MITSUBISHI MATERIALS

FMAX

HIGH FEED FINISH MILLING CUTTER FOR ALUMINUM ALLOYS AND CAST IRON





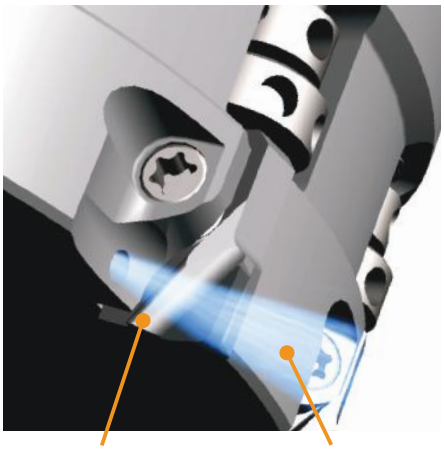
TOOL NEWS **B216A**

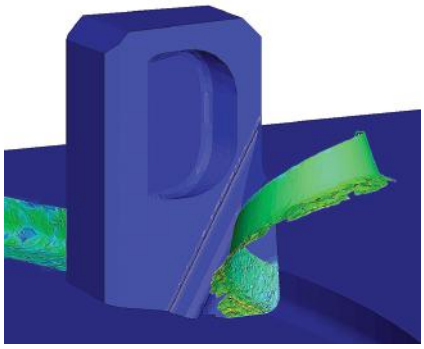
High Feed Finish Milling Cutter for Aluminum Alloys and Cast Iron

FMAX

Ultra High Efficiency Machining

The ultra fine pitch design is ideal for high efficiency machining (vf ≥ 787 IPM).
(Milling for aluminum alloy)
Internal coolant and a special chip breaker wall (body protector) provides ideal chip discharge performance.



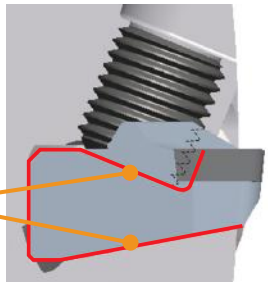

*Graphical Representation.



The body protector on the rake face forms chip shapes ideal for disposal and disperses them away from the body. Internal coolant also aids this process. The body is compatible with all center through coolant arbors.

Designed for High Speeds

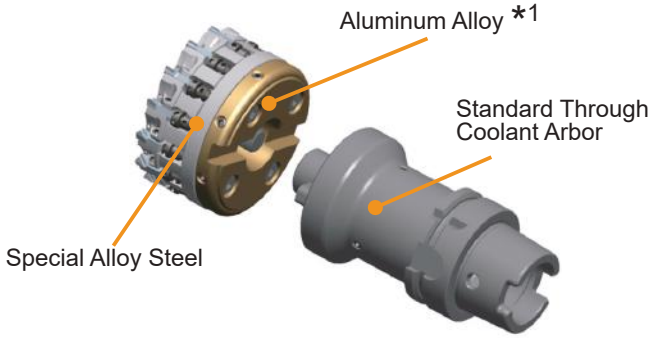
Anti fly dovetail clamping mechanism.





Light Weight, High Rigidity Body

A special alloy steel and aluminum body combine to provide rigidity and light weight.

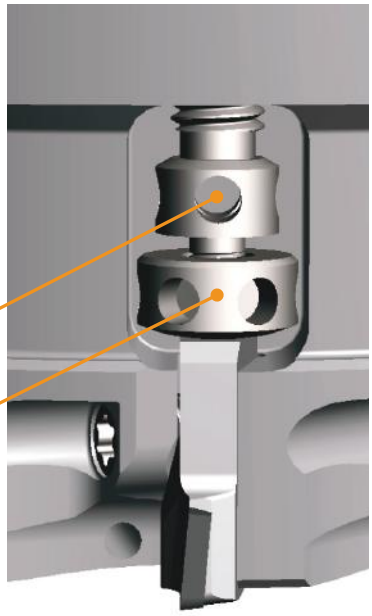


*1 Except DC=40, 50, 63mm

High Precision, Easy Setting



The combination of both a large and micro screw provides precise run-out adjustment and for adjusting new or re-ground inserts (.0002" or better).



Inserts, PCD Grades and CBN Grades

PCD grade inserts for machining Aluminum Alloys available in two grades for general purpose with focus on fracture or wear resistance.
New CBN grade inserts available for general purpose cast iron machining provide an excellent surface finish, low cutting force and long life.



DC = 40, 50, 63mm



PCD Grades
Milling of Aluminum Alloys
(GAMP: +5°)



CBN Grades
Milling of Cast Iron
(GAMP: 0°)

High Feed Finish Milling Cutter for Aluminum Alloys and Cast Iron

FMAX

CLASSIFICATION

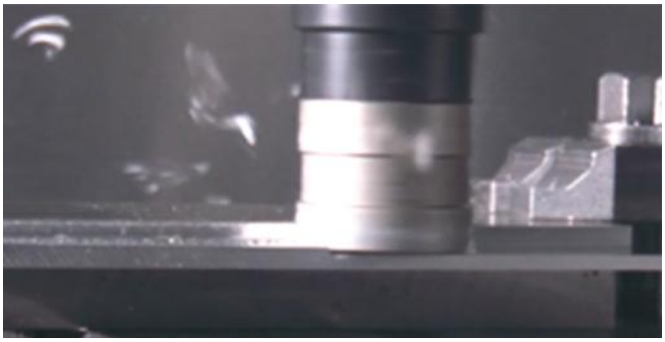
(inch)

Series	Use	Specifications	DCON MS	Minimum			Maximum		
				DC	Number of Teeth	WT(lbs)	DC	Number of Teeth	WT(lbs)
FMAX	High Feed Finish Millig Cutter	Light Weight, High Rigidity Body Alloy Steel and Aluminum Body	inch	3.000"	10	2.2	5.000"	16	7.6
					14	2.1		24	7.5
			mm	80mm	10	2.4	160mm	16	7.3
					14	2.4		24	7.5
			inch	80mm	14	2.4	125mm	24	7.2
FMAX-LW	High Feed Finish Millig Cutter Compact and Smaller Machining Centers	Light Weight, High Rigidity Body Alloy Steel and Aluminum Body	inch	100mm	10	2.3	125mm	14	3.2
					16	2.4		20	3.3
FMAX-40/50/63	High Feed Finish Millig Cutter Small Diameter	Alloy Steel Body	mm	40mm	4	0.5	63mm	10	1.5
					6	0.5		12	1.5
NEW **FMAX-MB**	Low Rigidity Conditions	Alloy Steel Body Coarse Pitch Type	inch	80mm	4	2.5	125mm	6	8.4
			mm	50mm	4	0.8	125mm	6	8.4

NEW FMAX-MB

By reducing the number of teeth finishing can be easily performed even if the machine or work material is not rigid.
Tool installation costs can also be reduced while maintaining the existing insert mounting and cutting edge adjustment functions.





