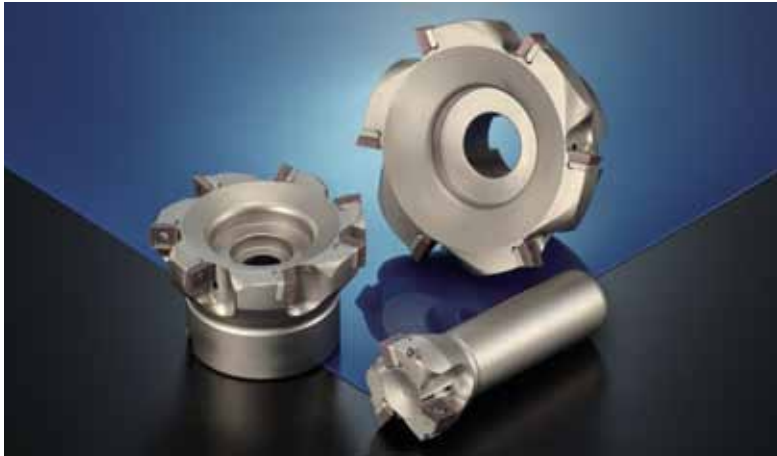


High Precision and High Quality 90°-Shoulder Milling Cutter

## **Wavemill WFX type / WFX-E type**



# 4-Cornered Shoulder Milling Cutter WFX (F) 1 2000 RS



## General Features

Wavemill Shoulder Milling Cutter WFX is a screw locking type cutter capable of using 4-cornered inserts. Ideal cutting edge design delivers superior squareness.

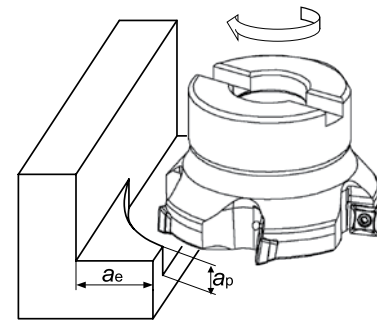
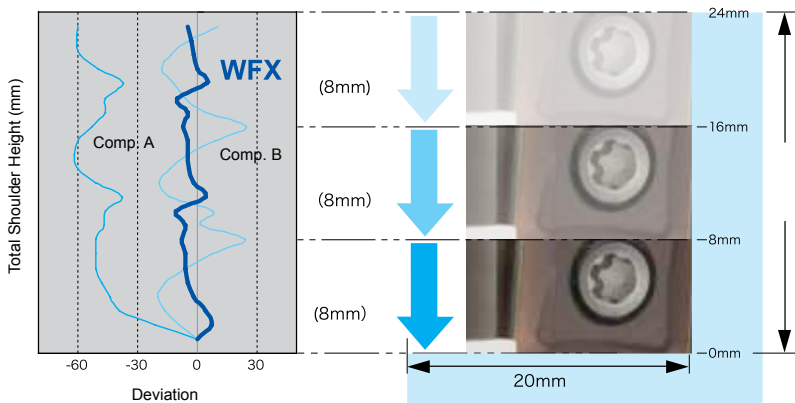
## Characteristics

The insert shape optimized for shoulder milling combined with a high-precision body leaves a superior machined surface finish.

- Maximum depth of cut 10 mm
- With oil hole (ø 125 mm or less)
- 3 chip breaker types (L-type / G-type / H-type)

