

AXD4000
Arbor type
additions!!

For Machining of Aluminium Alloys

AXD Series



**Multi functional milling cutter
for high speed & performance
machining of aluminium alloys.**

For Machining of Aluminium Alloys

AXD Series

Features

High Stability Under High Centrifugal Forces

At high spindle speeds the double clamping screws prevent insert displacement caused by centrifugal force. The double clamping offers both reliability and safety.

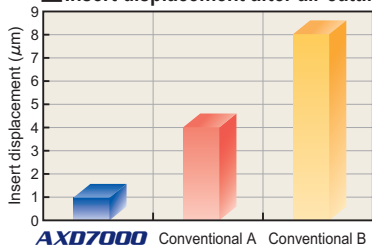
<Cutting conditions>

Tool : AXD7000-050A03RA	Feed per tooth : 0.2mm/tooth
Insert : XDGX227008PDFR-GL	Width of cut : 20mm
Grade : TF15	Depth of cut : 6mm
Workpiece : JIS A7075	Cutting length : 200mm
Spindle speed : 20000min ⁻¹	Wet cutting

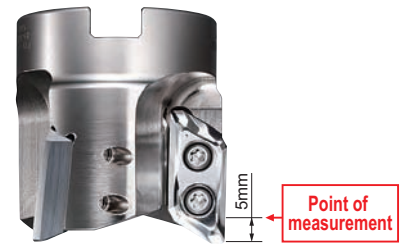
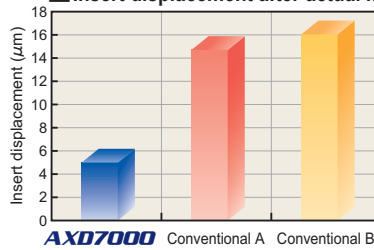
(for both air cutting and actual machining)

Insert Displacement due to Centrifugal Force

■ Insert displacement after air cutting



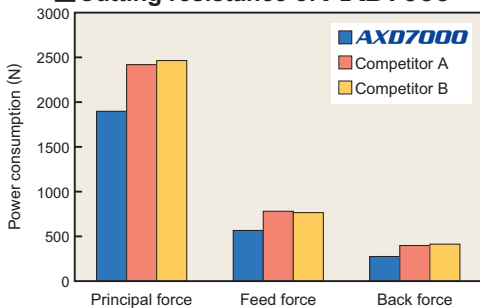
■ Insert displacement after actual machining



Low Resistance Inserts

An optimised helical flank and flank angle offers cutting edge strength and provides a large rake angle to reduce cutting resistance. Additionally a convex cutting edge is incorporated to ensure effective chip flow.

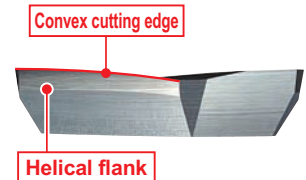
■ Cutting resistance of AXD7000



<Cutting conditions>

Tool : AXD7000-050A03RA
 Insert : XDGX227008PDFR-GL
 Grade : TF15
 Workpiece : JIS A7075
 Cutting speed : 1000m/min

Feed per tooth : 0.2mm/tooth
 Width of cut : 25mm
 Depth of cut : 10mm
 Single tooth
 Wet cutting

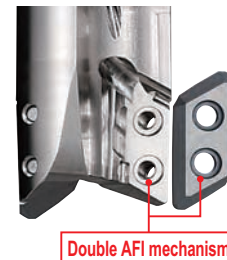


High Spindle Speeds Possible

Safe and reliable high spindle speed milling can be achieved due to the use of the double screw clamping and Mitsubishi Material's proprietary "Anti Fly Insert" mechanism (Double AFI).

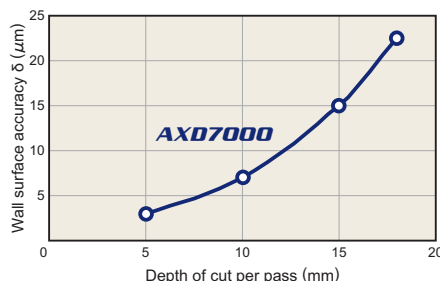
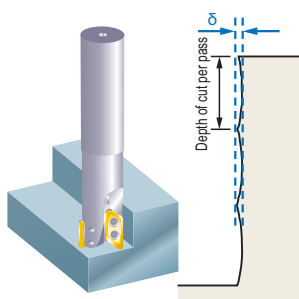
High Balance Quality

To prevent vibration under high spindle speeds the holder is balanced to G6.3 or better at 10000min⁻¹, according to the ISO1940 standard. (The holder is balanced without the inserts and the screws in place)



Excellent Wall Accuracy

Specially designed G-class inserts with a helical cutting edge for excellent wall accuracy.



<Cutting conditions>

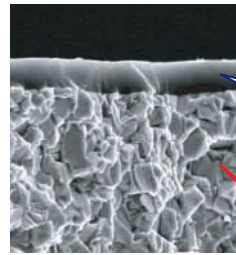
Tool : AXD7000R402SA42SA
 Insert : XDGX227008PDFR-GL
 Grade : TF15
 Workpiece : JIS A7075
 Cutting speed : 2500m/min
 Feed per tooth : 0.2mm/tooth
 Width of cut : 3mm
 Wet cutting



Grade Features

DLC coated LC15TF

TF15, a high wear and fracture resistant micro-grain cemented carbide coupled with Mitsubishi's unique, weld resistant DLC coating prevents the chips from welding on the insert rake face providing improved surface finishes and high-efficiency machining. LC15TF can be used for both wet and dry machining.



DLC coating

Coefficient of friction	0.1 or less
Adhesion strength	Good

The newly developed DLC coating technology maintains the surface smoothness of the inserts, providing increased welding resistance.

