DIA EDGE

TOOL NEWS

2018.12 Update
B200G

Exchangeable Head End Mills

iMX End Mill Series

World First!*

"Carbide"+"Carbide"

(Head) (Holder)

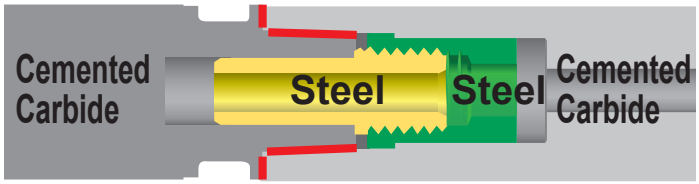
Double Face Contact Type

*According to our own research on exchangeable head end mills.

MITSUBISHI MATERIALS CORPORATION

Exchangeable Head End Mills

iMX End Mill Series

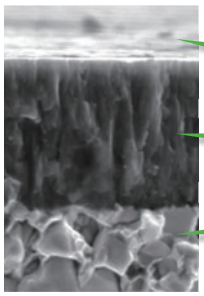


The iMX series is a revolutionary end mill system that enables efficiency, high accuracy and rigidity by combining the advantages of both solid carbide and indexable end mills.
Security and rigidity close to that of a solid type end mill because the contact faces are all carbide.
Excellent for reduced inventory over a variety of applications due to the exchangeable head.

Highly Versatile Grades

EP7020

Suitable for difficult-to-cut materials.



- Smoothed Surface "ZERO-μ Surface"
- (Al, Cr)N Based Coating
- Super-fine Particle, Carbide Material

EP8100 Series (EP8110, EP8120)

Suitable for milling of hardened steels.

EP6120

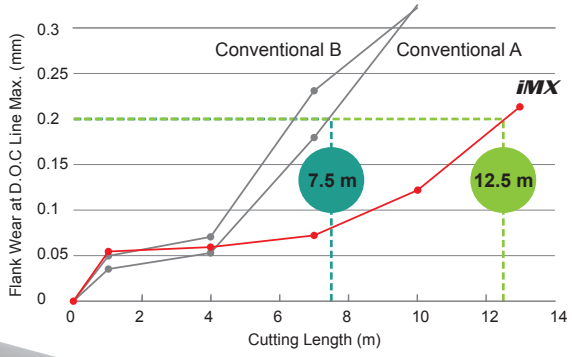
Suitable for high feed milling of steels.

ET2020 (Uncoated)

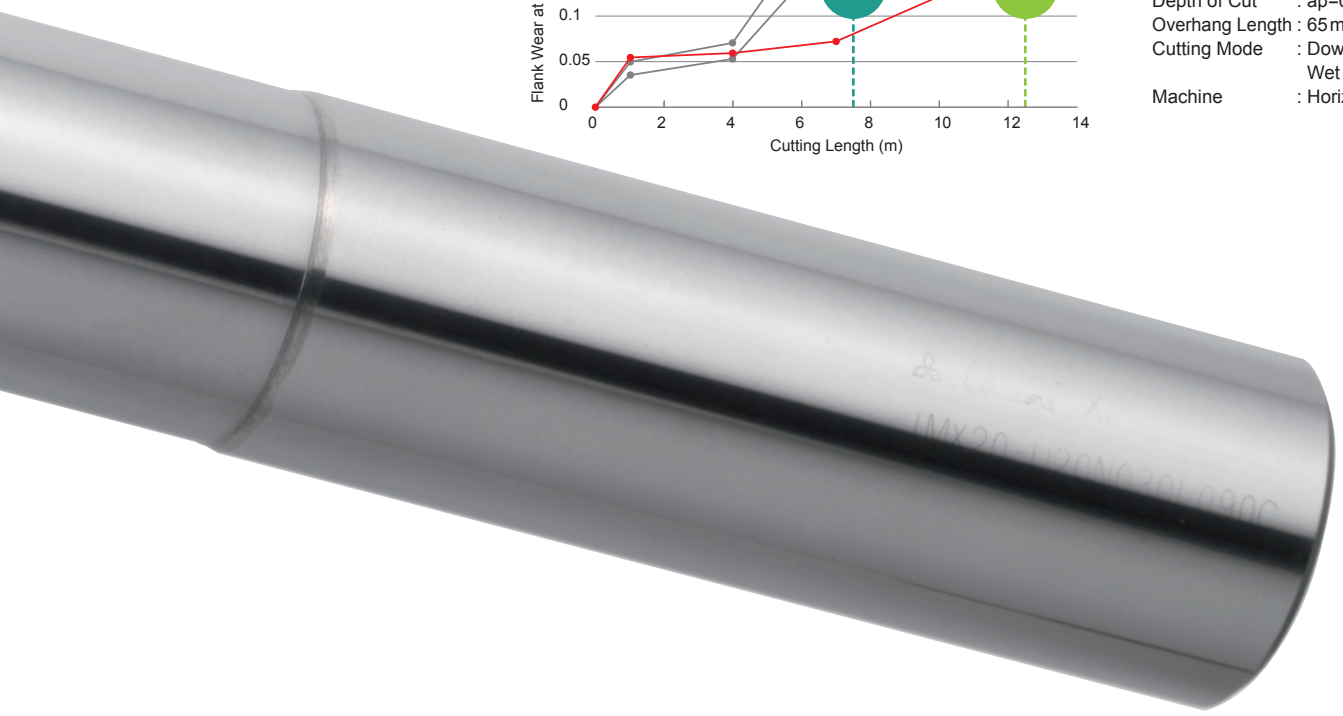
Suitable for milling of aluminum alloys.

Tool Life Comparison when Machining Flat Surfaces in Inconel 718

EP7020 is a grade that enables extended tool life when machining difficult-to-cut materials.

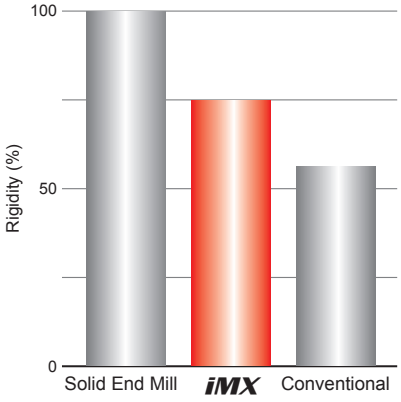


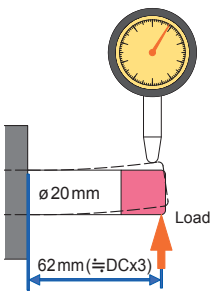
Work Material	: Inconel718 (43HRC)
Holder	: IMX12-U12N041L100C
Head	: IMX12B4HV12012
Revolution	: n=1700min^{-1}
Cutting Speed	: vc=28m/min
Table Feed	: vf=350mm/min
Feed per Tooth	: fz=0.05mm/t.
Depth of Cut	: ap=0.6mm, ae=1.2mm
Overhang Length	: 65mm
Cutting Mode	: Down(Climb) Cut, Wet Cutting (Emulsion)
Machine	: Horizontal MC (BT40)



Comparison of Tool Rigidity

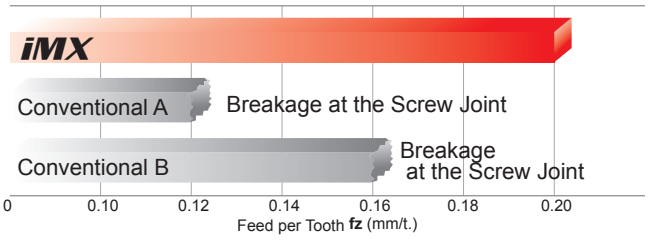
The double face contact of the carbide head and carbide holder gives an increase in rigidity of 30%.





Strength Comparison when Slot Milling Titanium Alloys

The reliability of the screw fastening is significantly improved when compared to conventional that employ only steel fastenings. It is also able to cope with high cutting loads.



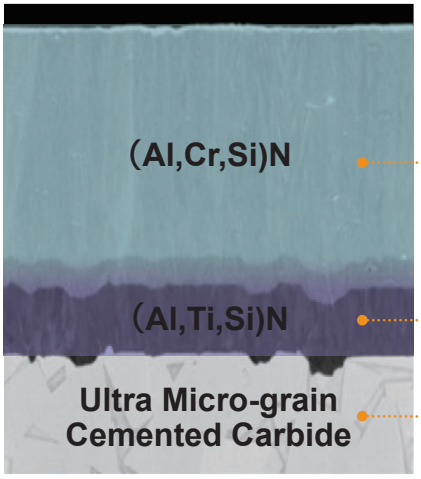
Work Material	: Ti-6Al-4V (32HRC)	Feed per Tooth	: Above (Expansion)
Holder	: IMX20-U20N030L090C	Depth of Cut	: ap=10mm, ae=20mm
Head	: IMX20C4HV200R10021	Overhang Length	: 72mm
Revolution	: n=1100min^{-1}	Cutting Mode	: Wet Cutting (Emulsion)
Cutting Speed	: vc=69m/min	Machine	: Vertical MC (BT50)

Exchangeable Head End Mills

iMX New Line-up

EP8100 Series (EP8110/EP8120)

The combination of the (Al,Cr,Si)N coating (newly-developed),which has a high oxidation temperature and high lubricity,together with the (Al,Ti,Si)N coating,which has better wear resistance and high adhesion,allows hardened steels with even greater strength to be maintained.

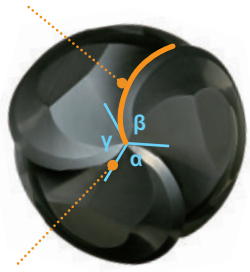


★High Oxidation Temperature
★High Lubricity

★Better Wear Resistance
★High Adhesion

iMX-B3FV

High Helical tooth improves fracture resistance.



Reduced vibration by optimized irregular curve.
α ≠ β ≠ γ

Stable wall machining is possible with a strong back taper angle.

EP8120 is ideal for processing hot forging dies.

iMX-B2S/iMX-B4S NEW

(Picture is iMX-B2S)

Low helix tooth is suitable for finishing.

EP8110 is ideal for processing high hardned steels.(≤ 65HRC)

Head

(mm)

Type	Applications, Features	No. of Flutes	Product Code	Shape	Dia. DC	Coolant	Long Cutting Edge	Work Material P: Carbon Steel	P: Tool Steel	H: -55HRC	H: 55HRC-	M: Stainless Steel	S: Titanium Alloy, Heat Resistant Alloy	N: Copper Alloy	N: Aluminum Alloy	Dimensions	Cutting Conditions
Square																	
	For Difficult-to-cut Materials	3	iMX-S3HV	Square head, 3 flute, Irregular helix 	10—25			◎	○			◎	◎	○		P8	P36 P37 P38
		4	iMX-S4HV	Square head, 4 flute, Irregular helix 	10—32			◎	○			◎	◎	○		P9	P39 P40 P42 P43
				Square head, 4 flute, Irregular helix, Long cutting edge type 	16, 20		●									P9	P41
		4	iMX-S4HV-S	Square head, 4 flute, Irregular helix, With coolant hole 	10—25	●		◎	○			◎	◎	○		P10	P39 P40
	For Aluminum Alloys	3	iMX-S3A	Square head, 3 flute, For aluminum alloys 	10—28										◎	P11	P52 P53
Radius																	
	For Difficult-to-cut Materials	4	iMX-C4HV	Corner radius head, 4 flute, Irregular helix 	10—28			◎	○			◎	◎	○		P19 P20	P39 P40 P42 P43
				Corner radius head, 4 flute, Irregular helix, Long cutting edge type 	16, 20		●									P21	P41
		4	iMX-C4HV-S	Corner radius head, 4 flute, Irregular helix, With coolant hole 	10—25	●		◎	○			◎	◎	○		P22 P23	P39 P40
		6	iMX-C6HV	Corner radius head, Multi-flute, Irregular helix 	10, 12			◎	○			◎	◎			P24	P54
		10	iMX-C10HV		16			◎	○			◎	◎				
		12	iMX-C12HV		20, 25			◎	○			◎	◎				
	For High Feed	4	iMX-C4FD-C	Duplex corner radius head, 4 flute, For high feed, With coolant hole 	10—25	●		◎	◎	◎		◎	◎	○		P25	P50
	For High Efficiency Machining	4	iMX-C4FV	Corner radius head, 4 flute, Irregular helix, For high efficiency machining 	10—25			◎	◎	◎						P26	P51
	For Aluminum Alloys	3	iMX-C3A	Corner radius head, 3 flute, For aluminum alloys 	10—28										◎	P27	P52 P53
	For Blade	8	iMX-C8T-C	Corner radius, Taper head, Multi-flute, With coolant hole 	8	●						◎	◎			P28	P55
		10	iMX-C10T-C		10	●						◎	◎				
		12	iMX-C12T-C		15, 19	●						◎	◎				
		15	iMX-C15T-C		15, 19	●						◎	◎				

Head

(mm)

Type	Applications, Features	No. of Flutes	Product Code	Shape	Dia. DC	Coolant	Long Cutting Edge	Work Material P: Carbon Steel	P: Tool Steel	H: -55HRC	H: 55HRC-	M: Stainless Steel	S: Titanium Alloy, Heat Resistant Alloy	N: Copper Alloy	N: Aluminum Alloy	Dimensions	Cutting Conditions
Roughing																	
	For Difficult-to-cut Materials	4	iMX-R4F	Roughing head, 4 flute 	10—25			◎	○			◎	◎	○		P12	P44 P45
Ball																	
	For Hardened Steels	2	NEW iMX-B2S	Ball nose head, 2 flute, For hardened steels 	16—20						◎					P13	P46
		4	NEW iMX-B4S	Ball nose head, 4 flute, For hardened steels 	16—20						◎					P14	P46
	For High Efficiency Machining	3	iMX-B3FV	Ball nose head, 3 flute, Irregular curve, For high efficiency machining 	10—20				◎	◎						P15	P47
	For Difficult-to-cut Materials	4	iMX-B4HV	Ball nose head, 4 flute, Irregular curve 	10—25			◎	○			◎	◎	○		P16	P48
		4	iMX-B4HV-E	Ball nose head, 4 flute, Irregular curve, With coolant hole 	10—25	●		◎	○			◎	◎	○		P17	P48
		6	iMX-B6HV	Ball nose head, 6 flute, Irregular curve 	10—25			◎	○			◎	◎			P18	P49
Chamfer																	
	For Chamfer Materials	3	iMX-CH3L	Chamfer head, 3 flute 	10—20			◎	○	○		◎	◎			P29	P56 P57
		6	iMX-CH6V	Chamfer head, 6 flute 	12—20			◎	○	○		◎	◎			P30	P58

Holder

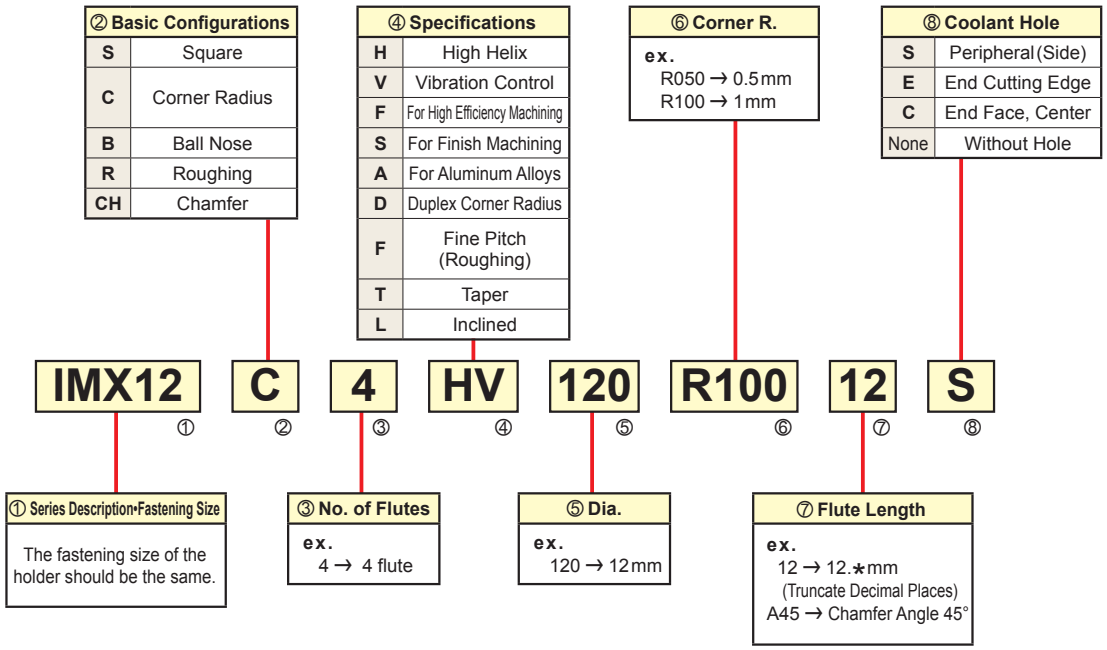
The undercut type holders are available in medium, semi-long, and long lengths.

Type			Length	Taper Angle	Material
Undercut			Medium Semi-long Long	—	Carbide Steel
Straight	Straight		Semi-long Long	—	Carbide
	Straight Oversize		Medium	—	Steel
Taper Neck			Long	1°	Carbide

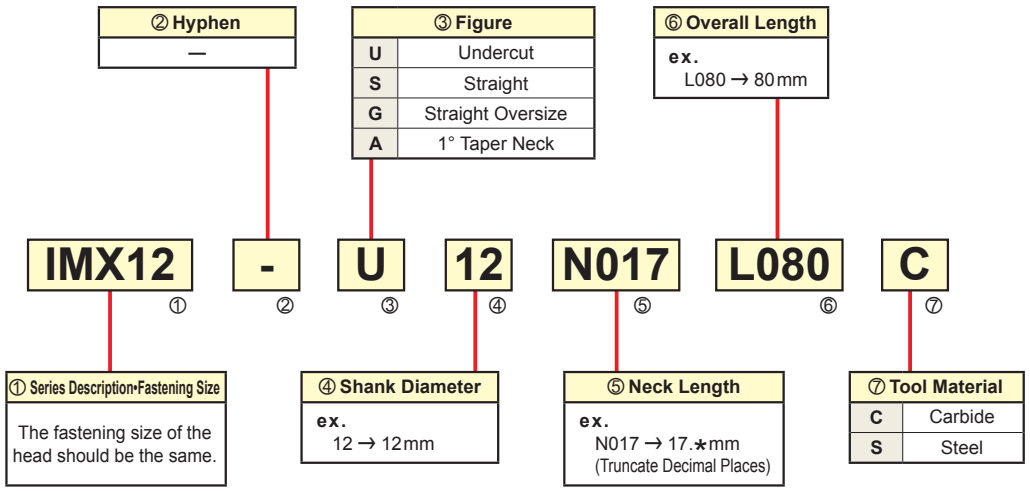
IDENTIFICATION

iMX End Mill Series

Head



Holder



Run-out Accuracy and Head Exchange Accuracy

(mm)

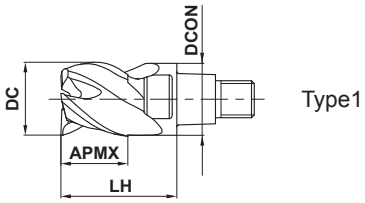
External Diameter **DC**	Run-out Accuracy for the Peripheral Cutting Edge*	Head Exchange Accuracy (Axial)
$<\phi 25$	0.015	±0.02
$\geq\phi 25$	0.020	

∗ Use the carbide holder.

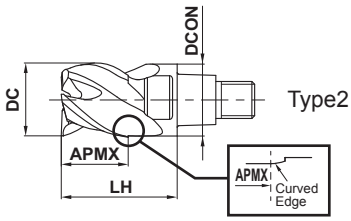
iMX-S3HV

Square head, 3 flute, Irregular helix

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminum Alloy
◎	○			◎	◎	○	



Type1



Type2

DC ≤12	DC>12			
0 - 0.020	0 - 0.030			

- 3-flute end mills suitable for shoulder milling, slot milling and plunging.
- Irregular helix controls vibration and achieves stable machining.

