

ARPF *type*

Radius Precision ARPF



MOLDINO Tool Engineering, Ltd.

New Product News | No.0901E-16 | 2022-11

Radius End Mill for High-Precision Finishing.

Introducing 7 Modular Mill Type with Air hole items!

SG type

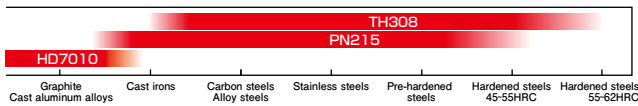
Excellent for semi-finishing and finishing of flat surfaces, sloped surfaces, or 3-dimensional shapes

SW type

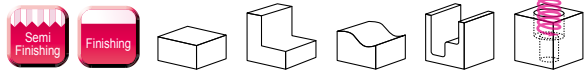
Excellent for high-accuracy finishing of standing walls (verticals)

SQ type

Demonstrates its power when performing corner R removal.



Applications



Features

01

Mounting runout accuracy of 0.02mm or less

- Unique clamp mechanism comprised of high-accuracy body and mounting screw enables inserts to be attached firmly with high accuracy.

Features

02

R accuracy of insert is $\pm 0.01\text{mm}$ or less

- SG and SW types with helical cutting edge use the tool axis center reference as the reference for R accuracy to provide higher accuracy.

Features

03

Blade diameter tolerance of 0 to -0.02 for inserts alone

Features

04

Smooth cutting performance finish by sharp cutting edge.

- SG and SW types with helical cutting edge have good lead-in and reduce vibrations to enable smooth cutting.

Features

05

New material for longer life

- Multi-layer coating provides long life.
 - TH308: Excellent for high-speed, high-performance machining of hardened steels or pre-hardened steels.
 - PN215: Reduces welding with workpiece material components to achieve good machining surfaces when finishing carbon steels or alloy steels.

※For details regarding cutting performance, see p.17 and 18.

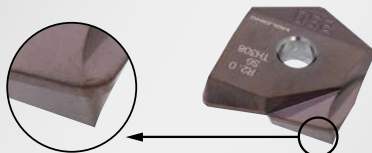
Proper use of helical cutting edge inserts

How to select helical cutting edge inserts

SG type

High-efficiency machining.

Application : semi-finishing to finishing



Magnified view of cutting edge

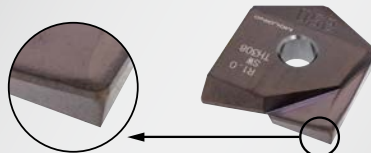
Suitable for machining of 3-dimensional shapes including flat surfaces and sloped surfaces.



SW type

High-accuracy machining of standing walls

Application : Finishing



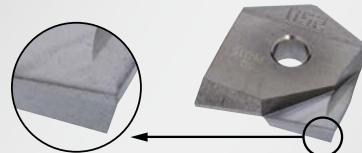
Magnified view of cutting edge

Suitable for high-accuracy finishing of vertical side surfaces (standing walls) which will be used as reference surfaces.



SQ type

Application : Corner R removal



Magnified view of cutting edge

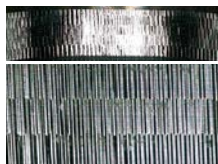
Suitable for removing remaining corner R areas after machining with radius tools.



An effect by helix edge shape

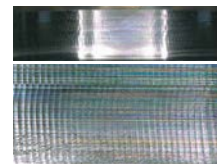
Typical conventional problem

When machining with a long overhang, the increased likelihood of chattering occurring had been a problem. In addition, the tool would vibrate intensely due to increased cutting resistance. As a result, chatter marks would be made on the machined surface.



Reduce cutting force

Helix edge shape suppresses rapid growth of cutting force. This relieves chattering while cutting and improves cutting surface finish.



- Improved cutting surface finish.
- Chattering is unlikely even when machining with long overhang.

Improved machining performance and machining accuracy can be expected, reducing work for downstream processes.

Merit

Improved quality

Cost reduction

Time savings

Improved tool life

Less cutting force reduces chipping due to wear and impact, and tool life is improved.

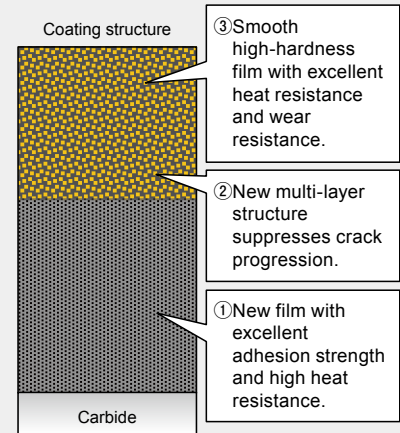
Features

- TH coating has further evolved to the new 3rd-generation TH coating.
- New film composition and film structure improves heat resistance and wear resistance.
- New multi-layer structure provides excellent durability and suppresses crack progression.

Strong fields

- High-speed finishing of hardened steels (45 to 65 HRC) such as SKD11, SKD61, SKH, SUS420 types, etc.
- High-speed finishing of pre-hardened steels such as P20, P21, etc.
- TH308 uses ultra-fine carbide alloy with excellent wear resistance and TH3 coating to demonstrate good performance especially for finishing of high-hardness materials.

Characteristics



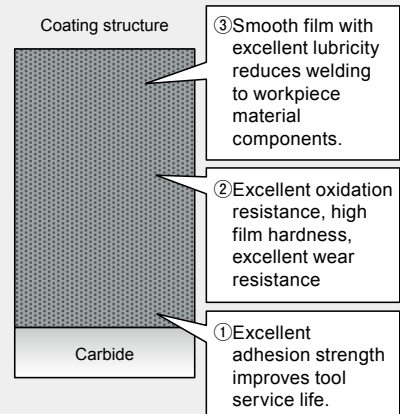
Features

- PN coating with excellent oxidation resistance, high film hardness, and excellent wear resistance.
- Low-friction smooth film surface has excellent lubricity, reducing welding to workpiece material components during cutting machining.

Strong fields

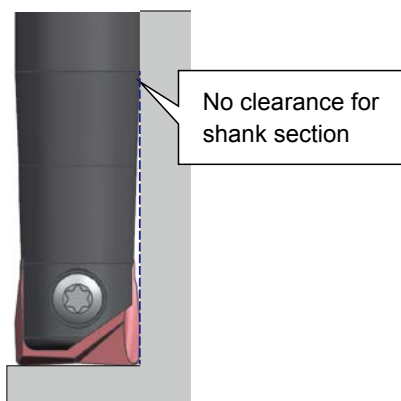
- Carbon steels, general steels: High-speed finishing of SC materials, SS materials, etc.
- Alloy steel: High-speed finishing of SKD11, SKD61, etc.
- Pre-hardened steels: High-speed finishing of CENA1, HPM-MAGIC, NAK80, etc.
- PN215 uses ultra-fine carbide alloy with excellent chipping resistance and PN2 coating to demonstrate good performance especially when finishing carbon steels or alloy steels.

Characteristics



01 Mounting inserts with diameter of shank diameter +1mm

- A $\phi 13$ mm insert can be mounted on a $\phi 12$ mm body, a $\phi 17$ mm insert can be mounted on a $\phi 16$ mm body, a $\phi 21$ mm insert can be mounted on a $\phi 20$ mm body, or a $\phi 26$ mm insert can be mounted on a $\phi 25$ mm body.



When insert with same diameter as shank is mounted



When insert with diameter +1mm larger than shank diameter is mounted.

Line Up

SG • SW • SQ type (helical cutting edge inserts)

P	Steels	TH Coating	PN Coating	Size (mm)					Shape	
	K			FC-FCD Cast irons	DC	RE	LE	INSL		T
N	Aluminum alloys									
H	Hardened steels									

Shape	Item code	Tolerance class	TH Coating	PN Coating	Size (mm)					Shape
			TH308	PN215	DC	RE	LE	INSL	T	
<p>Fig.1</p>	ZCFG06NSG-R0.3	F	●	●	6	0.3	2	5	2	Fig1
	ZCFG06NSG-R0.5		●	●		0.5				
	ZCFG06NSG-R1.0		●	●		1				
	ZCFG080SG-R0.3		●	●	8	0.3	2.5	9.9	2.1	
	ZCFG080SG-R0.5		●	●		0.5				
	ZCFG080SG-R1.0		●	●		1				
	ZCFG080SG-R1.5		●	●		1.5				
	ZCFG080SG-R2.0		●	●		2	3			
	* ZCFG100SG-R0.3		●	●	10	0.3	3	12.5	2.7	
	* ZCFG100SG-R0.5		●	●		0.5				
* ZCFG100SG-R1.0	●	●	1							
* ZCFG100SG-R1.5	●	●	1.5							
* ZCFG100SG-R2.0	●	●	2							
* ZCFG100SG-R3.0	●	●		3	4					
* ZCFG120SG-R0.3	●	●	12	0.3	4	15.1	3.2			
* ZCFG120SG-R0.5	●	●		0.5						
* ZCFG120SG-R1.0	●	●		1						
* ZCFG120SG-R1.5	●	●		1.5						
* ZCFG120SG-R2.0	●	●		2						
* ZCFG120SG-R3.0	●	●		3						
* ZCFG130SG-R0.3	●	●	13	0.3	4	15.1	3.2			
* ZCFG130SG-R0.5	●	●		0.5						
* ZCFG130SG-R1.0	●	●		1						
* ZCFG130SG-R1.5	●	●		1.5						
* ZCFG130SG-R2.0	●	●		2						
* ZCFG130SG-R3.0	●	●		3						
* ZCFG160SG-R0.3	●	●	16	0.3	5	17.2	4.2			
* ZCFG160SG-R0.5	●	●		0.5						
* ZCFG160SG-R1.0	●	●		1						
* ZCFG160SG-R1.5	●	●		1.5						
* ZCFG160SG-R2.0	●	●		2						
* ZCFG160SG-R3.0	●	●		3						
* ZCFG170SG-R0.3	●	●	17	0.3	5	17.2	4.2			
* ZCFG170SG-R0.5	●	●		0.5						
* ZCFG170SG-R1.0	●	●		1						
* ZCFG170SG-R1.5	●	●		1.5						
* ZCFG170SG-R2.0	●	●		2						
* ZCFG170SG-R3.0	●	●		3						
* ZCFG200SG-R0.3	●	●	20	0.3	7	20.9	5.2			
* ZCFG200SG-R0.5	●	●		0.5						
* ZCFG200SG-R1.0	●	●		1						
* ZCFG200SG-R1.5	●	●		1.5						
* ZCFG200SG-R2.0	●	●		2						
* ZCFG200SG-R3.0	●	●		3						
* ZCFG210SG-R0.3	●	●	21	0.3	7	20.9	5.2			
* ZCFG210SG-R0.5	●	●		0.5						
* ZCFG210SG-R1.0	●	●		1						
* ZCFG210SG-R1.5	●	●		1.5						
* ZCFG210SG-R2.0	●	●		2						
* ZCFG210SG-R3.0	●	●		3						
* ZCFG250SG-R0.3	●	●	25	0.3	8	24.4	6.2			
* ZCFG250SG-R0.5	●	●		0.5						
* ZCFG250SG-R1.0	●	●		1						
* ZCFG250SG-R1.5	●	●		1.5						
* ZCFG250SG-R2.0	●	●		2						
* ZCFG250SG-R3.0	●	●		3						

