KORLOY
TECH-NEWS

RM6



Double-Sided 6-Corner Shoulder Milling Tool

Milling tool series for high quality surface finish and cost efficiency

- **Higher Productivity**
  Designed to provide high speed and feed improves chip removal rates
- **Improved Perpendicularity**
  True perpendicular milling
- **Superior Clamping Stability**
  Powerful clamping thanks to strong clamping screws and 3-side flank supporting system



KORLOY

Double-Sided 6-Corner Shoulder Milling Tool

RM6



Insert



Cutter



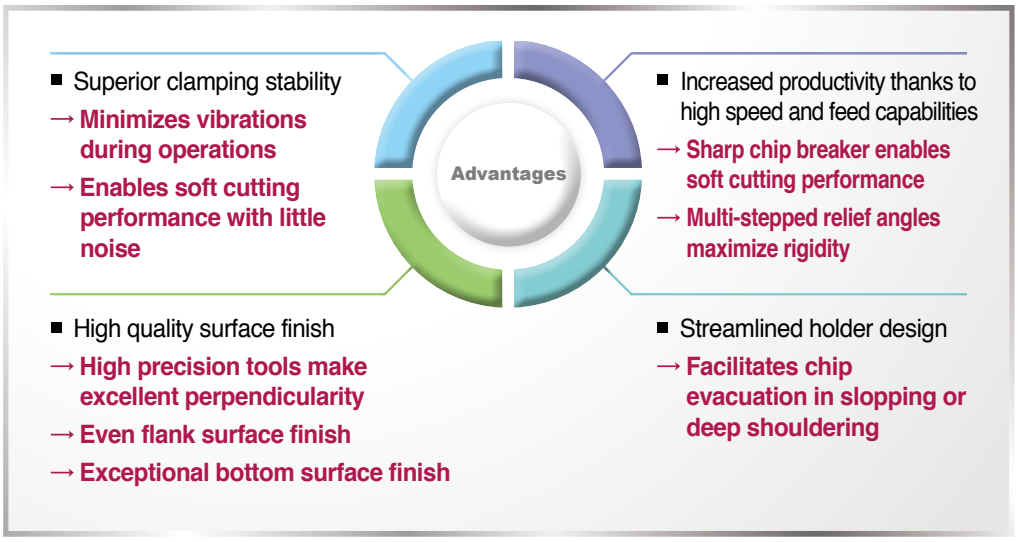
Shank

Mold making companies are required to keep up with the demands of the accelerated development of Industrial structures.

RM6, KORLOY's new Rich Mill Series for shouldering responds to these demands by employing double-sided inserts with six perpendicular corners to achieve cost efficiency.
It features strong clamping screws, 3-side supporting system, and wide clamping areas which enable powerful clamping force. This facilitates stable machining at high speed and feed, and delivers higher productivity.

Wide minor cutting edges and optimized multi-stepped relief surfaces of the RM6 provide exceptional bottom surface finish. The RM6 achieves perpendicularity and improved flank surface finish. The chip breaker design high rake and high helix angle were applied to the inserts for stable cutting performance in hard-to-cut materials or high hardened workpieces, achieving an increase in tool life.

KORLOY's RM6 is one of the most advanced shouldering solutions available to meet the demand of the mold making market today.



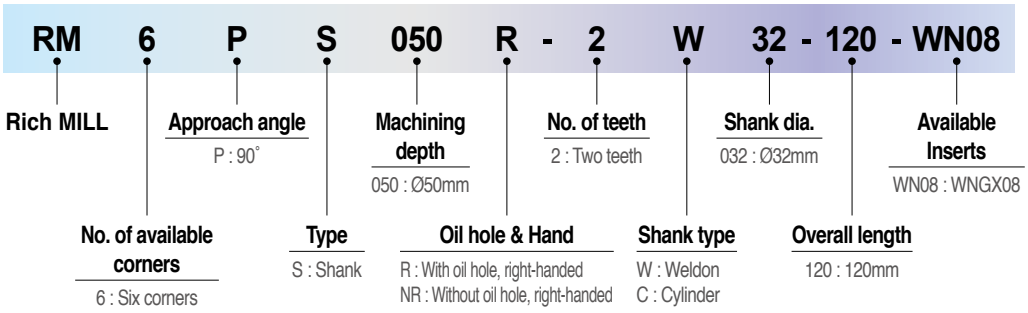
Code System

[Insert shape]

