

PRODUCT NEWS

PN-E-022

SERIES EXPANSION



For High Precision & High Efficient Machining of Aluminium Alloys

AERO-CHIPPER

"AERO-CHIPPER-MINI" AMX/MAM type
"AERO-CHIPPER" ALX/MAL type



Aerospace Tooling



AMX / MAM type

- Facemill $\phi 40 - 63$
- Modular head $\phi 16 - 42$

ALX / MAL type

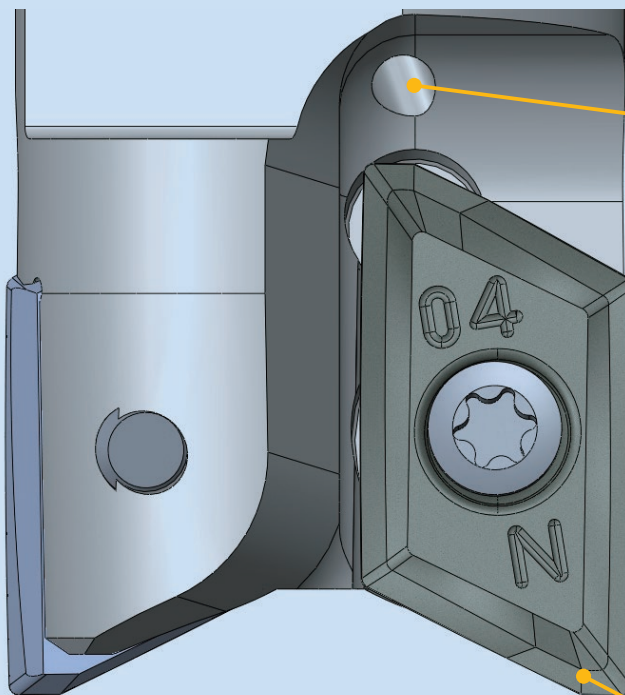
- Facemill $\phi 50 - 63$
- Modular head $\phi 20 - 40$
- Endmill Shank $\phi 20 - 40$



DIJET GmbH

www.dijet.de

High Precision & High Efficient Machining on Aerospace tooling



■ **Through coolant hole**

■ **High Precision**

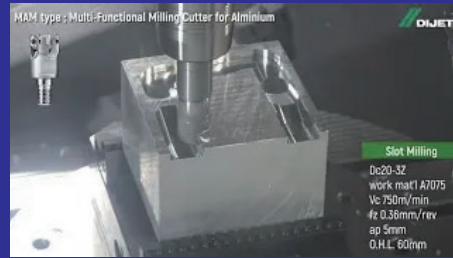
- Combination of high accuracy body and ground insert gives excellent side wall finish.

■ **Multi Function**

■ **High Efficiency**

- Sharp & Unique 3D geometry insert enables high efficiency and low cutting resistance machining. Key in insert gives added security allowing high speed spindle machining.





Movie



TECHNICAL INFORMATION

AMX / MAM type



- Facemill type
φ40 - φ63
- Modular Head type
φ16 - φ42

MAX.ap = 8mm

XOET0803..PDFR

grade: **FZ05**



RE: 0.4 - 2.0

ALX / MAL type



- Facemill type
φ50 - φ63
- Modular Head type
φ20 - φ40
- Endmill Shank type
φ20 - φ40

MAX.ap = 15mm

XOGT1605..PDFR

grade: **FZ05**



RE: 0.2 - 4.0

XOGT1605..PDER

grade: **JC5118**



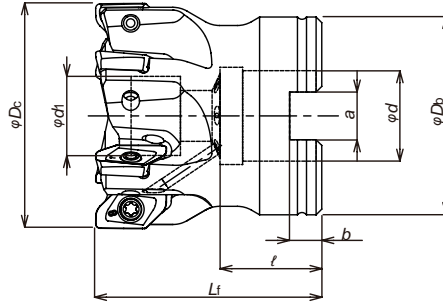
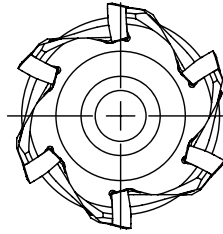
RE: 0.2 - 3.2