Shape	Item code	Tolerance class	TH Coating	PN Coating	DC	RE	LE	INSL	T	Shape
<p>Fig.2</p>	ZCFG06NSG-R0.3	F	●	●	6	0.3	2	5	2	Fig2
	ZCFG06NSG-R0.5		●	●		0.5				
	ZCFG06NSG-R1.0		●	●		1				
	ZCFG080SG-R0.3		●	●	8	0.3	2.5	9.9	2.1	
	ZCFG080SG-R0.5		●	●		0.5				
	ZCFG080SG-R1.0		●	●		1				
	ZCFG080SG-R1.5		●	●		1.5				
	ZCFG080SG-R2.0		●	●		2	3			
	* ZCFG100SG-R0.3		●	●	10	0.3	3	12.5	2.7	
	* ZCFG100SG-R0.5		●	●		0.5				
* ZCFG100SG-R1.0	●	●	1							
* ZCFG100SG-R1.5	●	●	1.5							
* ZCFG100SG-R2.0	●	●	2							
* ZCFG100SG-R3.0	●	●		3	4					
* ZCFG120SG-R0.3	●	●	12	0.3	4	15.1	3.2			
* ZCFG120SG-R0.5	●	●		0.5						
* ZCFG120SG-R1.0	●	●		1						
* ZCFG120SG-R1.5	●	●		1.5						
* ZCFG120SG-R2.0	●	●		2						
* ZCFG120SG-R3.0	●	●		3						
* ZCFG130SG-R0.3	●	●	13	0.3	4	15.1	3.2			
* ZCFG130SG-R0.5	●	●		0.5						
* ZCFG130SG-R1.0	●	●		1						
* ZCFG130SG-R1.5	●	●		1.5						
* ZCFG130SG-R2.0	●	●		2						
* ZCFG130SG-R3.0	●	●		3						
* ZCFG160SG-R0.3	●	●	16	0.3	5	17.2	4.2			
* ZCFG160SG-R0.5	●	●		0.5						
* ZCFG160SG-R1.0	●	●		1						
* ZCFG160SG-R1.5	●	●		1.5						
* ZCFG160SG-R2.0	●	●		2						
* ZCFG160SG-R3.0	●	●		3						
* ZCFG170SG-R0.3	●	●	17	0.3	5	17.2	4.2			
* ZCFG170SG-R0.5	●	●		0.5						
* ZCFG170SG-R1.0	●	●		1						
* ZCFG170SG-R1.5	●	●		1.5						
* ZCFG170SG-R2.0	●	●		2						
* ZCFG170SG-R3.0	●	●		3						
* ZCFG200SG-R0.3	●	●	20	0.3	7	20.9	5.2			
* ZCFG200SG-R0.5	●	●		0.5						
* ZCFG200SG-R1.0	●	●		1						
* ZCFG200SG-R1.5	●	●		1.5						
* ZCFG200SG-R2.0	●	●		2						
* ZCFG200SG-R3.0	●	●		3						
* ZCFG210SG-R0.3	●	●	21	0.3	7	20.9	5.2			
* ZCFG210SG-R0.5	●	●		0.5						
* ZCFG210SG-R1.0	●	●		1						
* ZCFG210SG-R1.5	●	●		1.5						
* ZCFG210SG-R2.0	●	●		2						
* ZCFG210SG-R3.0	●	●		3						
* ZCFG250SG-R0.3	●	●	25	0.3	8	24.4	6.2			
* ZCFG250SG-R0.5	●	●		0.5						
* ZCFG250SG-R1.0	●	●		1						
* ZCFG250SG-R1.5	●	●		1.5						
* ZCFG250SG-R2.0	●	●		2						
* ZCFG250SG-R3.0	●	●		3						

* mark: Re-grinding is applicable with insert $\phi 10$ or above. Insert $\phi 16$ or above may be re-ground up to twice.

●: Stocked items.

Line Up

P	Steels											
	K	FC-FCD Cast irons			: General cutting, First recommendation : General cutting, Second recommendation							
N	Aluminum alloys											
H	Hardened steels											
Shape	Item code	Tolerance class	TH Coating		PN Coating		Size (mm)					Shape
			TH308	PN215	DC	RE	LE	INSL	T			
<p>Fig.1</p>	※ ZCFG260SG-R0.3	F	●	●	26	0.3	8	24.4	6.2	Fig2		
	※ ZCFG260SG-R0.5		●	●		0.5						
	※ ZCFG260SG-R1.0		●	●		1						
	※ ZCFG260SG-R1.5		●	●		1.5						
	※ ZCFG260SG-R2.0		●	●		2						
	※ ZCFG260SG-R3.0		●	●		3						
	※ ZCFG300SG-R0.3		●	●	30	0.3	10	29.4	7.2			
	※ ZCFG300SG-R0.5		●	●		0.5						
	※ ZCFG300SG-R1.0		●	●		1						
	※ ZCFG300SG-R1.5		●	●		1.5						
	※ ZCFG300SG-R2.0		●	●		2						
	※ ZCFG300SG-R3.0		●	●		3						
	※ ZCFG320SG-R0.3		●	●	32	0.3	10	30.4	7.2			
	※ ZCFG320SG-R0.5		●	●		0.5						
	※ ZCFG320SG-R1.0		●	●		1						
	※ ZCFG320SG-R1.5		●	●		1.5						
※ ZCFG320SG-R2.0	●	●	2									
※ ZCFG320SG-R3.0	●	●	3									
<p>Fig.2</p>	ZCFG06NSW-R0.3	F	●	●	6	0.3	2	5	2	Fig1		
	ZCFG06NSW-R0.5		●	●		0.5						
	ZCFG080SW-R0.3		●	●	8	0.3	2.5	9.9	2.1			
	ZCFG080SW-R0.5		●	●		0.5						
	ZCFG080SW-R1.0		●	●	10	1	3	12.5	2.7			
	※ ZCFG100SW-R0.3		●	●		0.3						
	※ ZCFG100SW-R0.5		●	●		0.5						
	※ ZCFG100SW-R1.0		●	●		1						
	※ ZCFG120SW-R0.3		●	●	12	0.3	4	15.1	3.2			
	※ ZCFG120SW-R0.5		●	●		0.5						
	※ ZCFG120SW-R1.0		●	●	13	1	4	15.1	3.2			
	※ ZCFG130SW-R0.3		●	●		0.3						
	※ ZCFG130SW-R0.5		●	●		0.5						
	※ ZCFG130SW-R1.0		●	●	16	1	5	17.2	4.2			
	※ ZCFG160SW-R0.3		●	●		0.3						
	※ ZCFG160SW-R0.5		●	●		0.5						
	※ ZCFG160SW-R1.0		●	●		1						
	※ ZCFG170SW-R0.3		●	●	17	0.3	5	17.2	4.2			
	※ ZCFG170SW-R0.5		●	●		0.5						
	※ ZCFG170SW-R1.0		●	●		1						
	※ ZCFG200SW-R0.3		●	●	20	0.3	7	20.9	5.2			
	※ ZCFG200SW-R0.5		●	●		0.5						
	※ ZCFG200SW-R1.0		●	●		1						
	※ ZCFG210SW-R0.3		●	●	21	0.3	7	20.9	5.2			
	※ ZCFG210SW-R0.5		●	●		0.5						
	※ ZCFG210SW-R1.0		●	●		1						
	※ ZCFG250SW-R0.3		●	●	25	0.3	8	24.4	6.2			
	※ ZCFG250SW-R0.5		●	●		0.5						
	※ ZCFG250SW-R1.0		●	●		1						
	※ ZCFG260SW-R0.3		●	●	26	0.3	8	24.4	6.2			
	※ ZCFG260SW-R0.5		●	●		0.5						
	※ ZCFG260SW-R1.0		●	●		1						
※ ZCFG300SW-R0.3	●	●	30	0.3	10	29.4	7.2					
※ ZCFG300SW-R0.5	●	●		0.5								
※ ZCFG300SW-R1.0	●	●		1								
※ ZCFG320SW-R0.3	●	●	32	0.3	10	30.4	7.2					
※ ZCFG320SW-R0.5	●	●		0.5								
※ ZCFG320SW-R1.0	●	●		1								

※ mark: Re-grinding is applicable with insert ϕ 10 or above. Insert ϕ 16 or above may be re-ground up to twice.

● : Stocked Items.

P	Steels		: General cutting, First recommendation : General cutting, Second recommendation
K	FC-FCD Cast irons		
N	Aluminum alloys		
H	Hardened steels		

Shape	Item code	Tolerance class	PN Coating	Size (mm)				Shape
				PN215	DC	LE	INSL	
 Fig.3	ZCFG080SQ	F	●	8	2.5	9.9	2.1	Fig3
	* ZCFG100SQ		●	10	3	12.5	2.7	
	* ZCFG120SQ		●	12	4	15.1	3.2	
	* ZCFG130SQ		●	13	4	15.1	3.2	
	* ZCFG160SQ		●	16	5	17.2	4.2	
	* ZCFG170SQ		●	17	5	17.2	4.2	
	* ZCFG200SQ		●	20	7	20.9	5.2	
	* ZCFG210SQ		●	21	7	20.9	5.2	
	* ZCFG250SQ		●	25	8	24.4	6.2	
	* ZCFG260SQ		●	26	8	24.4	6.2	

[Note] Inserts of SG, SW, SQ type can be installed on Ball Precision F "ABPF type" bodies.
 Inserts ($\phi 8 \sim \phi 32$) of SG, SW, SQ type have a design with a longer A dimension than conventional products. Be careful of the dimension when installed on body.

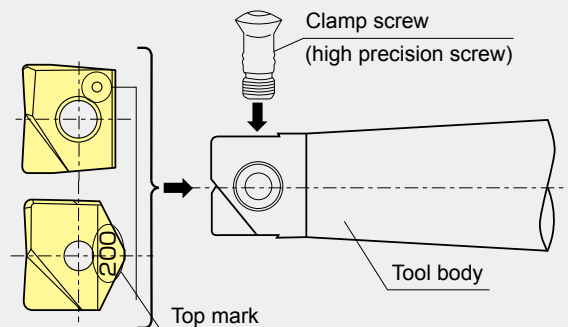
* mark: Re-grinding is applicable with insert $\phi 10$ or above. Insert $\phi 16$ or above may be re-ground up to twice.

Please inquire insert re-grinding / re-coating to sales office.

Set-up Procedures of Inserts

- 1 Clean the insert seat: Using air-blow or alike, clean the seat.
- 2 Put in the insert with its top positioned to the screw-tightening side of the tool body.
- 3 Tighten the clamp screw with the special wrench.
Please do not press down the insert during this tightening process.
- 4 This is the end of insert set-up.

In order to satisfy runout of 0.02mm or less, follow the procedure at above.



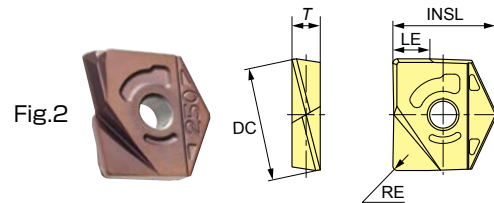
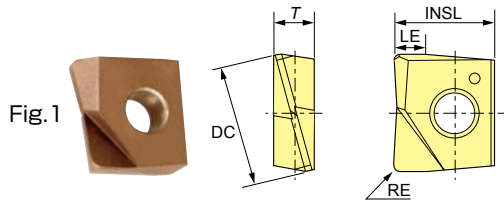
Attention

Never tighten the clamp screw without putting the insert. The tool body may be deformed, resulting in improper insert mounting or deterioration of mounting accuracy.



Do not tighten the screw without putting insert

General cutting edge shape inserts



Item code	Tolerance class	Coating				Size (mm)					Shape	
		C Coating PCA12M	TH Coating PTH08M	HD Coating HD7010	CBN BH250	DC	RE	LE	INSL	T		
ZCFW060-R0.3	F		●	●*	—	6	0.3	2	5	2	Fig.1	
ZCFW060-R0.5			●	●*	—		0.5					
ZCFW060-R1.0			●	●*	—		1					
ZCFW080-R0.3			●	●	●*	—	8	0.3	2.5	9.7	2.1	
ZCFW080-R0.5			●	●	●*	—		0.5				
ZCFW080-R1.0			●	●	●*	—		1				
* ZCFW100-R0.3			●	●	●*	—	10	0.3	3	12	2.7	
* ZCFW100-R0.5			●	●	●*	—		0.5				
* ZCFW100-R1.0			●	●	●*	—		1				
* ZCFW100-R1.5			●	●	●*	—		1.5				
* ZCFW100-R2.0			●	●	●*	—		2				
* ZCFW100-R3.0			●	●	●*	—	3	4	14.6	3.2		
* ZCFW120-R0.3			●	●	●*	—	12	0.3				
* ZCFW120-R0.5			●	●	●*	—		0.5				
* ZCFW120-R1.0			●	●	●*	—		1				
* ZCFW120-R1.5			●	●	●*	—		1.5				
* ZCFW120-R2.0			●	●	●*	—		2				
* ZCFW120-R3.0			●	●	●*	—	3	5	16.6	4.2	Fig.2	
* ZCFW160-R0.3			●	●	●*	—	16					0.3
* ZCFW160-R0.5			●	●	●*	—						0.5
* ZCFW160-R1.0			●	●	●*	●						1
* ZCFW160-R1.5			●	●	●*	●						1.5
* ZCFW160-R2.0			●	●	●*	●		2				
* ZCFW160-R3.0			●	●	●*	—	3	6	19.9	5.2		
* ZCFW200-R0.3			●	●	●*	—	20					0.3
* ZCFW200-R0.5			●	●	●*	—						0.5
* ZCFW200-R1.0			●	●	●*	●						1
* ZCFW200-R1.5			●	●	●*	●						1.5
* ZCFW200-R2.0			●	●	●*	●		2				
* ZCFW200-R3.0			●	●	●*	—	3	8	22.6	6.2		
* ZCFW250-R0.3			●	●	●*	—	25					0.3
* ZCFW250-R0.5			●	●	●*	—						0.5
* ZCFW250-R1.0		●	●	●*	●	1						
* ZCFW250-R2.0		●	●	●*	●	2						
* ZCFW250-R3.0		●	●	●*	—	3						
* ZCFW300-R0.3		●	●	●*	—	30	0.3	10	27.2	7.2		
* ZCFW300-R0.5		●	●	●*	—		0.5					
* ZCFW300-R1.0		●	●	●*	●		1					
* ZCFW300-R2.0		●	●	●*	●		2					
* ZCFW300-R3.0		●	●	●*	—		3					
* ZCFW320-R0.3		●	●	●*	—	32	0.3	10	28.2	7.2		
* ZCFW320-R0.5		●	●	●*	—		0.5					
* ZCFW320-R1.0		●	●	●*	—		1					
* ZCFW320-R2.0		●	●	●*	—		2					
* ZCFW320-R3.0		●	●	●*	—		3					

