap	1D	<table border="1"> <tr> <td>ap</td> </tr> <tr> <td>0,5D</td> </tr> </table>			ap	0,5D
ap										
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<ol style="list-style-type: none"> <li>1. Use a rigid and precise machine and holder.</li> <li>2. The indicated speeds and feeds are for milling with water-soluble coolant.</li> <li>3. Please adjust the speed and feed when the cutting depth is large or when machines with low rigidity are used.</li> <li>4. Reduce speed and feed as well as depth of cut when high precision is required.</li> <li>5. When the chips wind around the end mill, reduce the speed and feed.</li> <li>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.</li> </ol>										

## AE-TL-N 5xD flute length

Side Milling

	Aluminum Alloy Expanding Material • Magnesium Alloy A5052 • A7075 • AZ91 • AZ80A		Aluminum Alloy Casting AC4C • ADC		Copper Alloy C1100					
Cutting speed (m/min)	100		100		50					
DC x APMX	S (min <sup>-1</sup> )	F (mm/min)	S (min <sup>-1</sup> )	F (mm/min)	S (min <sup>-1</sup> )	F (mm/min)				
3 x 15	10.600	640	10.600	640	5.300	200				
4 x 20	8.000	690	8.000	690	4.000	210				
5 x 25	6.400	730	6.400	730	3.200	230				
6 x 30	5.300	780	5.300	780	2.600	240				
8 x 40	4.000	870	4.000	870	2.000	260				
10 x 50	3.200	960	3.200	960	1.600	290				
12 x 60	2.700	1.050	2.700	1.050	1.300	320				
Depth of cut	<table border="1"> <tr> <td>ap</td> <td>ae</td> </tr> <tr> <td>5D</td> <td>0,1D</td> </tr> </table>			ap	ae	5D	0,1D			
ap	ae									
5D	0,1D									
<ol style="list-style-type: none"> <li>1. Use a rigid and precise machine and holder.</li> <li>2. The indicated speeds and feeds are for milling with water-soluble coolant.</li> <li>3. Please adjust the speed and feed when the cutting depth is large or when machines with low rigidity are used.</li> <li>4. Reduce speed and feed as well as depth of cut when high precision is required.</li> <li>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.</li> </ol>										





# KEY FEATURES: AE-VTS-N

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**1** Variable lead and unequal spacing teeth

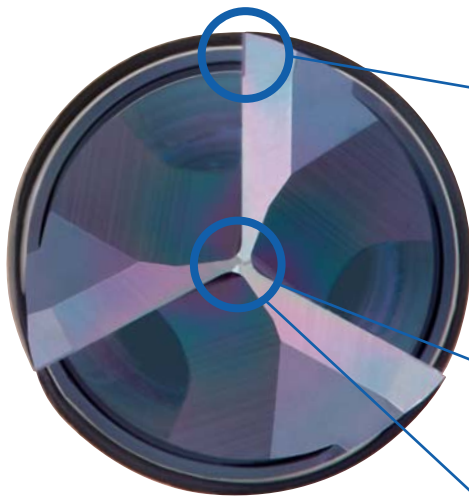
**2** Stable and high efficiency milling is made possible by the suppression of chattering

**3** DLC-IGUSS Coating

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.



# SUITABLE FOR A WIDE RANGE OF APPLICATIONS! HIGH EFFICIENCY AND HIGH QUALITY PROCESSING



## Flat cutting edge

Achieves higher precision machined surface quality

## Large core design

High rigidity prevents chattering

## Center cutting edge

Can be used for plunging

## Variable lead and unequal spacing teeth

Stable and high efficiency milling is made possible by the suppression of chattering

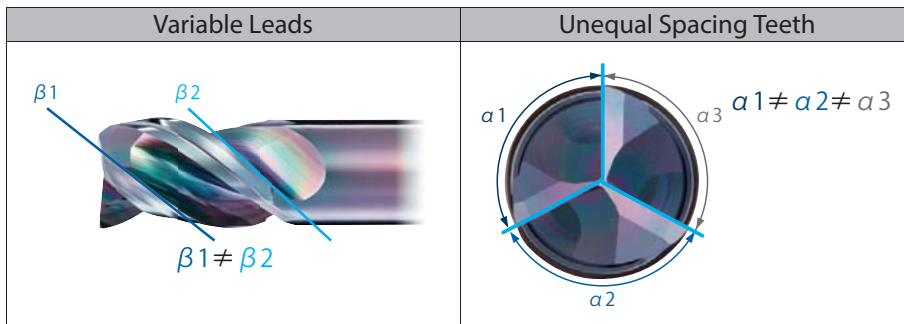
## 3 cutting edges that connect at the center

The cutting load is equalized among the cutting edges with greater stability to enable high speed milling\*

