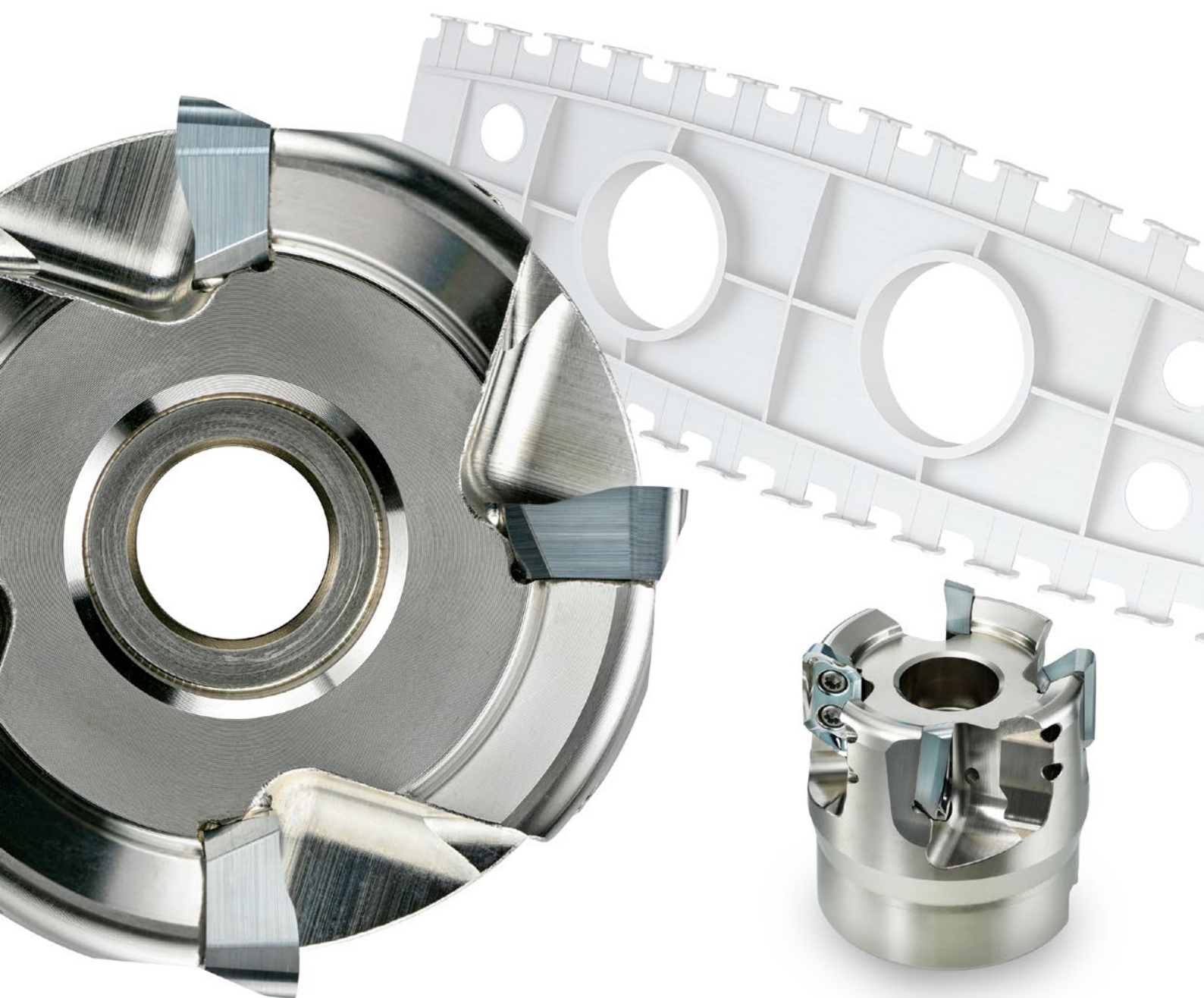


For Continuous High-Speed and Ultra-High-Speed Machining of Aluminium Alloys

AXD4000A

New
Products

**5000 m/min cutting speed is available,
M.R.R (Metal Removal Rate) can reach
10000 cm³/min** (300 km/h = 33000 min⁻¹ x ø50 mm)