(mm)

	Order Number	DC	APMX	LH	DCON	*1 No.F	Grade EP7020	Type
*	IMX10S3HV10008	10	8	16	9.7	3	●	2
NEW	IMX12S3HV12009	12	9.6	19	11.7	3	●	2
	IMX12S3HV12010	12	10.1	19	11.7	3	●	1
NEW	IMX16S3HV16012	16	12.8	24	15.5	3	●	2
	IMX16S3HV16013	16	13.3	24	15.5	3	●	1
NEW	IMX20S3HV20016	20	16	30	19.5	3	●	2
	IMX20S3HV20017	20	17	30	19.5	3	●	1
NEW	IMX25S3HV25020	25	20	37.5	24.5	3	●	2
	IMX25S3HV25021	25	21	37.5	24.5	3	●	1

(Note 1) The fastening size of the holder and head should be the same. (refer to P7)

* The geometry shown in figure 1 is sequentially switched to the geometry with a curved edge shown in figure 2.
When you require designating with a curved edge, please specify "with a curved edge".

*1 Number of Flutes

CUTTING CONDITIONS ➤ P36,37,38

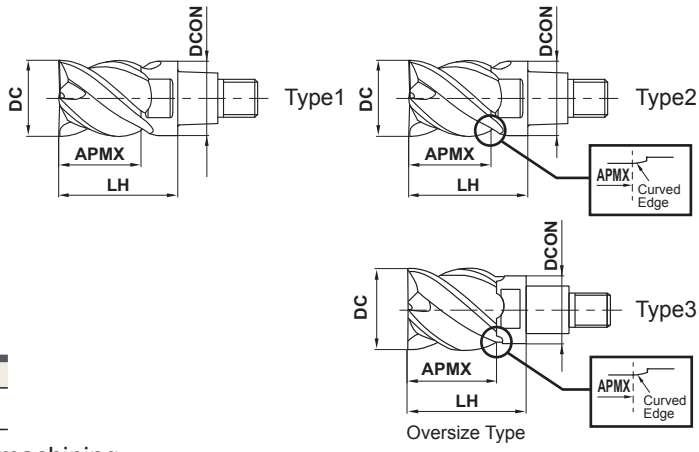
DC = Dia.
APMX = Length of Cut
LH = Head Length
DCON = Neck Dia.

● : Inventory maintained in Japan.

iMX-S4HV

Square head, 4 flute, Irregular helix

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminum Alloy
◎	○			◎	◎	○	



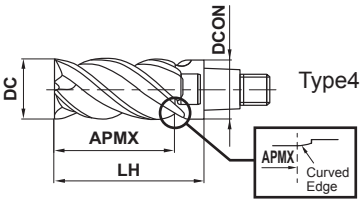
DC ≤12	DC>12			
0 - 0.020	0 - 0.030			

● Irregular helix controls vibration and achieves stable machining.

(mm)

	Order Number	DC	APMX	LH	DCON	*1 No.F	Grade EP7020	Type
*	IMX10S4HV10010	10	10	16	9.7	4	●	2
	IMX10S4HV12012	12	12.5	19	9.7	4	●	3
*	IMX12S4HV12012	12	12	19	11.7	4	●	2
	IMX12S4HV14014	14	14.5	22.5	11.7	4	●	3
*	IMX16S4HV16016	16	16	24	15.5	4	●	2
	IMX16S4HV18018	18	18.5	27	15.5	4	●	3
NEW	IMX20S4HV20020	20	20	30	19.5	4	●	2
	IMX20S4HV20021	20	21	30	19.5	4	●	1
	IMX20S4HV22023	22	23	33	19.5	4	●	3
NEW	IMX25S4HV25025	25	25	37.5	24.5	4	●	2
	IMX25S4HV25026	25	26	37.5	24.5	4	●	1
	IMX25S4HV28029	28	29	41.5	24.5	4	●	3
	IMX25S4HV30031	30	31	43.5	24.5	4	●	3
	IMX25S4HV32033	32	33	45.5	24.5	4	●	3

CUTTING CONDITIONS ➤ P39,40,42,43



Long Cutting Edge Type

(mm)

Order Number	DC	APMX	LH	DCON	*1 No.F	Grade EP7020	Type
IMX16S4HV16032	16	32	40	15.5	4	●	4
IMX20S4HV20040	20	40	50	19.5	4	●	4

CUTTING CONDITIONS ➤ P41

(Note 1) The fastening size of the holder and head should be the same. (refer to P7)
* The geometry shown in figure 1 is sequentially switched to the geometry with a curved edge shown in figure 2.
When you require designating with a curved edge, please specify "with a curved edge".
*1 Number of Flutes

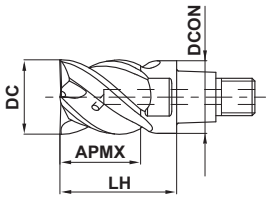
● : Inventory maintained in Japan.

iMX-S4HV-S

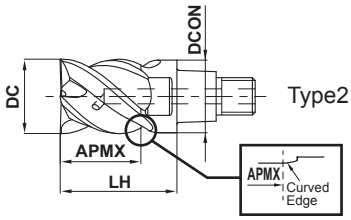
Square head, 4 flute, Irregular helix, With coolant hole

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminum Alloy
◎	○			◎	◎	○	

Peripheral Cutting Edge with Coolant Hole



Type1



Type2

DC ≤12	DC>12			
0 - 0.020	0 - 0.030			

- Coolant holes for each cutting edge enables a stable coolant supply.
- Irregular helix controls vibration and achieves stable machining.

(mm)

	Order Number	DC	APMX	LH	DCON	∗1 No.F	Grade EP7020	Type
∗	IMX10S4HV10010S	10	10	16	9.7	4	●	2
∗	IMX12S4HV12012S	12	12	19	11.7	4	●	2
∗	IMX16S4HV16016S	16	16	24	15.5	4	●	2
NEW	IMX20S4HV20020S	20	20	30	19.5	4	●	2
	IMX20S4HV20021S	20	21	30	19.5	4	●	1
NEW	IMX25S4HV25025S	25	25	37.5	24.5	4	●	2
	IMX25S4HV25026S	25	26	37.5	24.5	4	●	1

(Note 1) The fastening size of the holder and head should be the same. (refer to P7)

∗ The geometry shown in figure 1 is sequentially switched to the geometry with a curved edge shown in figure 2.
When you require designating with a curved edge, please specify "with a curved edge".

∗1 Number of Flutes

CUTTING CONDITIONS ➤ P39,40

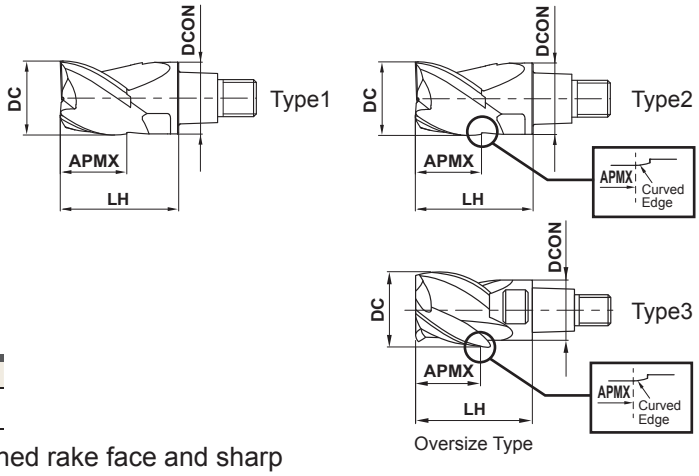
DC = Dia. **LH** = Head Length
APMX = Length of Cut **DCON** = Neck Dia.

Exchangeable Head End Mills

iMX-S3A

Square head, 3 flute, For aluminum alloys

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminum Alloy
							◎



DC ≤12	DC>12			
0 - 0.020	0 - 0.030			

● High efficiency machining is possible due to the polished rake face and sharp cutting edge.

(mm)

	Order Number	DC	APMX	LH	DCON	∗1 No.F	Grade ET2020	Type
∗	IMX10S3A10008	10	8	16	9.7	3	●	2
	IMX10S3A12010	12	10.1	19	9.7	3	●	3
NEW	IMX12S3A12009	12	9.6	19	11.7	3	●	2
	IMX12S3A12010	12	10.1	19	11.7	3	●	1
	IMX12S3A14011	14	11.7	22.5	11.7	3	●	3
NEW	IMX16S3A16012	16	12.8	24	15.5	3	●	2
	IMX16S3A16013	16	13.3	24	15.5	3	●	1
	IMX16S3A18014	18	14.9	27	15.5	3	●	3
NEW	IMX20S3A20016	20	16	30	19.5	3	●	2
	IMX20S3A20017	20	17	30	19.5	3	●	1
	IMX20S3A22018	22	18.6	33	19.5	3	●	3
NEW	IMX25S3A25020	25	20	37.5	24.5	3	●	2
	IMX25S3A25021	25	21	37.5	24.5	3	●	1
	IMX25S3A28023	28	23.4	41.5	24.5	3	●	3

(Note 1) The fastening size of the holder and head should be the same. (refer to P7)

∗ The geometry shown in figure 1 is sequentially switched to the geometry with a curved edge shown in figure 2.
When you require designating with a curved edge, please specify "with a curved edge".

∗1 Number of Flutes

CUTTING CONDITIONS ➤ P52,53

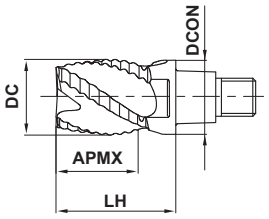
DC = Dia. **LH** = Head Length
APMX = Length of Cut **DCON** = Neck Dia.

● : **Inventory maintained in Japan.**

iMX-R4F

Roughing head, 4 flute

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminum Alloy
◎	○			◎	◎	○	



Type1

- The roughing edge geometry reduces cutting resistance.
  Effective when rigidity of the machine or work material is low.

(mm)

Order Number	DC	APMX	LH	DCON	* No.F	Grade EP7020	Type
IMX10R4F10010	10	10.5	16	9.7	4	●	1
IMX12R4F12012	12	12.5	19	11.7	4	●	1
IMX16R4F16016	16	16.5	24	15.5	4	●	1
IMX20R4F20021	20	21	30	19.5	4	●	1
IMX25R4F25026	25	26	37.5	24.5	4	●	1

(Note 1) The fastening size of the holder and head should be the same. (refer to P7)
* Number of Flutes

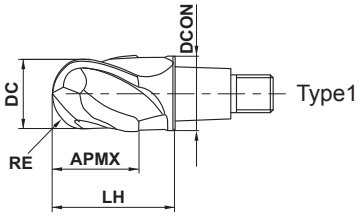
CUTTING CONDITIONS ➢ **P44,45**

DC = Dia.
APMX = Length of Cut
LH = Head Length
DCON = Neck Dia.

iMX-B2S NEW

Ball nose head, 2 flute, For hardened steels

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (55–65HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminum Alloy
			◎				



R					
RE ≥8					
±0.020					

● Ideal for machining with long overhangs.

(mm)

Order Number	RE	DC	APMX	LH	DCON	∗ No.F	Grade EP8110	Type
IMX16B2S16016	8	16	16	24	15.5	2	●	1
IMX20B2S20020	10	20	20	30	19.5	2	●	1

(Note 1) The fastening size of the holder and head should be the same. (refer to P7)
∗ Number of Flutes

CUTTING CONDITIONS ➤ P46

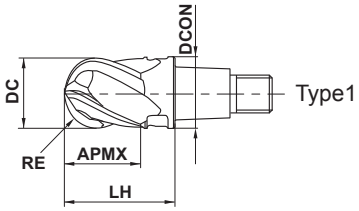
RE = Radius of Ball Nose
DC = Dia.
APMX = Length of Cut
LH = Head Length
DCON = Neck Dia.

● : **Inventory maintained in Japan.**

iMX-B4S NEW

Ball nose head, 4 flute, For hardened steels

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (55–65HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminum Alloy
			◎				



R					
RE≥8					
±0.020					

● High efficiency machining is realized even with machining using the tip.

(mm)

Order Number	RE	DC	APMX	LH	DCON	No.F	Grade EP8110	Type
IMX16B4S16016	8	16	16	24	15.5	4	●	1
IMX20B4S20020	10	20	20	30	19.5	4	●	1

(Note 1) The fastening size of the holder and head should be the same. (refer to P7)
∗ Number of Flutes

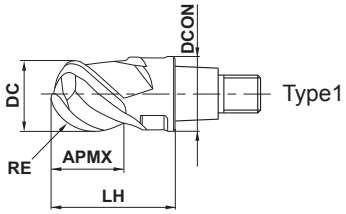
CUTTING CONDITIONS ➤ P46

RE = Radius of Ball Nose **APMX** = Length of Cut **DCON** = Neck Dia.
DC = Dia. **LH** = Head Length

iMX-B3FV

Ball nose head, 3 flute, Irregular curve, For high efficiency machining

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminum Alloy
	◎	◎					



R	RE≤6	RE>6			
	±0.010	±0.020			

● High efficiency machining is possible in deep engraving processing(DCx5)

(mm)

Order Number	RE	DC	APMX	LH	DCON	* No.F	Grade EP8120	Type
IMX10B3FV10008	5	10	8	16	9.7	3	●	1
IMX12B3FV12009	6	12	9.6	19	11.7	3	●	1
IMX16B3FV16012	8	16	12.8	24	15.5	3	●	1
IMX20B3FV20016	10	20	16	30	19.5	3	●	1

(Note 1) The fastening size of the holder and head should be the same. (refer to P7)

* Number of Flutes

CUTTING CONDITIONS ➤ P47

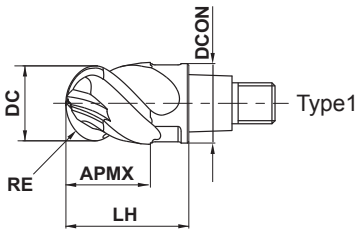
RE = Radius of Ball Nose **APMX** = Length of Cut **DCON** = Neck Dia.
DC = Dia. **LH** = Head Length

● : **Inventory maintained in Japan.**

iMX-B4HV

Ball nose head, 4 flute, Irregular curve

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminum Alloy
◎	○			◎	◎	○	



RE≤6	RE>6			
±0.010	±0.020			
DC≤12	DC>12			
0 - 0.020	0 - 0.030			

● Irregular curve cutting edge controls vibration and achieves stable machining.

(mm)

Order Number	RE	DC	APMX	LH	DCON	* No.F	Grade EP7020	Type
IMX10B4HV10010	5	10	10.5	16	9.7	4	●	1
IMX12B4HV12012	6	12	12.5	19	11.7	4	●	1
IMX16B4HV16016	8	16	16.5	24	15.5	4	●	1
IMX20B4HV20021	10	20	21	30	19.5	4	●	1
IMX25B4HV25026	12.5	25	26	37.5	24.5	4	●	1

(Note 1) The fastening size of the holder and head should be the same. (refer to P7)

∗ Number of Flutes

CUTTING CONDITIONS ➤ **P48**

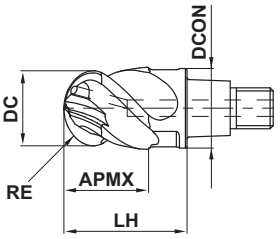
RE = Radius of Ball Nose **APMX** = Length of Cut **DCON** = Neck Dia.
DC = Dia. **LH** = Head Length

iMX-B4HV-E

Ball nose head, 4 flute, Irregular curve, With coolant hole

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminum Alloy
◎	○			◎	◎	○	

End Cutting Edge with Coolant Hole



Type1

R	RE≤6	RE>6			
	±0.010	±0.020			
	DC≤12	DC>12			
	0 -0.020	0 -0.030			

- Coolant holes for each cutting edge enables a stable coolant supply.
- Irregular curve cutting edge controls vibration and achieves stable machining.

(mm)

Order Number	RE	DC	APMX	LH	DCON	* No.F	Grade EP7020	Type
IMX10B4HV10010E	5	10	10.5	16	9.7	4	●	1
IMX12B4HV12012E	6	12	12.5	19	11.7	4	●	1
IMX16B4HV16016E	8	16	16.5	24	15.5	4	●	1
IMX20B4HV20021E	10	20	21	30	19.5	4	●	1
IMX25B4HV25026E	12.5	25	26	37.5	24.5	4	●	1

(Note 1) The fastening size of the holder and head should be the same. (refer to P7)

∗ Number of Flutes

CUTTING CONDITIONS ➢ P48

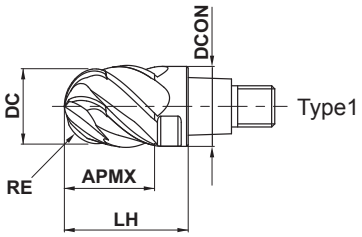
RE = Radius of Ball Nose **APMX** = Length of Cut **DCON** = Neck Dia.
DC = Dia. **LH** = Head Length

● : Inventory maintained in Japan.

iMX-B6HV

Ball nose head, 6 flute, Irregular curve

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminum Alloy
◎	○			◎	◎		



R	RE≤6	RE>6			
	±0.010	±0.020			
	DC≤12	DC>12			
	0 - 0.020	0 - 0.030			

- Irregular curve cutting edge controls vibration and achieves stable machining.
- 6 flutes enables high machining efficiency.

(mm)

Order Number	RE	DC	APMX	LH	DCON	* No.F	Grade EP7020	Type
IMX10B6HV10010	5	10	10.5	16	9.7	6	●	1
IMX12B6HV12012	6	12	12.5	19	11.7	6	●	1
IMX16B6HV16016	8	16	16.5	24	15.5	6	●	1
IMX20B6HV20021	10	20	21	30	19.5	6	●	1
IMX25B6HV25026	12.5	25	26	37.5	24.5	6	●	1

(Note 1) The fastening size of the holder and head should be the same. (refer to P7)

∗ Number of Flutes

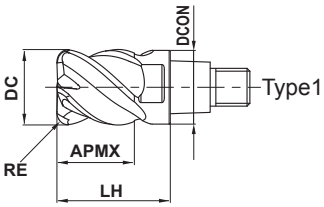
CUTTING CONDITIONS ➢ P49

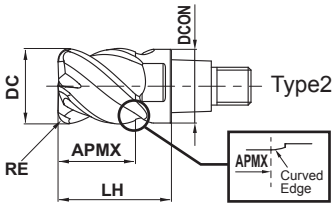
RE = Radius of Ball Nose **APMX** = Length of Cut **DCON** = Neck Dia.
DC = Dia. **LH** = Head Length

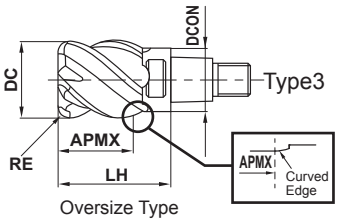
iMX-C4HV

Corner radius head, 4 flute, Irregular helix

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminum Alloy
◎	○			◎	◎	○	







Oversize Type

R					
	±0.020				
	DC≤12	DC>12			
	0 - 0.020	0 - 0.030			

● Irregular helix controls vibration and achieves stable machining.

(mm)

	Order Number	DC	RE	APMX	LH	DCON	*1 No.F	Grade EP7020	Type
	IMX10C4HV100R03010	10	0.3	10	16	9.7	4	●	2
*	IMX10C4HV100R05010	10	0.5	10	16	9.7	4	●	2
*	IMX10C4HV100R10010	10	1	10	16	9.7	4	●	2
*	IMX10C4HV100R15010	10	1.5	10	16	9.7	4	●	2
*	IMX10C4HV100R20010	10	2	10	16	9.7	4	●	2
*	IMX10C4HV100R25010	10	2.5	10	16	9.7	4	●	2
*	IMX10C4HV100R30010	10	3	10	16	9.7	4	●	2
	IMX10C4HV110R05011	11	0.5	11.5	18	9.7	4	●	3
	IMX10C4HV110R10011	11	1	11.5	18	9.7	4	●	3
	IMX10C4HV120R03012	12	0.3	12.5	19	9.7	4	●	3
	IMX10C4HV120R05012	12	0.5	12.5	19	9.7	4	●	3
	IMX10C4HV120R10012	12	1	12.5	19	9.7	4	●	3
	IMX10C4HV120R20012	12	2	12.5	19	9.7	4	●	3
	IMX12C4HV120R03012	12	0.3	12	19	11.7	4	●	2
*	IMX12C4HV120R05012	12	0.5	12	19	11.7	4	●	2
*	IMX12C4HV120R10012	12	1	12	19	11.7	4	●	2
*	IMX12C4HV120R15012	12	1.5	12	19	11.7	4	●	2
*	IMX12C4HV120R20012	12	2	12	19	11.7	4	●	2
*	IMX12C4HV120R25012	12	2.5	12	19	11.7	4	●	2
*	IMX12C4HV120R30012	12	3	12	19	11.7	4	●	2
*	IMX12C4HV120R40012	12	4	12	19	11.7	4	●	2
	IMX12C4HV130R05013	13	0.5	13.5	21.5	11.7	4	●	3
	IMX12C4HV130R10013	13	1	13.5	21.5	11.7	4	●	3
	IMX12C4HV140R03014	14	0.3	14.5	22.5	11.7	4	●	3
	IMX12C4HV140R05014	14	0.5	14.5	22.5	11.7	4	●	3
	IMX12C4HV140R10014	14	1	14.5	22.5	11.7	4	●	3
	IMX12C4HV140R20014	14	2	14.5	22.5	11.7	4	●	3
	IMX16C4HV160R03016	16	0.3	16	24	15.5	4	●	2
*	IMX16C4HV160R05016	16	0.5	16	24	15.5	4	●	2
*	IMX16C4HV160R10016	16	1	16	24	15.5	4	●	2
*	IMX16C4HV160R15016	16	1.5	16	24	15.5	4	●	2
*	IMX16C4HV160R20016	16	2	16	24	15.5	4	●	2
*	IMX16C4HV160R25016	16	2.5	16	24	15.5	4	●	2
*	IMX16C4HV160R30016	16	3	16	24	15.5	4	●	2
*	IMX16C4HV160R40016	16	4	16	24	15.5	4	●	2
*	IMX16C4HV160R50016	16	5	16	24	15.5	4	●	2

● : Inventory maintained in Japan.

