

High-Rake, General-Purpose Face Milling Cutter

SEC-WAVEMILL WGX series

Rev.11

**Unique chipbreaker design
achieves low cutting force and
high-quality surface finish**



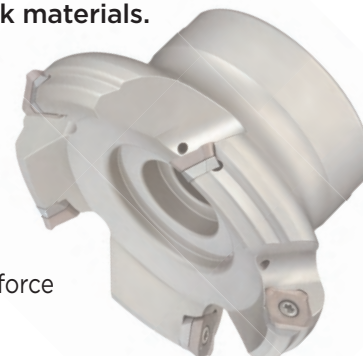
Coated Carbide Grades for Exotic Alloy Milling

Expansion**ACS1000/ACS2500/ACS3000 added to the WGX series lineup**



General Features

- Unique chipbreaker design achieves low cutting force and high-quality surface roughness compared to conventional tool.
- The ACS series, optimal for stainless steel and exotic alloy milling, has been expanded to offer a wide lineup of grades supporting various work materials.



Features

Reduced Cutting Force

- High-rake chipbreaker designed for use with the WGX series achieves low cutting force

High Quality

- Improved runout precision and unique wiper flat shape ensure excellent surface finish quality
- Additional edge chamfer reduces burrs and edge chipping

Wide Ranging Product Lineup

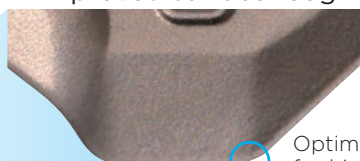
- A wide selection of grades along with 4 types of chipbreakers and wiper inserts are available.
- Can be used for a wide variety of machining applications.

Insert Shape Features

General-purpose G type Chipbreaker

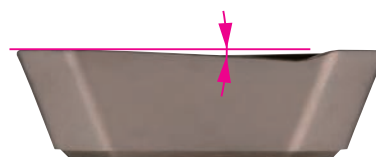


(1) Unique wiper edge shape for improved surface roughness



Optimal corner radius for high strength

(2) Large rake angle and cutting edge rake angle for improved sharpness



FG type Chipbreaker with Low-Burr Design



Additional edge chamfer reduces burrs on cutting surfaces

Product Range

Type	Cat. No.	Description	Dia. (mm)									
			ø32	ø40	ø50	ø63	ø80	ø100	ø125	ø160	ø200	ø250
Shell	WGX13000R Inch	Standard Pitch					4	5	6	7	8	10
	WGX13000RS	Standard Pitch		3	3	4	4	5	6	7	8	10
	WGXM13000R Inch	Fine Pitch					6	7	8	10	12	14
	WGXM13000RS	Fine Pitch			4	5	6	7	8	10	12	14
	WGXF13000R Inch	Extra Fine Pitch					8	10	12	16	20	24
	WGXF13000RS	Extra Fine Pitch			5	6	8	10	12	16	20	24
Shank	WGX13000EW	Shank type	3	3	4	5						

Number in ● shows the number of teeth Inch Bore Sizes of ø125mm and below have coolant holes