: General cutting, First recommendation
 : General cutting, Second recommendation

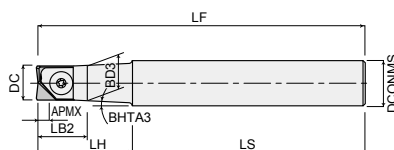
*mark: HD7010 insert cannot be reground. *mark: Inserts with diameters of $\phi 10$ or more except HD7010 can be reground. Insert $\phi 16$ or above may be re-ground up to twice.

Please inquire insert re-grinding / re-coating to sales office.

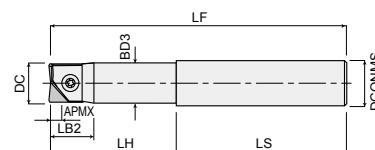
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Steel shank · Carbide shank

ARPF○○S○○ (□○○○/□○○○)



Type A (Taper Neck)



Type B (Straight Neck)

Type	Item code	Stock	No. of inserts	Size (mm)									Shape	Inserts		
				DC	LF	DCONMS	APMX	LB2	LH	BHTA3	BD3	LS				
Regular shank	ARPF06S10	●	1	6	80	10	2.0	15	30	8.25°	5.4	50	A	ZCFG06NS□(R○○)	ZCFW060-R○○	
	ARPF08S12	●	1	8	100(100.2)	12	2.5	10(10.2)	22(22.2)	9.5°	7.5	78	A	ZCFG080S□(R○○)	ZCFW080-R○○	
	ARPF10S12	●	1	10	100(100.4)	12	3.0	13(13.4)	25(25.4)	3°	9.5	75	A	ZCFG100S□(R○○)	ZCFW100-R○○	
	ARPF12S12	●	1	12 13*	110(110.6)	12	4.0	21(21.6)	30(30.6)	—	11.5	80	B	ZCFG120S□(R○○) ZCFG130S□(R○○)*	ZCFW120-R○○	
	ARPF16S16	●	1	16 17*	130(130.6)	16	5.0	27(27.6)	50(50.6)	—	15	80	B	ZCFG160S□(R○○) ZCFG170S□(R○○)*	ZCFW160-R○○	
	ARPF20S20	●	1	20 21*	140(141)	20	6.0	35(36)	60(61)	—	19	80	B	ZCFG200S□(R○○) ZCFG210S□(R○○)*	ZCFW200-R○○	
	ARPF25S25	●	1	25 26*	150(151.8)	25	8.0	43(44.8)	70(71.8)	—	24	80	B	ZCFG250S□(R○○) ZCFG260S□(R○○)*	ZCFW250-R○○	
	ARPF30S32	●	1	30	160(162.2)	32	10.0	55(57.2)	80(82.2)	—	29	80	B	ZCFG300S□(R○○)	ZCFW300-R○○	
	ARPF32S32	●	1	32	160(162.2)	32	10.0	58(60.2)	80(82.2)	—	31	80	B	ZCFG320S□(R○○)	ZCFW320-R○○	
Under neck long	ARPF08S12L	●	1	8	130(130.2)	12	2.5	10(10.2)	50(50.2)	3°	7.5	80	A	ZCFG080S□(R○○)	ZCFW080-R○○	
	ARPF10S16L	●	1	10	150(150.4)	16	3.0	13(13.4)	50(50.4)	4.5°	9.5	100	A	ZCFG100S□(R○○)	ZCFW100-R○○	
	ARPF12S16L	●	1	12 13*	160(160.6)	16	4.0	21(21.6)	60(60.6)	2°	11.5	100	A	ZCFG120S□(R○○) ZCFG130S□(R○○)*	ZCFW120-R○○	
	ARPF16S16L	●	1	16 17*	165(165.6)	16	5.0	27(27.6)	65(65.6)	—	15	100	B	ZCFG160S□(R○○) ZCFG170S□(R○○)*	ZCFW160-R○○	
	ARPF20S20L	●	1	20	180(181)	20	6.0	35(36)	80(81)	—	19	100	B	ZCFG200S□(R○○)	ZCFW200-R○○	
	ARPF20S20L120	●	1	20 21*	220(221)	20	6.0	35(36)	120(121)	—	19	100	B	ZCFG200S□(R○○) ZCFG210S□(R○○)*	ZCFW200-R○○	
	ARPF20S20L150	●	1	20	250(251)	20	6.0	35(36)	150(151)	—	19	100	B	ZCFG210S□(R○○)	ZCFW200-R○○	
	ARPF25S25L	●	1	25	200(201.8)	25	8.0	43(44.8)	90(91.8)	—	24	110	B	ZCFG250S□(R○○)	ZCFW250-R○○	
	ARPF25S32L150	●	1	26*	250(251.8)	32	8.0	43(44.8)	150(151.8)	—	24	100	B	ZCFG260S□(R○○)	ZCFW250-R○○	
	ARPF30S32L	●	1	30	220(222.2)	32	10.0	55(57.2)	100(102.2)	—	29	120	B	ZCFG300S□(R○○)	ZCFW300-R○○	
	ARPF30S32L150	●	1	30	250(252.2)	32	10.0	55(57.2)	150(152.2)	—	29	100	B	ZCFG300S□(R○○)	ZCFW300-R○○	
ARPF30S32L200	●	1	30	300(302.2)	32	10.0	55(57.2)	200(202.2)	—	29	100	B	ZCFG300S□(R○○)	ZCFW300-R○○		
ARPF32S32L	●	1	32	220(222.2)	32	10.0	58(60.2)	100(102.2)	—	31	120	B	ZCFG320S□(R○○)	ZCFW320-R○○		
Long shank	ARPF16S16E	●	1	16 17*	200(200.6)	16	5.0	27(27.6)	65(65.6)	—	15	135	B	ZCFG160S□(R○○) ZCFG170S□(R○○)*	ZCFW160-R○○	
	ARPF20S20E	●	1	20 21*	250(251)	20	6.0	35(36)	80(81)	—	19	170	B	ZCFG200S□(R○○) ZCFG210S□(R○○)*	ZCFW200-R○○	
	ARPF25S25E	●	1	25	300(301.8)	25	8.0	43(44.8)	90(91.8)	—	24	210	B	ZCFG250S□(R○○)	ZCFW250-R○○	
	ARPF25S32E	●	1	25	300(301.8)	32	8.0	43(44.8)	100(101.8)	3.5°	24	200	A	ZCFG260S□(R○○)	ZCFW250-R○○	
	ARPF30S32E	●	1	30	350(352.2)	32	10.0	55(57.2)	100(102.2)	—	29	250	B	ZCFG300S□(R○○)	ZCFW300-R○○	
	ARPF30S42E	●	1	30	350(352.2)	42	10.0	55(57.2)	120(122.2)	5.3°	29	230	A	ZCFG300S□(R○○)	ZCFW300-R○○	
	ARPF32S32E	●	1	32	350(352.2)	32	10.0	58(60.2)	100(102.2)	—	31	250	B	ZCFG320S□(R○○)	ZCFW320-R○○	
Carbide shank	Regular shank	ARPF06S06W	●	1	6	90	6	2.0	10.3	25	—	5.5	65	B	ZCFG06NS□(R○○)	ZCFW060-R○○
		ARPF06S06WL65	●	1	6	120	6	2.0	10.3	65	—	5.5	55	B	ZCFG06NS□(R○○)	ZCFW060-R○○
	Under neck long	ARPF08S08WL	●	1	8	130(130.2)	8	2.5	65(65.2)	65(65.2)	—	7.5	65	B	ZCFG080S□(R○○)	ZCFW080-R○○
		ARPF10S10WL	●	1	10	140(140.4)	10	3.0	18(18.4)	75(75.4)	—	9.5	65	B	ZCFG100S□(R○○)	ZCFW100-R○○
		ARPF12S12WL	●	1	12 13*	150(150.6)	12	4.0	21(21.6)	85(85.6)	—	11.5	65	B	ZCFG120S□(R○○) ZCFG130S□(R○○)*	ZCFW120-R○○
		ARPF16S16WE	●	1	16 17*	200(200.6)	16	5.0	27(27.6)	120(120.6)	—	15	80	B	ZCFG160S□(R○○) ZCFG170S□(R○○)*	ZCFW160-R○○
		ARPF20S20WE	●	1	20 21*	250(251)	20	6.0	35(36)	150(151)	—	19	100	B	ZCFG200S□(R○○) ZCFG210S□(R○○)*	ZCFW200-R○○
ARPF25S25WE	●	1	25 26*	300(301.8)	25	8.0	43(44.8)	190(191.8)	—	24	110	B	ZCFG250S□(R○○) ZCFG260S□(R○○)*	ZCFW250-R○○		
Long shank	ARPF30S32WE	●	1	30	350(352.2)	32	10.0	55(57.2)	230(232.2)	—	29	120	B	ZCFG300S□(R○○)	ZCFW300-R○○	
	ARPF32S32WE	●	1	32	350(352.2)	32	10.0	58(60.2)	230(232.2)	—	31	120	B	ZCFG320S□(R○○)	ZCFW320-R○○	

●: Stocked Items.

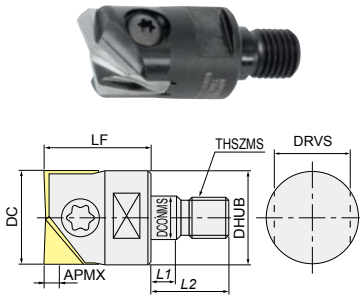
[Note] Dimensions in parentheses () are with ZCFG type inserts installed.

Line Up

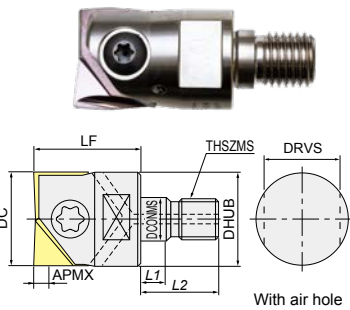
Modular Mill Type

ARPFM

Numeric figure in a circle ○ and alphabetical character comes in a square □.