For Continuous High-Speed and Ultra-High-Speed Machining of Aluminium Alloys

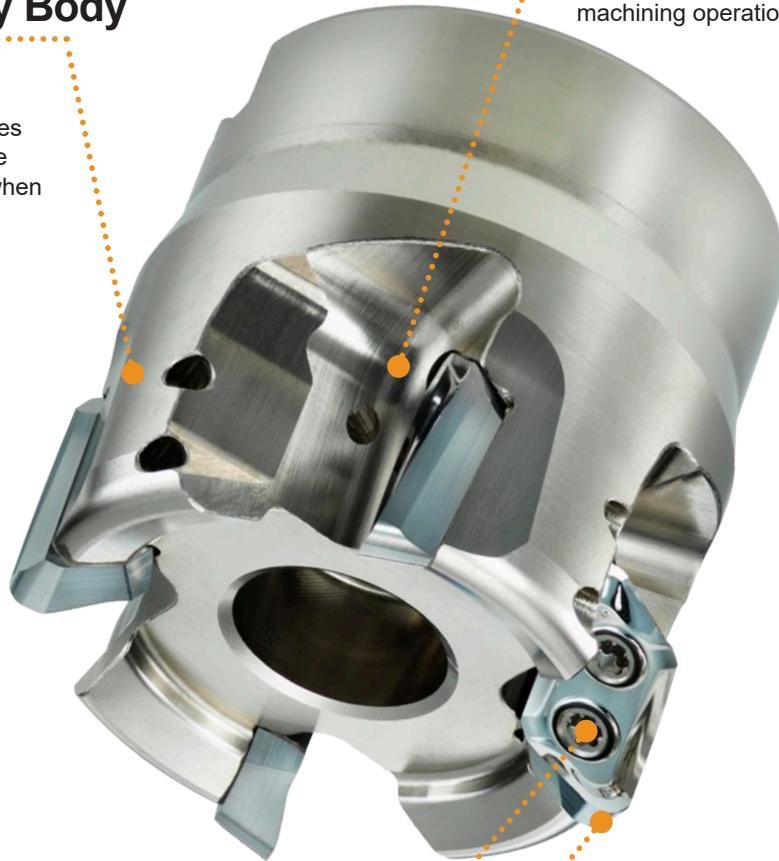
AXD4000A

High Rigidity Body

High rigidity body with modified insert seat withstands high stresses caused by cutting force and centrifugal force when performing high speed machining.

Optimal Designed Chip Pocket

Chip pocket specifically designed for optimal chip disposal during high-speed and ultra-high-speed machining operations.



High Reliability

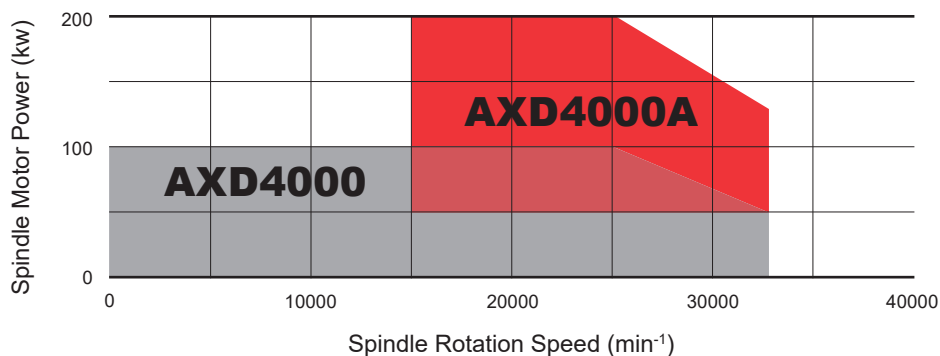
Improved anti-fly screw design ensures 100% contact with insert hole and 2x torque specifications compared to AXD4000 to ensure tightness and prevent loosening of screw during continuous high-speed machining operations.