WGX 13000R(S)
Standard Pitch

WGX 13000R(S)
Fine Pitch



WGX 13000R(S)
Extra Fine Pitch

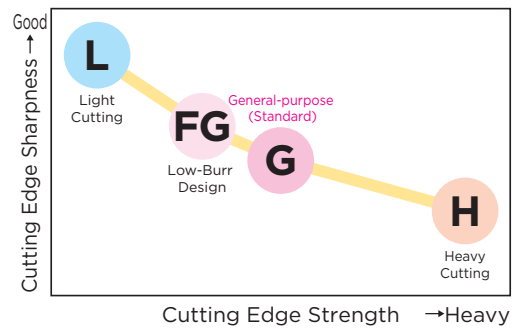


WGX 13000EW
Shank type

Chipbreaker Selection

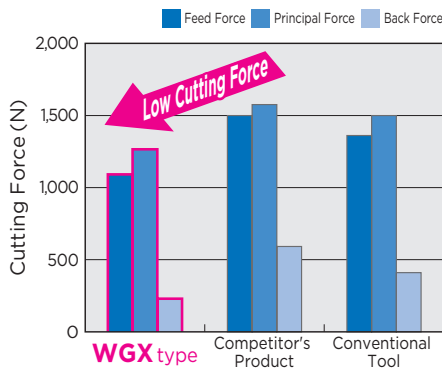
Work Material	P M K S N	P M K S			P K
Applications	Light Cutting	General-purpose/ Burr Prevention	General-purpose	Heavy Cutting	Surface Finish Emphasised
Features	Low Cutting Force	Standard / With Chamfer	Standard	High Strength	Wiper
Chipbreaker	L type	FG type	G type	H type	W type
Cutting Edge Cross Section					

Chipbreaker Selection Guide

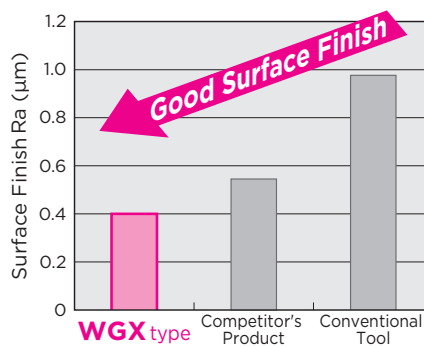


General-purpose G type Chipbreaker

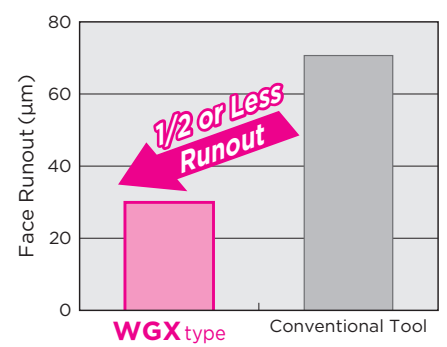
● Comparison of Cutting Force



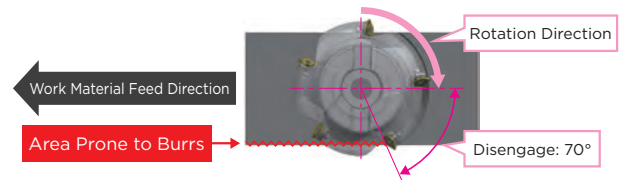
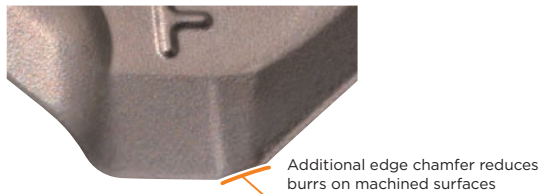
● Surface Finish Comparison



● Runout with Insert Attached



FG type Chipbreaker with Low-Burr Design



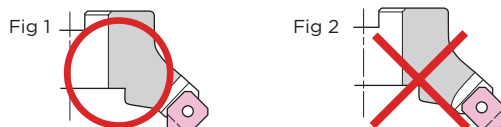
● Machined Surface Comparison

Work Material	FG type	G type	Conventional Tool	Competitor's Product
S50C				
SUS304				
SCM440				

Machine: Machining Centre BT50
Tool: WGX13100R ($\phi 100$),
Insert Grade: ACP200
Cutting Conditions:
 $vc = 200\text{m/min}$,
 $fz = 0.2\text{mm/t}$,
 $ap = 3.0\text{mm}$,
 $ae = 80\text{mm Dry}$

Precautions When Using Wiper Inserts with Holes

- When mounting the wiper insert, attach it as shown in Fig 1. When mounted as shown in Fig 2, normal machined surface roughness cannot be obtained.
- The wiper insert has a single corner specification.