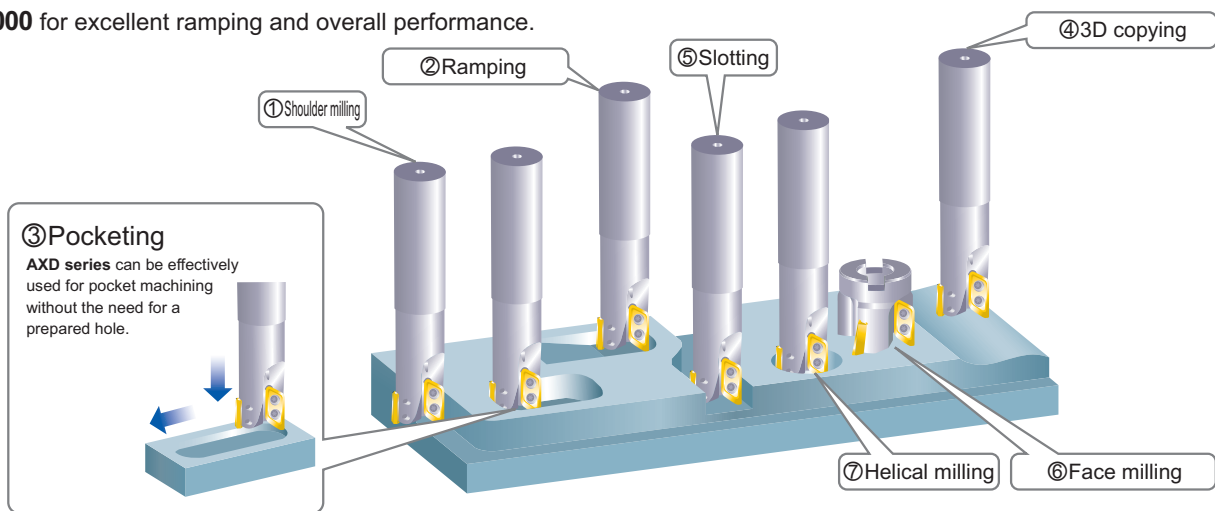
TF15 (micro-grain cemented carbide)

TF15

Micro-grain cemented carbide with superior resistance to wear and fracturing. TF15 ensures stable cutting and efficient machining of aluminium alloy. The special mirror treatment on the rake face prevents chip welding for reliability and longer tool life.

Multi Functional Milling

AXD7000 for excellent ramping and overall performance.



Operational Guidance

Only use the inserts and parts provided by Mitsubishi Materials with this tool. Use of the correct insert clamp screws is especially important to ensure overall tool safety. Do not use damaged or worn clamp screws.

Type	AXD4000	AXD7000	
Cutting Edge Diameter D1 (mm)	ø25-ø125	ø32	ø40-ø125
Clamp Screw Number	TS3SB	TS4SB	TS4SBL
Overall Length L (mm)	8	9	10.5
Clamp Torque (N·m)	1.5	3.5	3.5

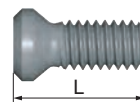


Figure 1

- When tightening the clamp screws, follow the order in Figure 1.
- The maximum allowable spindle speeds are shown in Table 1. Ensure that the cutter operates under the maximum allowable spindle speed.
 The maximum allowable spindle speeds for safety purposes are determined in accordance with ISO15641 (Milling Cutters for high speed machining-Safety requirements).

(Table 1) Maximum allowable spindle speed
AXD4000

Cutting Edge Diameter D1 (mm)	ø25	ø32	ø40	ø50	ø63	ø80	ø100	ø125
Max. Allowable Spindle Speed (min ⁻¹)	49000	48000	41000	35000	30000	27000	23000	20000

AXD7000

Cutting Edge Diameter D1 (mm)	ø32	ø40	ø50	ø63	ø80	ø100	ø125
Max. Allowable Spindle Speed (min ⁻¹)	41000	36000	30000	25000	23000	19000	16000

- Even when operating under the maximum allowable spindle speed, if the spindle speed is equal to or higher than the values shown in table 2, it is recommended that the balance quality (with the arbor or milling chuck) conforms to G6.3 or better based on ISO1940. It is also recommended to replace the clamp screws with new ones when changing inserts. Furthermore, ensure to use machines that are provided with safety measures in case of cutter breakage.
- * The balance quality of the holder (without inserts and clamp screws) is G6.3 or better at 10000min⁻¹.

(Table 2) Maximum spindle speed when balancing with the arbor or milling chuck has not been achieved
AXD4000

Cutting Edge Diameter D1 (mm)	ø25	ø32	ø40	ø50	ø63	ø80	ø100	ø125
Max. Spindle Speed (min ⁻¹)	12000	9500	7600	6000	4800	3800	3000	2400

AXD7000

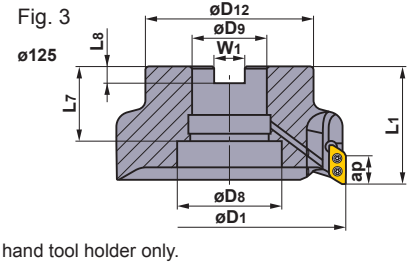
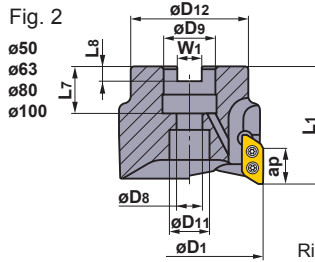
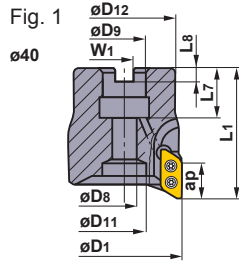
Cutting Edge Diameter D1 (mm)	ø32	ø40	ø50	ø63	ø80	ø100	ø125
Max. Spindle Speed (min ⁻¹)	9500	7600	6000	4800	3800	3000	2400

- When setting the spindle speed, take into consideration the maximum allowable spindle speed of the arbor or milling chuck.
- Use the specified set bolt when using the arbor type with through coolant.
- The inserts have sharp cutting edges and handling them with bare hands may cause injuries. Always wear safety gloves when handling the indexable inserts.

AXD4000

Arbor Type

NEW



Right hand tool holder only.

C H : 0°
 A.R. : +14° - 15° T : +21° - +26°
 R.R. : +21° - +26° I : +14° - +15°

Light Alloy	Cast Iron	Carbon Steel - Alloy Steel	Stainless Steel	Hardened Steel

Cutter Diameter D1	Set Bolt	Geometry			
φ40	HFF08043H	①	①	②	③
φ50, φ63	HSC10030H				
φ80	12035H	②			
φ100	16040H				
φ125	MBA20040H	③			

