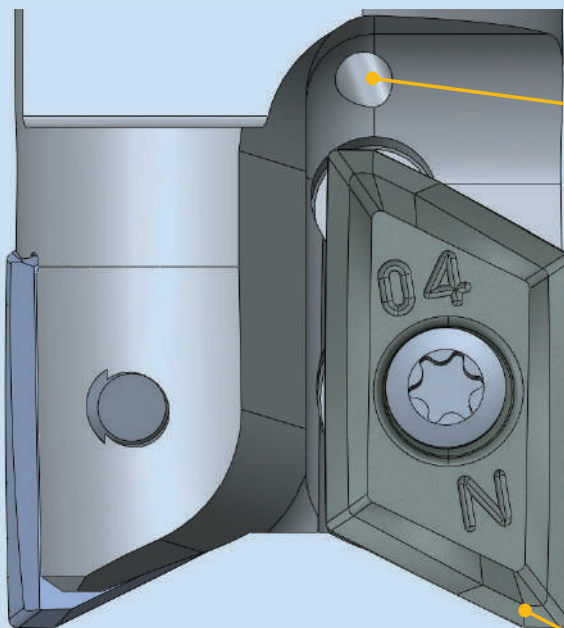


AERO CHIPPER

ALX/MAL/AMX/MAM Type



High Precision and High Efficient Machining on Aerospace tooling



Through coolant hole

High Precision

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

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.

Multi function

AERO CHIPPER

ALX/MAL/AMX/MAM Type



AMX/MAM
TYPE



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

MAX.ap = 8mm

XOET0803..PDFR
grade: FZ05

RE: 0.4 - 2.0



ALX/MAL
TYPE



- Bore type
φ50 - φ63
- Modular Head type
φ20 - φ40
- 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



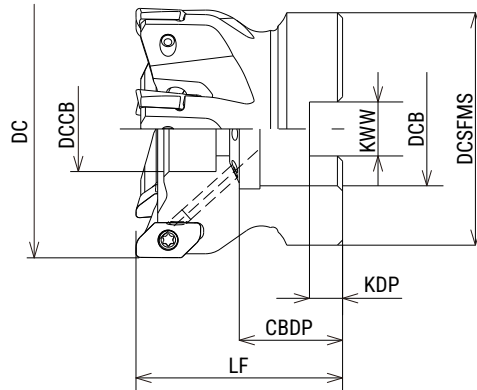
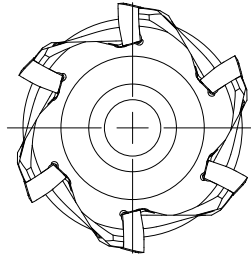
AERO CHIPPER AMX/MAM Type

Through coolant hole



AMX
TYPE

Bore Type



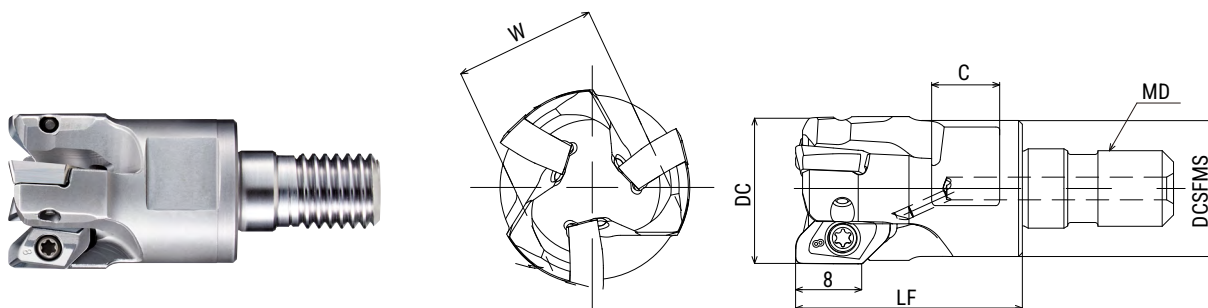
Cat.No.	Stock	No. of inserts	Dimensions(mm)								Max. spindle speed (min ⁻¹)	Weight (kg)	Inserts
			DC	LF	DCSFMS	DCB	DCCB	KWW	KDP	CBDP			
AMX-6040R-16	●	6	40	40	35	16	14	8.4	5.6	18	28,000	0.2	XOET0803**PDFR
AMX-7050R-22	●	7	50	40	45	22	16.5	10.4	6.3	20	24,000	0.3	
AMX-8063R-22	●	8	63	40	50	22	17	10.4	6.3	20	21,000	0.48	
AMX-9080R-22	○	9	80	40	50	22	17	10.4	6.3	20	18,000	0.68	
AMX-9080R-27	●	9	80	50	60	27	20	12.4	7	22	18,000	1.01	