AERO CHIPPER



AMX / MAM type

■ Facemill type



RECOMMENDED CUTTING CONDITIONS

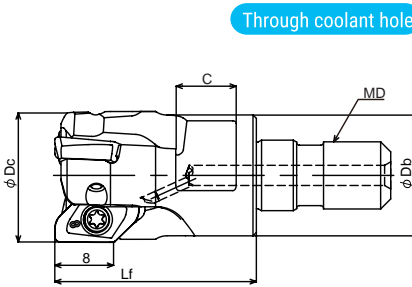
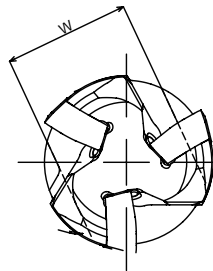
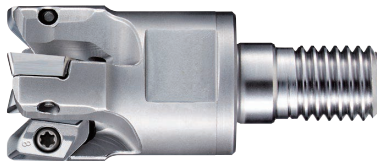
Cat.No.	Stock	No. of inserts	Dimensions(mm)								Max. spindle speed (min ⁻¹)	Weight (kg)	Inserts
			φDc	Lf	φDb	φd	φd1	a	b	ℓ			
AMX-6040R-16	●	6	40	40	35	16	14	8.4	5.6	18	28,000	0.2	XOET0803**PDFR
AMX-7050R-22	●	7	50	40	45	22	16.5	10.4	6.3	20	24,000	0.3	
AMX-8063R-22	●	8	63	40	50	22	17	10.4	6.3	20	21,000	0.48	

Note) 1. All cutters are supplied without inserts or wrenches.

2. In case to use cutting speed over 1,000m/min, please adjust the arbor with the holder within grade G6.3 of the rotating machines-balance quality requirements of rigid rotors (JIS B 0905).

Screw	Torque(N.m)	Wrench
TSW-2567H	1.1	A-08

■ Modular Head type



RECOMMENDED CUTTING CONDITIONS

Cat.No.	Stock	No. of inserts	Dimensions(mm)						Max. spindle speed(min ⁻¹)	Inserts	Parts	
			φDc	Lf	φDb	MD	C	W			Clamp screw	Wrench
MAM-2016-M8	●	2	16	23	14	M8	8	12	40,000	XOET0803**PDFR	TSW-2556H	A-08
MAM-3020-M10	●	3	20	30	18	M10	9	14	40,000			
MAM-3025-M12	○	3	25	35	22	M12	11	19	40,000			
MAM-4025-M12	●	4	25	35	22	M12	11	19	40,000			
MAM-4028-M12	○	4	28	35	23.6	M12	11	19	36,000			
MAM-4030-M16	○	4	30	43	27	M16	12	22	34,000			
MAM-5032-M16	●	5	32	43	29	M16	12	22	33,000			
MAM-5035-M16	○	5	35	43	32	M16	14	26	31,000			
MAM-6040-M16	●	6	40	43	32	M16	14	26	28,000			
MAM-6042-M16	○	6	42	43	32	M16	14	26	27,000			

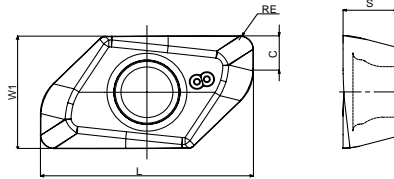
Note) 1. All cutters are supplied without inserts or wrenches.

2. In case to use cutting speed over 1,000m/min, please adjust the arbor with the holder within grade G6.3 of the rotating machines-balance quality requirements of rigid rotors (JIS B 0905).

Screw	Torque(N.m)	Wrench
TSW-2556H	1.1	A-08
TSW-2567H		

AMX / MAM type

■ Insert



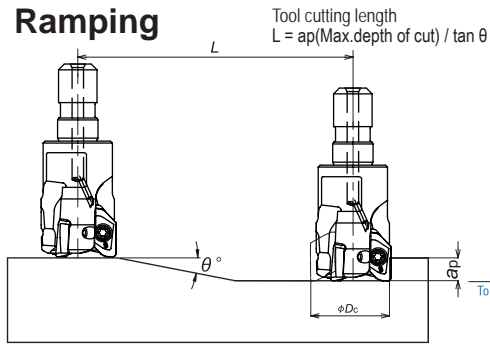
Cat.No.	Tolerance	Uncoated	Dimensions (mm)				
		FZ05	RE	L	W1	S	C
XOET080304PDFR	E	●	0.4	12.5	6.8	3.2	1.7
XOET080308PDFR		●	0.8	12.5	6.8	3.2	2
XOET080316PDFR		●	1.6	12.5	6.8	3.2	2.9
XOET080320PDFR		●	2.0	12.5	6.8	3.2	3

Note) 10 inserts per case.

