Strictly Confidential

MILLING

HF4 ENMX 06 / 09 NEW

Summery

Feature – Advantage – Benefit

Application
- High Feed Milling, Profiling, Face Milling, Ramping, Plunging, Helical Interpolation

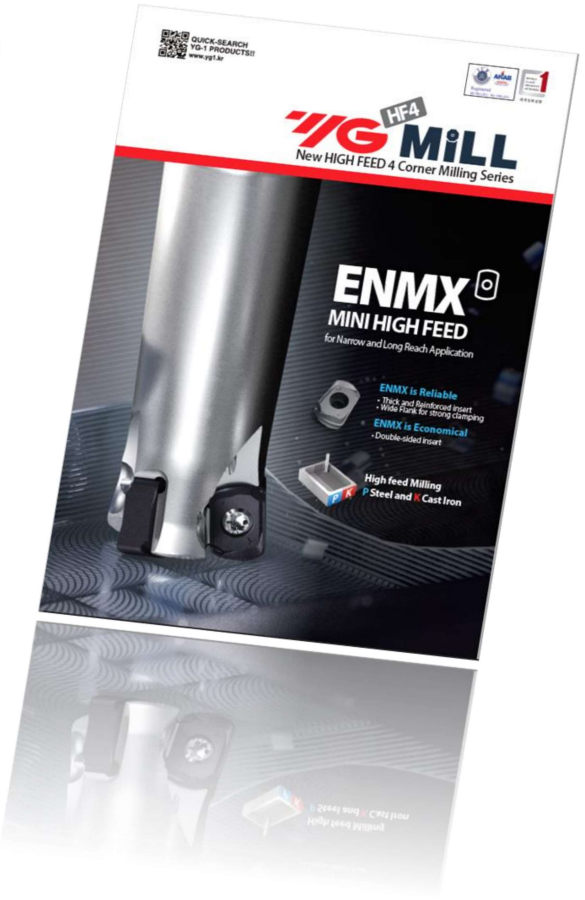
Features
- Diameter Range : 16~50mm (.625~2.0in)
- Double-sided Insert with 4 Corners
- Wide Flank Face with Reinforced Insert Shape
- Positive Rake Angle & Low Entering Angle
- 2 Insert Geometries

ENMX General
Carbon Steel
Low Alloy Steel

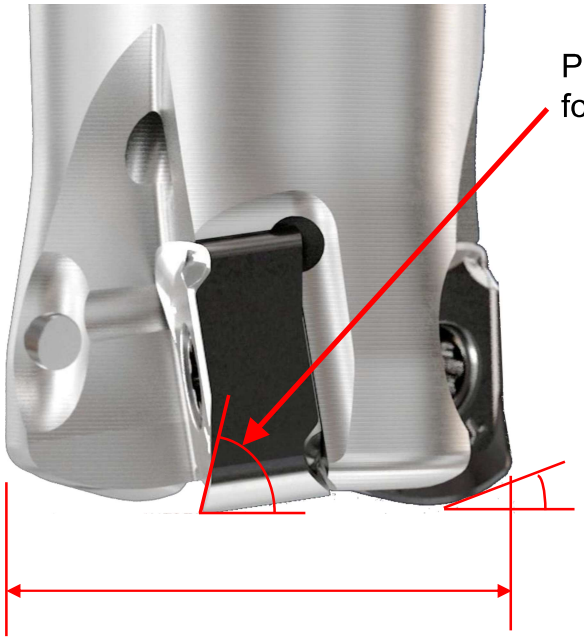
ENMX -TR
Reinforced Edge
High Alloy Steel
Hardened Steel
Cast Iron

Advantages
- Narrow application Available (Minimum Ø16)
- High Versatile Machining
- High Cost-Efficiency
- Rigid Clamping on Insert Seat
- Prevent Breakage on Machining
- Low Cutting Force with High Feed Rate Available

Benefits
- Expand machining ability with High Versatility & Small Diameter Ability
- Boost up productivity with High Feed Rate
- Safe Machining with Rigidity and Strong Insert Shape



Unique features of the ENMX Platform vs Competitors on the Market

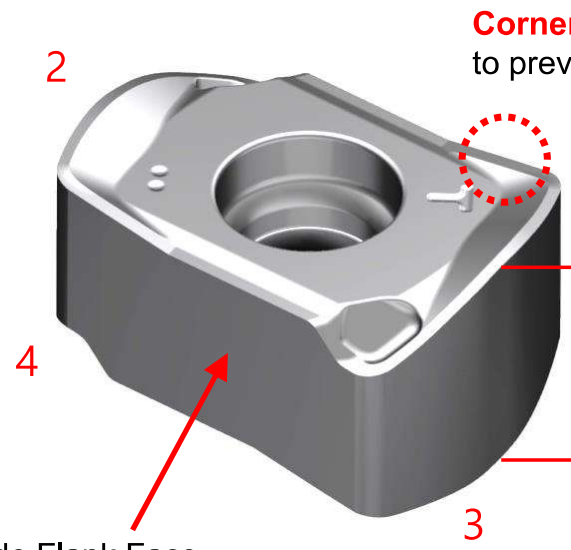


Positive Rake Angle
for Lower Cutting Force

Low Entering Angle
for High Feed Rate

Small Size
for Narrow Application
(Minimum Ø16)

