SUMITOMO
CARBIDE - CBN - DIAMOND

Tooling News E-190

High-Rake, General-Purpose Face Milling Cutter

SEC-WAVEMILL WGX

Insert Expansion

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

Expansion

Next-Generation Coated Carbide Grades for Milling

ACS1000/ACS2500/ACS3000 now available for WGX series

P M K N S H

SUMITOMO ELECTRIC GROUP

■ General Features

SEC-WaveMill WGX Type employs a unique chipbreaker design to provide lower cutting force and higher-quality surface finish than conventional cutters.
Lineup of insert grades and chipbreakers has been significantly expanded, and employment of the ACM series enables machining of stainless steel and exotic alloys.
Also applicable to any work material using the general-purpose grade ACU2500 or the new generation coated carbide grades ACS1000/ACS2500/ACS3000.

■ Features

● Reduced Cutting Force

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

● High Quality

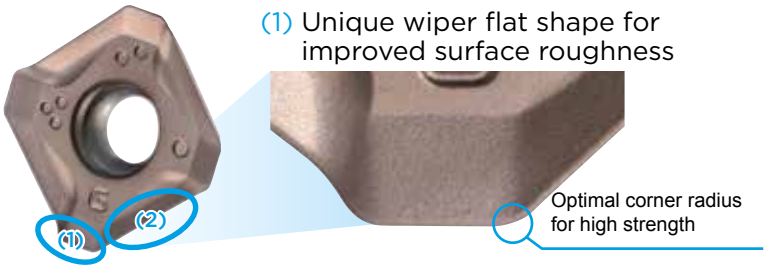
· Improved runout precision and unique wiper flat shape ensure excellent surface finish quality
· Additional edge chamfer reduces burrs and edge chipping

● Wide Ranging Product Lineup

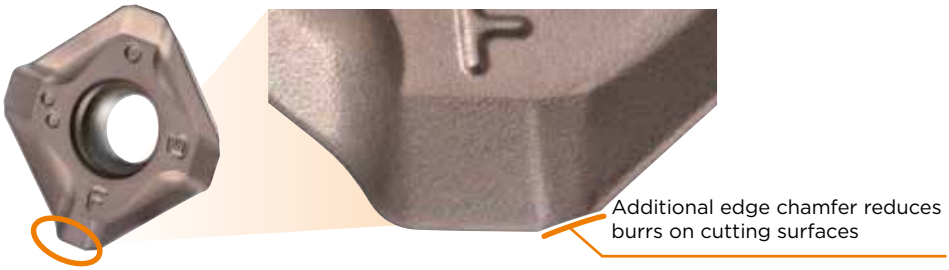
· A wide selection of grades along with 4 types of chipbreakers and wiper inserts are available.
· Can be used for a wide variety of machining applications.

■ Insert Shape Features

● General-purpose G Type Chipbreaker



● FG Type Chipbreaker with Low-Burr Design



■ 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) Inch Bore Sizes of ø125mm and below have coolant holes

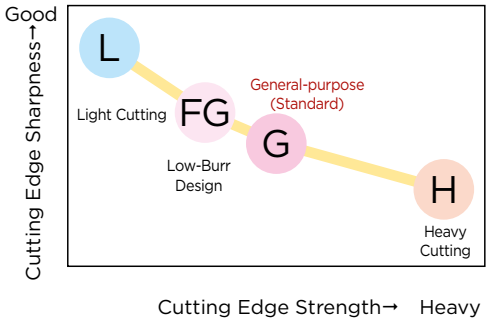
WGX 13000R(S) WGXM 13000R(S)
Standard Pitch Fine Pitch

WGXF 13000R(S) WGX 13000EW
Extra Fine Pitch Shank Type

■ Chipbreaker Selection

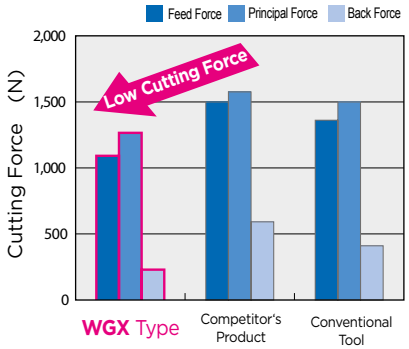
Work Material	P M K S N	P M K S			P K
Applica-tions	Light Cutting	General-purpose/ Burr Prevention	General-purpose	Heavy Cutting	Surface Finish Emphasized
Features	Low Cutting Force	Standard/ With Chamfer	Standard	High Strength	Wiper
Chip-breaker	L Type	FG Type	G Type	H Type	W Type
Cutting Edge Cross Section	0.05 mm, 25°	0.15 mm, 20°	0.15 mm, 20°	0.20 mm, 15°	

