

New Products 2023-2024



C
Chemical Vapor Deposition
V
D

CVD
TECHNOLOGY



KYOCERA'S COATING WORLD

Achieving Unprecedented Tool Life



P
Physical Vapor Deposition
V
D

MEGACOAT
NANO EX | Milling

New Products 2023-2024

Turning

New CVD coated carbide grade for steel	CA115P/CA125P	2
PVD coating for heat-resistant alloy	PR115S/PR120S	18
New coated CBN for machining hard materials	KBN010/KBN020	30
25° Insert profiling tools	ZBMT Series	38
Interchangeable head boring bars with anti-vibration dampener system	KAV Series	50

Milling

New 45° General purpose milling series	MB45	62
Tangential 90° end mill with 4-edge inserts	MA90	78
Next-generation PVD coating for milling	PR18 Series	92

Solid tools

High performance flat bottom drill	KDZ Series	106
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Turning indexable inserts

New CVD coated carbide grade for steel

CA115P/CA125P

Longer tool life in various steel machining environments

Expanded lineup of chipbreakers for steel machining in various applications



CA115P/CA125P drastically extends tool life

- Cost savings
- Reduced downtime
- Reduced inventory needed on hand
- Consistent machining quality
- Line automation and labor savings
- Promotes a carbon neutral society by reducing the amount of waste

Advancing technologies improve tool longevity

Advanced technology

New coating & New carbide substrate



Black & Gold

Excellent wear and fracture resistance

Innovative Layering Technology

Ultra-uniform alumina layering

Proprietary crystal forming technology

Achieving significant crystal growth uniformity and direction

Reduces crater wear and extends tool life



New development

PMG Chipbreaker for Medium-Roughing

Unique design covers a wide range of machining applications

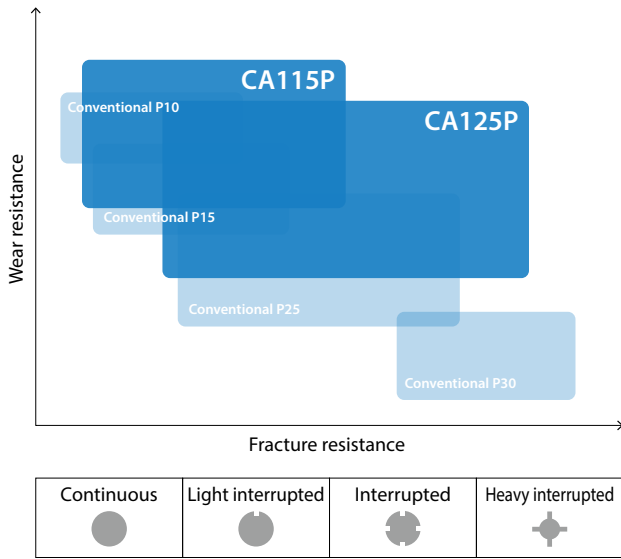
Maintains excellent chip control



1

Extended tool life in a wide variety of applications

Application Map



CA115P

Continuous-light interrupted machining of steel
For high-efficient machining with wear and chipping resistance

CA125P

Continuous-heavy interrupted steel machining
First recommendation for steel machining
High versatility

Solution

Long tool life in various machining environments from roughing to finishing

1 Shaft S43C

Good
Edge condition

CA125P maintained stability and achieved less wear than competitor A.



Edge condition



CA125P



Competitor A

Cutting conditions :
Vc = 200 m/min, ap = 0.5 mm
f = 0.3 mm/rev, Wet DNMG150408PP
Tool life : 150 pcs/corner

(User evaluation)

2 Sleeve HMM45

Tool life
 2 times

CA115P provides 2 times longer tool life than competitor B and maintained better edge wear.



Number of parts

CA115P **200 pcs/corner**

Competitor B **100 pcs/corner**

Cutting conditions :
Vc = 210 m/min, ap = 0.5 mm
f = 0.35 mm/rev, Wet DNMG150408PQ

(User evaluation)

3 Automotive parts SCM420H

Good
Edge condition

CA125P provides stable machining without chipping even after reaching the end of estimated tool life.



Edge condition



CA125P



Competitor C

Cutting conditions :
Vc = 160 m/min, ap = 1.0 mm
f = 0.32 mm/rev, Wet CNMG120412PG
Tool life : 100 pcs/corner

(User evaluation)

4 Automotive parts Non-tempered steel

Tool life
 1.4 times

CA125P shows 1.4 times longer tool life than competitor D.



Number of parts

CA125P **80 pcs/corner**

Competitor D **55 pcs/corner**

Cutting conditions :
Vc = 160 m/min, ap = 0.2 mm
f = 0.32 mm/rev, Wet CNMG120408PG

(User evaluation)

Solution

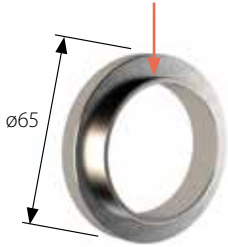
New PMG Chipbreaker provides up to 4 times longer tool life



5 Nut S45C

Tool life
↑
4 times

CA115P provides 4 times longer tool life than competitor E. The amount of wear after machining is also comparable.



Number of parts

CA115P 1,440 pcs/corner

Competitor E 360 pcs/corner

Cutting conditions :
Vc = 190 m/min, ap = 1.3 mm
f = 0.2 mm/rev, Wet CNMG120408PMG

(User evaluation)

6 Gear S35C

Tool life
↑
2 times

CA125P shows 2 times longer tool life than competitor F for stable machining even in interrupted machining sections.



Number of parts

CA125P 200 pcs/corner

Competitor F 100 pcs/corner

Cutting conditions :
Vc = 260 m/min, ap = 1.5 mm
f = 0.3 mm/rev, Wet CNMG120412PMG

(User evaluation)

7 Bearing SCM415

Good
Edge condition

CA125P maintained machining without fractures compared to competitor G, which was damaged frequently during machining.



Edge condition



CA125P



Competitor G

Cutting conditions :
Vc = 270 m/min, ap = 1.3 mm
f = 0.25 mm/rev, Wet WNMG080408PMG
Tool life : 300 pcs/corner

(User evaluation)

8 Yoke S45C

Tool life
↑
2 times

CA125P shows 2 times longer tool life than competitor H.



Number of parts

CA125P 100 pcs/corner

Competitor H 50 pcs/corner

Cutting conditions :
Vc = 160 m/min, ap = 1.0 mm
f = 0.37 mm/rev, Wet WNMG080408PMG

(User evaluation)

9 Bolt SCM440H

Good
Edge condition

CA125P has better chipping resistance against competitor I.



Edge condition



CA125P



Competitor I

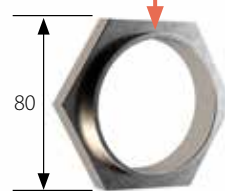
Cutting conditions :
Vc = 200 m/min, ap = 2.0 mm
f = 0.3 mm/rev, Wet TNMG160408PMG
Tool life : 130 pcs/corner

(User evaluation)

10 Nut S45C

Tool life
↑
2 times

CA125P shows 2 times longer tool life than competitor J due to improved wear resistance.



Number of parts

CA125P 720 pcs/corner

Competitor J 360 pcs/corner

Cutting conditions :
Vc = 200 m/min, ap = 2.2 mm
f = 0.2 mm/rev, Wet WNMG080408PMG

(User evaluation)



2 Newly developed proprietary coating and carbide substrate with superior wear and fracture resistance.

Optimized coating properties on rake and flank faces provides wear resistance and fracture resistance

The industry's most uniform alumina film* reduces crater wear

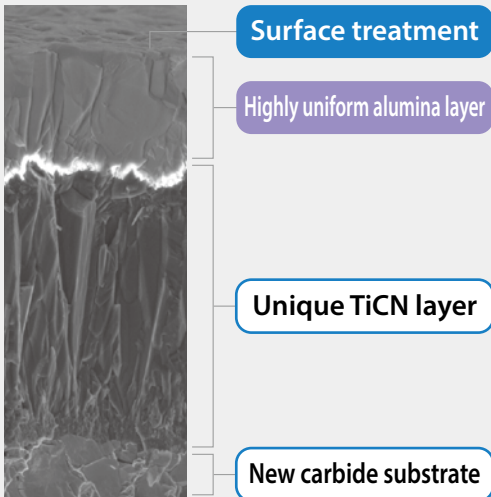
*March 2023, by Kyocera research

Black & Gold

Rake face

Suppresses crater wear and fracturing

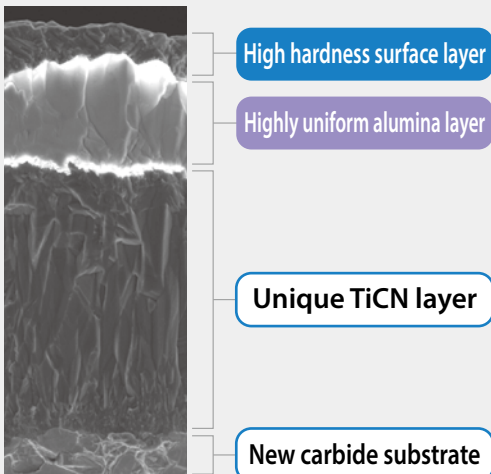
- New surface treatment technology improves fracture resistance
- Highly uniform alumina layer reduces wear



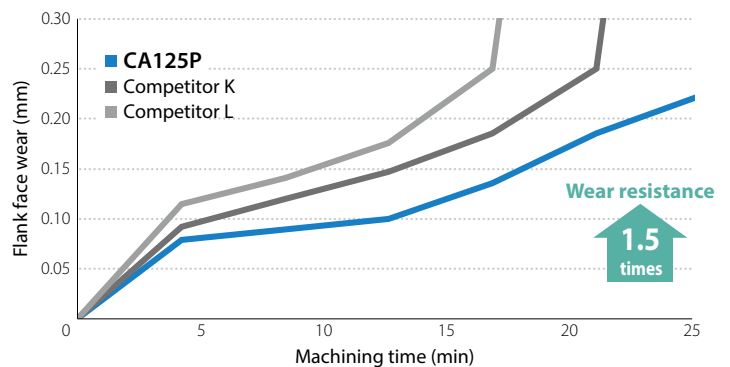
Flank face

Improved wear resistance

- High hardness surface layer suppresses abrasion
- Uniform alumina layer reduces wear
- Easy to see edge defects with golden surface

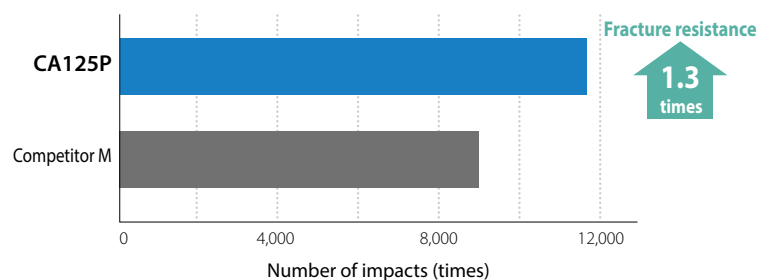


Wear resistance comparison (Internal evaluation)



Cutting conditions : $V_c = 300$ m/min, $a_p = 1.5$ mm, $f = 0.3$ mm/rev, Wet
Workpiece material : SCM435

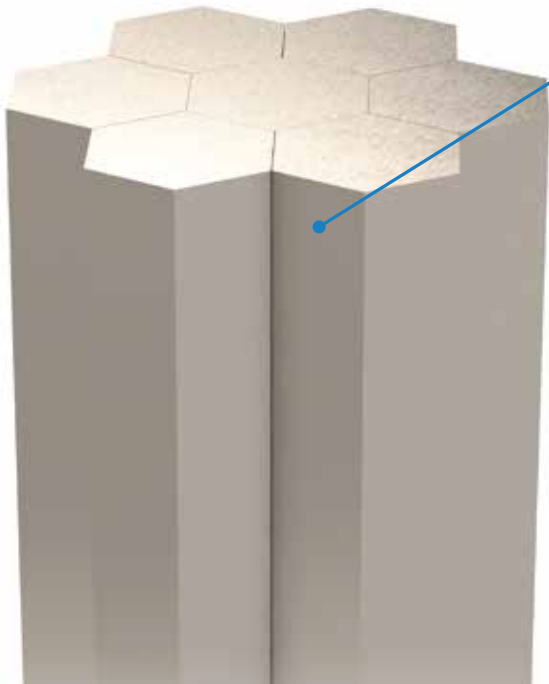
Fracture resistance comparison (Internal evaluation) Interrupted machining n = 3 mean



Cutting conditions : $V_c = 300$ m/min, $a_p = 1.5$ mm, $f = 0.35$ mm/rev, Wet Workpiece : S45C (4 grooves)

Highly uniform alumina layer

Excellent wear resistance due to the most uniform crystal orientation in the industry.*



Alumina film crystal structure (CG image)

Uniform crystal orientation

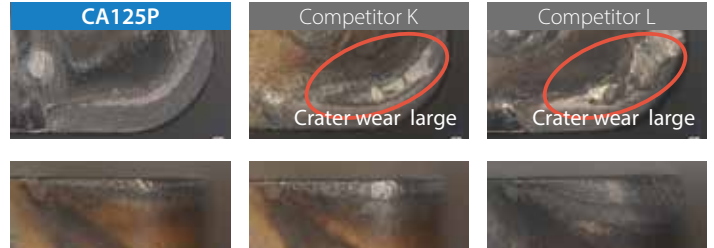
New crystal control technology provides industry-leading Al_2O_3 orientation

Comparison of cutting edge conditions (Internal evaluation)

After machining for 16.9 minutes

Improved wear resistance

Reduces crater wear and external abrasion caused by chip scraping

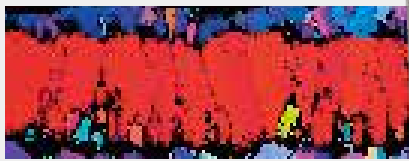


Cutting conditions : $V_c = 300$ m/min, $a_p = 1.5$ mm, $f = 0.3$ mm/rev, Wet
Workpiece material : SCM435

*March 2023, by Kyocera research

Crystal orientation analysis (EBSD pattern) A higher percentage of red indicates a more uniform growth pattern

CA125P

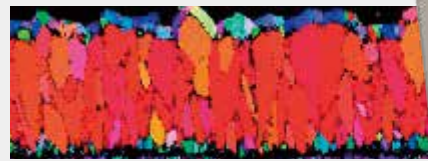


Uniform crystal direction



(CG image)

Conventional A



Nonuniform crystal orientation

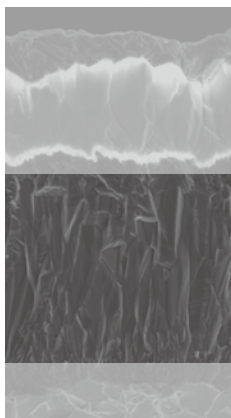


(CG image)

Unique TiCN layer

Proper TiCN particle size with proprietary crystal control technology
Greatly improved chipping resistance

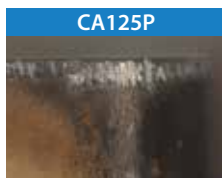
TiCN layer (CA125P)



Edge condition comparison

(Internal evaluation)

After machining 70 mm



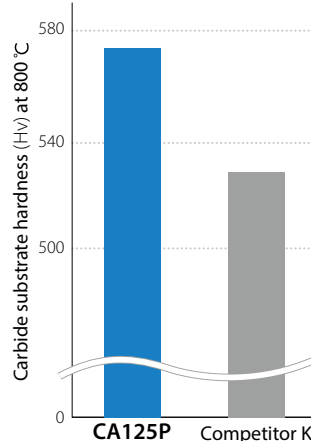
Cutting conditions : $V_c = 250$ m/min
 $a_p = 1.0$ mm, $f = 0.4$ mm/rev
 $L = 1.0$ mm, Wet, Workpiece material : SUJ2

New carbide substrate

Improved resistance to plastic deformation with an
increased temperature strength

Comparison of carbide substrate hardness

(Internal evaluation)



Edge condition comparison

(Internal evaluation)



Cutting conditions : $V_c = 300$ m/min
 $a_p = 1.0$ mm, $f = 0.4$ mm/rev
Dry, Workpiece material : SCM435

3

A large variety of chipbreakers cover a wide range of machining applications and conditions

New lineup with expanded PMG Chipbreakers for medium machining to roughing
Covers a wide area from finishing to roughing

Negative Type

Smart chipbreaker P series for steel machining

PP

For finishing
Low resistance



PQ

For finishing-medium
Sharpness and strength



PMG NEW

For medium-roughing
Covers a wide range of machining areas



PG

For medium-roughing
Stability-oriented

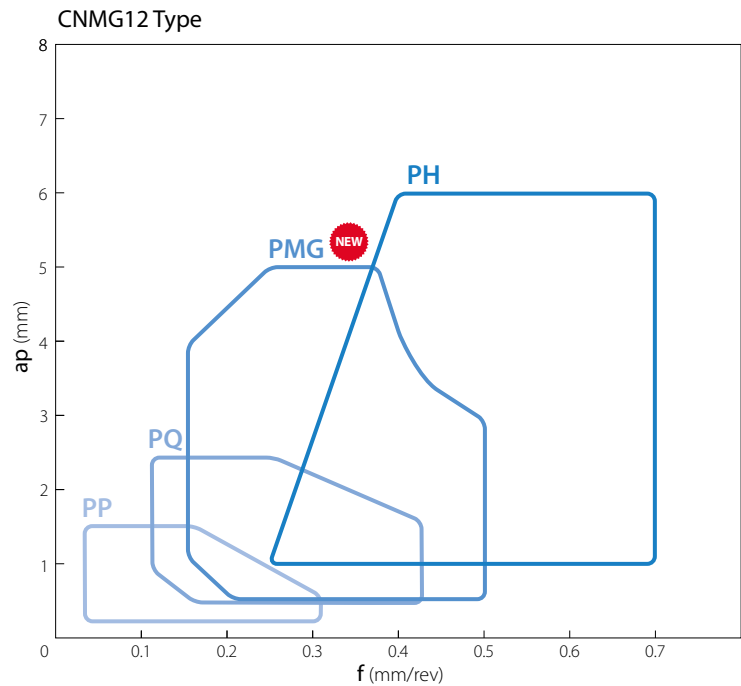


PH

For roughing
Tough edge design



Applicable Chipbreaker Range (ap indicates radius)



Positive Type

For finishing

PP

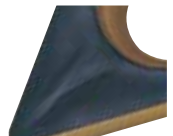
High reliability
Improving the productivity of finishing



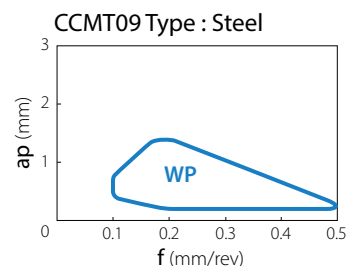
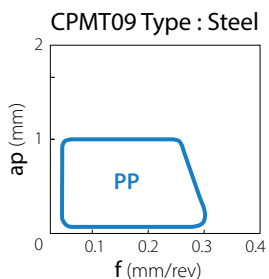
Wiper insert

WP

Newly designed wiper edge geometry
High productivity



Applicable Chipbreaker Range (ap indicates radius)



For medium-roughing

PMG Chipbreaker



Covers a wide range of machining applications from medium machining to roughing

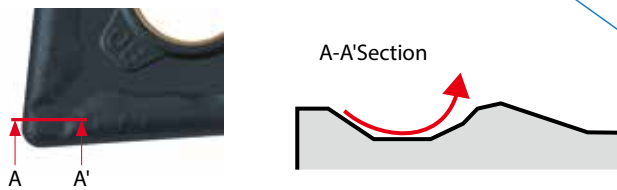
Excellent wear resistance with low cutting force design. Reduces chip shape inconsistencies and improves tool life

Step breaker structure

Suppresses chip entanglement during large D.O.C. machining with a gently rising surface

Circle Dot

Control chips during small D.O.C. machining



High Rake Perimeter

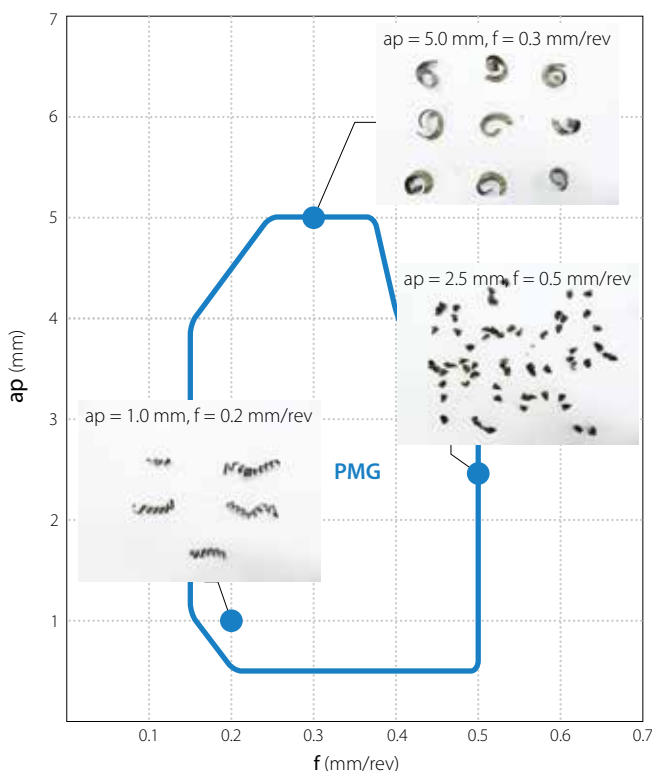
Low resistance design suppresses rake face temperature rise
Reduces chipbreaker wear and chip shape changes



Excellent chip control

Good chip control in a wide range of machining areas

Applicable Chipbreaker Range



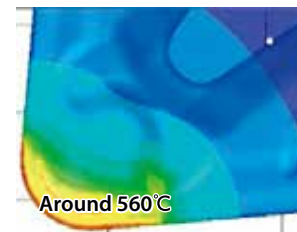
Cutting conditions : $V_c = 300$ m/min, $a_p = 0.5 \sim 5.0$ mm, $f = 0.1 \sim 0.5$ mm/rev
Workpiece material : SCr420 CNMG120408PMG

Achieves longer tool life

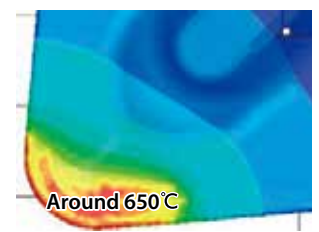
Suppresses rise in rake face temperature. Reduces crater wear

Edge temperature simulation comparison (Internal evaluation)

PMG Chipbreaker



Conventional B



Cutting conditions : $V_c = 270$ m/min, $a_p = 1.5$ mm, $f = 0.3$ mm/rev
Workpiece material : SCM430





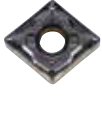







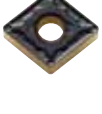

Consistent, small, and even chip shapes

Chip shape

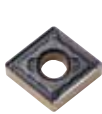
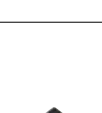
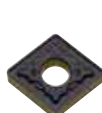
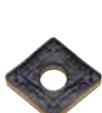



	PMG Chipbreaker	Conventional B
Initial machining		
After 27.2 min machining		

Cutting conditions : $V_c = 300$ m/min, $a_p = 1.5$ mm, $f = 0.3$ mm/rev
Wet (External coolant) Workpiece material : SCM435 WNMG080408PMG

Stock Items (Negative)

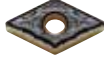
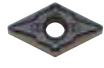

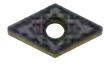

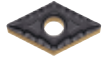
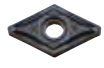
	Shape	Description	Dimensions (mm)				CA115P	CA125P			
			I.C.	Thickness	Hole Diameter	Corner R (RE)					
Wiper Edge		CNMG 120404WF	12.70	4.76	5.16	0.4	●	●			
		120408WF				0.8	●	●			
Wiper Edge		CNMG 120404WP	12.70	4.76	5.16	0.4	●	●			
		120408WP				0.8	●	●			
Wiper Edge		CNMG 120404WE	12.70	4.76	5.16	0.4	●	●			
		120408WE				0.8	●	●			
		120412WE				1.2	●	●			
Wiper Edge		CNMG 120404WQ	12.70	4.76	5.16	0.4	●	●			
		120408WQ				0.8	●	●			
		120412WQ				1.2	●	●			
Finishing		CNMG 120402PP	12.70	4.76	5.16	0.2	●	●			
		120404PP				0.4	●	●			
		120408PP				0.8	●	●			
		120412PP				1.2	●	●			
Finishing		CNMG 120402GP	12.70	4.76	5.16	0.2	●	●			
		120404GP				0.4	●	●			
		120408GP				0.8	●	●			
Finishing-Medium		CNMG 120404PQ	12.70	4.76	5.16	0.4	●	●			
		120408PQ				0.8	●	●			
		120412PQ				1.2	●	●			
Finishing-Medium		CNMG 090404HQ	9.525	4.76	3.81	0.4	●	●			
		090408HQ				0.8	●	●			
Finishing-Medium		CNMG 120404HQ	12.70	4.76	5.16	0.4	●	●			
		120408HQ				0.8	●	●			
		120412HQ				1.2	●	●			
Finishing-Medium / Up Facing		CNMG 120404CQ	12.70	4.76	5.16	0.4	●	●			
		120408CQ				0.8	●	●			
		120412CQ				1.2	●	●			
Finishing-Medium / Up Facing		CNMG 160608CQ	15.875	6.35	6.35	0.8	●	●			
		160612CQ				1.2	●	●			
Finishing-Medium / Up Facing		CNMG 120408CJ	12.70	4.76	5.16	0.8	●	●			
		120412CJ				1.2	●	●			
		CNMG 160612CJ				15.875	6.35	6.35	1.2	●	●
		160616CJ							1.6	●	●
Medium-Roughing		CNMG 120404PMG	12.70	4.76	5.16	0.4	●	●			
		120408PMG				0.8	●	●			
		120412PMG				1.2	●	●			
		120416PMG				1.6	●	●			
		CNMG 160608PMG	15.875	6.35	6.35	0.8	●	●			
		160612PMG				1.2	●	●			
		160616PMG				1.6	●	●			
Medium-Roughing (Continuous)		CNMG 090404GS	9.525	4.76	3.81	0.4	●	●			
		090408GS				0.8	●	●			

● : Standard stock

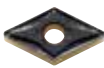
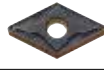
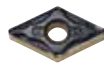
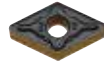






	Shape	Description	Dimensions (mm)				CA115P	CA125P
			I.C.	Thickness	Hole Diameter	Corner R (RE)		
Medium-Roughing (Intermittent)		CNMG 120404PG	12.70	4.76	5.16	0.4	●	●
		120408PG				0.8	●	●
		120412PG				1.2	●	●
		120416PG				1.6	●	●
Roughing		CNMG 120404	12.70	4.76	5.16	0.4	●	●
		120408				0.8	●	●
		120412				1.2	●	●
		CNMG 160608	15.875	6.35	6.35	0.8	●	●
		160612				1.2	●	●
		CNMG 190612	19.05	6.35	7.94	1.2	●	●
		190616				1.6	●	●
Roughing		CNMG 120408PH	12.70	4.76	5.16	0.8	●	●
		120412PH				1.2	●	●
		120416PH				1.6	●	●
		CNMG 160608PH	15.875	6.35	6.35	0.8	●	●
		160612PH				1.2	●	●
		160616PH				1.6	●	●
		CNMG 190608PH	19.05	6.35	7.94	0.8	●	●
		190612PH				1.2	●	●
		190616PH				1.6	●	●
		190624PH				2.4	●	●
Single-Sided Roughing / High Feed		CNMM 120408PX	12.70	4.76	5.16	0.8	●	●
		120412PX				1.2	●	●
		120416PX				1.6	●	●
		CNMM 160608PX	15.875	6.35	6.35	0.8	●	●
		160612PX				1.2	●	●
		160616PX				1.6	●	●
		CNMM 190608PX	19.05	6.35	7.94	0.8	●	●
		190612PX				1.2	●	●
		190616PX				1.6	●	●
		190624PX				2.4	●	●
Low Carbon Steel		CNMG 120404XP	12.70	4.76	5.16	0.4	●	●
		120408XP				0.8	●	●
Low Carbon Steel		CNMG 120404XQ	12.70	4.76	5.16	0.4	●	●
		120408XQ				0.8	●	●
Low Carbon Steel		CNMG 120408XS	12.70	4.76	5.16	0.8	●	●

● : Standard stock

Stock Items (Negative)












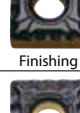
Shape	Description	Dimensions (mm)				CAT11SP	CAT12SP
		I.C.	Thickness	Hole Diameter	Corner R (RE)		
Wiper Edge  Finishing	DNMX 150404WF	12.70	4.76	5.16	0.4	●	●
	150408WF				0.8	●	●
	150412WF				1.2	●	●
	DNMX 150604WF	12.70	6.35	5.16	0.4	●	●
	150608WF				0.8	●	●
	150612WF				1.2	●	●
Finishing 	DNMG 150402PP	12.70	4.76	5.16	0.2	●	●
	150404PP				0.4	●	●
	150408PP				0.8	●	●
	150412PP				1.2	●	●
	DNMG 150602PP	12.70	6.35	5.16	0.2	●	●
	150604PP				0.4	●	●
	150608PP				0.8	●	●
	150612PP				1.2	●	●
Finishing 	DNMG 110404GP	9.525	4.76	3.81	0.4	●	●
	110408GP				0.8	●	●
	DNMG 150402GP	12.70	4.76	5.16	0.2	●	●
	150404GP				0.4	●	●
	150408GP				0.8	●	●
Finishing-Medium 	DNMG 150404PQ	12.70	4.76	5.16	0.4	●	●
	150408PQ				0.8	●	●
	150412PQ				1.2	●	●
	DNMG 150604PQ	12.70	6.35	5.16	0.4	●	●
	150608PQ				0.8	●	●
	150612PQ				1.2	●	●
Finishing-Medium 	DNMG 110402HQ	9.525	4.76	3.81	0.2	●	●
	110404HQ				0.4	●	●
	DNMG 150404HQ	12.70	4.76	5.16	0.4	●	●
	150408HQ				0.8	●	●
	150412HQ				1.2	●	●
	DNMG 150604HQ	12.70	6.35	5.16	0.4	●	●
	150608HQ				0.8	●	●
	150612HQ				1.2	●	●
Finishing-Medium / Up Facing 	DNMG 150404CQ	12.70	4.76	5.16	0.4	●	●
	150408CQ				0.8	●	●
	150412CQ				1.2	●	●
	DNMG 150604CQ	12.70	6.35	5.16	0.4	●	●
	150608CQ				0.8	●	●
	150612CQ				1.2	●	●
Finishing-Medium / Up Facing 	DNMG 150408CJ	12.70	4.76	5.16	0.8	●	●
	150412CJ				1.2	●	●
	DNMG 150608CJ	12.70	6.35	5.16	0.8	●	●
	150612CJ				1.2	●	●