■ Insert Grades Selection Guide

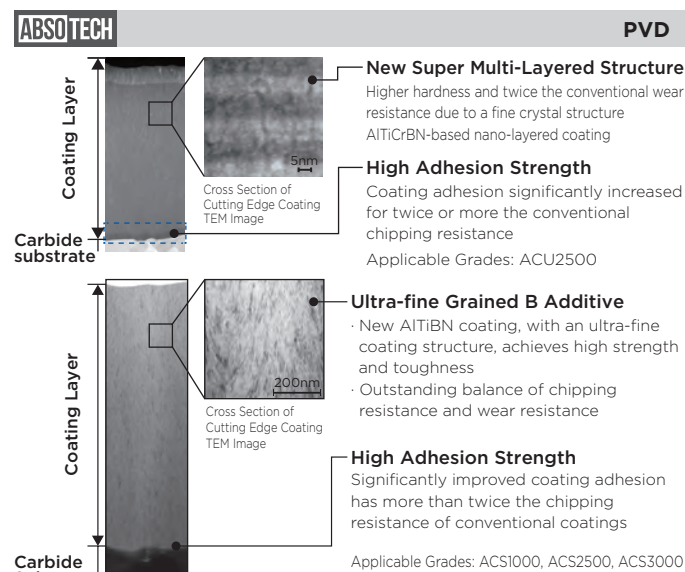
The **ACS1000/ACS2500/ACS3000** grades for exotic alloys have been expanded to a wide lineup applicable to various work materials

Work Material		Finishing to Light Cutting	Medium Cutting	Rough to Heavy Cutting
P Steel	Coated Carbide	ACU2500 ACP100 ACP200 ACP300		
	Cermet	T4500A		
M Stainless Steel	Coated Carbide	ACU2500 ACS1000 ACS2500 ACS3000 ACM200 ACM300		
	Coated Carbide	ACU2500 ACK200 ACK300		
S Exotic Alloy	Coated Carbide	ACU2500 ACK200 ACK300		
	Coated Carbide	DL1000 H1		

The letters "C" and "P" at the end of each grade indicate the coating type. ▽: CVD ▲: PVD

■ Grade Features

New ABSOTECH™ (absolute technology) coating technology that realises absolute stability



ACP200/ACP300/ACK300/ACM300

NEW SUPER ZX COAT

Realises superb stability due to a carbide substrate optimised for steel, cast iron, and stainless steel with a highly chipping-resistant coating.

ACP100/ACK200/ACM200

SUPER FF COAT

Realises superb stability in high-efficiency machining due to a carbide substrate optimised for steel, cast iron, and stainless steel with a highly wear-resistant coating.

DL1000

AURORA Coat (DLC (Diamond-like Carbon))

Second only to diamond in terms of hardness, this flat and smooth coating has a low coefficient of friction and provides excellent adhesion resistance to deliver better machined surface quality.

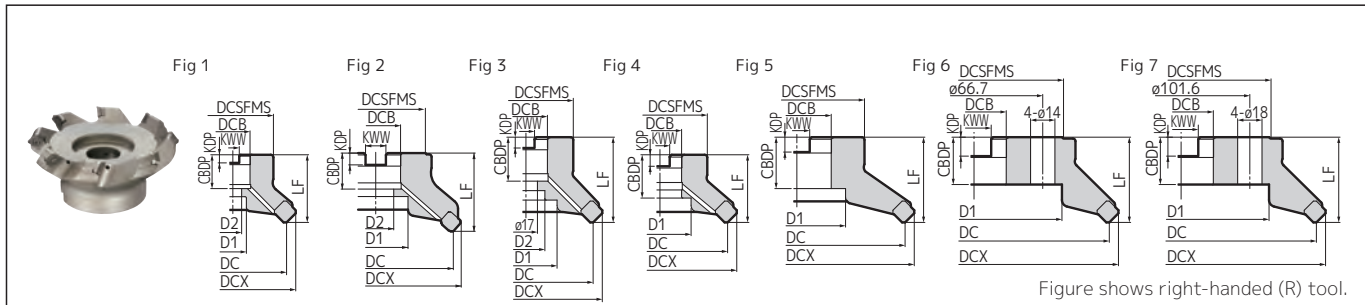
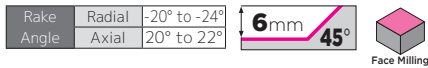


Figure shows right-handed (R) tool.