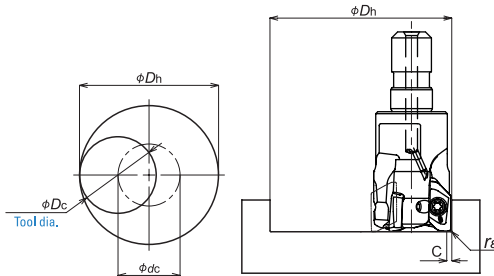
AMX / MAM type

Recommended Data for Profile Milling

Ramping



Helical interpolation



- Calculation of tool pass dia.

$$\phi_{dc} = \phi_{Dh} - \phi_{Dc}$$

Tool pass dia. Bore dia. Tool dia.

- Depth of cut per one circuit should not exceed max. depth of cut ap.
- Down cutting is recommended, so tool pass rotation should be counterclockwise.

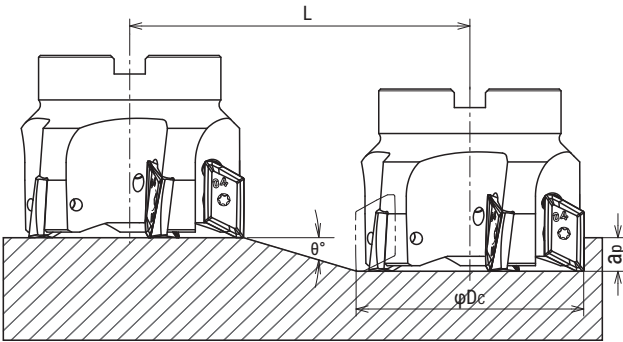
Cat.No.	Tool dia.	RE	Eff. Cutting dia. (mm)	Max. Depth of cut (mm) ap	Ramping		Helical interpolation			Max. Drilling Depth (mm)
					Max. ramping angle θ°	Total cutting length at Max. ap L (mm)	Through hole Min. bore dia. Dh min (mm)	Flat bottom Min. bore dia. Df min (mm)	Through hole Max. bore dia. phi Dh max (mm)	
MAM-2016-M8	16	0.4	15.1	5	18	15.4	20	29.0	31	2.5
MAM-2016-M8	16	0.8	14.3	5	18	15.4	20	28.5	31	2.5
MAM-2016-M8	16	1.6	12.7	5	18	15.4	20	27.0	31	2.5
MAM-2016-M8	16	2.0	11.9	5	18	15.4	20	26.5	31	2.5
MAM-3020-M10	20	0.4	19.1	5	14	20.1	28	37.0	39	2.5
MAM-3020-M10	20	0.8	18.3	5	14	20.1	28	36.5	39	2.5
MAM-3020-M10	20	1.6	16.7	5	14	20.1	28	35.0	39	2.5
MAM-3020-M10	20	2.0	15.9	5	14	20.1	28	34.5	39	2.5
MAM-3025... /MAM-4025...	25	0.4	24.1	5	10	28.4	38	47.0	49	2.5
MAM-3025... /MAM-4025...	25	0.8	23.3	5	10	28.4	38	46.5	49	2.5
MAM-3025... /MAM-4025...	25	1.6	21.7	5	10	28.4	38	45.0	49	2.5
MAM-3025... /MAM-4025...	25	2.0	20.9	5	10	28.4	38	44.5	49	2.5
MAM-4028-M12	28	0.4	27.1	5	8.5	33.5	44	53.0	55	2.5
MAM-4028-M12	28	0.8	26.3	5	8.5	33.5	44	52.5	55	2.5
MAM-4028-M12	28	1.6	24.7	5	8.5	33.5	44	51.0	55	2.5
MAM-4028-M12	28	2.0	23.9	5	8.5	33.5	44	50.5	55	2.5
MAM-4030-M16	30	0.4	29.1	5	7.5	38.0	48	57.0	59	2.5
MAM-4030-M16	30	0.8	28.3	5	7.5	38.0	48	56.5	59	2.5
MAM-4030-M16	30	1.6	26.7	5	7.5	38.0	48	55.0	59	2.5
MAM-4030-M16	30	2.0	25.9	5	7.5	38.0	48	54.5	59	2.5
MAM-5032-M16	32	0.4	31.1	5	7	40.7	52	61.0	63	2.5
MAM-5032-M16	32	0.8	30.3	5	7	40.7	52	60.5	63	2.5
MAM-5032-M16	32	1.6	28.7	5	7	40.7	52	59.0	63	2.5
MAM-5032-M16	32	2.0	27.9	5	7	40.7	52	58.5	63	2.5
MAM-5035-M16	35	0.4	34.1	5	6	47.6	58	67.0	69	2.5
MAM-5035-M16	35	0.8	33.3	5	6	47.6	58	66.5	69	2.5
MAM-5035-M16	35	1.6	31.7	5	6	47.6	58	65.0	69	2.5
MAM-5035-M16	35	2.0	30.9	5	6	47.6	58	64.5	69	2.5
MAM-6040... /AMX-6040...	40	0.4	39.1	5	5	57.2	68	77.0	79	2.5
MAM-6040... /AMX-6040...	40	0.8	38.3	5	5	57.2	68	76.5	79	2.5
MAM-6040... /AMX-6040...	40	1.6	36.7	5	5	57.2	68	75.0	79	2.5
MAM-6040... /AMX-6040...	40	2.0	35.9	5	5	57.2	68	74.5	79	2.5
MAM-6042-M16	42	0.4	41.1	5	5	57.2	72	81.0	83	2.5
MAM-6042-M16	42	0.8	40.3	5	5	57.2	72	80.5	83	2.5
MAM-6042-M16	42	1.6	38.7	5	5	57.2	72	79.0	83	2.5
MAM-6042-M16	42	2.0	37.9	5	5	57.2	72	78.5	83	2.5
AMX-7050R-22	50	0.4	49.1	5	4	71.5	88	97	99	2.5
AMX-7050R-22	50	0.8	48.3	5	4	71.5	88	96.5	99	2.5
AMX-7050R-22	50	1.6	46.7	5	4	71.5	88	94.5	99	2.5
AMX-7050R-22	50	2.0	45.9	5	4	71.5	88	94.5	99	2.5
AMX-8063R-22	63	0.4	62.1	5	3	95.4	114	123.0	125	2.5
AMX-8063R-22	63	0.8	61.3	5	3	95.4	114	122.5	125	2.5
AMX-8063R-22	63	1.6	59.7	5	3	95.4	114	120.5	125	2.5
AMX-8063R-22	63	2.0	58.9	5	3	95.4	114	120.5	125	2.5