4 Corner
Cost-Efficiency



Corner Protection
to prevent breakage

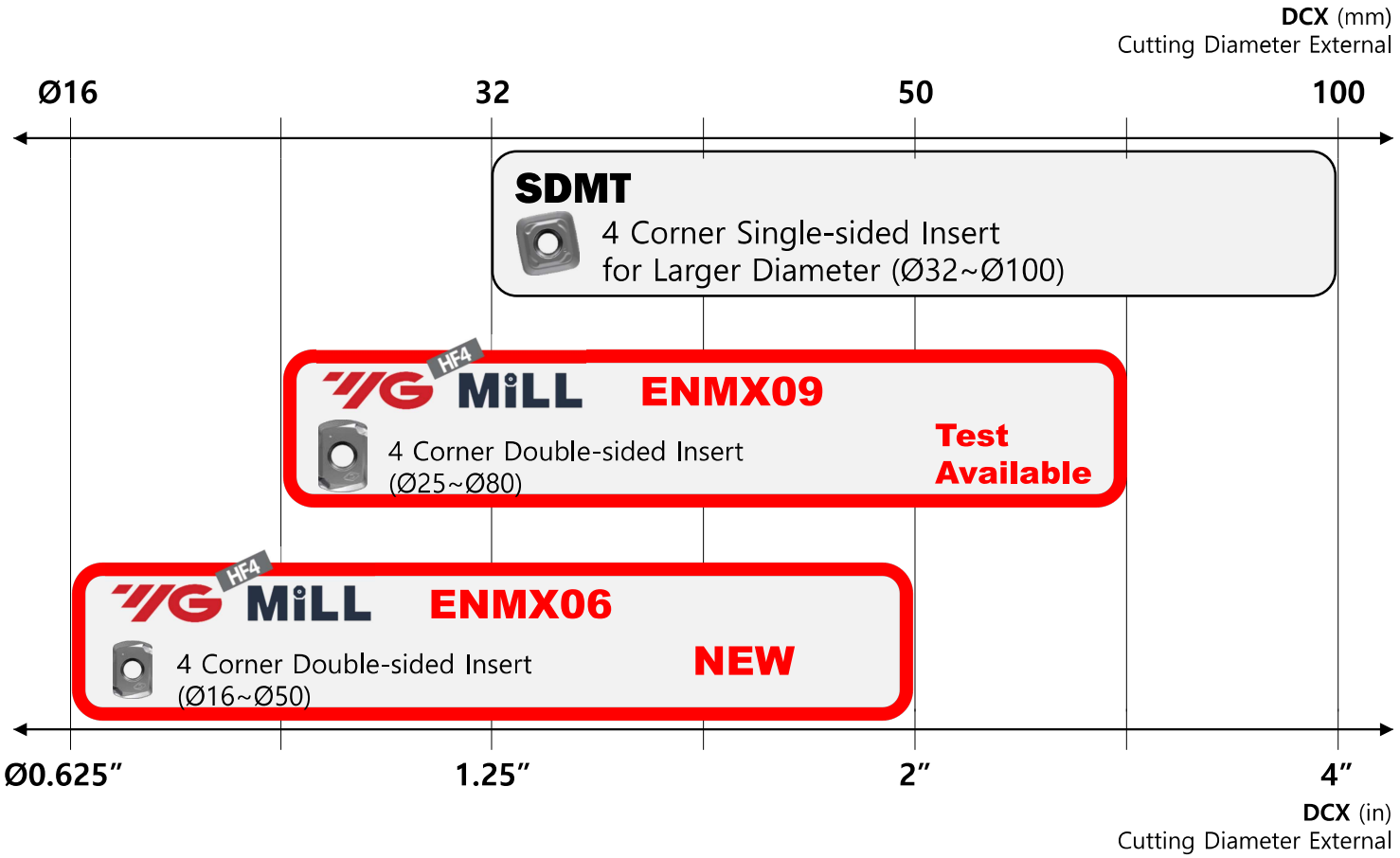
Improved
Strength

Wide Flank Face
For Strong clamping

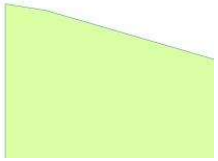
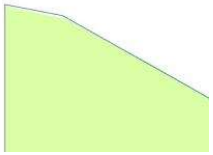
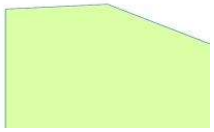
ENMX

YG-1 High Feed Milling Lines

NEW High Feed Milling Series for Small Size



HF4 ENMX Chipbreakers for ENMX 06 & 09

P	M	K	N	S	H	Chipbreaker	Application	ENMX Insert
	M			S		**ST** Sticky material 	**Aerospace** Sticky materials Stainless Steel & Super Alloys	**ENMX 06** (available) **ENMX 09** (available)
P	M	K				**General** Universal 	**General Application** Carbon Steels Low Alloyed Steels Low cutting force	**ENMX 06** (available) **ENMX 09** (available)
P		K				**-TR** Reinforced Edge 	**Mold & Die** High Alloyed Steels Cast Irons	**ENMX 06** (available) **ENMX 09** (available)