\*Effective for plunging and ramping

## Suppression of Vibration

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

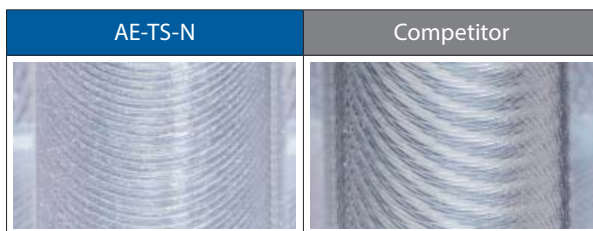
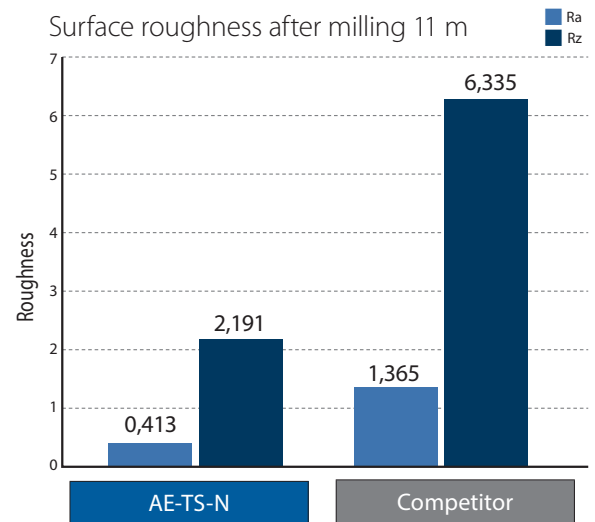


# SUITABLE FOR A WIDE RANGE OF APPLICATIONS! HIGH EFFICIENCY AND HIGH QUALITY PROCESSING

## Good machined surface quality even under high speed cutting condition

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.

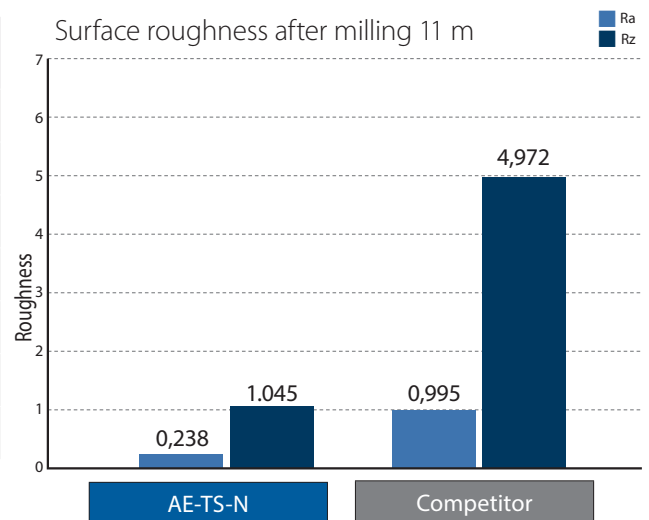
Tool	AE-VTS-N φ10×30	Non-coated Competitor φ10 3 Flutes
Work Material	A7075	
Milling Method	Slot Milling	
Cutting Speed	408m/min (13.000min <sup>-1</sup> )	300m/min (9.550min <sup>-1</sup> )
Feed	4.780mm/min(0.123mm/t)	1.432mm/min(0.05mm/t)
Depth of Cut	ap =10mm	
Coolant	Water Soluble	
Machine	Vertical Machining Center (BT40)	



## Excellent surface finish

Due to the effect of the DLC coating and the flat cutting edge specification, excellent machined surface quality is achieved.

Tool	AE-VTS-N φ10×30	Non-coated Competitor φ10 3 Flutes
Work Material	A7075	
Milling Method	Slot Milling	
Cutting Speed	300m/min (9.550min <sup>-1</sup> )	
Feed	1.432mm/min(0.05mm/t)	
Depth of Cut	ap =10mm	
Coolant	Water Soluble	
Machine	Vertical Machining Center (BT40)	





# CUTTING CONDITIONS

Milling | Endmills | Cutting conditions

## AE-VTS-N

### Slot Milling

Cutting speed (m/min)	Aluminum Alloy Expanding Material • Magnesium Alloy A5052 • A7075 • AZ91 • AZ80A		Aluminum Alloy Casting AC4C • ADC		Copper Alloy C1100					
	300~400		300~400		150					
DC X LU	S (min <sup>-1</sup> )	F (mm/min)	S (min <sup>-1</sup> )	F (mm/min)	S (min <sup>-1</sup> )	F (mm/min)				
3 x 9	32.000	3.060	32.000	3.820	16.000	1.430				
4 x 12	24.000	3.170	24.000	3.960	12.000	1.530				
5 x 15	19.200	3.270	19.200	4.090	9.600	1.640				
6 x 18	18.500	3.380	18.500	4.230	9.300	1.740				
8 x 24	16.000	3.610	16.000	4.510	8.000	1.940				
10 x 30	13.000	3.820	13.000	4.780	4.800	2.150				
12 x 36	11.000	4.040	11.000	5.050	4.000	2.360				
Depth of cut	<table border="1"> <tr> <td>ap</td> <td>1D</td> </tr> </table>				ap	1D	<table border="1"> <tr> <td>ap</td> <td>0,5D</td> </tr> </table>		ap	0,5D
ap	1D									
ap	0,5D									
<ol style="list-style-type: none"> <li>The above milling condition is a guideline for the overhang length is 4xD.</li> <li>Use a rigid and precise machine and holder.</li> <li>The indicated speeds and feeds are for milling with water-soluble coolant.</li> <li>Please adjust the speed and feed when the cutting depth is large or when machines with low rigidity are used.</li> <li>Reduce speed and feed as well as depth of cut when high precision is required.</li> <li>Adjust the speed and feed accordingly when the overhang length is longer than specified (refer to p.18).</li> <li>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.</li> </ol>										

