

THE NEW VALUE FRONTIER

京瓷 创造新价值



铣削加工  
Milling

MRX型

低阻力、高效率 圆弧铣刀

# MRX型

Low Cutting Force and High Efficiency Radius Cutter

- **圆弧切刃** 低阻力  
Low Cutting Force with Kyocera's helical cutting edge design
- 实现稳定加工  
**平板锁紧构造**  
Higher Stability with flat lock structure
- **R4/R5/R6/R8**系列  
R4, R5, R6 and R8 types are available



钛合金  
析出硬化系不锈钢

For titanium alloy and precipitation hardened stainless steel

MEGACOAT NANO

**NEW** PR1535

镍基耐热合金  
马氏体系不锈钢

For Ni-base heat resistant alloy and martensitic stainless steel

CVD涂层 CVD Coated Carbide

**NEW** CA6535

ADVANCING PRODUCTIVITY

致力于生产效率提高的京瓷



# MRX型

## 低阻力设计具有良好的切削性 实现高效率加工圆弧铣刀

Excellent cutting performance due to low cutting force design  
High efficiency radius cutter

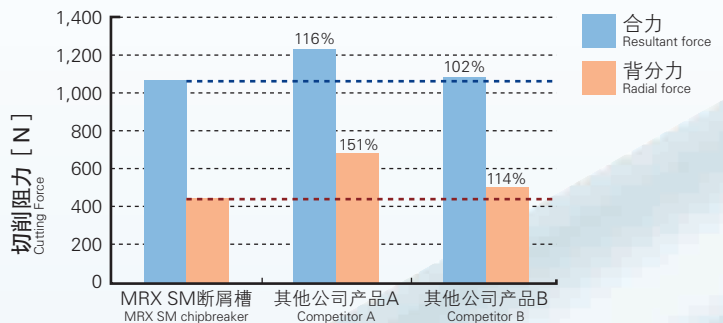
### POINT.1

#### 圆弧切刃低阻力

Low cutting force with Kyocera's helical cutting edge design



#### • 切削阻力比较 Cutting force comparison



< 切削条件 Cutting Conditions >

Vc=120m/min, ap x ae=2 x 25mm, fz=0.2mm/t, SUS304, 刀盘Cutter φ50

### POINT.2

#### 平板锁紧构造使刀片紧紧固定

#### 抑制刀片在加工中旋转，实现稳定加工

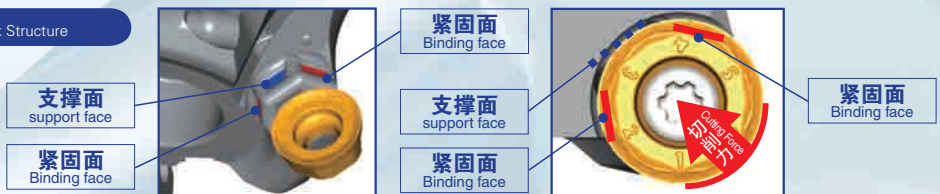
Flat Lock Structure to hold insert firmly

Prevents insert rotation during machining to provide stable cutting

#### 平板锁紧构造 Flat Lock Structure

- 两大宽广平板紧固面
- 均等的接受大切削力
- 抑制刀片旋转

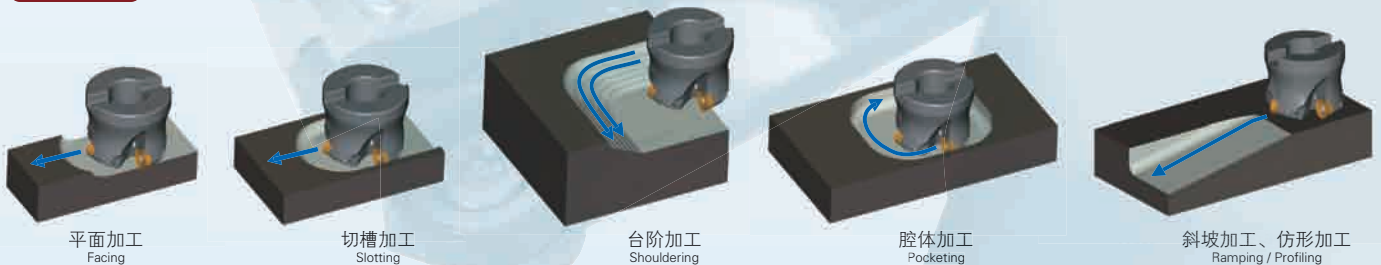
- Wide flat binding face
- Receives even cutting forces
- Prevents insert rotation



### POINT.3

#### 对应广泛加工

Wide application range



重点一  
ONE POINT

G级刀片之外，性价比优越的M级刀片也实现系列化  
Cost-effective M-class inserts are available.

# 从钢加工到不锈钢、耐热合金的四种材质与3种断屑槽实现长寿命加工

Longer tool life with a wide lineup including 4 grades and 3 chipbreakers! Available for steel, stainless steel, and heat resistant alloys

被切削材 Workpiece		适用刀片材质 Applicable Insert Grade	适用断屑槽 Applicable Chipbreaker
P 碳钢、合金钢、模具钢 Carbon Steel / Alloy Steel / Die Steel		PR1525	GM/SM/GH断屑槽 Chipbreaker
K 灰口铸铁、球墨铸铁 Gray Cast Iron / Nodular Cast Iron		PR1510	GH/GM断屑槽 Chipbreaker
S 镍基耐热合金 Ni-base Heat Resistant Alloy	M 马氏体系不锈钢 Martensitic Stainless Steel	CA6535	SM/GM断屑槽 Chipbreaker
S 钛合金 Titanium Alloy	M 奥氏体系不锈钢 Austenitic Stainless Steel	PR1535	SM/GM断屑槽 Chipbreaker
	M 析出硬化系不锈钢 Precipitation Hardened Stainless Steel		

断屑槽的区别使用与推荐切削条件 For Chipbreaker Selection and Recommended Cutting Conditions → P6