Body (Fine Pitch)

Dimensions (mm)

Cat. No.	Stock R L	Dia. DC	Max. Dia. DCX	Boss DCSFMS	Height LF	Hole Dia. DCB	Keyway Width KWW	Keyway Depth KDP	Mounting Depth CDBP	Bolt D1	Bolt D2	Number of Teeth	Weight (kg)	Fig
WGXM 13050RS/LS	●	50	62	40	40	22	10.4	6.3	20	18	11	4	0.4	1
13063RS/LS	●	63	76	50	40	22	10.4	6.3	20	18	11	5	0.6	1
13080RS/LS	●	*80	93	55	50	27	12.4	7	25	20	13.5	6	1.1	1
13100RS/LS	●	100	113	70	50	32	14.4	8.5	32	46	—	7	1.6	4
13125RS/LS	●	125	138	80	63	40	16.4	9.5	29	52	29	8	2.8	2
13160RS/LS	●	160	173	100	63	40	16.4	9.5	29	88	—	10	4.5	6
13200RS/LS	●	200	213	130	63	60	25.7	14	35	130	—	12	7.0	7
13250RS/LS	●	250	263	130	63	60	25.7	14	35	160	—	14	9.6	7
WGXM 13080R/L	●	*80	93	60	50	25.4	9.5	6	25	20	13	6	1.1	1
13100R/L	●	*100	113	70	63	31.75	12.7	8	32.5	46	28	7	2.2	3
13125R/L	●	125	138	80	63	38.1	15.9	10	35.5	55	30	8	2.9	1
13160R/L	●	160	173	100	63	50.8	19.1	11	38	72	—	10	4.5	5
13200R/L	●	200	213	130	63	47.625	25.4	14	35	130	—	12	7.0	7
13250R/L	●	250	263	130	63	47.625	25.4	14	35	150	—	14	10.8	7

Inserts are sold separately. Take note of the cutter mounting size (DCB) when selecting a cutter. Sizes ø160mm and above do not have coolant holes.

Note For mounting the cutters marked with * to an arbor, use a JIS B1176 hex socket bolt (ø80: M12 x 30 to 35mm, ø100: M16 x 40 to 45mm).

Insert Expansion

Dimensions (mm)

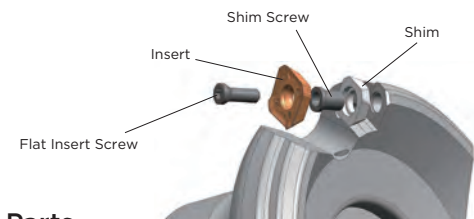
Grade Classification		Coated Carbide										Cemented Carbide	DLC	Cermet			
Process	High-speed/Light Cutting																
	Medium Cutting																
	Roughing																
Cat. No.		ACU250	ACP100	ACP200	ACP300	ACK200	ACK300	ACS1000	ACS2500	ACS3000	ACM200	ACM300	H1	DL1000	T4500A	Application	Fig.
SEET 13T3AGFR-L		—	—	—	—	—	—	—	—	—	—	—	●	●	—	Light Cutting (For Non-Ferrous Metals)	1
13T3AGSR-L		●	●	●	●	●	●	—	●	●	▲	▲	—	—	●	Light Cutting	1
13T3AGSR-G		●	●	●	●	●	●	●	●	●	▲	▲	—	—	●	General-purpose	1
SEMT 13T3AGSR-L		●	●	●	●	●	●	—	●	●	▲	▲	—	—	—	Light Cutting	1
13T3AGSR-G		●	●	●	●	●	●	●	●	●	▲	▲	—	—	—	General-purpose	1
13T3AGSR-H		●	●	●	●	●	●	—	●	●	▲	▲	—	—	—	Heavy Cutting	1
13T3AGSR-FG		●	●	●	●	●	●	—	●	●	▲	▲	—	—	—	Low-burr Design	2
13T3AGSL-G		—	—	—	—	—	—	—	—	—	—	—	—	—	—	General-purpose	4
XEEW 13T3AGER-WR		●	●	—	—	●	—	—	—	—	—	—	—	—	●	Wiper Insert	3

