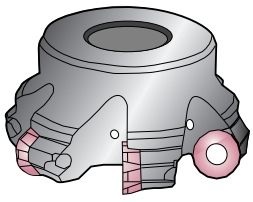
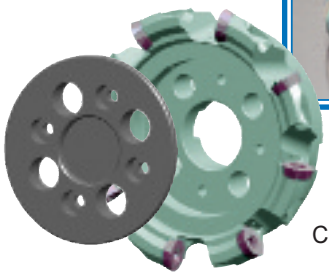
High Performance 16 Corner Polygon Insert Cutter

"Wave Radius Mill" WRCX Type

- High feed rates
- Vibration free machining
- Excellent Surface finish
- Low cutting force





Coolant cap (CCAP-160) is available for cutter ø160.

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Wave Radius Mill
WRCX Type

High Durable Mill with Polygon Inserts

Grades for Steels, Cast Iron and Aluminium

Features

The "Wave Mill" WRCX type is a new multi purpose milling cutter for face milling, slotting, helical boring, plunging and profiling. Its unique design features 16 corner polygon inserts and a durable cutter body manufactured from high tensile alloyed steel protected by a hard surface treatment. Insert rigidity is maximised via close tolerance seat pockets and centre clamped using a torxscrew . Choose from a variety of insert grades such as our award winning Diamond like Carbon DL 1000 capable of high feed machining aluminium, our uncoated H1 grade suitable for non-ferrous metals or our new ACP/ACK grades for steels and irons.

Advantages

- Durable cutter body – Special alloyed steel with hard surface.
- High feed cutting – Optimised pitch and high number of cutting edges
- Excellent chip removal – Wide pocket and integral coolant hole
- Maximum rigidity – Rigid clamping of inserts with TORXPLUS screw
- Wide application range – Carbon steels, alloy steels, stainless steels, high temperature alloys, diemould steels, aluminiums, non-ferrous metals etc

Insert

● QPMT... : Standard 16 cornered polygon type
QPMT...-H : Stronger cutting edge type

New ● QPET...-S : Polished round insert for non-ferrous material

Fig. 1

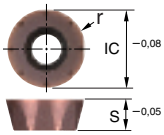
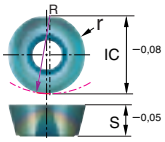


Fig. 2



Rake angle: 25°

4 corners use

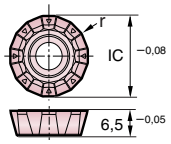
R : wiper radius

Cat. No.	Coated carbide					Diamond coated	Uncoated carbide	IC (mm)	r (mm)	s (mm)	Max. d_{oc}		Fig.
	ACP100	ACP200	ACP300	ACK200	ACK300	DL1000	H1				4 corners application	8 corners application	
QPMT 080330 PPEN	●	●	●	●	●			8	3,0	3,18	3,8	1,0	❶
QPMT 080330 PPEN-H	●	●	●	●	●								
QPMT 10T335 PPEN	●	●	●	●	●			10	3,5	3,97	4,7	1,2	❶
QPMT 10T335 PPEN-H	●	●	●	●	●								
QPET 10T350 PPFR-S						●	●		5,0			–	❷
QPMT 120440 PPEN	●	●	●	●	●			12	4,0	4,76	5,6	1,5	❶
QPMT 120440 PPEN-H	●	●	●	●	●								
QPET 120460 PPFR-S						●	●		6,0			–	❷
QPMT 160660 PPEN	●	●	●	●	●			16	6,0	6,5	7,6	2,1	❶
QPMT 160660 PPEN-H		●	●	●	●								
QPET 160680 PPFR-S						●	●		8,0			–	❷
QPMT 200670 PPEN	●	●	●	●	●			20	7,0	6,5	9,4	2,5	❶
QPMT 200670 PPEN-H	●	●	●	●	●								

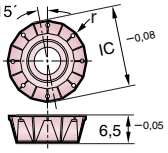
● = Euro stock
❍ = Delivery on request

● Anti-Vibration Type (Paired Sets for Vibration Free Machining)