(mm)

	Order Number	DC	RE	APMX	LH	DCON	∗1 No.F	Grade EP7020	Type
	IMX16C4HV170R05017	17	0.5	17	26	15.5	4	●	3
	IMX16C4HV170R10017	17	1	17	26	15.5	4	●	3
	IMX16C4HV180R03018	18	0.3	18	27	15.5	4	●	3
	IMX16C4HV180R05018	18	0.5	18.5	27	15.5	4	●	3
	IMX16C4HV180R10018	18	1	18.5	27	15.5	4	●	3
	IMX16C4HV180R20018	18	2	18.5	27	15.5	4	●	3
	IMX16C4HV180R30018	18	3	18.5	27	15.5	4	●	3
	IMX20C4HV200R03020	20	0.3	20	30	19.5	4	●	2
NEW	IMX20C4HV200R05020	20	0.5	20	30	19.5	4	●	2
	IMX20C4HV200R05021	20	0.5	21	30	19.5	4	●	1
NEW	IMX20C4HV200R10020	20	1	20	30	19.5	4	●	2
	IMX20C4HV200R10021	20	1	21	30	19.5	4	●	1
NEW	IMX20C4HV200R15020	20	1.5	20	30	19.5	4	●	2
	IMX20C4HV200R15021	20	1.5	21	30	19.5	4	●	1
NEW	IMX20C4HV200R20020	20	2	20	30	19.5	4	●	2
	IMX20C4HV200R20021	20	2	21	30	19.5	4	●	1
NEW	IMX20C4HV200R25020	20	2.5	20	30	19.5	4	●	2
	IMX20C4HV200R25021	20	2.5	21	30	19.5	4	●	1
NEW	IMX20C4HV200R30020	20	3	20	30	19.5	4	●	2
	IMX20C4HV200R30021	20	3	21	30	19.5	4	●	1
NEW	IMX20C4HV200R40020	20	4	20	30	19.5	4	●	2
	IMX20C4HV200R40021	20	4	21	30	19.5	4	●	1
NEW	IMX20C4HV200R50020	20	5	20	30	19.5	4	●	2
	IMX20C4HV200R50021	20	5	21	30	19.5	4	●	1
	IMX20C4HV200R60020	20	6	20	30	19.5	4	●	2
NEW	IMX20C4HV200R63520	20	6.35	20	30	19.5	4	●	2
	IMX20C4HV200R63521	20	6.35	21	30	19.5	4	●	1
	IMX20C4HV220R05023	22	0.5	23	33	19.5	4	●	3
	IMX20C4HV220R10023	22	1	23	33	19.5	4	●	3
	IMX20C4HV220R20023	22	2	23	33	19.5	4	●	3
	IMX20C4HV220R30023	22	3	23	33	19.5	4	●	3
NEW	IMX25C4HV250R10025	25	1	25	37.5	24.5	4	●	2
	IMX25C4HV250R10026	25	1	26	37.5	24.5	4	●	1
NEW	IMX25C4HV250R20025	25	2	25	37.5	24.5	4	●	2
	IMX25C4HV250R20026	25	2	26	37.5	24.5	4	●	1
NEW	IMX25C4HV250R30025	25	3	25	37.5	24.5	4	●	2
	IMX25C4HV250R30026	25	3	26	37.5	24.5	4	●	1
NEW	IMX25C4HV250R40025	25	4	25	37.5	24.5	4	●	2
	IMX25C4HV250R40026	25	4	26	37.5	24.5	4	●	1
NEW	IMX25C4HV250R50025	25	5	25	37.5	24.5	4	●	2
	IMX25C4HV250R50026	25	5	26	37.5	24.5	4	●	1
	IMX25C4HV250R60025	25	6	25	37.5	24.5	4	●	2
NEW	IMX25C4HV250R63525	25	6.35	25	37.5	24.5	4	●	2
	IMX25C4HV250R63526	25	6.35	26	37.5	24.5	4	●	1
	IMX25C4HV280R10029	28	1	29	41.5	24.5	4	●	3
	IMX25C4HV280R30029	28	3	29	41.5	24.5	4	●	3

(Note 1) The fastening size of the holder and head should be the same. (refer to P7)

∗ The geometry shown in figure 1 is sequentially switched to the geometry with a curved edge shown in figure 2.
When you require designating with a curved edge, please specify "with a curved edge".

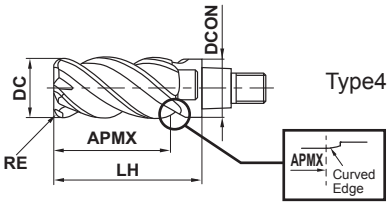
∗1 Number of Flutes

DC = Dia. **APMX** = Length of Cut **DCON** = Neck Dia.
RE = Corner R **LH** = Head Length

CUTTING CONDITIONS ➤ P39,40,42,43

iMX-C4HV

Corner radius head, 4 flute, Irregular helix



Long Cutting Edge Type

(mm)

Order Number	DC	RE	APMX	LH	DCON	* No.F	Grade EP7020	Type
IMX16C4HV160R10032	16	1	32	40	15.5	4	●	4
IMX16C4HV160R30032	16	3	32	40	15.5	4	●	4
IMX20C4HV200R10040	20	1	40	50	19.5	4	●	4
IMX20C4HV200R30040	20	3	40	50	19.5	4	●	4

(Note 1) The fastening size of the holder and head should be the same. (refer to P7)
* Number of Flutes

CUTTING CONDITIONS ➢ P41

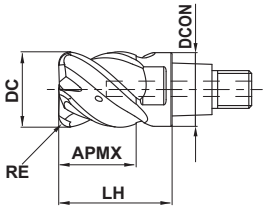
● : **Inventory maintained in Japan.**

iMX-C4HV-S

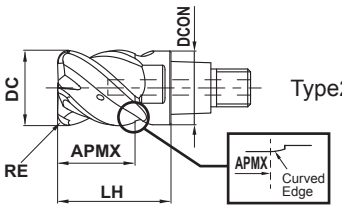
Corner radius head, 4 flute, Irregular helix, With coolant hole

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminum Alloy
◎	○			◎	◎	○	

Peripheral Cutting Edge with Coolant Hole



Type1



Type2

R					
	±0.020				
	DC ≤12	DC>12			
	0 - 0.020	0 - 0.030			

- Coolant holes for each cutting edge enables a stable coolant supply.
- Irregular helix controls vibration and achieves stable machining.

(mm)

	Order Number	DC	RE	APMX	LH	DCON	∗1 No.F	Grade EP7020	Type
	IMX10C4HV100R03010S	10	0.3	10	16	9.7	4	●	2
	IMX10C4HV100R05010S	10	0.5	10	16	9.7	4	●	2
∗	IMX10C4HV100R10010S	10	1	10	16	9.7	4	●	2
	IMX10C4HV100R15010S	10	1.5	10	16	9.7	4	●	2
	IMX10C4HV100R20010S	10	2	10	16	9.7	4	●	2
	IMX10C4HV100R30010S	10	3	10	16	9.7	4	●	2
	IMX12C4HV120R03012S	12	0.3	12	19	11.7	4	●	2
	IMX12C4HV120R05012S	12	0.5	12	19	11.7	4	●	2
∗	IMX12C4HV120R10012S	12	1	12	19	11.7	4	●	2
	IMX12C4HV120R15012S	12	1.5	12	19	11.7	4	●	2
	IMX12C4HV120R20012S	12	2	12	19	11.7	4	●	2
	IMX12C4HV120R30012S	12	3	12	19	11.7	4	●	2
	IMX12C4HV120R40012S	12	4	12	19	11.7	4	●	2
	IMX16C4HV160R05016S	16	0.5	16	24	15.5	4	●	2
∗	IMX16C4HV160R10016S	16	1	16	24	15.5	4	●	2
	IMX16C4HV160R15016S	16	1.5	16	24	15.5	4	●	2
	IMX16C4HV160R20016S	16	2	16	24	15.5	4	●	2
	IMX16C4HV160R30016S	16	3	16	24	15.5	4	●	2
	IMX16C4HV160R40016S	16	4	16	24	15.5	4	●	2
	IMX20C4HV200R05020S	20	0.5	20	30	19.5	4	●	2
NEW	IMX20C4HV200R10020S	20	1	20	30	19.5	4	●	2
	IMX20C4HV200R10021S	20	1	21	30	19.5	4	●	1
	IMX20C4HV200R15020S	20	1.5	20	30	19.5	4	●	2
	IMX20C4HV200R20020S	20	2	20	30	19.5	4	●	2
	IMX20C4HV200R30020S	20	3	20	30	19.5	4	●	2
	IMX20C4HV200R40020S	20	4	20	30	19.5	4	●	2
	IMX20C4HV200R60020S	20	6	20	30	19.5	4	●	2
	IMX20C4HV200R63520S	20	6.35	20	30	19.5	4	●	2
NEW	IMX25C4HV250R10025S	25	1	25	37.5	24.5	4	●	2
	IMX25C4HV250R10026S	25	1	26	37.5	24.5	4	●	1

(Note 1) The fastening size of the holder and head should be the same. (refer to P7)

∗ The geometry shown in figure 1 is sequentially switched to the geometry with a curved edge shown in figure 2.
When you require designating with a curved edge, please specify "with a curved edge".

∗1 Number of Flutes

iMX-C4HV-S

Corner radius head, 4 flute, Irregular helix, With coolant hole

(mm)

Order Number	DC	RE	APMX	LH	DCON	∗1 No.F	Grade EP7020	Type
IMX25C4HV250R15025S	25	1.5	25	37.5	24.5	4	●	2
IMX25C4HV250R20025S	25	2	25	37.5	24.5	4	●	2
IMX25C4HV250R30025S	25	3	25	37.5	24.5	4	●	2
IMX25C4HV250R40025S	25	4	25	37.5	24.5	4	●	2
IMX25C4HV250R60025S	25	6	25	37.5	24.5	4	●	2
IMX25C4HV250R63525S	25	6.35	25	37.5	24.5	4	●	2

(Note 1) The fastening size of the holder and head should be the same. (refer to P7)
∗1 Number of Flutes

CUTTING CONDITIONS ➤ **P39,40**

DC = Dia. **APMX** = Length of Cut **DCON** = Neck Dia.
RE = Corner R **LH** = Head Length

● : **Inventory maintained in Japan.**

iMX-C6HV/C10HV/C12HV

Corner radius head, Multi-flute, Irregular helix

UWC

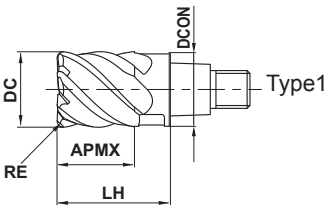
DC≤12

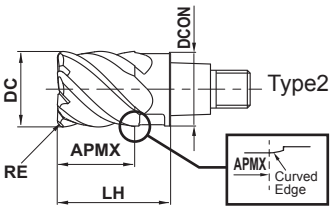
DC>12

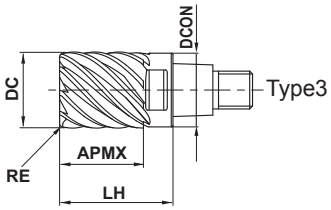

DC≤12

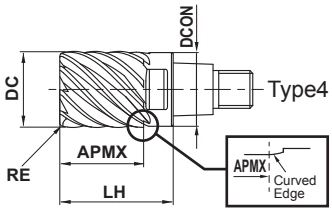

DC>12

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminum Alloy
◎	○			◎	◎		









R					
	±0.020				
	DC≤12	DC>12			
	0 - 0.020	0 - 0.030			

- High machining efficiency due to multi-flute design.
- Irregular helix controls vibration and achieves stable machining.

(mm)

	Order Number	DC	RE	APMX	LH	DCON	∗1 No.F	Grade EP7020	Type
∗	IMX10C6HV100R05010	10	0.5	10	16	9.7	6	●	2
∗	IMX10C6HV100R10010	10	1	10	16	9.7	6	●	2
∗	IMX12C6HV120R10012	12	1	12	19	11.7	6	●	2
∗	IMX16C10HV160R10016	16	1	16	24	15.5	10	●	4
NEW	IMX20C12HV200R10020	20	1	20	30	19.5	12	●	4
	IMX20C12HV200R10021	20	1	21	30	19.5	12	●	3
NEW	IMX25C12HV250R10025	25	1	25	37.5	24.5	12	●	4
	IMX25C12HV250R10026	25	1	26	37.5	24.5	12	●	3

(Note 1) The fastening size of the holder and head should be the same. (refer to P7)

∗ The geometry shown in figure 1 and 3 are sequentially switched to the geometry with a curved edge shown in figure 2 and 4.
When you require designating with a curved edge, please specify "with a curved edge".

∗1 Number of Flutes

CUTTING CONDITIONS ➤ P54

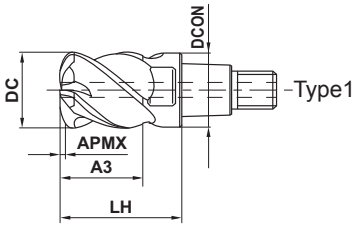
DC = Dia. **APMX** = Length of Cut **DCON** = Neck Dia.
RE = Corner R **LH** = Head Length

iMX-C4FD-C

Duplex corner radius head, 4 flute, For high feed, With coolant hole

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminum Alloy
◎	◎	◎		◎	◎	○	

End Face with Center Coolant Hole



DC ≤12	DC>12			
0 - 0.020	0 - 0.030			

- The duplex corner radius and 4 flute geometry enables efficient machining at higher feed rates.
- End face center coolant hole provides a stable supply of coolant.

(mm)

Order Number	DC	RE1	APMX	A3	LH	DCON	* No.F	RMPX	Grade EP7020	Type
IMX10C4FD10010C	10	1.99	0.7	10.5	16	9.7	4	2.1°	●	1
IMX12C4FD12012C	12	2.1	0.8	12.5	19	11.7	4	2.8°	●	1
IMX16C4FD16016C	16	2.75	1	16.5	24	15.5	4	3°	●	1
IMX20C4FD20021C	20	3.07	1.3	21	30	19.5	4	3.3°	●	1
IMX25C4FD25026C	25	4.21	1.6	26	37.5	24.5	4	4.5°	●	1

(Note 1) The fastening size of the holder and head should be the same. (refer to P7)
(Note 2) Duplex corner radius end mill is not suitable for corner radius machining due to the possibility of leaving unmachined areas.
* Number of Flutes

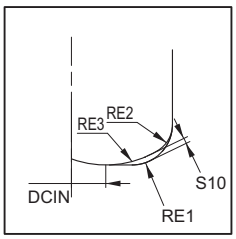
CUTTING CONDITIONS ➤ **P50**

DC = Dia.
RE1 = Approx. R
APMX = Max. Depth of Cut
A3 = Length of Cut
LH = Head Length
DCON = Neck Dia.
RMPX = Max. Ramping Angle

(mm)

Order Number	RE1	Duplex Corner Radius			
		S10	DCIN	RE2	RE3
IMX10C4FD10010C	1.99	0.27	3.4	1.5	5
IMX12C4FD12012C	2.1	0.33	4.5	1.5	6
IMX16C4FD16016C	2.75	0.42	6.2	2	8
IMX20C4FD20021C	3.07	0.59	8	2	10
IMX25C4FD25026C	4.21	0.67	10	3	12

RE1= Approx. R
S10= Remaining Stock



When using the iMX, please programme as an radius cutter. The approximate remaining stocks for the programme are as follows.

● : **Inventory maintained in Japan.**

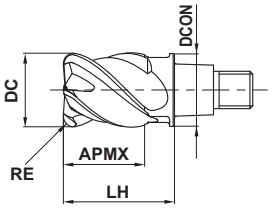
iMX-C4FV

Corner radius head, 4 flute, Irregular helix, For high efficiency machining

UWC

43°
45°

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminum Alloy
◎	◎	◎					



Type1

R					
	DC ≤20	DC=25			
	±0.010	±0.020			
	DC ≤12	DC>12			
	0 - 0.020	0 - 0.030			

- Corner radius end mill for high efficiency machining.
- Irregular helix controls vibration and achieves stable machining.

(mm)

Order Number	DC	RE	APMX	LH	DCON	* No.F	Grade EP6120	Type
IMX10C4FV100R20010	10	2	10.5	16	9.7	4	●	1
IMX12C4FV120R20012	12	2	12.5	19	11.7	4	●	1
IMX16C4FV160R30016	16	3	16.5	24	15.5	4	●	1
IMX20C4FV200R30021	20	3	21	30	19.5	4	●	1
IMX25C4FV250R40026	25	4	26	37.5	24.5	4	●	1

(Note 1) The fastening size of the holder and head should be the same. (refer to P7)

∗ Number of Flutes

CUTTING CONDITIONS ➢ P51

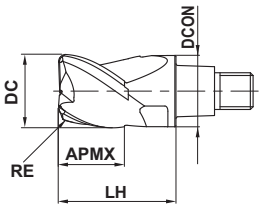
DC = Dia. **APMX** = Length of Cut **DCON** = Neck Dia.
RE = Corner R **LH** = Head Length

iMX-C3A

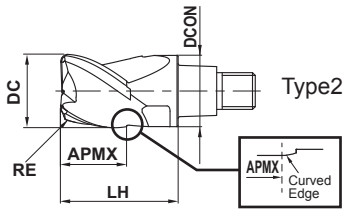
Corner radius head, 3 flute, For aluminum alloys

UWC 37.5°

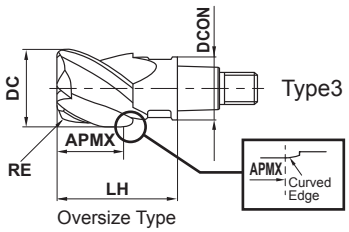
Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminum Alloy
							◎



Type1



Type2



Type3

Oversize Type

R					
	±0.020				
	DC ≤12	DC>12			
	0 - 0.020	0 - 0.030			

● High efficiency machining is possible due to the polished rake face and sharp cutting edge.