FMAX-LW

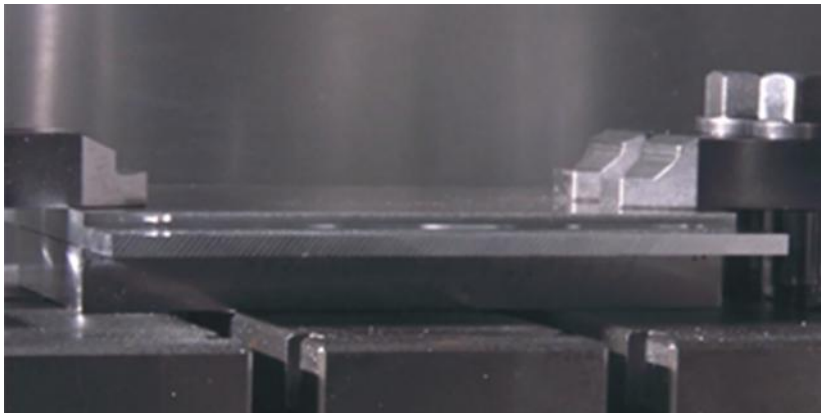
It can be used for compact and smaller machining centers while maintaining the conventional insert mounting function and cutting edge adjustment function.

Cutting Performance

Surface Finish Comparison of Thin Plate Machining ASTM 5052

The new coarse pitch type FMAX lessens chattering and vibration and is ideal for producing a good surface finish on low rigidity set ups.

Machining Condition

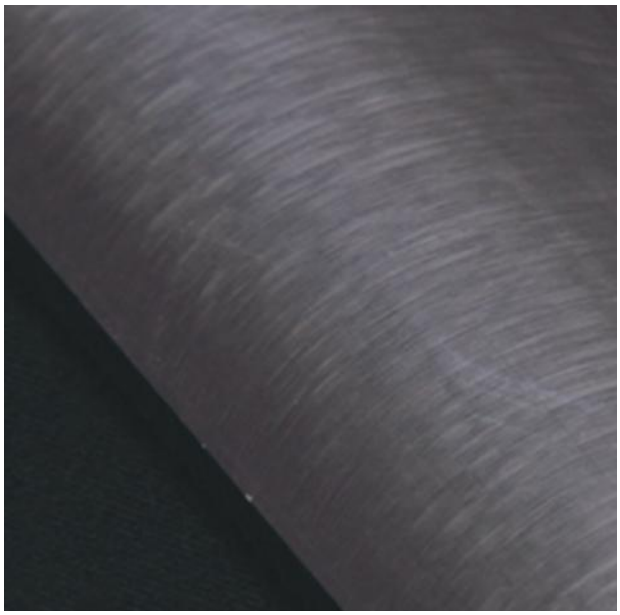


<Common Cutting Conditions>

Workpiece Material : ASTM 5052
Diameter : DC=50mm
Cutting Speed : vc=10300 SFM
Feed per Tooth : fz= .004 IPT
Depth of Cut : ap= .079 inch
Width of Cut : ae= .575 inch
Cutting Mode : Dry Cutting

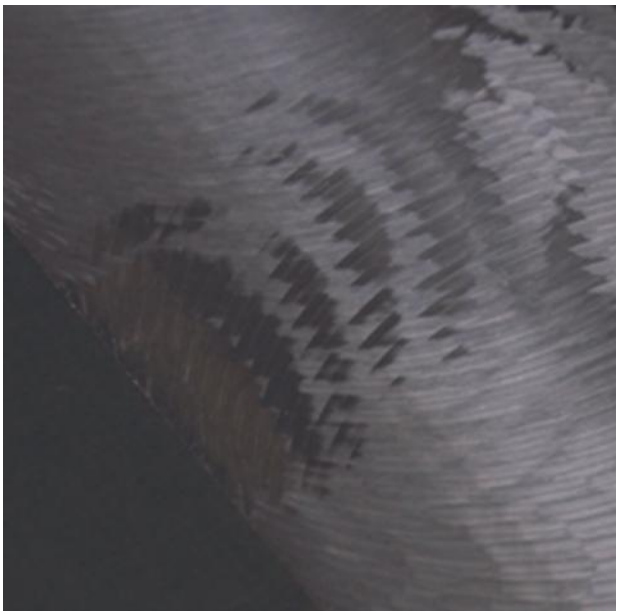
FMAX Coarse Pitch Type

<Cutting Conditions>
Number of Teeth : 4
Feed per Tooth : vf=315 IPM



FMAX Standard Type

<Cutting Conditions>
Number of Teeth : 10
Feed per Tooth : vf=787 IPM

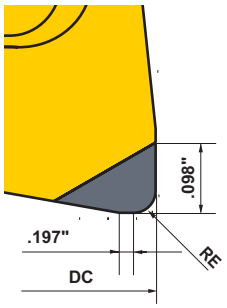


Inserts for Specific Applications

CBN Grades for Milling of Gray Cast Iron

General Purpose Inserts

CBN inserts for gray cast iron reduce the length of the wiper edge and provide excellent surface finish with low cutting forces.
CBN grade insert for cast iron is an economical and disposable insert that does not require re-grinding.

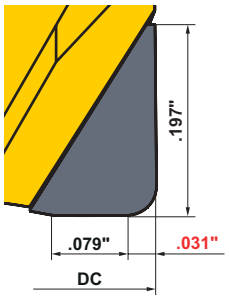


PCD Grades for Milling of Aluminum Alloys

General Purpose Inserts

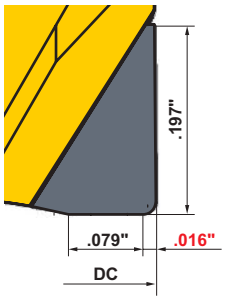
Inserts with corner R(RE) = .031 inch are excellent for general applications, and can be used in a wide variety of cutting areas. They are able to exhibit outstanding cutting edge stability, particularly under high-load conditions such as heavy interrupted cutting.

RE=.031"



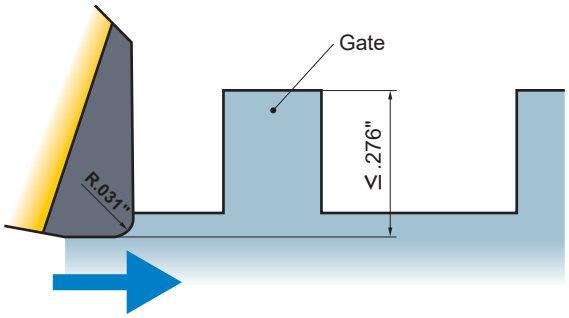
The sharpness of inserts with corner R(RE) = .016 inch is one of their most notable features. Its effectiveness can be demonstrated by the ability to suppress chatter and maintain finished surfaces.

RE=.016"

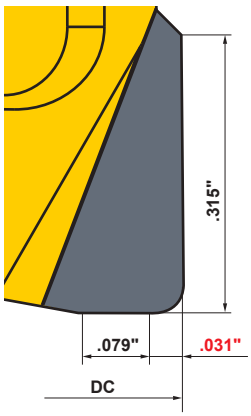


Long Edge Inserts

The long edge insert is capable of finish cutting of castings with a gate. Therefore, it is possible to reduce the number of cutting passes and to shorten the machining time as well.