POINT.4

## 难削材用新材质隆重登场!

New grade for difficult-to-cut material

抑制突发崩损、实现稳定加工  
抗崩损性能卓越 可实现高效率加工

Stable cutting prevents insert fracturing  
Good for high efficiency machining



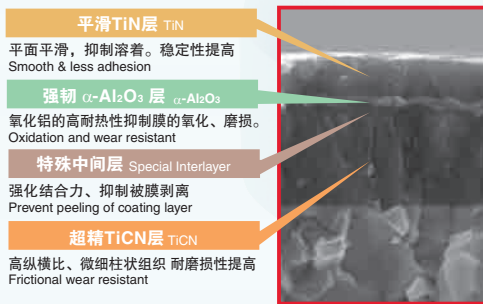
CA6535

镍基耐热合金、马氏体系不锈钢用  
CVD发挥高耐热性、耐磨损性  
采用薄膜涂层提高稳定性

For Ni-base heat resistant alloy and martensitic stainless steel  
High heat resistance and wear resistance with CVD coating  
Improved stability due to thin film coating technology



新开发  
高韧性母材  
Newly Developed  
Tougher Substrate



平滑TiN层 TiN  
平面平滑，抑制溶着。稳定性提高  
Smooth & less adhesion  
Stability improvement

强韧  $\alpha$ -Al<sub>2</sub>O<sub>3</sub>层  $\alpha$ -Al<sub>2</sub>O<sub>3</sub>  
氧化铝的高耐热性抑制膜的氧化、磨损。  
Oxidation and wear resistant

特殊中间层 Special Interlayer  
强化结合力、抑制被膜剥离  
Prevent peeling of coating layer

超精TiCN层 TiCN  
高纵横比、微细柱状组织 耐磨损性提高  
Fricitional wear resistant



PR1535

钛合金、析出硬化系不锈钢用  
特殊纳米涂层[MEGACOAT NANO]，实现铣削加工的  
稳定化与长寿命

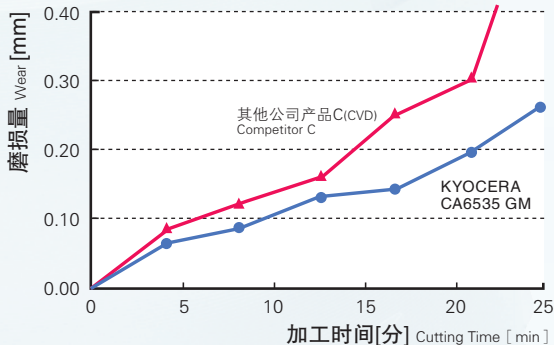
实现铣削加工的稳定化与长寿命  
For titanium alloy and precipitation hardened stainless steel  
Stabilized milling operation and long tool life with Kyocera's MEGACOAT NANO coating technology

MEGACOAT  
基础层构造  
Layer structure of MEGACOAT



### 寿命比较 Tool Life Comparison

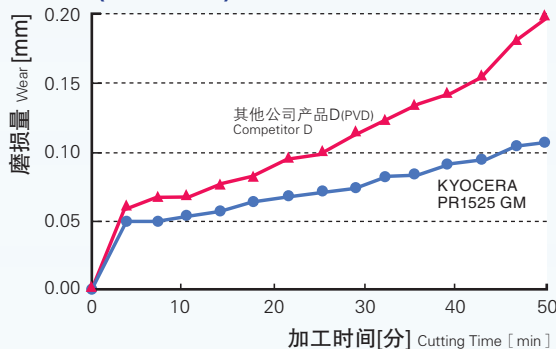
#### • 镍基耐热合金 Ni-base Heat Resistant Alloy



< 切削条件 Cutting Conditions > Vc=50m/min, ap x ae=1 x 20, fz=0.15mm/t, WET

第一推荐 GM断屑槽  
1st recommendation GM chipbreaker

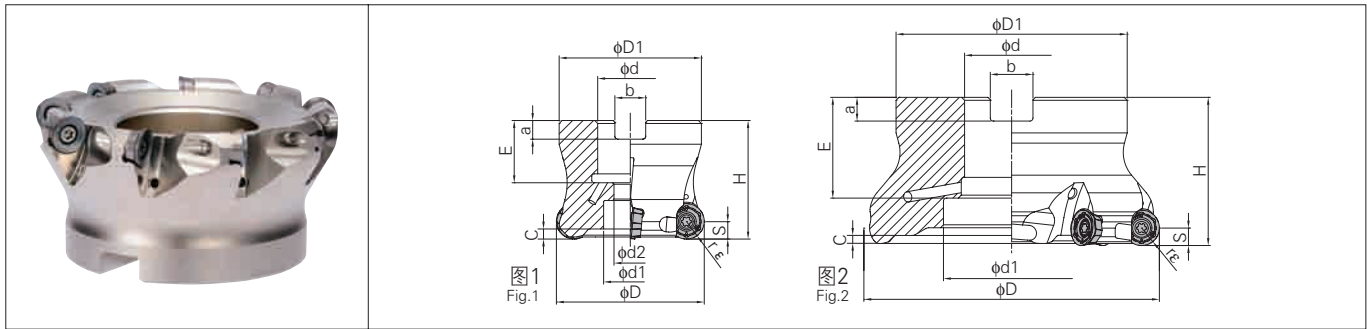
#### • SKD61(38-42HRC)