Type 08



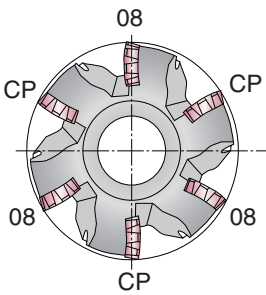
Type CP

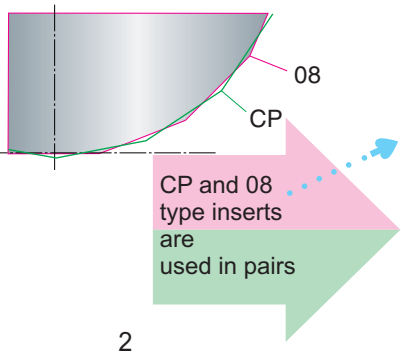


Cat. No.	Coated carbide					Diamond coated	Uncoated carbide	IC (mm)	r (mm)	s (mm)	Max. d_{oc}		Insert type
	ACP100	ACP200	ACP300	ACK200	ACK300	DL1000	H1				4 corners application	8 corners application	
QPMT 160608 PPEN	●	●	●	●	●			16	0,8	6,5	7,6	1,2	08
QPMT 200608 PPEN	●	●	●	●	●			20			9,4	1,6	
QPMT 160608 PPEN-CP	●	●	●	●	●			16	0,8	6,5	7,6	2,3	CP
QPMT 200608 PPEN-CP	●	●	●	●	●			20			9,4	2,9	

The combination of different inserts in a staggered formation varies the cut depth and eliminates vibration when feed rate is

$f_t < 0,15$ (IC=16 mm)
or
$f_t < 0,2$ (IC=20 mm).





● Chip Formation

Anti-vibration Type	Standard Type
	

Work material: 50C
Cutting data: f_t = 0,1mm/tooth, d_{oc} = 7 mm
Insert size: IC = 20 mm

Wave Radius Mill
WRCX Type

Axial rake angle: - 3°
Radial rake angle: 0°

Fig. 1

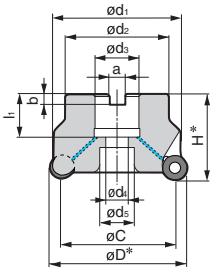


Fig. 2

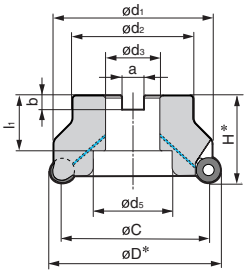
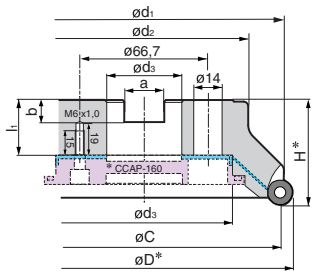


Fig. 3



* Note Fig.3 for øD=160 : Coolant cap (CCAP-160) with 4 screws (BX0620) and wrench (TH050) is available seperately.

■ Body

● Standard WRCX Type

Insert IC (mm)	Cat. No.	Stock	Dimensions (mm)					Mounting						No. of teeth	Helical boring øB Standard	Plunging α max.	Weight (Kg)	Fig.
			ø D*	ø C	ød1	ød2	H*	a	b	ød3	ød4	ød5	l1					
12	WRCX 12040 RS	●	40	28	36	36	40	8,4	5,6	16	9	14	18	4	68 ± 11	10°	0,2	1
	WRCX 12050 RS	●	50	38	46	40	40	10,4	6,3	22	11	18	20	4	88 ± 11	7°	0,3	
	WRCX 12052 RS	●	52	40	48	40	40	10,4	6,3	22	11	18	20	5	92 ± 11	6°30´	0,3	
	WRCX 12063 RS	●	63	51	59	40	40	10,4	6,3	22	11	18	20	5	114 ± 11	5°	0,4	
	WRCX 12080 RS	●	80	68	76	55	50	12,4	7,0	27	13,5	20	25	6	148 ± 11	3°30´	0,9	
16	WRCX 16063 RS	●	63	47	50	50	40	10,4	6,3	22	11	18	20	3	110 ± 15	8°	0,4	1
	WRCX 16080 RS	●	80	64	70	55	50	12,4	7,0	27	13,5	20	25	4	144 ± 15	5°30´	0,8	
	WRCX 16100 RS	●	100	84	90	70	50	14,4	8,5	32	-	46	32	5	184 ± 15	4°	1,3	2
	WRCX 16125 RS	❍	125	109	115	80	63	16,4	9,5	40	-	56	38	5	234 ± 15	3°	2,4	