### Side Milling

Cutting speed (m/min)	Aluminum Alloy Expanding Material • Magnesium Alloy A5052 • A7075 • AZ91 • AZ80A		Aluminum Alloy Casting AC4C • ADC		Copper Alloy C1100									
	300~400		300~400		150~200									
DC X LU	S (min <sup>-1</sup> )	F (mm/min)	S (min <sup>-1</sup> )	F (mm/min)	S (min <sup>-1</sup> )	F (mm/min)								
3 x 9	32.000	3.820	32.000	3.820	16.000	1.600								
4 x 12	24.000	3.960	24.000	3.960	12.000	1.700								
5 x 15	19.200	4.090	19.200	4.090	9.600	1.830								
6 x 18	18.500	4.230	18.500	4.230	9.300	1.950								
8 x 24	16.000	4.510	16.000	4.510	8.000	2.180								
10 x 30	13.000	4.780	13.000	4.780	6.400	2.400								
12 x 36	11.000	5.050	11.000	5.050	5.300	2.650								
Depth of cut	<table border="1"> <tr> <td>ap</td> <td>ae</td> </tr> <tr> <td>1,5D</td> <td>0,2D</td> </tr> </table>				ap	ae	1,5D	0,2D	<table border="1"> <tr> <td>ap</td> <td>ae</td> </tr> <tr> <td>1,5D</td> <td>0,1D</td> </tr> </table>		ap	ae	1,5D	0,1D
ap	ae													
1,5D	0,2D													
ap	ae													
1,5D	0,1D													
<ol style="list-style-type: none"> <li>The above milling condition is a guideline for the overhang length is 4xD.</li> <li>Use a rigid and precise machine and holder.</li> <li>The indicated speeds and feeds are for milling with water-soluble coolant.</li> <li>Please adjust the speed and feed when the cutting depth is large or when machines with low rigidity are used.</li> <li>Reduce speed and feed as well as depth of cut when high precision is required.</li> <li>Adjust the speed and feed accordingly when the overhang length is longer than specified (refer to p.18).</li> <li>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.</li> </ol>														





# CUTTING CONDITIONS

Milling | Endmills | Cutting conditions

## AE-VTS-N


### Plunging

	Aluminum Alloy Expanding Material • Magnesium Alloy A5052 • A7075 • AZ91 • AZ80A		Aluminum Alloy Casting AC4C • ADC		Copper Alloy C1100	
Cutting speed (m/min)	150		150		75	
DC X LU	S (min <sup>-1</sup> )	F (mm/min)	S (min <sup>-1</sup> )	F (mm/min)	S (min <sup>-1</sup> )	F (mm/min)
3 x 9	15.900	500	15.900	500	8.000	150
4 x 12	12.000	500	12.000	500	6.000	150
5 x 15	9.600	500	9.600	500	4.800	150
6 x 18	8.000	600	8.000	600	4.000	180
8 x 24	6.000	700	6.000	700	3.000	210
10 x 30	4.800	700	4.800	700	2.400	210
12 x 36	4.000	700	4.000	700	2.000	210
Depth of cut	ap 1D			ap 0,5D		

1. The above milling condition is a guideline for the overhang length is 4xD.
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.

### Cutting Condition Guide for Changes in Overhang Length

DC ≥ Ø6

	Work Material	Aluminum Alloy Expanding Material • Magnesium Alloy A5052 • A7075 • AZ91 • AZ80A		Aluminum Alloy Casting AC4C • ADC		Copper Alloy C1100	
		L/D	S (min <sup>-1</sup> )	F (mm/min)	S (min <sup>-1</sup> )	F (mm/min)	S (min <sup>-1</sup> )
Slot milling	5		70%		70%		70%
	6		50%		50%		50%
Side milling	5		70%		70%		70%
	6		50%		50%		50%
Plunging	5		80%		80%		80%
	6		60%		60%		60%



# KEY FEATURES: PXAL

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**1** Suitable for large-diameter milling with high surface quality

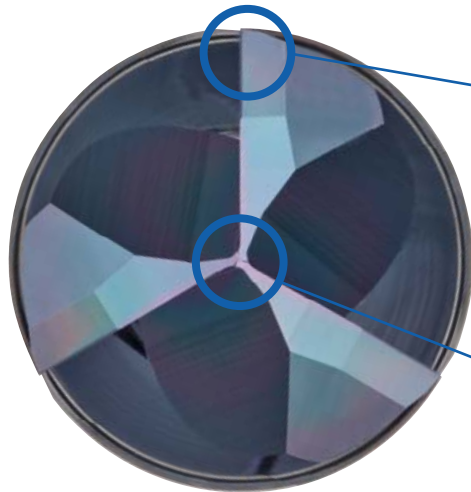
**2** Exchangeable Head End Mill PXM for Non-Ferrous Materials

**3** DLC-IGUSS Coating



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.