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



MAM TYPE

Modular Type



Cat.No.	Stock	No. of inserts	Dimensions(mm)						Max. spindle speed (min ⁻¹)	Parts	
			DC	LF	DCSFMS	MD	C	W		Clamp screw	Inserts
MAM-2016-M8	●	2	16	23	14	M8	8	12	40,000	TSW-2556H	XOET0803**PDFR
MAM-2018-M8	○	2	18	23	14	M8	8	12	40,000		
MAM-3020-M10	●	3	20	30	18	M10	9	14	40,000		
MAM-3022-M10	○	3	22	30	18	M10	9	14	40,000		
MAM-3025-M12	○	3	25	35	22	M12	11	19	40,000	TSW-2567H	
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		

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

AMX/MAM TYPE

Insert

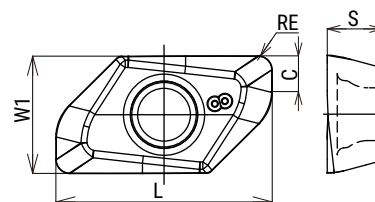
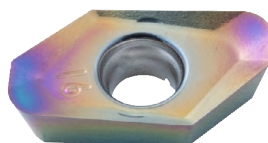
FZ05



DS217



DN103



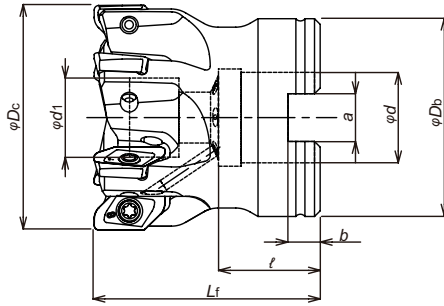
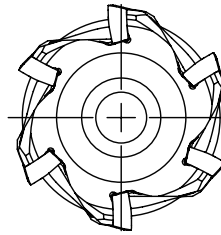
Cat.No.	Tolerance	Uncoated	PVD Coating	DLC Coating	Dimensions (mm)				
		FZ05	DS217	DN103	RE	L	W1	S	C
XOET080302PDFR	E	●		●	0.2	12.5	6.8	3.2	1.5
XOET080304PDFR	E	●		●	0.4	12.5	6.8	3.2	1.7
XOET080304PDFR	E		●		0.4	12.5	6.8	3.2	1.5
XOET080308PDFR	E	●		●	0.8	12.5	6.8	3.2	2
XOET080308PDFR	E		●		0.8	12.5	6.8	3.2	1.5
XOET080316PDFR	E	●		●	1.6	12.5	6.8	3.2	2.9
XOET080320PDFR	E	●		●	2.0	12.5	6.8	3.2	3
XOET080320PDFR	E		●		2.0	12.5	6.8	3.2	2.5

AERO CHIPPER

ALX/MAL Type

ALX
TYPE

Bore Type



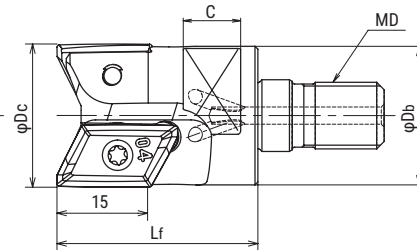
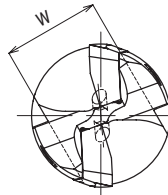
Cat.No.	Stock	No. of inserts	Dimensions(mm)								Max. spindle speed	Weight (kg)	Inserts
			φDc	Lf	φDb	φd	φd1	a	b	ℓ			
ALX4050R-22	●	4	50	50	45	22	16.5	10.4	6.3	20	24,000	0.4	XOGT1605**PD*R
ALX5063R-22	●	5	63		50						21,000	0.6	