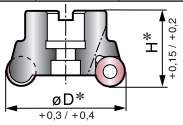
● Close Pitch WRCXF Type

Insert IC (mm)	Cat. No.	Stock	Dimensions (mm)					Mounting						No. of teeth	Helical boring øB Standard	Plunging α max.	Weight (Kg)	Fig.
			ø D*	ø C	ød1	ød2	H*	a	b	ød3	ød4	ød5	l1					
16	WRCXF 16052 RS	●	52	36	45	45	40	10,4	6,3	22	11	17,7	20	4	88 ± 15	10°	0,3	1
	WRCXF 16063 RS	●	63	47	50	50	40	10,4	6,3	22	11	18	20	4	110 ± 15	8°	0,4	
	WRCXF 16080 RS	●	80	64	70	55	50	12,4	7,0	27	13,5	20	25	5	144 ± 15	5°30´	0,8	
	WRCXF 16100 RS	●	100	84	90	70	50	14,4	8,5	32	-	46	32	6	184 ± 15	4°	1,3	2
	WRCXF 16125 RS	●	125	109	115	80	63	16,4	9,5	40	29	52	29	6	234 ± 15	3°	2,4	1
	WRCXF 16160 RS	●	160	144	150	100	63	16,4	9,5	40	-	93	29	8	304 ± 18	2°	4,0	3*
20	WRCXF 20080 RS	●	80	60	68	55	50	12,4	7,0	27	13,5	20	25	5	140 ± 18	7°	0,7	1
	WRCXF 20100 RS	●	100	80	88	70	50	14,4	8,5	32	-	46	32	6	180 ± 18	5°	1,1	2
	WRCXF 20125 RS	●	125	105	113	80	63	16,4	9,5	40	29	52	29	6	230 ± 18	3°30´	2,3	1
	WRCXF 20160 RS	●	160	140	148	100	63	16,4	9,5	40	-	93	29	8	300 ± 18	2°30´	3,9	3*

● Extra Close Pitch WRCXX Type

Insert IC (mm)	Cat. No.	Stock	Dimensions (mm)					Mounting						No. of teeth	Helical boring øB Standard	Plunging α max.	Weight (Kg)	Fig.
			ø D*	ø C	ød1	ød2	H*	a	b	ød3	ød4	ød5	l1					
16	WRCXX 16080 RS	●	80	64	70	55	50	12,4	7,0	27	13,5	20	25	6	144 ± 15	5°30´	0,8	1
	WRCXX 16100 RS	●	100	84	90	70	50	14,4	8,5	32	-	46	32	7	184 ± 15	4°	1,3	2

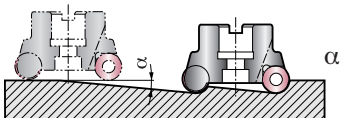
* Note : When using CP type anti-vibration inserts / IC = 16, please change above dimensions: øD* +0,3 & H* +0,15 mm
In case of anti-vibration inserts / IC = 20, please change above dimensions: øD* +0,4 & H* +0,2 mm



■ Maximum Rotation (min-1) for Non-ferrous cutting when using QPET Insert

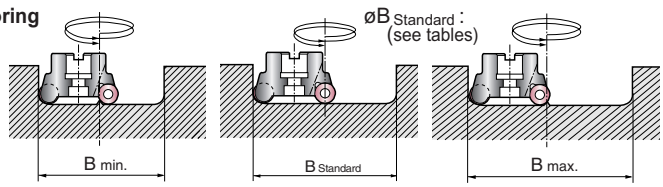
Tool ø D \ n	10	12	16
25	28.000		
32	25.000		
40		22.000	
50		20.000	14.000
63		18.000	13.000
80		16.000	12.000
100			10.000
125			9.000
160			8.000

Plunging



α max : (see tables)

Helical Boring



■ Spare Parts

Cutter		Screw	Screw
			
WRCX	12○○○	BFTX 0409 IP	TRDR 15 IP
WRCX/-F/-X	16052 ~ 16100	BFTX 0511 IP	TRDR 20 IP
	16125 ~ 16160	BFTX 0513 IP	
WRCX/-F	20○○○	BFTX 0615 IP	TRDR 25 IP