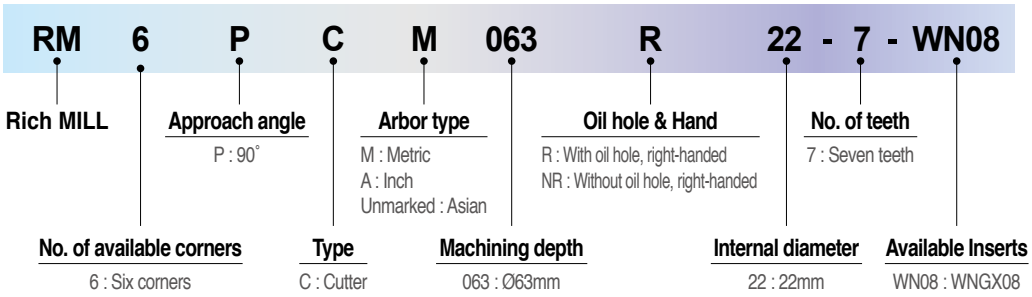
W	N	G	X	08	06	08	P	N	S	R	-	MM
Insert shape W : W Type	Relief angle of major cutting edge N : 0˚	Tolerance G : G class	Cross section type X : X Type	Cutting edge length 08 : 8.2mm	Cutting edge height 06 : 6.4mm	Nose radius 08 : R0.8	Approach angle P : 90˚	Relief angle of minor cutting edge N : 0˚	Edge preparation S : Negative land honed E : Honing	Hand R : Right-handed		Chip breaker MM : For general cutting ML : For light cutting

Code System

[Shank Type]



[Cutters type]



RM6 Features

- **Stable clamping -** 3 clamping surfaces on the side and strong clamping screws
  → Improves cutting stability
- **High quality results -** High precision, excellent perpendicularity, outstanding surface finish on the flank, accurate tolerance
- **High productivity -** High rake angle and sharp cutting edges for lower cutting resistance
  → Ideal for high speed and high feed machining

Insert Features

Higher clamping stability

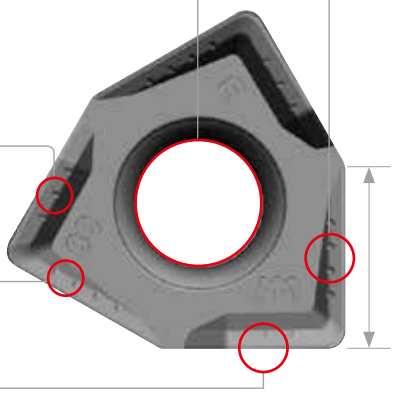
- Wide clamping areas and strong clamping screws for rigid clamping