HF4 ENMX Grades

ENMX 06 & 09

Grade	ENMX 06	ENMX 09	Application	ISO Range
YG602	●	●	Multi-Purpose Grade	P20-P35 M20-M40 K20-K40 S15-S25
YG622	●	●	High Alloyed Steels (Mold & Die)	P20-P40 K20-K40
YG712	●	●	Carbon or Alloyed Steel	P10-P30
YG613	●	●	Stainless Steel	M20-M40

● in stock

◎ test available

○ coming soon

YG-1 High Feed HF4 Milling Inserts

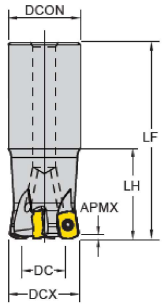
ENMX 06 & 09

ENMX Inserts Chip Breaker	Size [mm]	Description	RE [mm]	Fz [mm/tooth]	BS [mm]	YG622 P20-P40 K 20 - K 40	YG712 P10-P30 K 10 - K 30	YG712 P15-P25 H 20 - H 30	YG602 M25 S10	YG613 M35 S20	DC Group	List Price [€]	Local Price [€]
									New Developed Grade ↓ EDP code 1200…..				
General													
	**06 mm**	ENMX0604-YG602		0.3~2,0					• 0474		F10	13,44	
		ENMX0604-YG613		0.3~2,0						• 0606	F10	14,94	
		ENMX0604-YG622/ENMX0604		0.3~2,0		• 0553					F10	14,94	
- TR													
		ENMX0604-TR-YG602		0.3~2,5					• 0459		F10	13,44	
		ENMX0604-TR-YG622/ENMX0604-TF		0.3~2,5		• 0552					F10	14,94	
		ENMX0604-TR-YG712/ENMX0604-TF		0.3~2,5			• 0504				F10	13,44	
		ENMX0604-TR-YG713/ENMX0604-TF		0.3~2,5				• 0636			F10	13,44	
- ST													
		ENMX0604-ST-YG602		0.2~0,9					• 0623		F10	13,44	
		ENMX0604-ST-YG613		0.2~0,9						• 0625	F10	14,94	
General													
	**09 mm**	ENMX0905-YG602		0.3~2.5					• 0600		F10	16,11	
		ENMX0905-YG613		0.3~2.5						• 0703	F10	?	
		ENMX0905 YG622				• 0704							
- TR													
		ENMX0905-TR-YG602		0.3~3.0					• 0600		F10	?	
		ENMX0905-TR-YG622/ENMX0905-TR		0.3~3.0		• 0629							
- ST													
		ENMX0905-ST-YG602		0.2~1.2					• 0705		F10	?	
		ENMX0905-ST-YG613		0.2~1.2						• 0706	F10	?	

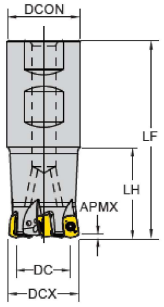
Product List – ENMX 06 Milling Cutter

ENMX Cutters Shank Type	Insert Size	Description	EDP 1700....	DC [mm]	DCX [mm]	ZEFP	LU [mm]	LF [mm]	LH [mm]	DCON [mm]	CBDP [mm]	DCSFMS [mm]	DC Group	List Price [€]	Local Price [€]	amount of insert for cutter for free
End Mill	06 mm	EHF-ENMX06-D16Z2C16-L100	• 0644	9	16	2		100	30	16			F15	135,93		20
		EHF-ENMX06-D16Z2C16-L150	• 0645					150	50				F15	143,76		20
		EHF-ENMX06-D20Z3C20-L130	• 0463	12,6	20	3		130	50	20			F15	174,45		30
		EHF-ENMX06-D20Z3C20-L160	• 0446					160	80				F15	197,00		30
		EHF-ENMX06-D25Z4C25-L140	• 0647	17,6	25	4		140	60	25			F15	216,55		40
		EHF-ENMX06-D25Z4C25-L180	• 0464					180	80				F15	229,17		40
Cylindric		EHF-ENMX06-D32Z5C32-L150	• 0649	24,6	32	5		150	70	32			F15	267,69		50
		EHF-ENMX06-D32Z5C32-L200	• 0465					200	100				F15	301,66		50
Face Mill Shell Mill		FHF-ENMX06-D40Z6S16	• 0482	32,6	40	6		40		16	18	37	F15	287,83		50
		FHF-ENMX06-D50Z6S22	• 0471	34,6	50			50		22	25	42	F15	304,69		50
Modular Heads		MHF-ENMX06-D16Z2M08	• 0691	9	16	2		23		M8		13	F15	111,28		20
		MHF-ENMX06-D18Z2M08	• 0730	11	18								F15	117,93		20
		MHF-ENMX06-D20Z3M10	• 0692	12,6	20	3		30		M10		18	F15	126,31		30
		MHF-ENMX06-D25Z4M12	• 0693	17,6	25	4		35		M12		21	F15	147,38		40
		MHF-ENMX06-D32Z5M16	• 0694	24,6	32	5		42		M16		29	F15	165,41		50
		MHF-ENMX06-D35Z5M16	• 0695	27,6	35								F15	168,41		50
		MHF-ENMX06-D40Z6M16	• 0732	32,6	40	6							F15	178,38		50
		MHF-ENMX06-D42Z6M16	• 0696	34,6	42								F15	191,00		50