(mm)

	Order Number	DC	RE	APMX	LH	DCON	∗1 No.F	Grade ET2020	Type
∗	IMX10C3A100R10008	10	1	8	16	9.7	3	●	2
∗	IMX10C3A100R25008	10	2.5	8	16	9.7	3	●	2
	IMX10C3A120R10010	12	1	10.1	19	9.7	3	●	3
NEW	IMX12C3A120R10009	12	1	9.6	19	11.7	3	●	2
	IMX12C3A120R10010	12	1	10.1	19	11.7	3	●	1
NEW	IMX12C3A120R32009	12	3.2	9.6	19	11.7	3	●	2
	IMX12C3A120R32010	12	3.2	10.1	19	11.7	3	●	1
	IMX12C3A140R10011	14	1	11.7	22.5	11.7	3	●	3
NEW	IMX16C3A160R10012	16	1	12.8	24	15.5	3	●	2
	IMX16C3A160R10013	16	1	13.3	24	15.5	3	●	1
NEW	IMX16C3A160R32012	16	3.2	12.8	24	15.5	3	●	2
	IMX16C3A160R32013	16	3.2	13.3	24	15.5	3	●	1
	IMX16C3A180R32014	18	3.2	14.9	27	15.5	3	●	3
NEW	IMX20C3A200R10016	20	1	16	30	19.5	3	●	2
	IMX20C3A200R10017	20	1	17	30	19.5	3	●	1
NEW	IMX20C3A200R32016	20	3.2	16	30	19.5	3	●	2
	IMX20C3A200R32017	20	3.2	17	30	19.5	3	●	1
	IMX20C3A220R32018	22	3.2	18.6	33	19.5	3	●	3
∗	IMX25C3A250R10020	25	1	20	37.5	24.5	3	●	2
NEW	IMX25C3A250R32020	25	3.2	20	37.5	24.5	3	●	2
	IMX25C3A250R32021	25	3.2	21	37.5	24.5	3	●	1
NEW	IMX25C3A250R50020	25	5	20	37.5	24.5	3	●	2
	IMX25C3A250R50021	25	5	21	37.5	24.5	3	●	1
	IMX25C3A280R32023	28	3.2	23.4	41.5	24.5	3	●	3

(Note 1) The fastening size of the holder and head should be the same. (refer to P7)

∗ The geometry shown in figure 1 is sequentially switched to the geometry with a curved edge shown in figure 2.
When you require designating with a curved edge, please specify "with a curved edge".

∗1 Number of Flutes

CUTTING CONDITIONS ➤ P52,53

DC = Dia. **APMX** = Length of Cut **DCON** = Neck Dia.
RE = Corner R **LH** = Head length

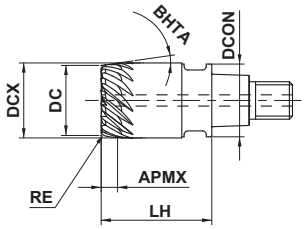
● : **Inventory maintained in Japan.**

iMX-C8T/C10T/C12T/C15T-C

Corner radius, Taper head, Multi-flute, With coolant hole

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-hardened Steel, Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminum Alloy
				◎	◎		

End Face with Center Coolant Hole



Type1

R					
	±0.015				
	DC≤12	DC>12			
	0 -0.020	0 -0.030			

- Suitable for 3-dimensional free-form surface cutting such as blades.
- High feed cutting is possible due to multiple cutting edges.

(mm)

Order Number	DC	RE	APMX	DCX	LH	DCON	BHTA	* No.F	Grade EP7020	Type
IMX10C8T080R05T080C	8	0.5	7.12	10	16	9.7	8°	8	●	1
IMX10C8T080R10T080C	8	1	7.12	10	16	9.7	8°	8	●	1
IMX12C10T100R05T080C	10	0.5	7.12	12	19	11.7	8°	10	●	1
IMX12C10T100R10T080C	10	1	7.12	12	19	11.7	8°	10	●	1
IMX16C15T150R05T080C	15	0.5	3.56	16	24	15.5	8°	15	●	1
IMX16C15T150R10T080C	15	1	3.56	16	24	15.5	8°	15	●	1
IMX16C12T150R20T080C	15	2	3.56	16	24	15.5	8°	12	●	1
IMX20C15T190R05T080C	19	0.5	3.56	20	30	19.5	8°	15	●	1
IMX20C15T190R10T080C	19	1	3.56	20	30	19.5	8°	15	●	1
IMX20C12T190R20T080C	19	2	3.56	20	30	19.5	8°	12	●	1

(Note 1) The fastening size of the holder and head should be the same. (refer to P7)

* Number of Flutes

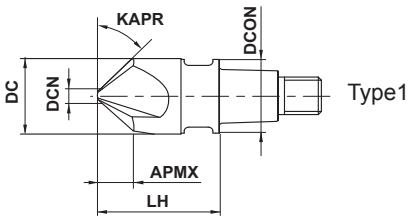
CUTTING CONDITIONS ➤ P55

DC = Dia.
RE = Corner R
APMX = Length of Cut
DCX = Maximum Hole Diameter
LH = Head Length
DCON = Neck Dia.
BHTA = Taper Angle One Side

iMX-CH3L

Chamfer head, 3 flute

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminum Alloy
◎	○	○		◎	◎		



Type1

DCN=1.5				
±0.020				

- Chamfered cutting head suitable for inner and outer circumference.
- Anti-vibration priority design.

(mm)

Order Number	DC	APMX	KAPR	DCN	LH	DCON	* No.F	Grade EP7020	Type
IMX10CH3L100A45	10	4.2	45°	1.5	16	9.7	3	●	1
IMX12CH3L120A45	12	5.2	45°	1.5	19	11.7	3	●	1
IMX16CH3L160A45	16	7.2	45°	1.5	24	15.5	3	●	1
IMX20CH3L200A45	20	9.2	45°	1.5	30	19.5	3	●	1

(Note 1) The fastening size of the holder and head should be the same. (refer to P7)

∗ Number of Flutes

CUTTING CONDITIONS ➤ **P56,57**

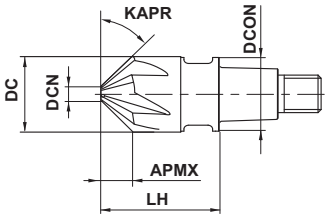
DC = Dia. **KAPR** = Cutting Edge Angle **LH** = Head Length
APMX = Length of Cut **DCN** = Diameter of Flat End **DCON** = Neck Dia.

● : **Inventory maintained in Japan.**

iMX-CH6V

Chamfer head, 6 flute

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminum Alloy
◎	○	○		◎	◎		



Type1

DCN=3.0				
±0.020				

- Suitable for outer circumference.
- Multiple cutting design for extended tool life.

(mm)

Order Number	DC	APMX	KAPR	DCN	LH	DCON	* No.F	Grade EP7020	Type
IMX12CH6V120A45	12	4.5	45°	3	19	11.7	6	●	1
IMX16CH6V160A45	16	6.5	45°	3	24	15.5	6	●	1
IMX20CH6V200A45	20	8.5	45°	3	30	19.5	6	●	1

(Note 1) The fastening size of the holder and head should be the same. (refer to P7)

∗ Number of Flutes

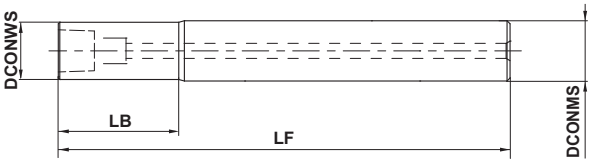
CUTTING CONDITIONS ➢ P58

DC = Dia.
APMX = Length of Cut
KAPR = Cutting Edge Angle
DCN = Diameter of Flat End
LH = Head Length
DCON = Neck Dia.

Exchangeable Head End Mills

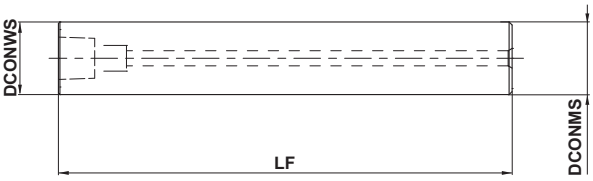
iMX
Carbide Holder

Undercut



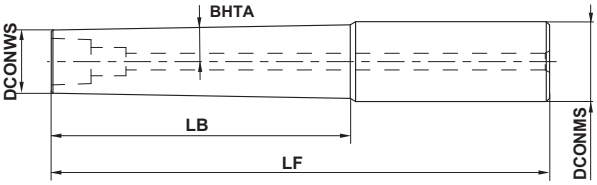
Type1

Straight



Type2

Taper Neck Type



Type3

h6	DCONMS=10	12 ≤DCONMS ≤16	20 ≤DCONMS ≤25		
	0 - 0.009	0 - 0.011	0 - 0.013		

Carbide Holder

(mm)

Order Number	BHTA	LB	DCONWS	LF	DCONMS	Stock	Type	Suitable Head	Wrench
IMX10-U10N014L070C	—	14	9.7	70	10	●	1	IMX10	IMX10-WR
IMX10-S10L090C	—	—	10	90	10	●	2	IMX10	IMX10-WR
IMX10-U10N034L090C	—	34	9.7	90	10	●	1	IMX10	IMX10-WR
IMX10-S10L110C	—	—	10	110	10	●	2	IMX10	IMX10-WR
IMX10-U10N054L110C	—	54	9.7	110	10	●	1	IMX10	IMX10-WR
IMX10-A12N054L110C	1°	54	9.7	110	12	●	3	IMX10	IMX10-WR
IMX12-U12N017L080C	—	17	11.7	80	12	●	1	IMX12	IMX12-WR
IMX12-S12L100C	—	—	12	100	12	●	2	IMX12	IMX12-WR
IMX12-U12N041L100C	—	41	11.7	100	12	●	1	IMX12	IMX12-WR
IMX12-S12L130C	—	—	12	130	12	●	2	IMX12	IMX12-WR
IMX12-U12N065L130C	—	65	11.7	130	12	●	1	IMX12	IMX12-WR
IMX12-A16N065L130C	1°	65	11.7	130	16	●	3	IMX12	IMX12-WR
IMX16-U16N024L080C	—	24	15.5	80	16	●	1	IMX16	IMX16-WR
IMX16-S16L110C	—	—	16	110	16	●	2	IMX16	IMX16-WR
IMX16-U16N056L110C	—	56	15.5	110	16	●	1	IMX16	IMX16-WR
IMX16-S16L150C	—	—	16	150	16	●	2	IMX16	IMX16-WR
IMX16-U16N088L150C	—	88	15.5	150	16	●	1	IMX16	IMX16-WR
IMX16-A20N088L150C	1°	88	15.5	150	20	●	3	IMX16	IMX16-WR
IMX20-U20N030L090C	—	30	19.5	90	20	●	1	IMX20	IMX20-WR
IMX20-S20L130C	—	—	20	130	20	●	2	IMX20	IMX20-WR
IMX20-U20N070L130C	—	70	19.5	130	20	●	1	IMX20	IMX20-WR
IMX20-S20L180C	—	—	20	180	20	●	2	IMX20	IMX20-WR
IMX20-U20N110L180C	—	110	19.5	180	20	●	1	IMX20	IMX20-WR
IMX20-A25N110L180C	1°	110	19.5	180	25	●	3	IMX20	IMX20-WR
IMX25-U25N037L110C	—	37.5	24.5	110	25	●	1	IMX25	IMX25-WR
IMX25-S25L160C	—	—	25	160	25	●	2	IMX25	IMX25-WR
IMX25-U25N087L160C	—	87.5	24.5	160	25	●	1	IMX25	IMX25-WR
IMX25-S25L210C	—	—	25	210	25	●	2	IMX25	IMX25-WR

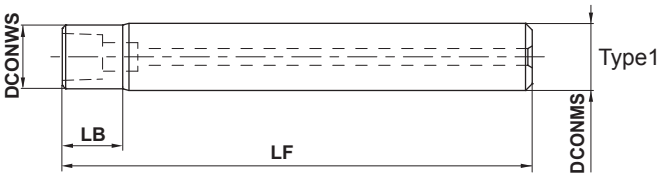
(Note 1) The fastening size of the holder and head should be the same. (refer to P7)

BHTA = Neck Taper Angle **DCONWS** = Connection Dia. Workpiece Side **DCONMS** = Connection Dia. Machine Side
LB = Neck Length **LF** = Functional Length

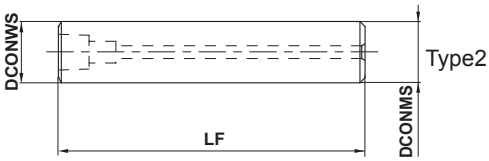
● : Inventory maintained in Japan.

iMX
Steel Holder

Undercut



Straight Oversize



h6

DCONMS=10	12 ≤DCONMS ≤16	20 ≤DCONMS ≤25	DCONMS=32
0 - 0.009	0 - 0.011	0 - 0.013	0 - 0.016

Steel Holder

(mm)

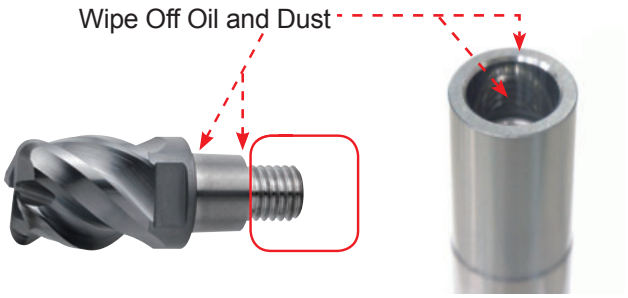
Order Number	LB	DCONWS	LF	DCONMS	Stock	Type	Suitable Head	Wrench
IMX10-U10N009L070S	9	9.7	70	10	●	1	IMX10	IMX10-WR
IMX10-G12L060S	—	12	60	12	●	2	IMX10	IMX10-WR
IMX12-U12N011L080S	11	11.7	80	12	●	1	IMX12	IMX12-WR
IMX12-G16L070S	—	16	70	16	●	2	IMX12	IMX12-WR
IMX16-U16N016L080S	16	15.5	80	16	●	1	IMX16	IMX16-WR
IMX16-G20L070S	—	20	70	20	●	2	IMX16	IMX16-WR
IMX20-U20N020L090S	20	19.5	90	20	●	1	IMX20	IMX20-WR
IMX20-G25L080S	—	25	80	25	●	2	IMX20	IMX20-WR
IMX25-U25N025L110S	25	24.5	110	25	●	1	IMX25	IMX25-WR
IMX25-G32L100S	—	32	100	32	●	2	IMX25	IMX25-WR

(Note 1) The fastening size of the holder and head should be the same. (refer to P7)

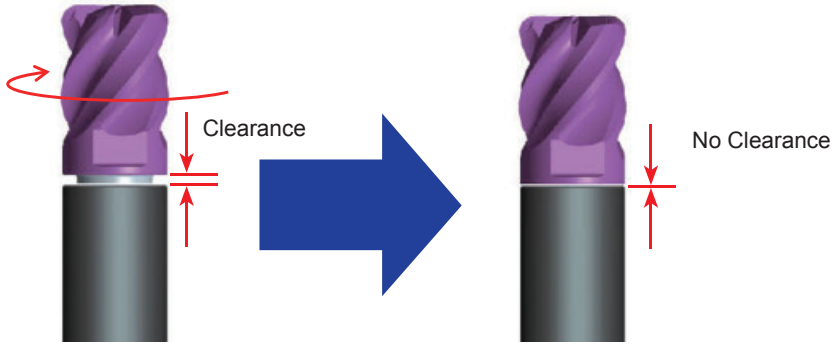
LB = Neck Length **LF** = Functional Length
DCONWS = Connection Dia. Workpiece Side **DCONMS** = Connection Dia. Machine Side

How to Install the Head

1 Using a clean cloth, wipe away oil and dust from the taper and end surfaces of the head and holder.

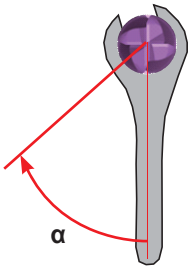


2 Be careful to avoid the possibility of cutting hands when fastening with bare hands directly near the blade tip.
Securely fasten the head and holder end surfaces using the enclosed wrench to close off any remaining gap.



3 Refer to the table at below regarding angles for recommended torque when necessary.
For stricter usage, refer to the table below for torque wrench fastening.

Suitable Head	Reference Tightening Angle α	Recommended Clamping Torque (N·m)
IMX10	50°	10
IMX12	50°	15
IMX16	50°	30
IMX20	40°	50
IMX25	35°	75

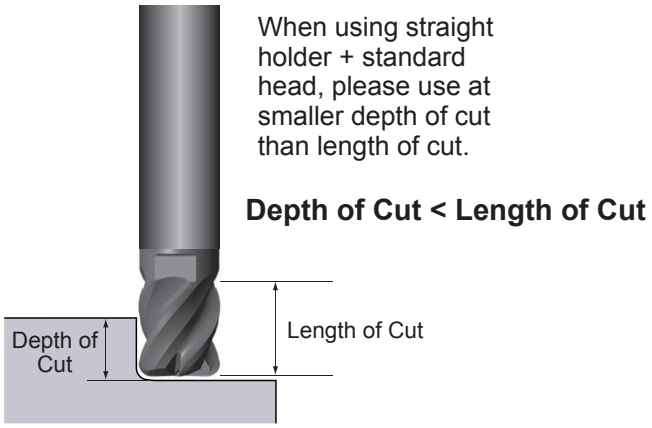


(Note 1) Use the enclosed wrench only.
(Typical wrenches differ in thickness.)

How to Select iMX Holders

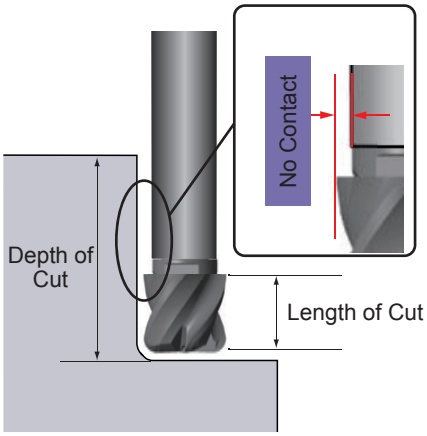
- When using straight holder + standard head, interference will occur in cases where the depth of cut is larger than the length of cut of the head.
- When using straight holder + oversize head, larger depths of cut are possible because the diameter of the head is larger than the holder.

Straight + Standard Head



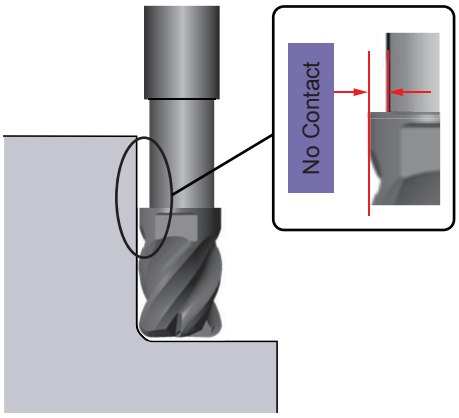
Less than DCx3 overhang is recommended when depth of cut < length of cut.

Straight + Oversize Head

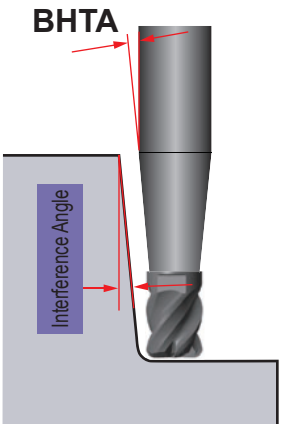


- Undercut type with relieved neck is suitable for vertical wall machining.
- The large diameter of the taper neck holder provides stability in long overhang applications.
- Undercut and taper neck types are now also available. (Please refer to diameter DC of each type for minimum diameter.)

Undercut + Standard Head



Taper Neck + Standard Head



Identification (Shoulder Milling)

Use by multiplying the recommended cutting condition on the next page by the correction factor by overhang length.
Refer to each recommended condition for the long cutting and oversize type.