● : Standard stock






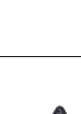



Shape	Description	Dimensions (mm)				CAT11SP	CAT12SP
		I.C.	Thickness	Hole Diameter	Corner R (RE)		
Medium-Roughing 	DNMG 150404PMG	12.70	4.76	5.16	0.4	●	●
	150408PMG				0.8	●	●
	150412PMG				1.2	●	●
	150416PMG				1.6	●	●
	DNMG 150604PMG	12.70	6.35	5.16	0.4	●	●
	150608PMG				0.8	●	●
150612PMG	1.2				●	●	
Medium-Roughing (Continual) 	DNMG 110404GS	9.525	4.76	3.81	0.4	●	●
	110408GS				0.8	●	●
Medium-Roughing (Interruption) 	DNMG 150404PG	12.70	4.76	5.16	0.4	●	●
	150408PG				0.8	●	●
	150412PG				1.2	●	●
	150416PG				1.6	●	●
	DNMG 150604PG	12.70	6.35	5.16	0.4	●	●
	150608PG				0.8	●	●
150612PG	1.2				●	●	
Medium-Roughing (Interruption) 	DNMG 150404PG	12.70	6.35	5.16	0.4	●	●
	150616PG				1.6	●	●
Roughing 	DNMG 150404	12.70	4.76	5.16	0.4	●	●
	150408				0.8	●	●
	DNMG 150608	12.70	6.35	5.16	0.8	●	●
	150612				1.2	●	●
Roughing 	DNMG 150408PH	12.70	4.76	5.16	0.8	●	●
	150412PH				1.2	●	●
	150416PH				1.6	●	●
	DNMG 150608PH	12.70	6.35	5.16	0.8	●	●
	150612PH				1.2	●	●
	150616PH				1.6	●	●
Single Sided Roughing / High Feed 	DNMM 150408PX	12.70	4.76	5.16	0.8	●	●
	150412PX				1.2	●	●
	150416PX				1.6	●	●
	DNMM 150608PX	12.70	6.35	5.16	0.8	●	●
	150612PX				1.2	●	●
	150616PX				1.6	●	●
Low Carbon Steel Finishing 	DNMG 150404XP	12.70	4.76	5.16	0.4	●	●
	150408XP				0.8	●	●
Low Carbon Steel Medium 	DNMG 150404XQ	12.70	4.76	5.16	0.4	●	●
	150408XQ				0.8	●	●
Low Carbon Steel Roughing 	DNMG 150408XS	12.70	4.76	5.16	0.8	●	●

● : Standard stock

Stock Items (Negative)







	Shape	Description	Dimensions (mm)				CAT15P	CAT25P
			I.C.	Thickness	Hole Diameter	Corner R (RE)		
Medium-Roughing		RNMG 090300	9.525	3.18	3.81	—	●	●
		RNMG 120400	12.70	4.76	5.16	—	●	●
		RNMG 150600	15.875	6.35	6.35	—	●	●
Finishing-Medium		SNMG 120404PQ	12.70	4.76	5.16	0.4	●	●
		120408PQ				0.8	●	●
		120412PQ				1.2	●	●
Finishing-Medium		SNMG 120404HQ	12.70	4.76	5.16	0.4	●	●
		120408HQ				0.8	●	●
		120412HQ				1.2	●	●
Medium-Roughing		SNMG 120408PMG	12.70	4.76	5.16	0.8	●	●
		120412PMG				1.2	●	●
		120416PMG				1.6	●	●
Medium-Roughing (Intermittent)		SNMG 120408PG	12.70	4.76	5.16	0.8	●	●
		120412PG				1.2	●	●
		120416PG				1.6	●	●
Roughing		SNMG 090304	9.525	3.18	3.81	0.4	●	●
		090308				0.8	●	●
		SNMG 120408	12.70	4.76	5.16	0.8	●	●
		120412				1.2	●	●
Roughing		SNMG 120408PH	12.70	4.76	5.16	0.8	●	●
		120412PH				1.2	●	●
		120416PH				1.6	●	●
		SNMG 150612PH	15.875	6.35	6.35	1.2	●	●
Roughing / High Feed		SNMM 120408PX	12.70	4.76	5.16	0.8	●	●
		120412PX				1.2	●	●
		120416PX				1.6	●	●
		SNMM 150612PX	15.875	6.35	6.35	1.2	●	●
Single Sided		SNMM 190612PX	19.05	6.35	7.94	1.2	●	●
		190616PX				1.6	●	●
		SNMM 190624PX	19.05	6.35	7.94	2.4	●	●
		SNMM 190612PX	19.05	6.35	7.94	1.2	●	●
Low Carbon Steel	 Finishing	SNMG 120408XP	12.70	4.76	5.16	0.8	●	●
Low Carbon Steel	 Medium	SNMG 120408XQ	12.70	4.76	5.16	0.8	●	●
Low Carbon Steel	 Roughing	SNMG 120408XS	12.70	4.76	5.16	0.8	●	●

● : Standard stock


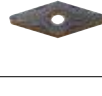





	Shape	Description	Dimensions (mm)				CAT15P	CAT25P
			I.C.	Thickness	Hole Diameter	Corner R (RE)		
Wiper Edge	 Finishing	TNMX 160404WF	9.525	4.76	3.81	0.4	●	●
		160408WF				0.8	●	●
		160412WF				1.2	●	●
Finishing		TNMG 160402PP	9.525	4.76	3.81	0.2	●	●
		160404PP				0.4	●	●
		160408PP				0.8	●	●
		160412PP				1.2	●	●
Finishing		TNMG 160402GP	9.525	4.76	3.81	0.2	●	●
		160404GP				0.4	●	●
		160408GP				0.8	●	●
Finishing-Medium		TNMG 160404PQ	9.525	4.76	3.81	0.4	●	●
		160408PQ				0.8	●	●
		160412PQ				1.2	●	●
Finishing-Medium		TNMG 110404HQ	6.35	4.76	2.26	0.4	●	●
		110408HQ				0.8	●	●
		TNMG 160404HQ	9.525	4.76	3.81	0.4	●	●
		160408HQ				0.8	●	●
Finishing-Medium / Up Facing		TNMG 160404CQ	9.525	4.76	3.81	0.4	●	●
		160408CQ				0.8	●	●
		160412CQ				1.2	●	●
		TNMG 220408CQ	12.70	4.76	5.16	0.8	●	●
Medium-Roughing		TNMG 160404PMG	9.525	4.76	3.81	0.4	●	●
		160408PMG				0.8	●	●
		160412PMG				1.2	●	●
		TNMG 220404PMG	12.70	4.76	5.16	0.4	●	●
Medium-Roughing (Continuous)		TNMG 110404GS	6.35	4.76	2.26	0.4	●	●
		110408GS				0.8	●	●
		TNMG 160404PG	9.525	4.76	3.81	0.4	●	●
		160408PG				0.8	●	●
Roughing		TNMG 160404	9.525	4.76	3.81	0.4	●	●
		160408				0.8	●	●
		160412				1.2	●	●
		TNMG 220408	12.70	4.76	5.16	0.8	●	●
		TNMG 220412				1.2	●	●

● : Standard stock

Stock Items (Negative)










Shape Handed insert shows Right-hand	Description	Dimensions (mm)				CA11SP	CA12SP
		I.C.	Thickness	Hole Diameter	Corner R (RE)		
Roughing 	TNMG 160408PH 160412PH	9.525	4.76	3.81	0.8	●	●
					1.2	●	●
	TNMG 220408PH 220412PH 220416PH	12.70	4.76	5.16	0.8	●	●
					1.2	●	●
	1.6				●	●	
Single Sided Roughing / High Feed 	TNMM 160408PX 160412PX	9.525	4.76	3.81	0.8	●	●
					1.2	●	●
	TNMM 220408PX 220412PX 220416PX	12.70	4.76	5.16	0.8	●	●
					1.2	●	●
	1.6				●	●	
Low Carbon Steel Finishing 	TNMG 160404XP 160408XP	9.525	4.76	3.81	0.4	●	●
	0.8				●	●	
Low Carbon Steel Medium 	TNMG 160404XQ 160408XQ	9.525	4.76	3.81	0.4	●	●
	0.8				●	●	
Low Carbon Steel Roughing 	TNMG 160408XS	9.525	4.76	3.81	0.8	●	●
Medium-Roughing 	TNMG 160404 R _L -ST 160408 R _L -ST	9.525	4.76	3.81	0.4	●	●
					0.8	●	●

● : Standard stock

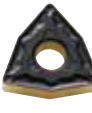







Shape Handed insert shows Right-hand	Description	Dimensions (mm)				CA11SP	CA12SP
		I.C.	Thickness	Hole Diameter	Corner R (RE)		
Finishing 	VNMG 160402PP 160404PP 160408PP 160412PP	9.525	4.76	3.81	0.2	●	●
					0.4	●	●
					0.8	●	●
					1.2	●	●
Finishing 	VNMG 160402GP 160404GP 160408GP	9.525	4.76	3.81	0.2	●	●
					0.4	●	●
					0.8	●	●
Finishing-Medium 	VNMG 160404 R _L -VC 160408 R _L -VC 160412R _L -VC	9.525	4.76	3.81	0.4	●	●
					0.8	●	●
					1.2	●	●
Finishing-Medium 	VNMG 160404VF 160408VF 160412VF	9.525	4.76	3.81	0.4	●	●
					0.8	●	●
					1.2	●	●
Finishing-Medium 	VNMG 160404PQ 160408PQ 160412PQ	9.525	4.76	3.81	0.4	●	●
					0.8	●	●
					1.2	●	●
Finishing-Medium 	VNMG 160404HQ 160408HQ 160412HQ	9.525	4.76	3.81	0.4	●	●
					0.8	●	●
					1.2	●	●
Roughing 	VNMG 160404 160408	9.525	4.76	3.81	0.4	●	●
					0.8	●	●

● : Standard stock

Stock Items (Negative)



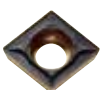
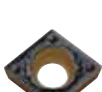


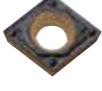



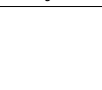
Shape	Description	Dimensions (mm)				CAT15P	CAT125P
		I.C.	Thickness	Hole Diameter	Corner R (RE)		
Wiper Edge  Finishing	WNMG 080404WF	12.70	4.76	5.16	0.4	●	●
	080408WF				0.8	●	●
Wiper Edge  Finishing	WNMG 080404WP	12.70	4.76	5.16	0.4	●	●
	080408WP				0.8	●	●
Wiper Edge  Finishing-Medium	WNMG 080404WE	12.70	4.76	5.16	0.4	●	●
	080408WE				0.8	●	●
	080412WE				1.2	●	●
Wiper Edge  Finishing-Medium	WNMG 080404WQ	12.70	4.76	5.16	0.4	●	●
	080408WQ				0.8	●	●
	080412WQ				1.2	●	●
Finishing 	WNMG 080402PP	12.70	4.76	5.16	0.2	●	●
	080404PP				0.4	●	●
	080408PP				0.8	●	●
	080412PP				1.2	●	●
Finishing-Medium 	WNMG 080404PQ	12.70	4.76	5.16	0.4	●	●
	080408PQ				0.8	●	●
	080412PQ				1.2	●	●
Finishing-Medium 	WNMG 06T304HQ	9.525	3.97	3.81	0.4	●	●
	06T308HQ				0.8	●	●
	WNMG 060404HQ	9.525	4.76	3.81	0.4	●	●
	060408HQ				0.8	●	●
	WNMG 080404HQ	12.70	4.76	5.16	0.4	●	●
	080408HQ				0.8	●	●
080412HQ	1.2				●	●	
Finishing-Medium / Up Facing 	WNMG 080404CQ	12.70	4.76	5.16	0.4	●	●
	080408CQ				0.8	●	●
	080412CQ				1.2	●	●
Finishing-Medium / Up Facing 	WNMG 080408CJ	12.70	4.76	5.16	0.8	●	●
	080412CJ				1.2	●	●

● : Standard stock

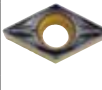


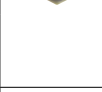



Shape	Description	Dimensions (mm)				CAT15P	CAT125P
		I.C.	Thickness	Hole Diameter	Corner R (RE)		
Medium-Roughing 	WNMG 080404PMG	12.70	4.76	5.16	0.4	●	●
	080408PMG				0.8	●	●
	080412PMG				1.2	●	●
	080416PMG				1.6	●	●
Medium-Roughing (Continuous) 	WNMG 060404GS	9.525	4.76	3.81	0.4	●	●
	060408GS				0.8	●	●
Medium-Roughing (Interruption) 	WNMG 080404PG	12.70	4.76	5.16	0.4	●	●
	080408PG				0.8	●	●
	080412PG				1.2	●	●
	080416PG				1.6	●	●
Roughing 	WNMG 080404	12.70	4.76	5.16	0.4	●	●
	080408				0.8	●	●
	080412				1.2	●	●
Roughing 	WNMG 080408PH	12.70	4.76	5.16	0.8	●	●
	080412PH				1.2	●	●
Low Carbon Steel  Finishing	WNMG 080404XP	12.70	4.76	5.16	0.4	●	●
	080408XP				0.8	●	●
Low Carbon Steel  Medium	WNMG 080404XQ	12.70	4.76	5.16	0.4	●	●
	080408XQ				0.8	●	●
Low Carbon Steel  Roughing	WNMG 080408XS	12.70	4.76	5.16	0.8	●	●

● : Standard stock

Stock Items (Positive)











Shape	Description	Dimensions (mm)				Relief Angle	CA115P	CA125P	
		I.C.	Thickness	Hole Diameter	Corner R (RE)				
Wiper Edge  Finishing	CCMT 060202WP	6.35	2.38	2.8	0.2	7°	●	●	
	060204WP				0.4		●	●	
	060208WP				0.8		●	●	
	CCMT 09T302WP	9.525	3.97	4.4	0.2	7°	●	●	
	09T304WP				0.4		●	●	
	09T308WP				0.8		●	●	
	Finishing 	CCMT 060202PP	6.35	2.38	2.8	0.2	7°	●	●
		060204PP				0.4		●	●
		060208PP				0.8		●	●
CCMT 09T302PP		9.525	3.97	4.4	0.2	7°	●	●	
09T304PP					0.4		●	●	
09T308PP					0.8		●	●	
Finishing-Medium 		CCMT 060202GK	6.35	2.38	2.8	0.2	7°	●	●
		060204GK				0.4		●	●
		060208GK				0.8		●	●
	CCMT 09T302GK	9.525	3.97	4.4	0.2	7°	●	●	
	09T304GK				0.4		●	●	
	09T308GK				0.8		●	●	
	CCMT 120404GK	12.70	4.76	5.5	0.4	7°	●	●	
	120408GK				0.8		●	●	
	120412GK				1.2		●	●	
Finishing-Medium 	CCMT 060202HQ	6.35	2.38	2.8	0.2	7°	●	●	
	060204HQ				0.4		●	●	
	CCMT 09T302HQ	9.525	3.97	4.4	0.2	7°	●	●	
	09T304HQ				0.4		●	●	
	09T308HQ				0.8		●	●	
	Medium 	CCMT 09T308	9.525	3.97	4.4	0.8	7°	●	●
Finishing 	CPMT 080202PP	7.94	2.38	3.3	0.2	11°	●	●	
	080204PP				0.4		●	●	
	CPMT 090302PP	9.525	3.18	4.4	0.2	11°	●	●	
	090304PP				0.4		●	●	
	090308PP				0.8		●	●	
	Finishing 	CPMT 080204GP	7.94	2.38	3.3	0.4	11°	●	●
CPMT 090304GP		9.525	3.18	4.4	0.4	11°	●	●	
090308GP					0.8		●	●	
Finishing-Medium 	CPMH 080204HQ	7.94	2.38	3.5	0.4	11°	●	●	
	080208HQ				0.8		●	●	
	CPMH 090304HQ	9.525	3.18	4.5	0.4	11°	●	●	
	090308HQ				0.8		●	●	
Medium 	CPMH 080204	7.94	2.38	3.5	0.4	11°	●	●	
	080208				0.8		●	●	
	CPMH 090304	9.525	3.18	4.5	0.4	11°	●	●	
	090308				0.8		●	●	
Low Carbon Steel  Finishing	CPMT 080204XP	7.94	2.38	3.3	0.4	11°	●	●	
	CPMT 090304XP	9.525	3.18	4.4	0.4	11°	●	●	
	090308XP				0.8		●	●	
Low Carbon Steel  Finishing-Medium	CPMT 090304XQ	9.525	3.18	4.4	0.4	11°	●	●	
	090308XQ				0.8		●	●	

● : Standard stock







Shape	Description	Dimensions (mm)				Relief Angle	CA115P	CA125P
		I.C.	Thickness	Hole Diameter	Corner R (RE)			
Wiper Edge  Finishing	DCMX 070202WP	6.35	2.38	2.8	0.2	7°	●	●
	070204WP				0.4		●	●
	070208WP				0.8		●	●
	DCMX 11T302WP	9.525	3.97	4.4	0.2	7°	●	●
	11T304WP				0.4		●	●
	11T308WP				0.8		●	●
Finishing 	DCMT 070202PP	6.35	2.38	2.8	0.2	7°	●	●
	070204PP				0.4		●	●
	DCMT 11T302PP	9.525	3.97	4.4	0.2	7°	●	●
	11T304PP				0.4		●	●
	11T308PP				0.8		●	●
	Finishing 	DCMT 070202GP	6.35	2.38	2.8	0.2	7°	●
070204GP		0.4				●		●
DCMT 11T304GP		9.525	3.97	4.4	0.4	7°	●	●
11T308GP					0.8		●	●
11T308GP					0.8		●	●
Finishing-Medium 		DCMT 070202GK	6.35	2.38	2.8	0.2	7°	●
	070204GK	0.4				●		●
	070208GK	0.8				●		●
	DCMT 11T302GK	9.525	3.97	4.4	0.2	7°	●	●
	11T304GK				0.4		●	●
	11T308GK				0.8		●	●
Finishing-Medium 	DCMT 070202HQ	6.35	2.38	2.8	0.2	7°	●	●
	070204HQ				0.4		●	●
	070208HQ				0.8		●	●
	DCMT 11T302HQ	9.525	3.97	4.4	0.2	7°	●	●
	11T304HQ				0.4		●	●
	11T308HQ				0.8		●	●
Low Carbon Steel  Finishing	DCMT 070204XP	6.35	2.38	2.8	0.4	7°	●	●
	DCMT 11T302XP	9.525	3.97	4.4	0.2	7°	●	●
	11T304XP				0.4		●	●
	11T308XP				0.8		●	●
Low Carbon Steel  Finishing-Medium	DCMT 11T304XQ	9.525	3.97	4.4	0.4	7°	●	●
	11T308XQ				0.8		●	●

● : Standard stock

Stock Items (Positive)

Shape	Description	Dimensions (mm)				Relief Angle	CA115P	CA125P	
		I.C.	Thickness	Hole Diameter	Corner R (RE)				
Medium	 RCMX 1003M0	10.0	3.18	3.6	—	7°	●	●	
	RCMX 1204M0	12.0	4.76	4.2	—		●	●	
Finishing-Medium	 SCMT 09T304HQ	9.525	3.97	4.4	0.4	7°	●	●	
	09T308HQ				0.8		●	●	
Medium	 SPMR 090304	9.525	3.18	—	0.4	11°	●	●	
	090308				0.8		●	●	
	SPMR 120304	12.7	3.18	—	0.4	11°	●	●	
120308	0.8				●		●		
Finishing	 TBMT 060102DP	3.97	1.59	2.3	0.2	5°	●	●	
	060104DP				0.4		●	●	
Wiper Edge	 TCMX 090204WP	5.56	2.38	2.5	0.4	7°	●	●	
	TCMX 110204WP	6.35	2.38	2.8	0.4	7°	●	●	
Finishing-Medium	 TCMT 110204HQ	6.35	2.38	2.8	0.4	7°	●	●	
	110208HQ				0.8		●	●	
Wiper Edge	 TPMX 090202WP	5.56	2.38	2.8	0.2	11°	●	●	
					090204WP		0.4	●	●
					090208WP		0.8	●	●
	 TPMX 110302WP	6.35	3.18	3.3	0.2	11°	●	●	
					110304WP		0.4	●	●
110308WP					0.8		●	●	
Finishing	 TPMT 090202PP	5.56	2.38	2.8	0.2	11°	●	●	
					090204PP		0.4	●	●
	TPMT 110302PP	6.35	3.18	3.3	0.2	11°	●	●	
					110304PP		0.4	●	●
Finishing	 TPMT 090204GP	5.56	2.38	2.8	0.4	11°	●	●	
					110304GP		0.4	●	●
	TPMT 110308GP	6.35	3.18	3.3	0.8	11°	●	●	
					0.4		●	●	
	TPMT 160304GP	9.525	3.18	4.4	0.4	11°	●	●	

● : Standard stock

Shape	Description	Dimensions (mm)				Relief Angle	CA115P	CA125P	
		I.C.	Thickness	Hole Diameter	Corner R (RE)				
Finishing-Medium	 TPMT 090202HQ	5.56	2.38	2.8	0.2	11°	●	●	
					090204HQ		0.4	●	●
	TPMT 110302HQ	6.35	3.18	3.3	0.2	11°	●	●	
					110304HQ		0.4	●	●
					110308HQ		0.8	●	●
	TPMT 160304HQ	9.525	3.18	4.4	0.4	11°	●	●	
160308HQ					0.8		●	●	
Low Carbon Steel	 TPMT 090204XP	5.56	2.38	2.8	0.4	11°	●	●	
					110304XP		0.4	●	●
	TPMT 110308XP	6.35	3.18	3.3	0.8	11°	●	●	
					0.4		●	●	
TPMT 160304XP	9.525	3.18	4.4	0.4	11°	●	●		
				160308XP		0.8	●	●	
Low Carbon Steel	 TPMT 110304XQ	6.35	3.18	3.3	0.4	11°	●	●	
					110308XQ		0.8	●	●
	TPMT 160304XQ	9.525	3.18	4.4	0.4	11°	●	●	
160308XQ	0.8				●		●		
Finishing	 TPMR 160304GP	9.525	3.18	—	0.4	11°	●	●	
					0.8		●	●	
Finishing-Medium	 TPMR 110304HQ	6.35	3.18	—	0.4	11°	●	●	
					110308HQ		0.8	●	●
	TPMR 160304HQ	9.525	3.18	—	0.4	11°	●	●	
160308HQ	0.8				●		●		
Medium	 TPMR 110304	6.35	3.18	—	0.4	11°	●	●	
					110308		0.8	●	●
	TPMR 160304	9.525	3.18	—	0.4	11°	●	●	
					160308		0.8	●	●

● : Standard stock

Stock Items (Positive)

Shape	Description	Dimensions (mm)				Relief Angle	CA115P	CA125P
		I.C.	Thickness	Hole Diameter	Corner R (RE)			
Finishing	VBMT 110302PP 110304PP 110308PP	6.35	3.18	2.8	0.2	5°	●	●
					0.4		●	●
					0.8		●	●
	VBMT 160404PP 160408PP 160412PP	9.525	4.76	4.4	0.4	5°	●	●
					0.8		●	●
					1.2		●	●
Finishing	VBMT 110304GP 160404GP	6.35	3.18	2.8	0.4	5°	●	●
					0.8		●	●
	160408GP	9.525	4.76	4.4	0.4	5°	●	●
Finishing	VBMT 110302VF 110304VF 110308VF	6.35	3.18	2.8	0.2	5°	●	●
					0.4		●	●
					0.8		●	●
	VBMT 160402VF 160404VF 160408VF 160412VF	9.525	4.76	4.4	0.2	5°	●	●
					0.4		●	●
					0.8		●	●
1.2					●		●	
Finishing-Medium	VBMT 110304HQ 110308HQ	6.35	3.18	2.8	0.4	5°	●	●
					0.8		●	●
	VBMT 160404HQ 160408HQ 160412HQ	9.525	4.76	4.4	0.4	5°	●	●
					0.8		●	●
1.2	●	●						

● : Standard stock

Shape	Description	Dimensions (mm)				Relief Angle	CA115P	CA125P
		I.C.	Thickness	Hole Diameter	Corner R (RE)			
Finishing	VCMT 080202PP 080204PP	4.76	2.38	2.3	0.2	7°	●	●
					0.4		●	●
	VCMT 160404PP 160408PP	9.525	4.76	4.4	0.4	7°	●	●
Finishing	VCMT 080202VF 080204VF	4.76	2.38	2.3	0.2	7°	●	●
					0.4		●	●
Finishing-Medium	VCMT 080202HQ 080204HQ	4.76	2.38	2.3	0.2	7°	●	●
					0.4		●	●
Finishing	WBMT 060102L-DP 060104L-DP	3.97	1.59	2.3	0.2	5°	L	L
					0.4		L	L
	WBMT 080202L-DP 080204L-DP	4.76	2.38	2.3	0.2	5°	L	L
Finishing	WPMT 110204GP 160304GP	6.35	2.38	2.8	0.4	11°	●	●
					9.525		3.18	4.4
Finishing-Medium	WPMT 110202HQ 110204HQ	6.35	2.38	2.8	0.2	11°	●	●
					0.4		●	●
	WPMT 160304HQ 160308HQ	9.525	3.18	4.4	0.4	11°	●	●
0.8	●	●						

● : Standard stock
L : Left-hand Only

Recommended Cutting Conditions

Vc (m/min)

		Low carbon steel Low carbon alloy steel	Medium carbon steel Medium carbon alloy steel	High carbon alloy steel
		150 HB or below	250 HB or below	300 HB or below
CA115P	Negative	150 ~ 300 ~ 400		150 ~ 280 ~ 360
	Positive	120 ~ 240 ~ 320		110 ~ 220 ~ 290
CA125P	Negative	150 ~ 240 ~ 320		150 ~ 220 ~ 280
	Positive	120 ~ 190 ~ 260		110 ~ 170 ~ 230

Turning indexable inserts

PVD coating for heat-resistant alloy

PR115S/PR120S

Unique carbide substrate with excellent heat-resistant properties and new coating technology "MEGACOAT TOUGH" provides longer tool life for heat-resistant alloy machining. Low cutting force and stable machining with specialized chipbreakers (SQ/SG/SX)



1 Longer tool life for heat-resistant alloy machining

Challenges of Machining Heat-Resistant Alloys

When machining heat-resistant alloys that can withstand high temperatures above 1,000 temperature (°C), the workpiece is likely to harden and insert damage is extremely rapid.

< Insert damaged image >

Crater wear

Worsening chip control, etc.

Diminishing wear damage from notching

Surface roughness
Deteriorating dimensional accuracy, etc.



Diminishing damage from notching

Burr occurs

Abrasive wear

Cutting force
Increased cutting heat

SOLUTION

With excellent heat resistance, wear resistance and stability, achieving long tool life and stable machining of heat-resistant alloys

- Excellent heat resistance : **Unique carbide substrate**
- To control wear : **New coating "MEGACOAT TOUGH"**
- Low cutting force
and stable machining : **Specialized chipbreakers (SQ/SG/SX)**



Video



HRSA(Heat-Resistant Super Alloy)

Exceptional Endurance. Maximum Tool Life.

Case Studies

SOLUTION ①

Airplane parts Ni-based heat-resistant alloy

Cutting conditions : Vc = 30 m/min, ap = 1.0 mm, f = 0.08 mm/rev, Wet
CCGT09T304MFP-GQ PR115S



Tool life

PR115S

20 pcs/edge

Tool life

1.3x

Competitor A

15 pcs/edge

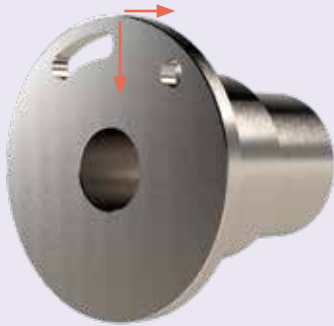
PR115S provides 1.3 times longer tool life in airplane parts machining, which requires high heat resistance

(User evaluation)

SOLUTION ②

Agricultural machine engine parts SUH600

Cutting conditions : Vc = 45 m/min, ap = 0.4 mm, f = 0.15 mm/rev, Wet
WNMG080408MQ PR120S



Tool life

PR120S

140 pcs/edge

Tool life

1.5x

Competitor B

90 pcs/edge

PR120S provides longer tool life in all six edges and ensures stable machining

(User evaluation)

SOLUTION ③

Bolt SUS304

Cutting conditions : Vc = 135 m/min, ap = 1.5 mm, f = 0.25 mm/rev, Wet
TNMG160408MQ PR120S



Tool life

PR120S

22 pcs/edge

Tool life

1.5x

Competitor C

15 pcs/edge

Improved tool life of stainless steel

(User evaluation)

Longer tool life of heat-resistant alloys

INCONEL718 cutting performance

PR115S

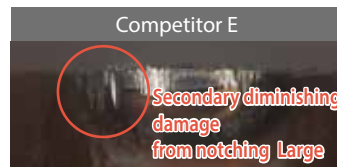
Cutting edge condition after 7.4 min machining
(Internal evaluation)



Cutting conditions :
Vc = 60 m/min, ap = 0.5 mm, f = 0.1 mm/rev,
Wet INCONEL718 CNMG120408 Type

PR120S

Cutting edge condition after 15 min machining
(Internal evaluation)



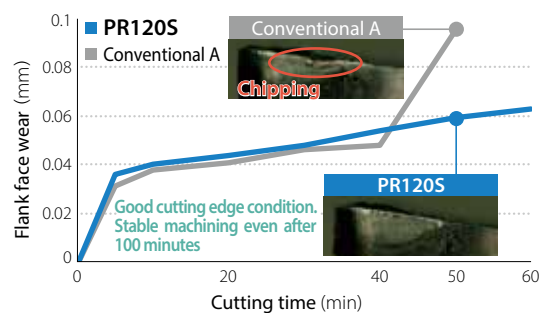
Cutting conditions :
Vc = 40 m/min, ap = 0.5 mm, f = 0.1 mm/rev,
Wet INCONEL718 CNMG120408 Type

Supports small parts machining of stainless steel

SUS316L cutting performance

PR120S

Wear resistance comparison (Internal evaluation)
Cutting edge comparison (after 50 min)



Cutting conditions : Vc = 150 m/min, ap = 1.0 mm, f = 0.08 mm/rev,
Wet, SUS316L, DCGT11T304 Type

2

Unique carbide substrate with excellent heat resistance and New coating “MEGACOAT TOUGH”

PR115S

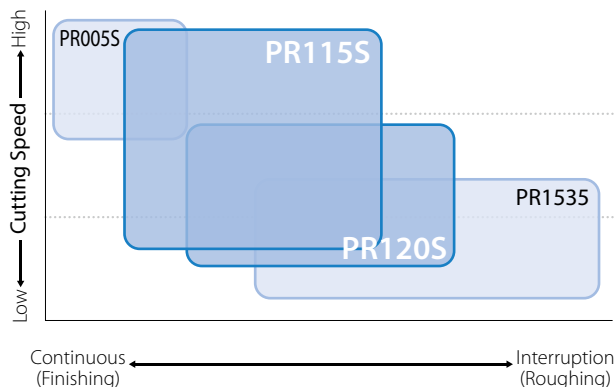
Covers a wide range of difficult-to-cut material machining applications
1st recommendation for continuous finishing of heat-resistant alloys

PR120S

Long tool life and stable machining in interrupted machining of heat-resistant alloys
1st recommendation for continuous finishing to light interrupted machining of stainless steel
Longer tool life extension possible for stainless steel machining

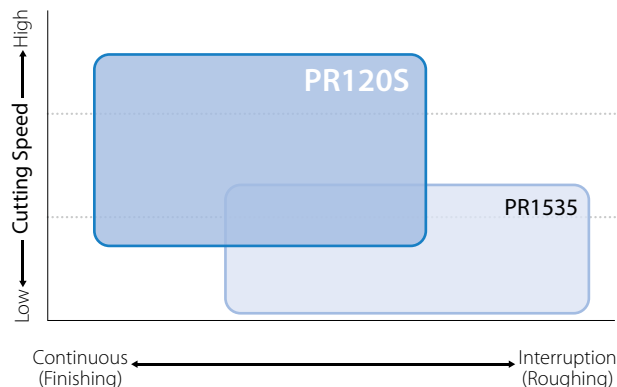
S

Heat-resistant alloys Application map



M

Stainless steel Application map



Carbide Substrate and Coating

< Section image >



“MEGACOAT TOUGH” has a special adhesive layer

1. Wear resistant layer

AlTiCrN layer
Thick-film PVD **suppresses abrasive wear**

2. Middle layer

TiAlN layer
Excellent oxidation resistance to **surpress crater wear**

3. Special adhesive layer

Check
Improved adhesion of the coating with **notching control**

4. Unique carbide substrate

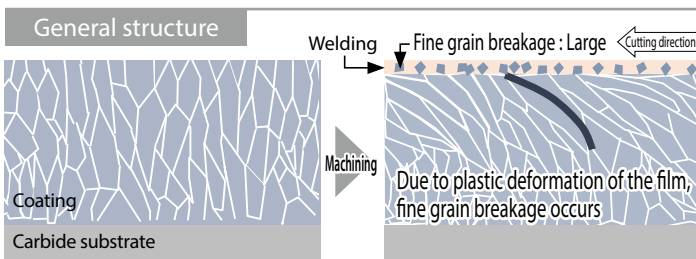
Specializes in heat-resistant alloys



1. Wear resistant layer

Thick-film PVD suppresses abrasive wear
Reduces notch damage with ultra-fine grain structure

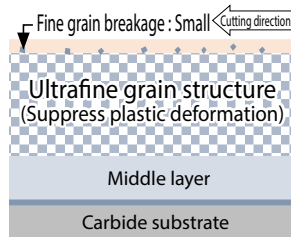
Damage to the coating during machining of heat-resistant alloys (Image)



PR115S/PR120S

Due to ultrafine structure of the membrane, controls fine grain breakage

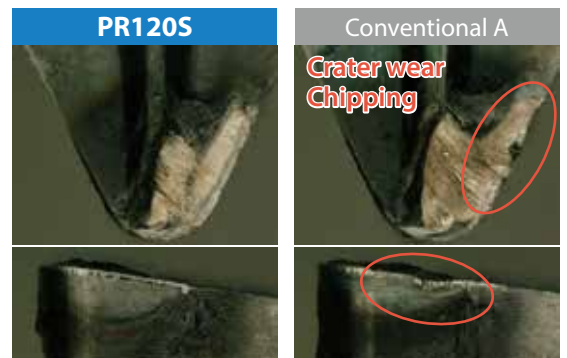
Due to grain breakage and dropping of welding, controls wear and tear



2. Middle layer

TiAlN layer provides superior oxidation resistance
Controls crater wear

Crater wear comparison (Internal evaluation) After machining for 50 min



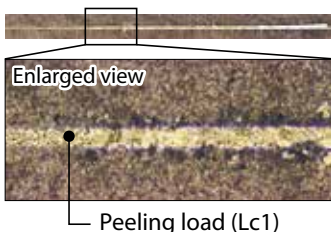
Cutting conditions : $V_c = 150$ m/min, $a_p = 1.0$ mm, $f = 0.08$ mm/rev, Wet SUS316L DCGT11T304 Type

3. Special adhesive layer

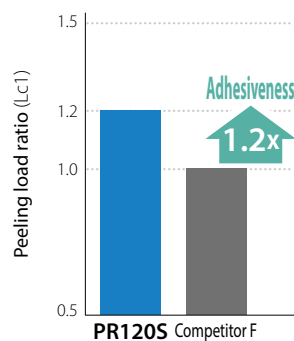
Check

Adhesion layer at carbide substrate-main layer interface, high affinity and improved adhesion

Scratch test results

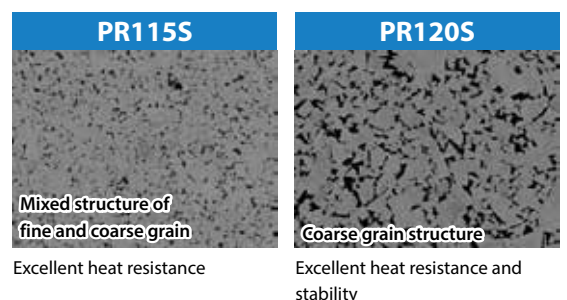


Peeling load (Lc1)
(Internal evaluation)



4. Unique carbide substrate

Carbide substrate for heat-resistant alloy machining
Excellent thermal properties with high thermal conductivity



3

New chipbreaker designs (SQ/SG/SX) improve machining stability

Finishing to medium machining SQ chipbreaker

Extended tool life and improved efficiency for mid-range to finishing applications in heat-resistant alloys

SQ chipbreaker benefits

Reduced temperature at the cutting edge → Extended tool life
Reduces burring → Extended tool life and efficiency improvements



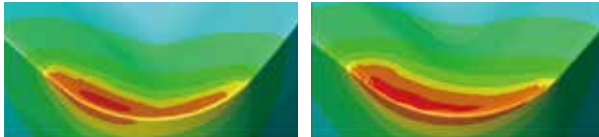
Special rake face design decreases cutting edge temperature

Optimal design achieved with simulation technology

Slant cutting edge

Inclined in (-) direction
Effective for burr suppression and reducing notching

Edge temperature comparison (Simulation) (Internal evaluation)



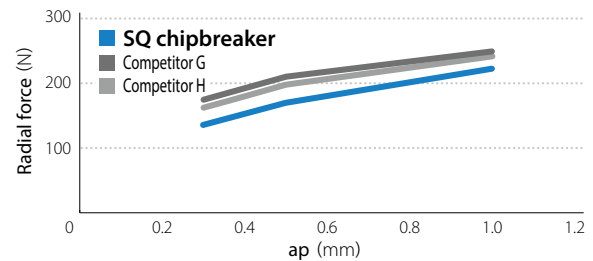
SQ chipbreaker

Conventional B

Cutting conditions : $V_c = 40$ m/min, $a_p = 1.0$ mm, $f = 0.15$ mm/rev,
Dry CNMG120408 Type
Workpiece material : Ni-based heat-resistant alloy

The newly developed chipbreaker lowers the temperature of the cutting edge, This improves tool life and machining efficiency in semi-finishing applications.