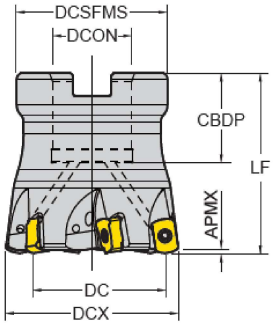
<C> Cyindrical



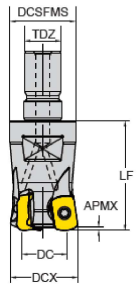
<W> Weldon



<S> Shell Mill



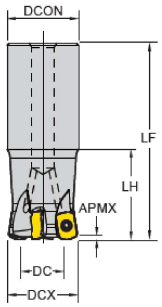
<M> Moduler



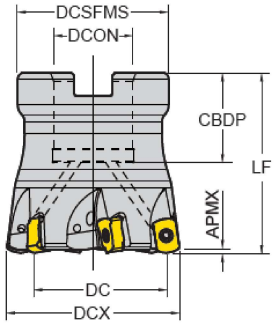
Product List – ENMX 09 Milling Cutter

ENMX Cutters Shank Type	Insert Size	Description	EDP 1700….	DC [mm]	DCX [mm]	ZEFP	LU [mm]	LF [mm]	LH [mm]	DCON [mm]	CBDP [mm]	DCSFMS [mm]	DC Group	List Price [€]	Local Price [€]	amount of insert for cutter for free
End Mill  Cylindric	09 mm	EHF-ENMX09-D26Z2C25-L200	• 0746	16	26	2		200	30	25			F15	?		20
		EHF-ENMX09-D26Z3C25-L200	• 0747	16				200	30	25			F15	?		30
		EHF-ENMX09-D32Z3C32-L160	• 0748	22	32	3		160	70	32			F15	?		30
		EHF-ENMX09-D33Z3C32-L200	• 0749	23	33			200	30	32			F15	?		30
		EHF-ENMX09-D33Z4C32-L200	• 0750	23		4		200	40	32			F15	?		40
		EHF-ENMX09-D40Z5C32-L180	• 0751	30	40	5		180	40	32			F15	?		50
Face Mill Shell Mill		FHF-ENMX09-D50Z5S22	• 0752	40	50	5		50		22	20	42	F15	?		50
		FHF-ENMX09-D63Z6S22	• 0753	53	63	6		63			20	48	F15	?		50
		FHF-ENMX09-D80Z8S27	• 0755	70	80	8		80		27	23	56	F15	?		50