High rake angle chip breaker

- Maintains stable clamping
- Induces smooth chip flow
  → Increases insert life

Wide minor cutting edges

- Improved surface finish
- Enable multi purpose machining incl. plunging

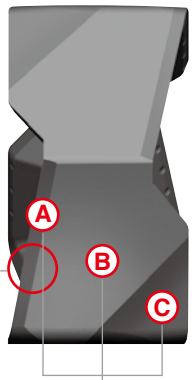


High rake cutting edges

- Improved machinability and reduces cutting resistance

Max. ap

- WNGX08 : 8.2mm
- WNGX04 : 4.3mm

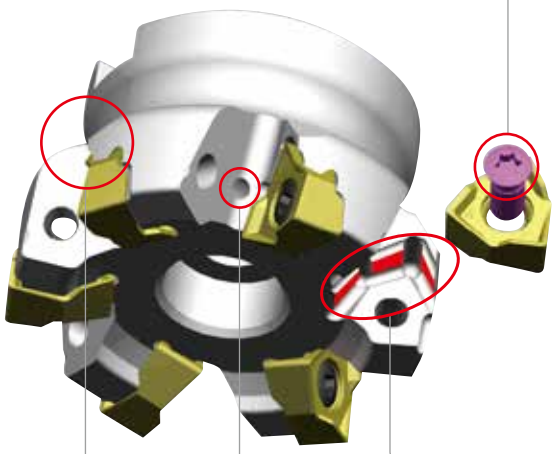


3-level flank relief surface

- Enhances rigidity and enables stable clamping
  → Improves cutting stability

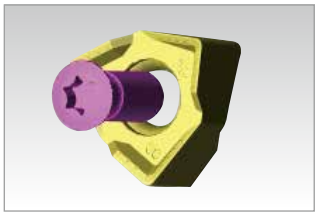
Cutter Features

- 3-side supporting system, strong clamping screws, and wide seat areas
  → **Improve clamping stability**
  → **Reduce tool vibrations and cutting resistance**
- Optimized H/D design with curved surface for smooth chip flow
  → **Facilitates chip evacuation in slopping or deep shouldering**



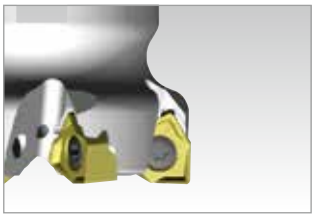
Strong clamping screws

- Strong clamping screws enable rigid clamping



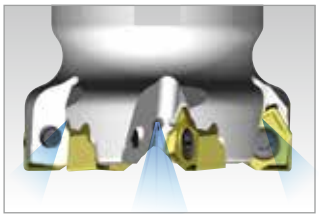
Streamlined holder design

- Improved chip evacuation in deep shouldering and slotting



Through coolant system

- Improved chip flow and tool life thanks to insert cooling



3-side supporting system

- Stable tool life



Chip Breaker Features

- Chip breaker **MA**

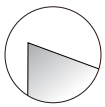
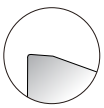
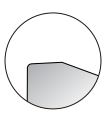


- Chip breaker **ML**



- Chip breaker **MM**



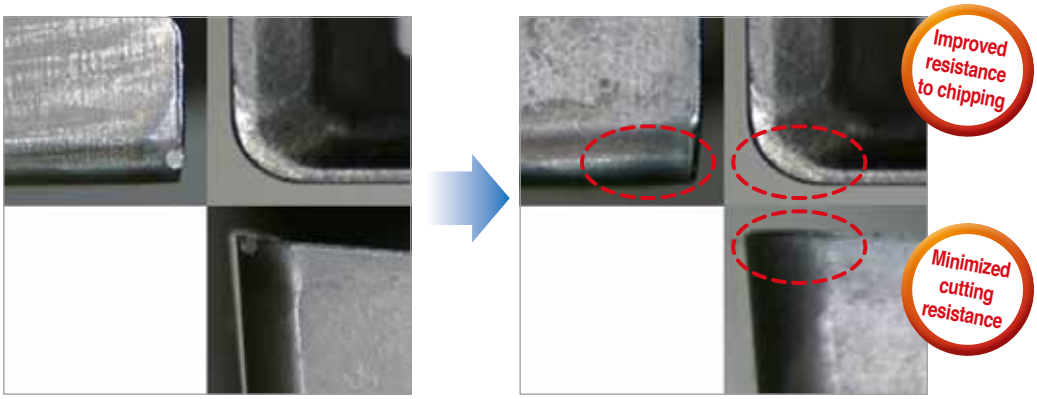
Chip breaker	Cutting edge	Application	Features
MA		For aluminum	■ MA : Milling Aluminum ■ Sharp cutting edges for excellent cutting performance in aluminum machining ■ Buffed surface for excellent chip flow and welding resistance
ML		For light cutting	■ ML : Milling Light ■ Chip breaker design of low cutting resistance, ideal for light cutting and machining hard-to-cut materials ■ Excellent tool life and quality results
MM		For general cutting	■ MM : General shouldering operations ■ Chip breaker design ideal for general shoulder milling and most applications

Performance Evaluation

- **Workpiece** 42CrMo4(DIN), SCM440(KS), 4140(AISI), 300(L)x200(W)x100(H), Steel rectangular tube
- **Cutting conditions** vc(m/min)=250, fz(mm/t)=0.2, ap(mm)=4, ae(mm)=10, Dry
- **Machining method** Facing
- **Tools** Insert WNGX080608PNSR-MM(PC5300) Holder RM6PCM063R-22-6-WN08