# SUITABLE FOR LARGE-DIAMETER MILLING WITH HIGH SURFACE QUALITY



## Flat cutting edge

Achieves higher precision machined surface quality

## Large core design

High rigidity prevents chattering

## Center cutting edge

Can be used for plunging

## Utilizes XP4625 grade suitable for non-ferrous metal applications

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.

## Abundant lineup in various shapes and styles

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

## Tightening procedure

**1. Cleaning**  
Remove dirt and chips from the connecting thread and shank.

**2. Initial Tightening**  
Tighten by hand

**3. Final Tightening**  
Tighten with a spanner wrench

**4. Confirmation**  
Confirm that there is no gap

**Cautions during use**

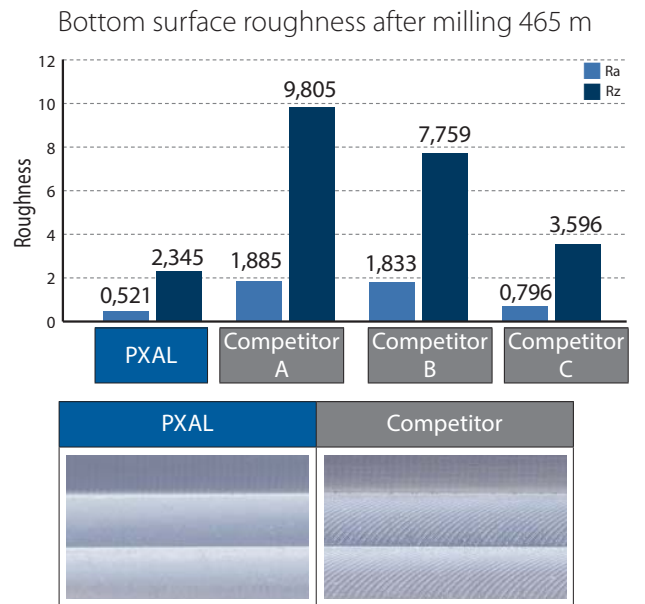
- Only use the spanner wrenches that are designed specifically for the PXM (P. 13). Please do not use alternative spanner wrenches sold on the market as a replacement.
- Please tighten until the head and the shank holder faces meet. Confirm that there is no gap.
- Degreasing the connecting thread may 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.



# CUTTING DATA

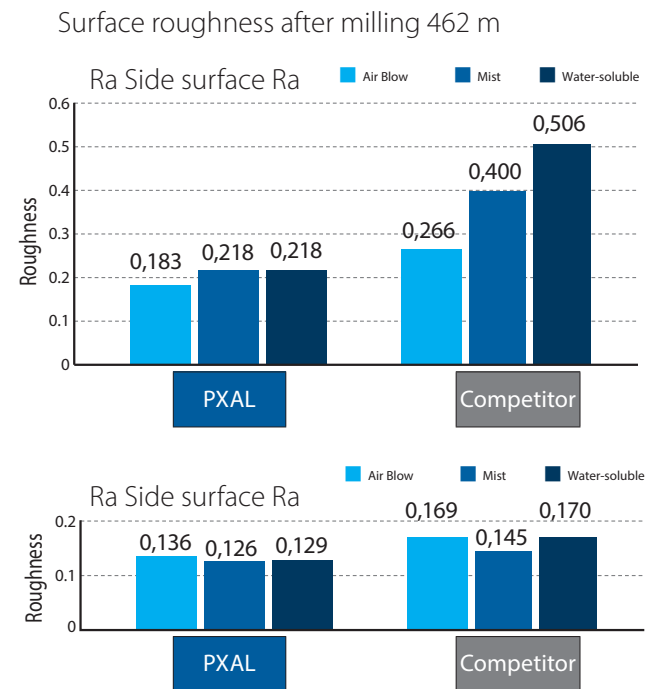
Improved surface roughness by the effect of the flat cutting edge specification

<b>Tool</b>	Head: PXAL160C16-03R000 Holder: PXMZ-C16SS16-S100	Non-coated Competitor A, B, C
<b>Size</b>	Ø16	Ø16 3 flutes
<b>Work Material</b>	A7075	
<b>Milling Method</b>	Side Milling	
<b>Cutting Speed</b>	600m/min (12.000min <sup>-1</sup> )	
<b>Feed</b>	5.400mm/min(0.15mm/t)	
<b>Depth of Cut</b>	ap =8mm (0,5D) ae=4,8mm (0,3D)	
<b>Overhang Length</b>	50mm (L/D= 3,1)	
<b>Coolant</b>	Water Soluble	
<b>Machine</b>	Vertical Machining Center (BT40)	