Cutting force comparison (Internal evaluation)



Cutting conditions :
 $V_c = 40$ m/min, $f = 0.15$ mm/rev, Wet, CNMG120408 Type
Workpiece material : Ni-based heat-resistant alloy

SG chipbreaker for roughing

Supports roughing of heat-resistant alloys

SG chipbreaker benefits

Well-balanced rake face shape → Extended tool life
Shallow bottom chipbreaker design → Smooth chip control



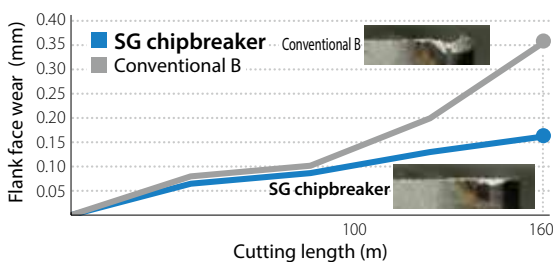
Standard chipbreaker

Stable chip control during heavy machining applications

Well-balanced rake face shape

High-strength and low cutting force design

Wear resistance comparison (Internal evaluation)



Cutting conditions :
 $V_c = 80$ m/min, $a_p = 1.0$ mm, $f = 0.20$ mm/rev, Wet, CNMG120408 Type
Workpiece material : INCONEL718

SX chipbreaker for high efficiency roughing

Improved efficiency for roughing in heat-resistant alloys

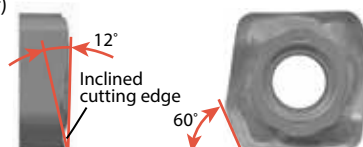
SX chipbreaker benefits

Decreased edge temperature → Extended tool life
Suppresses burr formation → Greater depths of cut
Decreased radial forces → Resists edge build-up and improves efficiency

Please refer to the page 27 for precautions when using the SX chipbreaker.

Unique cutting edge design (Handed insert)

- 60° lead angle (when installed in the toolholder)
- 12° rake angle




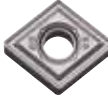









Rake design decreases temperature at the cutting edge














Optimal design achieved with CNC simulation technology

- Can be installed in standard Kyocera toolholders (DCLN/PCLN) by changing to corresponding SX shim
- Single-sided handed insert

Stock Items (Negative) M Class





Shape Handed Insert shows Right-hand	Description	Dimensions (mm)				PR1155	PR1205	PR1535
		I.C.	Thickness	Hole Diameter	Corner R (RE)			
	CNMG 120404SQ	12.70	4.76	5.16	0.4	●	●	
	120408SQ				0.8	●	●	
	120412SQ				1.2	●	●	
	CNMG 160612SQ	15.875	6.35	6.35	1.2	●	●	
	160616SQ				1.6	●	●	
	CNMG 190612SQ	19.05	6.35	7.94	1.2	●	●	
190616SQ	1.6				●	●		
	CNMG 120404MQ	12.70	4.76	5.16	0.4	●	●	●
	120408MQ				0.8	●	●	●
	CNMG 120404MS	12.70	4.76	5.16	0.4	●	●	●
	120408MS				0.8	●	●	●
	120412MS				1.2	●	●	●
	120416MS				1.6	●	●	●
	CNMG 120404MU	12.70	4.76	5.16	0.4	●	●	●
	120408MU				0.8	●	●	●
	120412MU				1.2	●	●	●
	CNMG 160608MU	15.875	6.35	6.35	0.8	●	●	●
	160612MU				1.2	●	●	●
	160616MU				1.6	●	●	●
CNMG 190612MU	19.05	6.35	7.94	1.2	●	●	●	
190616MU				1.6	●	●	●	
	CNMG 120404TK	12.70	4.76	5.16	0.4	●	●	●
	120408TK				0.8	●	●	●
	CNMG 120408SG	12.70	4.76	5.16	0.8	●	●	●
	120412SG				1.2	●	●	●
	CNMG 160612SG	15.875	6.35	6.35	1.2	●	●	●
	160616SG				1.6	●	●	●
	CNMG 190612SG	19.05	6.35	7.94	1.2	●	●	●
	190616SG				1.6	●	●	●
	CNMM 1204X ^{R/L} -SX	12.70	4.42	5.16	-	●	●	
	CNMM 1606X ^{R/L} -SX	15.875	5.96	6.35	-	●	●	
	CNMM 1906X ^{R/L} -SX	19.05	5.93	7.94	-	●	●	
	DNMG 150404SQ	12.70	4.76	5.16	0.4	●	●	
	150408SQ				0.8	●	●	
	150412SQ				1.2	●	●	
	DNMG 150604SQ	12.70	6.35	5.16	0.4	●	●	
	150608SQ				0.8	●	●	
	150612SQ				1.2	●	●	
	DNMG 150404MQ	12.70	4.76	5.16	0.4	●	●	●
	150408MQ				0.8	●	●	●
	DNMG 150604MQ	12.70	6.35	5.16	0.4	●	●	●
	150608MQ				0.8	●	●	●





CNMM...X^{R/L}-SX inserts are single-sided with 2 cutting edges

Shape	Description	Dimensions (mm)				PR1155	PR1205	PR1535
		I.C.	Thickness	Hole Diameter	Corner R (RE)			
	DNMG 150404MS	12.70	4.76	5.16	0.4	●	●	●
	150408MS				0.8	●	●	●
	150412MS				1.2	●	●	●
	DNMG 150604MS	12.70	6.35	5.16	0.4	●	●	●
	150608MS				0.8	●	●	●
	150612MS				1.2	●	●	●
	DNMG 150404MU	12.70	4.76	5.16	0.4	●	●	●
	150408MU				0.8	●	●	●
	DNMG 150604MU	12.70	6.35	5.16	0.4	●	●	●
	150608MU				0.8	●	●	●
	DNMG 150408SG	12.70	4.76	5.16	0.8	●	●	●
	150412SG				1.2	●	●	●
	DNMG 150608SG	12.70	6.35	5.16	0.8	●	●	●
150612SG	1.2				●	●	●	
	SNMG 120404MQ	12.70	4.76	5.16	0.4	●	●	●
	120408MQ				0.8	●	●	●
	SNMG 120404MS	12.70	4.76	5.16	0.4	●	●	●
	120408MS				0.8	●	●	●
	120412MS				1.2	●	●	●
	120416MS				1.6	●	●	●
	SNMG 190612MU	19.05	6.35	7.94	1.2	●	●	●
	190616MU				1.6	●	●	●
	SNMG 120408SG	12.70	4.76	5.16	0.8	●	●	●
	120412SG				1.2	●	●	●
	SNMG 150612SG	15.875	6.35	6.35	1.2	●	●	
	150616SG				1.6	●	●	
	SNMG 190612SG	19.05	6.35	7.94	1.2	●	●	●
	190616SG				1.6	●	●	●
	TNMG 160404MQ	9.525	4.76	3.81	0.4	●	●	●
	160408MQ				0.8	●	●	●
	TNMG 160404MS	9.525	4.76	3.81	0.4	●	●	●
	160408MS				0.8	●	●	●
	160412MS				1.2	●	●	●
	TNMG 160404MU	9.525	4.76	3.81	0.4	●	●	●
	160408MU				0.8	●	●	●
	TNMG 160408SG	9.525	4.76	3.81	0.8	●	●	●
	160412SG				1.2	●	●	●
	TNMG 220408SG				12.70	4.76	5.16	0.8
220412SG	1.2	●	●	●				

●: Standard stock



Stock Items (Negative) M Class

Shape	Description	Dimensions (mm)				PR1155	PR1205	PR1535
		I.C.	Thickness	Hole Diameter	Corner R (RE)			
 Finishing-Medium	VNMG 160404MQ	9.525	4.76	3.81	0.4	●	●	●
	160408MQ				0.8	●	●	●
 Medium-Roughing	VNMG 160404MS	9.525	4.76	3.81	0.4	●	●	●
	160408MS				0.8	●	●	●
	160412MS				1.2	●	●	●
 Medium-Roughing	VNMG 160404MU	9.525	4.76	3.81	0.4	●	●	●
	160408MU				0.8	●	●	●
 Roughing	VNMG 160404SG	9.525	4.76	3.81	0.4	●	●	●
	160408SG				0.8	●	●	●



Shape	Description	Dimensions (mm)				PR1155	PR1205	PR1535
		I.C.	Thickness	Hole Diameter	Corner R (RE)			
 Finishing-Medium	WNMG 080404MQ	12.70	4.76	5.16	0.4	●	●	●
	080408MQ				0.8	●	●	●
 Medium-Roughing	WNMG 080404MS	12.70	4.76	5.16	0.4	●	●	●
	080408MS				0.8	●	●	●
	080412MS				1.2	●	●	●
 Medium-Roughing	WNMG 080404MU	12.70	4.76	5.16	0.4	●	●	●
	080408MU				0.8	●	●	●
 Roughing	WNMG 080408SG	12.70	4.76	5.16	0.8	●	●	●
	080412SG				1.2	●	●	●

● : Standard stock

Stock Items (Negative) G Class

Shape	Description	Dimensions (mm)				PR1155	PR1205	PR1535
		I.C.	Thickness	Hole Diameter	Corner R (RE)			
 Finishing-Medium / Sharp Edge / Polished	CNGG 120402MFP-SK	12.70	4.76	5.16	<0.2	●	●	●
	120404MFP-SK				<0.4	●	●	●
 Finishing-Medium / Sharp Edge / Polished	DNGG 150402MFP-SK	12.70	4.76	5.16	<0.2	●	●	●
	150404MFP-SK				<0.4	●	●	●

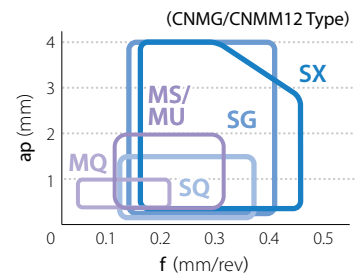
Insert with corner R (RE) dimension expressed with less than sign (e.g. <0.1, <0.2 etc.) indicates models with minus tolerance for corner R (RE)

Shape	Description	Dimensions (mm)				PR1155	PR1205	PR1535
		I.C.	Thickness	Hole Diameter	Corner R (RE)			
 Finishing-Medium / Sharp Edge / Polished	TNGG 160401MFP-SK	9.525	4.76	3.81	<0.1	●	●	●
	160402MFP-SK				<0.2	●	●	●
	160404MFP-SK				<0.4	●	●	●
 Finishing-Medium / Sharp Edge / Polished	VNGG 160402MFP-SK	9.525	4.76	3.81	<0.2	●	●	●
	160404MFP-SK				<0.4	●	●	●

● : Standard stock

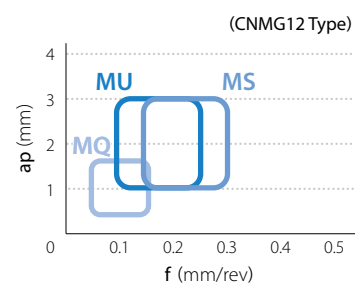
Applicable Chipbreaker Range (ap Indicates radial depth of cut per side)

Heat-resistant alloys



Cutting Range	Recommended Chipbreaker	Advantage
Finishing ap : 0.2 - 1.0 mm	SQ Chipbreaker	Notching control
	Issue: Finished surfaces, chip control	→ MQ Chipbreaker
		Advantage: Low Cutting Force/ Chip Control
Medium-Roughing ap : 0.5 - 4.0 mm	SG Chipbreaker	General Purpose/ 1st Recommendation
	Issue: Finished surfaces, chip control	→ MS Chipbreaker
		Advantage: Cutting Edge Damage Control
		→ MU Chipbreaker
		Advantage: Low Cutting Force/ Chip Control
Medium-Roughing ap : 0.5 - 4.0 mm	SX Chipbreaker	Minimize Burrs ⇒ Greater Depths of Cut

Stainless steel



Cutting Range	Recommended Chipbreaker	Advantage
Finishing ap : 0.5 - 1.5 mm	MQ Chipbreaker	Low Cutting Force/ Chip Control
Finishing-Medium ap : 1.0 - 3.0 mm	MS Chipbreaker	Cutting Edge Damage Control
	Issue: Finished surfaces, chip control	→ MU Chipbreaker
		Advantage: Low Cutting Force/ Chip Control

Recommended Cutting Conditions

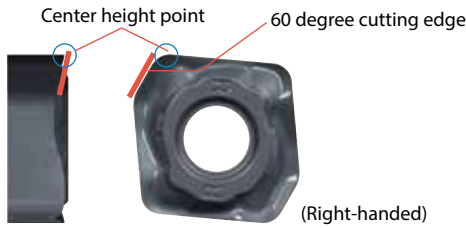
Workpiece Material	Cutting Range	Application	Recommended Chipbreaker	Recommended Grade	Min. – Recommendation – Max.			
					Vc (m/min)	ap (mm)	f (mm/rev)	
Heat-resistant alloys	Finishing	Continuous	MQ	PR115S	25 – 45 – 70	0.2 – 0.5 – 1.0	0.05 – 0.1 – 0.2	
		Light Interruption		PR120S	25 – 40 – 60			
	Finishing-Medium	Continuous	SQ	PR115S	25 – 45 – 70	0.3 – 0.5 – 1.5	0.1 – 0.17 – 0.35	
		Light Interruption		PR120S	25 – 40 – 60			
		Continuous	SK	PR115S	25 – 45 – 70	0.5 – 1.0 – 1.5	0.03 – 0.05 – 0.1	
		Light Interruption		PR120S	25 – 40 – 60			
	Medium-Roughing	Continuous	MU	PR115S	25 – 45 – 70	0.5 – 1.0 – 2.0	0.1 – 0.15 – 0.3	
		Light Interruption		PR120S	25 – 40 – 60			
		Heavy Interruption		PR1535	25 – 30 – 45			
		Continuous	MS	PR115S	25 – 45 – 70	0.5 – 1.0 – 2.0	0.1 – 0.15 – 0.3	
		Light Interruption		PR120S	25 – 40 – 60			
		Heavy Interruption		PR1535	25 – 30 – 45			
		Continuous	TK	PR115S	25 – 45 – 70	1.0 – 2.0 – 3.0	0.12 – 0.2 – 0.3	
		Light Interruption		PR120S	25 – 40 – 60			
		Heavy Interruption		PR1535	25 – 30 – 45			
	Roughing	Continuous	SG	PR115S	25 – 45 – 70	0.5 – 2.0 – 4.0	0.1 – 0.3 – 0.4	
		Light Interruption		PR120S	25 – 40 – 60			
		Heavy Interruption		PR1535	25 – 30 – 45			
		Continuous	SX	PR115S	25 – 45 – 70	0.5 – 2.0 – 4.0	0.15 – 0.3 – 0.45	
		Light Interruption		PR120S	25 – 40 – 60			
		Heavy Interruption		PR1535	25 – 30 – 45			
Stainless steel (Austenitic related)	Finishing	Continuous	MQ	PR120S	100 – 140 – 180	0.5 – 1.0 – 1.5	0.05 – 0.1 – 0.15	
		Interruption		PR1535				
	Finishing-Medium	Continuous	SK	PR120S	80 – 120 – 150	0.5 – 1.5 – 2.0	0.03 – 0.05 – 0.1	
		Interruption		PR1535				
	Medium-Roughing	Continuous	MU	PR120S	80 – 120 – 150	1.0 – 2.0 – 3.0	0.1 – 0.15 – 0.25	
		Interruption		PR1535			0.15 – 0.25 – 0.3	
		Continuous	MS	PR120S	80 – 120 – 150	1.0 – 2.0 – 3.0	0.15 – 0.2 – 0.3	
		Interruption		PR1535			0.2 – 0.3 – 0.4	
		Continuous	TK	PR120S	80 – 120 – 150	1.0 – 2.0 – 4.0	0.1 – 0.2 – 0.3	
		Interruption		PR1535			0.2 – 0.3 – 0.4	
	Stainless steel (Precipitation hardening)	Finishing	Continuous	MQ	PR120S	80 – 100 – 120	0.5 – 1.0 – 1.5	0.05 – 0.1 – 0.15
			Interruption		PR1535			
Medium-Roughing		Continuous	MU	PR120S	80 – 100 – 120	1.0 – 2.0 – 3.0	0.1 – 0.15 – 0.25	
		Interruption		PR1535			0.15 – 0.25 – 0.3	
		Continuous	MS	PR120S	80 – 100 – 120	1.0 – 2.0 – 3.0	0.15 – 0.2 – 0.3	
		Interruption		PR1535			0.2 – 0.3 – 0.4	
		Continuous	TK	PR120S	80 – 100 – 120	1.0 – 2.0 – 4.0	0.1 – 0.2 – 0.3	
		Interruption		PR1535			0.2 – 0.3 – 0.4	

The **bold-faced number** indicates a center value of recommended cutting condition

SX Chipbreaker Usage Precautions

1. Cutting Edge Height

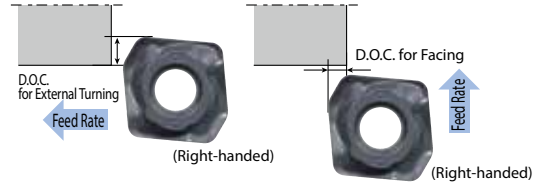
The center of the cutting edge height of the nose is slanted by 60 degrees based on circled portions in image below.



2. Recommended D.O.C.

Recommended depth of cut is no greater than the 60° lead angle; however, larger depths of cut are possible.

Description	Recommended D.O.C. External Turning (mm)	Max. D.O.C. Facing (mm)
CNMM1204X ^{R/L} -SX	0.5 - 2.0 - 4.0	2.0
CNMM1606X ^{R/L} -SX	0.5 - 2.5 - 4.5	2.0
CNMM1906X ^{R/L} -SX	0.5 - 3.0 - 5.0	2.5



3. Applicable Toolholder

The SX chipbreaker insert requires a different shim than standard inserts. No additional toolholder modifications are necessary when using the applicable Kyocera holders.

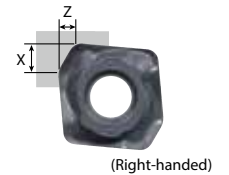
Insert Description	Applicable Toolholder (Kyocera)	Standard Shim	Shim for SX Chipbreaker
CNMM1204X ^{R/L} -SX	DCLN ^{R/L} 2020K-12	DC-44	DC-44-C
	DCLN ^{R/L} 2525M-12		
	PCLN ^{R/L} 2020H-12	LC-42N	LC-42N-C
	PCLN ^{R/L} 2020K-12		
	PCLN ^{R/L} 2525M-12		
PCLN ^{R/L} 3225P-12			
CNMM1606X ^{R/L} -SX	PCLN ^{R/L} 2525M-16	LC-53N	LC-53N-C
CNMM1906X ^{R/L} -SX	PCLN ^{R/L} 3232P-16		
CNMM1906X ^{R/L} -SX	PCLN ^{R/L} 3232P-19	LC-63	LC-63-C

Boring is not recommended

4. Unmachined Portion Varies with Insert Size

Unmachined portion is reflected below.

Description	Amount Uncut (mm)	
	X	Z
CNMM1204X ^{R/L} -SX	4.1	2.9
CNMM1606X ^{R/L} -SX	4.8	3.3
CNMM1906X ^{R/L} -SX	5.4	3.6



5. Facing






Facing is possible, but turning is recommended. Cutting edge may drop below center in facing operations. Boss remains at the center of the workpiece.





Description	Run-out Amount when Facing (mm)
CNMM1204X ^{R/L} -SX	0.75
CNMM1606X ^{R/L} -SX	0.85
CNMM1906X ^{R/L} -SX	1.05

The SX Chipbreaker is Uniquely Designed for High Efficiency Roughing. It Differs from Standard Inserts by the Following.

- Handed single-sided 2-corner insert
- Requires a dedicated shim
- Unmachined portion remains at corner (4. Unmachined portion varies with insert size)
- Position of insert is below the center when facing (5. Facing)

Stock Items (Positive)

Shape	Description	Dimensions (mm)					PRI155	PRI205	PRI535
		I.C.	Thickness	Hole Diameter	Corner R (RE)	Relief Angle			
	CCGT 0602005MFP-SKS	6.35	2.38	3	<0.05	7°	●	●	●
	060201MFP-SKS				<0.1		●	●	●
	060202MFP-SKS				<0.2		●	●	●
	CCGT 09T3005MFP-SKS	9.525	3.97	4.7	<0.05	7°	●	●	●
	09T301MFP-SKS				<0.1		●	●	●
	09T302MFP-SKS				<0.2		●	●	●
09T304MFP-SKS	<0.4				●		●	●	
	CCGT 060201MFP-SK	6.35	2.38	3	<0.1	7°	●	●	●
	060202MFP-SK				<0.2		●	●	●
	060204MFP-SK				<0.4		●	●	●
	CCGT 09T301MFP-SK	9.525	3.97	4.7	<0.1	7°	●	●	●
	09T302MFP-SK				<0.2		●	●	●
	09T304MFP-SK				<0.4		●	●	●
	CCGT 060201MFP-GQ	6.35	2.38	3	<0.1	7°	●	●	●
	060202MFP-GQ				<0.2		●	●	●
	060204MFP-GQ				<0.4		●	●	●
	CCGT 09T301MFP-GQ	9.525	3.97	4.7	<0.1	7°	●	●	●
	09T302MFP-GQ				<0.2		●	●	●
	09T304MFP-GQ				<0.4		●	●	●
	CCMT 09T304MQ	9.525	3.97	4.7	0.4	7°	●	●	●
	09T308MQ				0.8		●	●	●
	DCGT 0702005MFP-SKS	6.35	2.38	3	<0.05	7°	●	●	●
	070201MFP-SKS				<0.1		●	●	●
	070202MFP-SKS				<0.2		●	●	●
	DCGT 11T3005MFP-SKS	9.525	3.97	4.7	<0.05	7°	●	●	●
	11T301MFP-SKS				<0.1		●	●	●
	11T302MFP-SKS				<0.2		●	●	●
11T304MFP-SKS	<0.4	●	●	●					

Shape	Description	Dimensions (mm)					PRI155	PRI205	PRI535
		I.C.	Thickness	Hole Diameter	Corner R (RE)	Relief Angle			
	DCGT 070201MFP-SK	6.35	2.38	3	<0.1	7°	●	●	●
	070202MFP-SK				<0.2		●	●	●
	070204MFP-SK				<0.4		●	●	●
Finishing / Sharp Edge / Polished	DCGT 11T301MFP-SK	9.525	3.97	4.7	<0.1	7°	●	●	●
	11T302MFP-SK				<0.2		●	●	●
	11T304MFP-SK				<0.4		●	●	●
	DCGT 070201MFP-GQ	6.35	2.38	3	<0.1	7°	●	●	●
	070202MFP-GQ				<0.2		●	●	●
	070204MFP-GQ				<0.4		●	●	●
Finishing-Medium / Sharp Edge / Polished	DCGT 11T301MFP-GQ	9.525	3.97	4.7	<0.1	7°	●	●	●
	11T302MFP-GQ				<0.2		●	●	●
	11T304MFP-GQ				<0.4		●	●	●
	DCMT 070202MQ	6.35	2.38	3	0.2	7°	●	●	●
	070204MQ				0.4		●	●	●
	DCMT 11T304MQ	9.525	3.97	4.7	0.4	7°	●	●	●
Finishing-Medium	11T308MQ				0.8		●	●	●
	VCGT 110301MFP-SKS	6.35	3.18	2.8	<0.1	7°	●	●	●
	110302MFP-SKS				<0.2		●	●	●
	110304MFP-SKS				<0.4		●	●	●
Finishing / Sharp Edge / Polished	VPGT 110301MFP-SKS	6.35	3.18	3	<0.1	11°	●	●	●
	110302MFP-SKS				<0.2		●	●	●
	110304MFP-SKS				<0.4		●	●	●

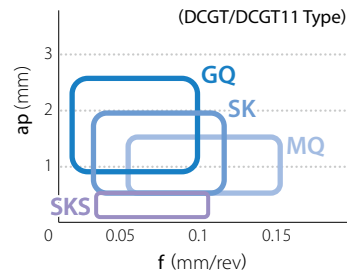
● : Standard stock

Insert with corner R (RE) dimension expressed with less than sign (e.g. <0.1, <0.2 etc.) indicates models with minus tolerance for corner R (RE)



Applicable Chipbreaker Range (ap Indicates radial depth of cut per side)

Heat-resistant alloys



Cutting Range

Finishing
ap : 0.5 - 2.0 mm

Finishing-Medium
ap : 1.0 - 2.5 mm

Recommended Chipbreaker

SK
Chipbreaker



Advantage

General Purpose/
1st Recommendation

Cutting Range
ap : 0.1 - 0.5 mm

SKS
Chipbreaker



Advantage

Chip Control

Issue : Chip control during low cutting

GQ

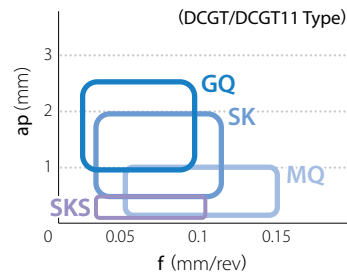
Chipbreaker



Advantage

Chipbreaker width according to ap range
⇒ Can be cut in a wide range of conditions

Stainless steel



Cutting Range

Finishing
ap : 0.5 - 1.5 mm

Finishing-Medium
ap : 1.0 - 2.5 mm

Recommended Chipbreaker

SK
Chipbreaker



Advantage

General Purpose/
1st Recommendation

Cutting Range
ap : 0.1 - 0.5 mm

SKS
Chipbreaker



Advantage

Chip Control

Issue : Chip control during low cutting

GQ

Chipbreaker



Advantage

Chipbreaker width according to ap range
⇒ Can be cut in a wide range of conditions

Recommended Cutting Conditions

Workpiece Material	Cutting Range	Recommended Chipbreaker	Recommended Grade	Min. - Recommendation - Max.		
				Vc (m/min)	ap (mm)	f (mm/rev)
Heat-resistant alloys	Finishing	MQ	PR115S	25 - 45 - 70	0.5 - 1.0 - 1.5	0.05 - 0.1 - 0.15
			PR120S	25 - 40 - 60		0.08 - 0.15 - 0.2
			PR153S	25 - 30 - 45		
		SKS	PR115S	25 - 45 - 70	0.1 - 0.3 - 0.5	0.03 - 0.05 - 0.1
			PR120S	25 - 40 - 60		
			PR153S	25 - 30 - 45		0.05 - 0.1 - 0.15
		SK	PR115S	25 - 45 - 70	0.5 - 1.0 - 2.0	0.03 - 0.08 - 0.12
			PR120S	25 - 40 - 60		
			PR153S	25 - 30 - 45		0.05 - 0.1 - 0.15
	Finishing-Medium	GQ	PR115S	25 - 45 - 70	1.0 - 1.5 - 2.5	0.02 - 0.05 - 0.08
			PR120S	25 - 40 - 60		
			PR153S	25 - 30 - 45		0.04 - 0.07 - 0.1
Stainless steel (Austenitic related)	Finishing	MQ	PR120S	80 - 100 - 120	0.3 - 0.5 - 1.0	0.05 - 0.1 - 0.15
			PR153S	60 - 80 - 100		0.08 - 0.15 - 0.2
		SKS	PR120S	80 - 100 - 120	0.1 - 0.3 - 0.5	0.03 - 0.05 - 0.1
			PR153S	60 - 80 - 100		0.05 - 0.1 - 0.15
		SK	PR120S	80 - 100 - 120	0.5 - 1.0 - 2.0	0.03 - 0.08 - 0.12
			PR153S	60 - 80 - 100		0.05 - 0.1 - 0.15
	Finishing-Medium	GQ	PR120S	80 - 100 - 120	1.0 - 1.5 - 2.5	0.02 - 0.05 - 0.08
			PR153S	60 - 80 - 100		0.04 - 0.07 - 0.1
Stainless steel (Precipitation hardening)	Finishing	MQ	PR120S	40 - 60 - 80	0.3 - 0.5 - 1.0	0.05 - 0.1 - 0.15
			PR153S	30 - 50 - 70		0.08 - 0.15 - 0.2
		SKS	PR120S	40 - 60 - 80	0.1 - 0.3 - 0.5	0.03 - 0.05 - 0.1
			PR153S	30 - 50 - 70		0.05 - 0.1 - 0.15
		SK	PR120S	40 - 60 - 80	0.5 - 1.0 - 2.0	0.03 - 0.08 - 0.12
			PR153S	30 - 50 - 70		0.05 - 0.1 - 0.15
	Finishing-Medium	GQ	PR120S	40 - 60 - 80	1.0 - 1.5 - 2.5	0.02 - 0.05 - 0.08
			PR153S	30 - 50 - 70		0.04 - 0.07 - 0.1

The **bold-faced number** indicates a center value of recommended cutting condition

Turning indexable inserts

New coated CBN for machining hard materials

KBN010/KBN020

Long tool life and stable machining results with wear resistance and fracture resistance
Supports a wide range of applications and reduces the cost of hard materials machining



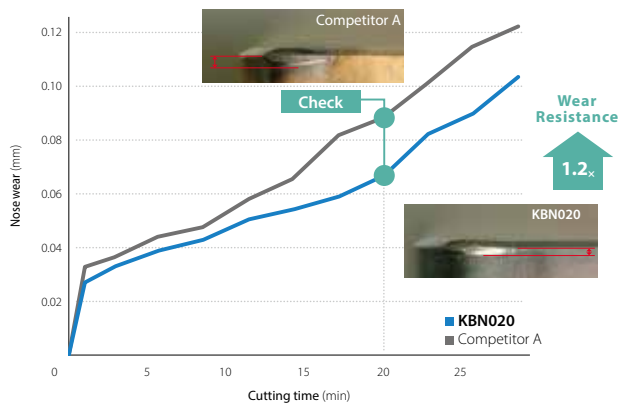
1 New Coating + High Toughness CBN Provide Wear Resistance and Fracture Resistance

Wear Resistance

New coating "MEGACOAT TOUGH" suppresses layer peeling.