- 10
1. In case of ramping, apply 70% or less feed (Vf) from standard cutting condition table.
 2. Wet cutting is recommended.

ALX / MAL type

Recommended Data for Profile Milling

Ramping

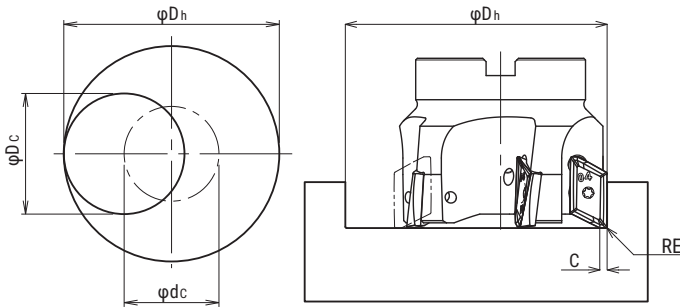


Tool dia. (mm)	Aluminium		Stainless steel		Titanium alloy		Max. Depth of cut (mm)
	Max. ramping angle (°)	Cutting length (mm)	Max. ramping angle (°)	Cutting length (mm)	Max. ramping angle (°)	Cutting length (mm)	
φDc	θ°	L	θ°	L	θ°	L	ap
20	16	28	10	45	10	45	8
25	11	41	9	51	9	51	8
28	9	51	7	65	7	65	8
30	8	57	6	76	6	76	8
32	7	65	6	76	6	76	8
35	6	76	6	76	6	76	8
40	5	91	5	91	5	91	8
50	4	114	4	114	4	114	8
63	3	153	3	153	3	153	8

Note

1. In case of ramping, apply 70% or less feed (Vf) from standard cutting condition table.
2. When cutting Titanium/Stainless steel, apply 0.005mm or less (fz) from standard cutting condition table.
3. Wet cutting is recommended.

Helical interpolation



- Calculation of tool pass dia.

$$\varphi_{dc} = \varphi_{Dh} - \varphi_{Dc}$$

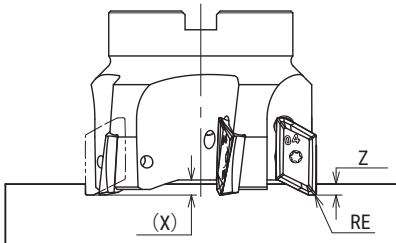
Tool pass dia. Bore dia. Tool dia.
- Depth of cut per one circuit should not exceed max. depth of cut Ap
- Down cutting is recommended, tool pass rotation should be counterclockwise

Tool dia. (mm)	Min.bore dia. (mm)	Max. Bore dia. (mm)	Max.Depth of cut (mm)		
			Aluminium	Stainless steel	Titanium alloy
φDc	φDh min.	φDh max.			
20	35.8	38.6	15	9	9
25	45.8	48.6	13	11	11
28	51.8	54.6	12	10	10
30	55.8	58.6	11	10	10
32	59.8	62.6	11	10	10
35	65.8	68.6	11	11	11
40	75.8	78.6	10	10	10
50	96.8	98.6	10	10	10
63	122.8	124.6	10	10	10

Note

1. In case of helical interpolation, apply 70% or less feed (Vf) from standard cutting condition table.
2. When cutting Titanium/Stainless steel, apply 0.005mm or less (fz) from standard cutting condition table.
3. Wet cutting is recommended.