Achieves good surface finish regardless of coolant type

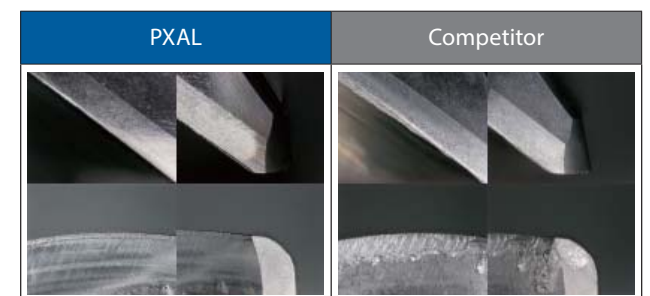
<b>Tool</b>	Head: PXAL160C16-03R000 Holder: PXMZ-C16SS16-S100	Non-coated Competitor
<b>Size</b>	Ø16	Ø16 3 flutes
<b>Work Material</b>	A7075	
<b>Milling Method</b>	Side Milling	
<b>Cutting Speed</b>	600m/min (12.000min <sup>-1</sup> )	
<b>Feed</b>	2.700mm/min(0.075mm/t)	
<b>Depth of Cut</b>	ap =8mm (0,5D) ae=4,8mm (0,3D)	
<b>Overhang Length</b>	50mm (L/D= 3,1)	
<b>Machine</b>	Vertical Machining Center (BT40)	



Welding suppression by DLC coating

<b>Tool</b>	Head: PXAL160C16-03R010 Holder: PXMZ-C16SS16-S100	Non-coated Competitor
<b>Size</b>	Ø16 x R1	Ø16 x R1 3 flutes
<b>Work Material</b>	A7075	
<b>Cutting Speed</b>	600m/min (12.000min <sup>-1</sup> )	
<b>Feed</b>	2.700mm/min(0.075mm/t)	
<b>Milling Method</b>	Side Milling	
<b>Depth of Cut</b>	ap =8mm (0,5D) ae=4,8mm (0,3D)	
<b>Overhang Length</b>	50mm	
<b>Coolant</b>	None Air Blow	
<b>Machine</b>	Vertical Machining Center (BT40)	

Cutting edge condition after milling 300 m

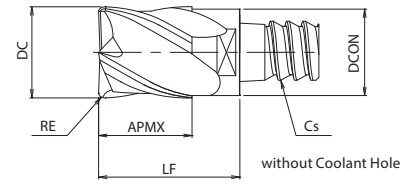


# PXAL HEADS

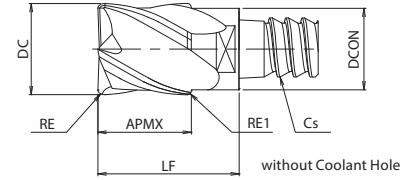
Milling | Indexables



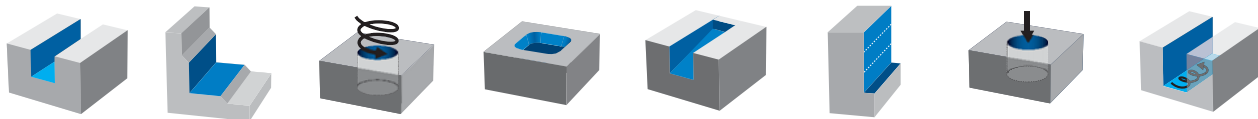
Type 1



Type 2



- Exchangeable Head End Mill
- Square, Corner Radius Type
- 3 flutes
- Non-ferrous materials, 10 -25 mm