< 切削条件 Cutting Conditions > Vc=120m/min, ap x ae=2 x 25, fz=0.35mm/t, DRY

第一推荐 GM断屑槽  
1st recommendation GM chipbreaker

## MRX型立铣刀(带冷却孔) MRX Face Mill (with coolant hole)



### 刀杆尺寸 Toolholder Dimensions

型号 Description	在库 Stock	刃数 No. of inserts	尺寸(mm) Dimension													前角(°) Rake Angle		冷却孔 Coolant Hole	形状 Drawing	重量 (kg) Weight	最高转速 (min <sup>-1</sup> ) Max. Revolution				
			rε	φD	φD1	φd	φd1	φd2	H	E	a	b	C	S	A.R.	R.R.									
刀柄安装部英制规格 Bore Dia. Inch Spec	MRX 080R-12-6T	●	6	6	80	70	25.4	20	13	50	27	6	9.5	3.4	6	+10°	-5.5°	有	图1 Fig.1	1.2	13,500				
	080R-12-8T	●	8		100	78	31.75	46	-		34	8	12.7						图2 Fig.2	1.1	13,500				
	100R-12-7T	●	7		100	78	31.75	46	-		34	8	12.7						4.4	8	+10°	-5.5°	图1 Fig.1	1.5	12,000
	100R-12-9T	●	9																				图2 Fig.2	1.5	12,000
	MRX 080R-16-5T	●	5	8	80	70	25.4	20	13	50	27	6	9.5	3.4	8	+10°	-5.5°		图1 Fig.1	1.1	11,500				
	080R-16-6T	●	6		100	78	31.75	46	-		34	8	12.7						图2 Fig.2	1.1	11,500				
100R-16-6T	●	6	100		78	31.75	46	-	34		8	12.7	4.4					8	+10°	-5.5°	图1 Fig.1	1.4	10,000		
100R-16-7T	●	7																			图2 Fig.2	1.4	10,000		
125R-16-6T	●	6	125		89	38.1	55	-	63	38	10	15.9	4.4					8	+10°	-5.5°	图1 Fig.1	2.7	9,000		
125R-16-8T	●	8																			图2 Fig.2	2.7	9,000		
公制规格 Metric Spec	MRX 040R-10-5T-M	●	5	5	40	38	16	15	9	40	19	5.6	8.4	2.9	5	+10°	-5.5°	有	图1 Fig.1	0.2	20,000				
	050R-10-6T-M	●	6		50	48	22	18	11		21	6.3	10.4						图1 Fig.1	0.3	17,500				
	063R-10-7T-M	●	7		63	60	22	18	11		21	6.3	10.4						图1 Fig.1	0.6	15,000				
	MRX 040R-12-4T-M	●	4	6	40	38	16	13.5	9	40	19	5.6	8.4	3.4	6	+10°	-5.5°		图1 Fig.1	0.2	21,000				
	050R-12-4T-M	●	4		50	48	22	18	11		21	6.3	10.4						图1 Fig.1	0.3	18,000				
	050R-12-5T-M	●	5		50	48	22	18	11		21	6.3	10.4						3.4	6	+10°	-5.5°	图1 Fig.1	0.3	18,000
	063R-12-5T-M	●	5							图1 Fig.1													0.6	15,500	
	063R-12-6T-M	●	6		63	60	22	18	11	40	21	6.3	10.4						3.4	6	+10°	-5.5°	图1 Fig.1	0.6	15,500
	080R-12-6T-M	●	6																				图1 Fig.1	1.2	13,500
	080R-12-8T-M	●	8																				图1 Fig.1	1.1	13,500
	100R-12-7T-M	●	7		100	78	32	46	-	50	30	8	14.4						3.4	6	+10°	-5.5°	图2 Fig.2	1.4	12,000
	100R-12-9T-M	●	9																				图2 Fig.2	1.4	12,000
	MRX 063R-16-4T-M	●	4	8										63	60	22	18						11	40	21
	063R-16-5T-M	●	5		80	70	27	20	13	24	7	12.4	图1 Fig.1	0.5	13,500										
	080R-16-5T-M	●	5		80	70	27	20	13	50	24	7	12.4	4.4	8	+10°	-5.5°		图1 Fig.1	1.1	11,500				
	080R-16-6T-M	●	6																图1 Fig.1	1.1	11,500				
	100R-16-6T-M	●	6		100	78	32	46	-	50	30	8	14.4	4.4	8	+10°	-5.5°		图1 Fig.1	1.4	10,000				
	100R-16-7T-M	●	7																图2 Fig.2	1.4	10,000				
125R-16-6T-M	●	6	图2 Fig.2															2.6	9,000						
125R-16-8T-M	●	8	125		89	40	55	-	63	33	9	16.4	图2 Fig.2	2.6	9,000										

### 零件与适用刀片 Spare Parts and Applicable Inserts

型号 Description	零件 Spare Parts				刀轴安装用 螺栓 Mounting Bolt	适用刀片 Applicable Inserts
	紧固螺丝 Clamp Screw	扳手 Wrench		防高温 烧结剂 Anti-seize Compound		
MRX 040R-10...	SB-3070TRP	DTPM-10		MP-1	HH8X25	RPMT10T3M0ER-GM RPGT10T3M0ER-GM RPGT10T3M0ER-SM RPMT10T3M0EN-GH ※1
050R-10...	刀片锁紧用紧固扭矩 2.0N·m Recommended Torque for Insert Clamp 2.0N·m				HH10X30	
063R-10...					HH10X30	
MRX 040R-12...	SB-4090TRPN	DTPM-15		MP-1	HH8X25	RPMT1204M0ER-GM RPGT1204M0ER-GM RPGT1204M0ER-SM RPMT1204M0EN-GH ※2
050R-12...					HH10X30	
063R-12...					HH10X30	
080R-12...					HH12X35	
100R-12...					-	
MRX 063R-16...	SB-50120TRP	TTP-20		MP-1	HH10X30	RPMT1605M0ER-GM RPGT1605M0ER-GM RPGT1605M0ER-SM RPMT1605M0EN-GH ※3
080R-16...					HH12X35	
100R-16...					-	
125R-16...					-	

● : 标准在库 Std. Item

• 有关最高转速的标记  
Caution with Max. Revolution  
因误操作等超出最高转速以上的情况下，  
请注意有可能离心力导致芯片或零部件飞  
散等。  
When running an endmill or a cutter at the  
maximum revolution, the insert or cutter may be  
damaged by centrifugal force.

• 固定刀片时，请涂抹少量防高温烧结  
剂(MP-1)在紧固螺丝上。  
Coat Anti-seize Compound (MP-1) thinly on  
portion of taper and thread when insert is fixed.

※1... 不能与旧型号RPMT10T3M0互换。

Not compatible with the conventional  
PRMT10T3M0.