Drilling



Coner radius R (mm)	Max. depth of cut: Z (mm)
RE	Z
R2.5 or below	3
R3 / R3.2	2
R4	1.5

Note

1. Do not combine drilling and ramping together.
2. In case of drilling, apply 50% or less feed (Vf) from standard cutting condition table.
3. Long chips may come out in case of drilling, confirm safe operating conditions.

Recommended cutting conditions for shoulder milling



Aero-chipper mini AMX / MAM type

■ Facemill type

Work Materials	Grades	Tool dia. (mm)				
		40				
		No. of teeth 6N				
		ℓ (mm)	ap (mm)	ap×ae (mm ²)	n (min ⁻¹)	Vf (mm/min)
Aluminium Alloy 50-110HB	FZ05	100	8	80	6,000	5,400
		150	6	36	6,000	5,400
		200	4	16	4,800	4,320

ℓ : Overhung length
 ap : Axial depth of cut
 ae : Radial depth of cut
 n : Spindle speed
 Vf : Feed speed

Note)

1. The figure to be adjusted according to the machine rigidity or work rigidity.
2. In case of chatter occurring, recommended to reduce the depth of cut ap or Spindle speed.
3. If machine does not have enough power, recommend to reduce the depth of cut ap or Spindle speed and Feed speed.
4. Use of water soluble cutting oil is recommended.

■ MAM head type and MSN type carbide shank holder

Work Materials	Grades	Tool dia. (mm)														
		16					20					25				
		No. of teeth 2N					No. of teeth 3N					No. of teeth 3N				
		ℓ (mm)	ap (mm)	ap×ae (mm ²)	n (min ⁻¹)	Vf (mm/min)	ℓ (mm)	ap (mm)	ap×ae (mm ²)	n (min ⁻¹)	Vf (mm/min)	ℓ (mm)	ap (mm)	ap×ae (mm ²)	n (min ⁻¹)	Vf (mm/min)
Aluminium Alloy 50-110HB	FZ05	50	8	32	17,900	5,370	60	8	40	14,300	6,440	75	8	50	11,500	5,180
		80	6	15	17,900	5,370	100	6	18	14,300	6,440	125	6	24	11,500	5,180
		130	4	6	14,300	4,290	160	4	8	11,500	5,180	200	4	10	9,200	4,140

Work Materials	Grades	Tool dia. (mm)									
		25/28					30				
		No. of teeth 4N					No. of teeth 4N				
		ℓ (mm)	ap (mm)	ap×ae (mm ²)	n (min ⁻¹)	Vf (mm/min)	ℓ (mm)	ap (mm)	ap×ae (mm ²)	n (min ⁻¹)	Vf (mm/min)
Aluminium Alloy 50-110HB	FZ05	75	8	50	11,500	6,900	90	8	60	9,500	5,700
		125	6	24	11,500	6,900	150	6	30	9,500	5,700
		200	4	10	9,200	5,520	240	4	12	7,600	4,560

Work Materials	Grades	Tool dia. (mm)									
		32/35					40/42				
		No. of teeth 5N					No. of teeth 6N				
		ℓ (mm)	ap (mm)	ap×ae (mm ²)	n (min ⁻¹)	Vf (mm/min)	ℓ (mm)	ap (mm)	ap×ae (mm ²)	n (min ⁻¹)	Vf (mm/min)
Aluminium Alloy 50-110HB	FZ05	100	8	64	9,000	6,750	100	8	80	6,000	5,400
		160	6	30	9,000	6,750	160	6	36	6,000	5,400
		260	4	12	7,200	5,400	260	4	16	4,800	4,320

ℓ : Overhung length
 ap : Axial depth of cut
 ae : Radial depth of cut
 n : Spindle speed
 Vf : Feed speed

Note)

1. The figure to be adjusted according to the machine rigidity or work rigidity.
2. In case of chatter occurring, recommended to reduce the depth of cut ap or Spindle speed.
3. If machine does not have enough power, recommend to reduce the depth of cut ap or Spindle speed and Feed speed.
4. Use of water soluble cutting oil is recommended.