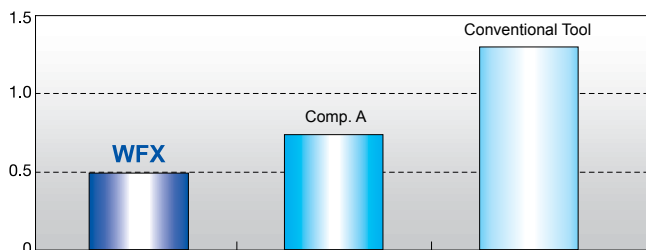
## Performance

### 1 • Squareness



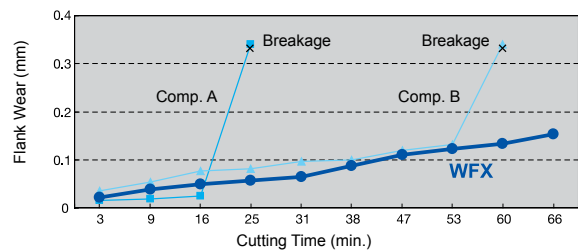
Work Material: C50  
Tool: WFX 1 21 00 RS (ø 100 mm x 5 Teeth)  
Cutting Conditions:  $v_c$ : 200 m/min  $a_e$ : 20 mm  
 $f_t$ : 0,15 mm/t  $a_p$ : 8 mm x 3 times

### 2 • Surface Finish



Work Material: 42CrMo4  
Tool: WFX 12 100 RS (5 Teeth)  
Cutting Conditions:  $v_c$ : 200 m/min  $f_t$ : 0,1 mm/t  $a_e$ : 90 mm  $a_p$ : 3 mm

### 3 • Wear Resistance



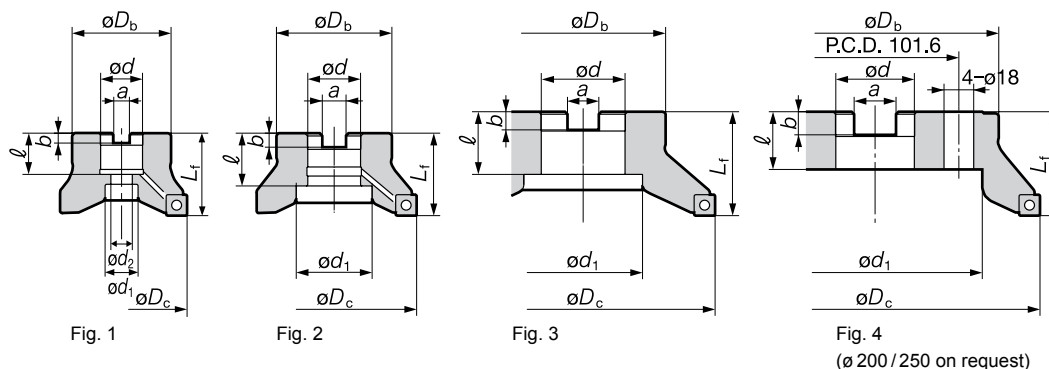
Work Material: 42CrMo4 Tool: WFX 12 100 RS (1 flute test)  
Cutting Conditions:  $v_c$ : 200 m/min  $f_t$ : 0,15 mm/t  
 $a_e$ : 30 mm  $a_p$ : 5 mm

## Product Range

Series	Type	Diameter	No. of Teeth	Image	
Shell Type	Standard	WFX RS 12000	ø40 ø50 ø63 ø80 ø100 ø125 ø160	3~8	
	Fine-Pitch	WFXF RS 12000		4~12	
Shank Type	Standard	WFX 12000E		3~4	
	Fine-Pitch	WFXF 12000E		4~6	

■ Shoulder Milling for Steel, Stainless Steel, Die Steel, Cast Iron, Non-Ferrous Alloys

Rake Angle	Radial	-8°	10mm	0°
	Axial	8°		



■ Body (Standard Type)

Cat. No.	Stock	Dimensions (mm)									No. of Teeth	Weight (kg)	Fig
		$\phi D_c$	$\phi D_b$	Lf	$\phi d$	a	b	l	$\phi d_1$	$\phi d_2$			
WFX 12050 RS	•	50	40	40	22	10,4	6,3	20	18	11	3	0,2	1
WFX 12063 RS	•	63	50	40	22	10,4	6,3	20	18	11	4	0,4	1
WFX 12080 RS	•	80	60	50	27	12,4	7	25	20	13,5	4	0,9	1
WFX 12100 RS	•	100	70	50	32	14,4	8,5	32	46	-	5	1,3	2
WFX 12125 RS	•	125	90	63	40	16,4	9,5	29	52	29	6	2,7	1
WFX 12160 RS	•	160	130	63	40	16,4	9,5	29	88	-	8	4,8	3