(mm)

Work Material	Carbon Steels, Alloy Steels, Mild Steels, Copper, Copper Alloys				Pre-hardened Steels, Carbon Steels, Alloy Steels, Alloy Tool Steels				Austenitic Stainless Steels, Ferritic and Martensitic Stainless Steels, Titanium Alloys			
L/D	**vc** (m/min)	**n** (min^{-1})	**fz** (mm/t.)	**ae**	**vc** (m/min)	**n** (min^{-1})	**fz** (mm/t.)	**ae**	**vc** (m/min)	**n** (min^{-1})	**fz** (mm/t.)	**ae**
2	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
3	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
4	80%	80%	90%	70%	80%	80%	90%	70%	80%	80%	90%	70%
5	60%	60%	80%	40%	60%	60%	80%	40%	60%	60%	80%	40%
6	50%	50%	70%	30%	50%	50%	70%	30%	50%	50%	70%	30%
7	40%	40%	70%	20%	40%	40%	70%	20%	30%	30%	60%	20%
8	40%	40%	60%	10%	40%	40%	60%	10%	30%	30%	50%	10%
9	30%	30%	60%	10%	30%	30%	60%	10%	20%	20%	50%	10%

Work Material	Precipitation Hardening Stainless Steels, Cobalt Chromium Alloys				Heat Resistant Alloys Inconel718			
L/D	**vc** (m/min)	**n** (min^{-1})	**fz** (mm/t.)	**ae**	**vc** (m/min)	**n** (min^{-1})	**fz** (mm/t.)	**ae**
2	100%	100%	100%	100%	100%	100%	100%	100%
3	100%	100%	100%	100%	100%	100%	100%	100%
4	80%	80%	90%	70%	80%	80%	90%	70%
5	60%	60%	80%	40%	60%	60%	80%	40%
6	50%	50%	70%	30%	50%	50%	70%	30%
7	30%	30%	60%	20%	30%	30%	60%	20%
8	30%	30%	50%	10%	30%	30%	50%	10%
9	20%	20%	50%	10%	20%	20%	50%	10%

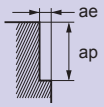
iMX-S3HV

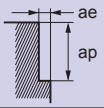
Square head, 3 flute, Irregular helix

Recommended Cutting Conditions

Shoulder Milling

(mm)

Work Material	Carbon Steels, Alloy Steels, Mild Steels, Copper, Copper Alloys						Pre-hardened Steels, Carbon Steels, Alloy Steels, Alloy Tool Steels						Austenitic Stainless Steels, Ferritic and Martensitic Stainless Steels, Titanium Alloys					
DC	vc (m/min)	n (min^{-1})	fz (mm/t.)	vf (mm/min)	ap	ae	vc (m/min)	n (min^{-1})	fz (mm/t.)	vf (mm/min)	ap	ae	vc (m/min)	n (min^{-1})	fz (mm/t.)	vf (mm/min)	ap	ae
10	150	4800	0.09	1300	8	2	120	3800	0.06	680	8	2	100	3200	0.075	720	8	2
12	150	4000	0.09	1100	9.6	2.4	120	3200	0.065	620	9.6	2.4	100	2700	0.08	650	9.6	2.4
16	150	3000	0.1	900	12.8	3.2	120	2400	0.075	540	12.8	3.2	100	2000	0.09	540	12.8	3.2
20	150	2400	0.1	720	16	4	120	1900	0.075	430	16	4	100	1600	0.09	430	16	4
25	150	1900	0.12	680	20	5	120	1500	0.075	340	20	5	100	1300	0.09	350	20	5
Depth of Cut	 DC:Dia.																	

Work Material	Precipitation Hardening Stainless Steels, Cobalt Chromium Alloys						Heat Resistant Alloys Inconel718					
DC	vc (m/min)	n (min^{-1})	fz (mm/t.)	vf (mm/min)	ap	ae	vc (m/min)	n (min^{-1})	fz (mm/t.)	vf (mm/min)	ap	ae
10	75	2400	0.06	430	8	2	40	1300	0.04	160	8	1
12	75	2000	0.065	390	9.6	2.4	40	1100	0.045	150	9.6	1.2
16	75	1500	0.075	340	12.8	3.2	40	800	0.05	120	12.8	1.6
20	75	1200	0.075	270	16	4	40	640	0.05	96	16	2
25	75	950	0.075	210	20	5	40	510	0.05	77	20	2.5
Depth of Cut	 DC:Dia.											

(Note 1) The irregular helix flute end mill has a larger effect on controlling vibration when compared to standard end mills. However, if the rigidity of the machine or the work material installation is poor, vibration or abnormal sound can occur. In this case, please reduce the revolution and the feed rate proportionately, or set a lower depth of cut.

(Note 2) If the depth of cut is smaller, the revolution and the feed rate can be increased.

(Note 3) For stainless steels, titanium alloys and heat resistant alloys, the use of water-soluble coolant is effective.

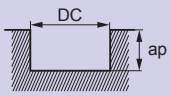
iMX-S3HV

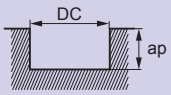
Square head, 3 flute, Irregular helix

Recommended Cutting Conditions

Slot Milling

(mm)

Work Material	Carbon Steels, Alloy Steels, Mild Steels, Copper, Copper Alloys					Pre-hardened Steels, Carbon Steels, Alloy Steels, Alloy Tool Steels					Austenitic Stainless Steels, Ferritic and Martensitic Stainless Steels, Titanium Alloys				
DC	**vc** (m/min)	**n** (min^{-1})	**fz** (mm/t.)	**vf** (mm/min)	**ap**	**vc** (m/min)	**n** (min^{-1})	**fz** (mm/t.)	**vf** (mm/min)	**ap**	**vc** (m/min)	**n** (min^{-1})	**fz** (mm/t.)	**vf** (mm/min)	**ap**
10	100	3200	0.04	380	5	80	2500	0.03	230	5	75	2400	0.03	220	5
12	100	2700	0.05	410	6	80	2100	0.04	250	6	75	2000	0.04	240	6
16	100	2000	0.07	420	8	80	1600	0.05	240	8	75	1500	0.06	270	8
20	100	1600	0.07	340	10	80	1300	0.05	200	10	75	1200	0.06	220	10
25	100	1300	0.08	310	12	80	1000	0.05	150	12	75	950	0.06	170	12
Depth of Cut	 DC:Dia.														

Work Material	Precipitation Hardening Stainless Steels, Cobalt Chromium Alloys					Heat Resistant Alloys Inconel718				
DC	**vc** (m/min)	**n** (min^{-1})	**fz** (mm/t.)	**vf** (mm/min)	**ap**	**vc** (m/min)	**n** (min^{-1})	**fz** (mm/t.)	**vf** (mm/min)	**ap**
10	60	1900	0.025	140	5	30	950	0.02	57	2
12	60	1600	0.035	170	6	30	800	0.03	72	2.4
16	60	1200	0.05	180	8	30	600	0.05	90	3.2
20	60	950	0.05	140	10	30	480	0.05	72	4
25	60	760	0.05	110	12	30	380	0.05	57	5
Depth of Cut	 DC:Dia.									

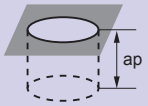
(Note 1) The irregular helix flute end mill has a larger effect on controlling vibration when compared to standard end mills. However, if the rigidity of the machine or the work material installation is poor, vibration or abnormal sound can occur. In this case, please reduce the revolution and the feed rate proportionately, or set a lower depth of cut.

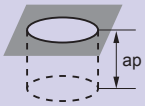
(Note 2) If the depth of cut is smaller, the revolution and the feed rate can be increased.

(Note 3) For stainless steels, titanium alloys and heat resistant alloys, the use of water-soluble coolant is effective.

Plunging

(mm)

Work Material	Carbon Steels, Alloy Steels, Mild Steels, Copper, Copper Alloys						Pre-hardened Steels, Carbon Steels, Alloy Steels, Alloy Tool Steels						Austenitic Stainless Steels, Ferritic and Martensitic Stainless Steels, Titanium Alloys					
DC	**vc** (m/min)	**n** (min^{-1})	**fr** (mm/rev)	**vf** (mm/min)	**ap**	Step **ap2**	**vc** (m/min)	**n** (min^{-1})	**fr** (mm/rev)	**vf** (mm/min)	**ap**	Step **ap2**	**vc** (m/min)	**n** (min^{-1})	**fr** (mm/rev)	**vf** (mm/min)	**ap**	Step **ap2**
10	100	3200	0.14	450	5	2.5	70	2200	0.09	200	5	2	60	1900	0.03	57	5	0.6
12	100	2700	0.14	380	6	2.5	70	1900	0.09	170	6	2	60	1600	0.03	48	6	0.6
16	100	2000	0.14	280	8	2.5	70	1400	0.09	130	8	2	60	1200	0.03	36	8	0.6
20	100	1600	0.14	220	10	2.5	70	1100	0.09	99	10	2	60	950	0.03	29	10	0.6
25	100	1300	0.14	180	12.5	2.5	70	890	0.09	80	12.5	2	60	760	0.03	23	12.5	0.6
Depth of Cut	 DC:Dia.																	

Work Material	Precipitation Hardening Stainless Steels, Cobalt Chromium Alloys					
DC	**vc** (m/min)	**n** (min^{-1})	**fr** (mm/rev)	**vf** (mm/min)	**ap**	Step **ap2**
10	40	1300	0.03	39	5	0.6
12	40	1100	0.03	33	6	0.6
16	40	800	0.03	24	8	0.6
20	40	640	0.03	19	10	0.6
25	40	510	0.03	15	12.5	0.6
Depth of Cut	 DC:Dia.					

(Note 1) The irregular helix flute end mill has a larger effect on controlling vibration when compared to standard end mills. However, if the rigidity of the machine or the work material installation is poor, vibration or abnormal sound can occur. If the depth of cut is smaller, the revolution and the feed rate can be increased.

(Note 2) For stainless steels, titanium alloys and heat resistant alloys, the use of water-soluble coolant is effective.

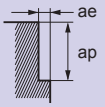
iMX-S4HV/iMX-S4HV-S/iMX-C4HV/iMX-C4HV-S

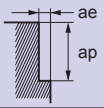
Square/Corner radius head, 4 flute, Irregular helix (With/Without coolant hole)

Recommended Cutting Conditions

Shoulder Milling

(mm)

Work Material	Carbon Steels, Alloy Steels, Mild Steels, Copper, Copper Alloys						Pre-hardened Steels, Carbon Steels, Alloy Steels, Alloy Tool Steels						Austenitic Stainless Steels, Ferritic and Martensitic Stainless Steels, Titanium Alloys					
DC	vc (m/min)	n (min^{-1})	fz (mm/t.)	vf (mm/min)	ap	ae	vc (m/min)	n (min^{-1})	fz (mm/t.)	vf (mm/min)	ap	ae	vc (m/min)	n (min^{-1})	fz (mm/t.)	vf (mm/min)	ap	ae
10	150	4800	0.09	1700	10	2	120	3800	0.06	910	10	2	100	3200	0.075	960	10	2
12	150	4000	0.09	1400	12	2.4	120	3200	0.065	830	12	2.4	100	2700	0.08	860	12	2.4
16	150	3000	0.1	1200	16	3.2	120	2400	0.075	720	16	3.2	100	2000	0.09	720	16	3.2
20	150	2400	0.1	960	20	4	120	1900	0.075	570	20	4	100	1600	0.09	580	20	4
25	150	1900	0.12	910	25	5	120	1500	0.075	450	25	5	100	1300	0.09	470	25	5
Depth of Cut	 DC:Dia.																	

Work Material	Precipitation Hardening Stainless Steels, Cobalt Chromium Alloys						Heat Resistant Alloys Inconel718					
DC	vc (m/min)	n (min^{-1})	fz (mm/t.)	vf (mm/min)	ap	ae	vc (m/min)	n (min^{-1})	fz (mm/t.)	vf (mm/min)	ap	ae
10	75	2400	0.06	580	10	2	40	1300	0.04	210	10	1
12	75	2000	0.065	520	12	2.4	40	1100	0.045	200	12	1.2
16	75	1500	0.075	450	16	3.2	40	800	0.05	160	16	1.6
20	75	1200	0.075	360	20	4	40	640	0.05	130	20	2
25	75	950	0.075	290	25	5	40	510	0.05	100	25	2.5
Depth of Cut	 DC:Dia.											

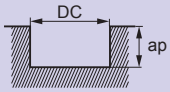
(Note 1) The irregular helix flute end mill has a larger effect on controlling vibration when compared to standard end mills. However, if the rigidity of the machine or the work material installation is poor, vibration or abnormal sound can occur. In this case, please reduce the revolution and the feed rate proportionately, or set a lower depth of cut.

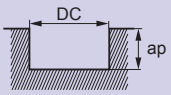
(Note 2) If the depth of cut is smaller, the revolution and the feed rate can be increased.

(Note 3) For stainless steels, titanium alloys and heat resistant alloys, the use of water-soluble coolant is effective.

Slot Milling

(mm)

Work Material	Carbon Steels, Alloy Steels, Mild Steels, Copper, Copper Alloys					Pre-hardened Steels, Carbon Steels, Alloy Steels, Alloy Tool Steels					Austenitic Stainless Steels, Ferritic and Martensitic Stainless Steels, Titanium Alloys				
DC	**vc** (m/min)	**n** (min^{-1})	**fz** (mm/t.)	**vf** (mm/min)	**ap**	**vc** (m/min)	**n** (min^{-1})	**fz** (mm/t.)	**vf** (mm/min)	**ap**	**vc** (m/min)	**n** (min^{-1})	**fz** (mm/t.)	**vf** (mm/min)	**ap**
10	100	3200	0.04	510	5	80	2500	0.03	300	5	75	2400	0.03	290	5
12	100	2700	0.05	540	6	80	2100	0.04	340	6	75	2000	0.04	320	6
16	100	2000	0.07	560	8	80	1600	0.05	320	8	75	1500	0.06	360	8
20	100	1600	0.07	450	10	80	1300	0.05	260	10	75	1200	0.06	290	10
25	100	1300	0.08	420	12	80	1000	0.05	200	12	75	950	0.06	230	12
Depth of Cut	 DC:Dia.														

Work Material	Precipitation Hardening Stainless Steels, Cobalt Chromium Alloys					Heat Resistant Alloys Inconel718				
DC	**vc** (m/min)	**n** (min^{-1})	**fz** (mm/t.)	**vf** (mm/min)	**ap**	**vc** (m/min)	**n** (min^{-1})	**fz** (mm/t.)	**vf** (mm/min)	**ap**
10	60	1900	0.025	190	5	30	950	0.02	76	2
12	60	1600	0.035	220	6	30	800	0.03	96	2.4
16	60	1200	0.05	240	8	30	600	0.05	120	3.2
20	60	950	0.05	190	10	30	480	0.05	96	4
25	60	760	0.05	150	12	30	380	0.05	76	5
Depth of Cut	 DC:Dia.									

(Note 1) The irregular helix flute end mill has a larger effect on controlling vibration when compared to standard end mills. However, if the rigidity of the machine or the work material installation is poor, vibration or abnormal sound can occur. In this case, please reduce the revolution and the feed rate proportionately, or set a lower depth of cut.
(Note 2) If the depth of cut is smaller, the revolution and the feed rate can be increased.
(Note 3) For stainless steels, titanium alloys and heat resistant alloys, the use of water-soluble coolant is effective.

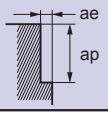
iMX-S4HV/iMX-C4HV

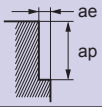
Square/Corner radius head, 4 flute, Irregular helix, Long cutting edge type

Recommended Cutting Conditions

Shoulder Milling

(mm)

Work Material		Carbon Steels, Alloy Steels, Mild Steels, Copper, Copper Alloys						Pre-hardened Steels, Carbon Steels, Alloy Steels, Alloy Tool Steels						Austenitic Stainless Steels, Ferritic and Martensitic Stainless Steels, Titanium Alloys					
L/D	DC	vc (m/min)	n (min-1)	fz (mm/t.)	vf (mm/min)	ap	ae	vc (m/min)	n (min-1)	fz (mm/t.)	vf (mm/min)	ap	ae	vc (m/min)	n (min-1)	fz (mm/t.)	vf (mm/min)	ap	ae
4	16	100	2000	0.09	720	32	0.8	80	1600	0.07	450	32	0.8	60	1200	0.08	380	32	0.8
	20	100	1600	0.09	580	40	1	80	1300	0.07	360	40	1	60	950	0.08	300	40	1
6	16	60	1200	0.07	340	32	0.8	50	990	0.05	200	32	0.8	40	800	0.06	190	32	0.8
	20	60	950	0.07	270	40	1	50	800	0.05	160	40	1	40	640	0.06	150	40	1
Depth of Cut		 DC:Dia.																	

Work Material		Precipitation Hardening Stainless Steels, Cobalt Chromium Alloys						Heat Resistant Alloys Inconel718					
L/D	DC	vc (m/min)	n (min-1)	fz (mm/t.)	vf (mm/min)	ap	ae	vc (m/min)	n (min-1)	fz (mm/t.)	vf (mm/min)	ap	ae
4	16	50	990	0.07	280	32	0.8	30	600	0.05	120	32	0.4
	20	50	800	0.07	220	40	1	30	480	0.05	96	40	0.5
6	16	30	600	0.05	120	32	0.8	20	400	0.04	64	32	0.4
	20	30	480	0.05	96	40	1	20	320	0.04	51	40	0.5
Depth of Cut		 DC:Dia.											

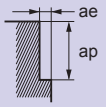
(Note 1) The irregular helix flute end mill has a larger effect on controlling vibration when compared to standard end mills. However, if the rigidity of the machine or the work material installation is poor, vibration or abnormal sound can occur. In this case, please reduce the revolution and the feed rate proportionately, or set a lower depth of cut.
(Note 2) If the depth of cut is smaller, the revolution and the feed rate can be increased.
(Note 3) L/D will be +1 when using a long cutting edge type head.
(Note 4) For stainless steels, titanium alloys and heat resistant alloys, the use of water-soluble coolant is effective.

iMX-S4HV/iMX-C4HV

Square/Corner radius head, 4 flute, Irregular helix, Oversize type head

Shoulder Milling

(mm)

Work Material		Carbon Steels, Alloy Steels, Mild Steels, Copper, Copper Alloys						Pre-hardened Steels, Carbon Steels, Alloy Steels, Alloy Tool Steels						Austenitic Stainless Steels, Ferritic and Martensitic Stainless Steels, Titanium Alloys					
L/D	DC	vc (m/min)	n (min-1)	fz (mm/t.)	vf (mm/min)	ap	ae	vc (m/min)	n (min-1)	fz (mm/t.)	vf (mm/min)	ap	ae	vc (m/min)	n (min-1)	fz (mm/t.)	vf (mm/min)	ap	ae
3	11	150	4300	0.09	1500	11	1.1	120	3500	0.06	840	11	1.1	100	2900	0.075	870	11	1.1
	12	150	4000	0.09	1400	12	1.2	120	3200	0.06	770	12	1.2	100	2700	0.075	810	12	1.2
	13	150	3700	0.09	1300	13	1.3	120	2900	0.065	750	13	1.3	100	2400	0.08	770	13	1.3
	14	150	3400	0.09	1200	14	1.4	120	2700	0.065	700	14	1.4	100	2300	0.08	740	14	1.4
	17	150	2800	0.1	1100	17	1.7	120	2200	0.075	660	17	1.7	100	1900	0.08	610	17	1.7
	18	150	2700	0.1	1100	18	1.8	120	2100	0.075	630	18	1.8	100	1800	0.09	650	18	1.8
	22	150	2200	0.1	880	22	2.2	120	1700	0.075	510	22	2.2	100	1400	0.09	500	22	2.2
	28	150	1700	0.12	820	28	2.8	120	1400	0.075	420	28	2.8	100	1100	0.09	400	28	2.8
	30	150	1600	0.12	770	30	3	120	1300	0.075	390	30	3	100	1100	0.09	400	30	3
	32	150	1500	0.12	720	32	3.2	120	1200	0.075	360	32	3.2	100	990	0.09	360	32	3.2
5	11	90	2600	0.07	730	11	0.4	70	2000	0.05	400	11	0.4	60	1700	0.06	410	11	0.4
	12	90	2400	0.07	670	12	0.5	70	1900	0.05	380	12	0.5	60	1600	0.06	380	12	0.5
	13	90	2200	0.07	620	13	0.5	70	1700	0.05	340	13	0.5	60	1500	0.06	360	13	0.5
	14	90	2000	0.07	560	14	0.6	70	1600	0.05	320	14	0.6	60	1400	0.06	340	14	0.6
	17	90	1700	0.08	540	17	0.7	70	1300	0.06	310	17	0.7	60	1100	0.07	310	17	0.7
	18	90	1600	0.08	510	18	0.7	70	1200	0.06	290	18	0.7	60	1100	0.07	310	18	0.7
	22	90	1300	0.08	420	22	0.9	70	1000	0.06	240	22	0.9	60	870	0.07	240	22	0.9
	28	90	1000	0.1	400	28	1.1	70	800	0.06	190	28	1.1	60	680	0.07	190	28	1.1
	30	90	950	0.1	380	30	1.2	70	740	0.06	180	30	1.2	60	640	0.07	180	30	1.2
	32	90	900	0.1	360	32	1.3	70	700	0.06	170	32	1.3	60	600	0.07	170	32	1.3
7	11	60	1700	0.06	410	11	0.2	50	1400	0.04	220	11	0.2	32	930	0.05	190	11	0.2
	12	60	1600	0.06	380	12	0.2	50	1300	0.04	210	12	0.2	32	850	0.05	170	12	0.2
	13	60	1500	0.06	360	13	0.3	50	1200	0.05	240	13	0.3	32	780	0.06	190	13	0.3
	14	60	1400	0.06	340	14	0.3	50	1100	0.05	220	14	0.3	32	730	0.06	180	14	0.3
	17	60	1100	0.07	310	17	0.3	50	940	0.05	190	17	0.3	32	600	0.06	140	17	0.3
	18	60	1100	0.07	310	18	0.4	50	880	0.05	180	18	0.4	32	570	0.06	140	18	0.4
	22	60	870	0.07	240	22	0.4	50	720	0.05	140	22	0.4	32	460	0.06	110	22	0.4
	28	60	680	0.08	220	28	0.6	50	570	0.05	110	28	0.6	32	360	0.06	86	28	0.6
	30	60	640	0.08	200	30	0.6	50	530	0.05	110	30	0.6	32	340	0.06	82	30	0.6
	32	60	600	0.08	190	32	0.6	50	500	0.05	100	32	0.6	32	320	0.06	77	32	0.6
Depth of Cut		 DC:Dia.																	