- Chipping resistance has improved thanks to stable clamping even at high speed
  → **Minimized unexpected tool breakage**
- Sharp cutting edges and streamlined chip breaker design
  → **Minimized cutting resistance**

Wear resistance evaluation

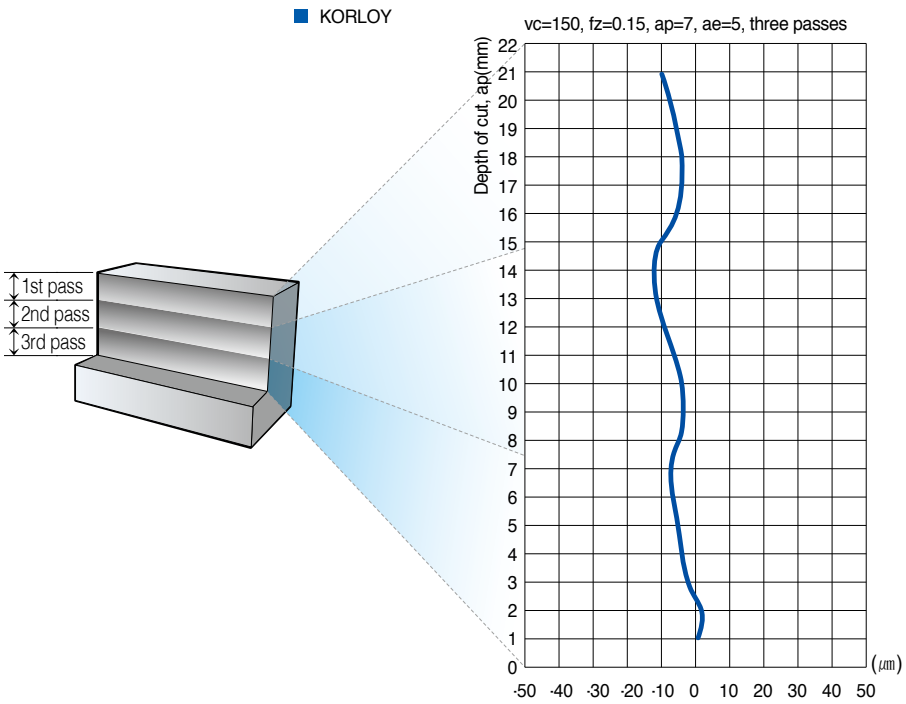


[Competitor] [RM6]

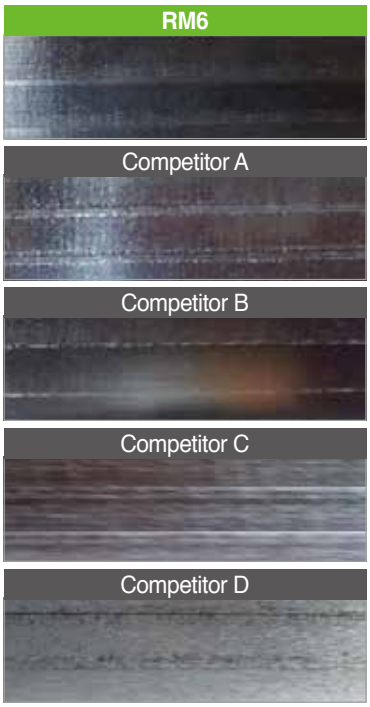
Perpendicularity Evaluation

- **Workpiece** C45(ISO), SM45C(KS), 1045(AISI), 300(L)x200(W)x100(H), Steel rectangular tube
- **Cutting conditions** vc(m/min)=150, fz(mm/t)=0.15, ap(mm)=7, ae(mm)=5, Dry
- **Machining method** Perpendicularity, flank surface finish, and unevenness were measured after three passes of 7mm each, and 21mm in total
- **Tools** Insert WNGX080608PNSR-MM(PC5300) Holder RM6PCM063R-22-6-WN08

Perpendicularity evaluation

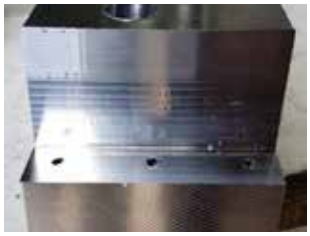


[Comparison graph of measured perpendicularities]