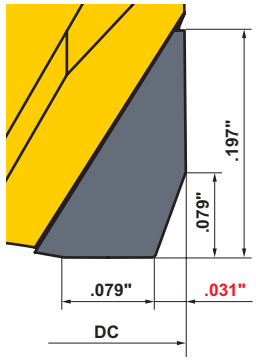
RE=.031"



Burr Prevention Inserts

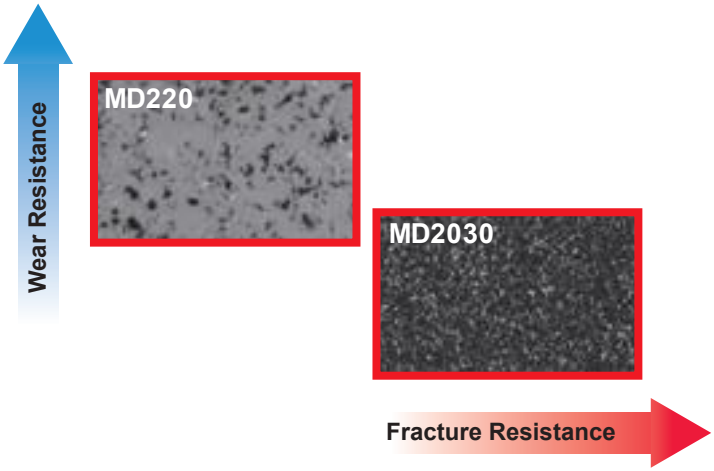
The tool cutting edge angle is effective at reducing the thickness of chips, with minimal; if any burrs generated in comparison to conventional products.
The finely-detailed R shape of the corner portion prevents chipping and enhances both stability and tool life.

Burr Prevention Type

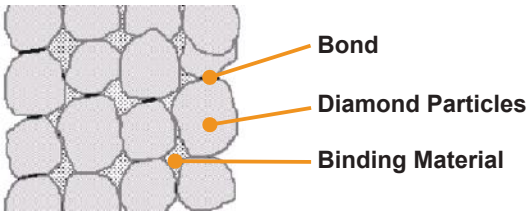


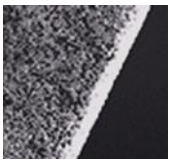
Features of the Grades

PCD Grade Diamond Sintered Segment Containing Ultra Microparticle Diamond



Bond of Diamond Particles





Diamond Particles : Give a highly stable cutting edge performance because of the strong bonding.

Features of MD2030

Intended for milling.
Improved fracture resistance when used in unstable applications.
The stability of the cutting edge can meet a wide variety of workpiece material and cutting conditions.

Features of MD220

Sintered medium grain diamond particles. Wear resistance and fracture resistance are superbly balanced.
MD220 can prevent burr formation and achieve long tool life.

CBN Grade High Fracture Resistance

Features of MB4120

Fine CBN particles increase cutting edge toughness.
The high fracture resistance allows stable performance even during interrupted machining.
Optimized grade prevents fracture, edge chipping and thermal cracks under both dry cutting conditions and when cutting workpiece following wet cut process.

FACE MILLING
<HIGH FEED FINISHING>

90° KAPR

F

FMAX

P M K N S H



Fig.1
ø3.000"
ø4.000"

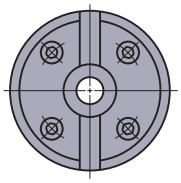
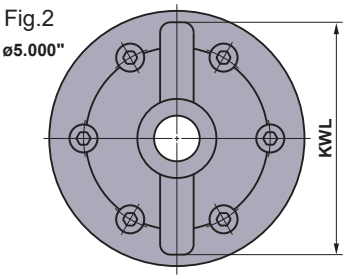
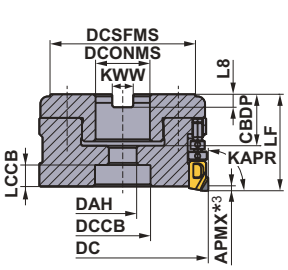
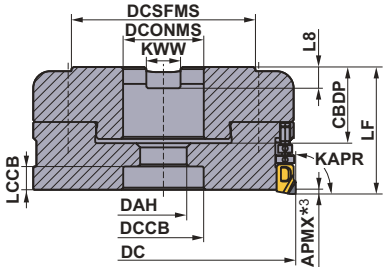


Fig.2
ø5.000"







■ Arbor Type

DC = Inch, DCONMS = Inch

Right hand tool holder only.

(inch)

DC	Order Number	Stock	★1 Coolant Thru	★2 No.T	LF	DCONMS	WT (lbs)	RPMX (min^{-1})	Fig.
3.000	**FMAXUR0310C**	●	Y	10	1.772	1.000	2.2	24500	1
3.000	**FMAXUR0314C**	●	Y	14	1.772	1.000	2.1	24500	1
4.000	**FMAXUR0412D**	●	Y	12	1.969	1.250	4.2	22000	1
4.000	**FMAXUR0418D**	●	Y	18	1.969	1.250	4.1	22000	1
5.000	**FMAXUR0516E**	●	Y	16	2.362	1.500	7.6	19600	2
5.000	**FMAXUR0524E**	●	Y	24	2.362	1.500	7.5	19600	2

★1 Y=Yes
★2 Number of Teeth
★3 For the maximum depth of cut (**APMX**), please refer to recommended cutting conditions (**ap**).
Note 1) The maximum depth of cut for should be .079 inch or less for ultra high efficiency machining with table feed (**vf** ≥ 787 IPM).

Mounting Dimensions

(inch)

DCONMS	DC	Tool Holder Type	CBDP	DAH	DCCB	LCCB	DCSFMS	KWW	L8	KWL	Fig.
1.000	3.000	**FMAXUR03**	.945	.539	1.024	.433	2.677	.375	.219	—	1
1.250	4.000	**FMAXUR04**	1.260	.669	1.260	.394	3.465	.500	.281	—	1
1.500	5.000	**FMAXUR05**	1.417	.787	1.496	.472	3.465	.625	.375	4.409	2

Spare Parts

(inch)

DC	Tool Holder Type	Insert Clamp Screw ★	Micro Adjustment Nut	Large Adjustment Screw	Cutter Set Bolt	Wrench T10	Wrench ø.098"
							
3.000	**FMAXUR03**	TSS04505S	KSN3	KSS2	HSCXU50012H	TKY10T	RKY25S
4.000	**FMAXUR04**	TSS04505S	KSN3	KSS2	HSCXU62514H	TKY10T	RKY25S
5.000	**FMAXUR05**	TSS04505S	KSN3	KSS2	HSCXU75017H	TKY10T	RKY25S

★ Clamp Torque (lbf-in) : TSS04505S = 31
Note 1) Refer to the instruction manual included in the cutter body for how to locate the insert and adjust the run-out.
Note 2) The cutter body includes a set bolt for an arbor.