Item code	Stock	No. of inserts	Size (mm)									Inserts	
			DC	LF	APMX	DCONMS	THSZMS	DHUB	L1	L2	DRVS		
ARPFM10	●	1	10	26(26.4)	3	6.5	M6	9.8	5.5	14.5	7	ZCFG100S (R○) (○)	ZCFW100-R (○) (○)
ARPFM12	●	1	12 13*	26(26.6)	4	6.5	M6	9.8	5.5	14.5	7	ZCFG120S (R○) (○) ZCFG130S (R○) (○)	ZCFW120-R (○) (○)
ARPFM16	●	1	16 17*	32(32.6)	5	8.5	M8	12.8	5.5	17	10	ZCFG160S (R○) (○) ZCFG170S (R○) (○)	ZCFW160-R (○) (○)
ARPFM20	●	1	20 21*	38(39)	6	10.5	M10	17.8	5.5	19	15	ZCFG200S (R○) (○) ZCFG210S (R○) (○)	ZCFW200-R (○) (○)
ARPFM25	●	1	25 26*	38(39.8)	8	12.5	M12	20.8	5.5	22	17	ZCFG250S (R○) (○) ZCFG260S (R○) (○)	ZCFW250-R (○) (○)
ARPFM30	●	1	30	43(45.2)	10	17	M16	28.8	6	23	22	ZCFG300S (R○) (○)	ZCFW300-R (○) (○)
ARPFM32	●	1	32	43(45.2)	10	17	M16	28.8	6	23	22	ZCFG320S (R○) (○)	ZCFW320-R (○) (○)



Item code	Stock	No. of inserts	Size (mm)									Inserts	
			DC	LF	APMX	DCONMS	THSZMS	DHUB	L1	L2	DRVS		
ARPFM10-H	●	1	10	26 (26.4)	3	6.5	M6	9.8	5.5	14.5	7	ZCFG100S (R○) (○)	ZCFW100-R (○) (○)
ARPFM12-H	●	1	12 13*	26 (26.6)	4	6.5	M6	9.8	5.5	14.5	7	ZCFG120S (R○) (○) ZCFG130S (R○) (○)	ZCFW120-R (○) (○)
ARPFM16-H	●	1	16 17*	32 (32.6)	5	8.5	M8	12.8	5.5	17	10	ZCFG160S (R○) (○) ZCFG170S (R○) (○)	ZCFW160-R (○) (○)
ARPFM20-H	●	1	20 21*	38 (39)	6	10.5	M10	17.8	5.5	19	15	ZCFG200S (R○) (○) ZCFG210S (R○) (○)	ZCFW200-R (○) (○)
ARPFM25-H	●	1	25 26*	38 (39.8)	8	12.5	M12	20.8	5.5	22	17	ZCFG250S (R○) (○) ZCFG260S (R○) (○)	ZCFW250-R (○) (○)
ARPFM30-H	●	1	30	43 (45.2)	10	17	M16	28.8	6	23	22	ZCFG300S (R○) (○)	ZCFW300-R (○) (○)
ARPFM32-H	●	1	32	43 (45.2)	10	17	M16	28.8	6	23	22	ZCFG320S (R○) (○)	ZCFW320-R (○) (○)

※A ϕ 13 mm insert can be mounted on a ϕ 12 mm body, a ϕ 17 mm insert can be mounted on a ϕ 16 mm body, a ϕ 21 mm insert can be mounted on a ϕ 20 mm body, or a ϕ 26 mm insert can be mounted on a ϕ 25 mm body.

[Note] Do not apply lubricants such as grease, etc. to the "contact faces" and "modular screws" of the "modular mill", "dedicated shanks" and "dedicated arbor".
Dimensions in parentheses () are with ZCFG type inserts installed.

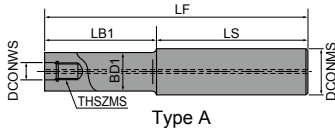
Parts

Parts	Shape	Clamp screw		Screw Driver / Wrench			Screw anti-seizure agent
		Fastening torque (N·m)	Type	A	B	C	
Cutter body							
ARPF06S (W/WL)		581-140	0.5	104-T6	A		
ARPF08S (L/WL)		581-141	1.1	104-T8	A		
ARPF10S (L/WL) ARPFM10(-H)		581-142	2.2	104-T10	A		
ARPF12S (L/WL) ARPFM12(-H)		581-143	4.9	105-T20	B		
ARPF16S (L/E/WE) ARPFM16(-H)		581-144	4.9		B		
ARPF20S (L/E/WE) ARPFM20(-H)		581-145	6.9	101-T25S	B		
ARPF25S (L/E/WE) ARPFM25(-H)		581-146	9.8	105-T30A	C		
ARPF30S (L/E/WE) ARPFM30(-H)		581-147	9.8		C		
ARPF32S (L/E/WE) ARPFM32(-H)					C		

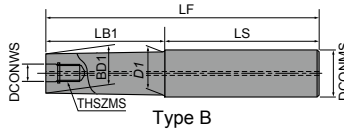
[Note] The clamp screw is a consumable part. Since replacement life depends on the use environment, it is recommended that it be replaced at an early stage.

The Shanks for Modular Mill

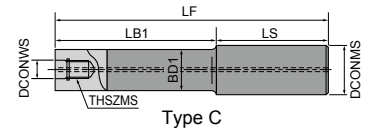
Carbide Shank



Type A



Type B

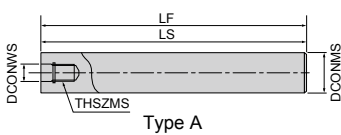


Type C

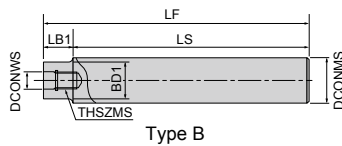
Item code	Stock	Size (mm)								Type	Cutter body	With/without air hole
		DCONWS	THSZMS	LF	LB1	LS	BD1	DCONMS	D1			
ASC10-6.5-74-24Z	●	6.5	M6	74	24	50	9.3	10	-	A	φ10	○
ASC10-6.5-84-34Z	●			84	34	50						
ASC10-6.5-114-49Z	●			114	49	65						
ASC10-6.5-114-24Z	●				24	90						
ASC12-6.5-74-24Z	●	6.5	M6	74	24	50	11	12	11.5	B	φ10 φ12	○
ASC12-6.5-94-44Z	●			94	44	50						
ASC12-6.5-129-64Z	●			129	64	65						
ASC12-6.5-129-24Z	●				24	105						
ASC16-8.5-95-30Z	●	8.5	M8	95	30	65	14.5	16	15.5	B	φ16	○
ASC16-8.5-120-55Z	●			120	55	65						
ASC16-8.5-140-75Z	●			140	75	65						
ASC16-8.5-160-95Z	●			160	95	65						
ASC16-8.5-160-30Z	●			160	30	130						
ASC20-10.5-120-50Z	●	10.5	M10	120	50	70	18.5	20	19.5	B	φ20	○
ASC20-10.5-170-90Z	●			170	90	80						
ASC20-10.5-220-120Z	●			220	120	100						
ASC20-10.5-270-150Z	●			270	150	120						
ASC20-10.5-220-50Z	●	10.5	M10	220	50	170	18.5	20	19.5	B	φ20	○
ASC20-10.5-270-50Z	●			270		220						
ASC25-12.5-145-65	●	12.5	M12	145	65	80	23	25	-	C	φ25	○
ASC25-12.5-215-115	●			215	115	100						
ASC25-12.5-265-145	●			265	145	120						
ASC25-12.5-315-195	●			315	195	120						
ASC25-12.5-265-65	●	12.5	M12	265	65	200	23	25	-	C	φ25	○
ASC25-12.5-315-65	●			315		250						
ASC32-17-160-80	●	17	M16	160	80	80	28	32	-	C	φ32	○
ASC32-17-210-110	●			210	110	100						
ASC32-17-260-140	●			260	140	120						
ASC32-17-310-190	●			310	190	120						
ASC32-17-360-240	●			360	240	120						
ASC32-17-260-80	●			260	80	180						
ASC32-17-310-80	●	17	M16	310		230	28	32	-	C	φ32	○
ASC32-17-360-80	●			360		280						

[Note] Can be used with commercially available milling chucks or shrink-fit holders.

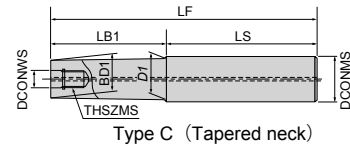
Steel Shank



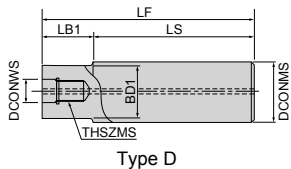
Type A



Type B



Type C (Tapered neck)

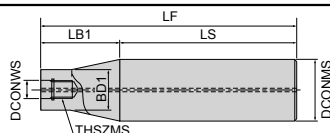


Type D

Item code	Stock	Size (mm)								Type	Cutter body
		DCONWS	THSZMS	LF	LB1	LS	BD1	DCONMS	D1		
AS10-6.5-74-0	●	6.5	M6	74	-	74	-	10	-	A	φ10
AS12-6.5-84-4	●	6.5	M6	84	4	80	11	12	-	B	φ12
AS16-8.5-95-15	●	8.5	M8	95	15	80	14.5	16	15.5	C	φ16
AS20-10.5-100-20	●	10.5	M10	100	20	80	18	20	-	D	φ20
AS25-12.5-115-35	●	12.5	M12	115	35	80	23	25	-	D	φ25
AS32-17-110-30	●	17	M16	110	30	80	28	32	-	D	φ30 φ32

[Note] Commercial milling chucks can be used.

Steel Shank



Item code	Stock	Size (mm)							Cutter body
		DCONWS	THSZMS	LF	LB1	LS	BD1	DCONMS	
AS42-17-360-90	●	17	M16	360	90	270	28	42	φ30 φ32

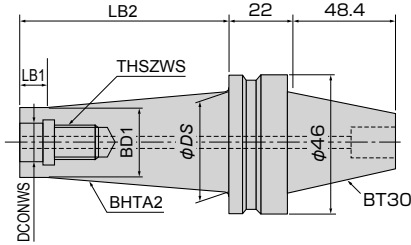
[Note] Commercial milling chucks can be used.

● : Stocked Items.

Line Up

Modular Mill Arbor

BT30

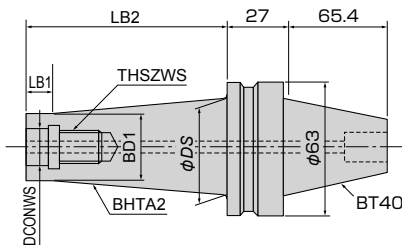


※For neck section, additional machining to user specifications is possible.

Item code	Stock	Size (mm)						
		DCONWS	THSZWS	BD1	φDS	LB2	LB1	BHTA2
BT30-6.5-30-9.7						30	5	17°
BT30-6.5-55-9.7		6.5	M6	9.7	25	55	10	9.6°
BT30-6.5-85-9.7	80					10	6.2°	
BT30-8.5-25-15	25					5	20.6°	
BT30-8.5-50-15		8.5	M8	15	30	50	10	10.6°
BT30-8.5-75-15	75					10	6.6°	
BT30-10.5-20-18	20					5	29.5°	
BT30-10.5-45-18		10.5	M10	18	35	45	10	13.7°
BT30-10.5-70-18	70					10	8.1°	
BT30-12.5-15-21	15					5	32.3°	
BT30-12.5-40-21		12.5	M12	21	40	40	10	17.6°
BT30-12.5-65-21	65					10	9.8°	
BT30-12.5-85-21	85					10	7.2°	
BT30-17-10-28		17	M16	28	40	10	5	31°
BT30-17-35-28	35					10	13.5°	
BT30-17-60-28	60					10	6.8°	

[Note] If vibrations are a concern due to the processing conditions, adjust conditions by 1.reducing cutting depth (ap) or 2.reducing per-flute feed rate (fz).

BT40

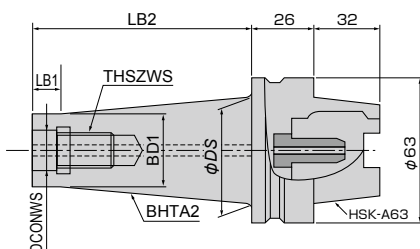


※For neck section, additional machining to user specifications is possible.