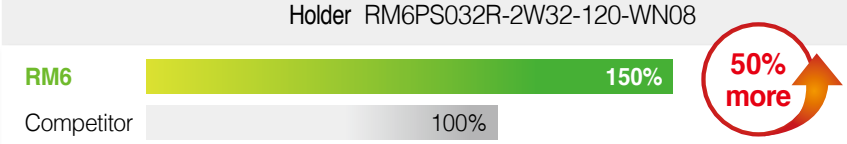
[Comparison pictures of flank surface finish]

Application Examples



Carbon steel [C45(ISO), HB180]

- Cutting conditions: vc(m/min)=250, fz(mm/t)=0.12, ap(mm)=7, ae(mm)=2, Dry
- Machining method: Shouldering
- Tools: Insert WNGX080608PNSR-MM(PC5300)
  Holder RM6PS032R-2W32-120-WN08

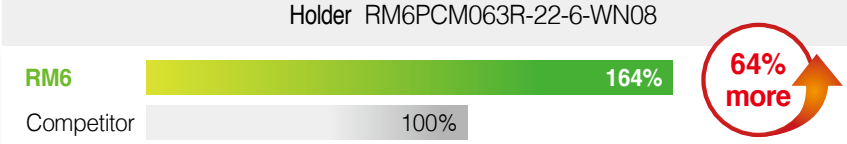


50% longer tool life compared to the competitor



Cold forged tool steel [X100CrMoV5 1(DIN), HB255]

- Cutting conditions: vc(m/min)=235, fz(mm/t)=0.28, ap(mm)=2, ae(mm)=5, Dry
- Machining method: Shouldering
- Tools: Insert WNGX080608PNER-ML(PC5300)
  Holder RM6PCM063R-22-6-WN08

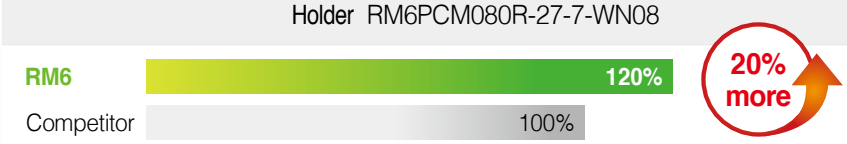


64% longer tool life compared to the competitor



Cast iron [600-3(ISO), HB230]

- Cutting conditions: vc(m/min)=226, fz(mm/t)=0.19, ap(mm)=1, ae(mm)=75, Dry
- Machining method: Facing
- Tools: Insert WNGX080608PNER-ML(PC5400)
  Holder RM6PCM080R-27-7-WN08



20% longer tool life compared to the competitor



Grade Guideline per Workpiece Type

Cutting conditions \ Workpiece		P		M	K	N
		Carbon steel	Alloy steel	Stainless steel	Cast iron	Non ferrous metal
Shape	1st recommended	MM	MM	ML	ML	MA
	2nd recommended	ML	ML	-	MM	MA
Grade	High speed milling	PC3600	PC3600	PC5300	PC6510	H01
	General milling	PC5400	PC5300	PC5400	PC5300	H01
	Interrupted milling	PC5400	PC5400	PC5400	PC5400	H01

Recommended Cutting Conditions

WNGX04

Workpiece		Grade	WNGX040304PNSR-MM			WNGX040304PNER-ML			WNGX040304PNFR-MA		
			vc (m/min)	fz (mm/t)	max. ap(mm)	vc (m/min)	fz (mm/t)	max. ap(mm)	vc (m/min)	fz (mm/t)	max. ap(mm)
P	Steel	PC3600	160~270	0.25~0.05	4.3	160~270	0.20~0.05	4.3	-	-	4.3
		PC5300	150~240	0.25~0.05	4.3	150~240	0.25~0.05	4.3	-	-	4.3
		PC5400	130~210	0.25~0.05	4.3	130~210	0.25~0.05	4.3	-	-	4.3
M	Stainless steel	PC5300	90~150	0.20~0.05	4.3	90~150	0.10~0.05	4.3	-	-	4.3
		PC5400	70~120	0.20~0.05	4.3	70~120	0.10~0.05	4.3	-	-	4.3
K	Cast iron	PC6510	140~230	0.30~0.08	4.3	140~230	0.25~0.08	4.3	-	-	4.3
		PC5300	120~200	0.30~0.08	4.3	120~200	0.25~0.08	4.3	-	-	4.3
N	Non ferrous metal	H01	-	-	4.3	-	-	4.3	500~1000	0.2~0.05	4.3

※ The above data refer to general cutting conditions and can be adjustable up to 300m/min and 0.4mm/t depending on user environment.