Screw	Torque (N.m)	Wrench
DSW-4085	3.6	A-15T



MAL
TYPE

Modular Type



Cat.No.	Stock	No. of inserts	Dimensions(mm)						Max. spindle speed	Inserts
			φDc	Lf	φDb	MD	C	W		
MAL-1020-M10	●	1	20	35	19.5	M10	9	14	15,000	XOGT1605**PD*R
MAL-2025-M12	●	2	25		24	M12	10	19	40,000	
MAL-2028-M12	●		28		M16	12	22	26	36,000	
MAL-2030-M16	●	30	28	34,000						
MAL-2032-M16	●	32	29	33,000						
MAL-2035-M16	●	35	32	31,000						
MAL-3040-M16	●	3	40	32	14	26	28,000			

Screw	Torque (N.m)	Wrench
DSW-4085	3.6	A-15



When using inserts with corner radius RE 4 (XOGT160540PDR), Standard cutter body has to be modified with R2.6 or C2.3

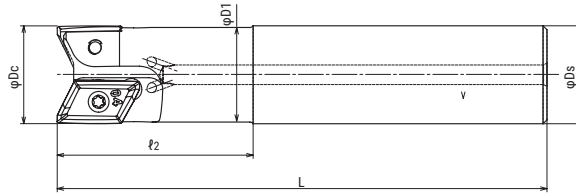
AERO CHIPPER

ALX/MAL Type



ALXM
TYPE

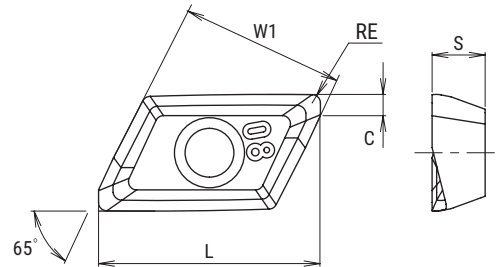
Shank Type



Cat.No.	Stock	No. of inserts	Dimensions(mm)					Max. spindle speed	Parts		Inserts
			φDc	l2	L	φD1	φDs		Screw	Wrench	
ALXM1020S20	●	1	20	35	110	19.18	20	15,000	DSW-4075H	A-15	XOGT1605**PD*R
ALXM2025S25	●	2	25	50	125	24	25	40,000	DSW-4085		
ALXM2028S25	●		28			26.87		36,000			
ALXM2032S32	●		32		30.5	33,000					
ALXM2035S32	●		35		33.32	31,000					
ALXM3040S32	●	3	40	80	170	37.96	32	28,000			

Screw	Torque (N.m)
DSW-4075H	3.6
DSW-4085	3.6

Insert

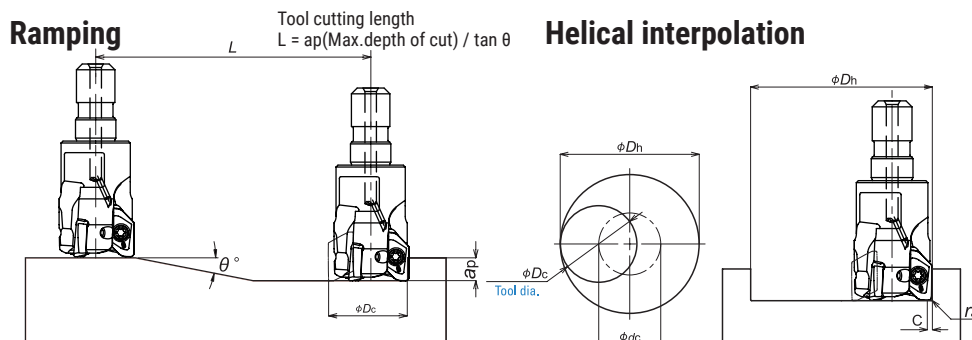


Cat.No.	Tolerance	PVD Coating	Uncoated	Dimensions (mm)					
		JC5118	FZ05	RE	L	W1	S	C	
XOGT160502PDFR	G		●	0.2	20.8	16.35	5	2.5	
XOGT160504PDFR			●	0.4	21.0			2.4	
XOGT160508PDFR			●	0.8				2.5	
XOGT160512PDFR			●	1.2	20.9			2.6	
XOGT160516PDFR			●	1.6	20.7			2.8	
XOGT160520PDFR			●	2.0	20.6			3.0	
XOGT160525PDFR			●	2.5	20.3			3.3	
XOGT160530PDFR			●	3.0	20.1			3.5	
XOGT160532PDFR			●	3.2	19.9			4.3	
XOGT160540PDFR			●	4.0	19.2			2.5	
XOGT160502PDER			●		0.2	20.8	16.35	5	2.5
XOGT160504PDER			●		0.4	21.0			2.4
XOGT160508PDER			●		0.8				2.5
XOGT160512PDER			●		1.2	20.9			2.6
XOGT160516PDER			●		1.6	20.7			2.8
XOGT160520PDER			●		2.0	20.6			3.0
XOGT160530PDER			●		3.0	20.1			3.3
XOGT160532PDER			●		3.2	19.9			4.3