■ Chipbreaker Selection Guide



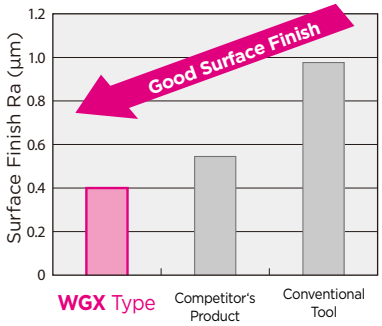
■ General-purpose G Type Chipbreaker

● Comparison of Cutting Force



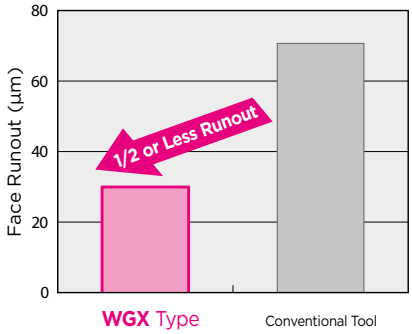
Work Material: S50C, Tool: ø100
Cutting Conditions: v_c = 200m/min, f_z = 0.2mm/t, a_p = 3.0mm

● Surface Finish Comparison



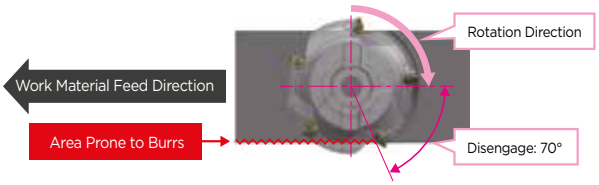
Work Material: S50C, Tool: ø100
Cutting Conditions: v_c = 200m/min, f_z = 0.2mm/t, a_p = 3.0mm

● Runout with Insert Attached



Tool: WGXM13100R (ø100)
Number of Teeth: 7

■ FG Type Chipbreaker with Low-Burr Design



● Machined Surface Comparison

Work Material	FG Type	G Type	Conventional Tool	Competitor's Product
S50C	○	○	○	× Burr Formation
SUS304	○	○	× Burr Formation	× Burr Formation
SCM440	○	× Burr Formation	× Burr Formation	× Burr Formation

Machine: Machining Centre BT50
Tool: WGX13100R (ø100),
Insert Grade: ACP200
Cutting Conditions:
v_c = 200m/min,
f_z = 0.2mm/t,
a_p = 3.0mm,
a_e = 80mm 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.

· For milling with wiper inserts, see "The Basics of Milling, Milling Edition" in Chapter N of the General Catalogue.

Fig 1

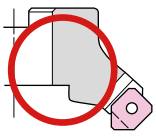
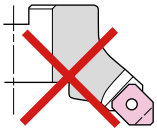
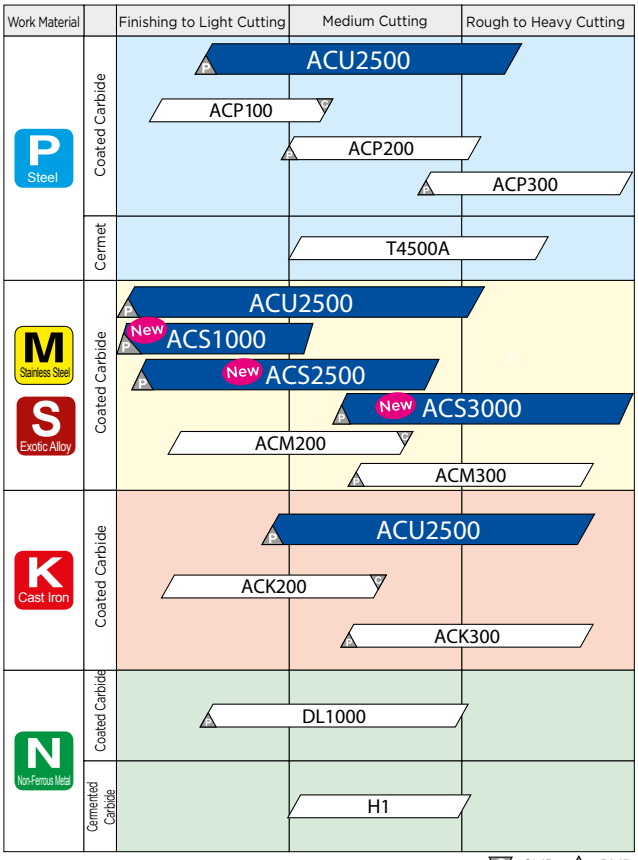