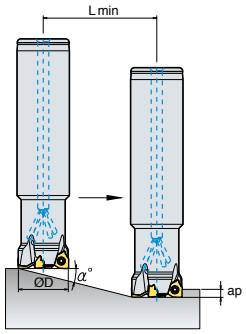
WNGX08

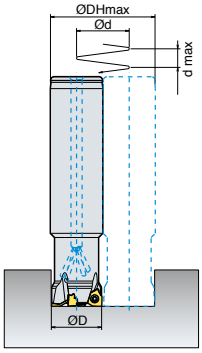
Workpiece		Grade	WNGX080608PNSR-MM			WNGX080608PNER-ML			WNGX080608PNFR-MA		
			vc (m/min)	fz (mm/t)	max. ap(mm)	vc (m/min)	fz (mm/t)	max. ap(mm)	vc (m/min)	fz (mm/t)	max. ap(mm)
P	Steel	PC3600	160~270	0.25~0.05	8.2	160~270	0.20~0.05	8.2	-	-	8.2
		PC5300	150~240	0.25~0.05	8.2	150~240	0.25~0.05	8.2	-	-	8.2
		PC5400	130~210	0.25~0.05	8.2	130~210	0.25~0.05	8.2	-	-	8.2
M	Stainless steel	PC5300	90~150	0.20~0.05	8.2	90~150	0.10~0.05	8.2	-	-	8.2
		PC5400	70~120	0.20~0.05	8.2	70~120	0.10~0.05	8.2	-	-	8.2
K	Cast iron	PC6510	140~230	0.30~0.08	8.2	140~230	0.25~0.08	8.2	-	-	8.2
		PC5300	120~200	0.30~0.08	8.2	120~200	0.25~0.08	8.2	-	-	8.2
N	Non ferrous metal	H01	-	-	8.2	-	-	8.2	500~1000	0.2~0.05	8.2

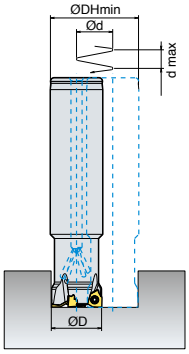
※ The above data refer to general cutting conditions and can be adjustable up to 300m/min and 0.4mm/t depending on user environment.

Ramping

1. Ramping	2. Helical cutting for blind holes	3. Helical cutting for through holes







(mm)

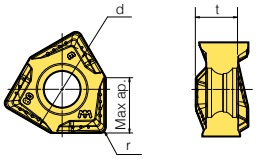
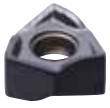
Designation		Tool Dia. ØD	Depth of cut ap	1. Ramping		2. Helical cutting for blind holes				3. Helical cutting for through holes	
				Max. rake angle α°	Lmin	Min. machining Dia. Ø DHmin	Max. pitch dmax	Max. machining Dia. Ø DHmax	Max. pitch dmax	Min. machining Dia. Ø DHmin	Max. pitch dmax
RM6PS	032R-2W32-120-WN08	32	8	4.6	99.5	53	4.5	62	5.2	38.5	3.2
	040R-3W32-120-WN08	40	8	4.2	109	69	5.3	78	6.0	54.5	4.2
	050R-4W32-120-WN08	50	8	4.0	114.5	89	6.5	98	7.2	74.5	5.5
RM6PCM	063R-22-6-WN08	63	8	4.0	114.5	115	8.0	124	8.0	100.5	7.4
	080R-27-7-WN08	80	8	3.5	131	149	8.0	158	8.0	134.5	8.0
	100R-32-8-WN08	100	8	2.6	176.5	189	8.0	198	8.0	174.5	8.0
	125R-40-11-WN08	125	8	1.8	255	239	8.0	248	8.0	224.5	7.8

* Make sure to use cutting fluids or air during ramping or hole making
Lmin = ap/tan(α°)

Lmin : Cutting length at min. rake angle
ap : Axial depth of cut
α° : Available rake angle for ramping