The ACP100 and ACK200 may vary in colour or lustre, but these variations do not affect the performance. Refer to P3 "Precautions When Using Wiper Inserts With Holes" (Mounting Precautions).

Identification Code

WGX **M** **13** **050** **R** **S**

Series Code Fine Pitch Insert Size Dia. Feed Direction Metric Bore



Parts

Applicable Cutter	Shim	Shim Screw	Wrench	Flat Insert Screw	Integrated Wrench	Detachable Wrench		Anti-seizure Cream
DC ø50 to 125 Other than above	WGCS13R	BW0507F	LH035	BFTX03512IP	3.0	Handle Grip	Bit	SUMI-P
					TRDR151P	HPS1015	TRB151P	

Note The cutting conditions above are a guide. Actual conditions will need to be adjusted according to machine rigidity, work clamp rigidity, depth of cut and other factors.

Recommended Tightening Torque (N·m) ● mark: Standard stocked item ● mark: Standard stocked item (new product/expanded item) ▲ mark: To be replaced by a new product, made to order, or discontinued (please confirm stock availability) Blank: Made-to-order item — mark: Not available



Face Milling



Dimensions (mm)

Inserts are sold separately. Take note of the cutter mounting size (DCB) when selecting a cutter. Sizes $\varnothing 160\text{mm}$ and above do not have coolant holes.

Expansion

Dimensions (mm)

Fig 1
(Right-Hand)

Fig 2
(Right-Hand)

Fig 3
(Right-Hand)

Wiper Insert

Fig 4
(Left-Hand)

The ACP100 and ACK200 may vary in colour or lustre, but these variations do not affect the performance. Refer to P3 "Precautions When Using Wiper Inserts With Holes" (Mounting Precautions).

WGX **F** **13** **050** **R** **S**

Series Code Extra Insert Dia. Feed Metric
Fine Pitch Size

Direction Bore



ISO	Work Material	Hardness	Cutting Speed vc (m/min) Min. - Optimum - Max.	Feed Rate fz (mm/t) Min. - Optimum - Max.	Insert Grade
P	General Steel	180 to 280 HB	150- 200 -250	0.10- 0.20 -0.30	ACU2500 ACP200
	Mild Steel	≤ 180HB	180- 270 -350	0.10- 0.25 -0.40	
	Die Steel	200 to 220 HB	100- 150 -200	0.15- 0.20 -0.25	
M	Stainless Steel	—	160- 210 -250	0.15- 0.23 -0.30	ACU2500 ACS1000 ACS2500 ACS3000
K	Cast Iron	250HB	100- 180 -250	0.15- 0.23 -0.30	ACU2500 ACK200
N	Non-Ferrous Alloy	—	500- 750 -1,000	0.15- 0.23 -0.30	DL1000
S	Exotic Alloy	—	30- 50 -80	0.10- 0.20 -0.30	ACU2500 ACS1000 ACS2500 ACS3000

Note The cutting conditions above are a guide. Actual conditions will need to be adjusted according to machine rigidity, work clamp rigidity, depth of cut and other factors.