Fig 2



■ Insert Grades Selection Guide

New-generation coated carbide grades **ACS1000/ ACS2500/ACS3000** now available!
Enhanced lineup of coated grades in addition to cemented carbide and cermet for milling steel, stainless steel, cast iron, and aluminum alloy.

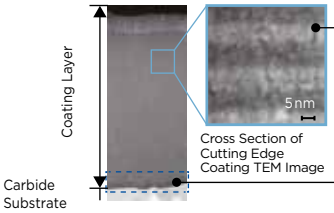


The letters "C" and "P" at the end of each grade indicate the coating type. ▽: CVD △: PVD

■ Grade Features

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

Applicable Grades: ACU2500 PVD

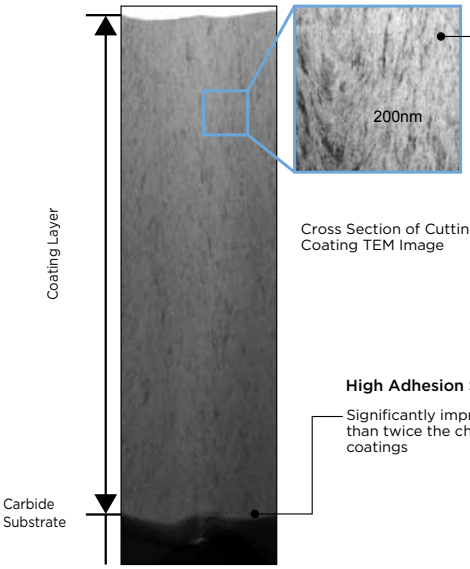


New Super Multi-Layered Structure
Higher hardness and twice the conventional wear resistance due to a fine crystal structure AlTiCrBN-based nano-layered coating

High Adhesion Strength
Higher hardness and twice the conventional wear resistance due to a fine crystal structure AlTiCrBN-based nano-layered coating

PVD coating with excellent wear and chipping resistance

Applicable Grades: ACS1000, ACS2500, ACS3000 PVD



Ultra-fine Grained B Additive
- New AlTiBN coating, with an ultra-fine coating structure, achieves high strength and toughness
- Outstanding balance of chipping and wear resistance

High Adhesion Strength
Significantly improved coating adhesion has more than twice the chipping resistance of conventional coatings

P 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

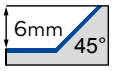
Realises superb stability in high-efficiency machining due to a carbide substrate optimised for steel, cast iron, and stainless steel with a highly wear-resistant coating.

P 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.

General Milling of Steel and Cast Iron

Rake Angle		
	Radial	-20° ~ -24°
	Axial	20° ~ 22°



Body – Shell Type

Fig. 1

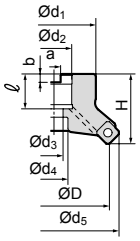


Fig. 2

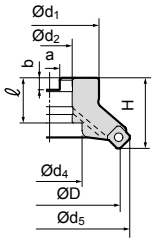


Fig. 3

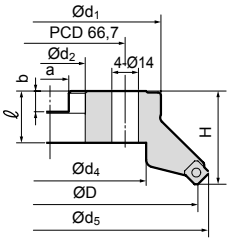
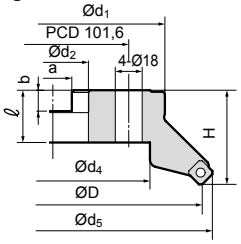