Available Inserts

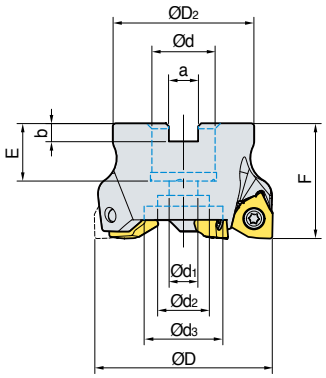
(mm)

Shape	Designation		Coated				Uncoated	Dimensions (mm)				Figure
			PC3600	PC5300	PC5400	PC6510	H01	d	t	r	Max. ap	
	WNGX	040304PNFR-MA						7.0	3.46	0.4	4.3	
		040308PNFR-MA						7.0	3.46	0.8	4.3	
		040312PNFR-MA						7.0	3.46	1.2	4.3	
		040316PNFR-MA						7.0	3.46	1.6	4.3	
		080604PNFR-MA						13.0	6.4	0.4	8.2	
		080608PNFR-MA					●	13.0	6.4	0.8	8.2	
		080612PNFR-MA						13.0	6.4	1.2	8.2	
		080616PNFR-MA						13.0	6.4	1.6	8.2	
		080620PNFR-MA						13.0	6.4	2.0	8.2	
	WNGX	040304PNER-ML						7.0	3.46	0.4	4.3	
		040308PNER-ML						7.0	3.46	0.8	4.3	
		040312PNER-ML						7.0	3.46	1.2	4.3	
		040316PNER-ML						7.0	3.46	1.6	4.3	
		080604PNER-ML	●	●	●			13.0	6.4	0.4	8.2	
		080608PNER-ML	●	●	●			13.0	6.4	0.8	8.2	
		080612PNER-ML						13.0	6.4	1.2	8.2	
		080616PNER-ML						13.0	6.4	1.6	8.2	
		080620PNER-ML						13.0	6.4	2.0	8.2	
	WNGX	040304PNSR-MM						7.0	3.46	0.4	4.3	
		040308PNSR-MM						7.0	3.46	0.8	4.3	
		040312PNSR-MM						7.0	3.46	1.2	4.3	
		040316PNSR-MM						7.0	3.46	1.6	4.3	
		080604PNSR-MM	●	●				13.0	6.4	0.4	8.2	
		080608PNSR-MM	●	●				13.0	6.4	0.8	8.2	
		080612PNSR-MM						13.0	6.4	1.2	8.2	
		080616PNSR-MM						13.0	6.4	1.6	8.2	
		080620PNSR-MM						13.0	6.4	2.0	8.2	

Cutters

Facing | Shouldering | Slotting | Ramping | Helical Cutting | Plunging | AA 90°





(mm)

Designation			ØD	ØD2	Ød	Ød1	Ød2	Ød3	a	b	E	F	ap	kg
RM6PCM	040R-16-6-WN04	6	40	35	16	9	14	-	8.4	5.6	19	40	4.3	0.19
	040R-16-7-WN04	7	40	35	16	9	14	-	8.4	5.6	19	40	4.3	0.19
	050R-22-8-WN04	8	50	42	22	11	18	-	10.4	6.3	20	40	4.3	0.28
	050R-22-9-WN04	9	50	42	22	11	18	-	10.4	6.3	20	40	4.3	0.28
	063R-22-10-WN04	10	63	49	22	11	18	-	10.4	6.3	20	40	4.3	0.47
	063R-22-11-WN04	11	63	49	22	11	18	-	10.4	6.3	20	40	4.3	0.47
	050R-22-4-WN08	4	50	42	22	11	18	-	10.4	6.3	20	40	8.2	0.28
	050R-22-5-WN08	5	50	42	22	11	18	-	10.4	6.3	20	40	8.2	0.27
	063R-22-5-WN08	5	63	49	22	11	18	-	10.4	6.3	20	40	8.2	0.45
	063R-22-6-WN08	6	63	49	22	11	18	-	10.4	6.3	20	40	8.2	0.45
	080R-27-7-WN08	7	80	57	27	14	20	35	12.4	7	23	50	8.2	0.90
	080R-27-9-WN08	9	80	57	27	14	20	35	12.4	7	23	50	8.2	0.89
	100R-32-8-WN08	8	100	67	32	18	26	42	14.4	8	25	50	8.2	1.47
	100R-32-11-WN08	11	100	67	32	18	26	42	14.4	8	25	50	8.2	1.45
	125R-40-11-WN08	11	125	90	40	22	32	52	16.4	10	29	63	8.2	2.94
	125R-40-14-WN08	14	125	90	40	22	32	52	16.4	10	29	63	8.2	2.91
RM6PC	080R-25.4-7-WN08	7	80	57	25.4	14	20	35	9.5	6	25	50	8.2	0.91
	080R-25.4-9-WN08	9	80	57	25.4	14	20	35	9.5	6	25	50	8.2	0.91
	100R-31.75-8-WN08	8	100	67	31.75	18	26	42	12.7	8	32	63	8.2	1.69
	100R-31.75-11-WN08	11	100	67	31.75	18	26	42	12.7	8	32	63	8.2	1.73
	125R-38.1-11-WN08	11	125	90	38.1	22	32	52	15.9	9	35	63	8.2	1.98
	125R-38.1-14-WN08	14	125	90	38.1	22	32	52	15.9	9	35	63	8.2	2.90