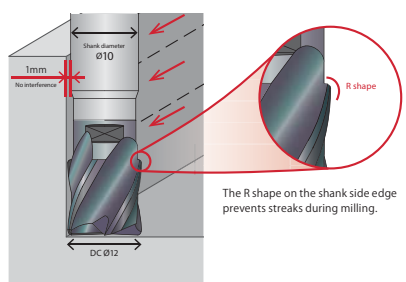


EDP	Designation	ZEFP	DC	RE	LF	FHA Helix Angle	APMX	DCON	Cs	Grade	Type	Price
7834930	PXAL100C10-03R000	3	10	0	16	45°	10	9,8	C10	XP4625	1	
7834931	PXAL100C10-03R100	3	10	1	16	45°	10	9,8	C10	XP4625	1	
7834932	PXAL100C10-03R250	3	10	2,5	16	45°	10	9,8	C10	XP4625	1	
7834933	PXAL120C10-03R000	3	12 ★	0	18	45°	12	9,8	C10	XP4625	2	
7834934	PXAL120C12-03R000	3	12	0	18	45°	12	11,7	C12	XP4625	1	
7834935	PXAL120C12-03R100	3	12	1	18	45°	12	11,7	C12	XP4625	1	
7834936	PXAL120C12-03R300	3	12	3	18	45°	12	11,7	C12	XP4625	1	
7834937	PXAL140C12-03R000	3	14 ★	0	20	45°	14	11,7	C12	XP4625	2	
7834938	PXAL160C16-03R000	3	16	0	23,5	45°	16	15,7	C16	XP4625	1	
7834939	PXAL160C16-03R100	3	16	1	23,5	45°	16	15,7	C16	XP4625	1	
7834940	PXAL160C16-03R200	3	16	2	23,5	45°	16	15,7	C16	XP4625	1	
7834941	PXAL160C16-03R300	3	16	3	23,5	45°	16	15,7	C16	XP4625	1	
7834942	PXAL160C16-03R400	3	16	4	23,5	45°	16	15,7	C16	XP4625	1	
7834943	PXAL180C16-03R000	3	18 ★	0	25,5	45°	18	15,7	C16	XP4625	2	
7834944	PXAL200C20-03R000	3	20	0	27,5	45°	20	19,6	C20	XP4625	1	
7834945	PXAL200C20-03R100	3	20	1	27,5	45°	20	19,6	C20	XP4625	1	
7834946	PXAL200C20-03R200	3	20	2	27,5	45°	20	19,6	C20	XP4625	1	
7834947	PXAL200C20-03R300	3	20	3	27,5	45°	20	19,6	C20	XP4625	1	
7834948	PXAL200C20-03R400	3	20	4	27,5	45°	20	19,6	C20	XP4625	1	
7834949	PXAL220C20-03R000	3	22 ★	0	29,5	45°	22	19,6	C20	XP4625	2	
7834950	PXAL250C25-03R000	3	25	0	35	45°	25	24	C25	XP4625	1	
7834951	PXAL250C25-03R100	3	25	1	35	45°	25	24	C25	XP4625	1	
7834952	PXAL250C25-03R300	3	25	3	35	45°	25	24	C25	XP4625	1	
7834953	PXAL250C25-03R500	3	25	5	35	45°	25	24	C25	XP4625	1	

★ PXAL Reduced Shank Type

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.

Example



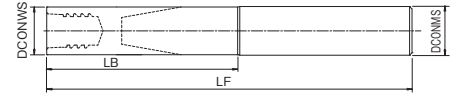
Milling | Indexables





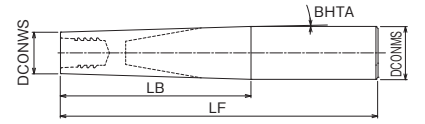


Type 1



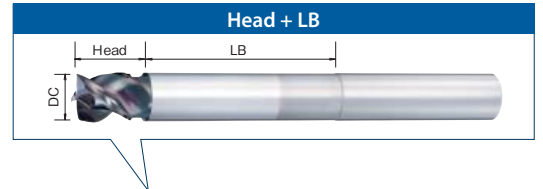
without Coolant Hole

Type 2



without Coolant Hole

- Straight Shank Holder for PXM
- Carbide Shank
- Shank & matching spanner sold as set

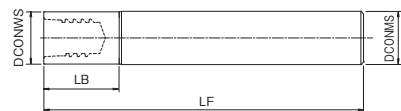


EDP	Designation	DCONWS	DCONMS	BHTA	LF	LB	Head + LB		CS	Type	Price
							PXAL DC				
							Ø10, 12, 16, 20, 25	Ø12, 14, 18, 22 Reduced Shank Type			
48174025	PXMZ-C10SS10-S075CS	9,8	10	0°	75	17,3	33,3	35,3	C10	1	
48174023	PXMZ-C10SS10-L100CS	9,8	10	0°	100	37,3	53,3	55,3	C10	1	
48174026	PXMZ-C10TP12-LL130CS	9,8	12	0,9°	130	67	83	85	C10	2	
48174008	PXMZ-C12SS12-S075CS	11,7	12	0°	75	24	42	44	C12	1	
48174009	PXMZ-C12SS12-L100CS	11,7	12	0°	100	45,9	63,9	65,9	C12	1	
48174010	PXMZ-C12SS12-L115CS	11,7	12	0°	115	64,2	82,2	84,2	C12	1	
48174011	PXMZ-C12TP16-LL135CS	11,7	16	1,3°	135	83,8	101,8	103,8	C12	2	
48174012	PXMZ-C16SS16-S090CS	15,7	16	0°	90	39,2	62,7	64,7	C16	1	
48174013	PXMZ-C16SS16-L130CS	15,7	16	0°	130	61,2	84,7	86,7	C16	1	
48174014	PXMZ-C16SS16-L135CS	15,7	16	0°	135	84,2	107,7	109,7	C16	1	
48174015	PXMZ-C16TP20-LL165CS	15,7	20	1,1°	165	115	138,5	140,5	C16	2	
48174016	PXMZ-C20SS20-S090CS	19,6	20	0°	90	39,1	66,6	68,6	C20	1	
48174017	PXMZ-C20SS20-L150CS	19,6	20	0°	150	78,4	105,9	107,9	C20	1	
48174018	PXMZ-C20SS20-L180CS	19,6	20	0°	180	109,1	136,6	138,6	C20	1	
48174019	PXMZ-C20TP25-LL200CS	19,6	25	1,1°	200	140	167,5	169,5	C20	2	
48174020	PXMZ-C25SS25-L200CS	24	25	0°	200	96,6	131,6	—	C25	1	

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.