■ Body (Fine Pitch Type)

Cat. No.	Stock	Dimensions (mm)									No. of Teeth	Weight (kg)	Fig
		$\phi D_c$	$\phi D_b$	Lf	$\phi d$	a	b	l	$\phi d_1$	$\phi d_2$			
WFXF 12050 RS	•	50	40	40	22	10,4	6,3	20	18	11	4	0,2	1
WFXF 12063 RS	•	63	50	40	22	10,4	6,3	20	18	11	5	0,4	1
WFXF 12080 RS	•	80	60	50	27	12,4	7	25	20	13,5	6	0,9	1
WFXF 12100 RS	•	100	70	50	32	14,4	8,5	32	46	-	7	1,2	3
WFXF 12125 RS	•	125	90	63	40	16,4	9,5	29	52	29	8	2,6	1
WFXF 12160 RS	•	160	130	63	40	16,4	9,5	29	88	-	12	4,7	3

• Euro-Stock • Japan-Stock

Inserts are not included. Cutters  $\phi 160$  mm do not have coolant holes. Please use JISB1176 „hexagonal bolt“ ( $\phi 80$ : M12 x 30-35 mm,  $\phi 100$ : M16 x 40-45 mm) for securing the  $\phi 80$  or  $\phi 100$  mm cutter to the arbor.

■ Inserts

**P** Steel **M** Stainless Steel **K** Cast Iron

Grade	Coated Carbide				
High Speed/Light	<b>P</b>				<b>K</b>
General Purpose	<b>P</b>	<b>M</b>	<b>M</b>	<b>M</b>	<b>K</b>
Roughing	<b>P</b>	<b>M</b>	<b>M</b>	<b>M</b>	<b>K</b>
Cat.No.	ACP 100	ACP 200	ACP 300	ACK 200	ACK 300
SOMT 120408PDER-L	•	•	•	•	•
SOMT 120408PDER-G	•	•	•	•	•
SOMT 120408PDER-H	•	•	•	•	•

• Euro-Stock • Japan-Stock

■ Spare Parts

Applicable Cutters	Shim	Shim Screw	Insert Screw	Torque	Wrench (insert)	Wrench (shim)
WFX(F)12000 RS	WFXS4R	BW0507F	BFTX03512IP	3,0 N · m	TRDR15IP	LH035



■ Identification Details

**WFX F 12 050 R S**

Cutter Series Fine-Pitch Indication Insert Size Cutter Diameter Direction Metric

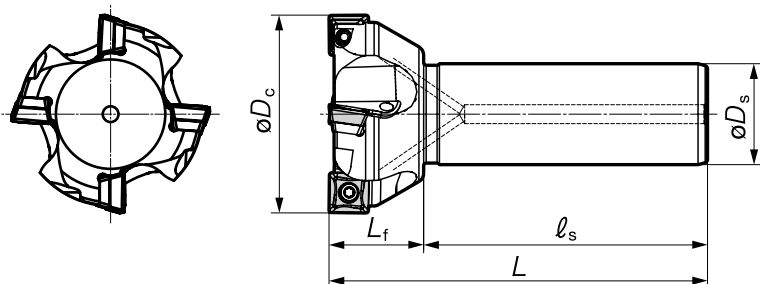
■ Recommended Cutting Conditions

ISO	Work Material	Good	Cutting Speed	Feed Rate	D.O.C.	Grades
<b>P</b>	General Steel	◎	150 200 250	0,1 0,15 0,2	< 10	ACP200 ACP300
		◎	180 265 350	0,1 0,15 0,2	< 10	ACP200 ACP300
	Die Steel	○	100 150 200	0,1 0,15 0,2	< 6	ACP200 ACP300
<b>M</b>	Stainless Steel	○	160 205 250	0,1 0,15 0,2	< 10	ACP300
		○	100 175 250	0,1 0,15 0,2	< 10	ACK200 ACK300

Cutting Speed and Feed Rate: Min. - Optimum - Max.