Excellent wear resistance

Wear Resistance Comparison (In-house evaluation)



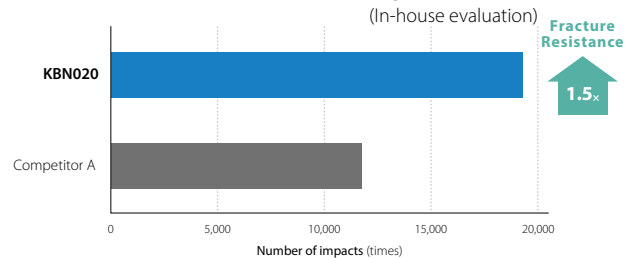
Cutting conditions : $V_c = 150$ m/min, $a_p = 0.2$ mm, $f = 0.1$ mm/rev, Wet
Workpiece material : SCM415® 60 HRC

Fracture Resistance

KBN010 : Mixed structure of micro grain CBN and coarse grain CBN

KBN020 : High content CBN and high purity TiN binder provides excellent fracture resistance

Continuous to Interrupted Machining Comparison (In-house evaluation)



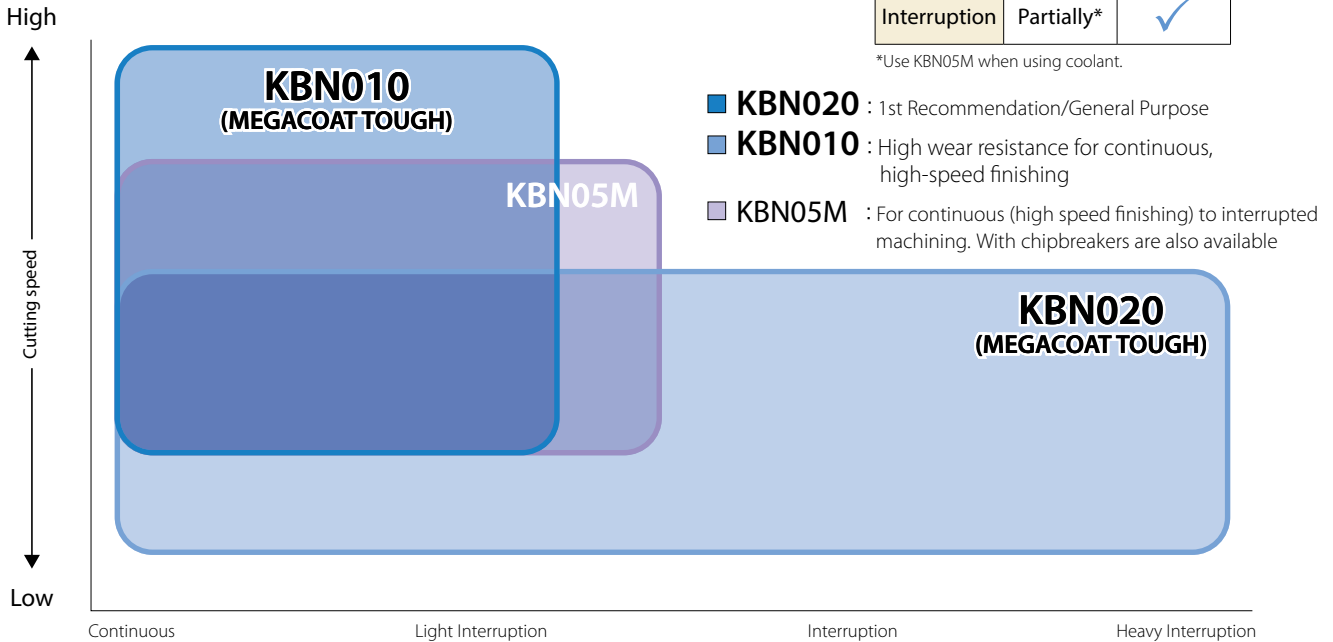
Cutting conditions : $V_c = 150$ m/min, $a_p = 0.2$ mm, $f = 0.2$ mm/rev, Dry
Workpiece material : SCM415® 60 HRC

2 Supports a Wide Range of Application from Continuous to Interrupted/ Heavy Interrupted Machining

KBN010 for high-speed finishing

KBN020 [1st recommendation] covers a wide range of applications

Application Map



Coolant

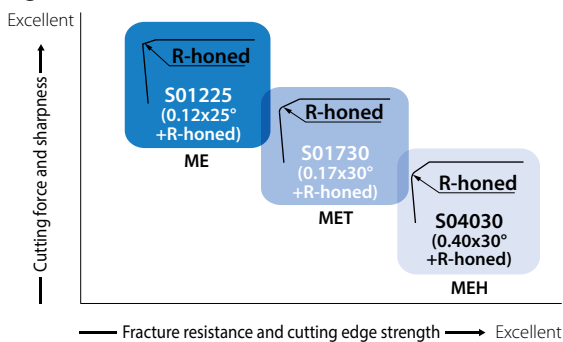
✓ Recommended ✗ Not Recommended

Application	Wet	Dry
Continuous	✓	✗
Interruption	Partially*	✓

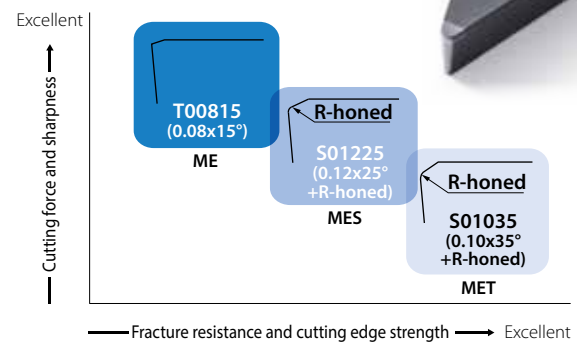
*Use KBN05M when using coolant.

3 Extended lineup of cutting edge preparations

Negative Insert



Positive Insert



Negative Insert Standard Cutting Edge Prep. (Hard materials machining)

Symbol	Cutting Edge Prep.		Applications and Features
ME	S01225	0.12mm x 25°+R-honed	General purpose
MET	S01730	0.17mm x 30°+R-honed	Superior fracture resistance
MEH	S04030	0.40mm x 30°+R-honed	For interrupted · high-feed machining Prevents flaking

Positive Insert Standard Cutting Edge Prep. (Hard materials machining)

Symbol	Cutting Edge Prep.		Applications and Features
ME	T00815	0.08mm x 15°	Chamfered Sharp edge, Minimize burrs
MES	S01225	0.12mm x 25°+R-honed	General purpose
MET	S01035	0.10mm x 35°+R-honed	For interruption Stable machining

4

Newly Developed Coating "MEGACOAT TOUGH"



Features

An adhesion layer is laminated between the high wear resistance layer and the CBN. Reduces layer peeling to achieve long tool life and stable machining

High wear resistance layer with TiAlN + Oxidation resistance components

Suppresses oxidation/diffusional wear

Check Newly developed adhesion layer

Interlayer for stress relief

High adhesion layer

Two layers dedicated to CBN

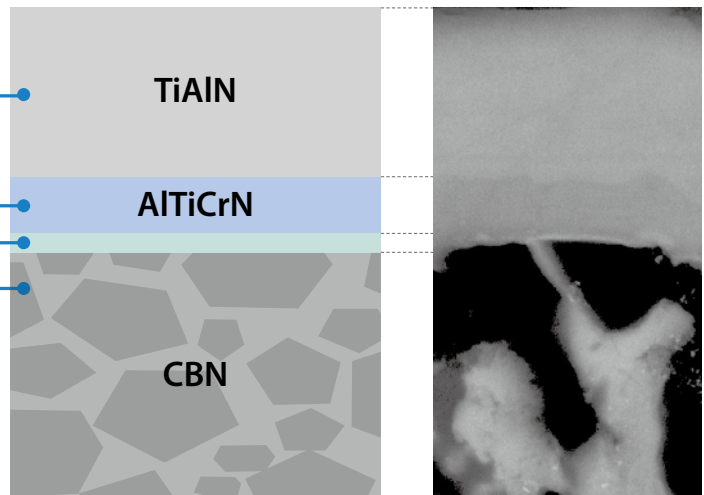
Improved adhesion between CBN and high wear resistant layer. Suppresses layer peeling

Check High toughness CBN

KBN010 : Mixed structure of micro grain CBN and coarse grain CBN

Improved wear resistance in high speed machining

KBN020 : High content CBN with high purity TiN binder
Improved heat resistance and toughness



Layer image

Case studies

Clutch SCr420H

Vc = 100 m/min
ap = 0.15 mm
f = 0.1 mm/rev
Wet
WNGA080408S01225



Tool Life

KBN020 650 pcs/edge

1.6x

Competitor B 400 pcs/edge

KBN020 provides stable machining with longer tool life.

(User evaluation)

Gear SNCM220® 58HRC

Vc = 125 m/min
ap = 0.25 mm
f = 0.1 mm/rev
Dry
CNGA120408S04030MEH



Tool Life

KBN010 600 pcs/edge

3.0x

Competitor D 200 pcs/edge

KBN010 provides longer tool life than competitor D.

(User evaluation)

Check

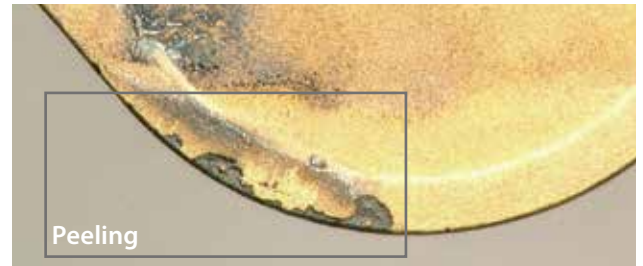
Newly developed adhesion layer

Improved adhesion between CBN and high wear resistance layer

KBN020



Competitor A



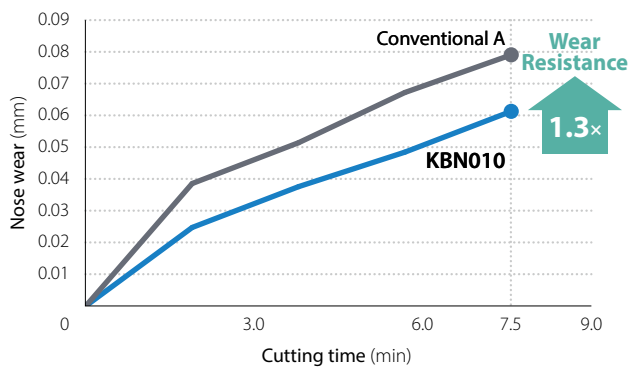
Cutting conditions : Vc = 150 m/min, ap = 0.2 mm, f = 0.2 mm/rev, Dry, Workpiece material : SCM 415® (In-house evaluation)

Check

High toughness CBN

KBN010

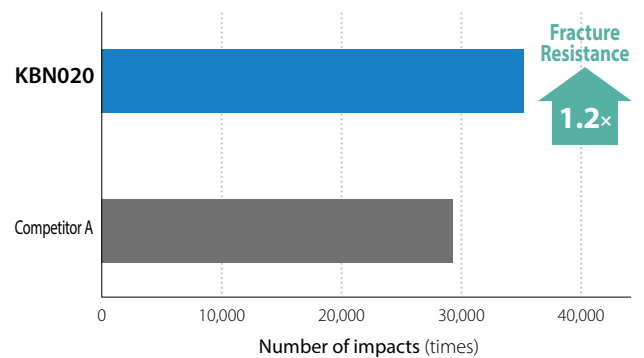
Improved wear resistance by 30% in high-speed machining (Compared to conventional A)



Cutting conditions : Vc = 210 m/min, ap = 0.2 mm, f = 0.1 mm/rev, Wet
Workpiece material : SCM415® 60HRC (In-house evaluation)

KBN020

Improved fracture resistance by 20% in heavy interrupted machining (Compared to competitor A)

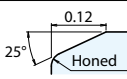


Cutting conditions : Vc = 100 m/min, ap=0.2 mm, f=0.3 mm/rev, Dry
Workpiece material : SCM415® 4 grooves in Workpiece material 61HRC
(In-house evaluation)

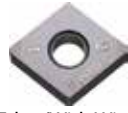
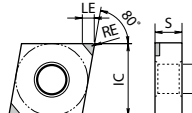
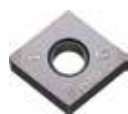
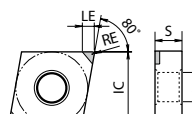
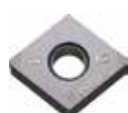
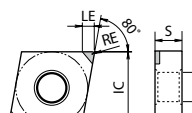

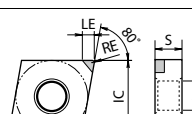

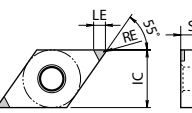



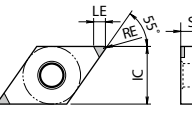

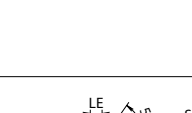

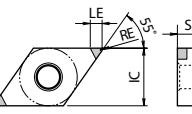
Recommended Cutting Conditions

Workpiece Material	Hardness	Application		Recommended Insert Grade	Cutting conditions		
					Vc (m/min)	ap (mm)	f (mm/rev)
Hard materials	55HRC or more	High-speed Finishing	Continuous	KBN010	80 - 180 - 230	0.05 - 0.2 - 0.35	0.05 - 0.15 - 0.3
		General Finishing	Continuous to Interruption	KBN020	80 - 150 - 200	0.05 - 0.2 - 0.5	0.05 - 0.2 - 0.45
		High-efficiency Stable Machining	Light Interruption to Interruption	KBN020	80 - 150 - 200	0.05 - 0.2 - 0.5	0.05 - 0.2 - 0.45
		Interruption	Interruption to Heavy Interruption	KBN020	80 - 130 - 180	0.05 - 0.2 - 0.5	0.05 - 0.2 - 0.4

Stock Items (Negative)

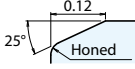
Cutting Edge Preparation				
Symbol	Cutting Edge Specification	Indication Example		Shape
S	Chamfered and Honed	S01225	0.12 mm x 25° chamfered and honed	

Description	IC	S	D1
CNGA 1204_	12.70	4.76	5.16
DNGA 1504_	12.70	4.76	5.16
DNGA 1506_		6.35	










Shape	Description	Cutting Edge Preparation	Dimensions (mm)		No. of Edges	MEGACOAT TOUGH			
			RE	LE		KBN010	KBN020		
 Multi Edge/With Wiper Edge		S01215	0.4	2.6	2	●	●		
			0.8	2.5		●	●		
			1.2	2.5		●	●		
 Multi Edge		S01225	0.2	2.6	2	●	●		
			0.4	2.6		●	●		
			0.8	2.6		●	●		
			1.2	2.5		●	●		
			1.6	3.4		●	●		
			2.0	3.4		●	●		
 Multi Edge/Tough		S01730	0.4	2.6	2	●	●		
			0.8	2.6		●	●		
			1.2	2.5		●	●		
			1.6	3.4		●	●		
 Multi Edge/Interruption		S04030	0.8	2.6	2	●	●		
			1.2	2.5		●	●		
 Multi Edge		S01225	0.1	2.8	2	●	●		
			0.2	2.7		●	●		
			0.4	2.6		●	●		
			0.8	2.2		●	●		
			1.2	1.9		●	●		
			1.6	3.8		●	●		
	 Multi Edge		S01225	0.4	2.6	2	●	●	
				0.8	2.2		●	●	
				0.4	2.6		2	●	●
				0.8	2.2			●	●
 Multi Edge/Tough		S01730	0.4	2.6	2	●	●		
			0.8	2.2		●	●		
			1.2	1.9		●	●		
			1.6	3.8		●	●		
	 Multi Edge/Tough		S01730	0.4	2.6	2	●	●	
				0.8	2.2		●	●	
 Multi Edge/Interruption		S04030	0.4	2.6	2	●	●		
			0.8	2.2		●	●		
			1.2	1.9		●	●		

● : Standard stock

Stock Items (Negative)

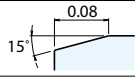
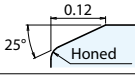
Cutting Edge Preparation			
Symbol	Cutting Edge Specification	Indication Example	Shape
S	Chamfered and Honed	S01225 0.12 mm x 25° chamfered and honed	

Description	IC	S	D1
SNGA 1204_	12.70	4.76	5.16
TNGA 1604_	9.525	4.76	3.81
VNGA 1604_	9.525	4.76	3.81
WNGA 0804_	12.70	4.76	5.16


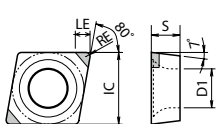

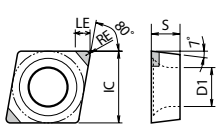

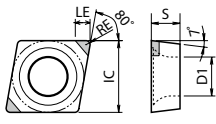

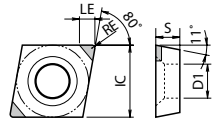

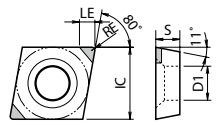

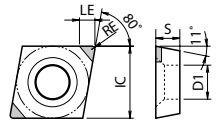

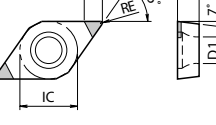

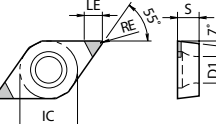

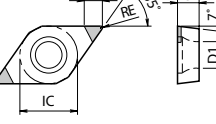
Shape	Description	Cutting Edge Preparation	Dimensions (mm)		No. of Edges	MEGACOAT TOUGH	
			RE	LE		KBN010	KBN020
 Multi Edge	SNGA 120404S01225ME	S01225	0.4	2.6	2	●	●
	120408S01225ME		0.8	2.6		●	●
 Multi Edge/Tough	SNGA 120404S01730MET	S01730	0.4	2.6	2	●	●
	120408S01730MET		0.8	2.6		●	●
	120412S01730MET		1.2	2.6		●	●
 Multi Edge	TNGA 160401S01225ME	S01225	0.1	2.9	3	●	●
	160402S01225ME		0.2	2.8		●	●
	160404S01225ME		0.4	2.7		●	●
	160408S01225ME		0.8	2.4		●	●
	160412S01225ME		1.2	2.1		●	●
 Multi Edge/Tough	TNGA 160404S01730MET	S01730	0.4	2.7	3	●	●
	160408S01730MET		0.8	2.4		●	●
	160412S01730MET		1.2	2.1		●	●
 Multi Edge/Interruption	TNGA 160404S04030MEH	S04030	0.4	2.7	3	●	●
	160408S04030MEH		0.8	2.4		●	●
 Multi Edge	VNGA 160401S01225ME	S01225	0.1	2.6	2	●	●
	160402S01225ME		0.2	2.3		●	●
	160404S01225ME		0.4	2.0		●	●
	160408S01225ME		0.8	2.7		●	●
 Multi Edge/Tough	VNGA 160404S01730MET	S01730	0.4	2.0	2	●	●
	160408S01730MET		0.8	2.7		●	●
 Multi Edge	WNGA 080404S01225ME	S01225	0.4	2.6	3	●	●
	080408S01225ME		0.8	2.6		●	●
 Multi Edge/Tough	WNGA 080404S01730MET	S01730	0.4	2.0	3	●	●
	080408S01730MET		0.8	2.6		●	●

● - Standard stock

Stock Items (Positive)

Cutting Edge Preparation			
Symbol	Cutting Edge Specification	Indication Example	Shape
T	Chamfered	T00815 0.08 mm x 15° chamfered	
S	Chamfered and Honed	S01225 0.12 mm x 25° chamfered and honed	

Description	IC	S	D1
CCMW 0602_	6.35	2.38	2.8
CCMW 09T3_	9.525	3.97	4.4
CPGB 0802_	7.94	2.38	3.5
CPGB 0903_	9.525	3.18	4.5
DCMW 0702_	6.35	2.38	2.8
DCMW 11T3_	9.525	3.97	4.4

Shape	Description	Cutting Edge Preparation	Dimensions (mm)		No. of Edges	MEGACOAT TOUGH		
			RE	LE		KBN010	KBN020	
 <p>Multi Edge</p>		T00815	CCMW 060202T00815ME	0.2	2.0	2	●	●
			CCMW 060204T00815ME	0.4	1.9		●	●
			CCMW 060208T00815ME	0.8	1.8		●	●
		T00815	CCMW 09T302T00815ME	0.2	2.0	2	●	●
			CCMW 09T304T00815ME	0.4	1.9		●	●
			CCMW 09T308T00815ME	0.8	1.8		●	●
 <p>Multi Edge/General Purpose</p>		S01225	CCMW 060204S01225MES	0.4	1.9	2	●	●
			CCMW 060208S01225MES	0.8	1.8		●	●
		S01225	CCMW 09T304S01225MES	0.4	1.9	2	●	●
			CCMW 09T308S01225MES	0.8	1.8		●	●
 <p>Multi Edge/Tough</p>		S01035	CCMW 09T304S01035MET	0.4	1.9	2	●	●
			CCMW 09T308S01035MET	0.8	1.8		●	●
 <p>Multi Edge</p>		T00815	CPGB 080204T00815ME	0.4	1.9	2	●	●
		T00815	CPGB 090302T00815ME	0.2	2.6		●	●
			CPGB 090304T00815ME	0.4	2.6		●	●
 <p>Multi Edge/General Purpose</p>		S01225	CPGB 090304S01225MES	0.4	2.5	2	●	●
			CPGB 090308S01225MES	0.8	2.5		●	●
 <p>Multi Edge/Tough</p>		S01035	CPGB 080204S01035MET	0.4	1.9	2	●	●
			CPGB 080208S01035MET	0.8	2.2		●	●
		S01035	CPGB 090304S01035MET	0.4	2.5	2	●	●
			CPGB 090308S01035MET	0.8	2.5		●	●
 <p>Multi Edge</p>		T00815	DCMW 070202T00815ME	0.2	2.4	2	●	●
			DCMW 070204T00815ME	0.4	2.2		●	●
			DCMW 070208T00815ME	0.8	1.9		●	●
		T00815	DCMW 11T302T00815ME	0.2	2.4	2	●	●
			DCMW 11T304T00815ME	0.4	2.2		●	●
			DCMW 11T308T00815ME	0.8	1.9		●	●
			DCMW 11T312T00815ME	1.2	1.9		●	●
 <p>Multi Edge/General Purpose</p>		S01225	DCMW 11T302S01225MES	0.2	2.4	2	●	●
			DCMW 11T304S01225MES	0.4	2.2		●	●
			DCMW 11T308S01225MES	0.8	1.9		●	●
 <p>Multi Edge/Tough</p>		S01035	DCMW 070202S01035MET	0.2	1.9	2	●	●
			DCMW 070204S01035MET	0.4	1.7		●	●
			DCMW 070208S01035MET	0.8	1.9		●	●
		S01035	DCMW 11T302S01035MET	0.2	2.4	2	●	●
			DCMW 11T304S01035MET	0.4	2.2		●	●
			DCMW 11T308S01035MET	0.8	1.9		●	●
			DCMW 11T312S01035MET	1.2	1.9		●	●

●: Standard stock

Stock Items (Positive)

Cutting Edge Preparation				
Symbol	Cutting Edge Specification	Indication Example		Shape
T	Chamfered	T00815	0.08 mm x 15° chamfered	
S	Chamfered and Honed	S01225	0.12 mm x 25° chamfered and honed	

Description	IC	S	D1
TPGB 1103_	6.35	3.18	3.5
TPGB 1603_	9.525		4.5
TPGW 1604_	9.525	4.76	4.4
VBGW 1103_	6.35	3.18	2.8
VBGW 1604_	9.525	4.76	4.4
VCGW 0802_	4.76	2.38	2.3

Shape	Description	Cutting Edge Preparation	Dimensions (mm)		No. of Edges	MEGACOAT TOUGH	
			RE	LE		KBN010	KBN020
 Multi Edge	TPGB 110302T00815ME	T00815	0.2	2.3	3	●	●
	110304T00815ME		0.4	2.1		●	●
	110308T00815ME		0.8	1.8		●	●
 Multi Edge/General Purpose	TPGB 110304S01225MES	S01225	0.4	2.1	3	●	●
	110308S01225MES		0.8	1.8		●	●
 Multi Edge/Tough	TPGB 110302S01035MET	S01035	0.2	2.3	3	●	●
	110304S01035MET		0.4	2.1		●	●
	110308S01035MET		0.8	1.8		●	●
	TPGB 160304S01035MET	S01035	0.4	1.8	3	●	●
160308S01035MET	0.8		1.5	●		●	
 Multi Edge/Tough	TPGW 160404S01035MET	S01035	0.4	1.8	3	●	●
	160408S01035MET		0.8	1.5		●	●
 Multi Edge	VBGW 110302T00815ME	T00815	0.2	2.4	2	●	●
	110304T00815ME		0.4	2.0		●	●
	110308T00815ME		0.8	1.7		●	●
	VBGW 160402T00815ME	T00815	0.2	2.4	2	●	●
	160404T00815ME		0.4	2.0		●	●
	160408T00815ME		0.8	1.7		●	●
 Multi Edge/General Purpose	VBGW 110304S01225MES	S01225	0.4	2.0	2	●	●
	VBGW 160404S01225MES	S01225	0.4	2.0	2	●	●
 Multi Edge/Tough	VBGW 110302S01035MET	S01035	0.2	2.4	2	●	●
	110304S01035MET		0.4	2.0		●	●
	110308S01035MET		0.8	1.7		●	●
	VBGW 160402S01035MET	S01035	0.2	2.4	2	●	●
	160404S01035MET		0.4	2.0		●	●
	160408S01035MET		0.8	1.7		●	●
 Multi Edge	VCGW 080202T00815ME	T00815	0.2	2.4	2	●	●
	080204T00815ME		0.4	2.0		●	●
 Multi Edge/Tough	VCGW 080202S01035MET	S01035	0.2	2.4	2	●	●
	080204S01035MET		0.4	2.0		●	●
	080208S01035MET		0.8	1.7		●	●

● Standard stock

25° Insert profiling tools

25° Insert profiling tools

ZBMT Series

Unique clamping structure and a wide lineup of external toolholders and boring bars. High precision and stable machining in a wide range of applications including copying, undercutting, tapering, V-slotting, spherical machining, and more.



New 25° Inserts Achieve Excellent Results Using a Large Variety of Toolholders

Challenges

Workpiece geometries are becoming more complex and can be difficult to machine with typical 35° V-style design inserts. Specialized tools focusing on shape often sacrifice rigidity, accuracy, or chip control

SOLUTION

The 25° ZBMT insert adopts a strong and unique clamp mechanism for added rigidity. This rigidity adds precision and stability in a variety of machining applications for shorter cycle times and lower machining costs.



The world of the 25° insert

Custom holder cutting angles, polygon taper shanks, etc. are available by request.

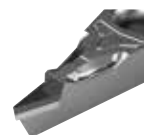
Please contact your Kyocera sales representative for details.

New insert grades are available

For a wide range of applications and work materials



Cermet insert



PCD insert

1

Newly Developed Unique-Clamping Mechanism Achieves a Higher Rigidity

Side Lock Mechanism

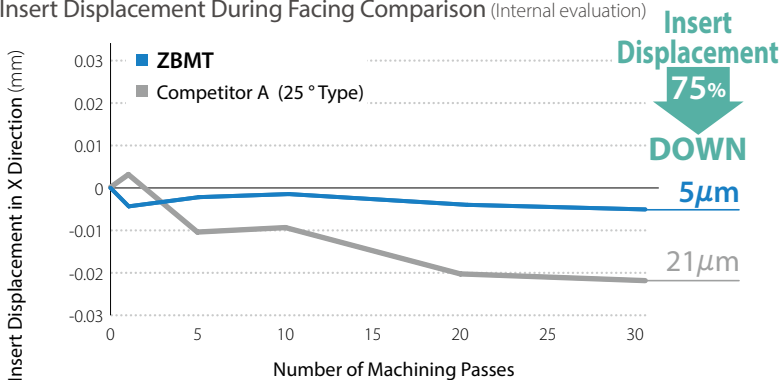
Unique design holds insert at 2 points
Safe even for insert with small tip angle that is difficult to mount



Indentations for screw clamp are designed into the insert's body
Uses a large screw size (M3)



Insert Displacement During Facing Comparison (Internal evaluation)



Cutting conditions : $V_c = 230$ m/min, $a_p = 0.3$ mm, $f = 0.15$ mm/rev, Wet
Workpiece material SCM435

*The above figures are not guaranteed. It depends on cutting conditions.

Check

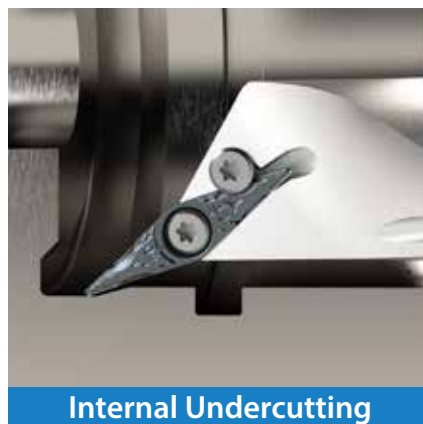
By controlling insert displacement,

- Machining precision is stabilized and long tool life is enable
- Reduces defect rate due to sudden dimensional deviation

*Please check P48 for how to attach and detach insert using the new insert clamp

Provides High Quality and Stable Machining in Various Machining Applications

Excellent performance in various machining applications including copying, undercutting, tapering, V-slotting, spherical machining, etc.



2

Unique Holder Design to Meet Customers' Needs

Both boring bars and external toolholders are compatible with internal coolant.