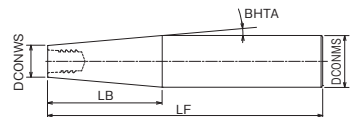
Type 1



without Coolant Hole

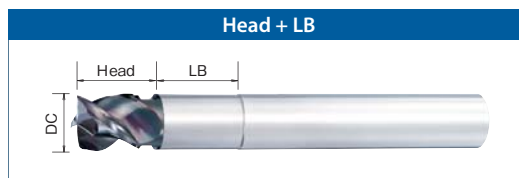


Type 2



without Coolant Hole


- Straight Shank Holder for PXM
- Steel Shank
- Shank & matching spanner sold as set



EDP	Designation	DCONWS	DCONMS	BHTA	LF	LB	Head + LB		CS	Type	Price
							PXAL DC				
							Ø10, 12, 16, 20, 25	Ø12, 14, 18, 22 Reduced Shank Type			
48174021	PXMZ-C10SS10-S075	9,8	10	0°	75	12	28	30	C10	1	
48174001	PXMZ-C12SS12-S100	11,7	12	0°	100	18	36	38	C12	1	
48174002	PXMZ-C12TP20-S145	11,7	20	5°	145	47.4	65.4	67.4	C12	2	
48174003	PXMZ-C16SS16-S100	15,7	16	0°	100	23	46.5	48.5	C16	1	
48174004	PXMZ-C16TP25-S155	15,7	25	5°	155	53.1	76.6	78.6	C16	2	
48174005	PXMZ-C20SS20-S120	19,6	20	0°	120	28	55.5	57.5	C20	1	
48174006	PXMZ-C20TP32-S170	19,6	32	5°	170	70.8	98.3	100.3	C20	2	
48174007	PXMZ-C25SS25-S140	24	25	0°	140	34.5	69.5	—	C25	1	

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.

### Accessories

Tool	EDP	Designation	Applicable Head Dia.	Cs	Recommended Tightening Torque	Price
 Spanner	7801890	PXMP8-10	Ø10, Ø12	C10	10N•m	
	7801890	PXMP8-10	Ø12, Ø14	C12	12N•m	
	7801891	PXMP13-16	Ø16, Ø18	C16	30N•m	
	7801891	PXMP13-16	Ø20, Ø22	C20	50N•m	
	7801892	PXMP21	Ø25	C25	60N•m	

1. Please refer to p.21 for cautions during use.
2. Please refer to the table above for tightening torque.
3. Contact your nearest OSG sales representative for details of our dedicated adjustable torque wrench for tightening inserts.



# CUTTING CONDITIONS

Milling | Indexables | Cutting conditions

## PXAL

Side milling  $L/D \leq 3$

Aluminum Alloy Expanding Material A5052 • A7075			
$\emptyset$	S ( $\text{min}^{-1}$ )	F ( $\text{mm}/\text{min}$ )	
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	
Depth of cut	ap		ae
	0,7 D		0,2 D

## PXAL

Side milling  $3 < L/D \leq 5$

Aluminum Alloy Expanding Material A5052 • A7075			
$\emptyset$	S ( $\text{min}^{-1}$ )	F ( $\text{mm}/\text{min}$ )	
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	
Depth of cut	ap		ae
	0,7 D		0,08 D

## PXAL

Side milling  $5 < L/D \leq 7$

Aluminum Alloy Expanding Material A5052 • A7075			
$\emptyset$	S ( $\text{min}^{-1}$ )	F ( $\text{mm}/\text{min}$ )	
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	
Depth of cut	ap		ae
	0,7 D		0,04 D




# CUTTING CONDITIONS

Milling | Indexables | Cutting conditions


## PXAL

Slot milling L/D ≤ 3

 Aluminum Alloy Expanding Material A5052 • A7075					
Ø	S (min <sup>-1</sup> )	F (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			
Depth of cut	<table border="1"> <tr><td>ap</td></tr> <tr><td>0,5 D</td></tr> </table>			ap	0,5 D
ap					
0,5 D					


## PXAL

Slot milling 3 < L/D ≤ 5

 Aluminum Alloy Expanding Material A5052 • A7075					
Ø	S (min <sup>-1</sup> )	F (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			
Depth of cut	<table border="1"> <tr><td>ap</td></tr> <tr><td>0,35 D</td></tr> </table>			ap	0,35 D
ap					
0,35 D					

## PXAL

Slot milling 5 < L/D ≤ 7

 Aluminum Alloy Expanding Material A5052 • A7075					
Ø	S (min <sup>-1</sup> )	F (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			
Depth of cut	<table border="1"> <tr><td>ap</td></tr> <tr><td>0,2 D</td></tr> </table>			ap	0,2 D
ap					
0,2 D					