(Note 1) The irregular helix flute end mill has a larger effect on controlling vibration when compared to standard end mills. However, if the rigidity of the machine or the work material installation is poor, vibration or abnormal sound can occur. In this case, please reduce the revolution and the feed rate proportionately, or set a lower depth of cut.
(Note 2) If the depth of cut is smaller, the revolution and the feed rate can be increased.
(Note 3) For stainless steels, titanium alloys and heat resistant alloys, the use of water-soluble coolant is effective.

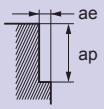
iMX-S4HV/iMX-C4HV

Square/Corner radius head, 4 flute, Irregular helix, Oversize type head

Recommended Cutting Conditions

Shoulder Milling

(mm)

Work Material		Precipitation Hardening Stainless Steels, Cobalt Chromium Alloys						Heat Resistant Alloys Inconel718					
L/D	DC	vc (m/min)	n (min^{-1})	fz (mm/t.)	vf (mm/min)	ap	ae	vc (m/min)	n (min^{-1})	fz (mm/t.)	vf (mm/min)	ap	ae
3	11	75	2200	0.06	530	11	1.1	30	870	0.04	140	11	0.8
	12	75	2000	0.06	480	12	1.2	30	800	0.04	130	12	0.9
	13	75	1800	0.065	470	13	1.3	30	730	0.045	130	13	1
	14	75	1700	0.065	440	14	1.4	30	680	0.045	120	14	1.1
	17	75	1400	0.065	360	17	1.7	40	750	0.045	140	17	1.3
	18	75	1300	0.075	390	18	1.8	40	710	0.05	140	18	1.4
	22	75	1100	0.075	330	22	2.2	40	580	0.05	120	22	1.7
	28	75	850	0.075	260	28	2.8	40	450	0.05	90	28	2.1
	30	75	800	0.075	240	30	3	40	420	0.05	84	30	2.3
	32	75	750	0.075	230	32	3.2	40	400	0.05	80	32	2.4
5	11	50	1400	0.05	280	11	0.4	10	290	0.03	35	11	0.3
	12	50	1300	0.05	260	12	0.5	10	270	0.03	32	12	0.4
	13	50	1200	0.05	240	13	0.5	10	240	0.04	38	13	0.4
	14	50	1100	0.05	220	14	0.6	10	230	0.04	37	14	0.4
	17	50	940	0.06	230	17	0.7	19	360	0.04	58	17	0.5
	18	50	880	0.06	210	18	0.7	19	340	0.04	54	18	0.6
	22	50	720	0.06	170	22	0.9	19	270	0.04	43	22	0.7
	28	50	570	0.06	140	28	1.1	19	220	0.04	35	28	0.8
	30	50	530	0.06	130	30	1.2	19	200	0.04	32	30	0.9
	32	50	500	0.06	120	32	1.3	19	190	0.04	30	32	1
7	11	24	690	0.04	110	11	0.2	–	–	–	–	–	–
	12	24	640	0.04	100	12	0.2	–	–	–	–	–	–
	13	24	590	0.05	120	13	0.3	–	–	–	–	–	–
	14	24	550	0.05	110	14	0.3	–	–	–	–	–	–
	17	24	450	0.05	90	17	0.3	–	–	–	–	–	–
	18	24	420	0.05	84	18	0.4	–	–	–	–	–	–
	22	24	350	0.05	70	22	0.4	–	–	–	–	–	–
	28	24	270	0.05	54	28	0.6	–	–	–	–	–	–
	30	24	250	0.05	50	30	0.6	–	–	–	–	–	–
	32	24	240	0.05	48	32	0.6	–	–	–	–	–	–
Depth of Cut		 DC:Dia.											

(Note 1) The irregular helix flute end mill has a larger effect on controlling vibration when compared to standard end mills. However, if the rigidity of the machine or the work material installation is poor, vibration or abnormal sound can occur. In this case, please reduce the revolution and the feed rate proportionately, or set a lower depth of cut.

(Note 2) If the depth of cut is smaller, the revolution and the feed rate can be increased.

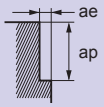
(Note 3) For stainless steels, titanium alloys and heat resistant alloys, the use of water-soluble coolant is effective.

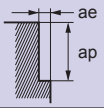
iMX-R4F
Roughing head, 4 flute

Recommended Cutting Conditions

Shoulder Milling

(mm)

Work Material	Carbon Steels, Alloy Steels, Mild Steels, Copper, Copper Alloys						Pre-hardened Steels, Carbon Steels, Alloy Steels, Alloy Tool Steels						Austenitic Stainless Steels, Ferritic and Martensitic Stainless Steels, Titanium Alloys					
DC	vc (m/min)	n (min-1)	fz (mm/t.)	vf (mm/min)	ap	ae	vc (m/min)	n (min-1)	fz (mm/t.)	vf (mm/min)	ap	ae	vc (m/min)	n (min-1)	fz (mm/t.)	vf (mm/min)	ap	ae
10	150	4800	0.045	860	8	4	120	3800	0.03	460	8	4	100	3200	0.038	490	8	4
12	150	4000	0.045	720	9.6	4.8	120	3200	0.033	420	9.6	4.8	100	2700	0.04	430	9.6	4.8
16	150	3000	0.05	600	12.8	6.4	120	2400	0.038	360	12.8	6.4	100	2000	0.045	360	12.8	6.4
20	150	2400	0.05	480	16	8	120	1900	0.038	290	16	8	100	1600	0.045	290	16	8
25	150	1900	0.06	460	20	10	120	1500	0.038	230	20	10	100	1300	0.045	230	20	10
Depth of Cut	 DC:Dia.																	

Work Material	Precipitation Hardening Stainless Steels, Cobalt Chromium Alloys						Heat Resistant Alloys Inconel718					
DC	vc (m/min)	n (min-1)	fz (mm/t.)	vf (mm/min)	ap	ae	vc (m/min)	n (min-1)	fz (mm/t.)	vf (mm/min)	ap	ae
10	75	2400	0.03	290	8	4	40	1300	0.04	210	8	1
12	75	2000	0.033	260	9.6	4.8	40	1100	0.045	200	9.6	1.2
16	75	1500	0.038	230	12.8	6.4	40	800	0.05	160	12.8	1.6
20	75	1200	0.038	180	16	8	40	640	0.05	130	16	2
25	75	950	0.038	140	20	10	40	510	0.05	100	20	2.5
Depth of Cut	 DC:Dia.											

(Note 1) Vibration may occur if the rigidity of machine or work material is low.
In this case, please reduce the revolution and the feed rate proportionately, or set a lower depth of cut.
(Note 2) If the depth of cut is smaller, the revolution and the feed rate can be increased.
(Note 3) For stainless steels, titanium alloys and heat resistant alloys, the use of water-soluble coolant is effective.

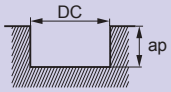
iMX-R4F

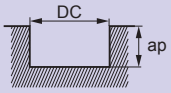
Roughing head, 4 flute

Recommended Cutting Conditions

Slot Milling

(mm)

Work Material	Carbon Steels, Alloy Steels, Mild Steels, Copper, Copper Alloys					Pre-hardened Steels, Carbon Steels, Alloy Steels, Alloy Tool Steels					Austenitic Stainless Steels, Ferritic and Martensitic Stainless Steels, Titanium Alloys				
DC	**vc** (m/min)	**n** (min^{-1})	**fz** (mm/t.)	**vf** (mm/min)	**ap**	**vc** (m/min)	**n** (min^{-1})	**fz** (mm/t.)	**vf** (mm/min)	**ap**	**vc** (m/min)	**n** (min^{-1})	**fz** (mm/t.)	**vf** (mm/min)	**ap**
10	100	3200	0.04	510	5	80	2500	0.03	300	5	60	1900	0.02	150	4
12	100	2700	0.045	490	6	80	2100	0.032	270	6	60	1600	0.025	160	4.8
16	100	2000	0.05	400	8	80	1600	0.038	240	8	60	1200	0.03	140	6.4
20	100	1600	0.05	320	10	80	1300	0.038	200	10	60	950	0.034	130	8
25	100	1300	0.06	310	12	80	1000	0.038	150	12	60	760	0.034	100	10
Depth of Cut	 DC:Dia.														

Work Material	Precipitation Hardening Stainless Steels, Cobalt Chromium Alloys				
DC	**vc** (m/min)	**n** (min^{-1})	**fz** (mm/t.)	**vf** (mm/min)	**ap**
10	40	1300	0.016	83	4
12	40	1100	0.02	88	4.8
16	40	800	0.024	77	6.4
20	40	640	0.027	70	8
25	40	510	0.027	55	10
Depth of Cut	 DC:Dia.				

(Note 1) Vibration may occur if the rigidity of machine or work material is low.
In this case, please reduce the revolution and the feed rate proportionately, or set a lower depth of cut.
(Note 2) If the depth of cut is smaller, the revolution and the feed rate can be increased.
(Note 3) For stainless steels, titanium alloys and heat resistant alloys, the use of water-soluble coolant is effective.

iMX-B2S/iMX-B4S NEW

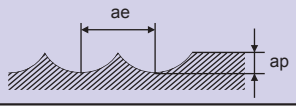
Ball nose head, 2 flute/4 flute, For hardened steels

Recommended Cutting Conditions

iMX-B2S

Shoulder Milling

(mm)

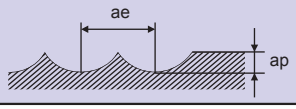
Work Material		Hardened Steels (55–65HRC)									
Inclination Angle		α≤15°				α>15°				ap	ae
DC	RE	vc (m/min)	n (min-1)	fz (mm/t.)	vf (mm/min)	vc (m/min)	n (min-1)	fz (mm/t.)	vf (mm/min)		
16	8	300	6000	0.14	1700	150	3000	0.08	480	0.3	1.6
20	10	300	4800	0.14	1300	150	2400	0.08	380	0.3	2
Depth of Cut		 DC:Dia.									

(Note 1) If the depth of cut is smaller, the revolution and the feed rate can be increased.
(Note 2) α is the inclination angle of the machined surface.

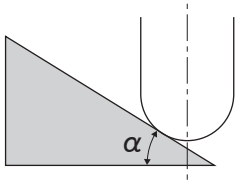
iMX-B4S

Shoulder Milling

(mm)

Work Material		Hardened Steels (55–65HRC)									
Inclination Angle		α≤15°				α>15°				ap	ae
DC	RE	vc (m/min)	n (min-1)	fz (mm/t.)	vf (mm/min)	vc (m/min)	n (min-1)	fz (mm/t.)	vf (mm/min)		
16	8	300	6000	0.07	1700	150	3000	0.06	720	0.3	1.6
20	10	300	4800	0.07	1300	150	2400	0.06	580	0.3	2
Depth of Cut		 DC:Dia.									

(Note 1) If the depth of cut is smaller, the revolution and the feed rate can be increased.
(Note 2) α is the inclination angle of the machined surface.



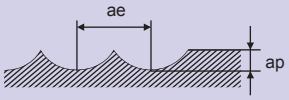
iMX-B3FV

Ball nose head, 3 flute, Irregular curve, For high efficiency machining

Recommended Cutting Conditions

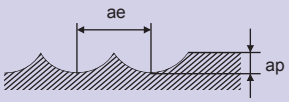
Shoulder Milling (L/D=5)

(mm)

Work Material		Pre-hardened Steels, Alloy Tool Steels										Hardened Steels (40–55HRC)									
Inclination Angle		α≤15°				α>15°				ap	ae	α≤15°				α>15°				ap	ae
DC	RE	vc (m/min)	n (min-1)	fz (mm/t.)	vf (mm/min)	vc (m/min)	n (min-1)	fz (mm/t.)	vf (mm/min)			vc (m/min)	n (min-1)	fz (mm/t.)	vf (mm/min)	vc (m/min)	n (min-1)	fz (mm/t.)	vf (mm/min)		
10	5	175	5600	0.22	3700	115	3700	0.15	1700	0.7	2.6	150	4800	0.18	2600	100	3200	0.12	1200	0.5	2
12	6	175	4600	0.22	3000	115	3100	0.15	1400	1	3.2	150	4000	0.18	2200	100	2700	0.12	970	0.7	2.5
16	8	175	3500	0.22	2300	115	2300	0.15	1000	1.1	3.8	150	3000	0.18	1600	100	2000	0.12	720	0.9	3.5
20	10	175	2800	0.22	1800	115	1800	0.15	810	1.2	4.8	150	2400	0.18	1300	100	1600	0.12	580	1.1	4.2
Depth of Cut		 DC:Dia.																			

Shoulder Milling (L/D=7)

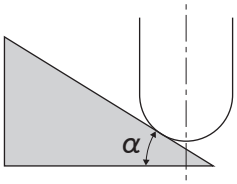
(mm)

Work Material		Pre-hardened Steels, Alloy Tool Steels										Hardened Steels (40–55HRC)									
Inclination Angle		α≤15°				α>15°				ap	ae	α≤15°				α>15°				ap	ae
DC	RE	vc (m/min)	n (min-1)	fz (mm/t.)	vf (mm/min)	vc (m/min)	n (min-1)	fz (mm/t.)	vf (mm/min)			vc (m/min)	n (min-1)	fz (mm/t.)	vf (mm/min)	vc (m/min)	n (min-1)	fz (mm/t.)	vf (mm/min)		
10	5	120	3800	0.2	2300	80	2500	0.13	980	0.5	1.3	100	3200	0.13	1200	65	2100	0.085	540	0.4	1
12	6	120	3200	0.2	1900	80	2100	0.13	820	0.7	1.6	100	2700	0.13	1100	65	1700	0.085	430	0.6	1.3
16	8	120	2400	0.2	1400	80	1600	0.13	620	0.8	1.9	100	2000	0.13	780	65	1300	0.085	330	0.7	1.8
20	10	120	1900	0.2	1100	80	1300	0.13	510	0.9	2.4	100	1600	0.13	620	65	1000	0.085	260	0.8	2.1
Depth of Cut		 DC:Dia.																			

(Note 1) The irregular helix flute end mill has a larger effect on controlling vibration when compared to standard end mills. However, if the rigidity of the machine or the work material installation is poor, vibration or abnormal sound can occur. In this case, please reduce the revolution and the feed rate proportionately, or set a lower depth of cut.

(Note 2) If the depth of cut is smaller, the revolution and the feed rate can be increased.

(Note 3) α is the inclination angle of the machined surface.



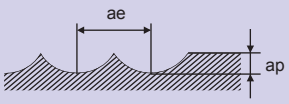
iMX-B4HV/iMX-B4HV-E

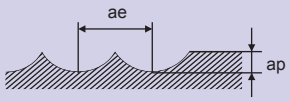
Ball nose head, 4 flute, Irregular curve (With/Without coolant hole)

Recommended Cutting Conditions

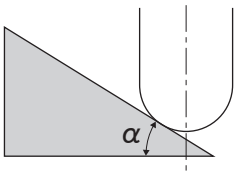
Shoulder Milling

(mm)

Work Material		Carbon Steels, Alloy Steels, Mild Steels, Pre-hardened Steels										Austenitic Stainless Steels, Ferritic and Martensitic Stainless Steels, Cobalt Chromium Alloys, Titanium Alloys									
Inclination Angle		α≤15°				α>15°				ap	ae	α≤15°				α>15°				ap	ae
DC	RE	vc (m/min)	n (min-1)	fz (mm/t.)	vf (mm/min)	vc (m/min)	n (min-1)	fz (mm/t.)	vf (mm/min)			vc (m/min)	n (min-1)	fz (mm/t.)	vf (mm/min)	vc (m/min)	n (min-1)	fz (mm/t.)	vf (mm/min)		
10	5	300	9500	0.106	4000	200	6400	0.07	1800	1	2.5	225	7200	0.105	3000	150	4800	0.067	1300	1	2.5
12	6	300	8000	0.125	4000	200	5300	0.085	1800	1.2	3	225	6000	0.125	3000	150	4000	0.08	1300	1.2	3
16	8	300	6000	0.134	3200	200	4000	0.088	1400	1.6	4	225	4500	0.14	2500	150	3000	0.09	1100	1.6	4
20	10	300	4800	0.156	3000	200	3200	0.1	1300	2	5	225	3600	0.16	2300	150	2400	0.105	1000	2	5
25	12.5	300	3800	0.16	2400	200	2500	0.1	1000	2.5	6	225	2900	0.16	1900	150	1900	0.105	800	2.5	6
Depth of Cut		 DC:Dia.																			

Work Material		Heat Resistant Alloys Inconel718									
Inclination Angle		α≤15°				α>15°				ap	ae
DC	RE	vc (m/min)	n (min-1)	fz (mm/t.)	vf (mm/min)	vc (m/min)	n (min-1)	fz (mm/t.)	vf (mm/min)		
10	5	60	1900	0.055	420	40	1300	0.035	180	0.5	1
12	6	60	1600	0.055	350	40	1100	0.035	150	0.6	1.2
16	8	60	1200	0.062	300	40	800	0.04	130	0.8	1.6
20	10	60	950	0.062	240	40	640	0.04	100	1	2
25	12.5	60	760	0.062	190	40	510	0.04	82	1.2	2.5
Depth of Cut		 DC:Dia.									

(Note 1) The irregular helix flute end mill has a larger effect on controlling vibration when compared to standard end mills. However, if the rigidity of the machine or the work material installation is poor, vibration or abnormal sound can occur. In this case, please reduce the revolution and the feed rate proportionately, or set a lower depth of cut.
(Note 2) If the depth of cut is smaller, the revolution and the feed rate can be increased.
(Note 3) For stainless steels, titanium alloys and heat resistant alloys, the use of water-soluble coolant is effective.
(Note 4) α is the inclination angle of the machined surface.



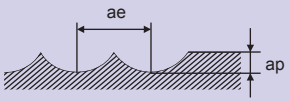
iMX-B6HV

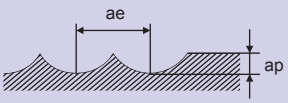
Ball nose head, 6 flute, Irregular curve

Recommended Cutting Conditions

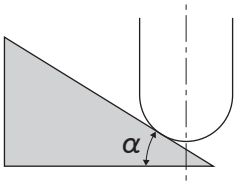
Shoulder Milling

(mm)

Work Material		Carbon Steels, Alloy Steels, Mild Steels, Pre-hardened Steels										Austenitic Stainless Steels, Ferritic and Martensitic Stainless Steels, Cobalt Chromium Alloys, Titanium Alloys									
Inclination Angle		α≤15°				α>15°				ap	ae	α≤15°				α>15°				ap	ae
DC	RE	vc (m/min)	n (min-1)	fz (mm/t.)	vf (mm/min)	vc (m/min)	n (min-1)	fz (mm/t.)	vf (mm/min)			vc (m/min)	n (min-1)	fz (mm/t.)	vf (mm/min)	vc (m/min)	n (min-1)	fz (mm/t.)	vf (mm/min)		
10	**5**	300	9500	0.106	6000	200	6400	0.07	2700	0.5	2	225	7200	0.105	4500	150	4800	0.067	1900	0.5	2
12	**6**	300	8000	0.125	6000	200	5300	0.085	2700	0.6	2.4	225	6000	0.125	4500	150	4000	0.08	1900	0.6	2.4
16	**8**	300	6000	0.134	4800	200	4000	0.088	2100	0.8	3.2	225	4500	0.14	3800	150	3000	0.09	1600	0.8	3.2
20	**10**	300	4800	0.156	4500	200	3200	0.1	1900	1	4	225	3600	0.16	3500	150	2400	0.105	1500	1	4
25	**12.5**	300	3800	0.16	3600	200	2500	0.1	1500	1.2	5	225	2900	0.16	2800	150	1900	0.105	1200	1.2	5
Depth of Cut		 DC:Dia.																			