Type	Insert Corner Re	Order Number	Stock R	Number of Teeth	Dimensions (mm)								Tool Weight (kg)	Max. Depth of Cut ap (mm)	Max. Allowable Revolution (min ⁻¹)	Type (Fig.)	Clamp Screw	Wrench	Anti-seize Lubricant	Insert	
					D1	L1	D9	L7	D8	D12	W1	L8									D11
A Type	0.4 3.2	AXD4000-040A02RA	●	2	40	50	16	18	8.5	34	8.4	5.6	12	0.3	15.5	41000	1	TS3SB	TKY08D	MK1KS	XDGX1750 PDFR-GL
		-040A03RA	●	3	40	50	16	18	8.5	34	8.4	5.6	12	0.3	15.5	41000	1	TS3SB	TKY08D	MK1KS	
		-050A02RA	●	2	50	50	22	20	11	45	10.4	6.3	17	0.4	15.5	35000	2	TS3SB	TKY08D	MK1KS	
		-050A04RA	●	4	50	50	22	20	11	45	10.4	6.3	17	0.4	15.5	35000	2	TS3SB	TKY08D	MK1KS	
		-063A05RA	●	5	63	50	22	20	11	50	10.4	6.3	17	0.6	15.5	30000	2	TS3SB	TKY08D	MK1KS	
		R08005CA	●	5	80	50	25.4	26	13	60	9.5	6	20	1.0	15.5	27000	2	TS3SB	TKY08D	MK1KS	
		R10006DA	●	6	100	63	31.75	32	17	70	12.7	8	26	2.0	15.5	23000	2	TS3SB	TKY08D	MK1KS	
R12507EA	●	7	125	63	38.1	40	56	90	15.9	10	-	2.8	15.5	20000	3	TS3SB	TKY08D	MK1KS			
B Type	4.0 5.0	AXD4000-040A02RB	●	2	40	50	16	18	8.5	34	8.4	5.6	12	0.3	14.8	41000	1	TS3SB	TKY08D	MK1KS	
		-040A03RB	●	3	40	50	16	18	8.5	34	8.4	5.6	12	0.3	14.8	41000	1	TS3SB	TKY08D	MK1KS	
		-050A02RB	●	2	50	50	22	20	11	45	10.4	6.3	17	0.4	14.8	35000	2	TS3SB	TKY08D	MK1KS	
		-050A04RB	●	4	50	50	22	20	11	45	10.4	6.3	17	0.4	14.8	35000	2	TS3SB	TKY08D	MK1KS	
		-063A05RB	●	5	63	50	22	20	11	50	10.4	6.3	17	0.6	14.8	30000	2	TS3SB	TKY08D	MK1KS	
		R08005CB	●	5	80	50	25.4	26	13	60	9.5	6	20	1.0	14.8	27000	2	TS3SB	TKY08D	MK1KS	
		R10006DB	●	6	100	63	31.75	32	17	70	12.7	8	26	2.0	14.8	23000	2	TS3SB	TKY08D	MK1KS	
R12507EB	●	7	125	63	38.1	40	56	90	15.9	10	-	2.8	14.8	20000	3	TS3SB	TKY08D	MK1KS			

(Note 1) The maximum allowable spindle speeds are set to ensure tool and insert stability.

Before operating the tool read the operational guidance on page 2.

(Note 2) When using the tool at high spindle speeds, ensure that the tool and arbor are correctly balanced.

(Note 3) Note for inserts with a corner radius of 1.6 and above, as corner radius increases the L1 dimension decreases.

* Clamp Torque (N · m) : TS3SB=1.5

Shank Type



Fig. 1

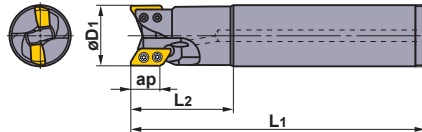
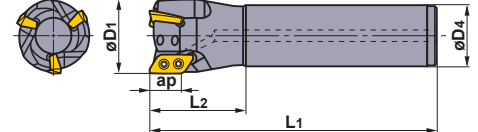


Fig. 2



Right hand tool holder only.

Type	Insert Corner Re	Order Number	Stock R	Number of Teeth	Dimensions (mm)				Max. Depth of Cut ap (mm)	Max. Allowable Revolution (min ⁻¹)	Type (Fig.)	Clamp Screw	Wrench	Anti-seize Lubricant	Insert
					D1	L1	L2	D4							
A Type	0.4 3.2	AXD4000R252SA25SA	●	2	25	125	50	25	15.5	49000	1	TS3SB	TKY08D	MK1KS	XDGX1750 PDFR-GL
		252SA25LA	●	2	25	170	80	25	15.5	49000	1	TS3SB	TKY08D	MK1KS	
		322SA32SA	●	2	32	150	50	32	15.5	48000	1	TS3SB	TKY08D	MK1KS	
		322SA32LA	●	2	32	200	80	32	15.5	48000	1	TS3SB	TKY08D	MK1KS	
		403SA32SA	●	3	40	150	50	32	15.5	41000	2	TS3SB	TKY08D	MK1KS	
		403SA42SA	●	3	40	170	80	42	15.5	41000	1	TS3SB	TKY08D	MK1KS	
B Type	4.0 5.0	AXD4000R252SA25SB	●	2	25	125	50	25	14.8	49000	1	TS3SB	TKY08D	MK1KS	
		252SA25LB	●	2	25	170	80	25	14.8	49000	1	TS3SB	TKY08D	MK1KS	
		322SA32SB	●	2	32	150	50	32	14.8	48000	1	TS3SB	TKY08D	MK1KS	
		322SA32LB	●	2	32	200	80	32	14.8	48000	1	TS3SB	TKY08D	MK1KS	
		403SA32SB	●	3	40	150	50	32	14.8	41000	2	TS3SB	TKY08D	MK1KS	
		403SA42SB	●	3	40	170	80	42	14.8	41000	1	TS3SB	TKY08D	MK1KS	

(Note 1) The maximum allowable spindle speeds are set to ensure tool and insert stability.

Before operating the tool read the operational guidance on page 2.


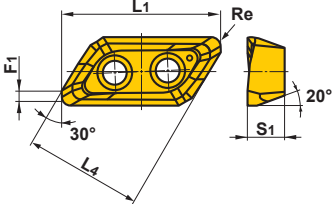
(Note 2) When using the tool at high spindle speeds, ensure that the tool and milling chuck are correctly balanced.

(Note 3) Note for inserts with a corner radius of 1.6 and above, as corner radius increases the L1 and L2 dimensions decrease.