Available Arbors

Cutter designation		NC arbors
RM6PCM	040R-16-6-WN04	BT□□-FMC16-□□
	040R-16-7-WN04	
	050R-22-8-WN04	BT□□-FMC22-□□
	050R-22-9-WN04	
	063R-22-10-WN04	
	063R-22-11-WN04	
	050R-22-4-WN08	
	050R-22-5-WN08	
	063R-22-6-WN08	
	063R-22-7-WN08	

Cutter designation		NC arbors
RM6PCM	080R-27-7-WN08	BT□□-FMC27-□□
	080R-27-9-WN08	
	100R-32-8-WN08	BT□□-FMC32-□□
	100R-32-11-WN08	
	125R-40-11-WN08	BT□□-FMC40-□□
	125R-40-14-WN08	
RM6PC	080R-25.4-7-WN08	BT□□-FMA25.4-□□
	080R-25.4-9-WN08	
	100R-31.75-8-WN08	BT□□-FMA31.75-□□
	100R-31.75-11-WN08	
	125R-38.1-11-WN08	BT□□-FMA38.1-□□
	125R-38.1-14-WN08	

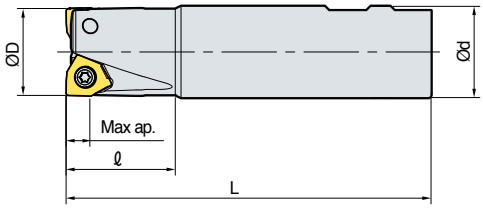
Parts

Specification		Screw	Wrench	Wrench
WNGX04	Ø40 ~ Ø63	ETNA02506	TW07S	-
WNGX08	Ø50 ~ Ø125	FTNA0512	-	TW20-100

Shanks

Facing | Shouldering | Slotting | Ramping | Helical Cutting | Plunging | AA 90°





(mm)

Designation			ØD	Ød	ℓ	L	ap	kg
RM6PS	020R-2W20-110-WN04	2	20	20	35	110	4.3	0.22
	020R-3W20-110-WN04	3	20	20	35	110	4.3	0.22
	025R-3W25-110-WN04	3	25	25	35	110	4.3	0.36
	025R-4W25-110-WN04	4	25	25	35	110	4.3	0.35
	032R-5W32-110-WN04	5	32	32	35	110	4.3	0.60
	025R-6W32-110-WN04	6	32	32	35	110	4.3	0.60
	032R-2W32-120-WN08	3	32	32	40	120	8.2	0.65
	040R-3W32-120-WN08	3	40	32	40	120	8.2	0.69
	040R-4W32-120-WN08	4	40	32	40	120	8.2	0.69
	050R-4W32-120-WN08	4	50	32	40	120	8.2	0.76
	050R-5W32-120-WN08	5	50	32	40	120	8.2	0.76

Parts

Specification		Screw	Wrench	Wrench
WNGX04	Ø20 ~ Ø53	ETNA02506	TW07S	-
WNGX08	Ø32 ~ Ø50	FTNA0512	-	TW20-100

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