■ Recommended Cutting Conditions

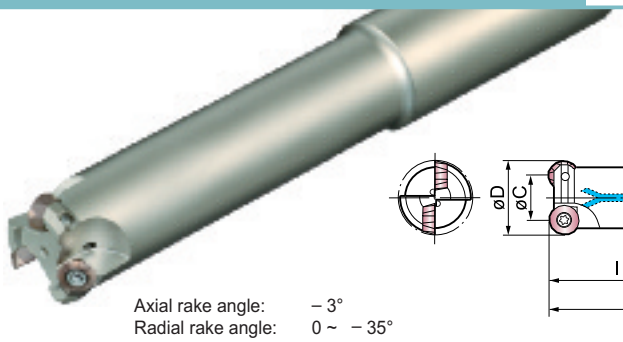
Material / Grade / øD (mm)		Carbon steel (ex. C40 ~ C50)	Alloy steel (Below HRC40)	Stainless steel (ex. X10CrNiS18-9)	Cast iron (ex. GG20)	Non-ferrous material
		ACP100, ACP200	ACP100, ACP200	ACP200, ACP300	ACK200, ACK300	DL1000, H1
40 ~ 80	v_c	100-**160**-200	100-**140**-180	80-**120**-160	80-**120**-160	200-**500**-1000
	f_t	0,2-**0,4**-0,6	0,2-**0,3**-0,4	0,1-**0,2**-0,3	0,1-**0,2**-0,4	0,1-**0,3**-0,4
100 ~ 160	v_c	150-**200**-250	100-**160**-200	160-**180**-200	100-**150**-200	200-**500**-1000
	f_t	0,3-**0,4**-0,6	0,1-**0,3**-0,5	0,15-**0,2**-0,3	0,1-**0,15**-0,2	0,2-**0,3**-0,6

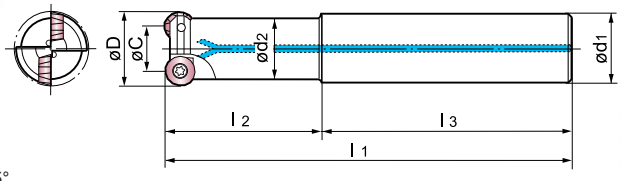
[v_c = m/min, f_t = mm/tooth] [min.– optimum – max.]

Wave Radius Mill
WRCX 08000/10000/12000 E

Multi Purpose Endmills with Polygon Inserts

Shank Type with Small Diameter Inserts





E_ : Cylindrical straight shank type

ES : **S**hort type with straight shank
EM : **M**iddle length type with straight shank
EL : **L**ong type with straight shank

Axial rake angle: – 3°
Radial rake angle: 0 ~ – 35°

Body

Spare Parts

Insert IC (mm)	Cat. No.	Stock	Dimensions (mm) øD	øC	ød1	ød2	l1	l2	l3	No. of teeth	Axial rake	Radial rake	Helical boring øB Standard	Plunging α max.		
	WRCX 08012 ES	●	12	-	12	9,4	110	40	70	1	-3°	-35°	–	0°30´	BFTX 02505 IP	TRDR 08 IP
	WRCX 08012 EM	●	12	-	12	9,4	150	70	80	1						
	WRCX 08016 ES	●	16	-	16	14	120	50	70	1	-3°	-10°	24^{+7}_{-4}	5°30´	BFTX 02506 IP	TRDR 08 IP
	WRCX 08016 EM	●	16	-	16	14	150	70	80	1						
	WRCX 08020 ES	●	20	12	20	18	130	50	80	2	-3°	-3°	32 ± 7	13°		
	WRCX 08020 EM	●	20	12	20	18	180	100	80	2						
8	**WRCX 08020 EL**	●	20	12	20	18	250	130	120	2						
	WRCX 08025 ES	●	25	17	25	21	130	50	80	3	-3°	0°	42 ± 7	8°20´		
	WRCX 08025 EM	●	25	17	25	21	180	100	80	3						
	WRCX 08025 EL	●	25	17	25	21	250	130	120	3						
	WRCX 10025 ES	●	25	15	25	21	130	50	80	2	-3°	0°	40 ± 8	13°10´	BFTX 03584 IP	TRDR 15 IP
	WRCX 10025 EM	●	25	15	25	21	180	100	80	2						
	WRCX 10025 EL	●	25	15	25	21	250	130	120	2						
	WRCX 10032 ES	●	32	22	32	28	130	50	80	3	-3°	0°	54 ± 8	8°		
10	**WRCX 10032 EM**	●	32	22	32	28	200	120	80	3						
	WRCX 10032 EL	●	32	22	32	28	300	180	120	3						

Recommended cutting conditions

[v_c = m/min, f_t = mm/tooth] [min.– optimum – max.]

Material / Grade / øD (mm)		Carbon steel (ex. C40 ~ C50)	Alloy steel (Below HRC40)	Stainless steel (ex. X10CrNiS18-9)	Cast iron (ex. GG20)	Non-ferrous material
		ACP100, ACP200	ACP100, ACP200	ACP200, ACP300	ACK200, ACK300	DL1000, H1
12 ~ 32	v_c	80-**120**-160	60-**100**-140	60-**100**-120	60-**80**-120	200-**500**-1000
	f_t	0,1-**0,3**-0,4	0,1-**0,2**-0,3	0,1-**0,15**-0,2	0,1-**0,2**-0,3	0,1-**0,2**-0,3

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CARBIDE - CBN - DIAMOND

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