* Clamp Torque (N · m) : TS3SB=1.5

● : Inventory maintained. (10 inserts in one case) ○ : Inventory maintained. (Available from winter 2010)

Inserts

Work Material	N	Aluminium Alloy	✚				●				Cutting Conditions (Guide): ● : Stable Cutting ● : General Cutting ✚ : Unstable Cutting F : Sharp					Honing: F : Sharp	
Shape	Order Number	Class	Honing	Stock		Dimensions (mm)					Geometry						
				Coated	Carbide	L1	L4	S1	F1	Re							
	XDGX175004PDFR-GL	G	F	●			●	23.0	17.5	5	1.7	0.4					
	175008PDFR-GL	G	F	●			●	23.0	17.5	5	1.3	0.8					
	175012PDFR-GL	G	F	●			●	23.0	17.5	5	0.9	1.2					
	175016PDFR-GL	G	F	●			●	22.0	17.5	5	1.4	1.6					
	175020PDFR-GL	G	F	●			●	22.0	17.5	5	1.0	2.0					
	175024PDFR-GL	G	F	●			●	22.0	17.5	5	0.6	2.4					
	175030PDFR-GL	G	F	●			●	21.1	17.5	5	0.8	3.0					
	175032PDFR-GL	G	F	●			●	21.1	17.5	5	0.6	3.2					
	175040PDFR-GL	G	F	●			●	20.0	17.5	5	0.8	4.0					
	175050PDFR-GL	G	F	●			●	19.4	17.5	5	0.4	5.0					

Holder And Insert Corner Radius Combination

Holder	A Type Holder								B Type Holder	
	AXD4000—A AXD4000R—A								AXD4000—B AXD4000R—B	
Applicable Insert Corner R (Re)										
	XDGX 175004PDFR-GL	XDGX 175008PDFR-GL	XDGX 175012PDFR-GL	XDGX 175016PDFR-GL	XDGX 175020PDFR-GL	XDGX 175024PDFR-GL	XDGX 175030PDFR-GL	XDGX 175032PDFR-GL	XDGX 175040PDFR-GL	XDGX 175050PDFR-GL

Recommended Cutting Conditions

Cutting conditions for shoulder milling

Work Material	Insert Grade	Width of Cut ae (mm)	Cutting Speed vc (m/min)	Depth of Cut ap (mm)	Feed per Tooth (mm/tooth)			
					Cutting Edge Diameter D1 φ25	Cutting Edge Diameter D1 φ32	Cutting Edge Diameter D1 φ40	Cutting Edge Diameter D1 φ50-φ125
N	Aluminium Alloy	-0.25 D1	1000 (200-3000)	-5	0.35	0.35	0.40	0.40
				5-7.5	0.33	0.33	0.38	0.38
				7.5-10	0.30	0.30	0.35	0.35
				10-12.5	0.28	0.28	0.33	0.33
				12.5-14.5	0.25	0.25	0.30	0.30
				12.5-14.5	0.25	0.25	0.30	0.30
		-0.5 D1	1000 (200-3000)	-5	0.35	0.35	0.35	0.40
				5-7.5	0.33	0.33	0.33	0.38
				7.5-10	0.30	0.30	0.30	0.35
				10-12.5	0.25	0.28	0.28	0.33
				12.5-14.5	0.20	0.25	0.25	0.30
				12.5-14.5	0.20	0.25	0.25	0.30
-0.75 D1	1000 (200-3000)	-5	0.30	0.30	0.30	0.35		
		5-7.5	0.28	0.28	0.28	0.33		
		7.5-10	0.25	0.25	0.25	0.30		
		10-12.5	0.23	0.23	0.23	0.28		
		12.5-14.5	0.20	0.20	0.20	0.25		
		12.5-14.5	0.20	0.20	0.20	0.25		

(Note 1) The above cutting conditions are determined based on high workpiece 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 has poor clamping rigidity or when the machine rigidity or workpiece rigidity is low, vibrations can occur easily, if so, reduce cutting conditions such as width and depth of cut and feed per tooth.

Cutting conditions for slot milling

Work Material	Insert Grade	Width of Cut ae (mm)	Cutting Speed vc (m/min)	Depth of Cut ap (mm)	Feed per Tooth (mm/tooth)			
					Cutting Edge Diameter D1 φ25	Cutting Edge Diameter D1 φ32	Cutting Edge Diameter D1 φ40	Cutting Edge Diameter D1 φ50-φ125
N	Aluminium Alloy	D1	1000 (200-3000)	-5	0.25	0.25	0.30	0.35
				5-7.5	0.23	0.23	0.28	0.33
				7.5-10	0.20	0.20	0.25	0.30
				10-12.5	—	0.18	0.23	0.28
				12.5-14.5	—	0.15	0.20	0.25

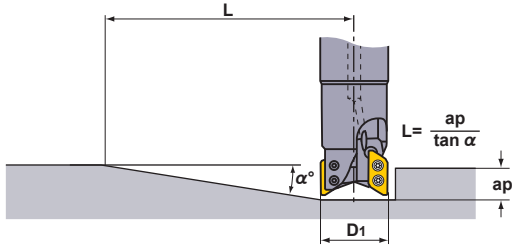
(Note 1) The above cutting conditions are determined based on high workpiece and machine rigidity, where no vibration occurred. If vibrations occur make adjustments according to the machining conditions.

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

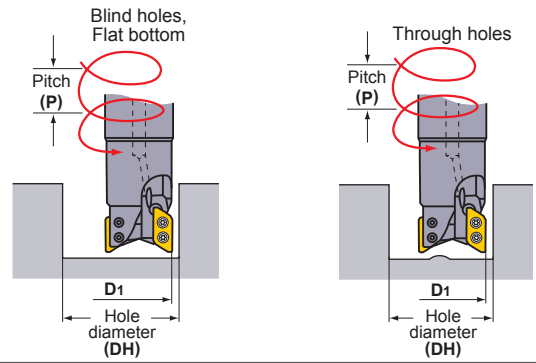
- When using long tool overhang.
- When pocket machining corner radii.
- When the workpiece has poor clamping rigidity or when the machine rigidity or workpiece rigidity is low, vibrations can occur easily, if so, reduce cutting conditions such as width and depth of cut and feed per tooth.