Item code	Stock	Size (mm)						
		DCONWS	THSZWS	BD1	φDS	LB2	LB1	BHTA2
BT40-6.5-30-9.7						30	5	17°
BT40-6.5-55-9.7		6.5	M6	9.7	25	55	10	9.6°
BT40-6.5-80-9.7	80					10	6.2°	
BT40-6.5-130-9.7	130					10	3.6°	
BT40-8.5-25-15		8.5	M8	15	30	25	5	20.6°
BT40-8.5-50-15	50					10	10.6°	
BT40-8.5-75-15	75					10	6.6°	
BT40-8.5-125-15						125	10	3.7°
BT40-10.5-20-18		10.5	M10	18	35	20	5	29.5°
BT40-10.5-45-18	45					10	13.7°	
BT40-10.5-70-18	70					10	8.1°	
BT40-10.5-120-18						120	10	4.4°
BT40-12.5-15-21		12.5	M12	21	40	15	5	32.3°
BT40-12.5-40-21	40					10	17.6°	
BT40-12.5-65-21	65					10	9.8°	
BT40-12.5-115-21						115	10	5.2°
BT40-17-10-28		17	M16	28	48	10	5	45°
BT40-17-35-28	35					10	21.8°	
BT40-17-60-28	60					10	11.3°	
BT40-17-110-28						110	10	5.7°

HSK

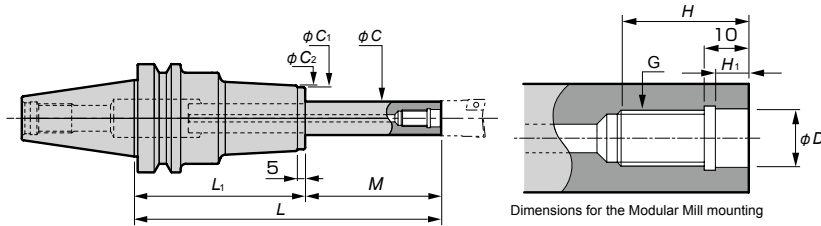
(Modular Mill Type)



Item code	Stock	Size (mm)							
		DCONWS	THSZWS	BD1	φDS	LB2	LB1	BHTA2	
HSK-A63-10.5-30-18	●	10.5	M10	18	20.8	30	-	3°	
HSK-A63-10.5-70-18	●					25	70	10	3°
HSK-A63-10.5-70-18S	●					48	70	10	12°
HSK-A63-10.5-120-18	●				30.2	120	10	3°	
HSK-A63-12.5-35-21	●	12.5	M12	21	24.3	35	-	3°	
HSK-A63-12.5-65-21	●					27.5	65	10	3°
HSK-A63-12.5-65-21S	●					48	65	10	12°
HSK-A63-12.5-115-21	●				32.7	115	10	3°	
HSK-A63-17-40-28	●	17	M16	28	31.8	40	-	3°	
HSK-A63-17-60-28	●					33.9	60	10	3°
HSK-A63-17-60-28S	●					48	60	10	9.5°
HSK-A63-17-110-28	●					39.2	110	10	3°

No Mark : Manufactured upon request only.

Red screw arbor



Caution

- Some of the indexable end mills cannot be attached to the RED screw arbor. Please check your indexable end mills for conformance to the dimensions, or please contact MOLDINO Tool Engineering, Ltd.
- Because cutting resistance is greater than the tool holder connection force associated with the machine spindle, please reduce the recommended cutting conditions by 50% for the RED screw arbors marked with ※. Otherwise, the tool holder shank may experience fretting corrosion or fall out of the machine spindle.

Item Code	Stock	Size(mm)										Weight (kg)	Rigidity value (μm) ↓
		G	φD	H	H1	φC	L	M	L1	φC1	φC2		
BT40-RSG8-105-M25							105	80				1.4	0.6
BT40-RSG8-135-M25							135	25	110			1.8	0.7
BT40-RSG8-165-M25							165	140				2.1	0.8
BT40-RSG8-130-M50							130	80				1.4	1.5
BT40-RSG8-160-M50							160	50	110			1.8	1.7
BT40-RSG8-190-M50							190	140				2.1	1.8
BT40-RSG8-155-M75							155	80				1.5	3.1
BT40-RSG8-185-M75		M8	8.5	18	6.5	15	185	75	110	30	32	1.9	3.4
BT40-RSG8-215-M75							215	140				2.2	3.5
BT40-RSG8-170-M90							170	140				1.5	4.5
BT40-RSG8-200-M90							200	90	110			1.9	4.8
BT40-RSG8-230-M90							230	140				2.2	4.9
BT40-RSG8-185-M105							185	80				1.6	6.2
BT40-RSG8-215-M105							215	105	110			2.0	6.7
BT40-RSG8-245-M105							245	140				2.3	6.8
BT40-RSG10-125-M25							125	100				1.8	0.4
BT40-RSG10-155-M25							155	25	130			2.2	0.5
BT40-RSG10-185-M25							185	160				2.4	0.7
BT40-RSG10-150-M50							150	100				1.9	0.8
BT40-RSG10-180-M50							180	50	130			2.3	1.0
BT40-RSG10-210-M50							210	160				2.5	1.2
BT40-RSG10-175-M75							175	100				2.0	1.6
BT40-RSG10-205-M75		M10	10.5	22	6.5	19	205	75	130	36	38	2.4	1.8
BT40-RSG10-235-M75							235	160				2.6	2.0
BT40-RSG10-200-M100							200	100				2.0	2.7
BT40-RSG10-230-M100							230	100	130			2.4	3.0
BT40-RSG10-260-M100							260	160				2.6	3.3
BT40-RSG10-220-M120							220	100				2.1	4.0
BT40-RSG10-250-M120							250	120	130			2.5	4.3
BT40-RSG10-280-M120							280	160				2.7	4.6
BT40-RSG12-125-M25							125	100				2.0	0.3
BT40-RSG12-155-M25							155	25	130			2.4	0.4
BT40-RSG12-185-M25							185	160				2.7	0.5
BT40-RSG12-150-M50							150	100				2.1	0.5
BT40-RSG12-180-M50							180	50	130			2.5	0.7
BT40-RSG12-210-M50							210	160				2.8	0.9
BT40-RSG12-175-M75							175	100				2.3	0.9
BT40-RSG12-205-M75		M12	12.5	22	6	24	205	75	130	43	45	2.7	1.1
BT40-RSG12-235-M75							235	160				3.0	1.3
BT40-RSG12-200-M100							200	100				2.4	1.4
BT40-RSG12-230-M100							230	100	130			2.8	1.6
BT40-RSG12-260-M100							260	160				3.1	1.9
BT40-RSG12-225-M125							225	100				2.6	2.1
BT40-RSG12-255-M125							255	125	130			3.0	2.4
BT40-RSG12-285-M125							285	160				3.3	2.8
BT40-RSG16-125-M25							125	25				2.6	0.2
BT40-RSG16-150-M50							150	50				2.8	0.3
BT40-RSG16-175-M75		M16	17	25	6	29	175	75	100	52	54	3.0	0.5
BT40-RSG16-200-M100							200	100				3.2	0.8
BT40-RSG16-225-M125 ※							225	125				3.4	1.2
BT50-RSG8-120-M25							120	95				4.0	0.6
BT50-RSG8-150-M25							150	25	125			4.3	0.7
BT50-RSG8-180-M25							180	155				4.8	0.7
BT50-RSG8-145-M50							145	95				4.0	1.5
BT50-RSG8-175-M50							175	50	125			4.3	1.7
BT50-RSG8-205-M50							205	155				4.8	1.7
BT50-RSG8-170-M75							170	95				4.1	3.1
BT50-RSG8-200-M75		M8	8.5	18	6.5	15	200	75	125	30	32	4.4	3.4
BT50-RSG8-230-M75							230	155				4.9	3.4
BT50-RSG8-185-M90							185	155				4.9	4.4
BT50-RSG8-215-M90							215	90	125			4.4	4.8
BT50-RSG8-245-M90							245	155				4.9	4.8
BT50-RSG8-200-M105							200	95				4.2	6.2
BT50-RSG8-230-M105							230	105	125			4.5	6.6
BT50-RSG8-260-M105							260	155				5.0	6.6
BT50-RSG10-140-M25		M10	10.5	22	6.5	19	140	25	115	36	38	4.3	0.4
BT50-RSG10-170-M25							170	145				4.6	0.5
BT50-RSG10-200-M25							200	25	175			2.1	0.5
BT50-RSG10-165-M50							165	115				1.8	1.5
BT50-RSG10-195-M50							195	50	145			2.2	1.7
BT50-RSG10-225-M50							225	175				2.5	1.9
BT50-RSG10-190-M75							190	115				1.9	1.7
BT50-RSG10-220-M75							220	75	145			2.2	1.8
BT50-RSG10-250-M75							250	175				2.5	1.9
BT50-RSG10-215-M100		M10	10.5	22	6.5	19	215	115		36	38	2.1	3.4
BT50-RSG10-245-M100							245	100	145			2.4	3.5
BT50-RSG10-275-M100							275	175				1.5	4.5
BT50-RSG10-235-M120							235	115				1.9	4.8
BT50-RSG10-265-M120							265	120	145			2.2	4.9
BT50-RSG10-295-M120							295	175				2.9	5.2
BT50-RSG10-255-M140							255	115				2.5	5.5
BT50-RSG10-285-M140							285	140	145			2.8	5.8
BT50-RSG10-315-M140							315	175				3.1	6.0
BT50-RSG12-140-M25							140	115				1.4	0.2
BT50-RSG12-170-M25							170	25	145			1.7	0.3
BT50-RSG12-200-M25							200	175				2.0	0.4
BT50-RSG12-165-M50							165	115				1.6	0.5
BT50-RSG12-195-M50							195	50	145			1.9	0.6
BT50-RSG12-225-M50							225	175				2.2	0.6
BT50-RSG12-190-M75							190	115				1.9	0.8
BT50-RSG12-220-M75							220	75	145			2.2	1.0
BT50-RSG12-250-M75							250	175				2.5	1.1
BT50-RSG12-215-M100		M12	12.5	22	6	24	215	115		43	45	2.1	1.3
BT50-RSG12-245-M100							245	100	145			2.4	1.5
BT50-RSG12-275-M100							275	175				2.7	1.6
BT50-RSG12-240-M125							240	115				2.4	2.1
BT50-RSG12-270-M125							270	125	145			2.7	2.3
BT50-RSG12-300-M125							300	175				3.0	2.4
BT50-RSG12-265-M150							265	115				2.6	3.0
BT50-RSG12-295-M150							295	150	145			2.9	3.3
BT50-RSG12-325-M150							325	175				3.2	3.4
BT50-RSG12-290-M175							290	115				2.9	4.2
BT50-RSG12-320-M175							320	175	145			3.2	4.6
BT50-RSG12-350-M175							350	175				3.5	4.6
BT50-RSG16-140-M25							140	115				1.4	0.2
BT50-RSG16-170-M25							170	25	145			1.7	0.2
BT50-RSG16-200-M25							200	175				2.0	0.2
BT50-RSG16-165-M50							165	115				1.6	0.3
BT50-RSG16-195-M50							195	50	145			1.9	0.4
BT50-RSG16-225-M50							225	175				2.2	0.4
BT50-RSG16-190-M75							190	115				1.9	0.5
BT50-RSG16-220-M75							220	75	145			2.2	0.6
BT50-RSG16-250-M75							250	175				2.5	0.6
BT50-RSG16-215-M100							215	115				2.1	0.7
BT50-RSG16-245-M100							245	100	145			2.4	0.9
BT50-RSG16-275-M100							275	175				2.7	0.9
BT50-RSG16-240-M125							240	115				2.4	1.1
BT50-RSG16-270-M125		M16	17	25	6	29	270	125	145	52	54	2.7	1.3
BT50-RSG16-300-M125							300	175				3.0	1.3
BT50-RSG16-265-M150							265	115				2.6	1.6
BT50-RSG16-295-M150							295	150	145			2.9	1.8
BT50-RSG16-325-M150							325	175				3.2	1.8
BT50-RSG16-290-M175							290	115				2.9	2.2
BT50-RSG16-320-M175							320	175	145			3.2	2.4
BT50-RSG16-350-M175							350	175					