AERO CHIPPER

AMX/MAM Type

Recommended Data for Profile Milling



- 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, 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. φ_{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	97.0	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

AERO CHIPPER

AMX/MAM Type

■ Recommended Cutting Conditions - Shoulder Milling -

● Bore Type

Material	Grade	Tool dia. (mm)														
		40					50					63				
		6N					7N					8N				
		ℓ	ap	ap×ae	n	Vf	ℓ	ap	ap×ae	n	Vf	ℓ	ap	ap×ae	n	Vf
Aluminium Alloy 50-110HB	FZ05	100	8	80	6000	5400	100	8	100	5700	5990	100	8	126	4500	5400
		150	6	42	6000	5400	150	8	80	5700	5990	150	8	126	4500	5400
		200	5	30	4800	4320	200	6	60	4600	4830	200	8	96	4500	5400

● Modular Type + MSN Type carbide shank holder

Material	Grade	Tool dia. (mm)														
		16					20					25				
		2N					2N					3N				
		ℓ	ap	ap×ae	n	Vf	ℓ	ap	ap×ae	n	Vf	ℓ	ap	ap×ae	n	Vf
Aluminium Alloy 50-110HB	FZ05	50	8	32	17900	5370	60	8	40	14300	6440	75	8	50	11500	5180
		80	6	15	17900	5370	100	6	18	14300	6440	125	6	24	11500	5180
		130	4	6	14300	4290	160	4	8	11500	5180	200	4	10	9200	4140

Material	Grade	Tool dia. (mm)									
		25/28					30				
		4N					4N				
		ℓ	ap	ap×ae	n	Vf	ℓ	ap	ap×ae	n	Vf
Aluminium Alloy 50-110HB	FZ05	75	8	50	11500	6900	90	8	60	9500	5700
		125	6	24	11500	6900	150	6	30	9500	5700
		200	4	10	9200	5520	240	4	12	7600	4560

Material	Grade	Tool dia. (mm)									
		32/35					40/42				
		5N					6N				
		ℓ	ap	ap×ae	n	Vf	ℓ	ap	ap×ae	n	Vf
Aluminium Alloy 50-110HB	FZ05	100	8	64	9000	6750	100	8	80	6000	5400
		160	6	30	9000	6750	160	6	36	6000	5400
		260	4	12	7200	5400	260	4	16	4800	4320

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.

AERO CHIPPER

AMX/MAM Type

■ Recommended Cutting Conditions - Face Milling -

● Bore Type

Material	Grade	Tool dia. (mm)														
		40					50					63				
		6N					7N					8N				
		ℓ	ap	ae	n	Vf	ℓ	ap	ae	n	Vf	ℓ	ap	ae	n	Vf
Aluminium Alloy 50-110HB	FZ05	100	5	28	6000	5400	100	5	35	5700	5990	100	5	44	4500	5400
		150	2.5	28	6000	5400	150	3.5	35	5700	5990	150	5	44	4500	5400
		200	1.5	28	4800	4320	200	2.5	35	4600	4830	200	3	44	4500	5400

● Modular Type + MSN Type carbide shank holder

Material	Grade	Tool dia. (mm)														
		16					20					25				
		2N					2N					3N				
		ℓ	ap	ae	n	Vf	ℓ	ap	ae	n	Vf	ℓ	ap	ae	n	Vf
Aluminium Alloy 50-110HB	FZ05	50	5	11	17900	5370	60	5	14	14300	6440	75	5	17.5	11500	5180
		80	2.5	11	17900	5370	100	2.5	14	14300	6440	125	2.5	17.5	11500	5180
		130	1	11	14300	4290	160	1	14	11500	5180	200	1	17.5	9200	4140