不能与旧型号RPMT1204M0与

※2... RPMT1204M0-H互换。

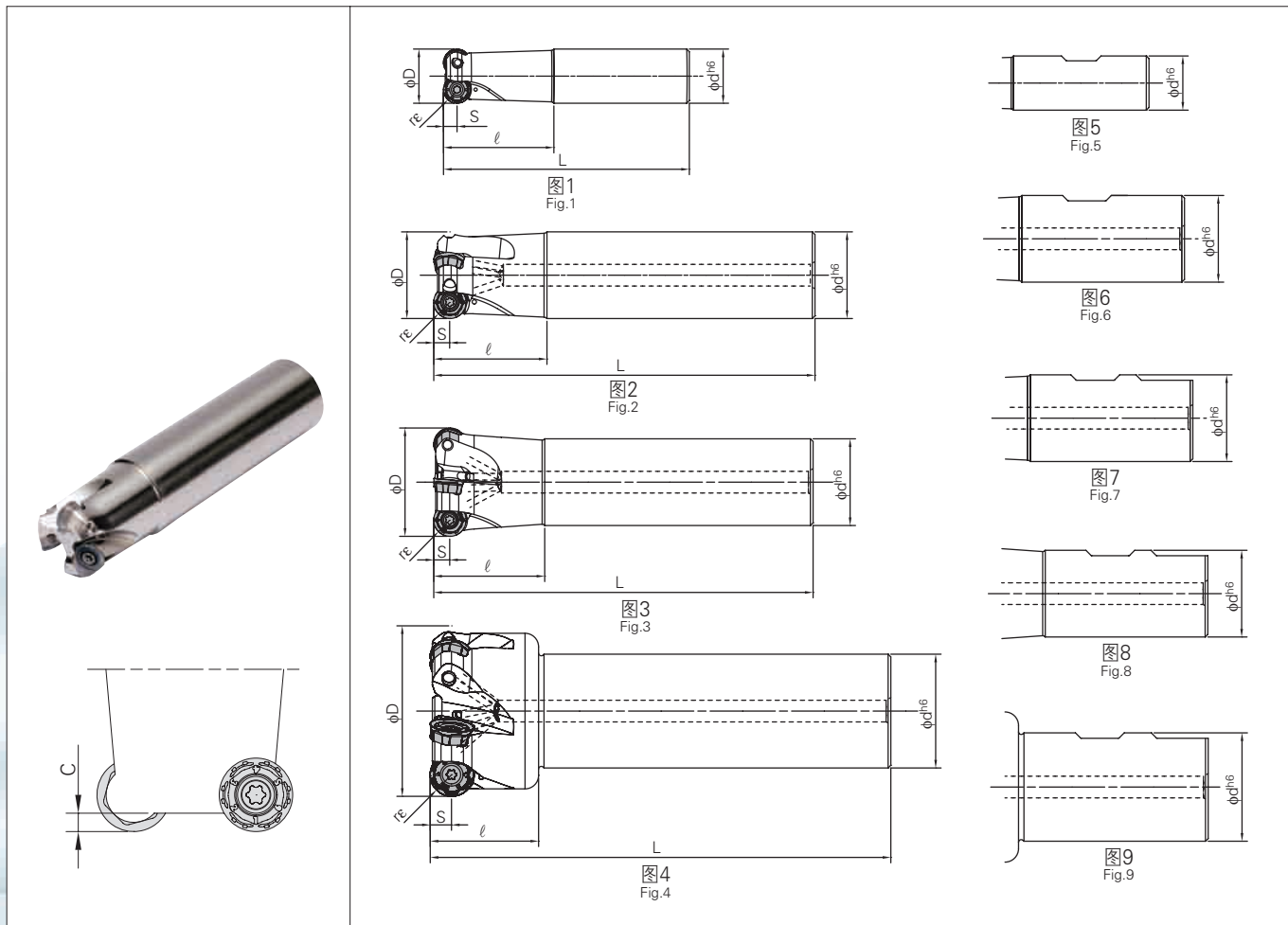
Not compatible with the conventional  
PRMT1204M0 and PRMT1204M0-H.

不能与旧型号RPMT1606M0-H互换。

※3... Not compatible with the conventional  
PRMT1606M0-H.

推荐切削条件 Recommended Cutting Conditions → P6

MRX型立铣刀 MRX End Mill



刀杆尺寸 Toolholder Dimensions

型号 Description	在库 Stock	刃数 No. of inserts	尺寸(mm) Dimension							前角(°) Rake Angle		冷却孔 Coolant Hole	形状 Drawin	最高转速 (min <sup>-1</sup> ) Max. Revolution		
			r <sub>α</sub>	φD	φd	L	ℓ	C	S	A.R. (MAX)	R.R.					
直型刀柄 Standard (Straight)	MRX 16-S16-08-2T	●	2	4	16	16	110	40	2.4	4.0	+3°	-5.5°	无	图1 Fig.1	38,000	
	20-S20-08-2T	●	2		20	20	120									图2 Fig.2
	25-S25-08-4T	●	4		25	25	120							图2 Fig.2	28,000	
	MRX 20-S20-10-2T	●	2	5	20	20	120	40	2.9	5.0	+5°	-8°	无			图1 Fig.1
	25-S25-10-3T	●	3		25	25	120							图2 Fig.2	28,000	
	32-S32-10-4T	●	4		32	32	140									图2 Fig.2
	MRX 32-S32-12-3T	●	3	6	32	32	140	40	3.4	6.0	+10°	-5.5°	有	图2 Fig.2	24,500	
	40-S32-12-4T	●	4		40	42	170									图3 Fig.3
	50-S42-12-5T	●	5		50	42	170							图3 Fig.3	18,000	
	MRX 40-S32-16-2T	●	2	8	40	32	140	40	4.4	8.0	+10°	-5.5°	有			图3 Fig.3
	50-S42-16-4T	●	4		50	42	170							图4 Fig.4	15,500	
	63-S42-16-5T	●	5		63	42	170									图4 Fig.4
侧固式刀柄 Standard (Weldon)	MRX 16-W16-08-2T	●	2	4	16	16	89	40	2.4	4.0	+3°	-5.5°	无	图5 Fig.5	38,000	
	20-W20-08-2T	●	2		20	20	91									图6 Fig.6
	25-W25-08-4T	●	4		25	25	97							图7 Fig.7	28,000	
	MRX 20-W20-10-2T	●	2	5	20	20	91	40	2.9	5.0	+5°	-8°	无			图5 Fig.5
	25-W25-10-3T	●	3		25	25	97							图7 Fig.7	28,000	
	32-W32-10-4T	●	4		32	32	101									图7 Fig.7
	MRX 32-W32-12-3T	●	3	6	32	32	101	40	3.4	6.0	+10°	-5.5°	有	图7 Fig.7	24,500	
	40-W32-12-4T	●	4		40	40	111									图8 Fig.8
	50-W40-12-5T	●	5		50	40	111							图8 Fig.8	18,000	
	MRX 40-W32-16-2T	●	2	8	40	32	101	40	4.4	8.0	+10°	-5.5°	有			图8 Fig.8
	50-W40-16-4T	●	4		50	40	111							图9 Fig.9	15,500	
	63-W40-16-5T	●	5		63	40	112									图9 Fig.9
长款刀柄 Long Shank (Straight)	MRX 16-S16-08-2T-160	●	2	4	16	16	160	70	2.4	4.0	+3°	-5.5°	无	图1 Fig.1	38,000	
	20-S20-08-2T-180	●	2		20	20	180									80
	25-S25-08-4T-180	●	4		25	25	180							80	图2 Fig.2	
	MRX 20-S20-10-2T-180	●	2	5	20	20	180	80	2.9	5.0	+5°	-8°	无			图1 Fig.1
	25-S25-10-2T-180	●	2		25	25	180							80	图2 Fig.2	
	32-S32-10-4T-200	●	4		32	32	200									80
	MRX 32-S32-12-2T-200	●	2	6	32	32	200	40	3.4	6.0	+10°	-5.5°	有	图2 Fig.2	24,500	
	40-S32-12-4T-200	●	4		40	42	200									图3 Fig.3
	50-S42-12-4T-300	●	4		50	42	300							图3 Fig.3	18,000	
	MRX 40-S32-16-2T-200	●	2	8	40	32	200	40	4.4	8.0	+10°	-5.5°	有			图3 Fig.3
	50-S42-16-4T-300	●	4		50	42	300							图4 Fig.4	15,500	
	63-S42-16-4T-300	●	4		63	42	300									图4 Fig.4