Unique Double Coolant Hole Design

Supplies coolant directly to the cutting edge and provides improved chip evacuation and long tool life (Coolant discharge direction: Fine adjustment possible)

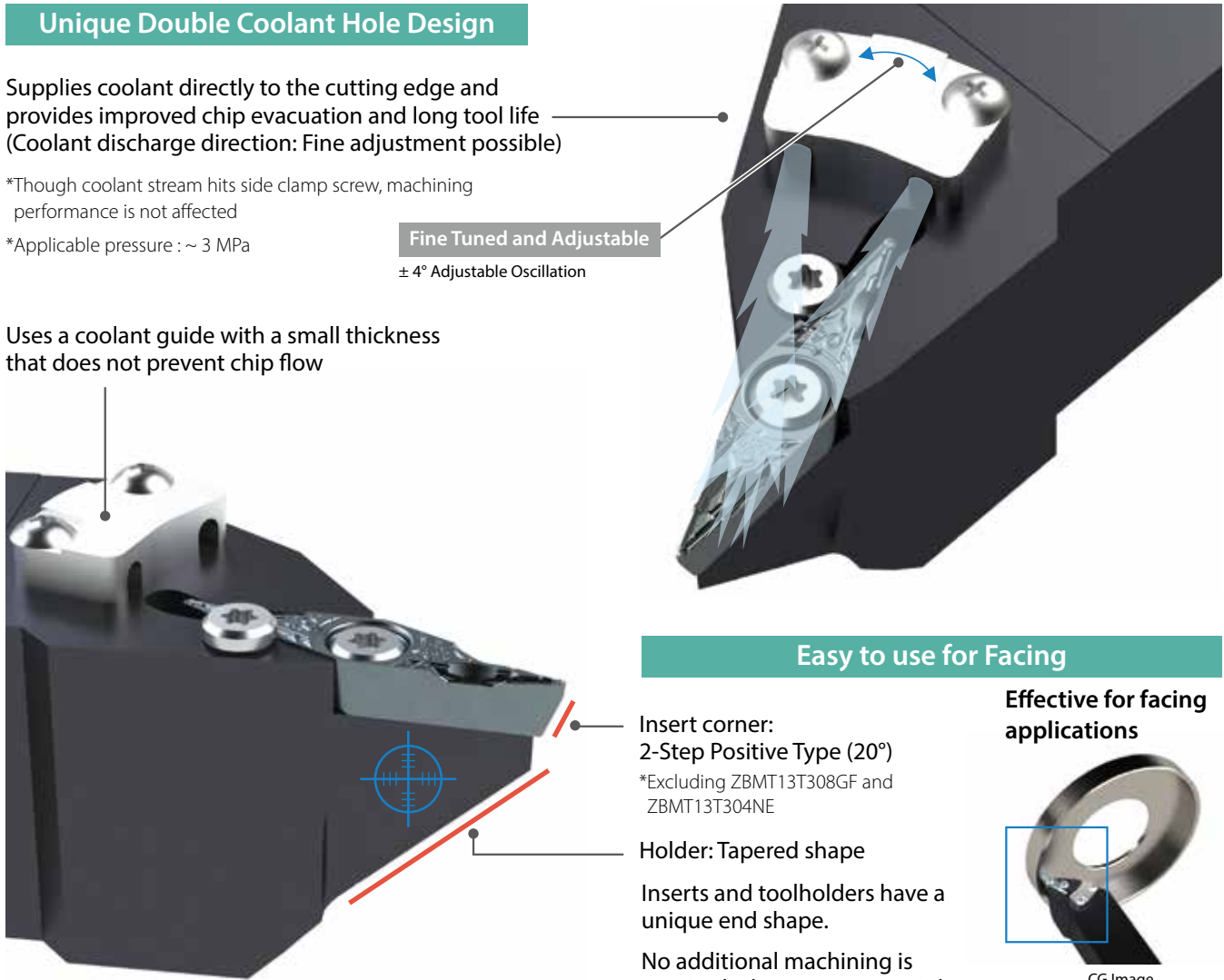
*Though coolant stream hits side clamp screw, machining performance is not affected

*Applicable pressure : ~ 3 MPa

Fine Tuned and Adjustable

± 4° Adjustable Oscillation

Uses a coolant guide with a small thickness that does not prevent chip flow



Easy to use for Facing

Effective for facing applications

Insert corner: 2-Step Positive Type (20°)

*Excluding ZBMT13T308GF and ZBMT13T304NE

Holder: Tapered shape

Inserts and toolholders have a unique end shape.

No additional machining is required when trying to avoid interference with workpiece.



CG Image

Solution Significant reduction in quality defect costs

(User evaluation)

Suppresses dimensional fluctuations due to insert displacement. Reduces defect rates.



CG Image

Dimension defect rate

GF Chipbreaker

Competitor B

100+/month

Defect rate Reduction
DOWN

Cutting conditions: Vc = 230 m/min, ap = 0.3 mm, f = 0.15 mm/rev, Wet Workpiece material SCM435

GF Chipbreaker chip condition



User Feedback

- Some parts require an insert with a tip angle of 25° to allow machining.
- The dimensional error of the GF chipbreaker was drastically improved in comparison with the competitors.
- Greatly reduced the cost of quality defects.

3 GF chipbreaker for ZBMT inserts reduces chip control issues when machining at minute depths of cut

GF Chipbreaker

Solving chip control issues leads to high-quality surface finishes

The thin molded chipbreaker extends near the corner and reliably controls chips even in narrow spaces

Movie



Two-step dot

Responds to chip fluctuation

Molded cutting edge

Improved chip control at small D.O.C.

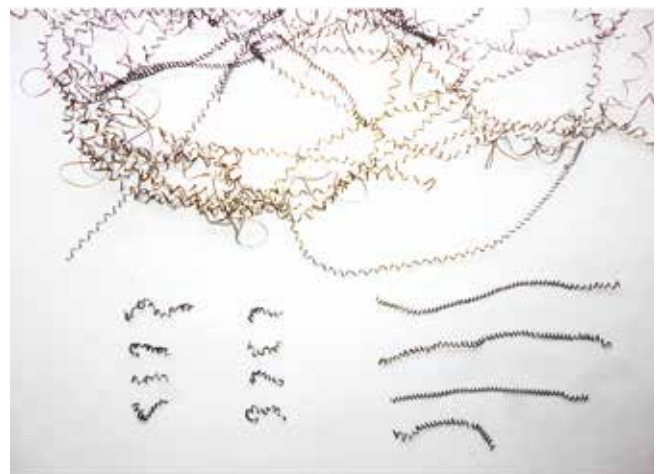
Mortar-shaped chipbreaker

Low resistance and excellent chip control even in ductile workpieces

Chip control comparison (Internal evaluation)



GF Chipbreaker



Competitor A (25° Type)

Cutting conditions : $V_c = 230$ m/min, $f = 0.15$ mm/rev, $a_p = 0.2 - 0.5$ mm, Wet, Workpiece material SCM435, Facing

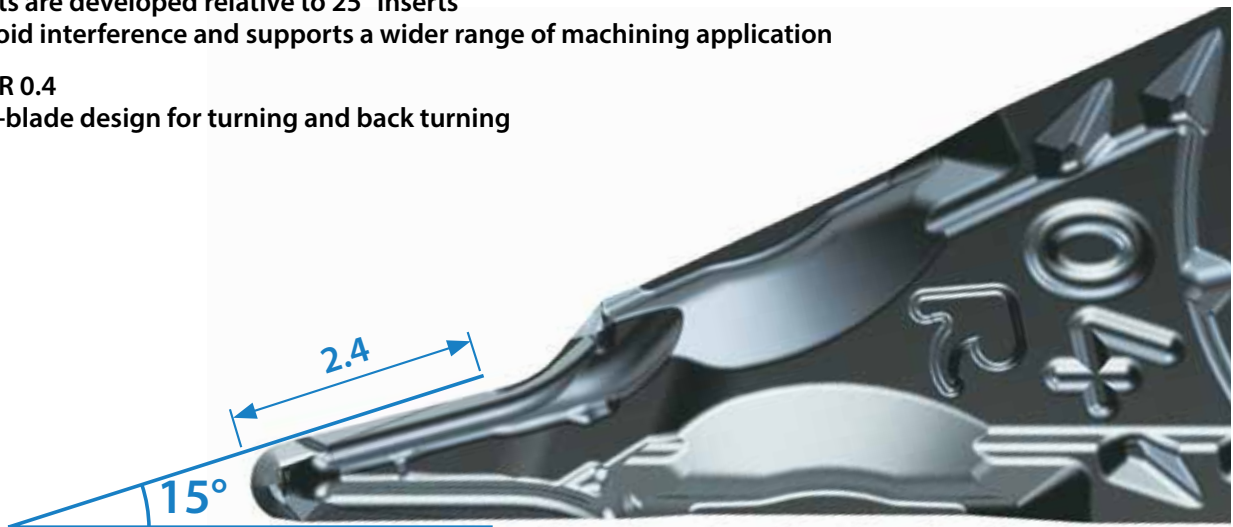
4

15° inserts are also available upon customer requests

15° inserts are developed relative to 25° inserts

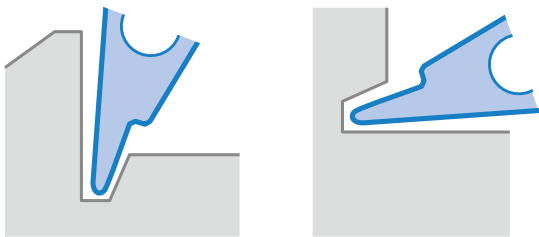
Helps avoid interference and supports a wider range of machining application

- Corner-R 0.4
- Double-blade design for turning and back turning

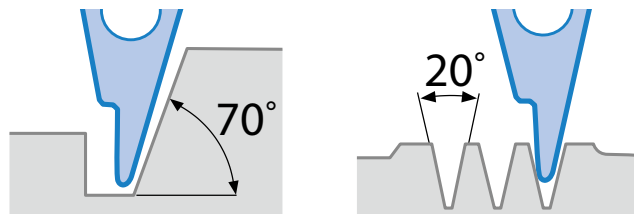


Examples

When using the toolholder in reverse mounting position



When using the toolholder in normal mounting position *Holder: Special order specification



To avoid holder interference, additional modifications is required as shown in the figure below.

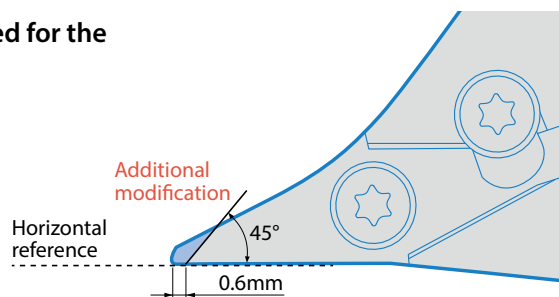
Also, as shown in the figure below, special order for holders may be required depending on machining application.

How to modify toolholder when using 15° insert

When using 15° insert, additional modification is required for the holder to avoid interference.

Recommended Additional Modification

- Set the edge of insert bearing surface at the end of the holder at horizontal reference shown below.
- Modify the holder to 0.6 mm from the tip at an angle of not less than 45° from the horizontal.





Hybrid Cermet for Steel machining

PV720 / PV730 New cermet for high quality surface finish machining



Uncoated Cermet

TN620 Three attributes of the hybrid technology contributes to excellent fracture and wear resistance

Case Studies (ZBMT)

Shaft S45C

Vc = 115 m/min
ap = 0.05 mm
f = 0.08 mm/rev
Wet
ZBMT13T304GF
SZLBR2525M-13C



Number of products

ZBMT
(PV720)

135 pcs/edge



Competitor D

55 pcs/edge

Side Lock Mechanism in ZBMT reduces the displacement in the Z-direction. Improves work efficiency with no dimension correction. Excellent surface finish with PV720

(User evaluation)



PCD (Polycrystalline Diamond)

KPD001 Excellent Aluminum Alloy Surface Finish with Micro-Grain PCD

Case Studies (ZBMT)

Spacer A2017/A5052/A7075

Vc = 540 m/min
ap = 0.1 mm (Facing) / 0.2 mm (Internal)
f = 0.05 mm/rev,
Wet
ZBMT13T304NE
A25S-SZQBR13-32AE



Number of products

ZBMT
(KPD001)

200 pcs/edge

Dimensional accuracy,
Stable



Competitor F

200 pcs/edge




Dimensional accuracy,
Unstable

Competitor's products had dimensional fluctuations, but ZBMT has excellent stability even with more than 200 pcs. Good cutting edge condition and high dimensional accuracy with H6 tolerance

(User evaluation)

Stock Items

Carbide coating, Cermet, PCD

Shape	Description	Dimensions (mm)				MEGACOAT NANO PLUS	MEGACOAT NANO	PVD Coated Cermet	NEW	Non-coated Cermet	NEW	PCD	NEW
		IC	S	D1	RE	PR1725	PR1535	PV720	PV730	TN620	KPD001 ^{*1}		
 Tip Angle 25°	ZBMT 13T302GF	6.35	3.97	3.7	0.2	●	●						
	13T304GF				0.4	●	●	●	●	●			
	13T308GF				0.8	●	●	●	●	●			
 Tip Angle 25° 1-edge	ZBMT 13T301NE	6.35	3.97	3.7	0.1							●	
	13T302NE				0.2								●
	13T304NE				0.4								
 Tip Angle 15° (Right-Hand R)	ZBMT 13T304R-GF-15D	6.35	3.97	3.7	0.4	●	●						

• Because insert has a molded shape, the tip angle may be 24° depending on the measurement location.

• A PCD insert (KPD001) can not be reground.

• When a PCD insert (KPD001) enters a workpiece or contacts a wall, keep the feed rate below 50% of normal use to prevent damage to the insert. If feed is not reduced, the edge may defect.

●: Standard stock
Inserts are sold in 10 piece boxes

*1.PCD Insert (KPD001) is sold in 1 piece boxes

Recommended Cutting Conditions

Workpiece Material	Insert tip angle	Corner-R (RE)	Insert Grade	Vc (m/min)	ap (mm)	f (mm/rev)
Carbon steel / Alloy steel	25°	0.2	PR1725	60 - 150 - 200	0.2 - 0.3 - 1.5	0.05 - 0.15 - 0.15
			PR1535	60 - 120 - 180	0.2 - 0.3 - 1.5	0.05 - 0.15 - 0.15
		0.4 / 0.8	PR1725	60 - 150 - 200	0.2 - 0.3 - 2.0	0.05 - 0.15 - 0.25
			PR1535	60 - 120 - 180	0.2 - 0.3 - 2.0	0.05 - 0.15 - 0.25
			PV720	140 - 180 - 240	0.2 - 0.3 - 1.5	0.05 - 0.13 - 0.20
			PV730	140 - 180 - 240	0.2 - 0.3 - 1.5	0.05 - 0.13 - 0.20
	15°	0.4	PR1725	60 - 150 - 200	0.2 - 0.3 - 1.0	0.05 - 0.10 - 0.15
			PR1535	60 - 120 - 180	0.2 - 0.3 - 1.0	0.05 - 0.10 - 0.15
Stainless steel	25°	0.2	PR1725	60 - 150 - 180	0.2 - 0.3 - 1.0	0.05 - 0.10 - 0.15
			PR1535	60 - 120 - 150	0.2 - 0.3 - 1.0	0.05 - 0.10 - 0.15
		0.4 / 0.8	PR1725	60 - 150 - 180	0.2 - 0.3 - 1.0	0.05 - 0.15 - 0.25
			PR1535	60 - 120 - 150	0.2 - 0.3 - 1.0	0.05 - 0.15 - 0.25
	15°	0.4	PR1725	60 - 150 - 180	0.2 - 0.3 - 1.0	0.05 - 0.10 - 0.15
			PR1535	60 - 120 - 150	0.2 - 0.3 - 1.0	0.05 - 0.10 - 0.15
Cast iron	25°	0.2	PR1725	60 - 150 - 180	0.2 - 0.3 - 1.5	0.05 - 0.10 - 0.15
		0.4 / 0.8	PR1725	60 - 150 - 180	0.2 - 0.3 - 2.0	0.05 - 0.15 - 0.25
	15°	0.4	PR1725	60 - 150 - 180	0.2 - 0.3 - 1.0	0.05 - 0.10 - 0.15
Non-ferrous metals (Aluminum alloys)	25°	0.1 / 0.2 / 0.4	KPD001	200 - 500 - 800	0.1 - 0.2 - 0.5	0.03 - 0.05 - 0.07

• When using machining at ap 1.5 mm or more, reduce the feed by about 50%.

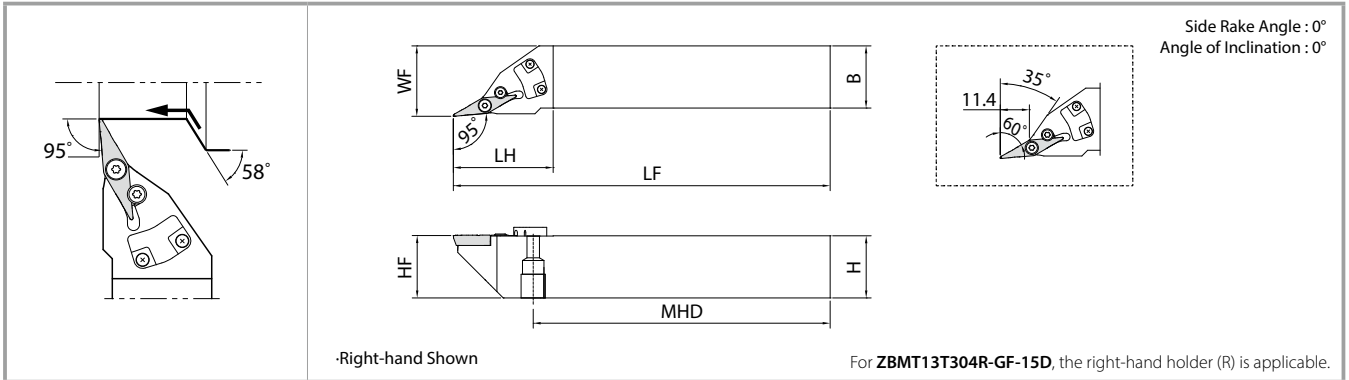
• Diamond inserts (KPD001) can not be reground.

• When a diamond insert (KPD001) enters a workpiece or contacts a wall, keep the feed rate below 50% of normal use to prevent damage to the insert. If feed is not reduced, the edge may defect.

External

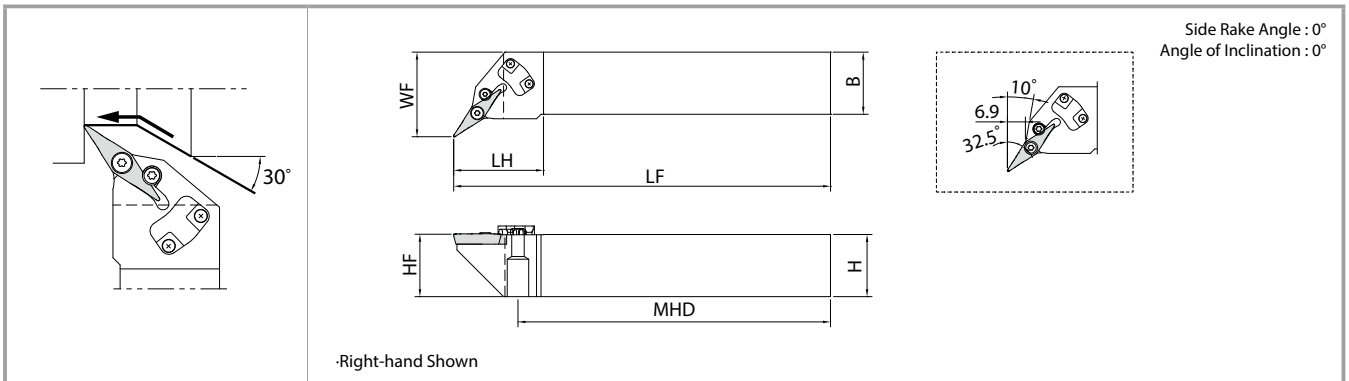
SZLB (External/Copying)

Applicable pressure : ~ 3 MPa



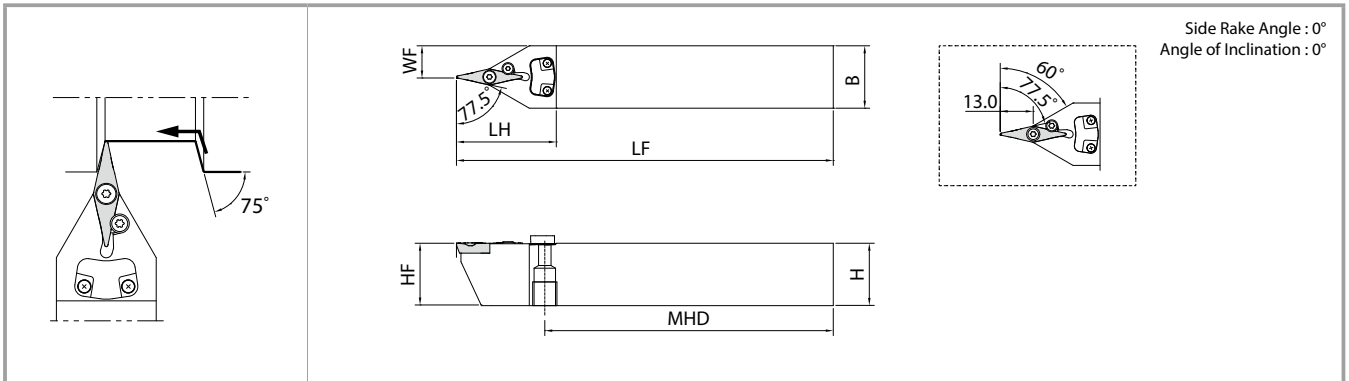
SZPB (External/Facing/Copying/Undercutting)

Applicable pressure : ~ 3 MPa

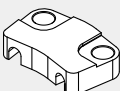


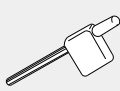


SZVBN (External/Copying)

Applicable pressure : ~ 3 MPa



Toolholder Dimensions

Description	Stock			Dimensions (mm)							Standard Corner-R (RE)	Coolant hole	Parts				
	R	N	L	H	HF	B	LF	LH	WF	MHD			Coolant Guide	Screw for Coolant Guide	Clamp Screw	Wrench	
SZLB ^{R/L}	2020K-13C	●	●	20	20	20	125	40	23	92.6	0.4	Yes	   	ZCP-13	BH2X6	SB-3079TR	Recommended tightening torque 1.2 N·m
	2525M-13C	●	●	25	25	25	150	40	28.2	118							
SZPB ^{R/L}	2020K-13C	●	●	20	20	20	125	37	27.2	95	0.4	Yes					
	2525M-13C	●	●	25	25	25	150	36	33.9	124.2							
SZVBN	2020K-13C	●	●	20	20	20	125	40	10	89.6	0.4	Yes					
	2525M-13C	●	●	25	25	25	150	40	12.5	114.6							

● : Standard stock

Boring Bar

Maximum overhang length $L/D \sim 5.5$

A-SZJB-AE Excellent Bar (Internal Spherical Machining/Internal Facing/Copying)

Left-hand (L) is the above shape

Shank Diameter	Straight Hole Diameter
ø20	ø5
ø25	
ø32	

Right-hand Shown

For ZBMT13T304R-GF-15D, the right-hand toolholder (R) is applicable.

A-SZXB-AE Excellent Bar (Internal Facing/Copying/Undercutting)

Left-hand (L) is the above shape

Shank Diameter	Straight Hole Diameter
ø20	ø5
ø25	
ø32	

Right-hand Shown

A-SZQB-AE Excellent Bar (Copying/Undercutting)

Left-hand (L) is the above shape

Shank Diameter	Straight Hole Diameter
ø20	ø5
ø25	
ø32	

Right-hand Shown

A-SZLB-AE Excellent Bar (Copying)

Left-hand (L) is the above shape

Shank Diameter	Straight Hole Diameter
ø20	ø5
ø25	
ø32	

Right-hand Shown

For ZBMT13T304R-GF-15D, the Left-hand (L) toolholder is applicable.

A-SZXB-AE Excellent Bar (Back Boring)

Left-hand (L) is the above shape



Shank Diameter	Straight Hole Diameter
ø20	ø5
ø25	
ø32	

Right-hand Shown

For ZBMT13T304R-GF-15D, the right-hand toolholder (R) is applicable.

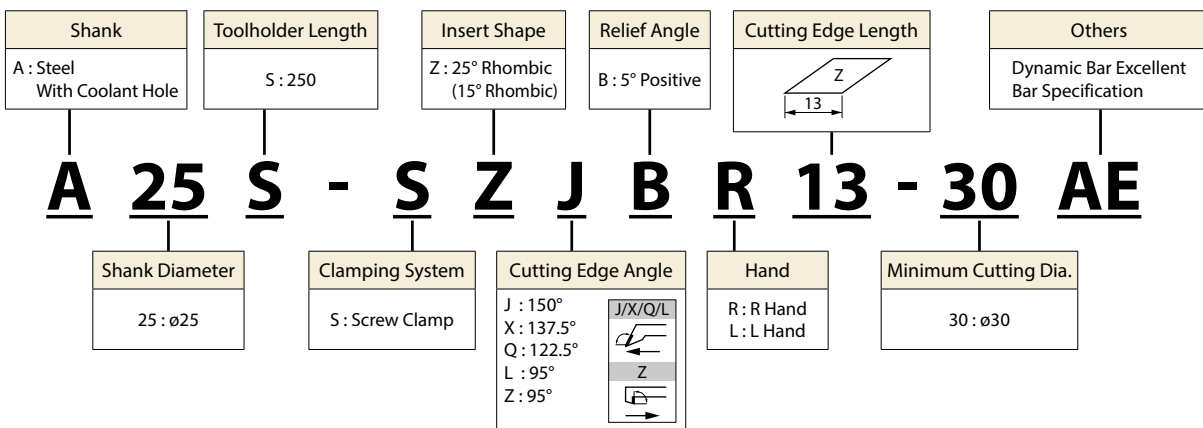
Boring Bar

Toolholder Dimensions

Description	Stock		Minimum Cutting Dia.	Dimensions (mm)								GAMO	Standard Corner-R (RE)	Coolant hole	Parts						
	R	L		DMIN	DCON	H	LPR	LF	LU	LH	WF				WF2	Clamp Screw	Wrench				
		●	●																		
A20R-SZJB ^{R/L} 13-28AE	●	●	28	20	19		200	37.5	48	3.0	-	5°	0.4	Yes	SB-3079TR	FT-8					
A25S-SZJB ^{R/L} 13-30AE	●	●	30	25	24	-	250	47	58	3.5	-	5°	0.4	Yes	SB-3079TR	FT-8					
A32S-SZJB ^{R/L} 13-40AE	●	●	40	32	31		250	61.5	74	3.5	-						Recommended tightening torque 1.2 N·m				
A20R-SZXB ^{R/L} 13-25AE	●	●	25	20	19		200	37.5	48	7.5	-						5°	0.4	Yes	SB-3079TR	FT-8
A25S-SZXB ^{R/L} 13-30AE	●	●	30	25	24	-	250	45	58	7	-	Recommended tightening torque 1.2 N·m									
A32S-SZXB ^{R/L} 13-40AE	●	●	40	32	31		250	60	74	7	-	5°	0.4	Yes	SB-3079TR	FT-8					
A20R-SZQB ^{R/L} 13-27AE	●	●	27	20	19		200	-	41	15.5	5.5						5°	0.4	Yes	SB-3079TR	FT-8
A25S-SZQB ^{R/L} 13-32AE	●	●	32	25	24	-	250	-	51	18	5.5										
A32S-SZQB ^{R/L} 13-40AE	●	●	40	32	31		250	-	54	22.5	6.5	7°	0.4	Yes	SB-3079TR	FT-8					
A20R-SZLB ^{R/L} 13-30AE	●	●	30	20	19		200	40	43	23	13						Recommended tightening torque 1.2 N·m				
A25S-SZLB ^{R/L} 13-34AE	●	●	34	25	24	-	250	62	66	25.5	13						7°	0.4	Yes	SB-3079TR	FT-8
A32S-SZLB ^{R/L} 13-40AE	●	●	40	32	31		250	84	87	29	13	Recommended tightening torque 1.2 N·m									
A20R-SZZB ^{R/L} 13-30AE	●	●	30	20	19	200	187	27	43	23	13	7°	0.4	Yes	SB-3079TR	FT-8					
A25S-SZZB ^{R/L} 13-34AE	●	●	34	25	24	250	237	43	60	25.5	13						Recommended tightening torque 1.2 N·m				
A32S-SZZB ^{R/L} 13-40AE	●	●	40	32	31	250	237	59	75	29	13						Recommended tightening torque 1.2 N·m				

● : Standard stock

Identification System



Unique Cutting Angle A-SZXB-AE (Internal Facing/Copying/Undercutting)

Features

• Chatter-resistant shape

The insert is placed near the center of the shank to ensure the thickness of the lower jaw of the insert.

• User-friendly design

The holder width (WF + Neck radius) is small, and it is easy to apply to the narrow gap of the workpiece (Minimum cutting dia. DMIN: Determined by R near the holder edge).





Piping Parts for External Toolholders

JCT series piping parts can be used for machining with internal coolant (Sold separately).
For details, please refer to the page 59.

Joint/Banjo Bolt


Applicable pressure : ~ 30 MPa

Shape	Description	Stock	Thread Standard	
			Toolholder machine connection side	
	J-G1/8-UNF3/8	●	G1/8	
	J-M10X1.5-UNF3/8	●	M10X1.5	
Banjo Bolt (For Angle Hose) 	BB-G1/8	●	G1/8	
	BB-M10X1.5	●	M10X1.5	

● : Standard stock

Washer

Applicable pressure : ~ 30 MPa




Shape	Description	Stock
	WS-10	●

*When using banjo bolts, two washers are required.

● : Standard stock

Hose

Applicable pressure : ~ 30 MPa

Shape	Description	Stock	Thread Standard		Dimensions (mm)
					L
Straight/Straight 	HS-ST-ST-200	●	UNF3/8	UNF3/8	200
	HS-ST-ST-250	●			250
Straight/Angle 	HS-ST-AN-200	●	UNF3/8	(Banjo Bolt)	200
	HS-ST-AN-250	●			250
Angle/Angle 	HS-AN-AN-200	●	(Banjo Bolt)	(Banjo Bolt)	200
	HS-AN-AN-250	●			250

● : Standard stock

Boring/Facing Available Cutting Diameter and Maximum D.O.C.



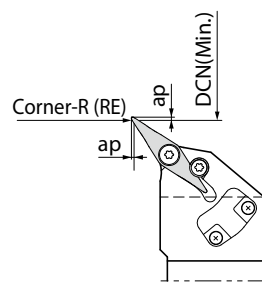
CG Image

Standard Corner-R(RE) 0.4

Cutting Dia.	Depth (mm)
ø30	0.5
ø50	1.5
ø65	3.0
ø80	6.0
ø100	10.0
ø150	14.0

Excluding PCD Insert (KPD001)

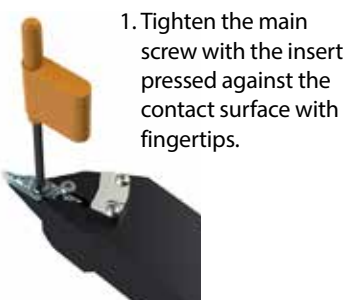
SZPB Type Cutting Diameter for Undercutting



Corner-R (RE)	ap (mm)	DCN (Min.)
0.1	0.5	ø30
	1	ø35
0.2	0.5	ø30
	1	ø35
0.4	0.5	ø30
	1	ø35
0.8	0.5	ø110
	1	ø150

Instructions

When mounting the insert (Tightening torque: 1.2 N · m)

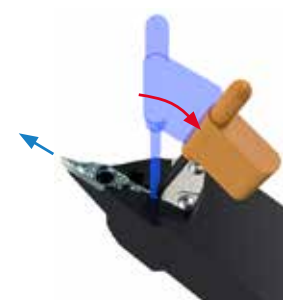


1. Tighten the main screw with the insert pressed against the contact surface with fingertips.



2. Tighten the side screw to complete the installation.

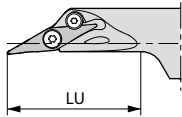
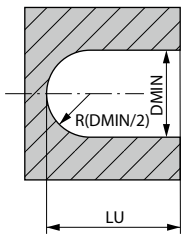
When removing the insert



Remove the two screws and put the wrench into the gap at the back end of the insert. It can be easily removed by pushing out the insert as shown on the left.