Line Up

Item Code	Stock	Size(mm)										Weight (kg)	Rigidity value (μm) $\delta \downarrow$
		G	ϕD	H	H ₁	ϕC	L	M	L ₁	ϕC_1	ϕC_2		
A63-RSG8-130-M50						130	80					1.3	1.5
A63-RSG8-160-M50						160	50 110					1.4	1.7
A63-RSG8-190-M50						190	140					1.9	1.7
A63-RSG8-155-M75						155	80					1.4	3.1
A63-RSG8-185-M75						185	75 110					1.5	3.4
A63-RSG8-215-M75						215	140					2.0	3.4
A63-RSG8-170-M90		M8	8.5	18	6.5	15	170	80	30	32		2.0	4.4
A63-RSG8-200-M90						200	90 110					1.5	4.8
A63-RSG8-230-M90						230	140					2.0	4.9
A63-RSG8-185-M105						185	80					1.5	6.2
A63-RSG8-215-M105						215	105 110					1.6	6.6
A63-RSG8-245-M105						245	140					2.1	6.7
A63-RSG10-125-M25						125	100					1.6	0.4
A63-RSG10-155-M25						155	25 130					1.9	0.5
A63-RSG10-185-M25						185	160					2.3	0.6
A63-RSG10-150-M50						150	100					1.7	0.8
A63-RSG10-180-M50						180	50 130					2.0	1.0
A63-RSG10-210-M50						210	160					2.4	1.2
A63-RSG10-175-M75						175	100					1.8	1.6
A63-RSG10-205-M75						205	75 130					2.1	1.8
A63-RSG10-235-M75						235	160					2.5	2.0
A63-RSG10-200-M100		M10	10.5	22	6.5	19	200	100	36	38		1.8	2.7
A63-RSG10-230-M100						230	100 130					2.1	2.9
A63-RSG10-260-M100						260	160					2.5	3.2
A63-RSG10-220-M120						220	100					1.9	4.0
A63-RSG10-250-M120						250	120 130					2.2	4.2
A63-RSG10-280-M120						280	160					2.6	4.5
A63-RSG10-240-M140						240	100					2.0	5.6
A63-RSG10-270-M140						270	140 130					2.3	5.9
A63-RSG10-300-M140						300	160					2.7	6.2
A63-RSG12-125-M25						125	100					1.9	0.3
A63-RSG12-155-M25						155	25 130					2.3	0.4
A63-RSG12-185-M25						185	160					2.7	0.5
A63-RSG12-150-M50						150	100					2.0	0.5
A63-RSG12-180-M50						180	50 130					2.4	0.6
A63-RSG12-210-M50						210	160					2.8	0.8
A63-RSG12-175-M75						175	100					2.2	0.9
A63-RSG12-205-M75						205	75 130					2.6	1.0
A63-RSG12-235-M75						235	160					3.0	1.3
A63-RSG12-200-M100		M12	12.5	22	6	24	200	100	43	45		2.3	1.4
A63-RSG12-230-M100						230	100 130					2.7	1.6
A63-RSG12-260-M100						260	160					3.1	1.9
A63-RSG12-225-M125						225	100					2.5	2.1
A63-RSG12-255-M125						255	125 130					2.9	2.4
A63-RSG12-285-M125						285	160					3.3	2.7
A63-RSG12-250-M150						250	100					2.6	3.1
A63-RSG12-280-M150						280	150 130					3.0	3.4
A63-RSG12-310-M150						310	160					3.4	3.8
A63-RSG16-140-M25						140	25					2.8	0.2
A63-RSG16-165-M50						165	50					3.2	0.4
A63-RSG16-190-M75						190	75					3.6	0.6
A63-RSG16-215-M100		M16	17	25	6	29	215	100 115	52	54		2.8	0.9
A63-RSG16-240-M125						240	125					2.8	1.3
A63-RSG16-265-M150						265	150					3.2	1.9
A63-RSG16-290-M175						290	175					3.6	2.5
A100-RSG8-120-M25						120	95					2.6	0.6
A100-RSG8-150-M25						150	25 125					2.9	0.8
A100-RSG8-180-M25						180	155					3.4	0.8
A100-RSG8-145-M50						145	95					2.6	1.5
A100-RSG8-175-M50						175	50 125					2.9	1.7
A100-RSG8-205-M50						205	155					3.4	1.7
A100-RSG8-170-M75		M8	8.5	18	6.5	15	170	95	30	32		2.7	3.1
A100-RSG8-200-M75						200	75 125					3.0	3.4
A100-RSG8-230-M75						230	155					3.5	3.4
A100-RSG8-185-M90						185	95					2.7	4.5
A100-RSG8-215-M90						215	90 125					3.0	4.9
A100-RSG8-245-M90						245	155					3.5	4.8
A100-RSG8-200-M105						200	105 95					2.8	6.3
A100-RSG8-230-M105						230	105					3.5	6.3
A100-RSG8-260-M105						260	105					4.2	6.6
A100-RSG10-140-M25						140	115					1.40	115
A100-RSG10-170-M25						170	25 145					1.70	145
A100-RSG10-200-M25						200	175					2.00	175
A100-RSG10-165-M50						165	115					1.65	115
A100-RSG10-195-M50						195	50 145					1.95	145
A100-RSG10-225-M50						225	175					2.25	175
A100-RSG10-190-M75						190	115					1.90	115
A100-RSG10-220-M75						220	75 145					2.20	145
A100-RSG10-250-M75						250	175					2.50	175
A100-RSG10-215-M100		M10	10.5	22	6.5	19	215	115	36	38		2.15	115
A100-RSG10-245-M100						245	100 145					2.45	145
A100-RSG10-275-M100						275	175					2.75	175
A100-RSG10-235-M120						235	115					2.35	115
A100-RSG10-265-M120						265	120 145					2.65	145
A100-RSG10-295-M120						295	175					2.95	175
A100-RSG10-255-M140						255	115					2.55	115
A100-RSG10-285-M140						285	140 145					2.85	145
A100-RSG10-315-M140						315	175					3.15	175
A100-RSG12-140-M25						140	115					1.40	115
A100-RSG12-170-M25						170	25 145					1.70	145
A100-RSG12-200-M25						200	175					2.00	175
A100-RSG12-165-M50						165	115					1.65	115
A100-RSG12-195-M50						195	50 145					1.95	145
A100-RSG12-225-M50						225	175					2.25	175
A100-RSG12-190-M75						190	115					1.90	115
A100-RSG12-220-M75						220	75 145					2.20	145
A100-RSG12-250-M75						250	175					2.50	175
A100-RSG12-215-M100						215	115					2.15	115
A100-RSG12-245-M100		M12	12.5	22	6	24	245	100 145	43	45		2.45	145
A100-RSG12-275-M100						275	175					2.75	175
A100-RSG12-240-M125						240	115					2.40	115
A100-RSG12-270-M125						270	125 145					2.70	145
A100-RSG12-300-M125						300	175					3.00	175
A100-RSG12-265-M150						265	115					2.65	115
A100-RSG12-295-M150						295	150 145					2.95	145
A100-RSG12-325-M150						325	175					3.25	175
A100-RSG12-290-M175						290	115					2.90	115
A100-RSG12-320-M175						320	175 145					3.20	145
A100-RSG12-350-M175						350	175					3.50	175
A100-RSG16-140-M25						140	115						

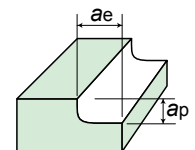
Recommended Cutting Conditions

※Red indicates primary recommended insert grade.

Work material	Insert grade		Cutting conditions	φ6			φ8			φ10			φ12		
	SG·SW (helical cutting edge inserts)	General edge shape		Semi finishing		Finishing	Semi finishing		Finishing	Semi finishing		Finishing	Semi finishing		Finishing
				General purpose	High-speed processing		General purpose	High-speed processing		General purpose	High-speed processing		General purpose	High-speed processing	
Carbon steels Alloy steels (30HRC or less)	※ PN215 TH308	PTH08M (PCA12M)	n (min ⁻¹)	8,490	16,450	16,450	6,370	11,940	11,940	5,090	9,550	9,550	4,240	7,960	7,960
			V_c (m/min)	160	310	310	160	300	300	160	300	300	160	300	300
			V_f (mm/min)	1,700	2,300	2,300	2,550	3,580	3,580	2,040	2,870	2,870	1,700	2,390	2,390
			f_z (mm/t)	0.1	0.07	0.07	0.2	0.15	0.15	0.2	0.15	0.15	0.2	0.15	0.15
			a_p (mm)	0.1	0.1	0.05	0.2	0.2	0.1	0.25	0.25	0.1	0.3	0.3	0.1
			a_e (mm)	0.6	0.3	0.2	0.8	0.4	0.2	1	0.5	0.2	1.2	0.6	0.2
Carbon steels Alloy steels (30~45HRC)	TH308 PN215	PTH08M (PCA12M)	n (min ⁻¹)	6,370	14,850	14,850	4,770	11,150	11,150	3,820	8,920	8,920	3,180	7,430	7,430
			V_c (m/min)	120	280	280	120	280	280	120	280	280	120	280	280
			V_f (mm/min)	1,270	2,080	2,080	1,910	3,350	3,350	1,530	2,680	2,680	1,270	2,230	2,230
			f_z (mm/t)	0.1	0.07	0.07	0.2	0.15	0.15	0.2	0.15	0.15	0.2	0.15	0.15
			a_p (mm)	0.1	0.1	0.05	0.2	0.2	0.1	0.25	0.25	0.1	0.3	0.3	0.1
			a_e (mm)	0.6	0.3	0.2	0.8	0.4	0.2	1	0.5	0.2	1.2	0.6	0.2
Cast irons	TH308 PN215	PTH08M (PCA12M)	n (min ⁻¹)	8,490	20,160	20,160	6,370	15,120	15,120	5,090	12,100	12,100	4,240	10,080	10,080
			V_c (m/min)	160	380	380	160	380	380	160	380	380	160	380	380
			V_f (mm/min)	2,550	4,030	4,030	3,820	6,050	6,050	3,050	4,840	4,840	2,550	4,030	4,030
			f_z (mm/t)	0.15	0.1	0.1	0.3	0.2	0.2	0.3	0.2	0.2	0.3	0.2	0.2
			a_p (mm)	0.1	0.1	0.05	0.2	0.2	0.1	0.25	0.2	0.1	0.3	0.3	0.1
			a_e (mm)	0.6	0.3	0.2	0.8	0.4	0.2	1	0.4	0.2	1.2	0.6	0.2
Graphite	HD7010	HD7010	n (min ⁻¹)	15,920	21,220	21,220	11,940	15,920	15,920	9,550	12,740	12,740	7,960	10,620	10,620
			V_c (m/min)	300	400	400	300	400	400	300	400	400	300	400	400
			V_f (mm/min)	3,180	6,370	4,240	4,780	9,550	6,370	3,820	7,640	5,100	3,190	6,370	4,240
			f_z (mm/t)	0.1	0.15	0.1	0.2	0.3	0.2	0.2	0.3	0.2	0.2	0.3	0.2
			a_p (mm)	0.3	0.15	0.15	0.4	0.2	0.2	0.5	0.3	0.2	0.6	0.4	0.2
			a_e (mm)	0.6	0.6	0.2	0.8	0.8	0.25	1	0.8	0.25	1.2	0.9	0.3
Cast aluminum alloys AC4A, ADC12 etc	PN215	HD7010	n (min ⁻¹)	15,920	26,530	26,530	11,940	19,900	19,900	9,550	15,920	15,920	7,960	13,270	13,270
			V_c (m/min)	300	500	500	300	500	500	300	500	500	300	500	500
			V_f (mm/min)	3,180	10,610	5,310	4,780	15,920	7,960	3,820	12,740	6,370	3,190	10,620	5,310
			f_z (mm/t)	0.1	0.2	0.1	0.2	0.4	0.2	0.2	0.4	0.2	0.2	0.4	0.2
			a_p (mm)	0.3	0.15	0.15	0.4	0.2	0.2	0.5	0.3	0.2	0.6	0.4	0.2
			a_e (mm)	0.6	0.6	0.2	0.8	0.8	0.25	1	0.8	0.25	1.2	0.9	0.3
Hardened steels 45~55HRC	TH308 PN215	PTH08M (PCA12M)	n (min ⁻¹)	5,310	14,850	14,850	3,980	11,150	11,150	3,180	8,920	8,920	2,650	7,430	7,430
			V_c (m/min)	100	280	280	100	280	280	100	280	280	100	280	280
			V_f (mm/min)	850	1,190	1,190	800	1,120	1,120	640	890	890	530	740	740
			f_z (mm/t)	0.08	0.04	0.04	0.1	0.05	0.05	0.1	0.05	0.05	0.1	0.05	0.05
			a_p (mm)	0.1	0.1	0.05	0.2	0.2	0.1	0.25	0.25	0.1	0.3	0.3	0.1
			a_e (mm)	0.6	0.2	0.2	0.8	0.2	0.2	1	0.25	0.2	1.2	0.3	0.2
Hardened steels 55~62HRC	TH308	PTH08M	n (min ⁻¹)	4,240	11,670	11,670	3,180	8,760	8,760	2,550	7,000	7,000	2,120	5,840	5,840
			V_c (m/min)	80	220	220	80	220	220	80	220	220	80	220	220
			V_f (mm/min)	680	930	930	640	880	880	510	700	700	420	580	580
			f_z (mm/t)	0.08	0.04	0.04	0.1	0.05	0.05	0.1	0.05	0.05	0.1	0.05	0.05
			a_p (mm)	0.1	0.1	0.05	0.2	0.2	0.1	0.25	0.25	0.1	0.3	0.3	0.1
			a_e (mm)	0.6	0.2	0.2	0.8	0.2	0.2	1	0.25	0.2	1.2	0.3	0.2
Maximum f_z (mm/t)				<0.2			<0.5			<0.5			<0.5		
Maximum a_p (mm)				<0.6			<2.5			<3.0			<4.0		

[Note]

1. Use the appropriate coolant for the work material and machining shape.
2. These conditions are for general guidance; in actual machining conditions adjust the parameters according to your actual machine and work-piece conditions.
3. Be sure to practice safety instructions and precautions such as wearing glasses and safety shoes, and placing safety covers when you use this tool. Because this tool can be broken during machining so failure to follow these instructions may cause personal injury.
4. Never attempt to modify the carbide shank holder. Use the value for the depth of cut (a_p) when the carbide shank holder is used.
Tool dia. DC ≤ 12mm: a_p ≤ 0.2mm. Tool dia. DC ≥ 16mm: a_p ≤ 0.3mm.