Material	Grade	Tool dia. (mm)									
		25/28					30				
		4N					4N				
		ℓ	ap	ae	n	Vf	ℓ	ap	ae	n	Vf
Aluminium Alloy 50-110HB	FZ05	75	5	17.5	11500	6900	90	5	21	9500	5700
		125	2.5	17.5	11500	6900	150	2.5	21	9500	5700
		200	1	17.5	9200	5520	240	1	21	7600	4560

Material	Grade	Tool dia. (mm)									
		32/35					40/42				
		5N					6N				
		ℓ	ap	ae	n	Vf	ℓ	ap	ae	n	Vf
Aluminium Alloy 50-110HB	FZ05	100	5	22.5	9000	6750	100	5	28	6000	5400
		160	2.5	22.5	9000	6750	160	2.5	28	6000	5400
		260	1	22.5	7200	5400	260	1	28	4800	4320

Note

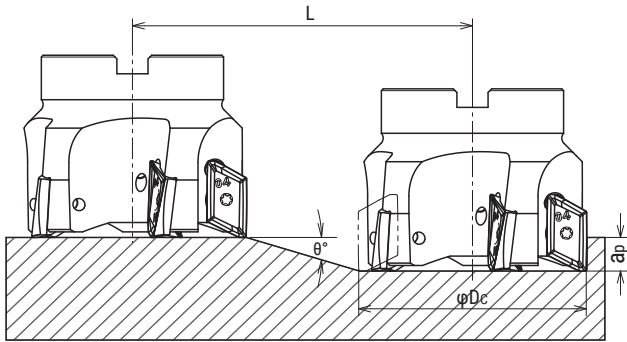
1. The figure to be adjusted according to the machine rigidity or work rigidity.
2. In case of chatter occurring, recommended to reduce the depth of cut ap or Spindle speed
3. If machine does not have enough power, recommend to reduce the depth of cut ap or Spindle speed and Feed speed.
4. Use of water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

AERO CHIPPER

ALX/MAL Type

Recommended Data for Profile Milling

Ramping

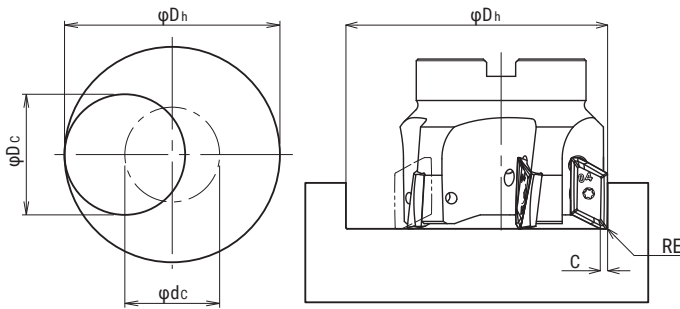


Tool dia. (mm)	Aluminium		Stainless steel		Titanium alloy		Max. Depth of cut (mm)
	Max. ramping angle (°)	Cutting length (mm)	Max. ramping angle (°)	Cutting length (mm)	Max. ramping angle (°)	Cutting length (mm)	
ϕD_c	θ°	L	θ°	L	θ°	L	a_p
20	16	28	10	45	10	45	8
25	11	41	9	51	9	51	8
28	9	51	7	65	7	65	8
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.

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

Tool pass dia. Bore dia. Tool dia.

- Depth of cut per one circuit should not exceed max. depth of cut Ap

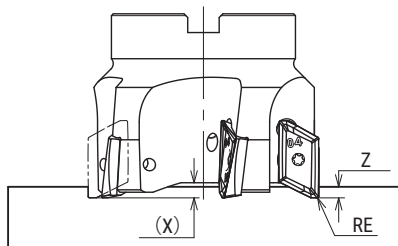
- Down cutting is recommended, tool pass rotation should be counterclockwise

Tool dia. (mm)	Min. bore dia. (mm)	Max. Bore dia. (mm)	Max. Depth of cut (mm)		
			Aluminium	Stainless steel	Titanium alloy
ϕD_c	ϕD_h min.	ϕD_h 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.