● : 标准在库 Std. Item

零件与适用刀片 Spare Parts and Applicable Inserts

型号 Description	紧固螺丝 Clamp Screw	扳手 Wrench		防高温 烧结剂 Anti-seize Compound	适用刀片 Applicable Inserts
		DTPM	TTP		
MRX ----08...	SB-2555TRP	DTPM-8		MP-1	RDMT0803M0ER-GM RDGT0803M0ER-GM RDGT0803M0ER-SM RDMT0803M0EN-GH ※1
	刀片锁紧用紧固扭矩 1.2N·m Recommended Torque for Insert Clamp 1.2N·m				
MRX ----10...	SB-3070TRP	DTPM-10		MP-1	RPMT10T3M0ER-GM RPGT10T3M0ER-GM RPGT10T3M0ER-SM RPMT10T3M0EN-GH ※2
	刀片锁紧用紧固扭矩 2.0N·m Recommended Torque for Insert Clamp 2.0N·m				
MRX ----12...	SB-4090TRPN	DTPM-15		MP-1	RPMT1204M0ER-GM RPGT1204M0ER-GM RPGT1204M0ER-SM RPMT1204M0EN-GH ※3
	刀片锁紧用紧固扭矩 3.5N·m Recommended Torque for Insert Clamp 3.5N·m				
MRX ----16...	SB-50120TRP	TTP-20		MP-1	RPMT1605M0ER-GM RPGT1605M0ER-GM RPGT1605M0ER-SM RPMT1605M0EN-GH ※4
	刀片锁紧用紧固扭矩 4.5N·m Recommended Torque for Insert Clamp 4.5N·m				

● 有关最高转数的标记

Caution with Max. Revolution

因误操作等超出最高转数以上的情况下，请注意有可能离心力导致芯片或零部件飞散等。

When running an endmill or a cutter at the maximum revolution, the insert or cutter may be damaged by centrifugal force.



固定刀片时，请涂抹少量防高温烧结剂(MP-1)在紧固螺丝上。

Coat Anti-seize Compound (MP-1) thinly on portion of taper and thread when insert is fixed.

※1... 不能与旧型号RPMT08T2M0-H互换。

Not compatible with the conventional RPMT08T2M0-H.

※2... 不能与旧型号RPMT10T3M0互换。

Not compatible with the conventional RPMT10T3M0.

※3... 不能与旧型号RPMT1204M0与RPMT1204M0-H互换。

Not compatible with the conventional RPMT1204M0 and RPMT1204M0-H.

※4... 不能与旧型号RPMT1606M0-H互换。

Not compatible with the conventional RPMT1606M0-H.

推荐切削条件 Recommended Cutting Conditions → P6

切削刀片(带孔) Milling Inserts (with hole)

使用分类明细 Classification of Usage		P	碳钢、合金钢 Carbon Steel / Alloy Steel					★				适用刀杆参照页 Applicable Holder Reference Page	
			模具钢 Die Steel					★					
★：粗加工/第1推荐 Roughing / 1st Choice ☆：粗加工/第2推荐 Roughing / 2nd Choice ■：精加工/第1推荐 Finishing / 1st Choice □：精加工/第2推荐 Finishing / 2nd Choice (高硬度在45HRC以下场合) In case hardness is under 45 HRC		M	奥氏体系不锈钢(SUS304等) Austenitic Stainless Steel					★	☆				
			马氏体系不锈钢(SUS404等) Martensitic Stainless Steel					☆				★	
		K	灰口铸铁 Gray Cast Iron								★		
			球墨铸铁 Nodular Cast Iron								★		
		S	耐热合金(镍基耐热合金) Heat Resistant Alloy (Ni-base Heat Resistant Alloy)					☆				★	
			钛合金(Ti-6Al-4V) Titanium Alloy					★		☆			
		H	高硬度材 Hard Materials						□				
形状 Insert		型号 Description	尺寸(mm) Dimension					后角 (°) Angle	MEGACOAT NANO			CVD涂层 CVD Coated Carbide	
			φA	T	φd	W	rε	α	PR1535	PR1525	PR1510	CA6535	
 通用(M级) General Purpose(M-class)	 A, T, φd, α	RDMT 0803M0ER-GM	8	3.18	3.0	-	4	15	●	●	●	●	P3 P4
		RPMT 10T3M0ER-GM	10	3.97	3.5	-	5	11	●	●	●	●	
		1204M0ER-GM	12	4.76	4.6	-	6		●	●	●	●	
		1605M0ER-GM	16	5.56	5.8	-	8		●	●	●	●	
 通用(G级) General Purpose(G-class)	 A, T, φd, α	RDGT 0803M0ER-GM	8	3.18	3.0	-	4		15	●	●	●	
		RPGT 10T3M0ER-GM	10	3.97	3.5	-	5	11	●	●	●	●	
		1204M0ER-GM	12	4.76	4.6	-	6		●	●	●	●	
		1605M0ER-GM	16	5.56	5.8	-	8		●	●	●	●	
 不锈钢、低阻力型 For stainless steel(Low cutting force)	 A, T, φd, α	RDGT 0803M0ER-SM	8	3.18	3.0	-	4		15	●	●	●	
		RPGT 10T3M0ER-SM	10	3.97	3.5	-	5	11	●	●	●	●	
		1204M0ER-SM	12	4.76	4.6	-	6		●	●	●	●	
		1605M0ER-SM	16	5.56	5.8	-	8		●	●	●	●	
 刀尖强化型(重切削用) Tough Edge(Heavy Milling)	 A, T, φd, α	RDMT 0803M0EN-GH	8	3.18	3.0	-	4		15	●	●	●	●
		RPMT 10T3M0EN-GH	10	3.97	3.5	-	5	11	●	●	●	●	
		1204M0EN-GH	12	4.76	4.6	-	6		●	●	●	●	
		1605M0EN-GH	16	5.56	5.8	-	8		●	●	●	●	