● : USA Stock ★ : Stocked in Japan

FACE MILLING
<HIGH FEED FINISHING>

90° KAPR

F

FMAX

P M K N S H



Metric Standard

For Inch Arbors

Fig.1

ø80

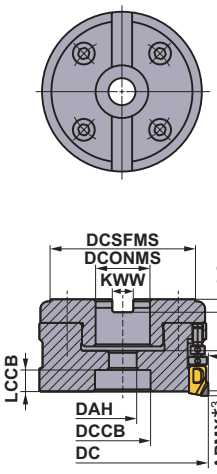
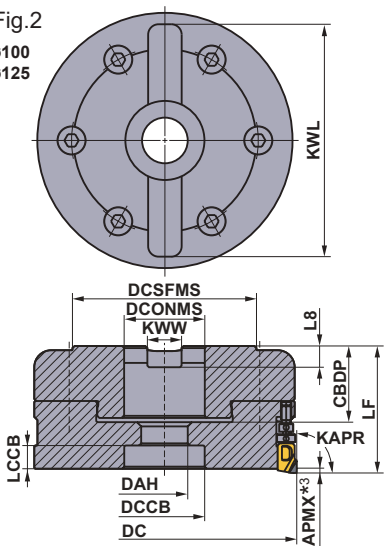


Fig.2

ø100
ø125



Right hand tool holder only.

■ Arbor Type

DC = mm, DCONMS = Inch

(mm)

DC	Order Number	Stock	*1 Coolant Thru	*2 No.T	LF	DCONMS	WT (kg)	RPMX (min^{-1})	Fig.
80	**FMAXR08010C**	★	Y	10	45	25.4	1.11	24500	1
80	**FMAXR08014C**	★	Y	14	45	25.4	1.09	24500	1
100	**FMAXR10012D**	★	Y	12	50	31.75	1.85	22000	2
100	**FMAXR10018D**	★	Y	18	50	31.75	1.81	22000	2
125	**FMAXR12516E**	★	Y	16	60	38.1	3.33	19600	2
125	**FMAXR12524E**	★	Y	24	60	38.1	3.27	19600	2
160	**FMAXR16016D**	★	Y	16	63	31.75	3.30	10000	1
160	**FMAXR16024D**	★	Y	24	63	31.75	3.39	10000	1

*1 Y=Yes
*2 Number of Teeth
*3 For the maximum depth of cut (**APMX**), please refer to recommended cutting conditions (**ap**).
Note 1) The maximum depth of cut for should be 2 mm or less for ultra high efficiency machining with table feed (**vf** ≥ 20000 mm/min).

Mounting Dimensions

(mm)

DCONMS	DC	Order Number	CBDP	DAH	DCCB	LCCB	DCSFMS	KWW	L8	KWL	Fig.
25.4	80	**FMAXR08010C**	24	13	26	11	68	9.5	6	—	1
25.4	80	**FMAXR08014C**	24	13	26	11	68	9.5	6	—	1
31.75	100	**FMAXR10012D**	32	17	32	10	79	12.7	8	90	2
31.75	100	**FMAXR10018D**	32	17	32	10	79	12.7	8	90	2
38.1	125	**FMAXR12516E**	36	22	38	12	88	15.9	10	112	2
38.1	125	**FMAXR12524E**	36	22	38	12	88	15.9	10	112	2
31.75	160	**FMAXR16016D**	38	17	53	10	75	12.7	8	—	1
31.75	160	**FMAXR16024D**	38	17	53	10	75	12.7	8	—	1

Spare Parts

(mm)

DC	Tool Holder Type	Insert Clamp Screw *	Micro Adjustment Nut	Large Adjustment Screw	Cutter Set Bolt	Wrench T10	Wrench ø2.5
							
80	**FMAXR080**	TSS04505S	KSN3	KSS2	HSCX12030H	TKY10T	RKY25S
100	**FMAXR100**	TSS04505S	KSN3	KSS2	HSCX16035H	TKY10T	RKY25S
125	**FMAXR125**	TSS04505S	KSN3	KSS2	HSCX20035H	TKY10T	RKY25S
160	**FMAXR160**	TSS04505S	KSN3	KSS2	HSCX16045H	TKY10T	RKY25S

* Clamp Torque (N • m) : TSS04505S = 3.5

Note 1) Refer to the instruction manual included in the cutter body for how to locate the insert and adjust the run-out.

Note 2) The cutter body includes a set bolt for an arbor.

FACE MILLING
<HIGH FEED FINISHING>

90° KAPR

F

FMAX-LW
Compact and Smaller Machining Centers

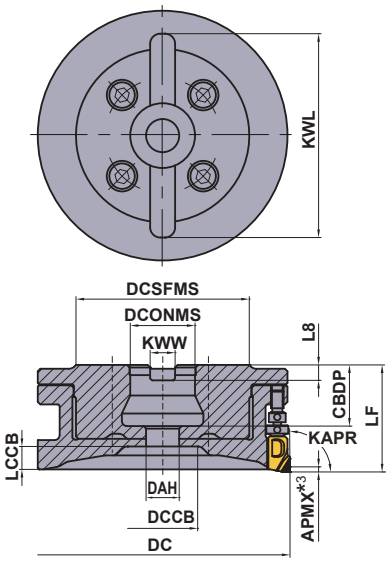
P M **K** **N** S H



Metric Standard

For Inch Arbors

Fig.1
ø100
ø125



Right hand tool holder only.

■ Arbor Type

DC = mm, DCONMS = Inch

(mm)

DC	Order Number	Stock	★1 Coolant Thru	★2 No.T	LF	DCONMS	WT (kg)	RPMX (min-1)	Fig.
100	**FMAXR10010CLW**	★	Y	10	42	25.4	1.06	22000	1
100	**FMAXR10016CLW**	★	Y	16	42	25.4	1.11	22000	1
125	**FMAXR12514CLW**	★	Y	14	42	25.4	1.44	19600	1
125	**FMAXR12520CLW**	★	Y	20	42	25.4	1.48	19600	1

★1 Y=Yes
★2 Number of Teeth
★3 For the maximum depth of cut (**APMX**), please refer to recommended cutting conditions (**ap**).
Note 1) The maximum depth of cut for should be 2 mm or less for ultra high efficiency machining with table feed (**vf** ≥ 20000 mm/min).

Mounting Dimensions

(mm)

DCONMS	DC	Order Number	CBDP	DAH	DCCB	LCCB	DCSFMS	KWW	L8	KWL	Fig.
25.4	100	**FMAXR10010CLW**	24	13	27	9	68	9.5	6	80	1
25.4	100	**FMAXR10016CLW**	24	13	27	9	68	9.5	6	80	1
25.4	125	**FMAXR12514CLW**	24	13	52	9	68	9.5	6	80	1
25.4	125	**FMAXR12520CLW**	24	13	52	9	68	9.5	6	80	1

Spare Parts

(mm)

Insert Clamp Screw *	Micro Adjustment Nut	Large Adjustment Screw	Cutter Set Bolt	Wrench T10	Wrench ø2.5
					
TSS04505S	KSN3	KSS2	HSCX12030H	TKY10T	RKY25S

★ Clamp Torque (N • m) : TSS04505S = 3.5
Note 1) Refer to the instruction manual included in the cutter body for how to locate the insert and adjust the run-out.
Note 2) The cutter body includes a set bolt for an arbor.