Ramping/Helical milling

Ramping



Helical milling



Ramping/Helical Milling

Holder Type	Cutting Edge Diameter D1 (mm)	Insert Corner Radius Re (mm)	Ramping		Helical Milling (Blind Hole, Flat Bottom)				Helical Milling (Through Hole)	
			Maximum Ramping Angle α°	Minimum Distance L *1 (mm)	Maximum Hole Diameter DH max. (mm)	Maximum Pitch P max. (mm)	Minimum Hole Diameter DH min. (mm)	Maximum Pitch P max. (mm)	Minimum Hole Diameter DH min. (mm)	Maximum Pitch P max. (mm)
A type	25	0.4-1.2	23.1	37	48.6 *2	29	45.7	27	31	7
		1.6-2.4	22.0	39	46.2 *3	24	44.1	24	31	7
		3.0-3.2	18.7	46	43.4 *4	19	42.6	18	32	6
	32	0.4-1.2	15.4	57	62.6 *2	25	59.7	24	45	10
		1.6-2.4	14.7	60	60.2 *3	21	58.0	21	45	10
		3.0-3.2	13.8	64	57.4 *4	19	56.5	18	45	9
	40	0.4-1.2	11.1	79	78.6 *2	22	75.7	22	61	12
		1.6-2.4	10.4	85	76.2 *3	20	74.0	19	61	11
		3.0-3.2	9.7	91	73.4 *4	17	72.4	17	61	11
	50	0.4-1.2	8.2	108	98.6 *2	21	95.7	20	81	13
		1.6-2.4	7.6	117	96.2 *3	18	93.9	18	81	12
		3.0-3.2	6.9	129	93.4 *4	16	92.4	16	81	11
	63	0.4-1.2	6.1	145	124.6 *2	20	121.6	19	107	14
		1.6-2.4	5.6	159	122.2 *3	17	119.9	17	107	13
		3.0-3.2	5.2	171	119.4 *4	16	118.3	15	107	12
	80	0.4-1.2	4.6	193	158.6 *2	19	155.6	19	141	15
		1.6-2.4	4.2	212	156.2 *3	17	153.9	17	141	13
		3.0-3.2	3.8	234	153.4 *4	15	152.3	15	141	12
	100	0.4-1.2	3.5	254	198.6 *2	18	195.6	18	181	15
		1.6-2.4	3.2	278	196.2 *3	16	193.9	16	181	14
		3.0-3.2	2.9	306	193.4 *4	14	192.3	14	181	12
	125	0.4-1.2	2.7	329	248.6 *2	18	245.6	17	231	15
		1.6-2.4	2.5	355	246.2 *3	16	243.9	16	231	14
		3.0-3.2	2.3	386	243.4 *4	14	242.3	14	231	13
B type	25	4.0	15.1	55	42.0	14	40.7	13	32	5
		5.0	13.7	61	40.2	11	39.8	11	33	5
	32	4.0	12.7	66	55.9	16	54.6	16	45	8
		5.0	12.0	70	54.1	14	53.6	14	45	8
	40	4.0	8.8	96	71.7	15	70.5	14	61	10
		5.0	8.2	103	69.8	13	69.5	13	61	9
	50	4.0	6.3	135	91.6	14	90.5	14	81	10
		5.0	5.8	146	89.7	12	89.4	12	81	9
	63	4.0	4.6	184	117.6	13	116.4	13	107	11
		5.0	4.2	202	115.7	12	115.4	12	107	10
	80	4.0	3.4	250	151.6	13	150.4	13	141	11
		5.0	3.1	274	149.7	11	149.4	11	141	10
100	4.0	2.6	326	191.6	13	190.4	12	181	11	
	5.0	2.4	354	189.7	11	189.4	11	181	10	
125	4.0	2.0	424	241.6	12	240.4	12	231	11	
	5.0	1.8	471	239.7	11	239.4	11	231	10	

(Note) The recommended ramping feed is 0.05mm/tooth or under.

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

$L = \frac{\text{maximum depth of cut } ap}{\tan \alpha}$. Maximum depth of cut A type is 15.5mm, B type is 14.8mm.

*2) Corner radius of 0.4mm. For other corner radii, use the following formula. $\{(cutting \text{ edge diameter } D1) - (corner \text{ radius } Re) - 0.3\} \times 2$

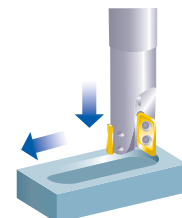
*3) Corner radius of 1.6mm. For other corner radii, use the following formula. $\{(cutting \text{ edge diameter } D1) - (corner \text{ radius } Re) - 0.3\} \times 2$

*4) Corner radius of 3.0mm. For other corner radii, use the following formula. $\{(cutting \text{ edge diameter } D1) - (corner \text{ radius } Re) - 0.3\} \times 2$

Max. Drilling Depth

Holder Type	Insert Corner R Re (mm)	Max. Drilling Depth (mm)		
		Cutting Edge Diameter D1 $\phi 25$	Cutting Edge Diameter D1 $\phi 32$	Cutting Edge Diameter D1 $\phi 40-\phi 125$
A type	0.4-1.2	5.2	5.2	5.3
	1.6-2.4	4.6	4.7	4.8
	3.0-3.2	3.7	4.2	4.4
B type	4.0	2.7	3.6	3.8
	5.0	2.3	3.3	3.5

AXD4000 can be effectively used for pocket machining without the need for a prepared hole.



AXD7000

Arbor Type



Fig. 1

ø50
ø63
ø80
ø100

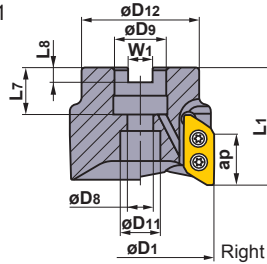
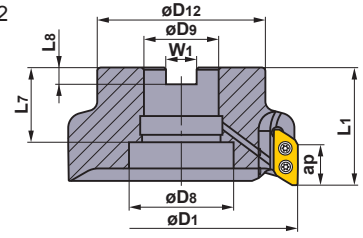


Fig. 2

ø250



Right hand tool holder only.

CH:0°
A.R.:+11° T:+26°-+29°
R.R.:+26°-+29° I:+11°

Light Alloy	Cast Iron	Carbon Steel - Alloy Steel	Stainless Steel	Hardened Steel

Cutter Diameter D1	Set Bolt	Geometry	
ø50, ø63	HSC10030H	①	
ø80	12035H		
ø100	16040H	②	
ø125	MBA20040H		

Type	Insert Corner Re	Order Number	Stock R	Number of Teeth	Dimensions (mm)								Tool Weight (kg)	Max. Depth of Cut ap (mm)	Ramping Angle α°	Max. Allowable Revolution (min ⁻¹)	Type (Fig.)	* Clamp Screw	Wrench	Anti-seize Lubricant	Insert	
					D1	L1	D9	L7	D8	D12	W1	L8										D11
A Type	0.8 3.2	AXD7000-050A03RA	●	3	50	50	22	20	11	45	10.4	6.3	17	0.4	21	9	30000	1	TS4SBL	TKY15D	MK1KS	XDX2270 PDFR-GL
		-063A03RA	●	3	63	50	22	20	11	50	10.4	6.3	17	0.5	21	7	25000	1	TS4SBL	TKY15D	MK1KS	
		R08004CA	●	4	80	63	25.4	26	13	63	9.5	6	20	1.2	21	5	23000	1	TS4SBL	TKY15D	MK1KS	
		R10005DA	●	5	100	63	31.75	32	17	70	12.7	8	26	1.8	21	4	19000	1	TS4SBL	TKY15D	MK1KS	
		R12506EA	●	6	125	63	38.1	40	56	90	15.9	10	-	2.7	21	3	16000	2	TS4SBL	TKY15D	MK1KS	
B Type	4.0 5.0	AXD7000-050A03RB	●	3	50	50	22	20	11	45	10.4	6.3	17	0.4	20.4	8	30000	1	TS4SBL	TKY15D	MK1KS	
		-063A03RB	●	3	63	50	22	20	11	50	10.4	6.3	17	0.5	20.4	6	25000	1	TS4SBL	TKY15D	MK1KS	
		R08004CB	●	4	80	63	25.4	26	13	63	9.5	6	20	1.2	20.4	4	23000	1	TS4SBL	TKY15D	MK1KS	
		R10005DB	●	5	100	63	31.75	32	17	70	12.7	8	26	1.8	20.4	3	19000	1	TS4SBL	TKY15D	MK1KS	
		R12506EB	●	6	125	63	38.1	40	56	90	15.9	10	-	2.7	20.4	2	16000	2	TS4SBL	TKY15D	MK1KS	

(Note 1) The maximum allowable spindle speeds are set to ensure tool and insert stability.