●：标准在库 Std. Item

推荐切削条件 Recommended Cutting Conditions

被切削材 Workpiece Material	推荐断屑槽(进给 fz mm/t) Recommended Chipbreaker ※ RD**08类型...ap=2mm, RP**10类型...ap=2.5mm RP**12类型...ap=3mm, RP**16类型...ap=4mm时的推荐进给(基准值) RD**08 type: ap=2mm, RP**10 type: ap=2.5mm RP**12 type: ap=3mm, RP**16 type: ap=4mm				推荐刀片材质(切削速度 m/min) Recommended Insert Grade			
	RDMT-GM RPMT-GM	RDGT-GM RPGT-GM	RDGT-SM RPGT-SM	RDMT-GH RPMT-GH	MEGACOAT NANO			CVD涂层 CVD Coated Carbide
					PR1535	PR1525	PR1510	CA6535
碳钢 Carbon Steel (SxxC)	★ 0.1-0.2-0.3	☆ 0.1-0.2-0.3	☆ 0.06-0.15-0.2	☆ 0.15-0.3-0.35	-	★ 120-180-250	-	-
合金钢 Alloy Steel (SCM等)	★ 0.1-0.2-0.3	☆ 0.1-0.2-0.3	☆ 0.06-0.15-0.2	☆ 0.15-0.3-0.35	-	★ 100-160-220	-	-
模具钢 Die Steel (SKD/NAK等)	★ 0.1-0.15-0.25	☆ 0.1-0.15-0.25	☆ 0.06-0.12-0.2	☆ 0.15-0.2-0.3	-	★ 80-140-180	-	-
奥氏体系不锈钢 Austenitic Stainless Steel (SUS304等)	☆ 0.1-0.15-0.2	☆ 0.1-0.15-0.2	★ 0.06-0.12-0.2	-	★ 100-160-200	☆ 100-160-200	-	-
马氏体系不锈钢 Martensitic Stainless Steel (SUS404等)	☆ 0.1-0.15-0.2	☆ 0.1-0.15-0.2	★ 0.06-0.12-0.2	-	☆ 150-200-250	-	-	★ 180-240-300
析出硬化系不锈钢 Precipitation Hardened Stainless Steel (SUS630等)	☆ 0.1-0.15-0.2	★ 0.1-0.15-0.2	☆ 0.06-0.12-0.2	-	★ 90-120-150	-	-	-
灰口铸铁 Gray Cast Iron (FC)	★ 0.1-0.2-0.3	☆ 0.1-0.2-0.3	-	☆ 0.15-0.3-0.35	-	-	★ 120-180-250	-
球墨铸铁 Nodular Cast Iron (FCD)	★ 0.1-0.15-0.25	☆ 0.1-0.15-0.25	-	☆ 0.15-0.2-0.3	-	-	★ 100-150-200	-
镍基耐热合金 Ni-base Heat Resistant Alloy	☆ 0.1-0.12-0.15	★ 0.1-0.12-0.15	☆ 0.06-0.1-0.15	-	☆ 20-30-50	-	-	★ 20-30-50
钛合金 Titanium Alloy (Ti-6Al-4V)	☆ 0.1-0.12-0.15	☆ 0.1-0.12-0.15	★ 0.06-0.1-0.15	-	★ 40-60-80	-	☆ 30-50-70	-

- ※ 镍基耐热合金、钛合金推荐湿式加工。  
Machining with coolant is recommended for Ni-base heat resistant alloy and titanium alloy.
- ※ 不锈钢、镍基耐热合金、钛合金推荐RDGT/RPGT。 RDGT/TPGT are recommended for stainless steel, Ni-base heat resistant alloy and titanium alloy.
- ※ 切削条件中的粗体字表示推荐条件的中间值。请根据实际加工情况在范围内调整切削速度、进给。  
The figure in bold font is center value of the recommended cutting conditions. Adjust the cutting speed and the feed rate within the above conditions according to the actual machining situation.
- ※ 切削条件中的推荐进给表示切深(ap)为rc/2(RD\*\*08型的2mm、RP\*\*10型的2.5mm、RP\*\*12型的3mm、RP\*\*16型的4mm时的基准值)切深在此以下,或者在此以上时根据下表的换算系数计算数值作为推荐值。  
Recommended feed rate in the table is the reference value when ap is rc/2. (2.5mm for RD\*\*08 / 3mm for RP\*\*12 / 4mm for RP\*\*16)  
For other ap, calculate the recommended feed rate based on the conversion factor below.
- ※ 使用MRX16-S16-08-2T(-160)、MRX16-W16-08-2T、MRX20-S20-10-2T(-180)、MRX20-W20-10-2T时,请将进给设定在推荐条件的50%以下。  
For MRX16-S16-08-2T(-160), MRX16-W16-08-2T, MRX20-S20-10-2T(-180)and MRX20-W20-10-2T, set the feed rate not higher than 50% of the recommended cutting conditions.