<C> Cyindrical

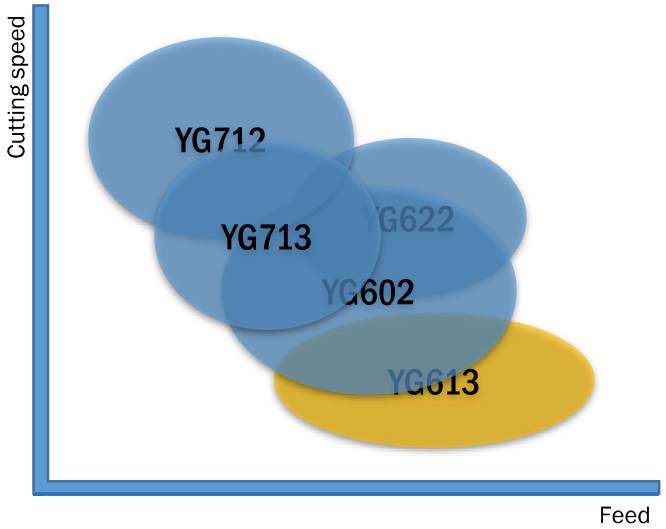


<S> Shell Mill

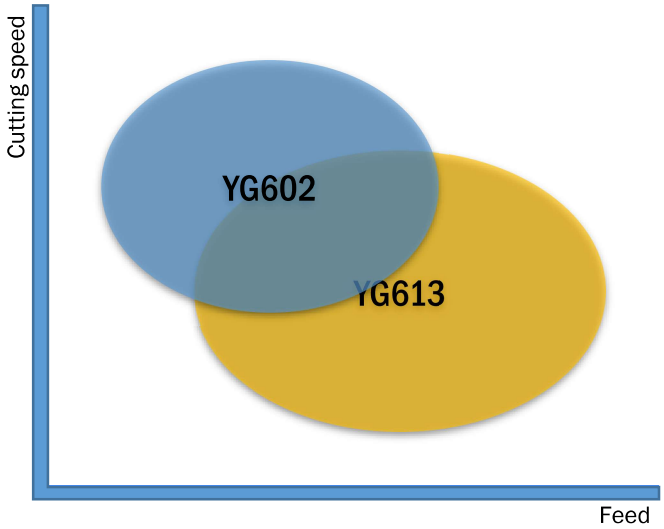


New Grade for Stainless Steel of Milling & Drilling

Steel Milling Grade



Stainless Steel Drilling Grade

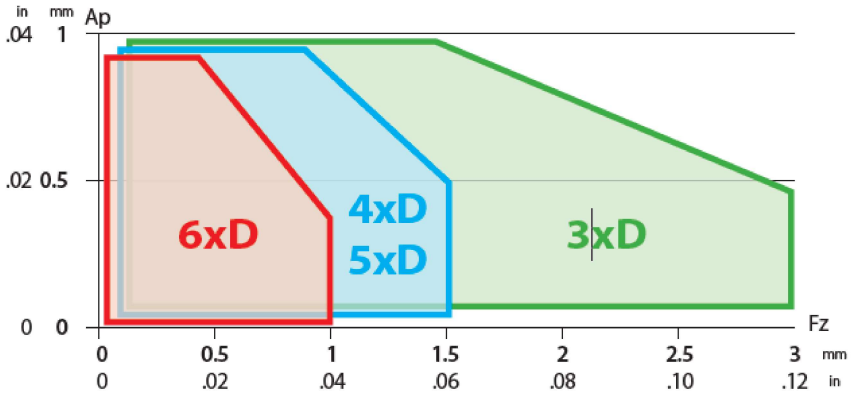


※ Choice of Milling Chipbreaker

Chipbreaker	Shape of Edge	Purpose	Feature
-ST		Finishing Semi-Finishing	Low cutting resistance chip breaker design, suitable finishing cutting.
-GN		General	Chipbreaker design suitable for general milling and suitable for most cutting areas

Application values

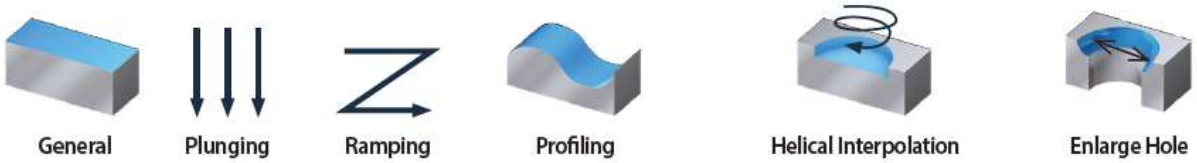
Feed per tooth & Depth of Cut (Alloy Steel)



Cutting Speed			Vc (m/min.)		Vc (ft/min.)	
ISO	VDI	Sub Group	YG602			
			Min	Max	Min	Max
P	1~5	Non-Alloyed Steel	140	380	460	1250
	6~9	Low-Alloyed Steel	120	300	390	980
	10~11	High-Alloyed Steel	70	150	230	490
M	12~13	Ferritic & Martensitic	120	200	390	660
	14	Austenitic Stainless Steel	130	250	430	820

Cutting Speed			Vc (m/min.)		Vc (ft/min.)	
ISO	VDI	Sub Group	YG602			
			Min	Max	Min	Max
K	15~16	Grey Cast Iron	120	250	390	820
	17~18	Nodular Cast Iron	130	220	430	720
N	21~30	Non-Ferrous Metals (Al)	-	-	-	-
S	31~37	Superalloys & Titanium	25	45	80	150
H	38~41	Hard Materials	40	80	130	260