 Recommended Tightening Torque (N·m) ● mark: Standard stocked item ● mark: Standard stocked item (new product/expanded item) ▲ mark: To be replaced by a new product, made to order, or discontinued (please confirm stock availability) Blank: Made-to-order item — mark: Not available

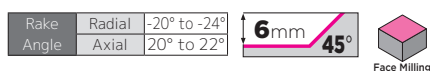
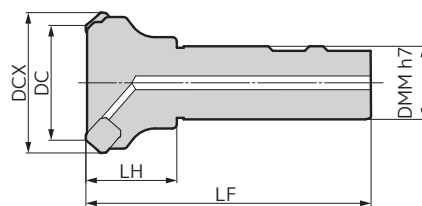
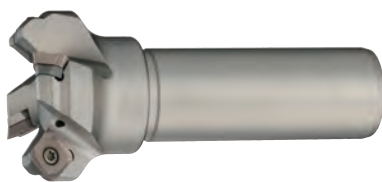


Fig 1



Body (Shank type)

Dimensions (mm)

Cat. No.	Stock	Dia. DC	Max. Dia. DCX	Shank DMM	Head LH	Overall Length LF	Number of Teeth	Fig
WGX 13032EW	●	32	44	32	40	125	3	1
13040EW	●	40	52	32	40	125	3	1
13050EW	●	50	62	32	40	125	4	1
13063EW	●	63	76	32	40	125	5	1

Inserts are sold separately. ø32mm size does not have shims.

Insert Expansion

Dimensions (mm)

Grade Classification		Coated Carbide										Cemented Carbide	DLC	Cermet			
Process	High-speed/Light Cutting																
	Medium Cutting																
	Roughing																
Cat. No.		ACU2500	ACP100	ACP200	ACP300	ACK200	ACK300	ACS1000	ACS2500	ACS3000	ACM200	ACM300	H1	DL1000	T4500A	Application	Fig
SEET 13T3AGFR-L		—	—	—	—	—	—	—	—	—	—	—	●	●	—	Light Cutting (For Non-Ferrous Metals)	1
13T3AGSR-L		●	●	●	●	●	●	●	●	●	▲	▲	—	—	●	Light Cutting	1
13T3AGSR-G		●	●	●	●	●	●	●	●	●	▲	▲	—	—	●	General-purpose	1
SEMT 13T3AGSR-L		●	●	●	●	●	●	—	●	●	▲	▲	—	—	—	Light Cutting	1
13T3AGSR-G		●	●	●	●	●	●	●	●	●	▲	▲	—	—	—	General-purpose	1
13T3AGSR-H		●	●	●	●	●	●	—	●	●	▲	▲	—	—	—	Heavy Cutting	1
13T3AGSR-FG		●	●	●	●	●	●	—	●	●	▲	▲	—	—	—	Low-burr Design	2
XEEW 13T3AGER-WR		●	●	—	—	—	●	—	—	—	—	—	—	—	●	Wiper Insert	3

Fig 1

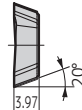
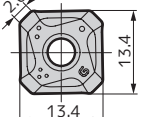


Fig 2

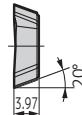
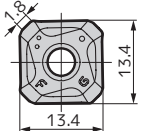
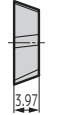
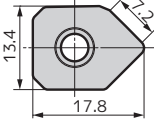
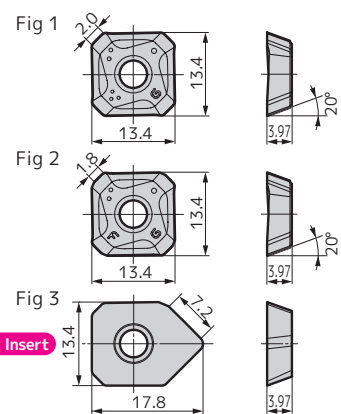


Fig 3



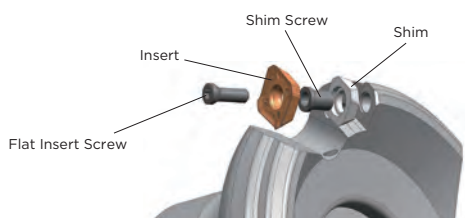
Wiper Insert

The ACP100 and ACK200 may vary in colour or lustre, but these variations do not affect the performance. Refer to P3 "Precautions When Using Wiper Inserts With Holes" (Mounting Precautions).