AERO CHIPPER

ALX/MAL Type

■ Recommended Cutting Conditions - Shoulder Milling -

● Bore Type

Material	Grade	Tool dia. (mm)									
		50					63				
		4N					5N				
		ℓ	ap	ap×ae	n	Vf	ℓ	ap	ap×ae	n	Vf
Aluminium Alloy 50-110 HB	FZ05	100	15	150	5,700	4,560	100	15	225	4,500	4,500
		150	12	96	5,700	4,560	150	12	168	4,500	4,500
		200	9	54	5,700	4,560	200	9	108	4,500	4,500
Stainless Steel Below 250HB	JC5118	100	10	80	640	260	100	10	120	510	260
		150	8	48	640	260	150	8	88	510	260
		200	6	27	640	260	200	6	54	510	260
Titanium Alloy 35-43 HRC	JC5118	100	15	120	380	120	100	15	180	300	120
		150	12	72	380	120	150	12	132	300	120
		200	9	40	380	120	200	9	81	300	120

● Shank Type

Material	Grade	Tool dia. (mm)									
		20					25/28				
		2N					2N				
		ℓ	ap	ap×ae	n	Vf	ℓ	ap	ap×ae	n	Vf
Aluminium Alloy 50-110 HB	FZ05	35	12	40	14,300	1,430	50	15	75	11,500	4,600
		60	9	25	14,300	1,430	75	12	48	11,500	4,600
Stainless Steel Below 250HB	JC5118	35	2	12	1,590	160	50	10	40	1,270	250
		60	1.2	12	1,590	160	75	8	24	1,270	250
Titanium Alloy 35-43 HRC	JC5118	35	4	12	950	76	50	15	60	760	120
		60	2.5	12	950	76	75	12	36	760	120

Material	Grade	Tool dia. (mm)									
		32/35					40				
		2N					3N				
		ℓ	ap	ap×ae	n	Vf	ℓ	ap	ap×ae	n	Vf
Aluminium Alloy 50-110 HB	FZ05	50	15	120	9,000	3,600	80	15	125	7,200	4,320
		100	12	60	9,000	3,600	120	12	75	7,200	4,320
Stainless Steel Below 250HB	JC5118	50	10	60	990	200	80	10	65	800	240
		100	8	30	990	200	120	8	40	800	240
Titanium Alloy 35-43 HRC	JC5118	50	15	96	600	96	80	15	100	480	120
		100	12	48	600	96	120	12	60	480	120

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 when machining Aluminium alloy or Titanium alloy.

AERO CHIPPER

ALX/MAL Type

■ Recommended Cutting Conditions - Shoulder Milling -

● Modular Type + MSN Type carbide shank holder

Material	Grade	Tool dia. (mm)									
		20					25/28				
		1N					2N				
		ℓ	ap	ap×ae	n	Vf	ℓ	ap	ap×ae	n	Vf
Aluminium Alloy 50-110 HB	FZ05	60	12	40	14,300	1,430	75	15	75	11,500	4,600
		100	9	18	14,300	1,430	125	12	36	11,500	4,600
		160	5	8	11,500	1,150	200	6	15	9,200	3,680
Stainless Steel Below 250HB	JC5118	60	8	20	1,590	160	75	10	40	1,270	250
		100	6	10	1,590	160	125	8	20	1,270	250
		160	3	4	1,270	130	200	4	8	1,020	200
Titanium Alloy 35-43 HRC	JC5118	60	12	32	950	76	75	15	60	760	120
		100	9	15	950	76	125	12	30	760	120
		160	5	6	760	61	200	6	12	610	98

Material	Grade	Tool dia. (mm)									
		30/32/35					40				
		2N					3N				
		ℓ	ap	ap×ae	n	Vf	ℓ	ap	ap×ae	n	Vf
Aluminium Alloy 50-110 HB	FZ05	100	15	96	9,000	3,600	100	15	120	6,000	3,600
		160	12	48	9,000	3,600	160	12	60	6,000	3,600
		260	6	18	7,200	2,880	260	6	24	4,800	2,880
Stainless Steel Below 250HB	JC5118	100	10	50	990	200	100	10	65	660	200
		160	8	24	990	200	160	8	32	660	200
		260	4	10	800	160	260	4	12	530	160
Titanium Alloy 35-43 HRC	JC5118	100	15	75	600	96	100	15	96	400	96
		160	12	36	600	96	160	12	45	400	96
		260	6	15	480	77	260	6	18	320	77

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 when machining Aluminium alloy or Titanium alloy.