Stable Machining

Standard and proven AXD4000 insert with sharp edge and tough carbide grade effectuates lower cutting force and substantial fracture resistance.

How to Choose AXD4000A or AXD4000

AXD4000A is specifically engineered for continuous high-speed and ultra-high-speed machining of aluminum alloys, especially over 80kW motor power.



MULTI FUNCTIONAL MILLING

<ALUMINIUM ALLOY MATERIAL CUTTING>

90°
KAPR

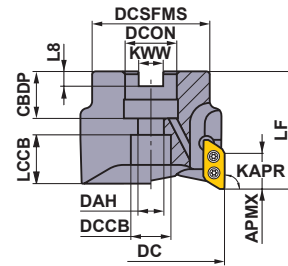


AXD4000A NEW

P M K N S H



ø50



Right hand tool holder only.

(mm)

DC	Set Bolt	Geometry
ø50	HSC10030H	

Arbor Type

KAPR : 90°
GAMP : +10° GAMF : +21°
DCON = inch size, With Coolant Hole

(mm)

DC	Type	Insert Corner Radius RE	Order Number	Stock	* No.T	LF	DCON	WT (kg)	APMX	RPMX (min ⁻¹)	
				R							Insert Type
50	D	0.4—3.2	AXD4000A-050A04RD	●	4	50	22	0.4	15.5	34000	XDGX1750
50	E	4.0—5.0	AXD4000A-050A04RE	●	4	50	22	0.4	14.8	34000	XDGX1750

* Number of Teeth

Note 1) The maximum allowable revolutions are set to ensure tool and insert stability.

RPMX (max. rev/min) for holders must also be considered.

Note 2) Tool should be set with balancing quality of G6.3 (ISO1940) or ISO16084, in case over 6000 min⁻¹ spindle rotation.

Note 3) When using the tool at high spindle speeds, ensure that the tool and chuck are correctly balanced.

Note 4) Note for inserts with a corner radius of 1.6 and above, as corner radius increases the LF dimensions decrease.

Mounting Dimensions

(mm)

DC	Order Number	DCON	CBDP	DAH	DCCB	LCCB	DCSFMS	KWW	L8
50	AXD4000A-050A04RD	22	20	11	17	15.4	45	10.4	6.3
50	AXD4000A-050A04RE	22	20	11	17	14.6	45	10.4	6.3

Spare Parts

	*		
Clamp Screw		Wrench	Anti-seize Lubricant
TPS3SB		TIP10D	MK1KS

* Clamp Torque (N · m) : TPS3SB = 3.0

Note 1) Clamp screw and wrench of AXD4000A are different from AXD4000.

Dimensions and Symbols (ISO 13399 Compliance)

DC = Cutting Diameter

LF = Functional Length

DCON = Connection Diameter

WT = Weight of Item

APMX = Depth of Cut Max.

RPMX = Rotational Speed Max.

CBDP = Connection Bore Depth

DAH = Diameter Access Hole

DCCB = Counterbore Diameter Connection Bore

LCCB = Counterbore Depth Connection Bore

DCSFMS = Contact Surface Diameter Machine Side

KWW = Keyway Width


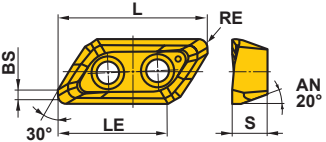


● : Inventory maintained in Japan.

Memo

A series of horizontal dashed lines for writing, spanning the width of the page.