★ : Stocked in Japan

FACE MILLING
<HIGH FEED FINISHING>

90° KAPR

F

FMAX-40/50/63

P M K N S H

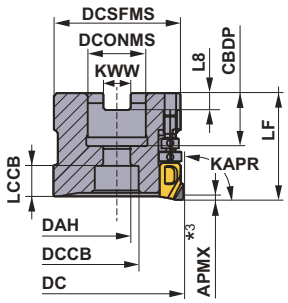


Metric Standard

For Metric Arbors

Fig.1

ø40
ø50
ø63



Right hand tool holder only.

■Arbor Type

DC=mm, DCONMS=mm (mm)

DC	Order Number	Stock	*1 Coolant Thru	*2 No.T	LF	DCONMS	WT (kg)	RPMX (min^{-1})	Fig.
40	**FMAX-040A04R**	★	Y	4	40	16	0.24	30000	1
40	**FMAX-040A06R**	★	Y	6	40	16	0.23	30000	1
50	**FMAX-050A08R**	★	Y	8	40	22	0.37	30000	1
50	**FMAX-050A10R**	★	Y	10	40	22	0.35	30000	1
63	**FMAX-063A10R**	★	Y	10	40	22	0.67	27000	1
63	**FMAX-063A12R**	★	Y	12	40	22	0.66	27000	1

*1 Y=Yes
*2 Number of Teeth
*3 For the maximum depth of cut (**APMX**), please refer to recommended cutting conditions (**ap**).
Note 1) The maximum depth of cut for should be 2mm or less for ultra high efficiency machining with table feed (**vf** ≥ 20000mm/min).

Mounting Dimensions

(mm)

DCONMS	DC	Tool Holder Type	CBDP	DAH	DCCB	LCCB	DCSFMS	KWW	L8	KWL	Fig.
16	40	**FMAX-040**	18	9	14	10	37	8.4	5.6	—	1
22	50	**FMAX-050**	20	11	17	12	47	10.4	6.3	—	1
22	63	**FMAX-063**	20	11	17	12	60	10.4	6.3	—	1

Spare Parts

(mm)

DC	Tool Holder Type	Insert Clamp Screw *	Micro Adjustment Nut	Large Adjustment Screw	Cutter Set Bolt	Wrench T10	Wrench ø2.5
							
40	**FMAX-040**	TSS04505S	KSN3	KSS2	HSC08030H	TKY10T	RKY25S
50	**FMAX-050**	TSS04505S	KSN3	KSS2	HSC10030H	TKY10T	RKY25S
63	**FMAX-063**	TSS04505S	KSN3	KSS2	HSC10030H	TKY10T	RKY25S

* Clamp Torque (N • m) : TSS04505S=3.5
Note 1) Refer to the instruction manual included in the cutter body for how to locate the insert and adjust the run-out.
Note 2) The cutter body includes a set bolt for an arbor.

★ : **Stocked in Japan**

FACE MILLING
<For Low Rigidity Conditions>

90° KAPR

F

FMAX-MB Coarse Pitch Type

NEW

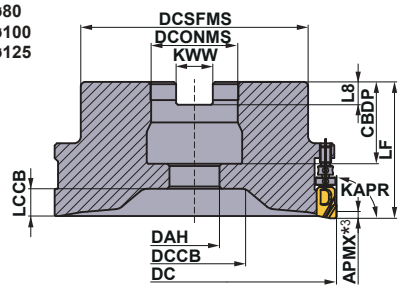
P M K N S H



Metric Standard

For Inch Arbors

Fig.1



Right hand tool holder only.

■ Arbor Type

DC = mm, DCONMS = Inch

(mm)

DC	Order Number	Stock	*1 Coolant Thru	*2 No.T	LF	DCONMS	WT (kg)	RPMX (min^{-1})	Fig.
80	**FMAXR08004CMB**	★	Y	4	45	25.4	1.14	24500	1
100	**FMAXR10004DMB**	★	Y	4	50	31.75	2.01	22000	1
125	**FMAXR12506EMB**	★	Y	6	60	38.1	3.82	19600	1

*1 Y=Yes

*2 Number of Teeth

*3 For the maximum depth of cut (**APMX**), please refer to the recommended cutting conditions (**ap**).

Mounting Dimensions

(mm)

DCONMS	DC	Order Number	CBDP	DAH	DCCB	LCCB	DCSFMS	KWW	L8	Fig.
25.4	80	**FMAXR08004CMB**	24	13	30	11	55	9.5	6	1
31.75	100	**FMAXR10004DMB**	32	17	39	10	75	12.7	8	1
38.1	125	**FMAXR12506EMB**	36	22	45	12	100	15.9	10	1

Spare Parts

(mm)

DC	Tool Holder Type	* Insert Clamp Screw	Micro Adjustment Screw	Large Adjustment Screw	Cuter Set Bolt	Wrench T10	Wrench ø2.5
							
80	**FMAXR080**	TSS04505S	KSN3	KSS2	HSCX12030H	TKY10T	RKY25S
100	**FMAXR100**	TSS04505S	KSN3	KSS2	HSCX16035H	TKY10T	RKY25S
125	**FMAXR125**	TSS04505S	KSN3	KSS2	HSCX20035H	TKY10T	RKY25S

* Clamp Torque (N • m) : TSS04505S = 3.5

Note 1) Please refer to the instruction manual included with the cutter body for how to locate the insert and adjust the run-out and the balance.

FACE MILLING
<For Low Rigidity Conditions>

90° KAPR

F

FMAX-MB Coarse Pitch Type

NEW

P M K N S H



Fig.1

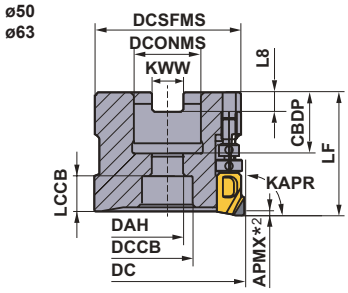
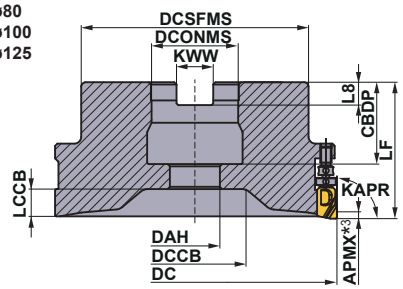


Fig.2



Metric Standard

For Metric Arbors

Right hand tool holder only.

■ Arbor Type

DC=mm, DCONMS=mm (mm)

DC	Order Number	Stock	✶1 Coolant Thru	✶2 No.T	LF	DCONMS	WT (kg)	RPMX (min^{-1})	Fig.
50	**FMAX-050A04R**	★	Y	4	40	22	0.38	30000	1
63	**FMAX-063A04R**	★	Y	4	40	22	0.70	30000	1
80	**FMAX-080B04RMB**	★	Y	4	45	27	1.12	24500	2
100	**FMAX-100B04RMB**	★	Y	4	50	32	2.00	22000	2
125	**FMAX-125B06RMB**	★	Y	6	60	40	3.81	19600	2

✶1 Y=Yes
✶2 Number of Teeth
✶3 For the maximum depth of cut (**APMX**), please refer to the recommended cutting conditions (**ap**).