Recommended cutting conditions for face milling

Aero-chipper mini AMX / MAM type

■ Facemill type

Work Materials	Grades	Tool dia. (mm)				
		40				
		No. of teeth 6N				
		ℓ (mm)	ap (mm)	ae (mm)	n (min ⁻¹)	Vf (mm/min)
Aluminium Alloy 50-110HB	FZ05	100	5	28	6,000	5,400
		150	2.5	28	6,000	5,400
		200	1	28	4,800	4,320

ℓ : Overhung length

ap : Axial depth of cut

ae : Radial depth of cut

n : Spindle speed

Vf : Feed speed

Note)

1. The figure to be adjusted according to the machine rigidity or work rigidity.
2. In case of chatter occurring, recommended to reduce the depth of cut ap or Spindle speed.
3. If machine does not have enough power, recommend to reduce the depth of cut ap or Spindle speed and Feed speed.
4. In case of full slotting, recommend to reduce the spindle speed and feed speed to 70% of above figures.
5. Use of water soluble cutting oil is recommended.

■ MAM head type and MSN type carbide shank holder

Work Materials	Grades	Tool dia. (mm)														
		16					20					25				
		No. of teeth 2N					No. of teeth 3N					No. of teeth 3N				
		ℓ (mm)	ap (mm)	ae (mm)	n (min ⁻¹)	Vf (mm/min)	ℓ (mm)	ap (mm)	ae (mm)	n (min ⁻¹)	Vf (mm/min)	ℓ (mm)	ap (mm)	ae (mm)	n (min ⁻¹)	Vf (mm/min)
Aluminium Alloy 50-110HB	FZ05	50	5	11	17,900	5,370	60	5	14	14,300	6,440	75	5	17.5	11,500	5,180
		80	2.5	11	17,900	5,370	100	2.5	14	14,300	6,440	125	2.5	17.5	11,500	5,180
		130	1	11	14,300	4,290	160	1	14	11,500	5,180	200	1	17.5	9,200	4,140

Work Materials	Grades	Tool dia. (mm)									
		25/28					30				
		No. of teeth 4N					No. of teeth 4N				
		ℓ (mm)	ap (mm)	ae (mm)	n (min ⁻¹)	Vf (mm/min)	ℓ (mm)	ap (mm)	ae (mm)	n (min ⁻¹)	Vf (mm/min)
Aluminium Alloy 50-110HB	FZ05	75	5	17.5	11,500	6,900	90	5	21	9,500	5,700
		125	2.5	17.5	11,500	6,900	150	2.5	21	9,500	5,700
		200	1	17.5	9,200	5,520	240	1	21	7,600	4,560

Work Materials	Grades	Tool dia. (mm)									
		32/35					40/42				
		No. of teeth 5N					No. of teeth 6N				
		ℓ (mm)	ap (mm)	ae (mm)	n (min ⁻¹)	Vf (mm/min)	ℓ (mm)	ap (mm)	ae (mm)	n (min ⁻¹)	Vf (mm/min)
Aluminium Alloy 50-110HB	FZ05	100	5	22.5	9,000	6,750	100	5	28	6,000	5,400
		160	2.5	22.5	9,000	6,750	160	2.5	28	6,000	5,400
		260	1	22.5	7,200	5,400	260	1	28	4,800	4,320

ℓ : Overhung length

ap : Axial depth of cut

ae : Radial depth of cut

n : Spindle speed

Vf : Feed speed

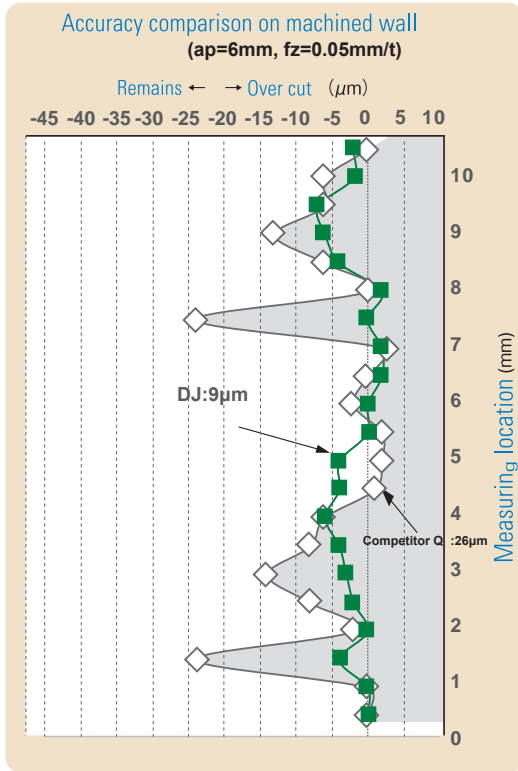
Note)