Inserts

(mm)

Workpiece Material	N	Aluminium Alloys		●	✦			✦	Cutting Conditions (Guide): ● :Stable Cutting ● :General Cutting ✦ :Unstable Cutting Edge Preparation: F :Sharp E :Round				
	Shape	Order Number	Class	Stock				Dimensions					Geometry
Coated				Carbide		L	LE	S	BS	RE*			
		Edge Preparation		LC15TF	MP9120		TF15						
	Strong Cutting Edge GM Breaker	XDGX175004PDFR-GM	G F				●	23.0	17.0	5	1.7	0.4	
		XDGX175008PDFR-GM	G F				●	23.0	17.0	5	1.2	0.8	
		XDGX175012PDFR-GM	G F				●	23.0	17.0	5	0.9	1.2	
		XDGX175016PDFR-GM	G F				●	22.0	15.9	5	1.3	1.6	
		XDGX175020PDFR-GM	G F				●	22.0	15.9	5	0.8	2.0	
		XDGX175024PDFR-GM	G F				●	22.0	15.9	5	0.4	2.4	
		XDGX175030PDFR-GM	G F				●	21.1	16.0	5	0.6	3.0	
		XDGX175032PDFR-GM	G F				●	21.1	16.0	5	0.4	3.2	
		XDGX175040PDFR-GM	G F				●	20.0	14.8	5	0.5	4.0	
		XDGX175050PDFR-GM	G F				●	19.4	15.0	5	0.3	5.0	
	Strong Cutting Edge Wear Resistant Type GM Breaker	XDGX175004PDER-GM	G E	●				23.0	17.0	5	1.7	0.4	
		XDGX175008PDER-GM	G E	●				23.0	17.0	5	1.2	0.8	
		XDGX175012PDER-GM	G E	●				23.0	17.0	5	0.9	1.2	
		XDGX175016PDER-GM	G E	●				22.0	15.9	5	1.3	1.6	
		XDGX175020PDER-GM	G E	●				22.0	15.9	5	0.8	2.0	
		XDGX175024PDER-GM	G E	●				22.0	15.9	5	0.4	2.4	
		XDGX175030PDER-GM	G E	●				21.1	16.0	5	0.6	3.0	
		XDGX175032PDER-GM	G E	●				21.1	16.0	5	0.4	3.2	
		XDGX175040PDER-GM	G E	●				20.0	14.8	5	0.5	4.0	
		XDGX175050PDER-GM	G E	●				19.4	15.0	5	0.3	5.0	
	Low Cutting Resistance GL Breaker	XDGX175004PDFR-GL	G F	●			●	23.0	16.9	5	1.7	0.4	
		XDGX175008PDFR-GL	G F	●			●	23.0	17.0	5	1.3	0.8	
		XDGX175012PDFR-GL	G F	●			●	23.0	17.0	5	0.9	1.2	
		XDGX175016PDFR-GL	G F	●			●	22.0	16.4	5	1.4	1.6	
		XDGX175020PDFR-GL	G F	●			●	22.0	16.4	5	1.0	2.0	
		XDGX175024PDFR-GL	G F	●			●	22.0	16.4	5	0.6	2.4	
		XDGX175030PDFR-GL	G F	●			●	21.1	16.1	5	0.8	3.0	
		XDGX175032PDFR-GL	G F	●			●	21.1	16.1	5	0.6	3.2	
		XDGX175040PDFR-GL	G F	●			●	20.0	15.6	5	0.8	4.0	
		XDGX175050PDFR-GL	G F	●			●	19.4	15.3	5	0.4	5.0	

* The insert nose R differs from radius form which is remains on workpiece material after machining due to the effects of the axial rake angle at the time of setting.
GM breaker is recommended if stress the dimensional precision of the workpiece shape.

Holder And Insert Corner Radius Combination

Holder	D Type Holder										B Type Holder	
	AXD4000A-050A04RD										AXD4000A-050A04RE	
Applicable Insert Corner R (RE)												
	XDGX175004PD R	XDGX175008PD R	XDGX175012PD R	XDGX175016PD R	XDGX175020PD R	XDGX175024PD R	XDGX175030PD R	XDGX175032PD R	XDGX175040PD R	XDGX175050PD R		