Identification Code

WGX **13** **032** **EW**
 Series Code Insert Size Dia. Shank type



Recommended Cutting Conditions

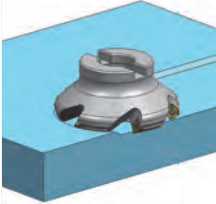
ISO	Work Material	Hardness	Cutting Speed v_c (m/min) Min. - Optimum - Max.	Feed Rate f_z (mm/t) Min. - Optimum - Max.	Insert Grade
P	General Steel	180 to 280 HB	150-200-250	0.10-0.20-0.30	ACU2500
	Mild Steel	≤ 180HB	180-270-350	0.10-0.25-0.40	ACP200
	Die Steel	200 to 220 HB	100-150-200	0.15-0.20-0.25	
M	Stainless Steel	—	160-210-250	0.15-0.23-0.30	ACU2500
					ACS1000
					ACS2500
					ACS3000
K	Cast Iron	250HB	100-180-250	0.15-0.23-0.30	ACU2500
N	Non-Ferrous Alloy	—	500-750-1,000	0.15-0.23-0.30	DL1000
S	Exotic Alloy	—	30-50-80	0.10-0.20-0.30	ACU2500
					ACS1000
					ACS2500
					ACS3000

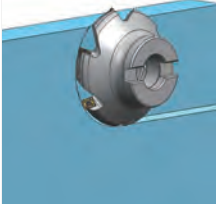
Note The cutting conditions above are a guide. Actual conditions will need to be adjusted according to machine rigidity, work clamp rigidity, depth of cut and other factors.

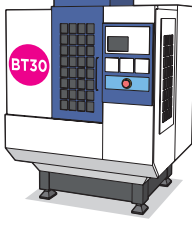
Parts

Applicable Cutter	Shim	Shim Screw	Wrench	Flat Insert Screw	Wrench	Anti-seizure Cream
WGX13032EW	—	—	—	BFTX03512IP	3.0	TRDR15IP
Other than above	WGCS13R	BW0507F	LH035			SUMI-P

Application Examples

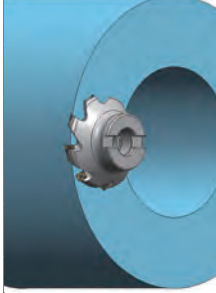
Cr-Mo Steel SCM420 Block Material		Sumitomo	Competitor's Product
	Tool	WGXI3125R	—
	Grade	ACP200	—
	Chipbreaker	G	—
	Cutter Dia. (mm)	125	125
	Number of Teeth	6	6
	vc(m/min)	220	220
	vf(mm/min)	840	840
	fz(mm/t)	0.25	0.25
	ap(mm)	2.0	2.0
	ae(mm)	125	125
	Coolant	Dry	Dry
	Results	Surface roughness was significantly improved. Cutting force was reduced. Stable cutting can be performed with a low cutting load.	

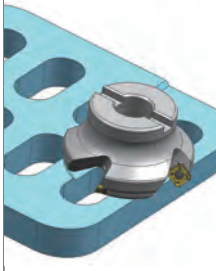
General Structural Steel SS400 Machine Component		Sumitomo	Conventional Tool
	Tool	WGXI3125R	—
	Grade	ACP200	—
	Chipbreaker	FG	—
	Cutter Dia. (mm)	125	125
	Number of Teeth	6	6
	vc(m/min)	200	200
	vf(mm/min)	610	610
	fz(mm/t)	0.2	0.2
	ap(mm)	1.0	1.0
	ae(mm)	100	100
	Coolant	Wet	Wet
	Results	Suppresses chatter. Reduces exit burrs.	