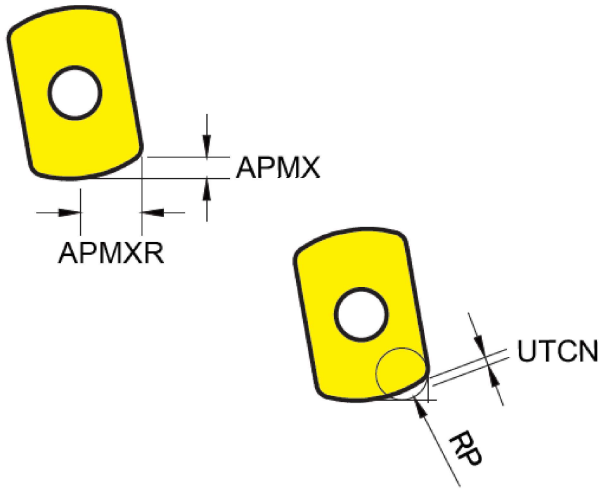
Advanced operational data ENMX 06



External Cutter Diameter	Maximum Depth of Cut	Maximum Radial Depth of Cut	Maximum Ramping Angle(°)	Programmed Corner Radius	Uncut Thickness	Minimum Cutting Diameter	Maximum Cutting Diameter	Helical Interpolation Pitch	Enlarge Width
DCX	APMX	APMXR	RMPX	RP	UTCN	Diameter	Diameter	Pitch	Ae
16 mm (.625 in)	0.9 (.035)	3.5 (.137)	3.6°	R2.0 (R.079)	0.3 (.011)	21 (.817)	30 (1.171)	0.9 (.035)	12.5 (.487)
20 mm (.75 in)	1 (.039)	3.7 (.145)	3.3°	R2.0 (R.079)	0.31 (.012)	29 (1.067)	38 (1.421)	1 (.039)	16.3 (.604)
25 mm (1.00 in)	1 (.039)	3.7 (.145)	2.2°	R2.0 (R.079)	0.31 (.012)	[illegible]	[illegible]	1 (.039)	21.3 (.854)
32 mm (1.25 in)	1 (.039)	3.7 (.145)	1.5°	R2.0 (R.079)	0.31 (.012)	[illegible]	[illegible]	[illegible]	28.3 (1.104)
40 mm (1.50 in)	1 (.039)	3.7 (.145)	1.1°	R2.0 (R.079)	0.31 (.012)	69 (2.567)	78 (2.921)	1 (.039)	36.3 (1.354)
50 mm (2.00 in)	1 (.039)	3.7 (.145)	0.8°	R2.0 (R.079)	0.31 (.012)	89 (3.567)	98 (3.921)	1 (.039)	46.3 (1.854)

Important

Changing the ramp angle



Programmed Corner Radius RP	Uncut Thickness UTCN	Overcut
2 (.079)	0.31 (.012)	0 (.000)
2.5 (.098)	0.18 (.007)	0.18 (.007)
3 (.118)	0.07 (.003)	0.36 (.014)

Ramp angles for ENMX06

Important

Changing the ramp angle

DCX External Cutter Diameter	APMX Maximum Depth of Cut	APMXR Maximum Radial Depth of Cut	RMPX Maximum Ramping Angle(°)	RP Programmed Corner Radius	UTCN Uncut Thickness	Diameter Minimum Cutting Diameter	Diameter Maximum Cutting Diameter	Pitch Helical Interpolation Pitch	Ae Enlarge Width
16	0.9	3.5	3.5°	R2.0	0.3	21	30	0.9	12.5
20	1	3.7	1.8°	R2.0	0.31	29	38	1	16.3
25	1	3.7	1.2°	R2.0	0.31	39	48	1	21.3
32	1	3.7	0.8°	R2.0	0.31	53	62	1	28.3
40	1	3.7	0.6°	R2.0	0.31	69	78	1	36.3
50	1	3.7	0.5°	R2.0	0.31	89	98	1	46.3

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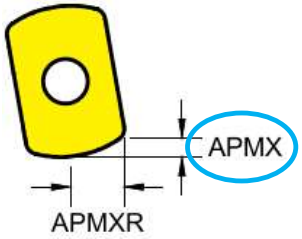
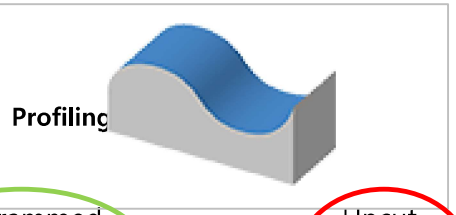
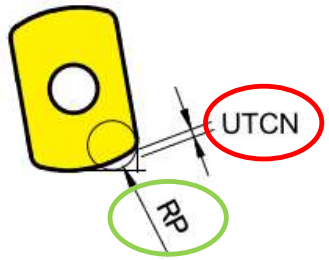
https://www.yg1.kr/storage/newsletter/vol11/YG1Newsletter_11.html

Profiling



External Cutter Diameter **DCX**	Maximum Depth of Cut **APMX**	Programmed Corner Radius **RP**	Uncut Thickness **UTCN**
16mm (0.625")	**0.9mm(.035")**	2.0mm (.079")	0.3mm (.011")
20mm (0.750")	**1.0mm (.039")**	2.0mm (.079")	0.31mm (.012")
25mm (1")	**1.0mm (.039")**	2.0mm (.079")	0.31mm (.012")
32mm (1.25")	**1.0mm (.039")**	2.0mm (.079")	0.31mm (.012")
40mm (1.5")	**1.0mm (.039")**	2.0mm (.079")	0.31mm (.012")
50mm (2")	**1.0mm (.039")**	2.0mm (.079")	0.31mm (.012")