Fig. 4



Inner coolant available for $D_c \leq$ Ø125mm

Body – Dimensions

Type: WGX, Standard Pitch

Cat. No.	Stock	Dimension (mm)				Mounting						No. of Teeth	Weight (kg)	Fig.
		øD	ød5	ød1	H	ød2	ød4	ød3	a	b	ℓ			
WGX 13040 RS	●	40	52	32	40	16	14,0	9,0	8,4	5,6	18	3	0,3	1
WGX 13050 RS	●	50	62	40	40	22	18,0	11,0	10,4	6,3	20	3	0,4	1
WGX 13063 RS	●	63	76	50	40	22	18,0	11,0	10,4	6,3	20	4	0,6	1
WGX 13080 RS	●	80	93	55	50	27	20,0	13,5	12,4	7,0	25	4	1,2	1
WGX 13100 RS	●	100	113	70	50	32	46,0	-	14,4	8,5	32	5	1,6	2
WGX 13125 RS	●	125	138	80	63	40	52,0	29,0	16,4	9,5	29	6	2,8	1
WGX 13160 RS	●	160	173	130	63	40	88,0	-	16,4	9,5	29	7	4,5	3
WGX 13200 RS	●	200	213	150	63	60	130,0	-	25,7	14,0	35	8	7,1	4
WGX 13250 RS	❍	250	263	190	63	60	160,0	-	25,7	14,0	35	10	11,2	4

Type: WGXM, Medium Pitch

Cat. No.	Stock	Dimension (mm)				Mounting						No. of Teeth	Weight (kg)	Fig.
		øD	ød5	ød1	H	ød2	ød4	ød3	a	b	ℓ			
WGXM 13050 RS	●	50	62	40	40	22	18,0	11,0	10,4	6,3	20	4	0,4	1
WGXM 13063 RS	●	63	77	50	40	22	18,0	11,0	10,4	6,3	20	5	0,6	1
WGXM 13080 RS	●	80	94	55	50	27	20,0	13,5	12,4	7,0	25	6	1,1	1
WGXM 13100 RS	●	100	114	70	50	32	46,0	-	14,4	8,5	32	7	1,6	2
WGXM 13125 RS	●	125	139	80	63	40	52,0	29,0	16,4	9,5	29	8	2,8	1
WGXM 13160 RS	●	160	174	130	63	40	88,0	-	16,4	9,5	29	10	4,5	3
WGXM 13200 RS	●	200	214	150	63	60	130,0	-	25,7	14,0	35	12	7,0	4
WGXM 13250 RS	❍	250	264	190	63	60	160,0	-	25,7	14,0	35	14	11,1	4

Type: WGXF, Fine Pitch

Cat. No.	Stock	Dimension (mm)				Mounting						No. of Teeth	Weight (kg)	Fig.
		øD	ød5	ød1	H	ød2	ød4	ød3	a	b	ℓ			
WGXF 13050 RS	●	50	62	40	40	22	18,0	11,0	10,4	6,3	20	5	0,4	1
WGXF 13063 RS	●	63	77	50	40	22	18,0	11,0	10,4	6,3	20	6	0,6	1
WGXF 13080 RS	●	80	94	55	50	27	20,0	13,5	12,4	7,0	25	8	1,1	1
WGXF 13100 RS	●	100	114	70	50	32	46,0	-	14,4	8,5	32	10	1,5	2
WGXF 13125 RS	●	125	139	80	63	40	52,0	29,0	16,4	9,5	29	12	2,7	1
WGXF 13160 RS	●	160	174	130	63	40	88,0	-	16,4	9,5	29	16	4,5	3
WGXF 13200 RS	●	200	214	150	63	60	130,0	-	25,7	14,0	35	20	6,9	4
WGXF 13250 RS	❍	250	264	190	63	60	160,0	-	25,7	14,0	35	24	11,0	4

❍ Delivery on request ● Euro stock

Inserts are not included.