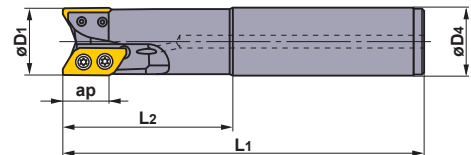
Before operating the tool read the operational guidance on page 2.

(Note 2) When using the tool at high spindle speeds, ensure that the tool and arbor are correctly balanced.

(Note 3) Note for inserts with a corner radius of 3.0 and above, as corner radius increases the L1 dimension decreases.

* Clamp Torque (N · m) : TS4SBL=3.5

Shank Type



Right hand tool holder only.

Type	Insert Corner Re	Order Number	Stock R	Number of Teeth	Dimensions (mm)				Max. Depth of Cut ap (mm)	Ramping Angle α°	Max. Allowable Revolution (min ⁻¹)	* Clamp Screw	Wrench	Anti-seize Lubricant	Insert
					D1	L1	L2	D4							
A Type	0.8 3.2	AXD7000R322SA32SA	●	2	32	170	80	32	21	19	41000	TS4SB	TKY15D	MK1KS	XDX2270 PDFR-GL
		402SA42SA	●	2	40	170	80	42	21	13	36000	TS4SBL	TKY15D	MK1KS	
B Type	4.0 5.0	AXD7000R322SA32SB	●	2	32	170	80	32	20.4	18	41000	TS4SB	TKY15D	MK1KS	
		402SA42SB	●	2	40	170	80	42	20.4	11	36000	TS4SBL	TKY15D	MK1KS	

(Note 1) The maximum allowable spindle speeds are set to ensure tool and insert stability.

Before operating the tool read the operational guidance on page 2.

(Note 2) When using the tool at high spindle speeds, ensure that the tool and milling chuck are correctly balanced.

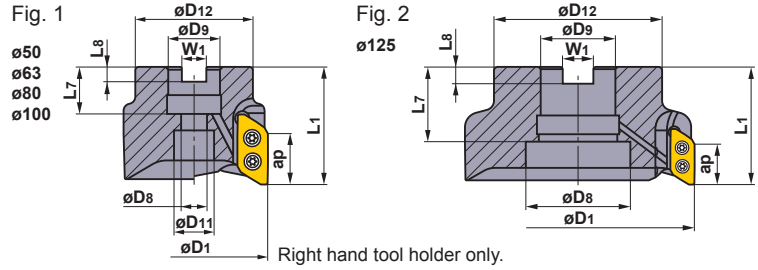
(Note 3) Note for inserts with a corner radius of 3.0 and above, as corner radius increases the L1 and L2 dimensions decrease.

* Clamp Torque (N · m) : TS4SB=3.5, TS4SBL=3.5

● : Inventory maintained.

AXD7000

Arbor Type



FOR METRIC ARBOR

The cutter bore diameter D9 is indicated in millimetre.

C.H.:0°
 A.R.:+11° T:+26°-+29°
 R.R.:+26°-+29° I:+11°

Cutter Diameter D1	Set Bolt	Geometry	
$\phi 50, \phi 63$	HSC10030H	①	
$\phi 80$	12035H		
$\phi 100$	16040H	②	
$\phi 125$	MBA20040H		

Type	Insert Corner Re	Order Number	Stock R	Number of Teeth	Dimensions (mm)									Tool Weight (kg)	Max. Depth of Cut ap (mm)	Ramping Angle α°	Max. Allowable Revolution (min ⁻¹)	Type (Fig.)	* Clamp Screw	Wrench	Anti-seize Lubricant	Insert
					D1	L1	D9	L7	D8	D12	W1	L8	D11									
A Type	0.8 3.2	AXD7000-050A03RA	●	3	50	50	22	20	11	45	10.4	6.3	17	0.4	21	9	30000	1	TS4SBL	TKY15D	MK1KS	XDGX2270 PDFR-GL
		-063A03RA	●	3	63	50	22	20	11	50	10.4	6.3	17	0.5	21	7	25000	1	TS4SBL	TKY15D	MK1KS	
		-080A04RA	●	4	80	63	27	23	13	63	12.4	7	20	1.2	21	5	23000	1	TS4SBL	TKY15D	MK1KS	
		-100A05RA	●	5	100	63	32	26	17	70	14.4	8	26	1.8	21	4	19000	1	TS4SBL	TKY15D	MK1KS	
		-125B06RA	●	6	125	63	40	40	56	90	16.4	9	-	2.7	21	3	16000	2	TS4SBL	TKY15D	MK1KS	
B Type	4.0 5.0	AXD7000-050A03RB	●	3	50	50	22	20	11	45	10.4	6.3	17	0.4	20.4	8	30000	1	TS4SBL	TKY15D	MK1KS	
		-063A03RB	●	3	63	50	22	20	11	50	10.4	6.3	17	0.5	20.4	6	25000	1	TS4SBL	TKY15D	MK1KS	
		-080A04RB	●	4	80	63	27	23	13	63	12.4	7	20	1.2	20.4	4	23000	1	TS4SBL	TKY15D	MK1KS	
		-100A05RB	●	5	100	63	32	26	17	70	14.4	8	26	1.8	20.4	3	19000	1	TS4SBL	TKY15D	MK1KS	
		-125B06RB	●	6	125	63	40	40	56	90	16.4	9	-	2.7	20.4	2	16000	2	TS4SBL	TKY15D	MK1KS	

(Note 1) The maximum allowable spindle speeds are set to ensure tool and insert stability.

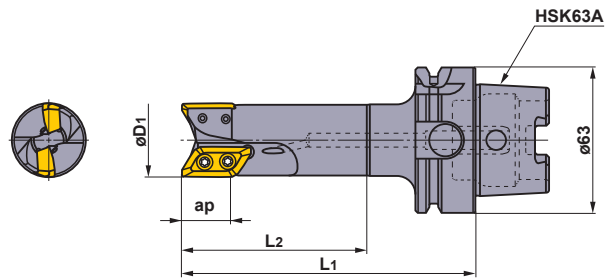
Before operating the tool read the operational guidance on page 2.