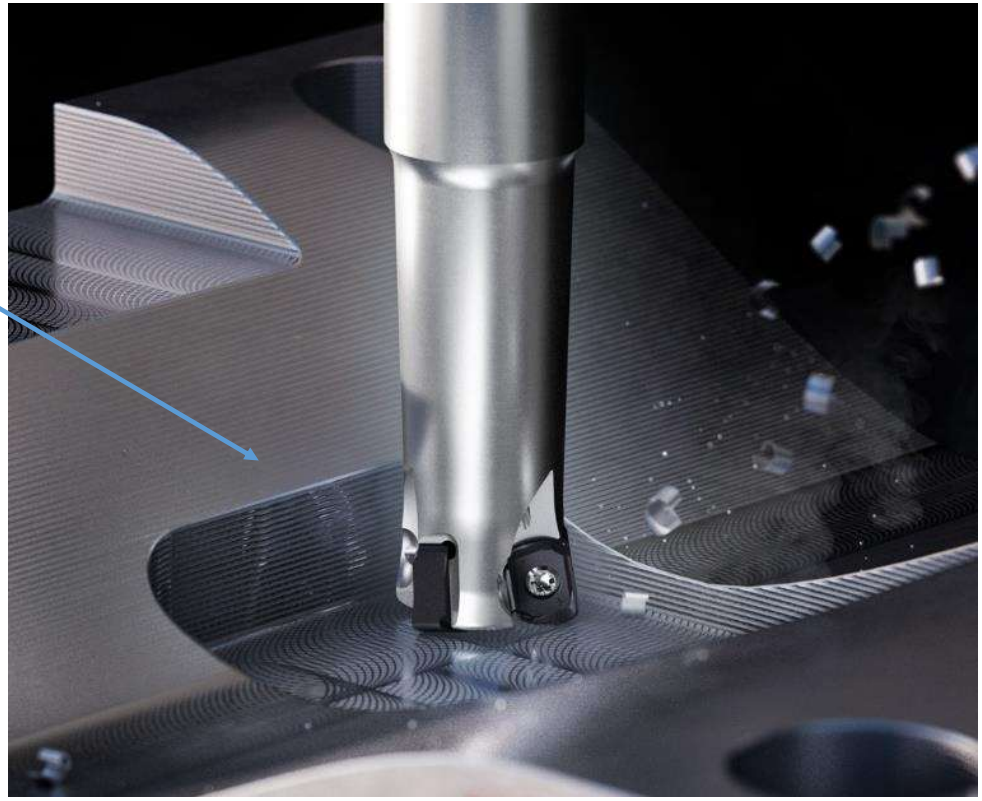




Programmed Corner Radius Overcut – 90° Milling

Program R

Programmed Corner Radius **RP**	Overcut
2mm (.079”)	0mm (.000”)
2.5mm (.098”)	0.18mm (.007”)
3mm (.118”)	0.36mm (.014”)



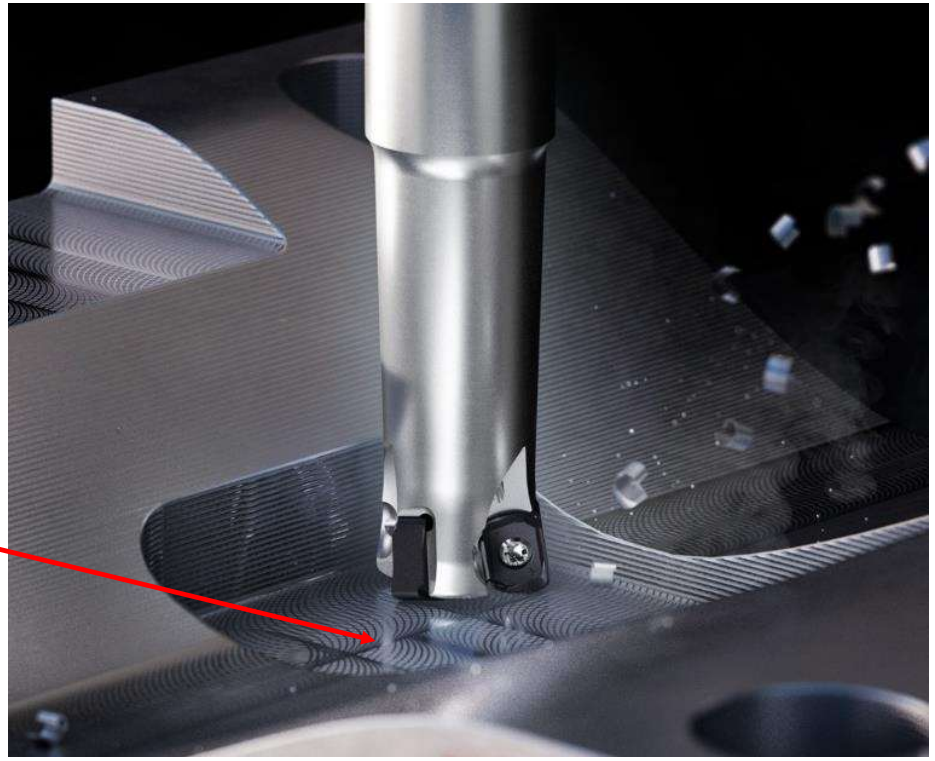
For any application where you are going up against a wall (90° Milling) , machining a full slot, or profiling, you ***MUST*** program a 2mm (.079”) corner radius.