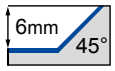
Note: Please use screw according to JIS B1176 for securing Ø80/Ø100 cutter to the arbor (Ø80 ⇨ M12x30 to 35mm, Ø100 ⇨ M16x40 to 45mm)

Identification Details

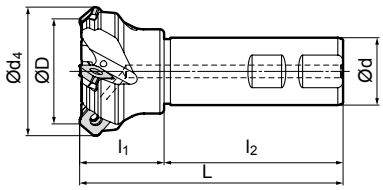
WGX	M	13	050	R	S
Cutter Series	M: Medium F: Fine	Insert Size	Cutter Diameter	Direction	Metric

General Milling of Steel and Cast Iron

Rake Angle		
	Radial	-20° ~ 24°
	Axial	20° ~ 22°



Body – Shank Type



Body – Dimensions

Cat. No.	Stock	Dimension (mm)						No. of Teeth
		ØD	Ød4	Ød	l1	l2	L	
WGX 13032 EW	❍	32	44	32	40	85	125	3
WGX 13040 EW	❍	40	52	32	40	85	125	3
WGX 13050 EW	❍	50	62	32	40	85	125	4
WGX 13063 EW	❍	63	76	32	40	85	125	5

❍ Japan stock Inserts are not included. Ø32mm size does not have seats.

Identification Details

WGX	13	032	EW
Cutter Series	Insert Size	Cutter Diameter	Endmill Type Weldon

Insert

Dimensions (mm)

Grade Classification		Coated Carbide										Cemented Carbide	DLC	Cermet		
Process	High-speed/Light	K M S	P			K		M S	M S		M S		K N	N		
	Medium Cutting	K M S		P M	P M	K			M S	M S	M S	M S		N	P	
	Roughing	K M S		P M	P M		K			M S		M S				
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

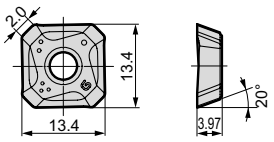


Fig 2

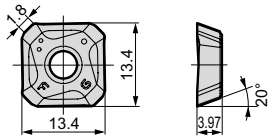
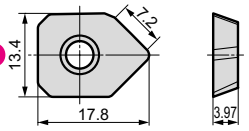


Fig 3

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).

Spare Parts

Applicable Cutters	Seat	Seat Screw	Insert Screw	Spanner (for Insert)	Torque (N·m)	Spanner (for Seat)
WGX(M/F)13000	WGCS13R	BW0507F	BFTX03512IP	TRDR15IP	3,0	LH035
WGX13032EW	-	-	BFTX03512IP	TRDR15IP	3,0	-

Recommended Cutting Conditions

ISO	Work Material	Hardness	Cutting Speed v_c (m/min)	Feed Rate f_z (mm/t)	Grade
P	General Steel	180~280HB	150-**200**-250	0,10-**0,20**-0,30	ACP200
	Soft Steel	≤180HB	180-**265**-350	0,10-**0,25**-0,40	ACP200
	Die Steel	200~220HB	100-**150**-200	0,15-**0,20**-0,25	ACP200
M	Stainless Steel	-	160-**205**-250	0,15-**0,23**-0,30	ACM300
K	Cast Iron	250HB	100-**175**-250	0,15-**0,23**-0,30	ACK200
S	Super Alloy	-	30- **50**- 80	0,10-**0,20**-0,30	AC300M

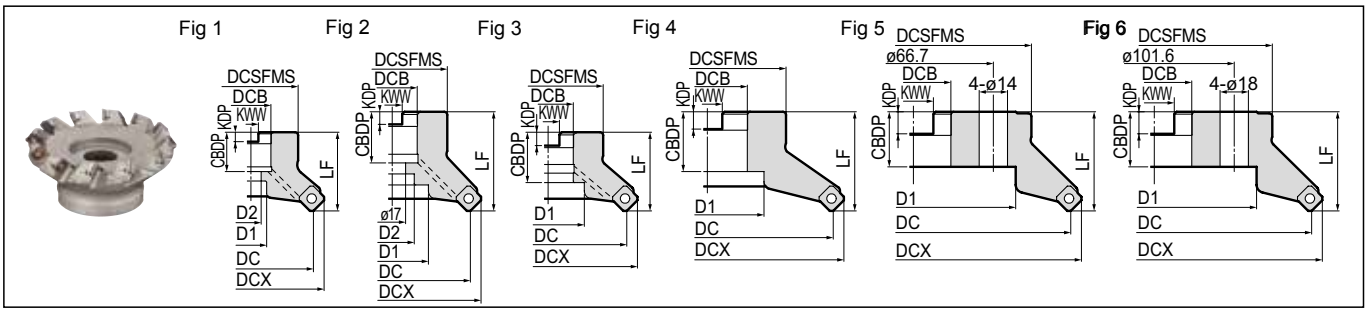
Minimum-**Optimum**-Maximum

N·m Recommended Tightening Torque (N·m) ● Euro stock ❍ Japan stock ▲: To be replaced by a new product