1. The figure to be adjusted according to the machine rigidity or work rigidity.
2. In case of chatter occurring, recommended to reduce the depth of cut ap or Spindle speed.
3. If machine does not have enough power, recommend to reduce the depth of cut ap or Spindle speed and Feed speed.
4. In case of full slotting, recommend to reduce the spindle speed and feed speed to 70% of above figures.
5. Use of water soluble cutting oil is recommended.

Cutting performance

Aero-chipper mini MAM type

Machining accuracy



Material : A 7075

Insert grade : FZ05 • Tool dia. : $\Phi 16$

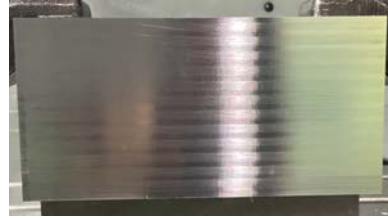
• Cutting conditions :

$l=70(\text{mm})$ $V_f=1,200 (\text{mm/min})$ $n=12,000 (\text{min}^{-1})$
 $ap=6(\text{mm})$ $ae=0.5(\text{mm})$

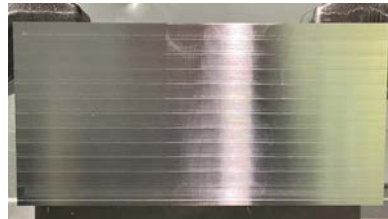
AERO-CHIPPER MINI showed
4 times better accuracy.

Comparison of machining surface quality

DIJET



Competitor Q



Material : A 7075

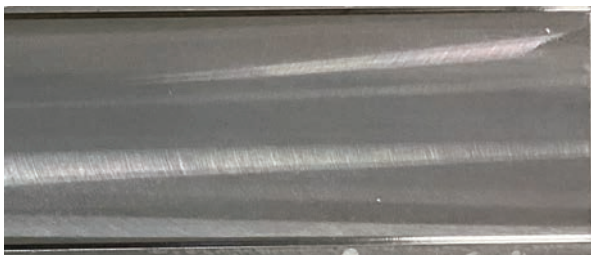
Insert grade : FZ05 • Tool dia. : $\Phi 16$

• Cutting conditions :

$l=70(\text{mm})$ $V_f=1,200 (\text{mm/min})$ $n=12,000 (\text{min}^{-1})$
 $ap=4(\text{mm})$ $ae=0.5(\text{mm})$

Competitor Q has a line.
MAM achieved a beautiful finished surface.

Comparison of machining surface of slotting



Material : A 5052

Insert grade : FZ05 • Tool dia. : $\Phi 25$

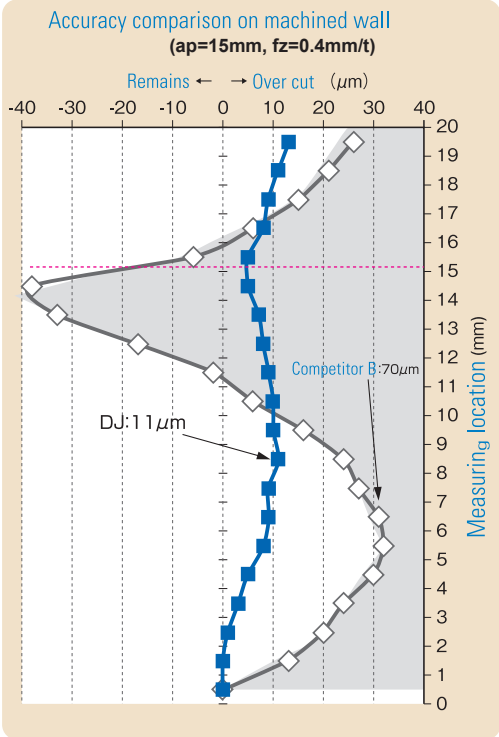
• Cutting conditions :

$l=150(\text{mm})$ $V_f=1,200 (\text{mm/min})$ $n=9,000 (\text{min}^{-1})$
 $ap=2.5(\text{mm})$ $ae=25(\text{mm})$

In case of groove processing,
a surface of 3 tooth type $\Phi 25$ is better.