切深是根据相当1刀刃的进给的换算系数 Conversion factor for feed per tooth by depth of cut (ap)

刀片 Insert	最大切深 ap ap (max)	相当于1刀刃的进给换算系数 Conversion factor for feed per tooth									
		ap=0.5mm	ap=1mm	ap=1.5mm	ap=2mm	ap=2.5mm	ap=3mm	ap=4mm	ap=5mm	ap=6mm	ap=8mm
RD**08类型(GM/SM/GH类型) RD**08 type (GM/SM/GH chipbreaker)	4mm	1.7	1.3	1.1	1(基准) Standard	0.9	0.8	0.8	-	-	-
RP**10类型(GM/SM/GH类型) RP**10 type (GM/SM/GH chipbreaker)	5mm	1.9	1.4	1.2	1	1(基准) Standard	0.9	0.8	0.8	-	-
RP**12类型(GM/SM/GH类型) RP**12 type (GM/SM/GH chipbreaker)	6mm	2.1	1.5	1.3	1.1	1	1(基准) Standard	0.9	0.8	0.8	-
RP**16类型(GM/SM/GH类型) RP**16 type (GM/SM/GH chipbreaker)	8mm	2.4	1.7	1.4	1.3	1.1	1.1	1(基准) Standard	0.9	0.8	0.8

※ 计算例  
(RPMT12型、碳钢、GM断屑槽、切深ap=1mm)  
0.2mm/t(碳钢、GM断屑槽的进给基准值) × 1.5  
(RP\*\*12型、ap=1mm时的换算基准值)=  
0.3mm/t → 0.3mm/t 作为推荐值  
Calculation example  
(RPMT12 type, Carbon steel, GM chipbreaker, ap=1mm)  
0.2mm/t (Reference value for carbon steel and GM chipbreaker) × 1.5 (Conversion factor for RP\*\*12 type, ap=1mm)=0.3mm/t (Recommended feed rate)

钻削加工、斜坡加工、螺旋加工 Drilling / Ramping / Helical milling

工具式样 Tool spec.		最大切深 Max. ap	钻削加工 Drilling			斜坡加工 Ramping			螺旋加工 Helical milling		
刀片 Insert	工具径 Tool dia.		最大加工深度Pd Max. Cutting Depth	底面平坦处最小 切削长X Min. Cutting Length for flat bottom face	最大倾斜角度 Maximum ramping angle αmax (°)	tan αmax	根据最大倾斜角度的 最大切削长L Max. Cutting Length at Max. Ramping Angle	最小加工孔直径 φDh1 Min. Cutting Dia.	底面平坦处最小加工孔直径 φDh2 Min. Cutting Dia. for flat bottom facing	最大加工孔直径 φDh3 Max. Cutting Dia.	
RD**08类型 RD**08 type	16	4	0.7	9	8	0.141	28	20	24	30	
	20			13	9	0.158	25	26	32	38	
	25			18	5	0.087	45	36	42	48	
RP**10类型 RP**10 type	20	5	0.6	11	5	0.087	57	26	30	38	
	25			16	10	0.176	28	33	40	48	
	32			23	6	0.105	47	47	54	62	
	40			31	4	0.070	71	63	70	78	
	50			41	3	0.052	95	83	90	98	
	63			54	2	0.035	143	109	116	124	
RP**12类型 RP**12 type	32	6	2.4	21	9	0.158	37	43	52	62	
	40			29	5	0.087	68	59	68	78	
	50			39	4	0.070	85	79	88	98	
	63			52	2	0.035	171	105	114	124	
	80			69	2	0.035	171	139	148	158	
RP**16类型 RP**16 type	100	8	3.4	89	1	0.017	343	179	188	198	
	40			25	11	0.194	41	51	64	78	
	50			35	7	0.123	65	71	84	98	
	63			48	4	0.070	114	97	110	124	
	80			65	3	0.052	152	131	144	158	
100	85	2	0.035	229	171	184	198				
125	110	1	0.017	458	221	234	248				

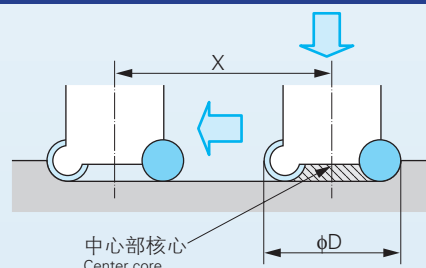
※ 以上为刀杆与工件的紧固螺丝剩余1mm时的值。The above value is based on the clearance of 1mm between the tool body and the workpiece. 单位 Unit: mm

钻削加工的注意点 Tips for drilling

【钻削深度】 Drilling depth  
请参照表的Pd值。(Pd: 表示最大加工深度) See Max. Cutting Depth (Pd) in the above cutting conditions

【钻削后的横进给加工】 Traversing after drilling  
钻削加工后直接进行横进给加工时的注意点  
Caution for traversing right after drilling

- 中心部的核心(切削残留部分)切削时, 请在工作台进给进行横进给时下降一半再加工。  
(因内侧切刃的径向前角方向较大)  
Reduce the table feed by 50% of the recommended conditions until the center core part is completely cut off.  
The internal cutting edge's radial rake angle is large in the negative direction.
- 底面平坦最小切削长X尺寸如上表所示。  
Min cutting length for flat bottom face is as the list above.



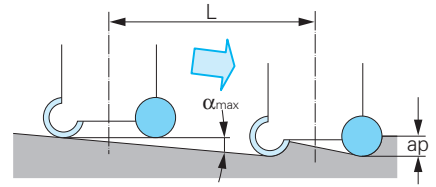
## 斜坡加工(集中加工)的注意点 Tips for ramping

- 斜坡加工的角度请设定在 $\alpha_{max}$ 以下。  
Ramping angle should be under  $\alpha_{max}$  (Maximum ramping angle) in the above cutting conditions.
- 进给请设定在目录的70%以下。  
Feed rate should be under 70% of the above cutting conditions.