# WFX (F) 1 2000 E

- Shoulder Milling for Steel, Stainless Steel, Die Steel, Cast Iron, Non-Ferrous Alloys



## Body (Shank Type)

Cat. No.	Stock	Dimensions (mm)					No. of Teeth
		$\varnothing D_c$	$\varnothing D_s$	$L_f$	$l_s$	L	
WFX 12040E	•	40	32	30	90	120	3
WFX 12050E	•	50	32	30	90	120	3
WFX 12063E	◦	63	32	30	90	120	4
WFX 12080E	◦	80	32	30	90	120	4

## Body (Shank, Fine Pitched Type)

Cat. No.	Stock	Dimensions (mm)					No. of Teeth
		$\varnothing D_c$	$\varnothing D_s$	$L_f$	$l_s$	L	
WFXF 12050E	•	50	32	30	90	120	4
WFXF 12063E	◦	63	32	30	90	120	5
WFXF 12080E	◦	80	32	30	90	120	6

• Euro-Stock ◦ Japan-Stock  
 Inserts are not included.  $\varnothing 40$  mm cutters do not have a seat.

## Inserts

P Steel M Stainless Steel K Cast Iron

Application	Grade	Coated Carbide				
	High Speed / Light	P				
General Purpose		P	M	K		
	Roughing	P	M	K		
Cat.No.	ACP 100					
	ACP 200					
	ACP 300					
	ACK 200					
	ACK 300					
SOMT 120408PDER-L	◦	•	•	•	•	•
SOMT 120408PDER-G	◦	•	•	•	•	•
SOMT 120408PDER-H	◦	•	•	•	•	•

• Euro-Stock ◦ Japan-Stock

## Spare Parts

Applicable Cutters	Shim	Shim Screw	Insert Screw	Torque	Wrench (insert)	Wrench (shim)
WFX 12040 E	-	-	BFTX03512IP	3,0 N · m	TRDR15IP	-
WFX (F) 12000 E	WFXS4R	BW0507F	BFTX03512IP	3,0 N · m	TRDR15IP	LH035



## Identification Details

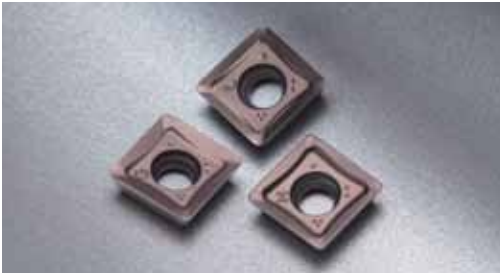
# WFX F 12 050 E

Cutter Series: P Fine-Pitch Indication: ◯ Insert Size: 265 Cutter Diameter: 50 Endmill

## Recommended Cutting Conditions

ISO	Work Material	Good	Cutting Speed	Feed Rate	D.O.C.	Grades	
P	General Steel	◎	150 200 250	0,1 0,15 0,2	< 10	ACP200 ACP300	
		Soft Steel	◎	180 265 350	0,1 0,15 0,2	< 10	ACP200 ACP300
			○	100 150 200	0,1 0,15 0,2	< 6	ACP200 ACP300
	Die Steel	○	160 205 250	0,1 0,15 0,2	< 10	ACP300	
		Stainless Steel	○	100 175 250	0,1 0,15 0,2	< 10	ACK200 ACK300
			Cast Iron	○	100 175 250	0,1 0,15 0,2	< 10

Cutting Speed and Feed Rate: Min. - Optimum - Max.