Mounting Dimensions

(mm)

DCONMS	DC	Order Number	CBDP	DAH	DCCB	LCCB	DCSFMS	KWW	L8	Fig.
22	50	**FMAX-050A04R**	20	11	17	12	47	10.4	6.3	1
22	63	**FMAX-063A04R**	20	11	17	12	60	10.4	6.3	1
27	80	**FMAX-080B04RMB**	24	13	30	11	55	12.4	7	2
32	100	**FMAX-100B04RMB**	32	17	39	10	75	14.4	8	2
40	125	**FMAX-125B06RMB**	36	22	45	12	100	16.4	9	2

Spare Parts

(mm)

DC	Tool Holder Type	✶ Insert Clamp Screw	Micro Adjustment Screw	Large Adjustment Screw	Cuter Set Bolt	Wrench T10	Wrench ø2.5
							
50	**FMAX-050**	TSS04505S	KSN3	KSS2	HSC10030H	TKY10T	RKY25S
63	**FMAX-063**	TSS04505S	KSN3	KSS2	HSC10030H	TKY10T	RKY25S
80	**FMAX-080**	TSS04505S	KSN3	KSS2	HSCX12030H	TKY10T	RKY25S
100	**FMAX-100**	TSS04505S	KSN3	KSS2	HSCX16035H	TKY10T	RKY25S
125	**FMAX-125**	TSS04505S	KSN3	KSS2	HSCX20035H	TKY10T	RKY25S

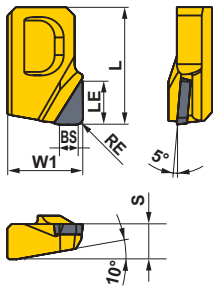
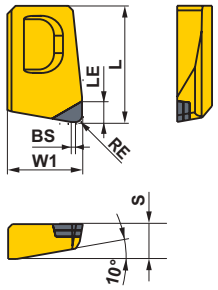
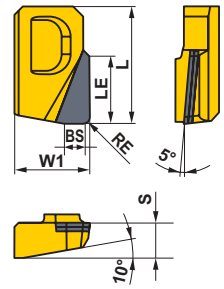
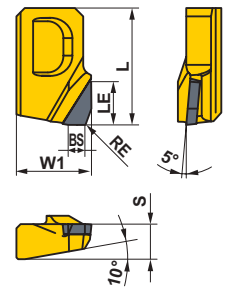
✶ Clamp Torque (N • m) : TSS04505S=3.5

Note 1) Please refer to the instruction manual included with the cutter body for how to locate the insert and adjust the run-out and the balance.

● : USA Stock ★ : Stocked in Japan (PCD and CBN inserts are available with 1 piece in one case.)

■ Inserts

(inch)

Shape	Order Number	MD220	MD2030	MB4120	L	LE	W1	S	BS	RE	Geometry
For Aluminum Alloys	**GOER1404PXFR2**	●	●		.551	.197	.354	.165	.079	.016	
	GOER1408PXFR2	●	●		.551	.197	.354	.165	.079	.031	
 General Purpose											
For Gray Cast Iron	**NP-GOEN1404PXSR05**			●	.551	.098	.354	.165	.020	.016	
	NP-GOEN1408PXSR05			●	.551	.098	.354	.165	.020	.031	
 General Purpose											
For Aluminum Alloys	**GOER1408PXFR2-8**	●			.551	.315	.354	.165	.079	.031	
 Long Edge											
For Aluminum Alloys	**GOER1401ZXFR2**	●			.551	.197	.354	.165	.079	.004	
 Burr Prevention											

For Aluminum Alloys : Sharp Edge

For Gray Cast Iron : Chamferd and Rounded (0.13mmx15°+R0.01)

Note 1) If general purpose inserts (RE = .016", .031"), burr prevention inserts and long edge inserts are used together, they will not be able to sufficiently display their full performance. Inserts of the same shape should be used according to the application.

Note 2) The cutting diameter will change depending on the shape. Refer to page 4 for details.
Be particularly careful when cutting near vertical walls, since there is a possibility of interference with the holder.

Note 3) The long edge inserts corresponds to the gate remainder and can not be used for constant depth cutting.

Note 4) Rake angle Axial GAMP varies depending on the insert grade. For aluminum alloy = 5°, For gray cast iron = 0°

Recommended Cutting Conditions

(inch)

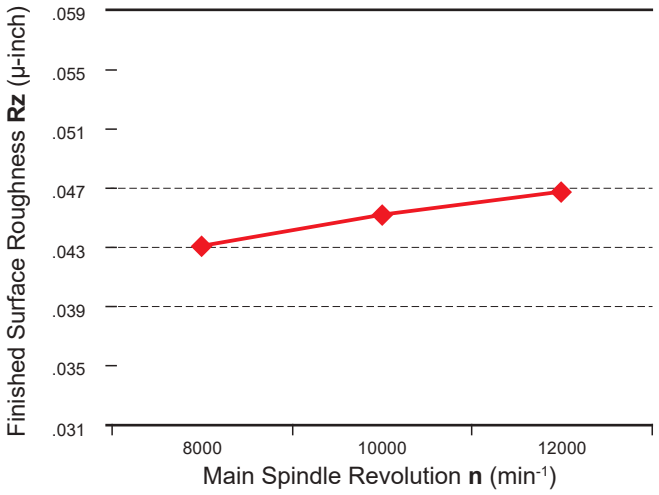
Workpiece Material		Properties	Grade	Cutting Speed **vc** (SFM)	Depth of Cut		Feed per Tooth **fz** (IPT)	Cutting Mode
					ae	**ap**		
K	Gray Cast Iron	Tensile Strength ≤350MPa	**MB4120**	3280 (2295—4265)	≤ .8 DC	≤ .020	.003 (.002—.006)	Dry Cutting
N	Aluminum Alloys	Content Si < 5%	**MD2030 MD220**	8200 (6560—9840)	≤ .2 DC	≤ .118 (.020—.118)	.003 (.002—.008)	Wet Cutting
					≤ .5 DC	≤ .098 (.020—.098)		
					≤ .8 DC	≤ .079 (.020—.079)		
		Content 5% ≤ Si ≤ 10%	**MD2030 MD220**	8200 (6560—9840)	≤ .2 DC	≤ .118 (.020—.118)	.003 (.002—.008)	Wet Cutting
					≤ .5 DC	≤ .098 (.020—.098)		
					≤ .8 DC	≤ .079 (.020—.079)		
		Content 10% < Si < 15%	**MD220 MD2030**	1970 (1310—2625)	≤ .2 DC	≤ .118 (.020—.118)	.003 (.002—.008)	Wet Cutting
					≤ .5 DC	≤ .098 (.020—.098)		
					≤ .8 DC	≤ .079 (.020—.079)		
		Content Si ≥ 15%	**MD220 MD2030**	1970 (1310—2625)	≤ .2 DC	≤ .118 (.020—.118)	.003 (.002—.008)	Wet Cutting
					≤ .5 DC	≤ .098 (.020—.098)		
					≤ .8 DC	≤ .079 (.020—.079)		

(Note 1) Please adjust the depth of cut **ap** depending on the width of cut **ae**.