根据最大倾斜角度的最大切削长 L 的计算式

$$L = \frac{ap}{\tan \alpha_{max}}$$

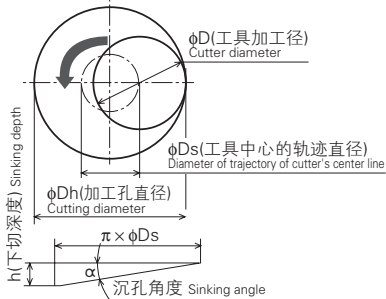
Formula for Max. cutting length (L) at Max. ramping angle



## 螺旋铣时的注意点 Tips for helical milling

- 螺旋加工相当于1次的沉孔深度时请设定最大切深ap以下。  
此外, 根据工作中心的轨迹沉孔角度 $\alpha$ 请不要超过斜面沉孔加工的最大倾斜角度 $\alpha_{max}$ 。  
Sinking depth (h) at helical milling should be under Max.ap in the above cutting conditions. Sinking angle  $\alpha$  (with trajectory of the center line of tool) should be under  $\alpha_{max}$  (Maximum ramping angle) in the above cutting conditions.
- 进给请设定在目录的70%以下。  
Feed rate should be under 70% of the above cutting conditions.
- 推荐顺铣加工。Down-cut milling is recommended.

### 螺旋加工的计算方法 Helical milling factors



$\phi D_s$ (工具中心的轨迹直径)的求解方法

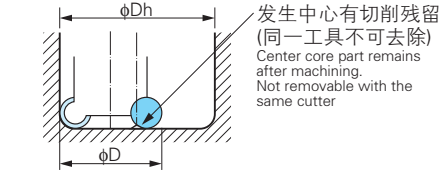
Diameter of trajectory of cutter's center line  
 $\phi D_s = \phi D_h - \phi D$

下切深度公式(h)

Formula for sinking depth (h)  
 $h = \pi \times \phi D_s \times \tan \alpha$   
(h请设定在ap以下)  
( $\alpha$ 请设定在 $\alpha_{max}$ 以下)  
h should be under ap  
 $\alpha$  should be under  $\alpha_{max}$

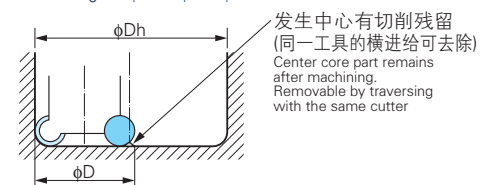
【加工孔直径 $\phi D_h1 \leq \phi D_h < \phi D_h2$ 场合下】

When cutting dia.  $\phi D_h1 < \phi D_h < \phi D_h2$



【加工孔直径 $\phi D_h1 \leq \phi D_h \leq \phi D_h2$ 场合下】

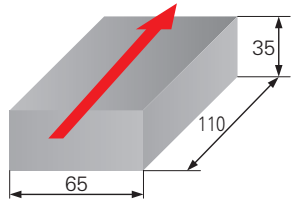
When cutting dia.  $\phi D_h2 \leq \phi D_h \leq \phi D_h3$



※ $\phi D_h1 \sim D_h3$ 请参照P6的下表。  
Please refer to P6 the list below for  $\phi D_h1 \sim D_h3$ .

## 加工案例 Case Studies

### SUS304



工具寿命  
4.5倍  
4.5 times  
longer tool life

- 喷嘴零件 Nozzle parts •  $V_c = 113\text{m/min}$  •  $f_z = 0.14\text{mm/t}$
- $ap \times ae = 1.0 \times 65\text{mm}$  • 干式 Dry
- MRX100R-12-9T-M(9枚刃) 9 edges • RPGT1204M0ER-SM(PR1535)

PR1535

450个/1刀尖  
450 pcs/edge

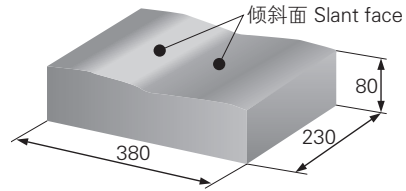
以往产品  
Conventional

100个/1刀尖 100 pcs/edge

- 寿命达成4.5倍、刀尖数也成本降低了1.5倍
  - 与以往产品相比, 抑制了毛刺并加工面良好
- High cost efficiency due to 4.5 times longer tool life and 1.5 times more insert edges.  
MRX prevented burr formation and improved surface finish.

(根据用户评价) User Evaluation

### SKD61(47-49HRC)



工具寿命  
2倍以上  
More than  
double tool life

- 模具零件 Mold parts •  $V_c = 125\text{m/min}$  •  $f_z = 0.25\text{mm/t}$
- $ap \times ae = 1.0 \sim 2.0 \times 10\text{mm}$  • 干式 Dry
- MRX20-S20-08-2T(2枚刃) 2 edges • RDGT0803M0ER-GM(PR1525)

PR1525

2个以上 寿命安定  
2 pcs and more

以往产品  
Conventional

1个 寿命不安定  
1 pc (unstable tool life)

- 以往产品因寿命不稳定1个为界限, MRX可实现稳定加工寿命提高2倍以上
- Conventional tool machined only 1 pc of workpiece due to unstable tool life, but MRX doubled the tool life with stable machining.

(根据用户评价) User Evaluation

## 2种iPhone应用程序, 为客户生产效率提高做出贡献。



### 切削条件计算器

帮助铣削、钻孔、车削相关计算。  
可导出加工时间, 所以在计算出节拍时间方面也有帮助。



### 其他公司型号对照表

从其他公司材质、断屑槽型号筒单导向京瓷相应产品。  
可检索在适合不同加工条件的结果。

程序免费

App Store中获取!

在App Store中输入“京瓷”检索相应程序。  
※App Store为美国apple.inc.的注册商标。  
※iPad可利用。

可在京瓷网站阅取最新信息。

京瓷 切削工具

检索

<http://www.kyocera.com.cn/prdct/cuttingtool/index.html>

## 各种APP应用程序, 为客户生产效率提高做出贡献。

搜索“京瓷切削工具”或扫描下方二维码下载 APP 应用

iPhone



iPad



Android



还可在京瓷网站阅取最新信息。 <http://www.kyocera.com.cn/prdct/cuttingtool/index.html>



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