Aero-chipper MAL type

Machining accuracy



- Tool dia : $\phi 25$
MAL+MSN(carbide shank)
- work material : A5056
n=20,000(min⁻¹)
Vc=1,570(m/min)
ap=15(mm)
ae=3(mm)
Wet,Down cut

AERO-CHIPPER showed 4times better accuracy.

Aero-chipper mini MAM type



Cutting performance

Aero-chipper mini MAM type

① Pocket milling for aluminum alloy



Result

AERO-CHIPPER MINI removed maximum $Q=32\text{cc}/\text{min}$.
No chattering on such thin shape work.

Work	Part name	Parts	
	Material	A5083	
	Hardness	—	
Tool	Tool No.	MAM-4025-M12	
	Insert No. Grade	XOET080308PDFR (FZ05)	
Cutting conditions	Spindle speed	n	11,600 (min^{-1})
	Cutting speed	V_c	910 (m/min)
	Feed speed	V_f	9,600 (mm/min)
	Feed	f_z	0.2 (mm/t)
	a_p	1.5 (mm)	
	a_e	15 (mm)	
	Coolant	Watercoolant (internal)	
	Machine	VerticalMC	

② Rugby ball for aluminum alloy



Result

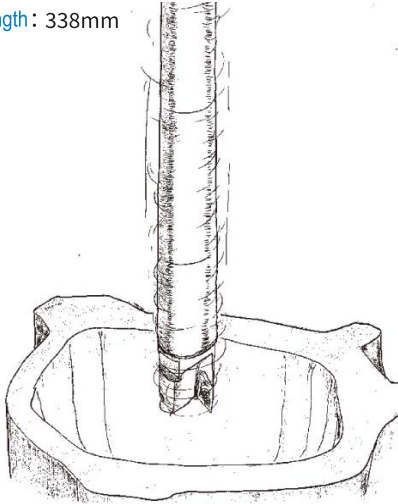
Available in the semi-finishing of 5 axis.

Work	Part name	rough machining of base	semi-finishing of curved surface
	Material	A5083	
	Hardness	—	
Tool	Tool No.	MAM-2016-M08	
	Insert No. Grade	XOET080308PDFR (FZ05)	
Cutting conditions	Spindle speed	n	12,000 (min^{-1})
	Cutting speed	V_c	603 (m/min)
	Feed speed	V_f	4,800 (mm/min)
	Feed	f_z	0.2 (mm/t)
	a_p	4 (mm)	3 (mm)
	a_e	3 (mm)	0.5 (mm)
	Coolant	Watercoolant (internal)	
	Machine	Vertical MC(5 axis)	

Aero-chipper MAL type

① Pocket milling for aluminum alloy

over hung length : 338mm



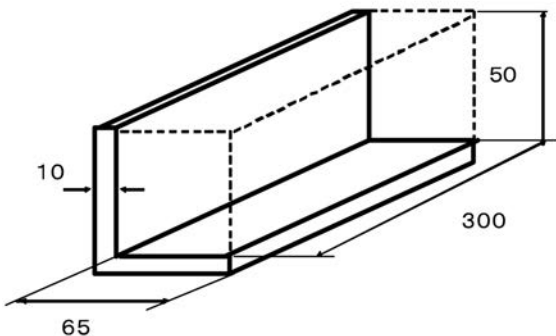
Result

Successful machining of 10D overhang from rough machining to finishing in one shot.

Work	Part name	Engine housing	
	Material	A6061	
	Hardness	-	
Tool	Tool No.	MAL-2032-M16	
	Insert No. Grade	XOGT160508PDR (FZ05)	
Cutting conditions	Spindle speed	n	1,600 (min ⁻¹)
	Cutting speed	V_c	100 (m/min)
	Feed speed	V_f	800 (mm/min)
	Feed	f	0.32 (mm/t)
	a_p		0.2 (mm)
	a_e		21 (mm)
	Coolant		Watercoolant (internal)
	Machine		VerticalMC

② Titanium alloy(thin shape work)

over hung length : 100mm



Result

AERO-CHIPPER removed maximum Q=32cc/min.
No chattering on such thin shape work.

Work	Part name	航空機部品 Aircraft parts	
	Material	Ti-6Al-4V	
	Hardness	41HRC	
Tool	Tool No.	ALX5063R	
	Insert No. Grade	XOGT160508PDR (JC5118)	
Cutting conditions	Spindle speed	n	200 (min ⁻¹)
	Cutting speed	V_c	40 (m/min)
	Feed speed	V_f	100 (mm/min)
	Feed	f_z	0.1 (mm/t)
	a_p		8 (mm)
	a_e		40 (mm)
	Coolant		Watercoolant (internal)
	Machine		VerticalMC