(Note 2) When using the long edge insert, please select the conditions depending on depths of cut (**ap**) excluding the length of the gate.

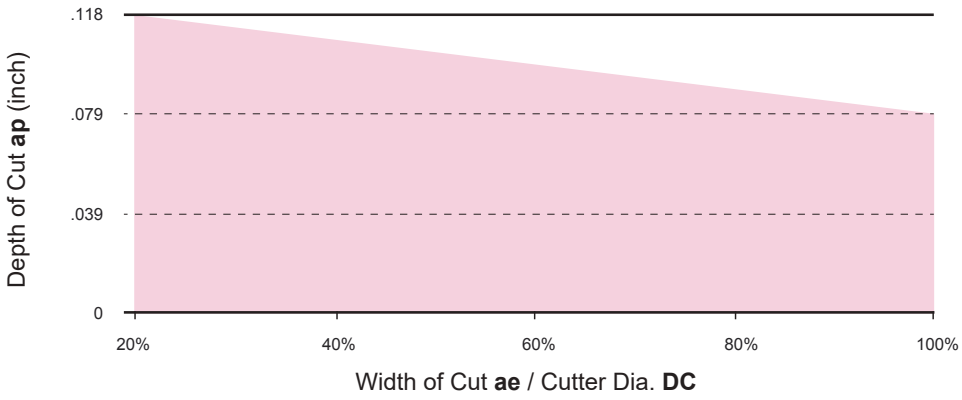
Cutting Performance

Aluminum Alloy Finished Surface Roughness (Rz) Comparison by PCD Grade

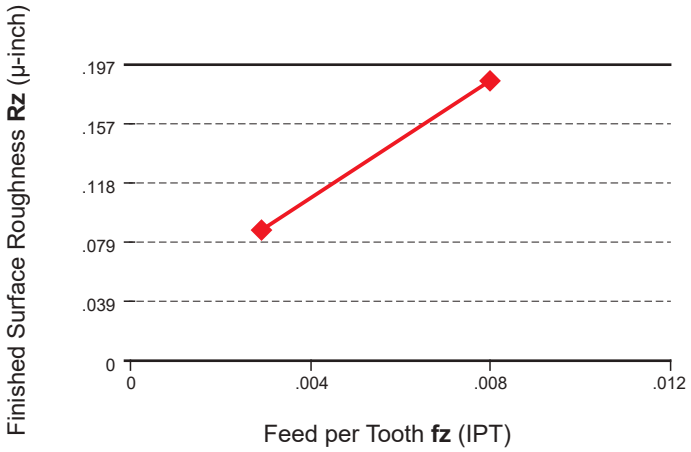


<Cutting Conditions>
Workpiece Material : AISI 383.0 Cylinder Head
Tool : FMAXR12524E
Insert : GOER1408PXFR2
Grade : MD2030
Revolution : n = 8000–12000 min^{-1}
Feed per Tooth : fz = .003 IPT
Depth of Cut : ap = .079 inch
Width of Cut : ae = 2.677 inch x 3
Cutting Mode : Internal Coolant 580 psi

Aluminum Alloy Effective Chip Disposal Range Comparison by PCD Grade

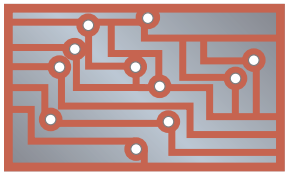
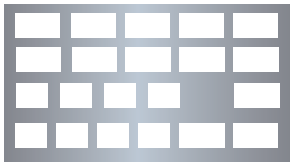


Gray Cast Iron Finished Surface Roughness (Rz) Comparison by CBN Grade



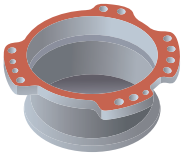
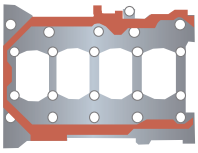
<Cutting Conditions>
Workpiece Material : AISI No.35 B
Tool : FAMXUR0524E
Insert : NP-GOEN1408PXSR05
Grade : MB4120
Revolution : n = 2546 min^{-1}
Feed per Tooth : fz =.003 IPT .008 IPT
Depth of Cut : ap = .020 inch
Cutting Mode : Dry Cutting

Application Examples

Cutter Body		**FMAXR12520CLW**	**FMAXR16016D**
Insert (Grade)		**GOER1401ZXFR2 (MD220)**	**NP-GOEN1408PXSR05 (MB4120)**
Workpiece		Aluminum Alloy 	AISI No.35 B 
Cutting Conditions	Cutting Speed **vc** (SFM)	12885(Conventional 10305)	2640(Conventional 595)
	Revolution **n** (min^{-1})	10000(Conventional 8000)	1600(Conventional 360)
	Feed per Tooth **fz** (IPT)	.0035	.004(Conventional .028)
	Table Feed **vf** (IPM)	709(Conventional 624)	100(Conventional 39)
	Depth of Cut **ap** (inch)	.020	.008
	Width of Cut **ae** (inch)	–	4.331
Cutting Mode		Wet Cutting	Dry Cutting
Machine		Vertical MC (BT30)	Double Column Type MC
Results		Compared to the conventional cutting conditions, the surface roughness is maintained and the machining efficiency is improved by 15%.	Compared to conventional cemented carbide, machining efficiency is 2.5 times and cutting length is 2.7 times. In addition was the good results for the surface finish.

The above application examples are customer's applications, so it can be different from the recommended conditions.

	Cutter Body	**FMAXR10018D**	**FMAXR08014C**
	Insert (Grade)	**GOER1408PXFR2 (MD2030)**	**GOER1408PXFR2 (MD2030)**
	Workpiece	Aluminum Alloy 	Aluminum Alloy 
Cutting Conditions	Cutting Speed **vc** (SFM)	8245	6600
	Revolution **n** (min^{-1})	8000	8000
	Feed per Tooth **fz** (IPT)	.008	.005
	Table Feed **vf** (IPM)	1134	591
	Depth of Cut **ap** (inch)	.059	.098
	Width of Cut **ae** (inch)	1.969	.787
	Cutting Mode	Wet Cutting	Wet Cutting
	Machine	Horizontal MC	Horizontal MC
	Results	Increased efficiency with a table feed increase 2.6X, FMAX achieved good surface finishes and increased machining stability.	Increased efficiency with a table feed increase 2.2X, FMAX achieved good surface finishes and increased machining stability.