Any larger programmed corner radius and you will cut outside of nominal diameter, which ***will cause catastrophic failure*** as soon as total depth of cut exceeds 1mm (0.9mm for the 16 mm (0.625”)

Programmed Corner Radius Uncut Thickness – Face Milling

Program R

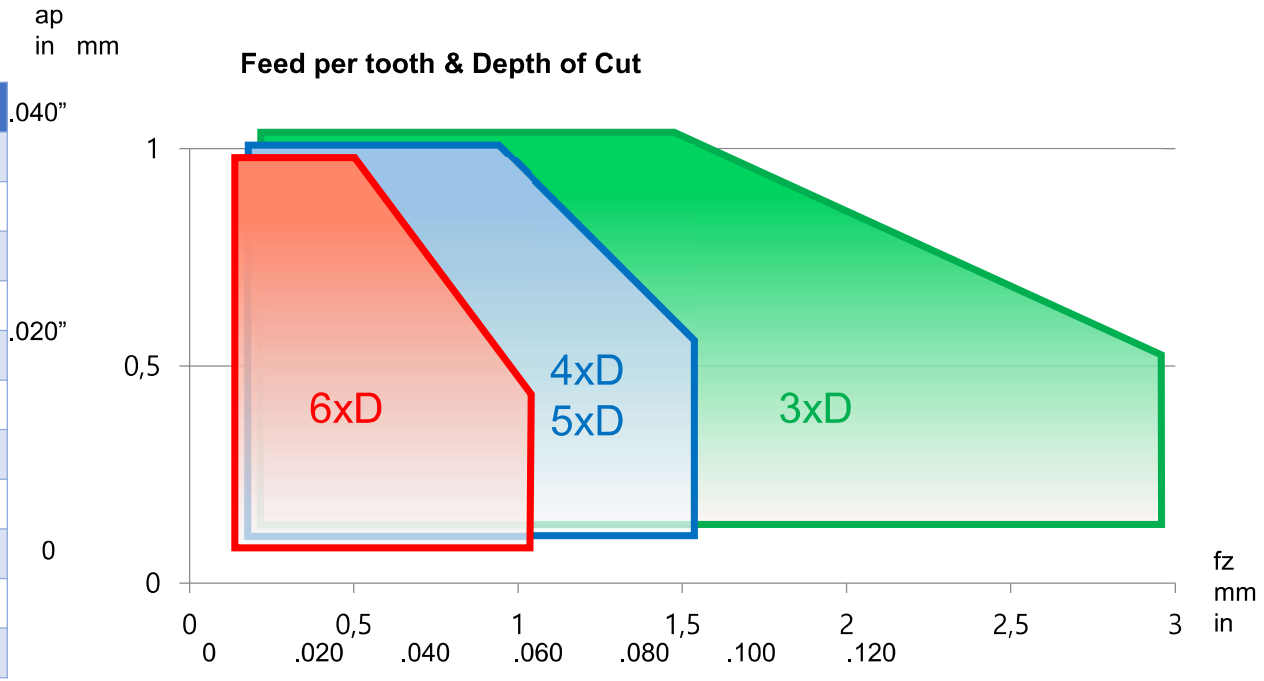
Programmed Corner Radius **RP**	Uncut Thickness **UTCN**
2mm (.079”)	0.31mm (.012”)
2.5mm (.098”)	0.18mm (.007”)
3mm (.118”)	0.07mm (.003”)



If the application is ***face milling only*** and flatness is the primary concern, program a corner radius of 3mm (.118”) as this will generate the smallest Uncut Thickness (scallops on the floor).

Feed rate

Fz (mm)	Hex (mm)
0.050	0.013
0.075	0.019
1.000	0.259
1.250	0.324
1.500	0.388
1.750	0.453
2.000	0.518
2.250	0.582
2.500	0.647
2.750	0.712
3.000	0.776

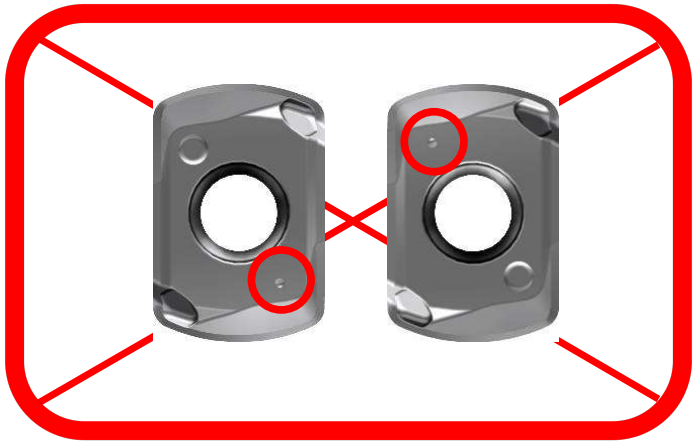


Fz (in)	Hex (in)
0.020	0.0052
0.030	0.0078
0.040	0.0104
0.050	0.0129
0.060	0.0155
0.070	0.0181
0.080	0.0207
0.090	0.0233
0.100	0.0259
0.110	0.0285
0.120	0.0311

Because of chip thinning, it is ***CRUCIAL*** to increase your feed rate to the proper level. Failure to do so will cause shortened tool life (due to insufficient thermal evacuation) and reduced chip evacuation from the cutting zone.

- The shorter the overhang, the higher the feed.
- The lower the depth of cut the higher the feed.

HF4 MiLL Indexing



Align ALL inserts so the marking is facing in the same direction.

This is CRUCIAL to minimize runout and uneven insert wear

Features