Recommended Cutting Conditions

※Red indicates primary recommended insert grade.

Work material	Insert grade		Cutting conditions	φ16			φ20			φ25			φ30			φ32		
	SG·SW (helical cutting edge inserts)	General edge shape		Semi finishing		Finishing	Semi finishing		Finishing	Semi finishing		Finishing	Semi finishing		Finishing	Semi finishing		Finishing
				General purpose	High-speed processing		General purpose	High-speed processing		General purpose	High-speed processing		General purpose	High-speed processing		General purpose	High-speed processing	
Carbon steels Alloy steels (30HRC or less)	※ PN215 TH308	PTH08M (PCA12M)	n (min ⁻¹)	3,190	5,970	5,970	2,550	4,780	4,780	2,040	3,820	3,820	1,700	3,180	3,180	1,590	2,990	2,990
			Vc (m/min)	160	300	300	160	300	300	160	300	300	160	300	300	160	300	300
			Vf (mm/min)	1,600	2,390	2,390	1,280	1,910	1,910	1,020	1,530	1,530	850	1,270	1,270	800	1,200	1,200
			fz (mm/t)	0.25	0.2	0.2	0.25	0.2	0.2	0.25	0.2	0.2	0.25	0.2	0.2	0.25	0.2	0.2
			ap (mm)	0.8	0.8	0.2	1	1	0.2	1.25	1.25	0.2	1.6	1.6	0.2	1.6	1.6	0.2
			ae (mm)	1.6	1.6	0.2	2	2	0.2	2.5	2.5	0.2	3.2	3.2	0.2	3.2	3.2	0.2
Carbon steels Alloy steels (30~45HRC)	TH308 PN215	PTH08M (PCA12M)	n (min ⁻¹)	2,390	5,570	5,570	1,910	4,460	4,460	1,530	3,570	3,570	1,270	2,970	2,970	1,190	2,790	2,790
			Vc (m/min)	120	280	280	120	280	280	120	280	280	120	280	280	120	280	280
			Vf (mm/min)	1,200	2,230	2,230	960	1,780	1,780	760	1,430	1,430	640	1,190	1,190	600	1,120	1,120
			fz (mm/t)	0.25	0.2	0.2	0.25	0.2	0.2	0.25	0.2	0.2	0.25	0.2	0.2	0.25	0.2	0.2
			ap (mm)	0.8	0.8	0.2	1	1	0.2	1.25	1.25	0.2	1.6	1.6	0.2	1.6	1.6	0.2
			ae (mm)	1.6	1.6	0.2	2	2	0.2	2.5	2.5	0.2	3.2	3.2	0.2	3.2	3.2	0.2
Cast irons	TH308 PN215	PTH08M (PCA12M)	n (min ⁻¹)	3,190	7,560	7,560	2,550	6,050	6,050	2,040	4,840	4,840	1,700	4,030	4,030	1,590	3,780	3,780
			Vc (m/min)	160	380	380	160	380	380	160	380	380	160	380	380	160	380	380
			Vf (mm/min)	2,240	4,540	4,540	1,790	3,630	3,630	1,430	2,900	2,900	1,190	2,420	2,420	1,110	2,270	2,270
			fz (mm/t)	0.35	0.3	0.3	0.35	0.3	0.3	0.35	0.3	0.3	0.35	0.3	0.3	0.35	0.3	0.3
			ap (mm)	0.8	0.8	0.2	1	1	0.2	1.25	1.25	0.2	1.6	1.6	0.2	1.6	1.6	0.2
			ae (mm)	1.6	1.6	0.2	2	2	0.2	2.5	2.5	0.2	3.2	3.2	0.2	3.2	3.2	0.2
Graphite	HD7010	HD7010	n (min ⁻¹)	5,970	7,960	7,960	4,780	6,370	6,370	3,830	5,100	5,100	3,190	4,250	4,250	3,190	3,980	3,980
			Vc (m/min)	300	400	400	300	400	400	300	400	400	300	400	400	300	400	400
			Vf (mm/min)	2,990	4,780	3,980	2,390	3,820	3,190	1,920	3,060	2,550	1,600	2,550	2,130	1,600	2,390	1,990
			fz (mm/t)	0.25	0.3	0.25	0.25	0.3	0.25	0.25	0.3	0.25	0.25	0.3	0.25	0.25	0.3	0.25
			ap (mm)	0.8	0.6	0.2	1	0.7	0.2	1.25	1.25	0.2	1.6	1.6	0.2	1.6	1.6	0.2
			ae (mm)	1.6	1.1	0.3	2	1.5	0.4	2.5	2.5	0.4	3.2	3.2	0.4	3.2	3.2	0.4
Cast aluminum alloys AC4A, ADC12 etc	PN215	HD7010	n (min ⁻¹)	5,970	9,950	9,950	4,780	7,960	7,960	3,830	6,370	6,370	3,190	5,310	5,310	3,190	4,980	4,980
			Vc (m/min)	300	500	500	300	500	500	300	500	500	300	500	500	300	500	500
			Vf (mm/min)	2,990	7,960	4,980	2,390	6,370	3,980	1,920	5,100	3,190	1,600	4,250	2,660	1,600	3,980	2,490
			fz (mm/t)	0.25	0.4	0.25	0.25	0.4	0.25	0.25	0.4	0.25	0.25	0.4	0.25	0.25	0.4	0.25
			ap (mm)	0.8	0.6	0.2	1	0.7	0.2	1.25	1.25	0.2	1.6	1.6	0.2	1.6	1.6	0.2
			ae (mm)	1.6	1.1	0.3	2	1.5	0.4	2.5	2.5	0.4	3.2	3.2	0.4	3.2	3.2	0.4
Hardened steels 45~55HRC	TH308 PN215	PTH08M (PCA12M)	n (min ⁻¹)	1,990	5,570	5,570	1,590	4,460	4,460	1,270	3,570	3,570	1,060	2,970	2,970	1,000	2,790	2,790
			Vc (m/min)	100	280	280	100	280	280	100	280	280	100	280	280	100	280	280
			Vf (mm/min)	480	670	670	380	530	530	310	430	430	250	360	360	240	330	330
			fz (mm/t)	0.12	0.06	0.06	0.12	0.06	0.06	0.12	0.06	0.06	0.12	0.06	0.06	0.12	0.06	0.06
			ap (mm)	0.8	0.8	0.2	1	1	0.2	1.25	1.25	0.2	1.6	1.6	0.2	1.6	1.6	0.2
			ae (mm)	1.6	0.8	0.2	2	1	0.2	2.5	1.25	0.2	3.2	1.6	0.2	3.2	1.6	0.2
Hardened steels 55~62HRC	TH308	PTH08M	n (min ⁻¹)	1,590	4,380	4,380	1,270	3,500	3,500	1,020	2,800	2,800	850	2,330	2,330	800	2,190	2,190
			Vc (m/min)	80	220	220	80	220	220	80	220	220	80	220	220	80	220	220
			Vf (mm/min)	380	530	530	300	420	420	240	340	340	200	280	280	190	260	260
			fz (mm/t)	0.12	0.06	0.06	0.12	0.06	0.06	0.12	0.06	0.06	0.12	0.06	0.06	0.12	0.06	0.06
			ap (mm)	0.8	0.8	0.2	1	1	0.2	1.25	1.25	0.2	1.6	1.6	0.2	1.6	1.6	0.2
			ae (mm)	1.6	0.8	0.2	2	1	0.2	2.5	1.25	0.2	3.2	1.6	0.2	3.2	1.6	0.2
Maximum fz (mm/t)				<0.6			<0.6			<0.6			<0.6			<0.6		
Maximum ap (mm)				<5.0			<6.0			<8.0			<10.0			<10.0		

※If overhang length is 3DC or more, make adjustments to the table above according to the table at right.

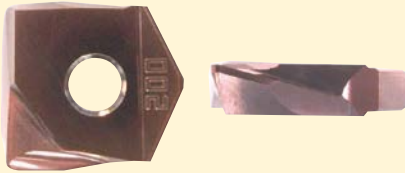
Overhang	Vc (m/min)	Vf (mm/min)
<3DC	100%	100%
3DC~5DC	70%	70%
5DC~8DC	60%	60%
8DC~10DC	50%	50%

Cutting performance

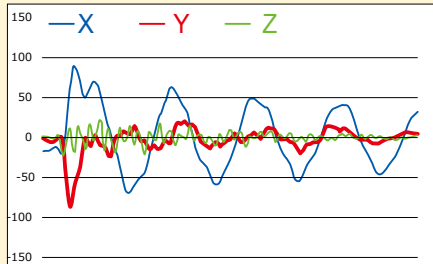
SG type

01 Cutting force comparison between conventional edge shape and high helix one.

ZCFG-SG(helical cutting edge inserts)

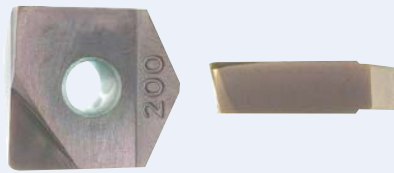


Insert : ZCFG200SG-R1.0

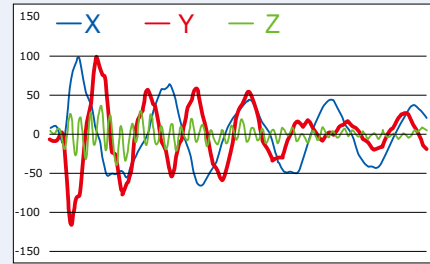


Compared to conventional tools, the cutting resistance (Y part force) received from the wall surface is low and the variation is also small so machining stability is good.

Conventional



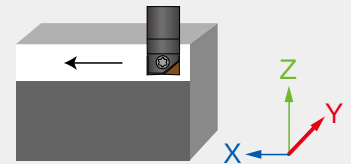
Insert : ZCFW200-R1.0



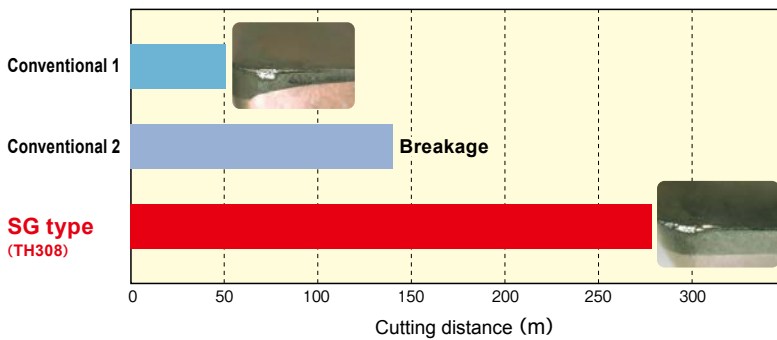
Cutting resistance variation is large.