Work Material		Heat Resistant Alloys Inconel718									
Inclination Angle		α≤15°				α>15°				ap	ae
DC	RE	vc (m/min)	n (min-1)	fz (mm/t.)	vf (mm/min)	vc (m/min)	n (min-1)	fz (mm/t.)	vf (mm/min)		
10	**5**	60	1900	0.055	630	40	1300	0.035	270	0.5	1
12	**6**	60	1600	0.055	530	40	1100	0.035	230	0.6	1.2
16	**8**	60	1200	0.062	450	40	800	0.04	190	0.8	1.6
20	**10**	60	950	0.062	350	40	640	0.04	150	1	2
25	**12.5**	60	760	0.062	280	40	510	0.04	120	1.2	2.5
Depth of Cut		 DC:Dia.									

(Note 1) The irregular helix flute end mill has a larger effect on controlling vibration when compared to standard end mills. However, if the rigidity of the machine or the work material installation is poor, vibration or abnormal sound can occur. In this case, please reduce the revolution and the feed rate proportionately, or set a lower depth of cut.
(Note 2) If the depth of cut is smaller, the revolution and the feed rate can be increased.
(Note 3) For stainless steels, titanium alloys and heat resistant alloys, the use of water-soluble coolant is effective.
(Note 4) α is the inclination angle of the machined surface.



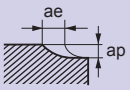
iMX-C4FD-C

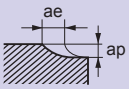
Duplex corner radius head, 4 flute, For high feed, With coolant hole

Recommended Cutting Conditions

Shoulder Milling

(mm)

Work Material	Carbon Steels, Alloy Steels, Mild Steels, Copper, Copper Alloys						Pre-hardened Steels, Carbon Steels, Alloy Steels, Alloy Tool Steels						Hardened Steels, Precipitation Hardening Stainless Steels, Ferritic and Martensitic Stainless Steels					
DC	vc (m/min)	n (min-1)	fz (mm/t.)	vf (mm/min)	ap	ae	vc (m/min)	n (min-1)	fz (mm/t.)	vf (mm/min)	ap	ae	vc (m/min)	n (min-1)	fz (mm/t.)	vf (mm/min)	ap	ae
10	150	4800	0.4	7700	0.5	6	135	4300	0.4	6900	0.5	6	120	3800	0.3	4600	0.5	6
12	150	4000	0.45	7200	0.6	7.2	135	3600	0.45	6500	0.6	7.2	120	3200	0.3	3800	0.6	7.2
16	150	3000	0.5	6000	0.8	9.6	135	2700	0.5	5400	0.8	9.6	120	2400	0.4	3800	0.8	9.6
20	150	2400	0.5	4800	1	12	135	2100	0.5	4200	1	12	120	1900	0.4	3000	1	12
25	150	1900	0.5	3800	1.25	15	135	1700	0.5	3400	1.25	15	120	1500	0.4	2400	1.25	15
Depth of Cut	 DC:Dia.																	

Work Material	Austenitic Stainless Steels, Titanium Alloys, Cobalt Chromium Alloys						Heat Resistant Alloys Inconel718					
DC	vc (m/min)	n (min-1)	fz (mm/t.)	vf (mm/min)	ap	ae	vc (m/min)	n (min-1)	fz (mm/t.)	vf (mm/min)	ap	ae
10	40	1300	0.2	1000	0.5	6	25	800	0.1	320	0.5	6
12	40	1100	0.2	880	0.6	7.2	25	660	0.1	260	0.6	7.2
16	40	800	0.3	960	0.8	9.6	25	500	0.15	300	0.8	9.6
20	40	640	0.3	770	1	12	25	400	0.15	240	1	12
25	40	510	0.3	610	1.25	15	25	320	0.15	190	1.25	15
Depth of Cut	 DC:Dia.											

(Note 1) Vibration may occur if the rigidity of machine or work material is low. In this case, please reduce the revolution and the feed rate proportionately, or set a lower depth of cut.
(Note 2) If the depth of cut is smaller, the revolution and the feed rate can be increased.
(Note 3) Please reduce the feed rate by half when ramping.
(Note 4) For stainless steels, titanium alloys and heat resistant alloys, the use of water-soluble coolant is effective.

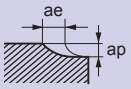
iMX-C4FV

Corner radius head, 4 flute, Irregular helix, For high efficiency machining

Recommended Cutting Conditions

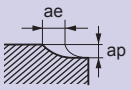
Large Depth of Cut Milling

(mm)

Work Material		Carbon Steels, Alloy Steels, Gray Cast Irons						Pre-hardened Steels, Alloy Tool Steels						Hardened Steels (40－55HRC)					
DC	RE	vc (m/min)	n (min-1)	fz (mm/t.)	vf (mm/min)	ap	ae	vc (m/min)	n (min-1)	fz (mm/t.)	vf (mm/min)	ap	ae	vc (m/min)	n (min-1)	fz (mm/t.)	vf (mm/min)	ap	ae
10	2	90	2900	0.25	2900	1.2	4.5	75	2400	0.23	2200	1	4.5	60	1900	0.22	1700	0.7	4.5
12	2	90	2400	0.25	2400	1.8	6	75	2000	0.23	1800	1.4	6	60	1600	0.22	1400	0.9	6
16	3	90	1800	0.25	1800	1.8	7.5	75	1500	0.23	1400	1.4	7.5	60	1200	0.22	1100	0.9	7.5
20	3	90	1400	0.25	1400	1.8	9	75	1200	0.23	1100	1.4	9	60	950	0.22	840	0.9	9
25	4	90	1100	0.25	1100	2.4	11.5	75	950	0.23	870	1.8	11.5	60	760	0.22	670	1.2	11.5
Depth of Cut		 DC:Dia.																	

High Speed Milling

(mm)

Work Material		Carbon Steel, Alloy Steels, Gray Cast Irons						Pre-hardened Steels, Alloy Tool Steels						Hardened Steels (40－55HRC)					
DC	RE	vc (m/min)	n (min-1)	fz (mm/t.)	vf (mm/min)	ap	ae	vc (m/min)	n (min-1)	fz (mm/t.)	vf (mm/min)	ap	ae	vc (m/min)	n (min-1)	fz (mm/t.)	vf (mm/min)	ap	ae
10	2	150	4800	0.4	7700	0.6	4.5	125	4000	0.35	5600	0.46	4.5	100	3200	0.3	3800	0.36	4.5
12	2	150	4000	0.45	7200	0.9	6	125	3300	0.4	5300	0.7	6	100	2700	0.3	3200	0.45	6
16	3	150	3000	0.5	6000	0.9	7.5	125	2500	0.45	4500	0.7	7.5	100	2000	0.3	2400	0.45	7.5
20	3	150	2400	0.5	4800	0.9	9	125	2000	0.45	3600	0.7	9	100	1600	0.35	2200	0.45	9
25	4	150	1900	0.5	3800	1.2	11.5	125	1600	0.45	2900	0.9	11.5	100	1300	0.35	1800	0.6	11.5
Depth of Cut		 DC:Dia.																	

(Note 1) The irregular helix flute end mill has a larger effect on controlling vibration when compared to standard end mills. However, if the rigidity of the machine or the work material installation is poor, vibration or abnormal sound can occur. In this case, please reduce the revolution and the feed rate proportionately, or set a lower depth of cut.
(Note 2) If the depth of cut is smaller, the revolution and the feed rate can be increased.
(Note 3) For profile machining such as molds, machining conditions may differ considerably depending on the work material geometry, machining methods and depth of cut. Reduce the feed rate especially when machining the corner sections of a work material.
(Note 4) Air blow or oil mist is recommended for good chip evacuation.

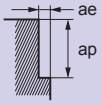
iMX-S3A/iMX-C3A

Square/Corner radius head, 3 flute, For aluminum alloys

Recommended Cutting Conditions

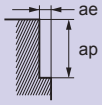
Shoulder Milling (L/D=3)

(mm)

Work Material	Aluminum Alloys					
DC	vc (m/min)	n (min-1)	fz (mm/t.)	vf (mm/min)	ap	ae
10	500	16000	0.117	5600	8	3
12	500	13000	0.118	4600	9.6	3.6
16	500	9900	0.153	4500	12.8	4.8
20	500	8000	0.175	4200	16	6
25	500	6400	0.211	4100	20	7.5
Depth of Cut	 DC:Dia.					

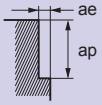
Shoulder Milling (L/D=5)

(mm)

Work Material	Aluminum Alloys					
DC	vc (m/min)	n (min-1)	fz (mm/t.)	vf (mm/min)	ap	ae
10	300	9500	0.09	2600	8	1.2
12	300	8000	0.09	2200	9.6	1.44
16	300	6000	0.12	2200	12.8	1.92
20	300	4800	0.14	2000	16	2.4
25	300	3800	0.17	1900	20	3
Depth of Cut	 DC:Dia.					

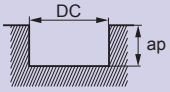
Shoulder Milling (L/D=7)

(mm)

Work Material	Aluminum Alloys					
DC	vc (m/min)	n (min-1)	fz (mm/t.)	vf (mm/min)	ap	ae
10	200	6400	0.08	1500	8	0.6
12	200	5300	0.08	1300	9.6	0.72
16	200	4000	0.11	1300	12.8	0.96
20	200	3200	0.12	1200	16	1.2
25	200	2500	0.15	1100	20	1.5
Depth of Cut	 DC:Dia.					

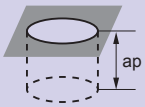
Slot Milling (L/D=3)

(mm)

Work Material	Aluminum Alloys				
DC	vc (m/min)	n (min-1)	fz (mm/t.)	vf (mm/min)	ap
10	500	16000	0.068	3300	5
12	500	13000	0.072	2800	6
16	500	9900	0.093	2800	8
20	500	8000	0.108	2600	10
25	500	6400	0.127	2400	12.5
Depth of Cut	 DC:Dia.				

Plunging (L/D=3)

(mm)

Work Material	Aluminum Alloys					
DC	vc (m/min)	n (min-1)	fr (mm/rev)	vf (mm/min)	ap	Step ap2
10	300	9500	0.1	950	5	2.5
12	300	8000	0.1	800	6	2.5
16	300	6000	0.1	600	8	2.5
20	300	4800	0.1	480	10	2.5
25	300	3800	0.1	380	12.5	2.5
Depth of Cut	 DC:Dia.					

(Note 1) Vibration may occur if the rigidity of machine or work material is low.
In this case, please reduce the revolution and the feed rate proportionately, or set a lower depth of cut.
(Note 2) The use of water-soluble coolant is effective.

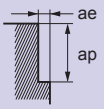
iMX-S3A/iMX-C3A

Square/Corner radius head, 3 flute, For aluminum alloys, Oversize type head

Recommended Cutting Conditions

Shoulder Milling

(mm)

Work Material		Aluminum Alloys					
L/D	DC	vc (m/min)	n (min-1)	fz (mm/t.)	vf (mm/min)	ap	ae
3	12	500	13000	0.117	4600	9.6	2.4
	14	500	11000	0.118	3900	11.2	2.8
	18	500	8800	0.153	4000	14.4	3.6
	22	500	7200	0.175	3800	17.6	4.4
	28	500	5700	0.211	3600	22.4	5.6
5	12	300	8000	0.09	2200	9.6	1.0
	14	300	6800	0.09	1800	11.2	1.1
	18	300	5300	0.12	1900	14.4	1.4
	22	300	4300	0.14	1800	17.6	1.8
	28	300	3400	0.17	1700	22.4	2.2
Depth of Cut		 DC:Dia.					

(Note 1) Vibration may occur if the rigidity of machine or work material is low.
In this case, please reduce the revolution and the feed rate proportionately, or set a lower depth of cut.
(Note 2) The use of water-soluble coolant is effective.

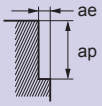
iMX-C6HV/C10HV/C12HV

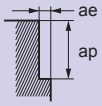
Corner radius head, Multi-flute, Irregular helix

Recommended Cutting Conditions

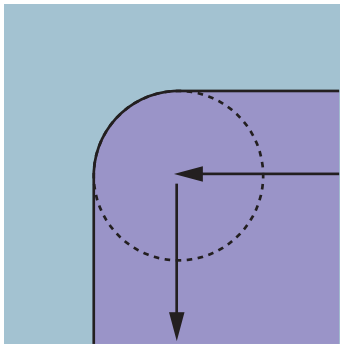
Shoulder Milling

(mm)

Work Material	Pre-hardened Steels, Carbon Steels, Alloy Steels, Alloy Tool Steels						Austenitic Stainless Steels, Ferritic and Martensitic Stainless Steels, Titanium Alloys						Precipitation Hardening Stainless Steels, Cobalt Chromium Alloys					
DC	vc (m/min)	n (min^{-1})	fz (mm/t.)	vf (mm/min)	ap	ae	vc (m/min)	n (min^{-1})	fz (mm/t.)	vf (mm/min)	ap	ae	vc (m/min)	n (min^{-1})	fz (mm/t.)	vf (mm/min)	ap	ae
10	200	6400	0.07	2700	10	1	150	4800	0.07	2000	10	1	100	3200	0.07	1300	10	1
12	200	5300	0.085	2700	12	1.2	150	4000	0.085	2000	12	1.2	100	2700	0.085	1400	12	1.2
16	200	4000	0.088	3500	16	0.6	150	3000	0.088	2600	16	0.64	100	2000	0.088	1800	16	0.6
20	200	3200	0.1	3800	20	0.8	150	2400	0.1	2900	20	0.8	100	1600	0.1	1900	20	0.8
25	200	2500	0.1	3000	25	1	150	1900	0.1	2300	25	1	100	1300	0.1	1600	25	1
Depth of Cut	 DC:Dia.																	

Work Material	Heat Resistant Alloys Inconel718					
DC	vc (m/min)	n (min^{-1})	fz (mm/t.)	vf (mm/min)	ap	ae
10	40	1300	0.033	260	10	0.5
12	40	1100	0.035	230	12	0.6
16	40	800	0.038	300	16	0.6
20	40	640	0.04	310	20	0.8
25	40	510	0.04	240	25	1
Depth of Cut	 DC:Dia.					

(Note 1) The irregular helix flute end mill has a larger effect on controlling vibration when compared to standard end mills. However, if the rigidity of the machine or the work material installation is poor, vibration or abnormal sound can occur. In this case, please reduce the revolution and the feed rate proportionately, or set a lower depth of cut.
(Note 2) If the depth of cut is smaller, the revolution and the feed rate can be increased.
(Note 3) If the machining radius at the corner is the same as the tool radius when using a head with more than 10 flutes, please set the depth of cut and feed rate to half of the above.
(Note 4) For stainless steels, titanium alloys and heat resistant alloys, the use of water-soluble coolant is effective.



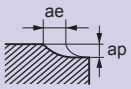
iMX-C8T/C10T/C12T/C15T-C

Corner radius, Taper head, Multi-flute, With coolant hole

Recommended Cutting Conditions

Shoulder Milling

(mm)

Work Material		Austenitic Stainless Steels, Ferritic and Martensitic Stainless Steels						Precipitation Hardening Stainless Steels, Titanium Alloys						Heat Resistant Alloys Inconel718					
DC	No. of Flutes	**vc** (m/min)	**n** (min^{-1})	**fz** (mm/t.)	**vf** (mm/min)	**ap**	**ae**	**vc** (m/min)	**n** (min^{-1})	**fz** (mm/t.)	**vf** (mm/min)	**ap**	**ae**	**vc** (m/min)	**n** (min^{-1})	**fz** (mm/t.)	**vf** (mm/min)	**ap**	**ae**
8	**8**	300	12000	0.1	9600	0.3	1.2	200	8000	0.1	6400	0.3	1.2	60	2400	0.08	1500	0.3	0.8
10	**10**	300	9500	0.1	9500	0.3	1.5	200	6400	0.1	6400	0.3	1.5	60	1900	0.08	1500	0.3	1
15	**12**	300	6400	0.12	9200	0.3	2.2	200	4200	0.12	6000	0.3	2.2	60	1300	0.1	1600	0.3	1.5
15	**15**	300	6400	0.1	9600	0.3	2.2	200	4200	0.1	6300	0.3	2.2	60	1300	0.08	1600	0.3	1.5
19	**12**	300	5000	0.12	7200	0.3	2.8	200	3400	0.12	4900	0.3	2.8	60	1000	0.1	1200	0.3	1.9
19	**15**	300	5000	0.1	7500	0.3	2.8	200	3400	0.1	5100	0.3	2.8	60	1000	0.08	1200	0.3	1.9
Depth of Cut		 DC:Dia.																	

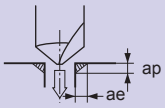
(Note 1) Vibration may occur if the rigidity of machine or work material is low.
In this case, please reduce the revolution and the feed rate proportionately, or set a lower depth of cut.
(Note 2) The use of water-soluble coolant is effective.

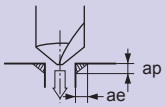
iMX-CH3L
Chamfer head, 3 flute

Recommended Cutting Conditions

Chamfer Milling (Hole Circumference)

(mm)

Work Material		Carbon Steels, Alloy Steels, Gray Cast Irons						Alloy Tool Steels, Carbon Steels, Alloy Steels, Pre-hardened Steels						Austenitic Stainless Steels, Titanium Alloys					
DC	No. of Flutes	vc (m/min)	n (min^{-1})	fz (mm/t.)	vf (mm/min)	ap	ae	vc (m/min)	n (min^{-1})	fz (mm/t.)	vf (mm/min)	ap	ae	vc (m/min)	n (min^{-1})	fz (mm/t.)	vf (mm/min)	ap	ae
10	**3**	40	1300	0.04	160	1.8	1.8	40	1300	0.03	120	1.8	1.8	30	950	0.03	86	1.8	1.8
12	**3**	40	1100	0.04	130	2.2	2.2	40	1100	0.03	99	2.2	2.2	30	800	0.03	72	2.2	2.2
16	**3**	40	800	0.04	96	2.4	2.4	40	800	0.03	72	2.4	2.4	30	600	0.03	54	2.4	2.4
20	**3**	40	640	0.04	77	2.6	2.6	40	640	0.03	58	2.6	2.6	30	480	0.03	43	2.6	2.6
Depth of Cut		 DC:Dia.																	

Work Material		Hardenned Steels (40-55HRC)						Heat Resistant Alloys Inconel718					
DC	No. of Flutes	vc (m/min)	n (min^{-1})	fz (mm/t.)	vf (mm/min)	ap	ae	vc (m/min)	n (min^{-1})	fz (mm/t.)	vf (mm/min)	ap	ae
10	**3**	30	950	0.02	57	1.8	1.8	30	950	0.04	110	1.8	1.8
12	**3**	30	800	0.02	48	2.2	2.2	30	800	0.04	96	2.2	2.2
16	**3**	30	600	0.02	36	2.4	2.4	30	600	0.04	72	2.4	2.4
20	**3**	30	480	0.02	29	2.6	2.6	30	480	0.04	58	2.6	2.6
Depth of Cut		 DC:Dia.											

(Note 1) Vibration may occur if the rigidity of machine or work material is low.
In this case, please reduce the revolution and the feed rate proportionately.
(Note 2) For stainless steels, titanium alloys and heat resistant alloys, the use of water-soluble coolant is effective.

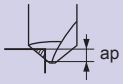
iMX-CH3L

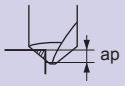
Chamfer head, 3 flute

Recommended Cutting Conditions

Chamfer Milling (Shape Circumference)

(mm)

Work Material		Carbon Steels, Alloy Steels, Gray Cast Irons					Alloy Tool Steels, Carbon Steels, Alloy Steels, Pre-hardened Steels					Austenitic Stainless Steels, Titanium Alloys				
DC	No. of Flutes	**vc** (m/min)	**n** (min^{-1})	**fz** (mm/t.)	**vf** (mm/min)	**ap**	**vc** (m/min)	**n** (min^{-1})	**fz** (mm/t.)	**vf** (mm/min)	**ap**	**vc** (m/min)	**n** (min^{-1})	**fz** (mm/t.)	**vf** (mm/min)	**ap**
10	**3**	100	3200	0.05	480	2	70	2200	0.05	300	2	60	1900	0.04	230	2
12	**3**	100	2700	0.05	410	2.4	70	1900	0.05	260	2.4	60	1600	0.04	190	2.4
16	**3**	100	2000	0.05	300	2.7	70	1400	0.05	190	2.7	60	1200	0.04	140	2.7
20	**3**	100	1600	0.05	240	3.2	70	1100	0.05	150	3.2	60	950	0.04	110	3.2
Depth of Cut		 DC:Dia.														