Inner Spherical Machining/Internal Facing/Copying (A-SZJB-AE)

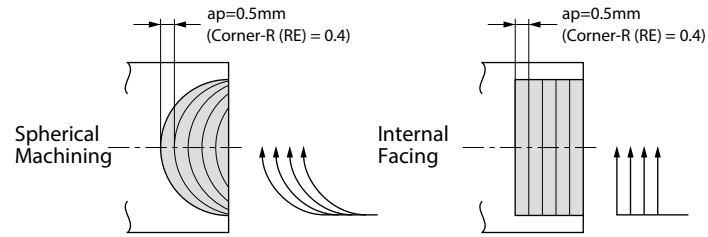
Application Range



DMIN : $\phi 28 - \phi 40$

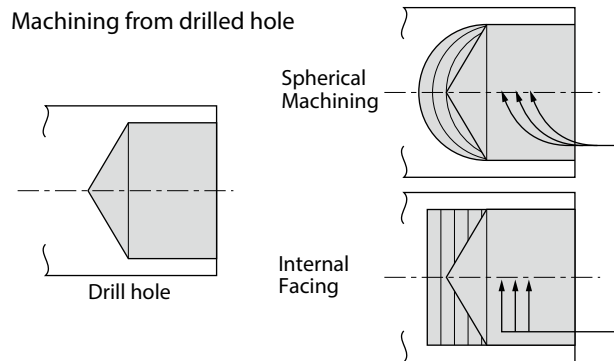
Applications

Without pre-drilled hole



* f should be 0.05 mm/rev or less at internal facing.

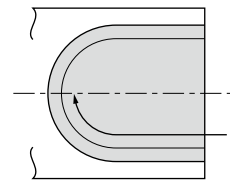
Machining from drilled hole



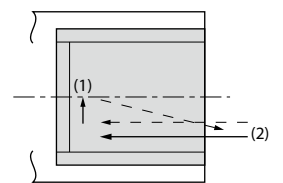
* f should be 0.05 mm/rev or less at internal facing.

Finishing

Spherical Machining



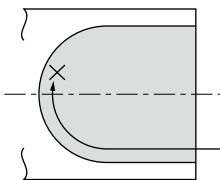
Internal Facing



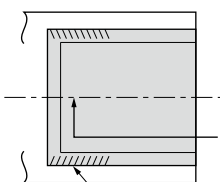
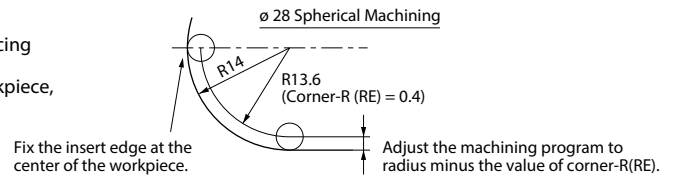
Machining Process

1. Finish the internal face first.
2. Next, finish the internal surface.

Caution

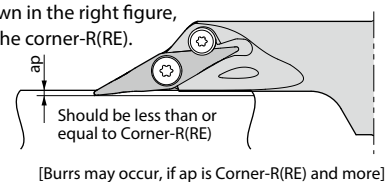


Internal spherical machining and internal facing
(Especially internal spherical machining)
When machining past the center of the workpiece,
insert may break.



This type of machining is possible,
but the chips might scratch the surface.

When internal copying as shown in the right figure,
keep ap less than or equal to the corner-R(RE).



Boring bar with anti-vibration dampener system

Interchangeable head boring bars with anti-vibration dampener system

KAV Series

"Max L/D = 10" Solves deep-boring challenges

Excellent anti-chatter performance due to unique anti-vibration design and available for a wide range of machining operations

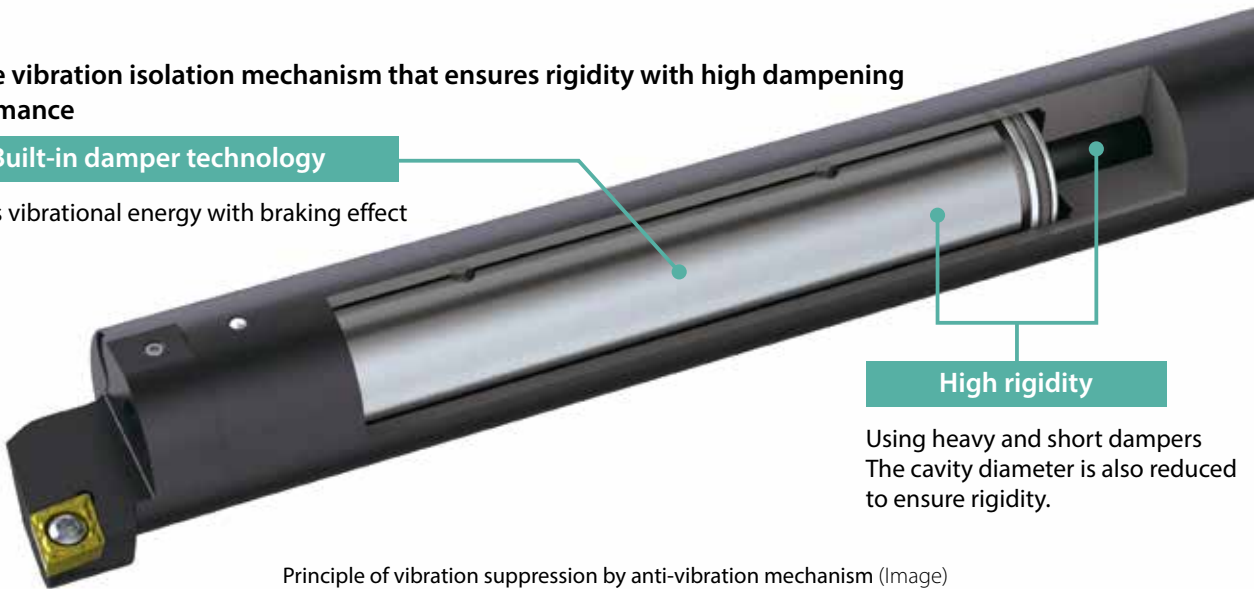


1 Unique anti-vibration mechanism provides superior chatter resistance

Unique vibration isolation mechanism that ensures rigidity with high dampening performance

Built-in damper technology

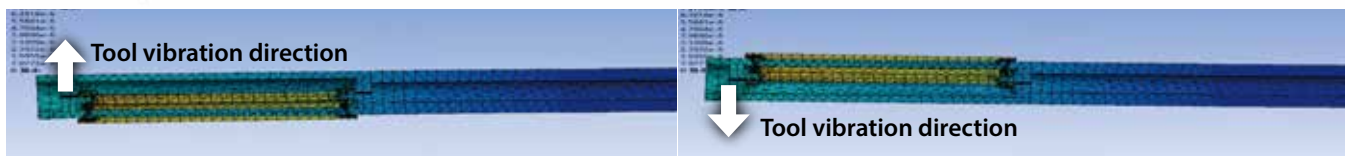
Absorbs vibrational energy with braking effect



High rigidity

Using heavy and short dampers
The cavity diameter is also reduced to ensure rigidity.

Principle of vibration suppression by anti-vibration mechanism (Image)



The damper vibrates late against the shank. Effective for vibration damping



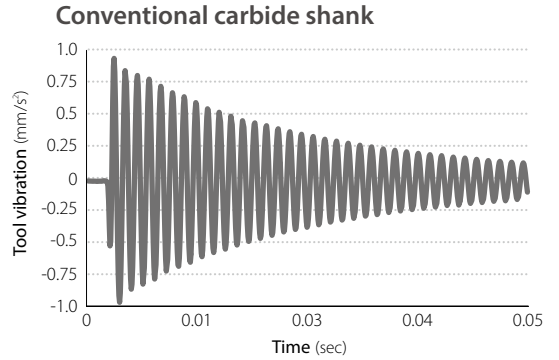
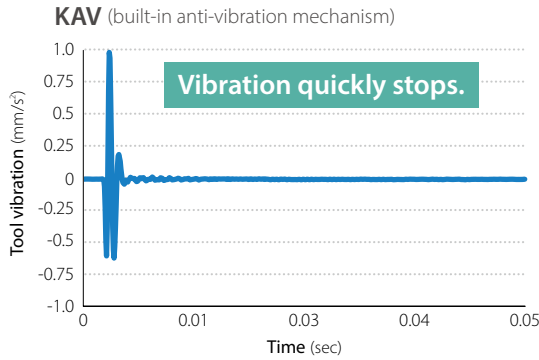
Available up to L/D = 10. Excellent anti-vibration performance over conventional carbide shanks

Hammering test (Internal evaluation)

Hammer impacts to the head of the tool (ø20, Overhang length 10D)



Vibration measurement direction

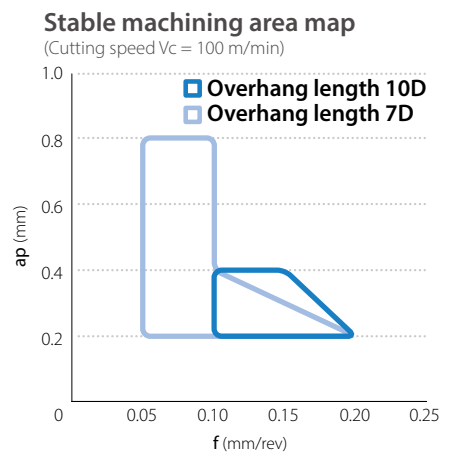
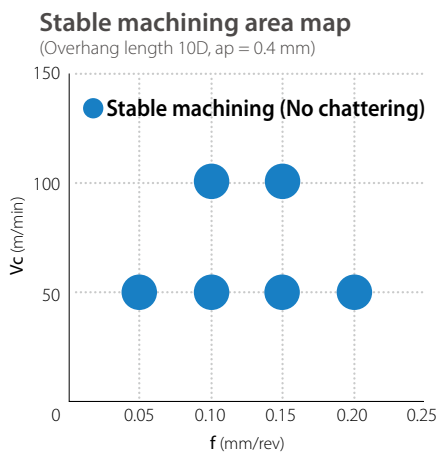


10D Shank Anti-vibration performance (Internal evaluation)

KAV maintains stable machining



KAV-G20-10D / KAVH20-SCLCR09
CCMT09T304PP
Overhang length: 140 mm (7D) / 200 mm (10D)
Workpiece material: SCM435



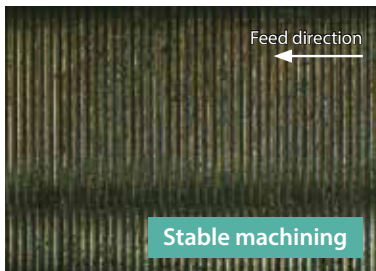
Unique anti-vibration mechanism provides superior anti-chatter performance against competitors

Anti-vibration performance comparison (Internal evaluation)

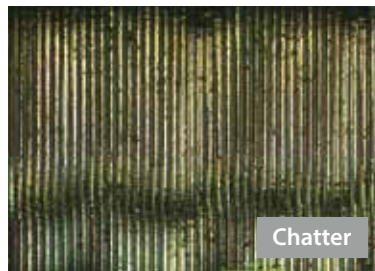
Competitors produced chattering. KAV maintains stable machining.



KAV



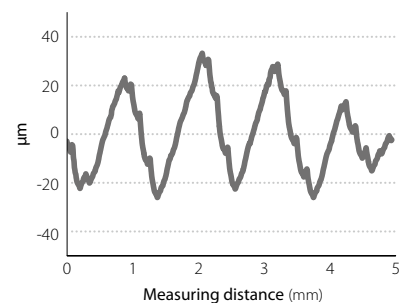
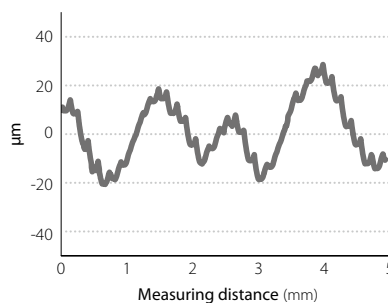
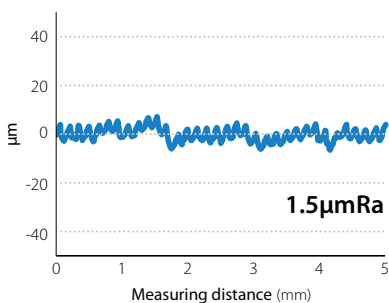
Competitor A (anti-vibration type)



Competitor B (anti-vibration type)



Surface roughness

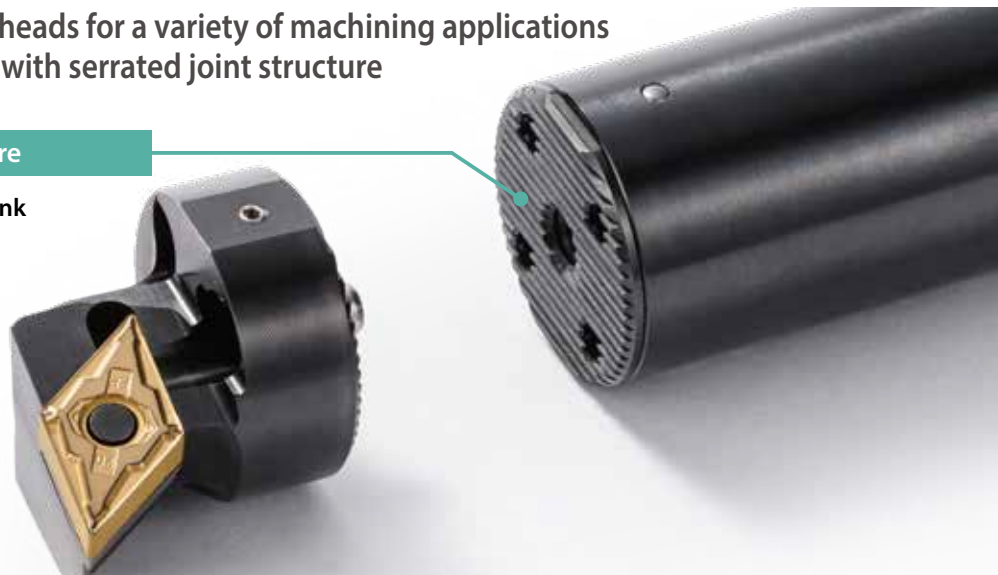


Cutting conditions: Vc = 150 m/min, ap = 0.4 mm, f = 0.15 mm/rev Workpiece material: SCM435 Overhang length 320 mm

2 Interchangeable heads for a variety of machining applications Strong fastening with serrated joint structure

Serrated structure

Securely fastens head and shank



Internal coolant recommended

Internal coolant recommended to prevent damage to anti-vibration mechanism

When using our plumbing parts:
Supports pressures up to 7 MPa
(some items are only recommended up to 1 MPa)



Coolant pipe connections: See page 58

Head Lineup

Shank diameter	Positive Type (Screw Clamp)				Negative Type (Lever Lock)		
	SCLC	SDUC	STLP	SVUB	PCLN	PDUN	PTFN
ø16	●	●	●				
ø20	●	●	●	●			
ø25	●	●	●	●			
ø32	●	●	●	●	●	●	●

3 Easy cutting edge adjustment with E-Sleeve Smooth machining setup

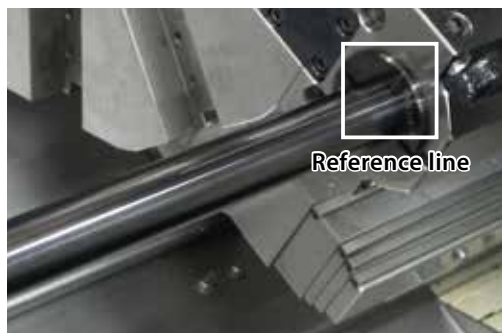
E-Sleeve (Sold separately)

Separated structure with printed reference lines
Easy adjustment reduces setup time

Adjusting the cutting edge position

Exclusive Sleeve (E-Sleeve)

Adjusting the cutting edge position with a reference line



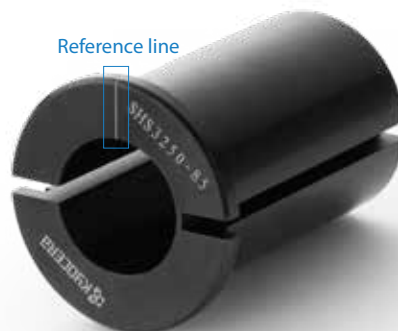
Reference line



Instruction video

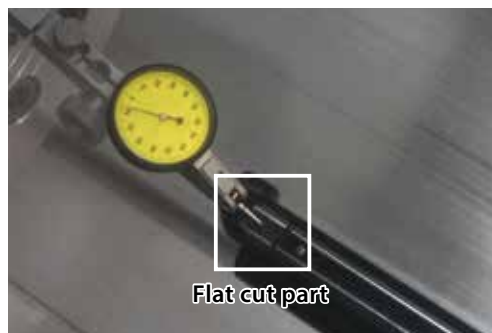
Adjusting the cutting edge position is easy by simply aligning the reference line between the shank and the sleeve.

Reference line



Conventional Sleeve

Adjusting the cutting edge position with the flat cut part of the head



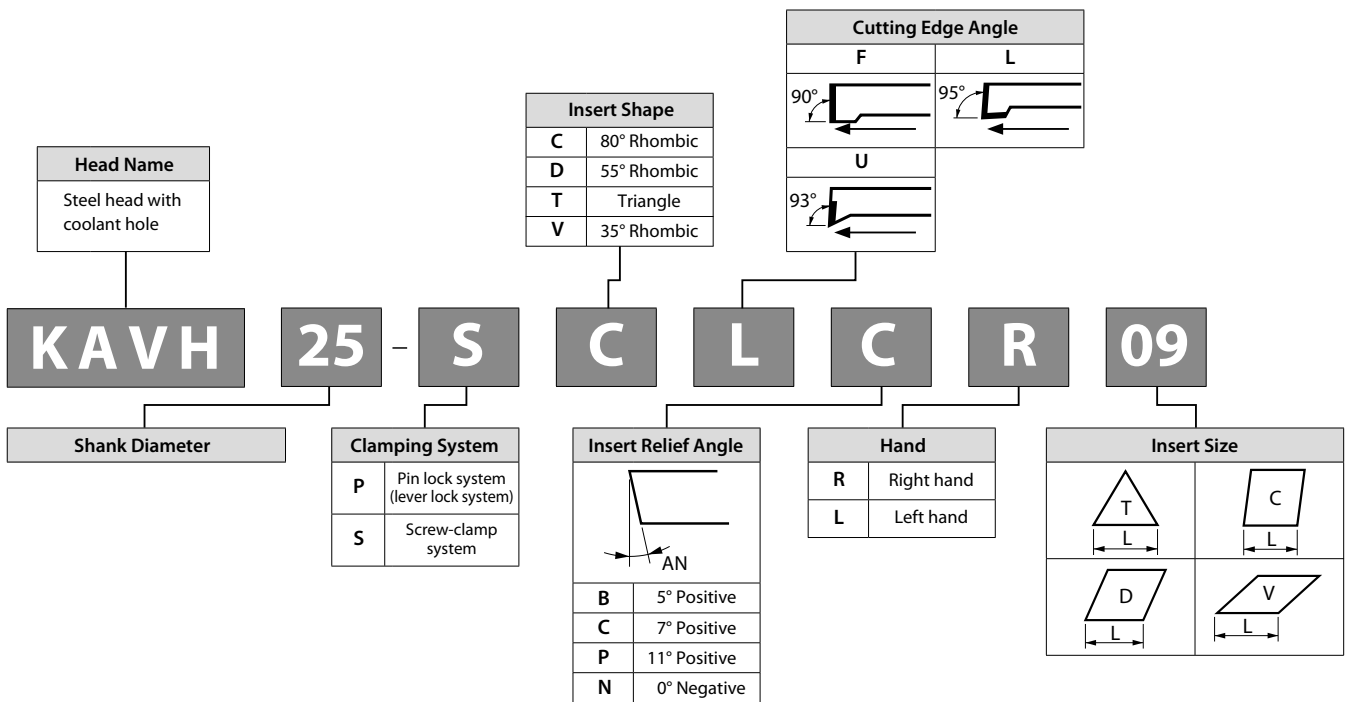
Flat cut part



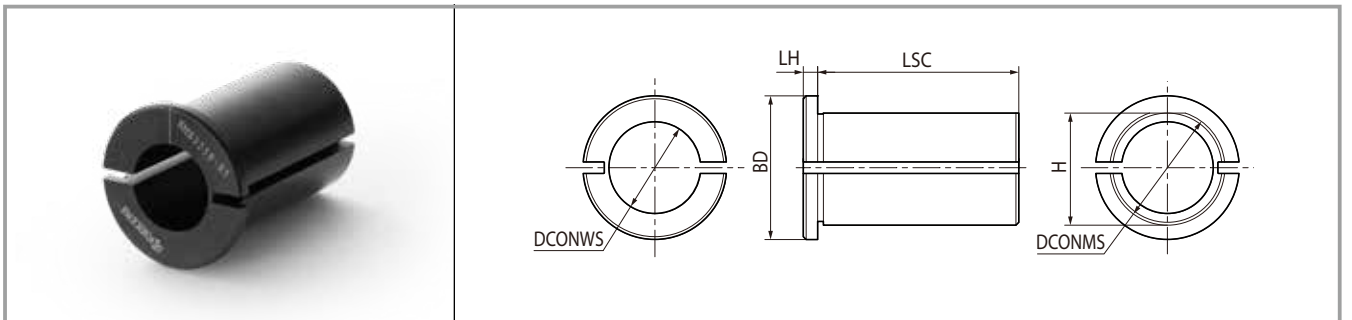
Instruction video

Adjust the flat cut part of the head by moving the tool while applying a dial gauge, etc.

Replaceable boring bar head identification system



Sleeve for KAV (E-Sleeve)



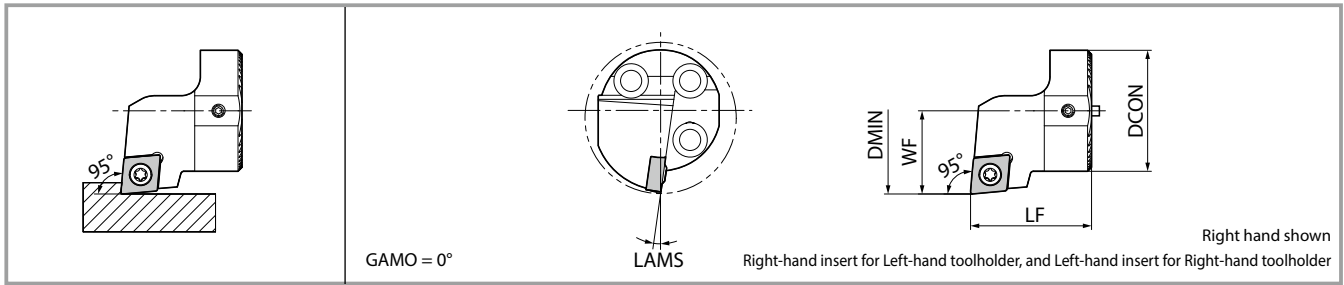
Sleeve dimensions

Description	Stock	Dimensions (mm)						Applicable Shank
		DCONMS	DCONWS	BD	LSC	LH	H	
SHS 1640-75	●	40	16	50	70	5	39	KAV-D16-7D/10D
	●		20					KAV-G16-10D
	●		25					KAV-D20-7D/10D
	●		32					KAV-G20-10D
SHS 2540-75	●	50	25	60	80	5	48.5	KAV-D25-7D/10D
	●		32					KAV-D32-7D/10D



Choose the sleeve DCONWS together with the shank DCONMS.

●: Standard stock

KAVH-SCLC (Internal/Internal Facing, Screw Clamp)



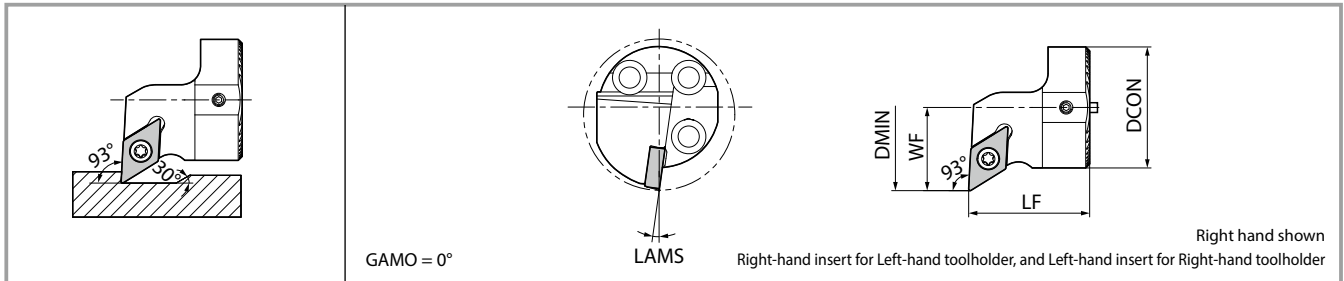
Toolholder dimensions

Description	Stock		Dimensions (mm)				LAMS (°)	Std. Corner R (RE)	Spare Parts		Applicable Shank	Applicable Insert
	R	L	DMIN	DCON	LF	WF			Clamp Screw	Wrench		
												
KAVH 16-SCLC ^{R/L} 06	●	●	20	16	20	11	-7	0.4	SB-2545TR	FT-8	KAV-D16/G16...	CC <input type="checkbox"/> T0602... CC <input type="checkbox"/> W0602...
KAVH 20-SCLC ^{R/L} 09	●	●	25	20	20	13	-8	0.4	SB-4065TR	FT-15	KAV-D20/G20...	CC <input type="checkbox"/> T09T3... CC <input type="checkbox"/> W09T3...
	●	●	32	25							KAV-D25...	
	●	●	40	32	32	22					KAV-D32...	



When using the P chipbreaker, use Right-hand insert for Right-hand toolholder and Left-hand insert for Left-hand toolholder.

● Standard stock

KAVH-SDUC (Copying, Screw Clamp)



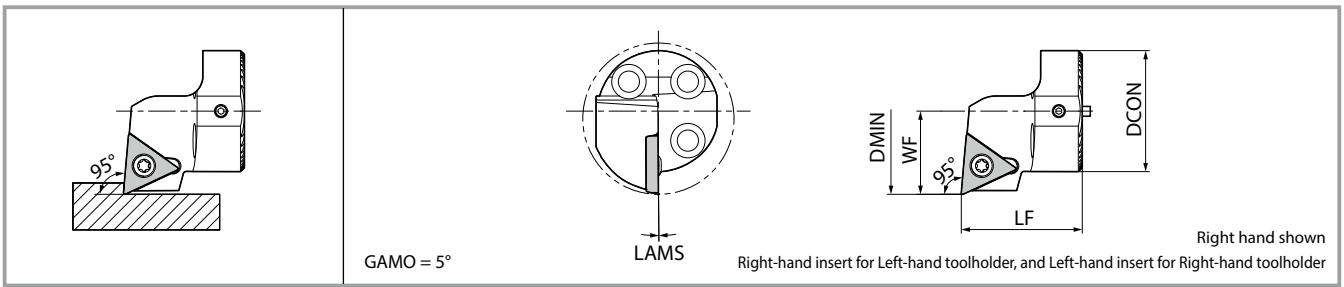
Toolholder dimensions

Description	Stock		Dimensions (mm)				LAMS (°)	Std. Corner R (RE)	Spare Parts		Applicable Shank	Applicable Insert
	R	L	DMIN	DCON	LF	WF			Clamp Screw	Wrench		
												
KAVH 16-SDUC ^{R/L} 07	●	●	20	16	20	11	-7	0.4	SB-2545TR	FT-8	KAV-D16/G16...	DC <input type="checkbox"/> T0702... DC <input type="checkbox"/> W0702... DC <input type="checkbox"/> X0702...
KAVH 20-SDUC ^{R/L} 11	●	●	25	20	20	13	-9	0.4	SB-4065TR	FT-15	KAV-D20/G20...	DC <input type="checkbox"/> T11T3... DC <input type="checkbox"/> W11T3... DC <input type="checkbox"/> X11T3...
	●	●	32	25							KAV-D25...	
	●	●	40	32	32	22					KAV-D32...	

When using a WP chipbreaker, you need to correct the cutting edge position or the machining program.

● Standard stock

KAVH-STLP (Internal/Internal Facing, Screw Clamp)



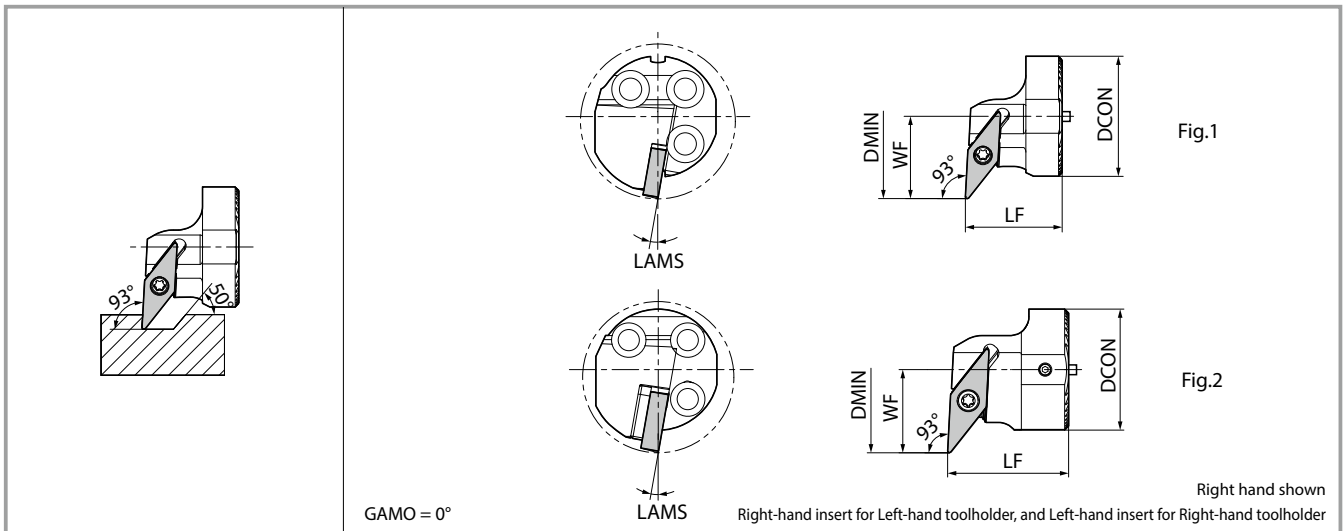
Toolholder dimensions

Description	Stock		Dimensions (mm)				LAMS (°)	Std. Corner R (RE)	Spare Parts			Applicable Shank	Applicable Insert		
	R	L	DMIN	DCON	LF	WF			Clamp Screw	Wrench					
KAVH 16-STLP R/L 11	●	●	20	16	20	11	-3.5	0.4	SB-3060TR			KAV-D16/G16...	TP <input type="checkbox"/> T1103...		
	●	●	25	20		13			-2				SB-3080TR	KAV-D20/G20...	TP <input type="checkbox"/> H1103...
	●	●	32	25		17			0				KAV-D25...	TP <input type="checkbox"/> B1103...	TP <input type="checkbox"/> X1103...
KAVH 32-STLP R/L 16	●	●	40	32	32	22	0	0.4	SB-4065TR	FT-15		KAV-D32...	TP <input type="checkbox"/> T1603...		
													TP <input type="checkbox"/> H1603...		
													TP <input type="checkbox"/> B1603...		

When using a WP chipbreaker insert, you need to correct the cutting edge position or the machining program.
When using the P chipbreaker, use Right-hand insert for Right-hand toolholder and Left-hand insert for Left-hand toolholder.