(Note 2) When using the tool at high spindle speeds, ensure that the tool and arbor are correctly balanced.

(Note 3) Note for inserts with a corner radius of 3.0 and above, as corner radius increases the L1 dimension decreases.

* Clamp Torque (N · m) : TS4SBL=3.5

HSK63A Shank Type



Right hand tool holder only.

Type	Insert Corner Re	Order Number	Stock R	Number of Teeth	Dimensions (mm)			Max. Depth of Cut ap (mm)	Ramping Angle α°	Max. Allowable Revolution (min ⁻¹)	* Clamp Screw	Wrench	Anti-seize Lubricant	Insert
					D1	L1	L2							
A Type	0.8 3.2	AXD7000R03202A-H63A	●	2	32	127	80	21	19	41000	TS4SB	TKY15D	MK1KS	XDGX2270 PDFR-GL
		04002A-H63A	●	2	40	132	85	21	13	36000	TS4SBL	TKY15D	MK1KS	
		05003A-H63A	●	3	50	137	90	21	9	30000	TS4SBL	TKY15D	MK1KS	

(Note 1) The maximum allowable spindle speeds are set to ensure tool and insert stability.

Before operating the tool read the operational guidance on page 2.

(Note 2) When using the tool at high spindle speeds, ensure that the tool and milling chuck are correctly balanced.


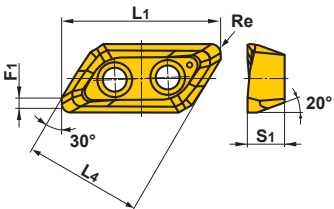
(Note 3) Note for inserts with a corner radius of 3.0 and above, as corner radius increases the L1 and L2 dimensions decrease.

(Note 4) There is no hole for a data chip.






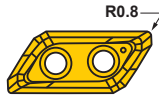
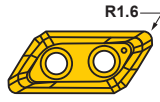
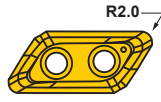
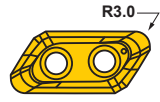
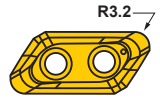


* Clamp Torque (N · m) : TS4SB=3.5, TS4SBL=3.5

● : Inventory maintained. (10 inserts in one case) □ : Non stock, produced to order only.

Inserts

Work Material	N	Aluminium Alloy	✚		●		Cutting Conditions (Guide): ● :Stable Cutting ● :General Cutting ✚ :Unstable Cutting					Honing: F :Sharp	
Shape	Order Number	Class	Honing	Stock		Dimensions (mm)					Geometry		
				Coated	Carbide	L1	L4	S1	F1	Re			
	XDGX227008PDFR-GL	G	F	□			●	30	22.5	7	2.0	0.8	
	227016PDFR-GL	G	F	□			●	30	22.5	7	1.2	1.6	
	227020PDFR-GL	G	F	□			●	30	22.5	7	0.8	2.0	
	227030PDFR-GL	G	F	□			●	28.8	22.5	7	0.8	3.0	
	227032PDFR-GL	G	F	□			●	28.8	22.5	7	0.6	3.2	
	227040PDFR-GL	G	F	□			●	27.5	22.5	7	0.9	4.0	
	227050PDFR-GL	G	F	□			●	27	22.5	7	0.4	5.0	

Holder And Insert Corner Radius Combination

Holder	A Type Holder					B Type Holder	
	AXD7000-  A AXD7000R-  A AXD7000R-  A-H63A					AXD7000-  B AXD7000R-  B	
Applicable Insert Corner R (Re)							
	XDGX 227008PDFR-GL	XDGX 227016PDFR-GL	XDGX 227020PDFR-GL	XDGX 227030PDFR-GL	XDGX 227032PDFR-GL	XDGX 227040PDFR-GL	XDGX 227050PDFR-GL

Recommended Cutting Conditions

Cutting conditions for shoulder milling

Work Material	Insert Grade	Width of Cut ae (mm)	Cutting Speed vc (m/min)	Depth of Cut ap (mm)	Feed per Tooth (mm/tooth)		
					Cutting Edge Diameter D1 φ32	Cutting Edge Diameter D1 φ40	Cutting Edge Diameter D1 φ50-φ125
N Aluminium Alloy	LC15TF TF15	-0.25 D1	1000 (200-3000)	-5	0.35	0.40	0.40
				5-10	0.30	0.35	0.35
				10-15	0.25	0.30	0.30
				15-20	0.20	0.25	0.25
		-0.5 D1	1000 (200-3000)	-5	0.35	0.35	0.40
				5-10	0.30	0.30	0.35
				10-15	0.25	0.25	0.30
				15-20	0.20	0.20	0.25
		-0.75 D1	1000 (200-3000)	-5	0.30	0.30	0.35
				5-10	0.25	0.25	0.30
				10-15	0.20	0.20	0.25
				15-20	0.15	0.15	0.20

(Note 1) The above cutting conditions are determined based on high workpiece 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 has poor clamping rigidity or when the machine rigidity or workpiece rigidity is low, vibrations can occur easily, if so, reduce cutting conditions such as width and depth of cut and feed per tooth.

Cutting conditions for slot milling

Work Material	Insert Grade	Width of Cut ae (mm)	Cutting Speed vc (m/min)	Depth of Cut ap (mm)	Feed per Tooth (mm/tooth)		
					Cutting Edge Diameter D1 φ32	Cutting Edge Diameter D1 φ40	Cutting Edge Diameter D1 φ50-φ125
N Aluminium Alloy	LC15TF TF15	D1	1000 (200-3000)	-5	0.25	0.30	0.35
				5-10	0.20	0.25	0.30
				10-15	0.15	0.20	0.25
				15-20	0.10	0.15	0.20

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

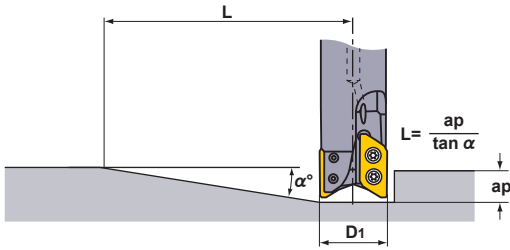
(Note 2) Note, vibrations may occur in the following conditions.