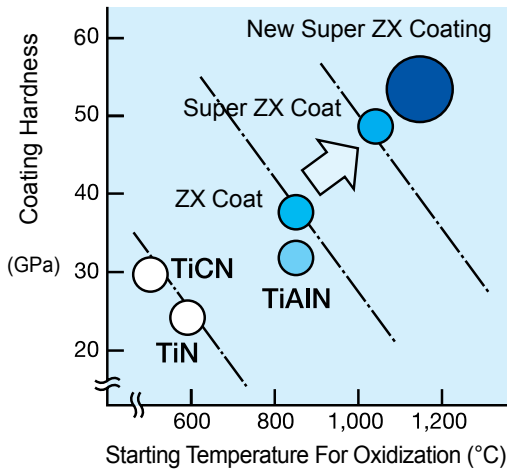


■ Grade

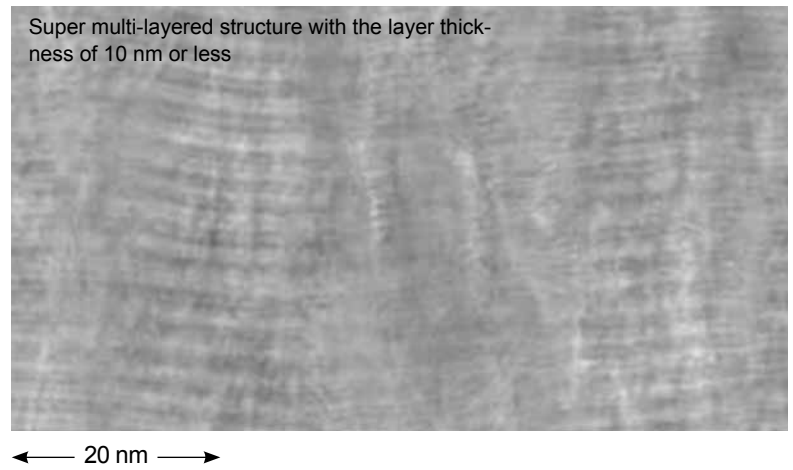
The WFX type is the first series to offer the newly developed multi-layer PVD coating structure on these grades: ACP200, ACP300 and ACK300.

With excellent resistance against wear, fracture and adhesion, the grades achieve 1,5 times longer tool life than conventional coating.