●: Standard stock

KAVH-SVUB (Copying, Screw Clamp)



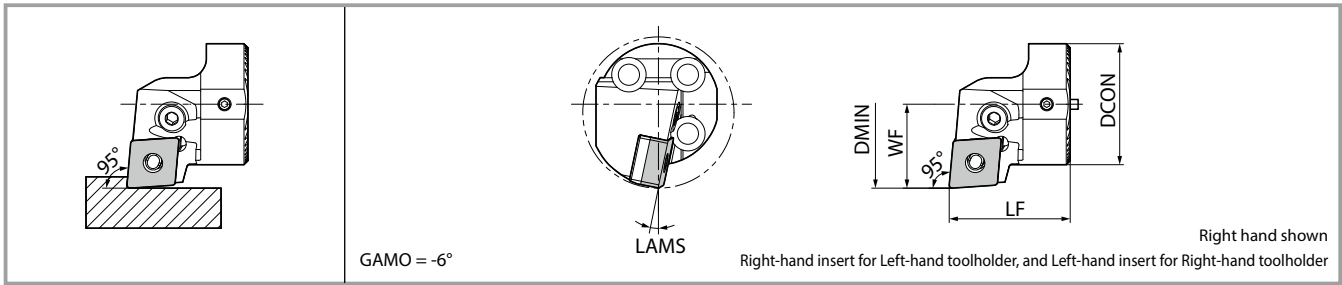
Toolholder dimensions

Description	Stock		Dimensions (mm)				LAMS (°)	Std. Corner R (RE)	Spare Parts					Shape	Applicable Shank	Applicable Insert	
	R	L	DMIN	DCON	LF	WF			Clamp Screw	Wrench	Sheet	Shim Screw	Wrench (for shim screws)				
KAVH 20-SVUB R/L 11	●	●	25	20	20	13	-10	0.4	SB-2570TR	FT-8		-	-	-	Fig.1	KAV-D20/G20...	VB <input type="checkbox"/> T1103...
	●	●	32	25		17			KAV-D25...							VB <input type="checkbox"/> W1103...	
KAVH 32-SVUB R/L 16	●	●	40	32	32	22	-10	0.4	SB-40125TRN	FT-15		SVN-32N *(SVN-32S)	SS-4N	LW-4	Fig.2	KAV-D32...	VB <input type="checkbox"/> T1604...
																VB <input type="checkbox"/> W1604...	VB <input type="checkbox"/> T1604...

When using a corner R (RE) = 0.2 or 0.4 mm insert, we recommend using a sheet marked with * (sold separately).

●: Standard stock

KAVH-PCLN (Internal/Internal Facing, Lever Lock)



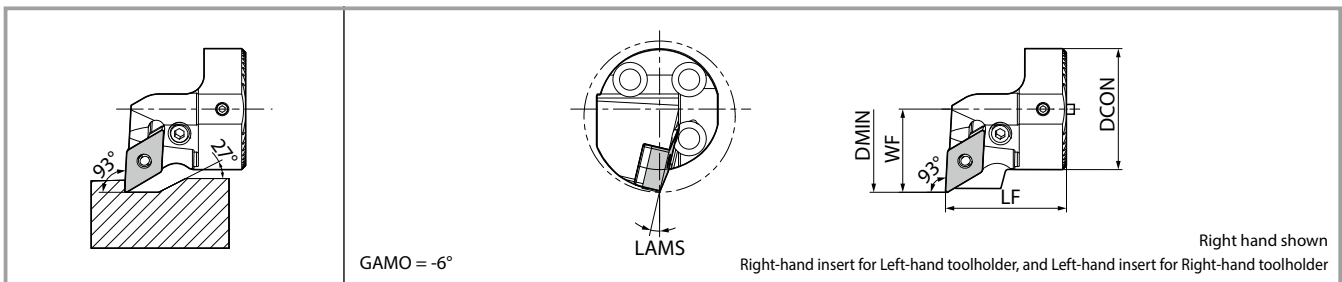
Toolholder dimensions

Description	Stock		Dimensions (mm)				LAMS (°)	Std. Corner R (RE)	Spare Parts						Applicable Shank	Applicable Insert
	R	L	DMIN	DCON	LF	WF			Lever	Lock Screw	Sheet	Shim Pin	Punch	Wrench		
KAVH 32-PCLN ^{R/L} 12	●	●	40	32	32	22.2	-11.5	0.8							KAV-D32...	CN <input type="checkbox"/> A1204... CN <input type="checkbox"/> G1204... CN <input type="checkbox"/> M1204...

Sheet: LC-42NR for Right-hand toolholder, LC-42NL for Left-hand toolholder

● Standard stock

KAVH-PDUN (Copying, Lever Lock)



Toolholder dimensions

Description	Stock		Dimensions (mm)				LAMS (°)	Std. Corner R (RE)	Spare Parts						Applicable Shank	Applicable Insert
	R	L	DMIN	DCON	LF	WF			Lever	Lock Screw	Sheet	Shim Pin	Punch	Wrench		
KAVH 32-PDUN ^{R/L} 11	●	●	40	32	32	22	-13	0.4							KAV-D32...	DN <input type="checkbox"/> G1104...

● Standard stock

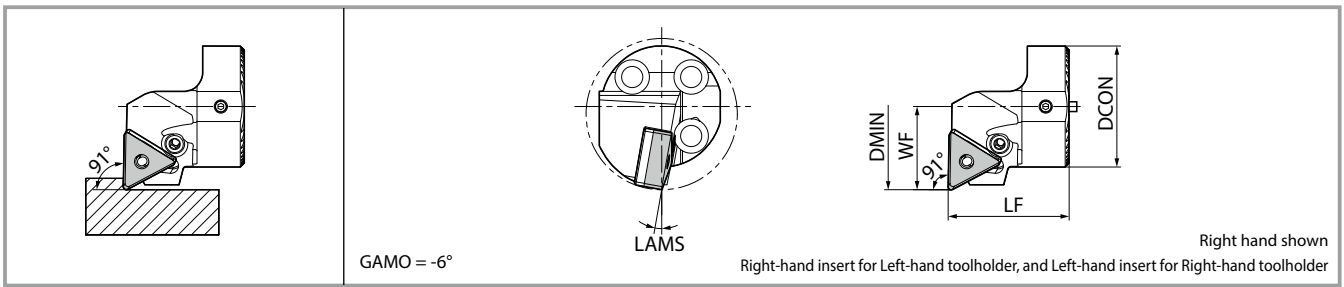
Description	Stock		Dimensions (mm)				LAMS (°)	Std. Corner R (RE)	Spare Parts					Applicable Shank	Applicable Insert
	R	L	DMIN	DCON	LF	WF			Wrench	Locking Pin	Sheet	Clamp Screw	Wrench (for clamp screws)		
KAVH 32-PDUN ^{R/L} 15	●	●	40	32	32	22	-12.5	0.8						KAV-D32...	DN <input type="checkbox"/> A1504... DN <input type="checkbox"/> G1504... DN <input type="checkbox"/> M1504... DN <input type="checkbox"/> X1504...

When using a WF chipbreaker insert, you need to correct the cutting edge position or machining program.

When using inserts with corner-R (RE) greater than 1.6mm, additional modifications to the sheet are necessary to prevent workpiece and sheet from interfering with each other.

● Standard stock

KAVH-PTFN (Internal, Lever Lock)

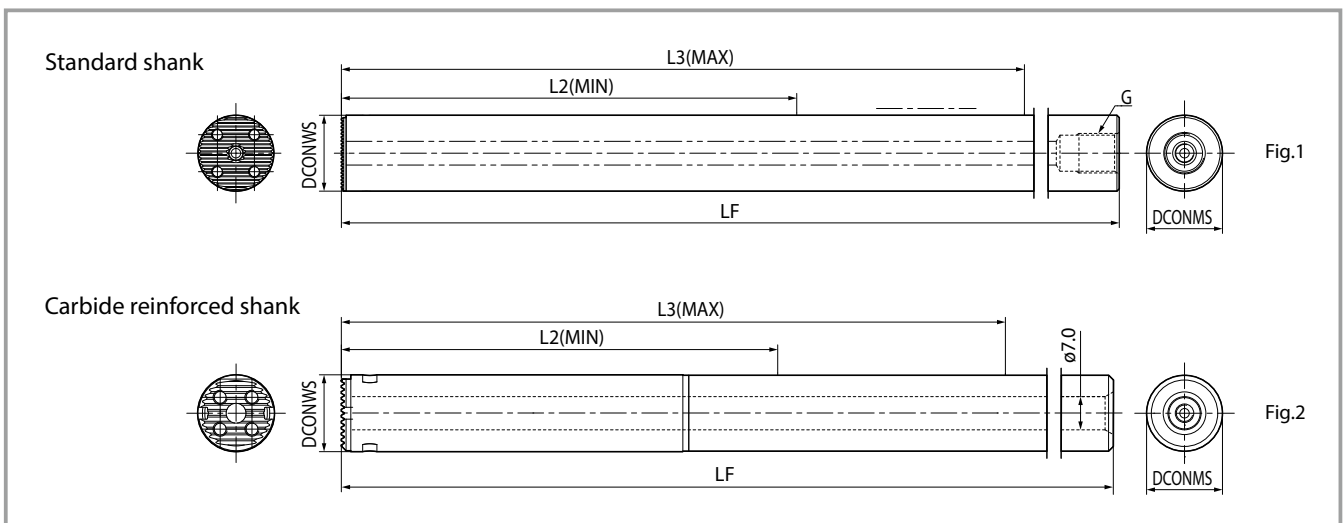


Toolholder dimensions

Description	Stock		Dimensions (mm)				LAMS (°)	Std. Corner R (RE)	Spare Parts						Applicable Shank	Applicable Insert	
	R	L	DMIN	DCON	LF	WF			Lever	Lock Screw	Sheet	Shim Pin	Punch	Wrench			
KAVH 32-PTFN ^R /L16	●	●	40	32	32	22	-10	0.8			LT-32N *(LT-32N-20)					KAV-D32...	TN□A1604... TN□G1604... TN□M1604... TN□X1604...

* When using inserts with a corner-R (RE) greater than 1.2mm, purchase a sheet marked with * (sold separately) to prevent workpiece and sheet from interfering with each other. ●: Standard stock

Shank



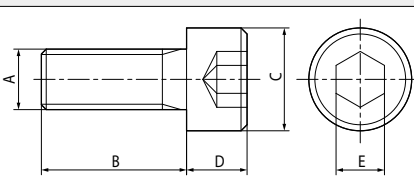
Toolholder dimensions

Description	Stock	Dimensions (mm)						G	Spare Parts			Shape
		DCONWS	DCONMS	LF	L2(MIN) Minimum Overhang length	L3(MAX) Maximum Overhang length	Head fastening bolts (3)		Wrench	O-ring		
Standard shank	KAV- D16-7D	●	16	16	157.5	44	92	G1/8	HH3X10S	LW-2.5	-	Fig.1
	D20-7D	●	20	20	201.5	60	120	G1/4	HH3.5X10S			
	D25-7D	●	25	25	256.5	80	155		G3/8	HH4X12S		
	D25-10D	●			321.5	155	230	HH5X12		LW-4		
	D32-7D	●	32	32	321.5	96	192		-			
	D32-10D	●			417.5	192	288	HH3.5X10S				
Carbide reinforced shank	KAV- G16-10D	●	16.2	16	205.5	92	140	-	HH3X10S	LW-2.5	-	Fig.2
	G20-10D	●	20.2	20	261.5	120	180	HH3.5X10S				

When cutting the back end, consider the length of the shank grip in addition to the amount of overhang length: See page 61.

●: Standard stock

Head fastening bolt

Shape	Description	Stock	Dimensions (mm)				
			A	B	C	D	E
	HH3X10S	●	M3X0.5	10	5	3	2.5
	HH3.5X10S	●	M3.5X0.6	10	5.5	3	2.5
	HH4X12S	●	M4X0.7	12	7	4	3
	HH5X12	●	M5X0.8	12	8.5	5	4

● Standard stock

Recommended tightening torque




Shank diameter	Tightening torque
ø16	2.2 [N·m]
ø20	2.2 [N·m]
ø25	3.0 [N·m]
ø32	5.0 [N·m]

Internal coolant: Piping connections

1 Screw standard for shank back end (pipe connection)

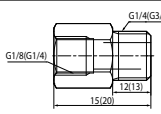
- The thread standard depends on the description. Please refer to the dimension chart "G" on page 57 when using commercially available piping parts.
- When using our piping components, they must be converted to "UNF3/8" or "G1/8." Check the table below and select the required joint parts (sold separately).

● Steel shank (Applicable pressure: ~ 7MPa)

Type	Thread Standards and Conversion Joints
ø16-7D	G1/8 
ø20-7D ø25-7D/10D	G1/8 ⇔ G1/4 J-ST-G1/4-G1/8 
ø32-7D/10D	G1/8 ⇔ G1/4 ⇔ G3/8 J-ST-G3/8-G1/4 J-ST-G1/4-G1/8 


If a leak occurs, use a commercially available washer.

Joint

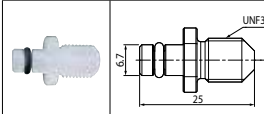
Shape	Description	Stock	Thread Standard
	J-ST-G1/4-G1/8	●	G1/4 ⇔ G1/8
	J-ST-G3/8-G1/4	●	G3/8 ⇔ G1/4

● Standard stock

● Carbide reinforced shank (Applicable pressure: ~ 1MPa)

Type	Thread Standards and Conversion Joints
ø16-10D ø20-10D	 UNF3/8 ⇔ ø7 Straight Hole *The shank side is not threaded.

Resin joint (with O-ring)

Shape	Description	Stock	Thread Standard
	PR07-ST-UNF3/8	●	UNF3/8

You can order only the included O-ring (GR-004-2).

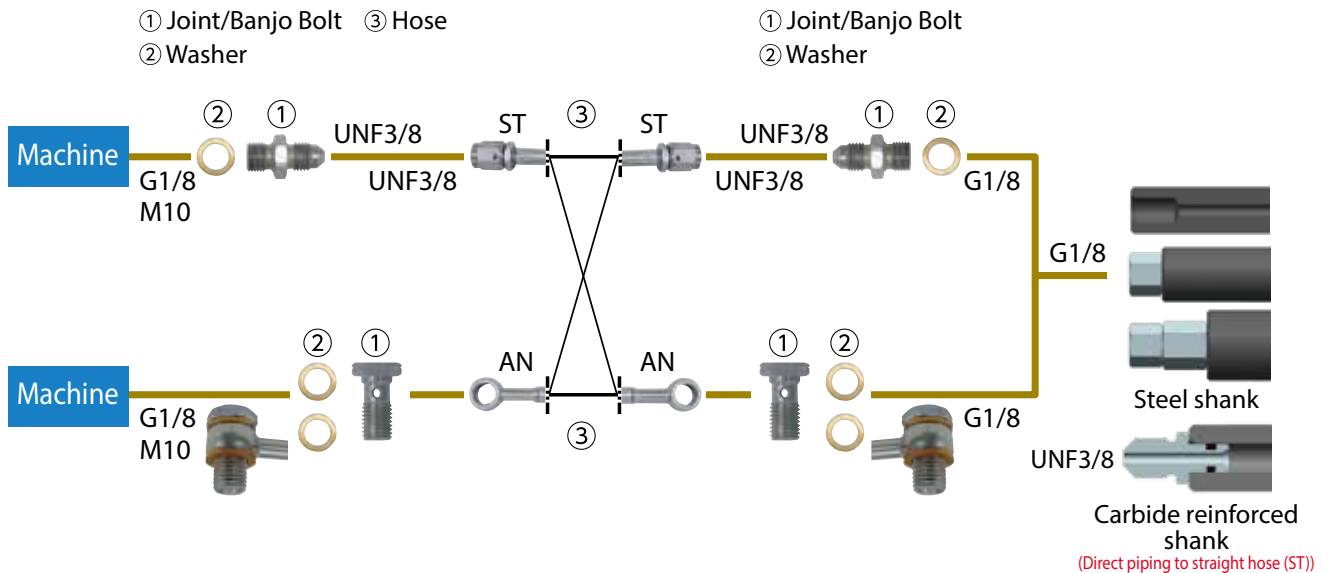
● Standard stock

2 How to connect when using our plumbing parts

Easy to use with high pressure capable hoses and joints

- Can be used as internal coolant at normal pressure without a high-pressure pump unit
- Banjo bolts for angle hoses available. Supports a wide variety of machines

<Piping Installation Guide>





Optional piping parts available (Sold separately)

Choose from parts below to match your machine specifications and piping method.

① Joint or banjo bolt × 2, ② 2 ~ 4 washers, ③ 1 hose

① Joint/Banjo Bolt


Applicable pressure : ~ 30 MPa

Shape	Description	Stock	Thread Standard Thread connection to the machine
	J-G1/8-UNF3/8	●	G1/8
	J-M10X1.5-UNF3/8	●	M10X1.5
Banjo bolt available for angled hose connection 	BB-G1/8	●	G1/8
	BB-M10X1.5	●	M10X1.5

●: Standard stock

② Washer

Applicable pressure : ~ 30 MPa

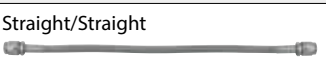


Shape	Description	Stock
	WS-10	●

*Two washers are required when using banjo bolts

●: Standard stock

③ Hose

Applicable pressure : ~ 30 MPa

Shape	Description	Stock	Thread Standard		Dimensions (mm)
					L
Straight/Straight 	HS-ST-ST-200	●	UNF3/8	UNF3/8	200
	HS-ST-ST-250	●			250
Straight/Angle 	HS-ST-AN-200	●	UNF3/8	(Banjo Bolt)	200
	HS-ST-AN-250	●			250
Angle/Angle 	HS-AN-AN-200	●	-	-	200
	HS-AN-AN-250	●	(Banjo Bolt)	(Banjo Bolt)	250

●: Standard stock

Precautions

1. Make sure machine door is completely closed before use of these parts.
2. Use appropriate seal for the male thread of the piping parts and make sure the connection is secure. Use plugs to seal off unused coolant holes.
3. Connect and fasten the coolant hose firmly.
4. The use of copper washers may cause leakage but will have no effect on the performance.
5. Commercial piping parts can be used if the thread standards are same. Check the pressure resistance before use.
6. Regularly changing the coolant filter is recommended.

Precautions

About the Dedicated E-Sleeve

The shank does not have a flat cut. In order to ensure vibration-proof performance, we recommend using a special sleeve (SHS ****_**) that is sold separately.

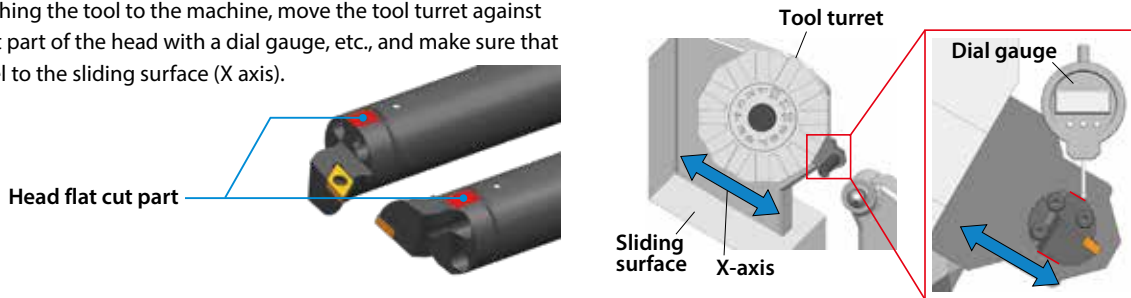


Use the entire sleeve to grasp the shank area.

How to adjust cutting edge position

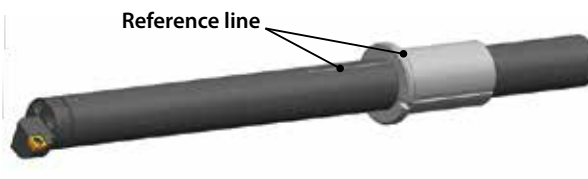
When using a head flat cut part

After attaching the tool to the machine, move the tool turret against the flat cut part of the head with a dial gauge, etc., and make sure that it is parallel to the sliding surface (X axis).



When using the reference lines of the shank/dedicated sleeve (E-Sleeve)

Align the reference lines printed on the shank and the dedicated sleeve (SHS ****_*). It is possible to more easily adjust the cutting edge position than using the head flat cut part.



Recommendations for internal coolant

Under high temperatures, the anti-vibration mechanism may deteriorate or be damaged.

Please use with **internal coolant**.

The coolant applicable pressure of the shank is 7 MPa. However, when using coolant parts (PR07-ST-UNF 3/8) for internal coolant in the carbide reinforced shank (KAV-G ***), the coolant pressure is 1 MPa. Please be careful.



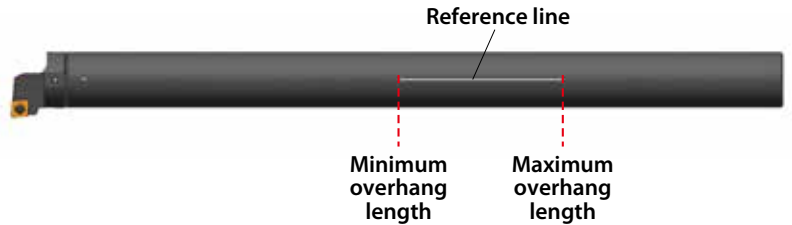
Coolant parts (PR07-ST-UNF3/8)

Available overhang length range

Available overhang length is set for this tool.

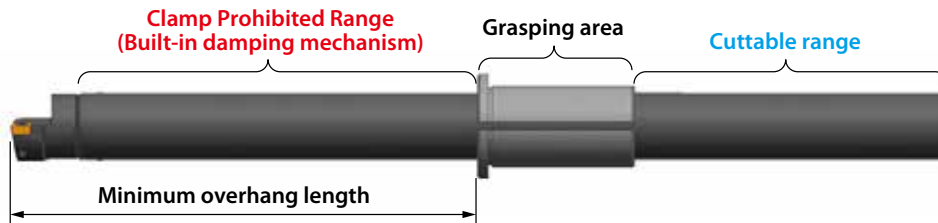
To adjust the overhang length, please use the reference line printed on the shank.

Available overhang length range		
Description	Minimum overhang length	Maximum overhang length
KAV-***-10D	Shank diameter × 7	Shank diameter × 10
KAV-***-7D	Shank diameter × 4	Shank diameter × 7



Shank cut

If the shank needs to be cut or modified, do so within the cutting range and do not clamp the built-in damping mechanism.



- Use the appropriate inserts and parts. Use of damaged parts may result in tool breakage and injury.
- Do not touch the cutting edge of the insert directly with your bare hands. There is a risk of injury.
- Make sure that there are no foreign materials such as chips in the insert seating area, serrated area, or shank grip area before mounting.
- Do not use the product under chattering conditions. This can lead to damage of the built-in damping mechanism.
- If tool falls or hits the part while machining, do not use it. The impact can cause tool damage and lead to large chattering.
- Avoid high humidity and store at room temperature (about 20°C).



Milling

New 45° General purpose milling series

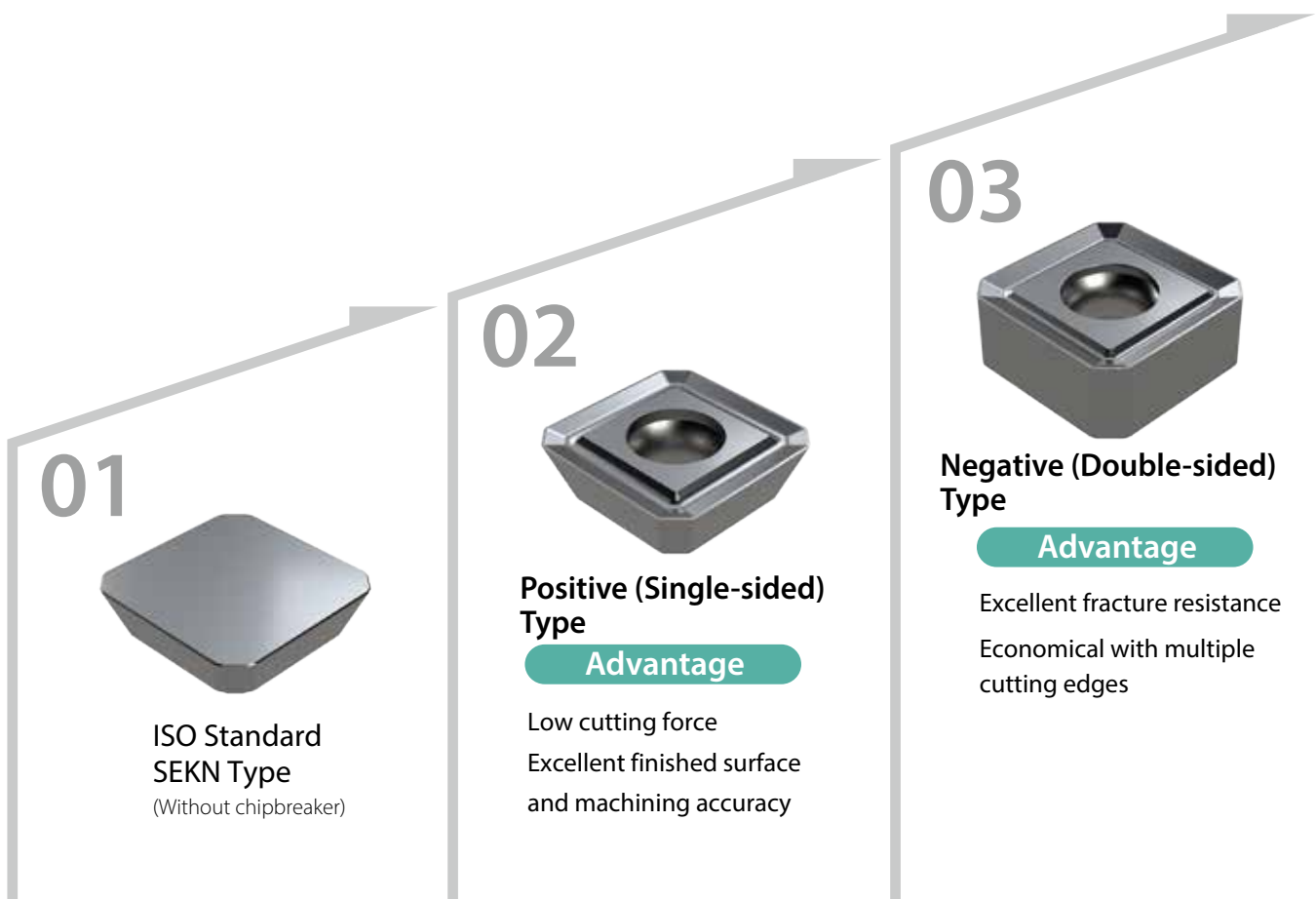
MB45

Provides high quality and high performance machining solutions with long tool life

Delivers the “low cutting force” benefits of positive inserts and the “fracture resistance” benefits of negative inserts, and provides excellent surface finish



Evolving to standardize new technology

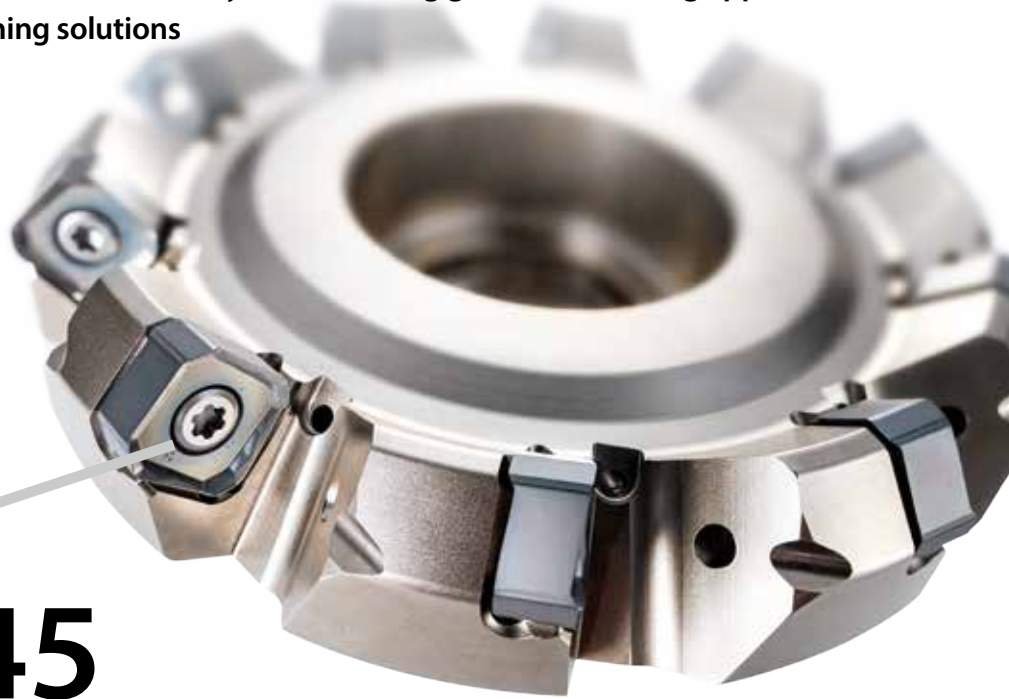


Extreme versatility

General-purpose milling cutters require a balance between high-quality, high-performance, long tool life, economy, and versatility to be able to tackle a wide variety of machining applications

Pursue all of these qualities without compromising with the MB45

These next-generation cutters will last, whether you are running general machining applications, or finding valuable new machining solutions



04

MB45

Delivers the “low cutting force” benefits of positive inserts and the “fracture resistance” benefits of negative inserts

High Quality

High quality results and excellent surface finish

- Lineup of E class inserts
- Long arc wiper edge
- Back coolant hole

High Performance

Unique design with high performance, low cutting force and fracture resistance

- Double edge structure and helical cutting edge (A.R. max + 13°)

Long Tool Life

Next-generation PVD coating for milling PR18 Series

NEW

- Double lamination technology maintains longer tool life
- Double-sided 8-edge design reduces tool costs

Solution

Find new value with excellent versatility

- Integrated tooling: Roughing and finishing with E class inserts
- For a wide variety of machining applications: Small machines (BT30, etc.) with $\varnothing 40\text{mm}$ cutter
- For a variety of workpieces: Cost-cutting with multiple cutting edges for aluminum machining
- Enhanced Quality: Gain excellent surface finish with Cermet inserts (TN620M)

1 "Versatility" + "Quality" Large insert lineup Supports a wide variety of machining applications

Five types of inserts for various machining applications

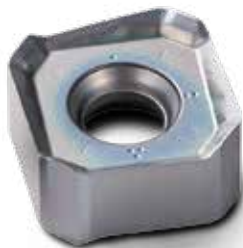
Economical inserts with 8 cutting edges

General purpose GM insert with E-Class and M-Class options based on required machining accuracy

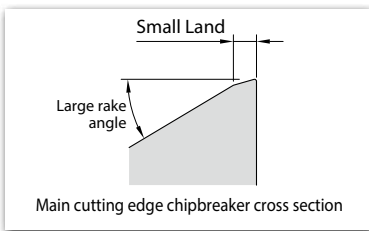
Video



Low cutting force **SM** (E-Class)



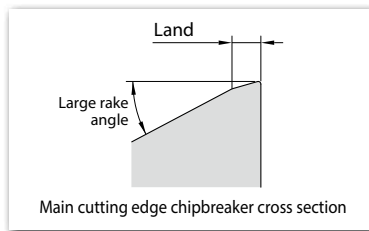
Sharpness oriented with a low cutting force design
-10% cutting resistance compared to general purpose GM insert
Recommended for small machines (BT30)



General **GM** (E-Class / M-Class)



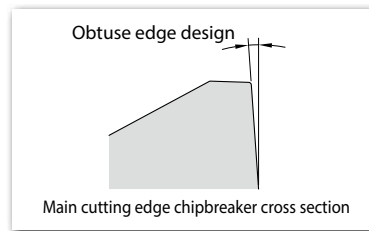
1st recommendation for steel machining
Low cutting force and fracture resistance
E-Class or M-Class selectable



Tough Edge **GH** (M-Class)



Tough cutting edge and excellent fracture resistance
Obtuse edge design is resistant to chipping
Recommended for intermittent machining



Wiper Insert **W** (E-Class)

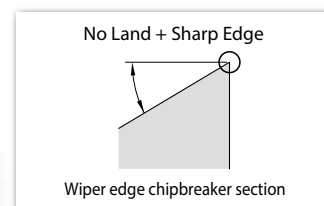
Ultra-long wiper edge (Wiper edge length approx. 8 mm)