Cutting conditions

Work material : S50C (220HB)
 Cutter : ARPFM20 (Tool dia. $\phi 20$ -R1.0)
 Insert : ZCFG200SG-R1.0 (TH308)
 ZCFW200-R1.0 (PTH08M)
 Shank : ASC20-10.5-170-90Z
 (Overhang : 140mm)
 Machine : Vertical type (BT50)
 Cutting speed : $v_c=200$ m/min
 Feed rate : $f_z=0.15$ mm/t
 Cutting depth (a_p)=1.0mm
 Radial depth of cut (a_e)=0.1mm
 Cutting shape : Standing wall (vertical)
 Coolant : Air



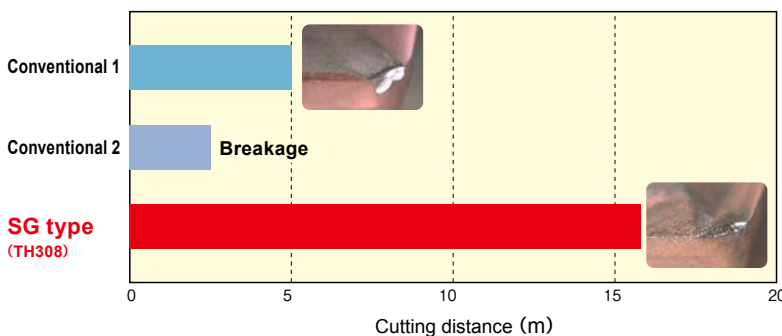
02 Tool service life when performing semi-finishing of standing walls



Cutting conditions

Work material : stainless materials (52HRC)
 Cutter : ARPFM20 (Tool dia. $\phi 20$)
 Shank : ASC20-10.5-120-50Z
 (Overhang : 60mm)
 Machine : Vertical type (BT50)
 Cutting speed : $v_c=120$ m/min
 Feed rate : $f_z=0.25$ mm/t
 Cutting depth (a_p)=1.0mm
 Radial depth of cut (a_e)=0.5mm
 Cutting shape : Standing wall
 Coolant : Air

03 Tool service life when performing semi-finishing of bottom surface



Cutting conditions

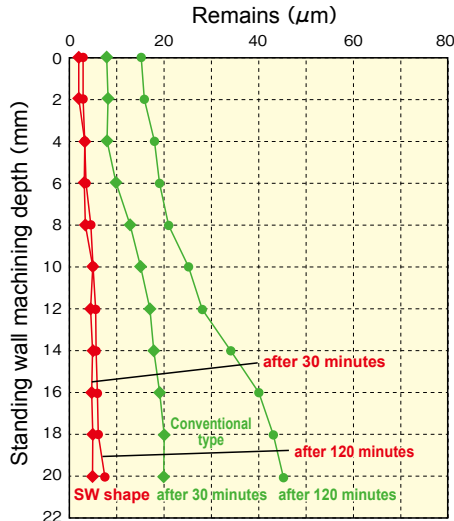
Work material : stainless materials (52HRC)
 Cutter : ARPFM20 (Tool dia. $\phi 20$)
 Shank : ASC20-10.5-120-50Z
 (Overhang : 60mm)
 Machine : Vertical type (BT50)
 Cutting speed : $v_c=120$ m/min
 Feed rate : $f_z=0.25$ mm/t
 Cutting depth (a_p)=0.5mm
 Radial depth of cut (a_e)=10mm
 Cutting shape : Planing
 Coolant : Air

Cutting performance

SW type

Remaining stock when cutting standing walls

※Comparison of remaining stock with conventional products when the standing wall was machined for 120 minutes.

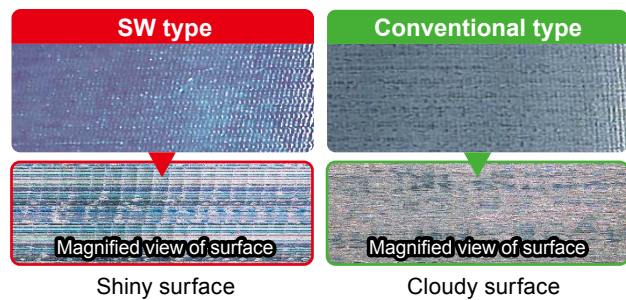


With SW type (PN215), even after machining for 120 minutes, the remaining stock was 10μm or less and cut surface quality is good.

Cutting conditions

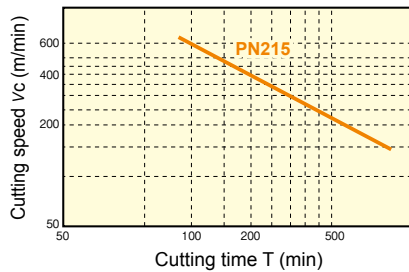
Work material : S50C (220HB)
 Cutter : ARPFM20 (Tool dia. $\phi 20$)
 Shank : ASC20-10.5-170-90Z
 (Overhang : 140mm)
 Machine : Vertical type (BT50)
 Cutting speed : $V_c=200\text{m/min}$
 Feed rate : $f_z=0.15\text{mm/t}$
 Cutting depth (a_p) = 1.0mm
 Radial depth of cut (a_e) = 0.1mm
 Cutting shape : Standing wall (vertical)
 Coolant : Air

Magnified view of surface after 120 minutes of machining



Field data

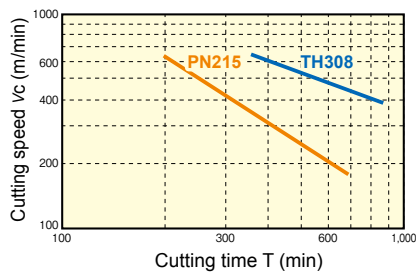
01 Vc-T chart for S50C [220HB]



Cutting conditions

Work material : S50C (220HB)
 Tool Cutter : ARPFM20 ($\phi 20$)
 Shank : ASC20-10.5-120-50Z
 Insert : ZCFG200SG-R1.0(PN215)
 Overhang : 80mm, Feed rate : $f_z=0.15\text{mm/t}$
 Radial depth of cut : $a_p \times a_e = 1 \times 0.1\text{mm}$
 Machine : Vertical type(BT50)
 Cutting shape : Standing wall, Coolant : Air

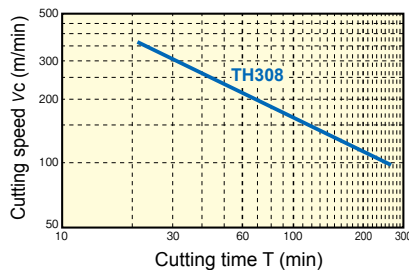
02 Vc-T chart for SKD61 [45HRC]



Cutting conditions

Work material : SKD61 (45HRC)
 Tool Cutter : ARPFM20 ($\phi 20$)
 Shank : ASC20-10.5-120-50Z
 Insert : ZCFG200SG-R1.0(PN215), ZCFG200SG-R1.0(TH308)
 Overhang : 80mm, Feed rate : $f_z=0.15\text{mm/t}$
 Radial depth of cut : $a_p \times a_e = 1 \times 0.1\text{mm}$
 Machine : Vertical type(BT50)
 Cutting shape : Standing wall, Coolant : Air

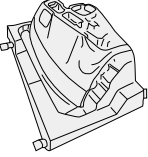
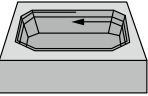
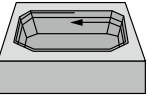
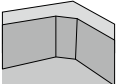
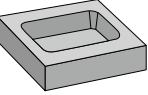
03 Vc-T chart for SKD11 [60HRC]



Cutting conditions

Work material : SKD11 (60HRC)
 Tool Cutter : ARPFM20 ($\phi 20$)
 Shank : ASC20-10.5-120-50Z
 Insert : ZCFG200SG-R1.0(TH308)
 Overhang : 80mm, Feed rate : $f_z=0.15\text{mm/t}$
 Radial depth of cut : $a_p \times a_e = 1 \times 0.1\text{mm}$
 Machine : Vertical type(BT50)
 Cutting shape : Standing wall, Coolant : Air

Field data

Cutting examples	Cutting conditions		Result
<p>Plastic mold</p> 	<p>Tool : ARPF20S20WE (OH=150mm) Work material : Carbon steels Insert : ZCFG200SG-R1.0 (PN215) Machine: Vertical type M/C(BT50) Cutting speed : Vc=220m/min Revolution : n=3500min⁻¹</p>	<p>Feed speed : Vf=1750mm/min Feed rate : fz=0.25mm/t Cutting depth : ap=0.2mm Radial depth of cut : ae=0.1mm Coolant : Dry(Air)</p>	<p>After 6 hours, the cutting edge is good with normal wear. The finished surface is also good compared with conventional products.</p>
<p>Plastic mold (S50C)</p> 	<p>Tool : ARPFM20 + ASC20-10.5-120-50Z(OH=90mm) Work material : Carbon steels Insert : ZCFG200SG-R1.0 (PN215) Machine : Vertical type M/C(BT50) Cutting speed : Vc=188m/min Revolution : n=3000min⁻¹</p>	<p>Feed speed : Vf=1500mm/min Feed rate : fz=0.25mm/t Cutting depth : ap=0.3mm Radial depth of cut : ae=0.4mm Coolant : Dry(Air)</p>	<p>Even after performing semi-finishing with non-uniform cutting for 7 hours, the cutting edge is good with no chipping.</p>
<p>Machining of die-casting mold (pocket area)</p> 	<p>Tool : ARPFM20+ASC20-10.5-220-120Z (OH=160mm) Work material : Equivalent to SKD61(40 ~ 43HRC) Insert : ZCFG200SW-R1.0 (TH308) Machine : Vertical type M/C(BT50) ■side wall Cutting speed : Vc=182m/min Revolution : n=2900min⁻¹ Feed speed : Vf=600mm/min Feed rate : fz=0.1mm/t Cutting depth : ap=0.1mm Radial depth of cut : ae=0.1mm</p>	<p>■planar section Cutting speed : Vc=70m/min Revolution : n=1100min⁻¹ Feed speed : Vf=180mm/min Feed rate : fz=0.08mm/t Cutting depth : ap=0.1mm Radial depth of cut : ae=8mm Coolant : Dry(Air)</p>	<p>Machining accuracy for both side surface areas and flat surface areas is good. With conventional indexable tools, machining accuracy had been a problem.</p>
<p>Machining of die-casting mold</p> 	<p>Tool : ARPFM20+ASC20-10.5-170-90Z(OH=130mm) Work material : SKD61(45HRC) Insert : ZCFG200SG-R1.0 (PN215) Machine : Vertical type M/C(BT50) Cutting speed : Vc=88m/min Revolution : n=1400min⁻¹</p>	<p>Feed speed : Vf=280mm/min Feed rate : fz=0.1mm/t Cutting depth : ap=0.5mm Radial depth of cut : ae=1mm Coolant : Dry(Air)</p>	<p>Even when machining corner areas where cutting amount is non-uniform, the cutting edge is good with no chipping.</p>
<p>Machining of die-casting mold (structural area)</p> 	<p>Tool : ARPFM20+ASC20-10.5-170-90Z(OH=130mm) Work material : SKD61(45HRC) Insert : ZCFG200SG-R1.0 (TH308) Machine : Vertical type M/C(BT50) Cutting speed : Vc=200m/min Revolution : n=3200min⁻¹</p>	<p>Feed speed : Vf=1600mm/min Feed rate : fz=0.25mm/t Cutting depth : ap=0.2mm Radial depth of cut : ae=0.1mm Coolant : Dry(Air)</p>	<p>Performing finishing once resulted in finishing that was within the specified dimensional tolerance. With conventional products, chattering often occurred and there were uncut areas so re-machining was necessary.</p>



The diagrams and table data are examples of test results, and are not guaranteed values.
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Attentions on Safety

1. Attentions regarding handling

- (1) When removing the tool from the case (package), be careful not to drop it on your foot or drop it onto the tips of your bare fingers.
- (2) When actually setting the inserts, be careful not to touch the cutting flute directly with your bare hands.

2. Attentions regarding mounting

- (1) When preparing for use, be sure that the inserts are firmly mounted in place and that they are firmly mounted on the arbor, etc.
- (2) If abnormal chattering occurs during use, stop the machine immediately and remove the cause of the chattering.

3. Attentions during use

- (1) Before use, confirm the dimensions and direction of rotation of the tool and milling work material.
- (2) The numerical values in the standard cutting conditions table should be used as criteria when starting new work. The cutting conditions should be adjusted as appropriate when the cutting depth is large, the rigidity of the machine being used is low, or according to the conditions of the work material.
- (3) The inserts are made of a hard material. During use, they may break and fly off. In addition, cutting chips may also fly off. Since there is a danger of injury to workers, fire, or eye damage from such flying pieces, a safety cover should be installed and safety equipment such as safety glasses should be worn to create a safe environment for work.
 - Do not use where there is a risk of fire or explosion.
 - Do not use non-water-soluble cutting oils. Such oils may result in fire.
- (4) Do not use the tool for any purpose other than that for which it is intended, and do not modify it.

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