Work Material		Hardenned Steels (40-55HRC)					Heat Resistant Alloys Inconel718				
DC	No. of Flutes	**vc** (m/min)	**n** (min^{-1})	**fz** (mm/t.)	**vf** (mm/min)	**ap**	**vc** (m/min)	**n** (min^{-1})	**fz** (mm/t.)	**vf** (mm/min)	**ap**
10	**3**	50	1600	0.03	140	2	30	950	0.04	110	2
12	**3**	50	1300	0.03	120	2.4	30	800	0.04	96	2.4
16	**3**	50	990	0.03	89	2.7	30	600	0.04	72	2.7
20	**3**	50	800	0.03	72	3.2	30	480	0.04	58	3.2
Depth of Cut		 DC:Dia.									

(Note 1) Vibration may occur if the rigidity of machine or work material is low.
In this case, please reduce the revolution and the feed rate proportionately.
(Note 2) For stainless steels, titanium alloys and heat resistant alloys, the use of water-soluble coolant is effective.

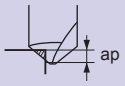
iMX-CH6V
Chamfer head, 6 flute

Recommended Cutting Conditions

Chamfer Milling (Shape Circumference)

(mm)

Work Material		Carbon Steels, Alloy Steels, Gray Cast Irons					Alloy Tool Steels, Carbon Steels, Alloy Steels, Pre-hardened Steels					Austenitic Stainless Steels, Titanium Alloys				
DC	No. of Flutes	**vc** (m/min)	**n** (min^{-1})	**fz** (mm/t.)	**vf** (mm/min)	**ap**	**vc** (m/min)	**n** (min^{-1})	**fz** (mm/t.)	**vf** (mm/min)	**ap**	**vc** (m/min)	**n** (min^{-1})	**fz** (mm/t.)	**vf** (mm/min)	**ap**
12	**6**	100	2700	0.05	810	2.4	70	1900	0.045	510	2.4	60	1600	0.04	380	2.4
16	**6**	100	2000	0.05	600	2.7	70	1400	0.045	380	2.7	60	1200	0.04	290	2.7
20	**6**	100	1600	0.05	480	3.2	70	1100	0.045	300	3.2	60	950	0.04	230	3.2
Depth of Cut		 DC:Dia.														

Work Material		Hardenned Steels (40-55HRC)					Heat Resistant Alloys Inconel718				
DC	No. of Flutes	**vc** (m/min)	**n** (min^{-1})	**fz** (mm/t.)	**vf** (mm/min)	**ap**	**vc** (m/min)	**n** (min^{-1})	**fz** (mm/t.)	**vf** (mm/min)	**ap**
12	**6**	50	1300	0.03	230	2.4	30	800	0.04	190	2.4
16	**6**	50	990	0.03	180	2.7	30	600	0.04	140	2.7
20	**6**	50	800	0.03	140	3.2	30	480	0.04	120	3.2
Depth of Cut		 DC:Dia.									

(Note 1) Vibration may occur if the rigidity of machine or work material is low.
In this case, please reduce the revolution and the feed rate proportionately.
(Note 2) For stainless steels, titanium alloys and heat resistant alloys, the use of water-soluble coolant is effective.

Corner radius, Taper head, Multi-flute, With coolant hole

Taper radius end mills(Torus cutter) were conventionally used for turbine blade finishing. iMX taper radius offers the performance equivalent to solid end mills and it can achieve lower milling cost.

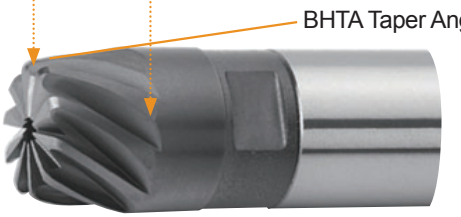
Features

Extensive Size Line-up of Corner Radius

For a wide range of applications.

Ultra Multi-flute

Higher efficiency milling by multi-flute design more than conventional.

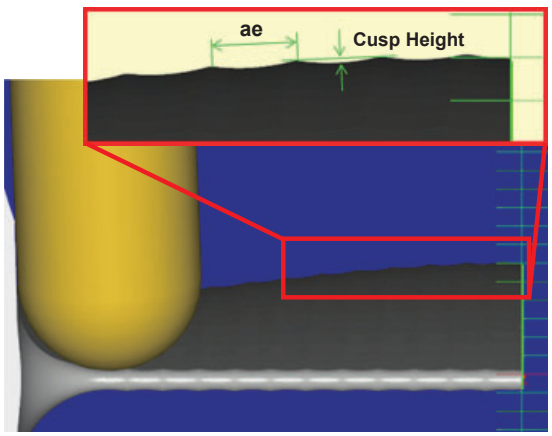


Coolant Through Hole

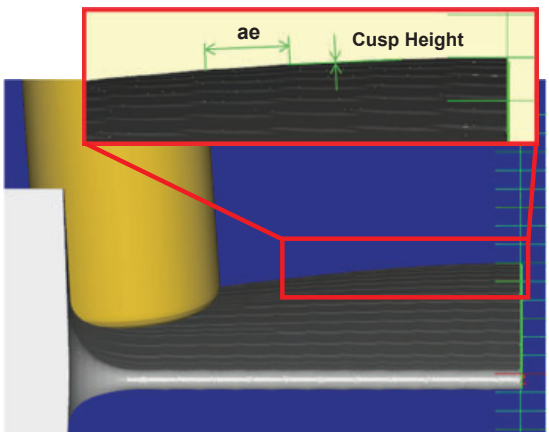
For more sable chip evacuation.

Drastically Reduces Cutting Time

Possible to process using a large peck feed (ae) when the cusp height is shortened and fixed even using the same ae.



Set peck feed (ae) = 2.0mm, with RE5 of the ball nose end mill

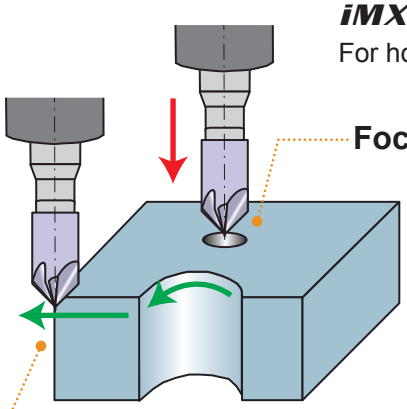


Set peck feed (ae) = 2.0mm, with IMX10C8T080R10T080C

Chamfer Head

Features

Standardized ideal shape for different chamfer cutting regions.



iMX-CH3L
For hole circumference (inner rim)=3 flute

Focusing on Vibration Resistant

iMX-CH6V
For shape circumference (outer rim)
=6 flute

Focusing on Tool Life

Steel Holder

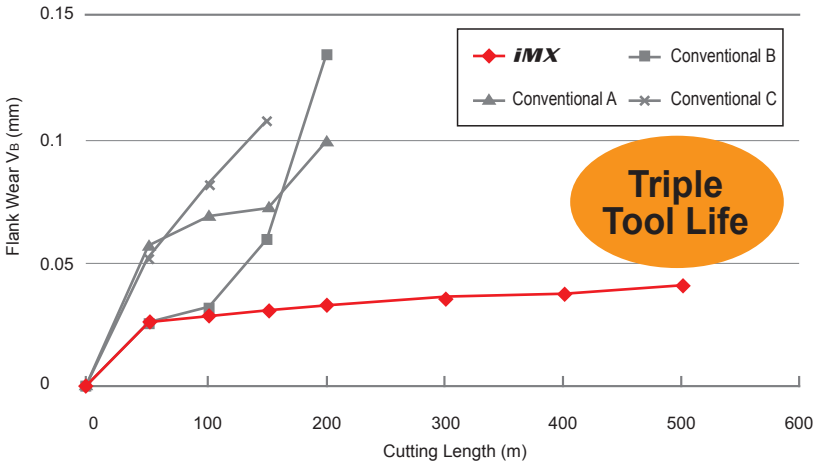
Features

Series expansion of efficient steel holders.

Developed series of efficient steel holders based on a carbide holder for low cut processing when the overhang is short.

Cutting Performance

A tool life achieves at least 3 x longer compared with conventional steel holders.

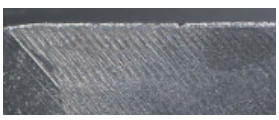


<Cutting Conditions>

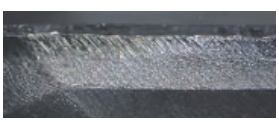
Work Material	: AISI 1055 (220HB)	Depth of Cut	: ap=5mm ae=0.5mm
Holder	: IMX10-U10N009L070S		
Head	: IMX10C4HV100R10010	Overhang Length	: 30mm
Cutting Speed	: n=5100 min^{-1} (160m/min)	Cutting Mode	: Down(Climb) Cut Wet Cutting (Emulsion)
Table Feed	: vf=1530 mm/min (0.075mm/t.)	Machining Center	: Vertical MC (BT50)

Tip Damage

iMX-C4HV
(Cutting Length 150m)

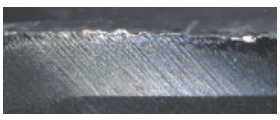


Conventional A
(Cutting Length 100m)



Conventional B
(Cutting Length 100m)

Conventional C
(Cutting Length 100m)

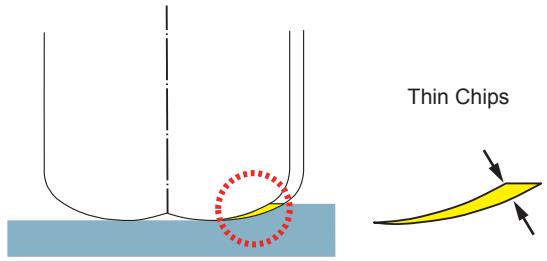


iMX-C4FD-C

Duplex corner radius head, 4 flute, For high feed, With coolant hole

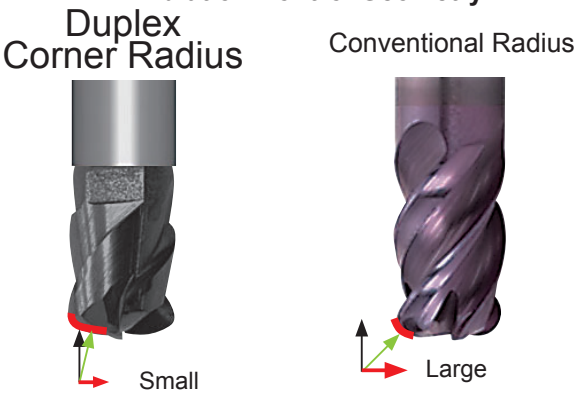
Features

High Efficiency Machining Geometry



Thin chips and a long cutting edge combine to provide both high performance and long tool life.

Vibration Control Geometry

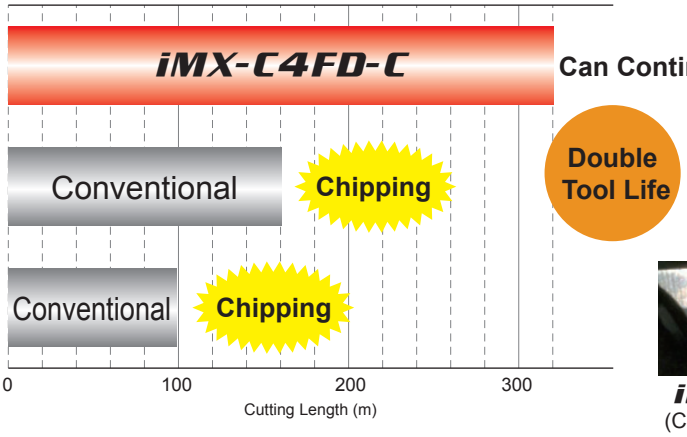


Reduced cutting resistance in the radius direction suppresses tool vibration and reduces deflection.

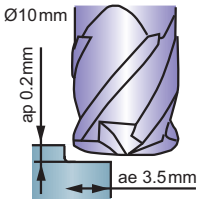
Cutting Performance

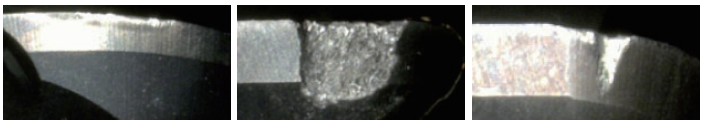
Tool Life Comparison in Cobalt Chromium Alloy (DC=10mm)

Tool Life (Co-Cr Alloy)



Work Material	: Co-Cr Alloy
Tool Size	: DC=10mm
Revolution	: n=3185min^{-1} (100m/min)
Table Feed	: vf=1911mm/min (0.15mm/t.)
Depth of Cut	: ap=0.2mm, ae=3.5mm
Overhang Length	: 32mm
Cutting Mode	: Down(Climb) Cut, Soluble
Machine	: Vertical MC (BT40)

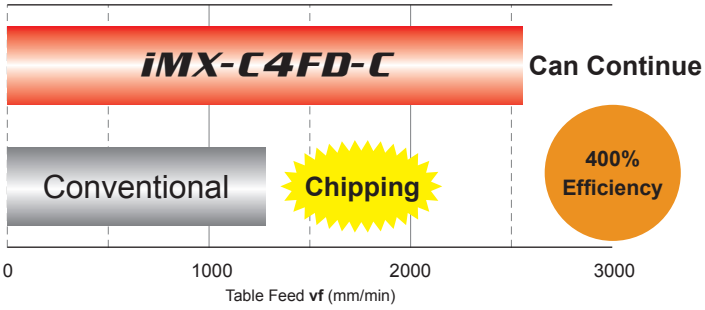




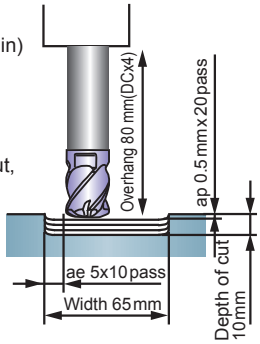
iMX-C4FD-C (Cutting Length 320m) | Conventional (Cutting Length 160m) | Conventional (Cutting Length 96m)

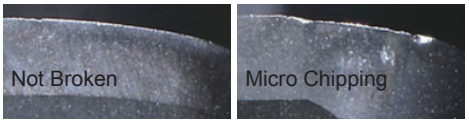
Efficiency Comparison in ASTM H13 (DC=20mm)

Machining Efficiency Comparison in ASTM H13



Work Material	: ASTM H13(52HRC)
Tool Size	: DC=20mm
Revolution	: n=1600min^{-1} (100m/min)
Table Feed	: vf=640-2560mm/min (0.10-0.40mm/t.)
Depth of Cut	: ap=0.5mm, ae=5mm
Overhang Length	: 80mm
Cutting Mode	: Slot & Down(Climb) Cut, Air Blow
Machine	: Vertical MC (BT50)

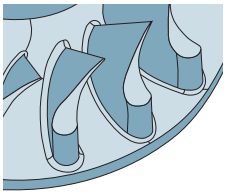
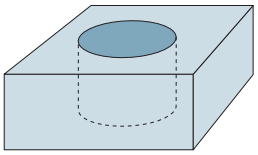
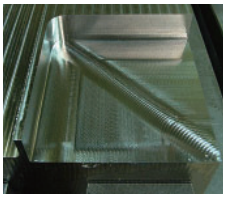


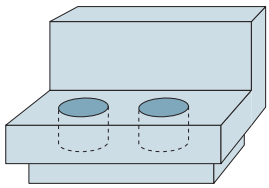
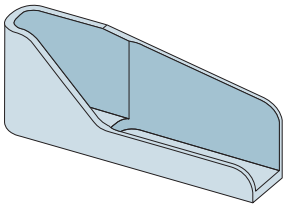
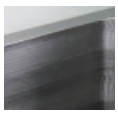


iMX-C4FD-C (Table Feed **vf** 2560mm/min) | Conventional (Table Feed **vf** 1280mm/min)

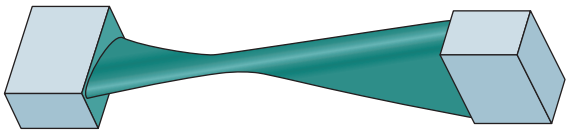
Recommended cutting conditions may vary according to the stability of the set up.

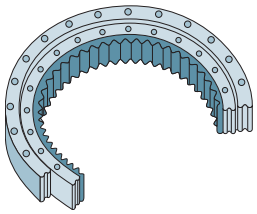
Application Examples

Holder		IMX12-U12N041L100C	IMX20-U20N070L130C	IMX16-U16N024L080C
Head		IMX12B6HV12012	IMX20C4HV200R10021	IMX16C10HV160R10016
Workpiece		AISI 1049 	Mild Steel 	Titanium Alloy (Ti-6Al4V) 
Component		Impeller for Torque Converter	Die Steel	Test Work
Intended Process		Finishing of Blade Faces	Hole Finishing	Shoulder Milling (Down(Climb) Cut)
Cutting Conditions	Cutting Speed **vc** (m/min)	200	100	151
	Feed per Tooth **fz** (mm/t.)	0.08	0.05	0.08
	Width of Cut **ae** (mm)	Approx. 1.4	1	0.5
	Depth of Cut **ap** (mm)	Approx. 1.0	3	16
	Overhang Length (mm)	—	105	52
Cutting Mode		—	Air Blow	Wet Cutting (Emulsion)
Machine		5-axis MC (HSK A63)	Vertical MC	Vertical MC
Results		The tool reduced machining time by 30% and also produced a good surface finish.	The irregular helix flutes combined with the solid carbide holder gave better performance than the conventional tools.	Machining without vibration was achieved even when the workpiece radius and tool radius were the same.

Holder		IMX10-U10N034L090C	IMX20-S20L180C
Head		IMX10B4HV10010	IMX20C4HV220R10023
Workpiece		Stainless Steel 	Titanium Alloy (Ti-6Al4V) 
Component		—	—
Intended Process		—	Deep Wall Machining
Cutting Conditions	Cutting Speed **vc** (m/min)	230	60
	Feed per Tooth **fz** (mm/t.)	0.14	0.08
	Width of Cut **ae** (mm)	1.0	0.2
	Depth of Cut **ap** (mm)	1.4	15
	Overhang Length (mm)	—	142 (L/D=7)
Cutting Mode		Air Blow	Wet Cutting (Emulsion)
Machine		Vertical MC	Vertical MC
Results		Conventional products machined 8 pieces. iMX produced a good surface finish even after machining 70 pieces, giving 9 x tool life.	The oversize type head achieved good surface finishes that reduced step differences in vertical wall surfaces.  **iMX**  Conventional

The examples shown are actual applications and can differ from the recommended cutting conditions.

Holder		**IMX20-U20N030L090C**
Head		**IMX20C15T190R10T080C**
Workpiece		Stainless Steel 
Component		Blade
Intended Process		Finished Wing Surface
Cutting Conditions	Cutting Speed **vc** (m/min)	304
	Feed per Tooth **fz** (mm/t.)	0.09
	Width of Cut **ae** (mm)	2.5
	Depth of Cut **ap** (mm)	0.4
	Overhang Length (mm)	—
Cutting Mode		Wet Cutting (Emulsion)
Machine		5-axis MC
Results		Advanced cutting surface roughness compared with conventional.

Holder		**IMX12-S12L100C**
Head		**IMX12CH6V120A45**
Workpiece		AISI 4140 
Component		Swing Bearing
Intended Process		Gear Part Chamfer Milling
Cutting Conditions	Cutting Speed **vc** (m/min)	75
	Feed per Tooth **fz** (mm/t.)	0.05
	Width of Cut **ae** (mm)	2.0
	Depth of Cut **ap** (mm)	2.0
	Overhang Length (mm)	—
Cutting Mode		Dry Cutting
Machine		Machining Center
Results		iMX achieved more long tool life than conventional.

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

MITSUBISHI MATERIALS CORPORATION

Overseas Sales Dept, Asian Region
KFC bldg., 8F, 1-6-1 Yokoami, Sumida-ku, Tokyo 130-0015, Japan
TEL +81-3-5819-8771 FAX +81-3-5819-8774

Overseas Sales Dept, European & American Region
KFC bldg., 8F, 1-6-1 Yokoami, Sumida-ku, Tokyo 130-0015, Japan
TEL +81-3-5819-8772 FAX +81-3-5819-8774

http://www.mitsubishicarbide.com/en/
(Tools specifications subject to change without notice.)

EXP-12-E029
2018.8.(-)