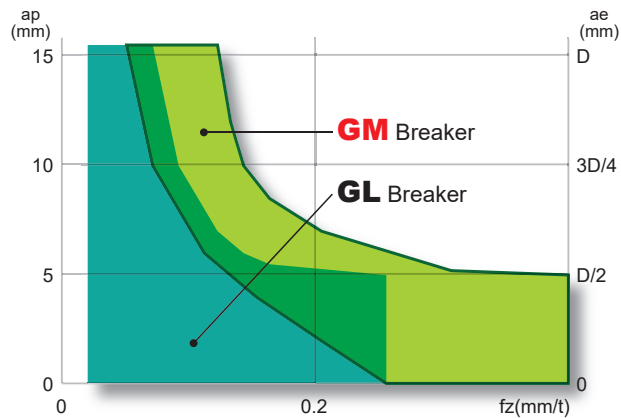
Note 1) Other combinations of holder and insert corner R are not acceptable.

● : Inventory maintained in Japan.
(10 inserts in one case)

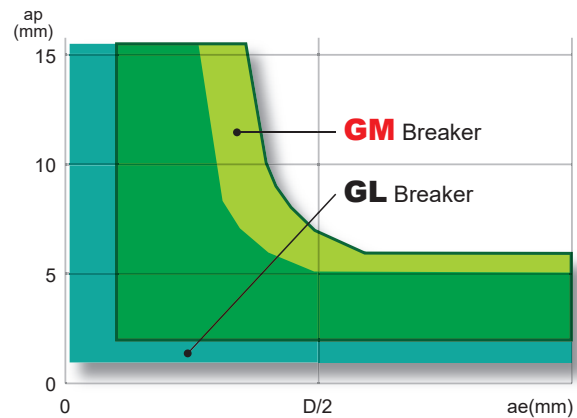
Selection of Insert

It is necessary to choose the best insert according to the cutting conditions. Please select an insert from the tables below. 1st recommendation for High Efficiency and High Load Machining on High-speed Spindles is the GM breaker with a strong cutting edge.

Selection of insert according to the feed per tooth and the required cutting depth