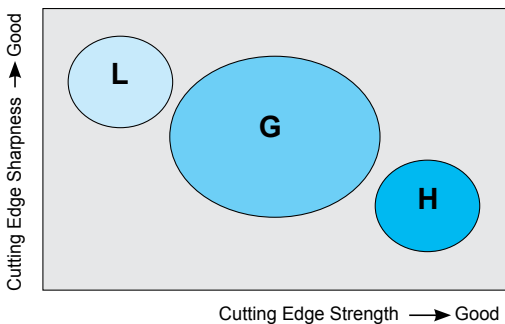
■ Characteristics of Coatings



■ Cross Sectional TEM Photo of Coating

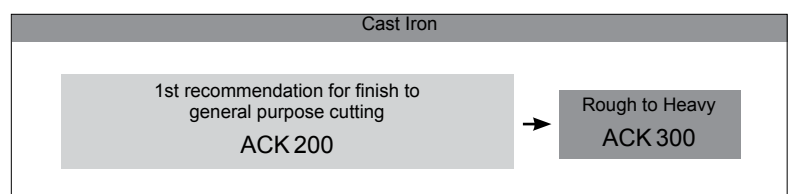
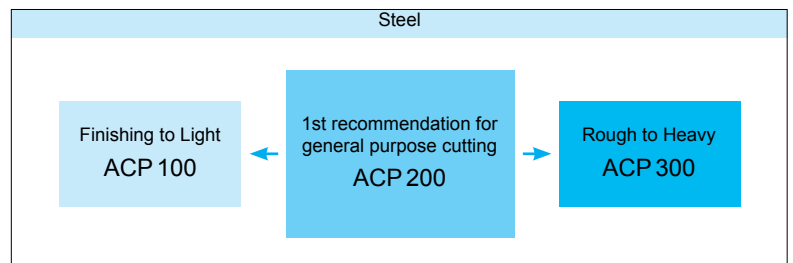
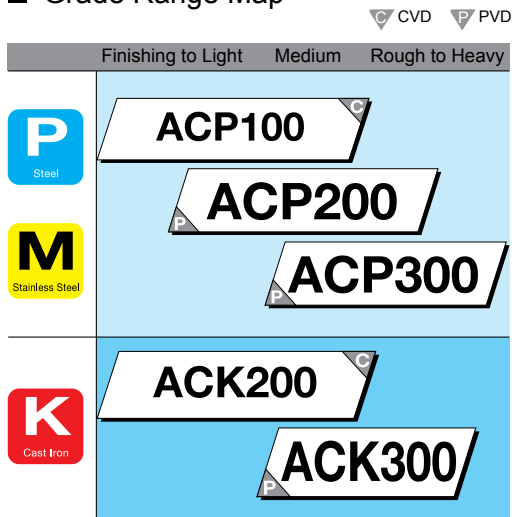


■ Chipbreaker Selection

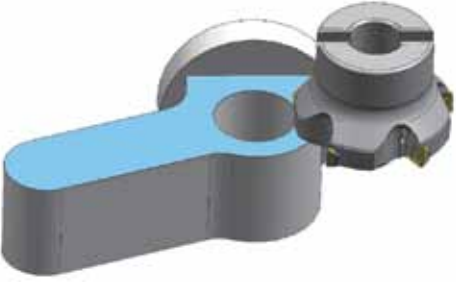



Work Material	Steel, Cast Iron		
	L	G	H
Breaker			
Feature	Low Cutting Force	General Purpose	Strong Edge
Insert Figure			
Application	Light cut, low rigidity milling and reduced burrs	Main breaker, General Purpose to interrupted milling	Roughing, heavy interrupted and hardened steel milling

■ Grade Range Map



■ Application Examples

Part / Work Material: Railways / GGG60 	Tool	Manufacturer	Sumitomo	Conventional Tool
		Body	WFX F 12 100 RS	ø 100
		Insert	SOMT 12-G	16
		Diameter	ø 100	ø 100
		No. of Teeth	7	8
	Cutting Conditions	Grade	ACK 300 (PVD)	(PVD)
		Cutting Speed (m / min.)	150	100
		Feed (mm / t)	0,1	0,1
		Axial Cutting Depth (mm)	2,5	2,0
		Cutting Width (mm)	50-100	50-100
Results	Dry / Wet			Dry
Machining efficiency is 1,3 times the conventional tool.				

Part / Work Material: Equipment / St44-2 	Tool	Manufacturer	Sumitomo	Conventional Tool
		Body	WFX 12 050 E	ø 50
		Insert	SOMT 12-G	12
		Diameter	ø 50	ø 50
		No. of Teeth	3	3
	Cutting Conditions	Grade	ACK 200 (PVD)	(PVD)
		Cutting Speed (m / min.)	135	135
		Feed (mm / t)	0,14	0,14
		Axial Cutting Depth (mm)	1,5	1,5
		Cutting Width (mm)	20	20
Results	Dry / Wet			Wet
Tool life is improved by 20% or more compared to the conventional tool.				

• Very hot or lengthy chips may be discharged while the machine is in operation. Therefore, machine guards, safety goggles or other protective covers must be used. Fire safety precautions must also be considered.

• Please handle with care as this product has sharp edges.  
 • Improper cutting conditions or mis-handling of the tool may result in breakages or projectiles. Therefore, please use the tool within its recommended conditions.

• When using non-water soluble cutting oil, precautions against fire must be taken and please ensure that a fire extinguisher is placed near the machine.



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