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

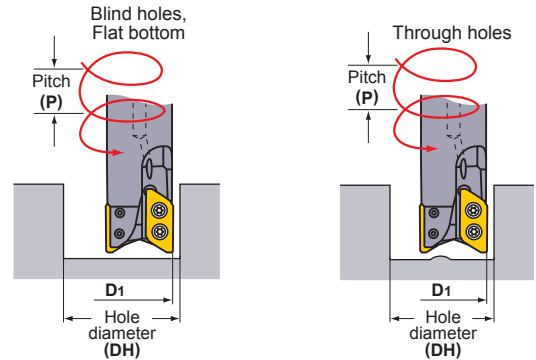
AXD7000

Ramping/Helical milling

Ramping



Helical milling



Ramping/Helical Milling

Holder Type	Cutting Edge Diameter D1 (mm)	Ramping		Helical Milling (Blind Hole, Flat Bottom)				Helical Milling (Through Hole)	
		Maximum Ramping Angle α°	Minimum Distance L *1 (mm)	Maximum Hole Diameter DH max. *2 (mm)	Maximum Pitch P max. (mm)	Minimum Hole Diameter DH min. *3 (mm)	Maximum Pitch P max. (mm)	Minimum Hole Diameter DH min. (mm)	Maximum Pitch P max. (mm)
A type	32	19	61	61.8	21	58.2	20	41	7
	40	13	91	77.8	18	74.2	17	57	9
	50	9	133	97.8	16	94.2	16	77	10
	63	7	171	123.8	15	120.2	15	103	11
	80	5	240	157.8	16	154.2	15	137	12
	100	4	300	197.8	15	194.2	15	177	12
B type	32	18	63	55.4	16	54.0	16	41	7
	40	11	105	71.4	14	70.0	14	57	8
	50	8	146	91.4	13	90.0	12	77	8
	63	6	195	117.4	11	116.0	11	103	8
	80	4	293	151.4	11	150.0	11	137	9
	100	3	391	191.4	9	190.0	9	177	8
	125	2	587	241.4	12	240.0	12	227	11

(Note) The recommended ramping feed is 0.05mm/tooth or under.

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

$L = (\text{maximum depth of cut } ap / \tan \alpha)$. Maximum depth of cut A type is 21mm, B type is 20.4mm.

*2) The maximum diameter when machining a blind hole with a flat face using a corner radius of 0.8mm for A type and 4mm for B type.

For other corner radii, use the below formula.
 $\{(\text{cutting edge diameter } D1) - (\text{corner radius } Re) - 0.3\} \times 2$

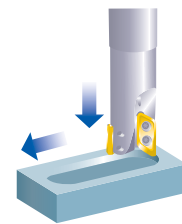
*3) The minimum diameter when machining a blind hole with a flat face using a corner radius of 0.8mm for A type and 4mm for B type.

For other corner radii, use the below formula.
 $\{(\text{cutting edge diameter } D1) - (\text{corner radius } Re) - (\text{Width of wiper edge } F1) - 0.1\} \times 2$

Max. Drilling Depth

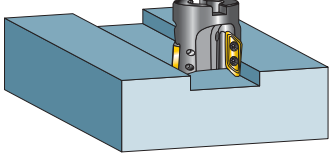
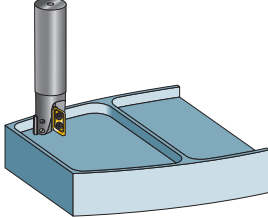
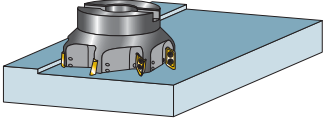
Type	Insert Corner R Re (mm)	Max. Drilling Depth (mm)
A type	0.8	5
	3.2	
B type	4.0	4
	5.0	

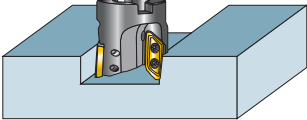
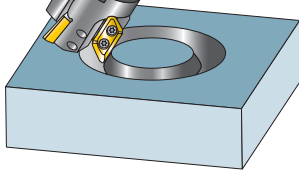
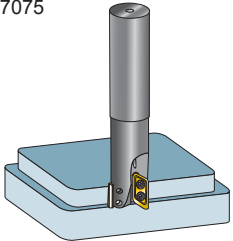
AXD7000 can be effectively used for pocket machining without the need for a prepared hole.



AXD Series

Application Examples

Tool		AXD4000-050A02RA	AXD4000R322SA32SA	AXD4000R12507EA
Insert (Grade)		XDGX175030PDFR-GL(TF15)	XDGX175030PDFR-GL(TF15)	XDGX175008PDFR-GL(TF15)
Workpiece		JIS A7075 	JIS A7050 	JIS A5052 
Cutting Conditions	Spindle speed (min ⁻¹)	27000	13000	5000
	Cutting Speed (m/min)	4240	1300	1960
	Feed per Tooth (mm/tooth)	0.285	0.2	0.3
	Depth of Cut (mm)	6	12	5
	Width of Cut (mm)	50	20	80
	Metal Removal Rate (cm ³ /min)	4620	1250	4200
Coolant		Wet	Wet	Wet
Machine Spindle Type		M/C-HSK80F	M/C-BT50	M/C-BT50
Result		Although tool overhang was significant, the low cutting resistance compared with conventional products enabled stable milling.	Compared with conventional products, tool rigidity is high, obtaining an excellent surface finish.	Compared with conventional products, cutting resistance is low, and feed rate per tooth was improved by 20%.

Tool		AXD7000-050A03RB	AXD7000-050A03RA	AXD7000R402SA42SA
Insert (Grade)		XDGX227040PDFR-GL(TF15)	XDGX227008PDFR-GL(TF15)	XDGX227008PDFR-GL(TF15)
Workpiece		JIS A7075 	JIS A7075 	JIS A7075 
Cutting Conditions	Spindle speed (min ⁻¹)	18000	12500	7950
	Cutting Speed (m/min)	2830	1960	1000
	1Feed per Tooth (mm/tooth)	0.2	0.27	0.2
	Depth of Cut (mm)	18	10	10
	Width of Cut (mm)	50	20	5
	Metal Removal Rate (cm ³ /min)	9720	1010	160
Coolant		MQL	Wet	Wet
Machine Spindle Type		M/C-HSK63/80A	M/C-BT50	M/C-HSK63A
Result		AXD displayed lower cutting resistance and achieved a high metal removal rate of up to 9720cc/min.	Clamping rigidity of the inserts was higher than a conventional product, thus allowing stable 5-axis machining.	AXD achieved excellent results with vertical wall accuracy of under 0.007mm.

● Please note that the machining performed in the application examples is dependent on the rigidity of the machine used and the rigidity of the workpiece and clamping.



For Machining of Aluminium Alloys

AXD Series

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 spanner. ●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.)