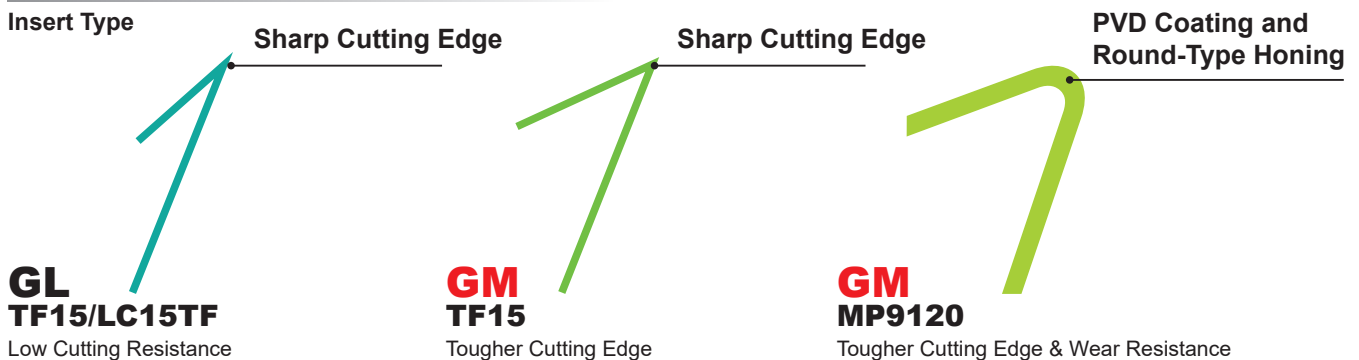


Selection of insert according to the width of cut and the required cutting depth

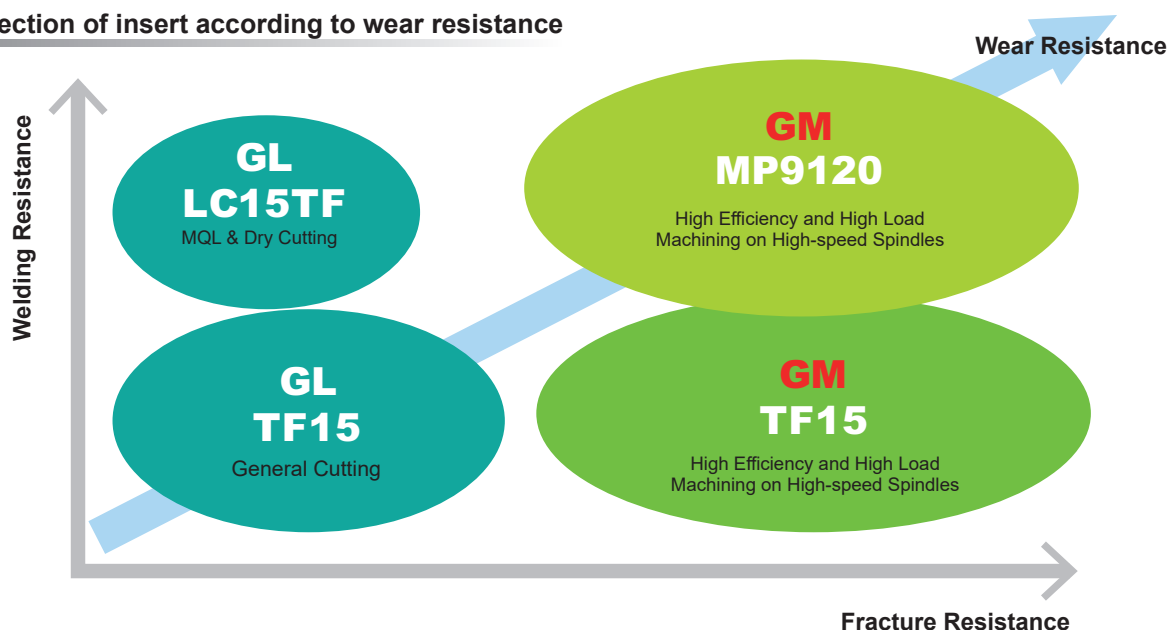


1st recommendation for machining aluminium alloys is GL breaker. Under high-load conditions such as deep or high feed cutting, it is advisable to use the GM breaker.

Selection of Insert According to Cutting Edge



Selection of insert according to wear resistance



Recommended Cutting Conditions

(mm)

Workpiece Material	Properties	Grade	Breaker	Cutting Speed vc (mm/min)	Cutting Width ae	Depth of Cut ap	Feed per Tooth (mm/t.)
Aluminium Alloys (A7050, A7075, A2024, A6061 etc)	Content Si < 5%	TF15 MP9120	GM	4000(2000—5000)	≤ 0.5 DC	≤ 5	≤ 0.35
						≤ 10	≤ 0.30
						≤ 14.5	≤ 0.25
		TF15 LC15TF	GL	4000(2000—5000)	≤ 0.75 DC	≤ 5	≤ 0.30
						≤ 10	≤ 0.25
						≤ 14.5	≤ 0.20
DC (Slot)	≤ 5	≤ 0.30					
	≤ 5	≤ 0.20					
DC (Slot)	≤ 5	≤ 0.15					
	≤ 10	≤ 0.10					
DC (Slot)	≤ 5	≤ 0.10					
	≤ 5	≤ 0.20					

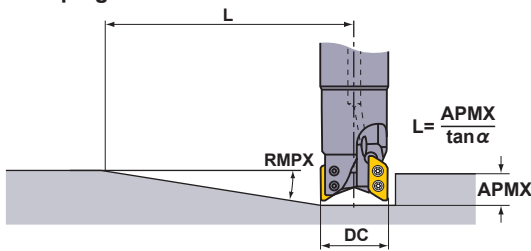
Note 1) The above cutting conditions are determined based on high workpiece materials and machine rigidity, where no vibration occurred. If vibrations occur make adjustments according to the machining conditions.

Note 2) Note, vibrations may occur in the following conditions.