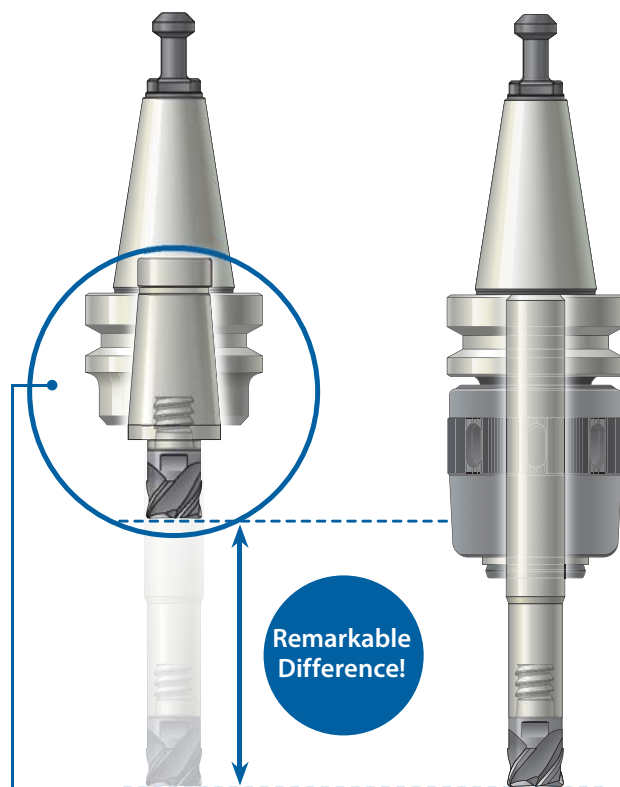
1. Use a rigid and precise machine and holder.
2. Please adjust the speed and feed when the depth of cut is large or when machines with low rigidity are used.
3. Please adjust the cutting condition when the overhang length is longer.
4. Please consider the overhang length as the total length of replaceable 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.

# KEY FEATURES: PXMC COLLET

- 1 Powerful chip evacuation even on small machining center
- 2 The reduction of overhang length improves rigidity and rotational balance
- 3 A wide variety of exchangeable heads
  - Suitable for steel, stainless steel and aluminum
  - Wide processing range from roughing to finishing
- 4 Greater cost performance compared to monoblock type holders, only need to change the collet in case of trouble.

PXMC Collet Extra Short Type

Conventional Combination

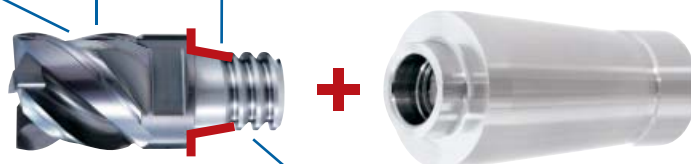


# KEY FEATURES: PXM EXCHANGEABLE HEAD

Milling | Indexables

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.

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 =  $\pm 0.03\text{mm}$



Applying buttress screw makes easy and reduces time to desorb heads







# CUTTING CONDITIONS

Milling | Indexables | Cutting conditions

## PXAL + PXMC

Side milling Extra Short Type

Aluminum Alloy Expanding Material A5052 • A7075			
Ø	S (min <sup>-1</sup> )	F (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	
Depth of cut	ap		ae
	0,7 D		0,2 D

## PXAL + PXMC

Slot milling Extra Short Type

Aluminum Alloy Expanding Material A5052 • A7075			
Ø	S (min <sup>-1</sup> )	F (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	
Depth of cut	ap		
	0,5 D		

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.




# CUTTING CONDITIONS

Milling | Indexables | Cutting conditions


## PXAL + PXMC

Side milling Short Type

 Aluminum Alloy Expanding Material A5052 • A7075			
Ø	S (min <sup>-1</sup> )	F (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	
Depth of cut	ap		ae
	0,7 D		0,2 D

## PXAL + PXMC

Slot milling Short Type

 Aluminum Alloy Expanding Material A5052 • A7075			
Ø	S (min <sup>-1</sup> )	F (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	
Depth of cut	ap		
	0,5 D		
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.			



# MOUNTING PROCEDURE



## 1. Initial Tightening (BT30)

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.



## 2. Final Tightening

Tighten with a spanner wrench



## 3. Cleaning

Remove dirt and chips from the connecting thread and collet



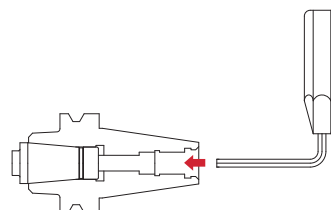
## 4. Mounting the Head

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

### Mounting procedure for holders other than BT30

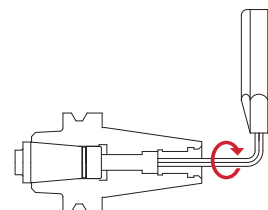
①

Insert the hexagon socket wrench into the pull screw hexagonal section.  
\*For pull studs with holes ( $\phi 6$  or above), it is operational with the stud being attached.



②

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



### Cautions during use

- 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.

## Abundant exchangeable milling heads! Exchangeable head end mill PXM

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.

### Available shapes

- Square Type
- Roughing Type
- Corner Radius Type
- Ball Type

Please see OSG PHOENIX Catalog for details.



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