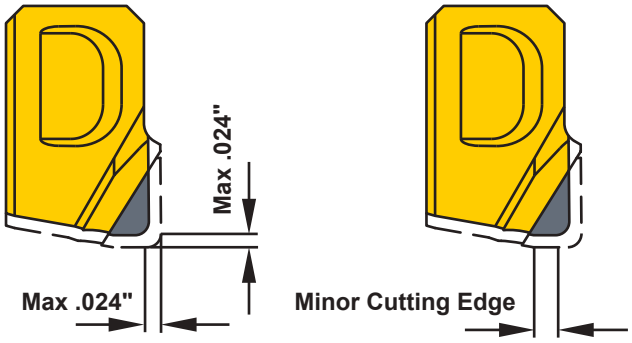
	Cutter Body	**FMAX-050A08R**	**FMAXR08014C**
	Insert (Grade)	**GOER1401ZXFR2 (MD220)**	**GOER1408PXFR2-8 (MD220)**
	Workpiece	AISI 383.0 	AISI 383.0 
Cutting Conditions	Cutting Speed **vc** (SFM)	3605	8200
	Revolution **n** (min^{-1})	7000	9950
	Feed per Tooth **fz** (IPT)	.002	.004
	Table Feed **vf** (IPM)	138	551
	Depth of Cut **ap** (inch)	.012	.039, Gate .276
	Width of Cut **ae** (inch)	.787 – 1.181	.984 – 1.969
	Cutting Mode	Wet Cutting	Wet Cutting (Water-soluble)
	Machine	Vertical MC (BT30)	Horizontal MC
	Results	Tool Life (feet) 16400 49200 82000 **FMAX** Conventional **Can Continue** Burr prevention inserts can ensure smooth finished surfaces and can maintain their effective burr prevention capabilities over long periods of use. As a result, they can achieve tool life which is over triple longer than conventional product.	Table Feed **vf** (IPM) 197 394 591 **FMAX** Conventional FMAX achieved 1.4 times higher efficiency than a conventional product due to its fine pitch design.

The above application examples are customer's applications, so it can be different from the recommended conditions.

Re-grinding of a PCD Insert

The maximum material to be re-grinding is .024 inch.
Use similar inserts after re-grinding to maintain balance.
Problems may occur if the cutter isn't balanced correctly.
After re-grinding the minor edge will reduce in size and may affect surface finishes.
Check the diameter offset after fitting re-grinding inserts.

* Please contact us regarding optimum re-grinding conditions.



Memo

MTEC

MACHINING TECHNOLOGY AND EDUCATION CENTER

Welcome to our new world-class Machining Technology and Education Center (MTEC) in Mooresville, NC providing year round support and services to North America.



ABOUT MTEC

TOOLING PROPOSALS & EVALUATION

We will review your current processes or outline a new process. From this review, we will improve productivity, analyze programming methods and output a solution with programming, tooling and time savings.

MACHINING SIMULATION

Using the latest CAD/CAM software and our cutting tool experience, we will outline a new process using proper machining techniques to maximize tool life and productivity.

TECHNICAL SUPPORT

Dedicated local professionals to answer any of your order, product or technical questions.

TRAINING

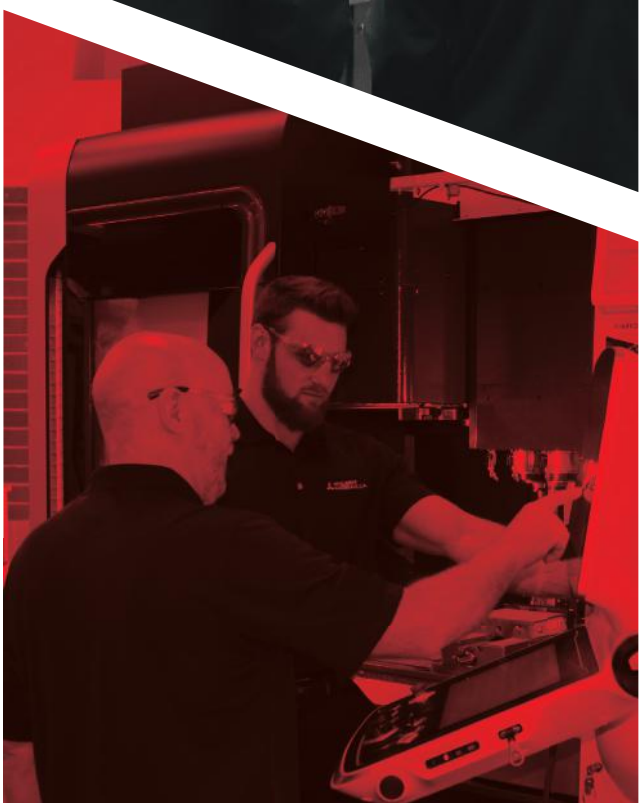
We are excited to offer several levels of training with goals to reach our highest level--Craftsman Machining Technology. At MTEC NC, we will train using a combination of classroom and hands-on machine time to develop skills and real-world understanding of materials, tools and applications. In addition to multi-day courses, we will have Machining Technology skills seminars, as well as seminars from our partners to complement our apprentice level courses, our journeyman courses, and up to our craftsman level courses.

PROCESS IMPROVEMENTS

Review of the complete part processing and recommend changes of speed, feed, new tooling, reduction of passes, modifying programming and other solutions to reduce cycle time, save money and be proactive.







WEBINARS

Our FREE online webinar series is available anytime on-demand. Narrated by the MTEC training staff, you will receive in-depth knowledge of the topic. Simply register online at the link below for access. You will receive a certificate upon completion of each course.

mmusnewsstand.com/register

ONLINE TRAINING

Our FREE e-learning program offers 11 courses in drilling, milling, turning, threading, tool grades and workpiece materials. Once each course is completed, you will be given the opportunity to print a certificate.

- Basic Drilling
- Basic Milling
- Basic Turning
- Advanced Drilling
- Advanced End Milling
- Advanced Turning
- Basic Threading
- Advanced Face Milling
- Basic Workpiece Materials
- Tool Grades
- Advanced Workpiece Materials

TRAINING COURSES

Programs are designed for several levels of skill development – from basic understanding to advance manufacturing with digital solutions, complementing to your valued experience in CNC machining environment. Participate in machining demonstrations with Mitsubishi Materials' skilled engineers. Discover methods to reduce setup and cycle time, optimize programs and enhance your knowledge base.

Information on course schedule,
course description, and accommodations

MTECTRAINING.INFO

Follow the QR Code for a virtual facility tour

MITSUBISHI MATERIALS U.S.A.

MITSUBISHI MATERIALS U.S.A. CORPORATION

California Office
(Headquarters)

3535 Hyland Avenue, Suite 200
Costa Mesa, CA 92626
Customer Service: 800.523.0800
Technical Service: 800.486.2341

Chicago Office
(Engineering)

300 N. Martingale Road, Suite 500
Schaumburg, IL 60173
Main: 847.252.6300
Fax: 847.519.1732

MMC Metal de Mexico, S.A. DE C.V.

Av. La Cañada No.16,
Parque Industrial Bernardo
Quintana, El Marques,
Queretaro C.P. 76246 MEXICO
Main: +52.442.221.61.36
Fax: +52.442.221.61.34

North Carolina-MTEC
(Marketing & Technical Center)

105 Corporate Center Drive, Suite A
Mooresville, NC 28117
Main: 980.312.3100
Fax: 704.746.9292

Toronto Office
(Canada Branch)

600 Matheson Blvd. Unit 5 (Office)
Mississauga, ON L5R 4C1
Main: 905.814.0240
Fax: 905.814.0245

Detroit Office
(Moldino CS)

41700 Gardenbrook Road, Suite 120
Novi, MI 48375
Main: 248.308.2620
Fax: 248.308.2627

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.

www.mmc-carbide.com/us

Tools specifications subject to change without notice.

B216A-US-2023.10