AERO CHIPPER

ALX/MAL Type

■ Recommended Cutting Conditions - Face Milling -

● Bore Type

Material	Grade	Tool dia. (mm)									
		50					63				
		4N					5N				
		ℓ	ap	ae	n	Vf	ℓ	ap	ae	n	Vf
Aluminium Alloy 50-110 HB	FZ05	100	6	35	5,700	4,560	100	7	44	4,500	4,500
		150	4	35	5,700	4,560	150	5	44	4,500	4,500
		200	2	35	5,700	4,560	200	3	44	4,500	4,500
Stainless Steel Below 250HB	JC5118	100	3	30	640	260	100	4	38	510	260
		150	2	30	640	260	150	2.5	38	510	260
		200	1	30	640	260	200	1.5	38	510	260
Titanium Alloy 35-43 HRC	JC5118	100	6	30	380	120	100	7	38	300	120
		150	4	30	380	120	150	5	38	300	120
		200	2	30	380	120	200	3	38	300	120

● Shank Type

Material	Grade	Tool dia. (mm)									
		20					25/28				
		2N					2N				
		ℓ	ap	ae	n	Vf	ℓ	ap	ae	n	Vf
Aluminium Alloy 50-110 HB	FZ05	35	4	14	14,300	1,430	50	6	17.5	11,500	4,600
		60	2.5	14	14,300	1,430	75	4	17.5	11,500	4,600
Stainless Steel Below 250HB	JC5118	35	2	12	1,590	160	50	3	15	1,270	250
		60	1.2	12	1,590	160	75	2	15	1,270	250
Titanium Alloy 35-43 HRC	JC5118	35	4	12	950	76	50	6	15	760	120
		60	2.5	12	950	76	75	4	15	760	120

Material	Grade	Tool dia. (mm)									
		32/35					40				
		2N					3N				
		ℓ	ap	ae	n	Vf	ℓ	ap	ae	n	Vf
Aluminium Alloy 50-110 HB	FZ05	50	7	22.5	9,000	3,600	80	6	28	7,200	4,320
		100	4	22.5	9,000	3,600	120	4	28	7,200	4,320
Stainless Steel Below 250HB	JC5118	50	4	19	990	200	80	3	24	800	240
		100	2	19	990	200	120	2	24	800	240
Titanium Alloy 35-43 HRC	JC5118	50	7	19	600	96	80	6	24	480	120
		100	4	19	600	96	120	4	24	480	120

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 when machining Aluminium alloy or Titanium alloy.

AERO CHIPPER

ALX/MAL Type

■ Recommended Cutting Conditions - Face Milling -

● Modular Type + MSN Type carbide shank holder

Material	Grade	Tool dia. (mm)									
		20					25/28				
		1N					2N				
		ℓ	ap	ae	n	Vf	ℓ	ap	ae	n	Vf
Aluminium Alloy 50-110 HB	FZ05	60	4	14	14,300	1,430	75	6	17.5	11,500	4,600
		100	2	14	14,300	1,430	125	3	17.5	11,500	4,600
		160	0.8	14	11,500	1,150	200	1.2	17.5	9,200	3,680
Stainless Steel Below 250HB	JC5118	60	2	12	1,590	160	75	3	15	1,270	250
		100	1	12	1,590	160	125	1.5	15	1,270	250
		160	0.5	12	1,270	130	200	0.6	15	1,020	200
Titanium Alloy 35-43 HRC	JC5118	60	4	12	950	76	75	6	15	760	120
		100	2	12	950	76	125	3	15	760	120
		160	0.8	12	760	61	200	1.2	15	610	98

Material	Grade	Tool dia. (mm)									
		30/32/35					40				
		2N					3N				
		ℓ	ap	ae	n	Vf	ℓ	ap	ae	n	Vf
Aluminium Alloy 50-110 HB	FZ05	100	6	22.5	9,000	3,600	100	6	28	6,000	3,600
		160	3	22.5	9,000	3,600	160	3	28	6,000	3,600
		260	1.2	22.5	7,200	2,880	260	1.2	28	4,800	2,880
Stainless Steel Below 250HB	JC5118	100	3	19	990	200	100	3	24	660	200
		160	1.5	19	990	200	160	1.5	24	660	200
		260	0.6	19	800	160	260	0.6	24	530	160
Titanium Alloy 35-43 HRC	JC5118	100	6	19	600	96	100	6	24	400	96
		160	3	19	600	96	160	3	24	400	96
		260	1.2	19	480	77	260	1.2	24	320	77

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 when machining Aluminium alloy or Titanium alloy.