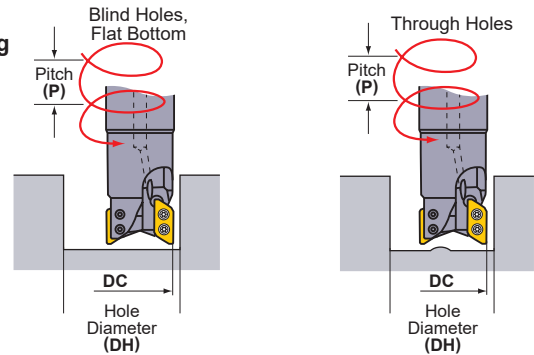
- When using long tool overhang.
- When pocket machining corner radii.
- When the workpiece materials has poor clamping rigidity or when the machine rigidity or workpiece materials rigidity is low, vibrations can occur easily, if so, reduce cutting conditions such as width and depth of cut and feed per tooth.

Ramping / Helical Milling / Drilling

Ramping



Helical Milling



Refer to the table below for cutting conditions. For feed per tooth and cutting speed, follow the cutting conditions for slot milling.

(mm)

DC	Type	Insert Corner R RE	Ramping		Helical Milling (Blind Hole, Flat Bottom)			Helical Milling (Through Hole)		Drilling
			RMPX	L	DH * max.	DH min.	P max.	DH min.	P max.	
50	D	0.4—1.2	8.2°	108	96.8 *2	95.4	14	81.2	14	5.5
		1.6—2.4	7.6°	117	94.4 *3	93.6	13	81.2	13	5.0
		3.0—3.2	6.9°	129	92.8 *4	92.0	12	81.2	12	4.5
	E	4.0	6.3°	135	91.2	90.0	10	81.2	10	3.9
		5.0	5.8°	146	89.2	88.8	9	81.2	9	3.6

*1 Using the maximum ramping angle, the distance to reach the maximum depth of cut is as follows:

L = (maximum depth of cut APMX / tan α). Maximum depth of cut D type is 15.5mm, E type is 14.8mm.

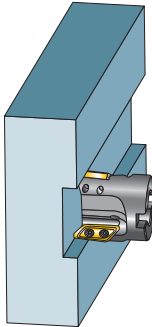
*2 Corner radius of 1.2mm. For other corner radii, use the following formula. {(cutting edge diameter DC) - (corner radius RE) - 0.3} × 2

*3 Corner radius of 2.4mm. For other corner radii, use the following formula. {(cutting edge diameter DC) - (corner radius RE) - 0.3} × 2

*4 Corner radius of 3.2mm. For other corner radii, use the following formula. {(cutting edge diameter DC) - (corner radius RE) - 0.3} × 2

Note 1) The recommended ramping feed is 0.05mm/t. or under.

Application Examples

Tool		Conventional		AXD4000A-050A04RD	
Insert (Grade)				XDGX175030PDER-GM(TF15)	
Workpiece		JIS A7075			
Components		Aircraft Fuselage Parts			
Cutting Conditions	Spindle Speed n (min ⁻¹)	30000		32000	
	Cutting Speed vc (m/min)	4700		5000	
	Feed per Tooth fz (mm/t.)	0.15		0.25	
	Depth of Cut ap (mm)	5		5	
	Width of Cut ae (mm)	50		50	
	Metal Removal Rate M.R.R (cm ³ /min)	4500		8000	
Cutting Mode		Wet Cutting		Wet Cutting	
Machine Spindle Type		High Speed and High Power 5-axis MC			
Result		Compared with the conventional product M.R.R becomes 1.8 times, and was made possible stable processing.			

For Your Safety

●Don't handle inserts and chips without gloves. ●Please machine within the recommended application range and exchange expired tools with new ones in advance of breakage. ●Please use safety covers and wear safety glasses. ●When using compounded cutting oils, please take fire precautions. ●When attaching inserts or spare parts, please use only the correct wrench or driver. ●When using rotating tools, please make a trial run to check run-out, vibration and abnormal sounds etc.

MITSUBISHI MATERIALS CORPORATION

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(Tools specifications subject to change without notice.)