WGX Series

Rake Angle		
	Radial	-20° to -24°
	Axial	20° to 22°

6mm 45°



Body (Extra Fine Pitch)

Dimensions (mm)

	Cat. No.	Stock	DC	DCX	DCSFMS	LF	DCB	KWW	KDP	CBDP	D1	D2	Number of Teeth	Weight (kg)	Fig
Metric	WGXF 13050RS	●	50	62	40	40	22	10.4	6.3	20	18	11	5	0.4	1
	13063RS	●	63	77	50	40	22	10.4	6.3	20	18	11	6	0.6	1
	13080RS	●	*80	94	55	50	27	12.4	7	25	20	13.5	8	1.1	1
	13100RS	●	100	114	70	50	32	14.4	8.5	32	46	—	10	1.5	3
	13125RS	●	125	139	80	63	40	16.4	9.5	29	52	29	12	2.7	1
	13160RS	●	160	174	130	63	40	16.4	9.5	29	88	—	16	4.5	5
	13200RS	●	200	214	150	63	60	25.7	14	35	130	—	20	6.9	6
	13250RS	●	250	264	190	63	60	25.7	14	35	160	—	24	11.0	6
Inch	WGXF 13080R	●	*80	94	60	50	25.4	9.5	6	25	20	13	8	1.1	1
	13100R	●	*100	114	70	63	31.75	12.7	8	32.5	46	28	10	2.1	2
	13125R	●	125	139	80	63	38.1	15.9	10	35.5	55	30	12	2.8	1
	13160R	●	160	174	100	63	50.8	19.1	11	38	72	—	16	4.5	4
	13200R	●	200	214	150	63	47.625	25.4	14	35	130	—	20	6.9	6
	13250R	●	250	264	190	63	47.625	25.4	14	35	150	—	24	11.0	6

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.

For mounting the ø80 and ø100mm sized 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

Dimensions (mm)

Grade Classification		Coated Carbide										Cemented Carbide	DLC	Cermet		
Process	High-speed/Light	PS	P			K		MS	MS		MS		N			
	Medium Cutting	PS		PM	PM	K			MS	MS	MS	MS	N	P		
	Roughing	PS		PM	PM		K			MS		MS				
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

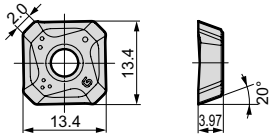


Fig 2

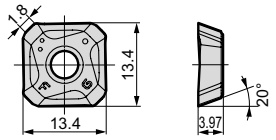
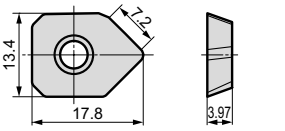


Fig 3

Wiper Insert

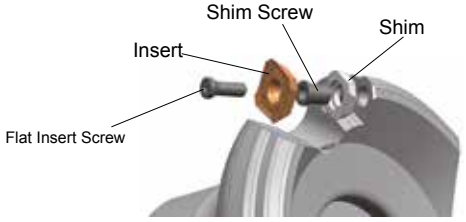


The ACP100 and ACK200 may vary in colour or lustre, but these variations do not affect the performance. Refer to P3 "Precautions when using Wiper Inserts with holes" (Mounting Precautions).

Identification Code

WGX F 13 050 R S

Series	Extra Fine Pitch	Insert Size	Cutter Dia.	Feed Direction	Metric Bore



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 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 ACM300
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 ACM300

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		Integrated Wrench	Detachable Wrench		Anti-seizure Cream
							Handle Grip	Bit	
DC ø50 to 125 Other than above	WGCS13R	BW0507F	LH035	BFTX03512IP	N·m 3.0	Q	HPS1015	TRB15IP	SUMI-P
						TRDR15IP	—	—	

N·m Recommended Tightening Torque (N·m) ● Euro stock ❍ Japan stock ▲: To be replaced by a new product

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CARBIDE - CBN - DIAMOND

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