Carbon Steel S50C Machine Component		Sumitomo	Competitor's Product
M/C BT30 	Tool	WGXI3063RS	—
	Grade	ACP200	—
	Chipbreaker	L	—
	Cutter Dia. (mm)	63	63
	Number of Teeth	4	4
	vc(m/min)	300	300
	vf(mm/min)	610	610
	fz(mm/t)	0.1	0.1
	ap(mm)	4.0	4.0
	ae(mm)	10.0 to 40.0	10.0 to 20.0
	Coolant	Dry	Dry
	Results	Stable cutting was achieved even with low-rigidity machines. Machining was also possible with lateral depth of cut 30 to 40mm.	

Low-rigidity Machine

Stainless Steel SUS304 Machine Component		Sumitomo	Competitor's Product
Cutting Distance: 3.75m  WGX series  Competitor's Product	Tool	WGXI3100RS	—
	Grade	ACM300	—
	Chipbreaker	G	—
	Cutter Dia. (mm)	100	100
	Number of Teeth	5	5
	vc(m/min)	150	150
	vf(mm/min)	360	360
	fz(mm/t)	0.15	0.15
	ap(mm)	2.0	2.0
	ae(mm)	20.0	20.0
	Coolant	Dry	Dry
	Results	High hardness and the superior oxidation resistance of PVD coating provides at least double the tool life.	

Pipe Steel St52 Pipe		Sumitomo	Conventional Tool
	Tool	WGXI3125R	—
	Grade	ACP200	—
	Chipbreaker	G	—
	Cutter Dia. (mm)	125	125
	Number of Teeth	8	8
	vc(m/min)	300	300
	vf(mm/min)	730	730
	fz(mm/t)	0.12	0.12
	ap(mm)	4.0	4.0
	ae(mm)	100	100
	Coolant	Wet	Wet
	Results	Tool life improved by more than 1.4 times per corner.	

Cr-Mo Steel SCM440 Machine Component		Sumitomo	Competitor's Product
	Tool	WGXI3080R	—
	Grade	ACP200	—
	Chipbreaker	H	—
	Cutter Dia. (mm)	80	80
	Number of Teeth	4	4
	vc(m/min)	200	200
	vf(mm/min)	480	480
	fz(mm/t)	0.15	0.15
	ap(mm)	3.0	3.0
	ae(mm)	—	—
	Coolant	Dry	Dry
	Results	In heavy interrupted cutting, this tool achieved a longer tool life with good surface roughness.	

SUS309S Liquid Level Gauge Component		Sumitomo	Conventional Tool
	Tool	WGXI3160R	Single-Sided, 4 Corners
	Grade	ACU2500	—
	Chipbreaker	G	—
	Cutter Dia. (mm)	160	160
	Number of Teeth	7	7
	vc(m/min)	180	180
	vf(mm/min)	333	333
	fz(mm/t)	0.13	0.13
	ap(mm)	1.5	1.5
	ae(mm)	—	—
	Coolant	Dry	Dry
	Results	Tool life extension of 300% achieved.	

Stainless Steel SUS630/H900 Machine Component		Sumitomo	Competitor's Product
Cutting Distance: 7.5m  WGX series  Competitor's Product	Tool	WGXI3100RS	—
	Grade	ACM200	—
	Chipbreaker	G	—
	Cutter Dia. (mm)	100	100
	Number of Teeth	5	5
	vc(m/min)	150	150
	vf(mm/min)	240	240
	fz(mm/t)	0.1	0.1
	ap(mm)	1.0	1.0
	ae(mm)	75.0	75.0
	Coolant	Dry	Dry
	Results	The high wear resistance of CVD coating provides at least double the tool life.	

MEMO

A large rectangular area filled with a uniform grid of small dots, intended for handwritten notes or a drawing.

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A large rectangular area filled with a uniform grid of small dots, intended for handwritten notes or a drawing.



- 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.

< SAFETY NOTES >

- 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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