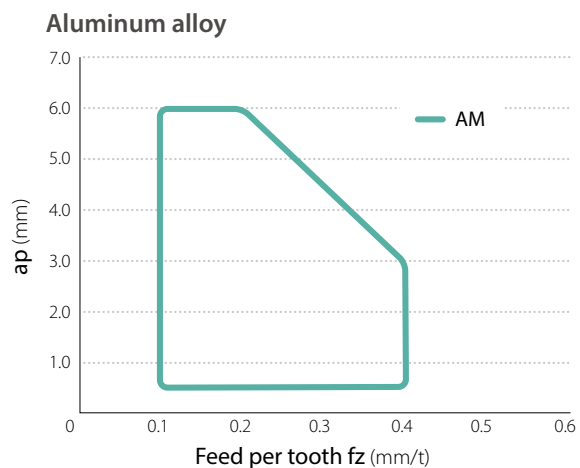
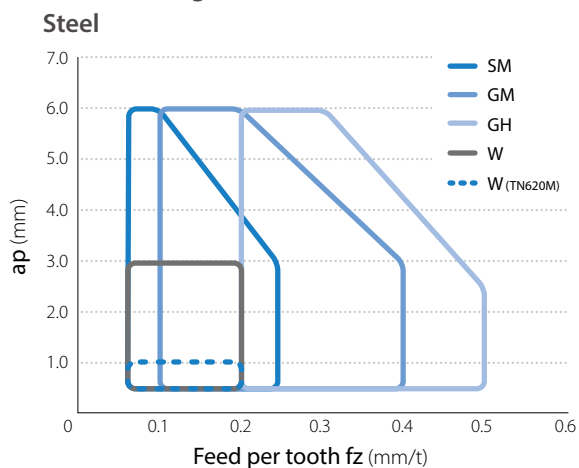
* Double-sided
2-edge insert

AM for Aluminum Alloys

No Land + Sharp Edge Specifications
Excellent sharpness



Applicable Insert Range



When to use GM (class E/M)

Selection by machining application Surface finish oriented: **GM (E-Class)**
 Cost-effective and surface finish oriented: **GM (M-Class)**
 Efficiency and surface roughness oriented: **W (E-Class)**

Criteria	GM (E-Class)	GM (M-Class)	W (E-Class) *Wiper
Tolerance	Inscribed Circle Tolerance ±0.013mm	Inscribed Circle Tolerance ±0.05mm	Inscribed Circle Tolerance ±0.013mm
Surface finish	○ Approx. 1.6µmRa	△ Approx. 3.2µmRa	⊙ Approx. 0.8µmRa or less
(Gloss)	(○)	(⊙)	(⊙)
Machining efficiency	○	○	⊙
Economy	○	⊙	△

*Surface finish is based on internal assessment and varies depending on the machining environment

Solution Tool integration for roughing and finishing with E-Class insert

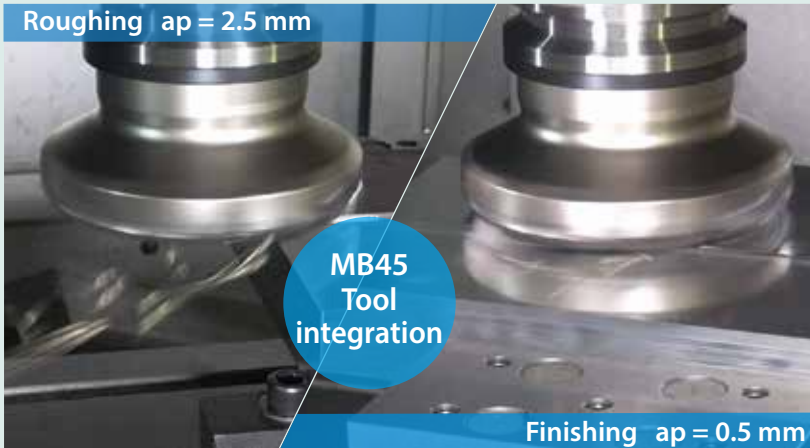
MB45

Tool integration for roughing and finishing
 Reduced tool management and inventory costs

Video



Roughing $a_p = 2.5 \text{ mm}$



**MB45
Tool
integration**

Finishing $a_p = 0.5 \text{ mm}$

Chip condition

Good chips in both roughing and finishing

Roughing



Finishing



Cutting conditions: $\phi 125$ (10 inserts) GM (E-Class) Dry Workpiece material: S50C
 Roughing: $V_c = 200 \text{ m/min}$, $a_p \times a_e = 2.5 \times 85 \text{ mm}$, $f_z = 0.20 \text{ mm/t}$
 Finishing: $V_c = 250 \text{ m/min}$, $a_p \times a_e = 0.5 \times 85 \text{ mm}$, $f_z = 0.15 \text{ mm/t}$

Finished surface condition

Excellent surface finish



0.75µmRa

**Conventional
machining**

**Tool replacement is needed when roughing
and finishing**



+



(Internal evaluation)

2 "Versatility" + "Long tool life" Large lineup of insert grades
Steel, stainless steel, cast iron, heat-resistant alloys to aluminum alloy machining

For steel, stainless steel and cast iron

PR1825/PR1835/PR1810 New development MEGACOAT NANO EX

PR1825
P
PR1835
M
PR1810
K

For Steel (Wear resistance oriented) For Steel (Stability oriented) For Cast iron
 1st Recommendation for stainless steel

Workpiece	P Steel					M Stainless steel					K Cast iron				
	01	10	20	30	40	01	10	20	30	40	01	10	20	30	40
ISO															
Grade	Wear resistance oriented PR1825					1st Recommendation PR1835					1st Recommendation PR1810				
	Stability oriented PR1835														

For hard materials

PR015S MEGACOAT HARD PVD coating

For steel Surface finish oriented

TN620M Cermet

For stainless steel and heat-resistant alloys

CA6535 CVD coating

For aluminum machining

PDL025 DLC coating
GW25 Non-coated Carbide

Next-generation PVD coating for milling NEW

PR18 Series

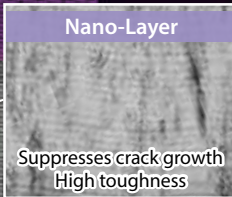
Kyocera's Nano Layer Coating Technology
Longer Tool Life with Next-generation Coating for Milling



Double lamination technology with special nano layer

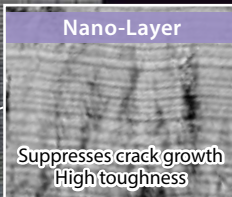
Double Lamination Technology Maintains Longer Tool Life
Multi-layer structure with two unique nano layers
Superior abrasion resistance and fracture resistance

Nano-Layer



Suppresses crack growth
High toughness

Nano-Layer



Suppresses crack growth
High toughness

AlCr-based coating
with excellent abrasion resistance

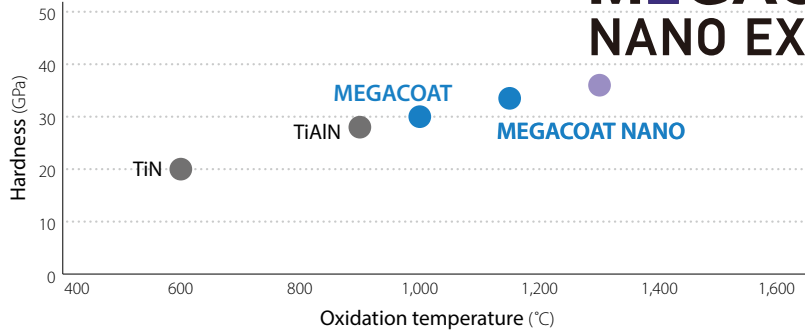
AlTi-based coating
with excellent heat resistance

Multi-layering of high-performance nano layers
Increases toughness with the suppression of crack growth and optimization of internal stress

CG Image

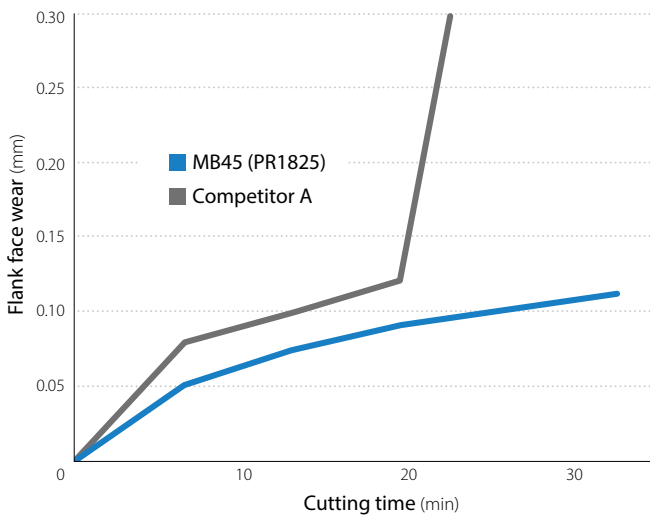
Coating characteristics (Internal evaluation)

MEGACOAT NANO EX | Milling |



PR1825 with PVD coating MEGACOAT NANO EX provides long tool life

Wear resistance comparison (Internal evaluation)



Cutting edge condition (after 20 min machining)

MB45(PR1825)



Competitor A



Cutting conditions: $V_c = 120$ m/min, $a_p = 2.0$ mm, $a_e/DC = 80\%$, $f_z = 0.20$ mm/t, Dry, Workpiece material: SKD11, $\phi 125$ BT50

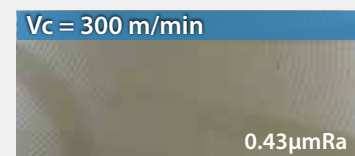
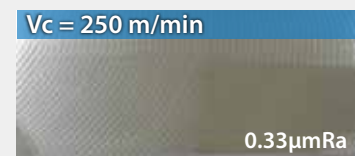
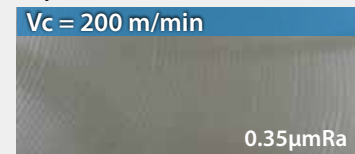
Solution Utilizing Cermet TN620M

Cermet (TN620M) for efficient finishing



Surface finish condition (Internal evaluation)

Superior surface finish



Cutting conditions: $a_p \times a_e = 0.5 \times 100$ mm
 $f_z = 0.15$ mm/t, Dry
Workpiece material: S50C, $\phi 125$ (10 inserts), GM (TN620M)

3

“Versatility” + “High Performance” New design utilizes unique technology
 Low cutting force and excellent fracture resistance with excellent surface finish



Low cutting force and excellent fracture resistance

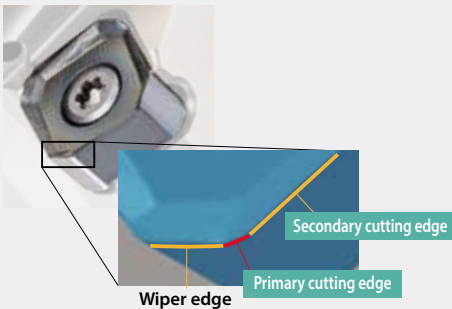
Unique helical cutting edge and double-edge structure

A unique helical cutting edge



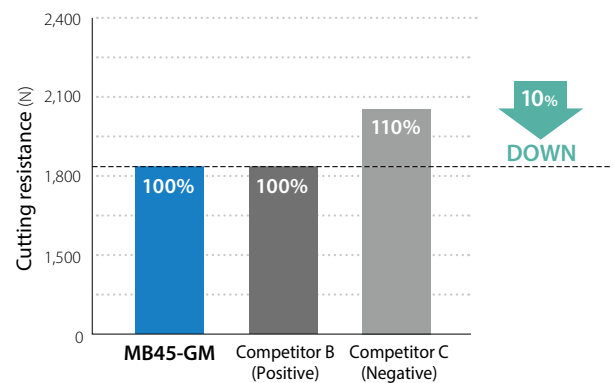
A.R. Ensures a maximum of 13° and suppresses chatter with low cutting force.

Double edge structure



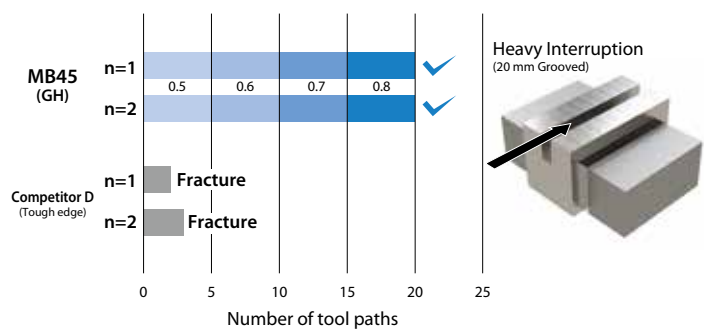
Primary cutting edge generates thin chips
 Reduces impact load and greatly reduces vibration when exiting the part

Cutting resistance comparison (Internal evaluation)



Cutting conditions: $V_c = 180$ m/min, $a_p = 3.0$ mm, $a_e/DC = 80\%$ Center Cut, $f_z = 0.30$ mm/t, Workpiece material: S50C

Fracture resistance comparison (Internal evaluation) $f_z = 0.5\sim 0.8$ mm/t



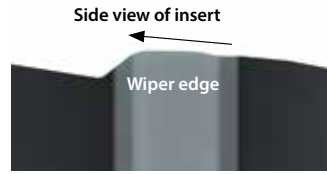
Cutting conditions: $V_c = 100$ m/min, $a_p \times a_e = 2 \times 100$ mm Center Cut, BT50 Workpiece material: SCM440HT $\phi 125$ (10 inserts)

High quality

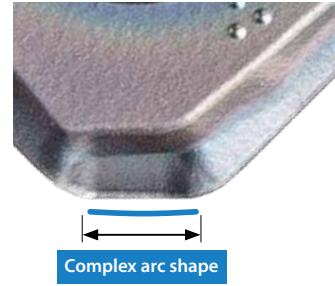
Long arc wiper edge utilizing unique technology

Unique long arc wiper edge

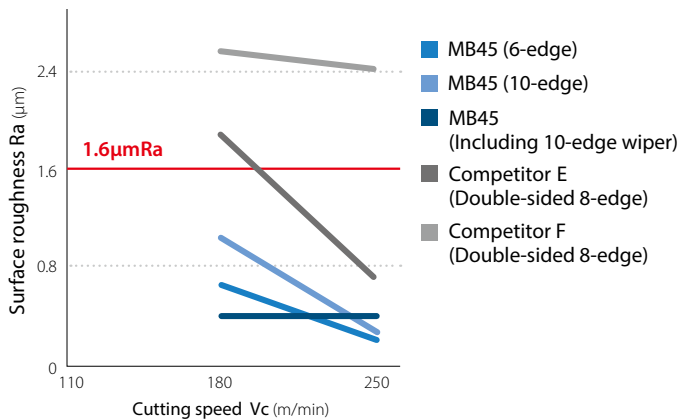
Reduces variation in mounting accuracy and provides superior finished surface quality



Convex curved shape with wiper edge protruding upward
*GM/SM/AM (E-Class)



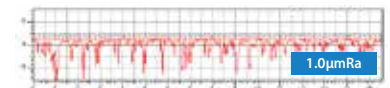
Surface roughness comparison (Internal evaluation)



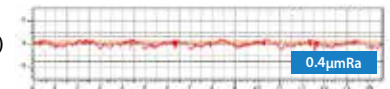
Cutting conditions: $a_p \times a_e = 1 \times 100$ mm (Center Cut), $f_z = 0.20$ mm/t, Dry
Workpiece material: S50C $\phi 125$ (6 inserts/10 inserts) GM (PR1825) BT50

Finishing surface condition (Vc = 180 m/min)

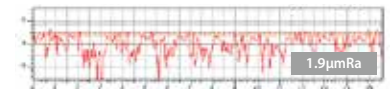
MB45 (10-edge)



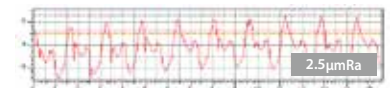
MB45 (Including 10-edge wiper)



Competitor E (Double-sided 8-edge)



Competitor F (Double-sided 8-edge)



Proprietary long arc wiper edge provides excellent finishing surface quality

Finishing surface quality comparison (Image)

MB45

Long arc wiper edge

Smooth finished surface with small feed joints



General insert

Straight wiper edge

The feed joint is large and the finished surface is stepped.



Solution Unique back coolant structure delivers excellent finished surface.

Smooth chip evacuation reduces scratches and chip clogging on finished surfaces

Reliably supplies coolant to the cutting edge. Internal coolant allows for even higher quality surface finish

Unique back coolant structure

Coolant hole

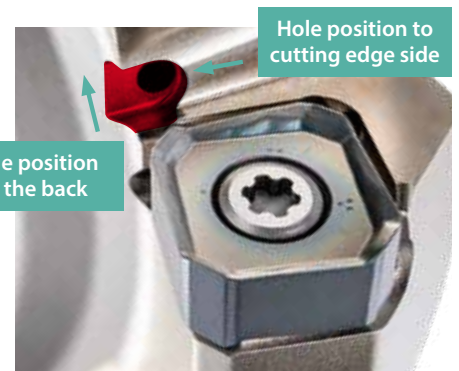
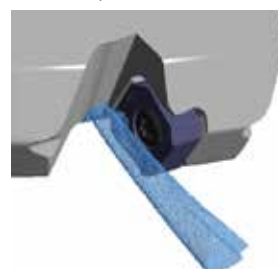
Mounted closer to the cutting edge than before
Control chip outward for excellent chip evacuation to ensure to cool the cutting edge (up to $\phi 125$).

Special grooves in the discharge port





The hole position is on the far side to prevent chip contact
Improves deterioration of chip control and evacuation

* Due to shape restrictions, some toolholders do not have grooves in the discharge port.

Fluid analysis (image)



Toolholder Lineup

Coarse pitch	Fine pitch	Extra fine pitch
		
Recommended for workpieces or machines with low rigidity (such as sheet machining or BT30) Economical	<u>1st recommendation</u> Good balance of stability, machining accuracy and efficiency Supports a wide range of machining areas	Recommended for high rigid workpiece and machine
Cutting diameter $\varnothing 80$ to $\varnothing 315$ (inch spec) Cutting diameter $\varnothing 40$ to $\varnothing 315$ (metrics) * $\varnothing 315$: Made to order	Cutting diameter $\varnothing 80$ to $\varnothing 315$ (inch spec) Cutting diameter $\varnothing 40$ to $\varnothing 315$ (metrics) * $\varnothing 315$: Made to order	Cutting diameter $\varnothing 80$ to $\varnothing 250$ (inch spec) Cutting diameter $\varnothing 40$ to $\varnothing 250$ (metrics)
Shank Type		
		
Compatible with milling chucks (face mill recommended basically) *Shank size: $\varnothing 32$		
Cutting diameter $\varnothing 40$ to $\varnothing 80$		

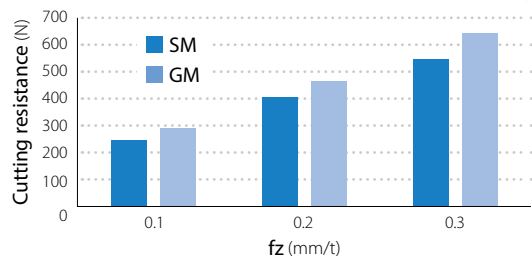
Compatible with smaller machines



Lineup of coarse pitch $\varnothing 40$
Works well on small machines such as BT30

Recommendation for small machines:
Low cutting force SM
Cutting resistance is about 10% less than general-purpose GM

Cutting resistance comparison (Internal evaluation)



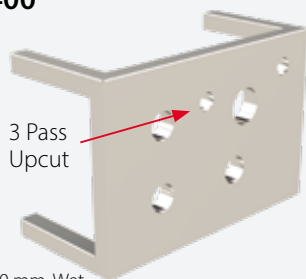
Cutting conditions: $V_c = 150$ m/min, $a_p = 1.0$ mm, $a_e/D_c = 80\%$, Dry, BT50
Workpiece material: S50C



Case studies

Excellent performance even under unstable machining conditions

Cradle SS400



$V_c = 160 \text{ m/min}$
 $a_p \times a_e = 0.07 \times 130 \text{ mm}$, Wet

Machining efficiency

MB45 $\phi 160$ 12 inserts
 GM(PR1825)

$V_f = 760 \text{ mm/min}$

$f_z = 0.20 \text{ mm/t}$

Competitor G $\phi 160$ 8 inserts

$V_f = 640 \text{ mm/min}$

$f_z = 0.25 \text{ mm/t}$

Machining efficiency

↑
1.2x

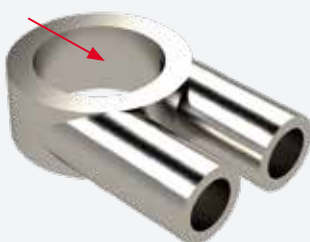
MB45 shows stable machining in an environment prone to deflection and chatter. Increasing the number of inserts improves efficiency. Highly rated for quiet machining. Improved joints between machining passes.

(User evaluation)

Case studies

Achieves 1.6x longer tool life under the same machining conditions

Housing SUS316



$V_c = 90 \text{ m/min}$
 $a_p = 2.0 \text{ mm}$, $f_z = 0.18 \text{ mm/t}$, Dry

Number of parts

MB45 $\phi 63$ 5 inserts
 GM(PR1825)

30 pcs per corner

Competitor H $\phi 63$ 5 inserts

18 pcs per corner

Tool life


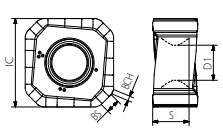

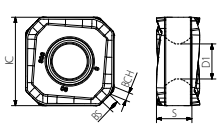

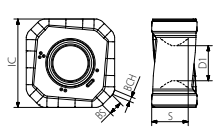

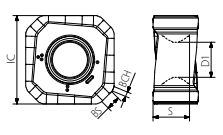

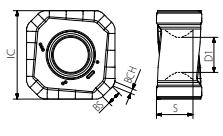

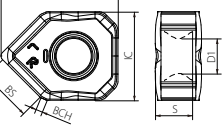
↑
1.6x

MB45 shows stable machining without chattering. Wear on the cutting edge proceeds normally and shows 1.6x tool life than competitor.

(User evaluation)



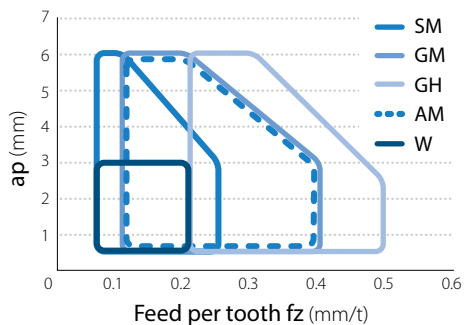
Applicable Inserts

Usage Classification	P	Steel	★	☆					■						
		Mold steel	★	☆					■						
★: Roughing/ 1st recommendation ☆: Roughing/ 2nd recommendation ■: Finishing/ 1st recommendation □: Finishing/ 2nd recommendation (Hard materials is 40 HRC or less)	M	Austenitic stainless steel	☆	★											
		Martensitic stainless steel		☆				★							
		Precipitation hardening stainless steel		★											
	K	Gray cast iron						★							
		Nodular cast iron						★							
N	Non-ferrous metals									★	☆				
S	Heat-resistant alloys (Ni-based heat-resistant alloys)								★						
		Titanium alloy		★											
H	Hard materials								★						
Shape	Description	Dimensions (mm)						MEGACOAT NANO EX NEW		MEGACOAT HARD	CVD coating	Cermet	DLC coating	Carbide	
		IC	S	BCH	BS	D1	INSL	PR1825	PR1835	PR1810	PR0155	CA6535	TN620M	PDL025	GW25
 General Purpose (M-Class)		SNMU1406ANER-GM	14.7	6.07	0.8	2.3	5.8	●	●	●		●	●		
 Tough Edge (M-Class)		SNMU1406ANER-GH	14.7	5.89	1.4	1.7	5.8	●	●	●	●	●			
 General Purpose (E-Class)		SNEU1406ANER-GM	14.7	6.07	0.8	2.3	5.8	●	●	●		●	●		
 Low cutting force (E-Class)		SNEU1406ANER-SM	14.7	6.07	0.8	2.3	5.8	●	●			●			
 Aluminum and non-ferrous metals (E-Class)		SNEU1406ANFR-AM	14.7	6.07	0.8	2.3	5.8							●	●
 Wiper Insert (E-Class 2-edge)		SNEU1406ANEN-W	14.7	6.15	1.1	8.8	5.8	19.4	●	●	●		●	●	

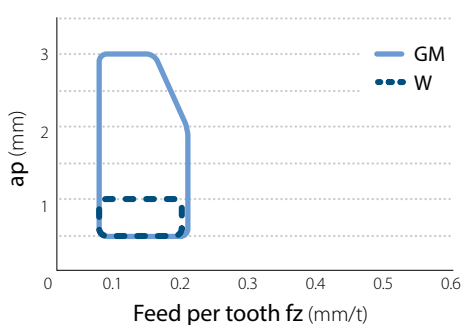
● Standard stock

Applicable Chipbreaker Range

Carbide coating



Cermet

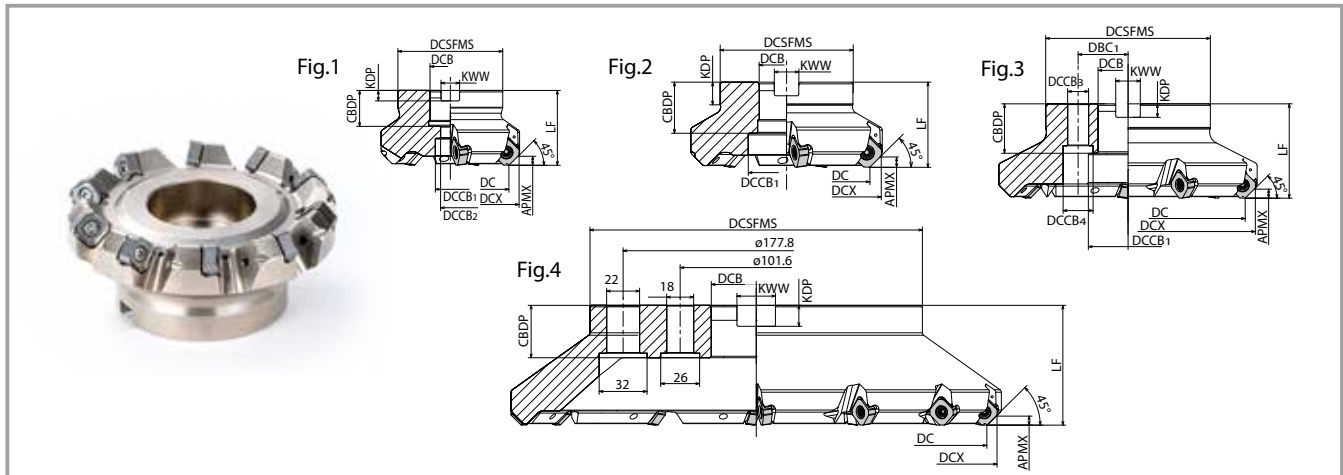


Recommended Cutting Conditions ★ 1st Recommendation ☆ 2nd Recommendation

Chipbreaker	Workpiece Material	Feed fz (mm/t) ():TN620M	Recommended Insert Grade (Vc: m/min)							
			MEGACOAT NANO EX (PVD coating)			MEGACOAT HARD (PVD coating)	CVD coating	Cermet	DLC coating	Carbide
			PR1835	PR1825	PR1810	PR015S	CA6535	TN620M	PDL025	GW25
General GM	Carbon steel (SxxC)	0.1 - 0.2 - 0.4 (0.06 - 0.12 - 0.20)	☆ 120 - 180 - 250	★ 120 - 180 - 250	-	-	-	★ 200 - 250 - 300	-	-
	Alloy steel (SCM, etc.)	0.1 - 0.2 - 0.4 (0.06 - 0.12 - 0.20)	☆ 100 - 160 - 220	★ 100 - 160 - 220	-	-	-	★ 180 - 220 - 250	-	-
	Mold steel (SKD, etc.)	0.1 - 0.2 - 0.35 (0.06 - 0.08 - 0.15)	☆ 80 - 140 - 180	★ 80 - 140 - 180	-	-	-	★ 150 - 180 - 220	-	-
	Austenitic stainless steel (SUS304, etc.)	0.1 - 0.2 - 0.4	☆ 100 - 160 - 200	☆ 100 - 160 - 200	-	-	-	-	-	-
	Martensitic stainless steel (SUS403, etc.)	0.1 - 0.2 - 0.4	☆ 150 - 200 - 250	-	-	-	☆ 180 - 240 - 300	-	-	-
	Precipitation hardening stainless steel (SUS630, etc.)	0.1 - 0.2 - 0.3	★ 90 - 120 - 150	-	-	-	-	-	-	-
	Gray cast iron (FC)	0.1 - 0.2 - 0.4	-	-	★ 120 - 180 - 250	-	-	-	-	-
	Nodular cast iron (FCD)	0.1 - 0.2 - 0.35	-	-	★ 100 - 150 - 200	-	-	-	-	-
	Ni-based heat-resistant alloys	0.1 - 0.12 - 0.2	☆ 20 - 30 - 50	-	-	-	★ 20 - 30 - 50	-	-	-
Low Cutting Force SM	Carbon steel (SxxC)	0.06 - 0.12 - 0.25	☆ 120 - 180 - 250	☆ 120 - 180 - 250	-	-	-	-	-	-
	Alloy steel (SCM, etc.)	0.06 - 0.12 - 0.25	☆ 100 - 160 - 220	☆ 100 - 160 - 220	-	-	-	-	-	-
	Mold steel (SKD, etc.)	0.06 - 0.1 - 0.2	☆ 80 - 140 - 180	☆ 80 - 140 - 180	-	-	-	-	-	-
	Austenitic stainless steel (SUS304, etc.)	0.06 - 0.12 - 0.25	★ 100 - 160 - 200	☆ 100 - 160 - 200	-	-	-	-	-	-
	Martensitic stainless steel (SUS403, etc.)	0.06 - 0.12 - 0.25	☆ 150 - 200 - 250	-	-	-	★ 180 - 240 - 300	-	-	-
	Precipitation hardening stainless steel (SUS630, etc.)	0.06 - 0.12 - 0.25	☆ 90 - 120 - 150	-	-	-	-	-	-	-
	Gray cast iron (FC)	0.06 - 0.12 - 0.25	-	-	☆ 120 - 180 - 250	-	-	-	-	-
	Nodular cast iron (FCD)	0.06 - 0.1 - 0.2	-	-	☆ 100 - 150 - 200	-	-	-	-	-
	Ni-based heat-resistant alloys	0.06 - 0.1 - 0.15	☆ 20 - 30 - 50	-	-	-	☆ 20 - 30 - 50	-	-	-
Titanium alloy (Ti-6Al-4V)	0.06 - 0.08 - 0.15	★ 40 - 60 - 80	-	-	-	-	-	-	-	
Tough Edge GH	Carbon steel (SxxC)	0.2 - 0.3 - 0.5	☆ 120 - 180 - 250	☆ 120 - 180 - 250	-	-	-	-	-	-
	Alloy steel (SCM, etc.)	0.2 - 0.3 - 0.5	☆ 100 - 160 - 220	☆ 120 - 160 - 220	-	-	-	-	-	-
	Mold steel (SKD, etc.)	0.2 - 0.3 - 0.45	☆ 80 - 140 - 180	☆ 80 - 140 - 180	-	-	-	-	-	-
	Austenitic stainless steel (SUS304, etc.)	0.2 - 0.3 - 0.4	☆ 100 - 160 - 200	☆ 100 - 160 - 200	-	-	-	-	-	-
	Martensitic stainless steel (SUS403, etc.)	0.2 - 0.3 - 0.4	☆ 150 - 200 - 250	-	-	-	☆ 180 - 240 - 300	-	-	-
	Precipitation hardening stainless steel (SUS630, etc.)	0.2 - 0.3 - 0.4	☆ 90 - 120 - 150	-	-	-	-	-	-	-
	Gray cast iron (FC)	0.2 - 0.3 - 0.5	-	-	☆ 120 - 180 - 250	-	-	-	-	-
	Nodular cast iron (FCD)	0.2 - 0.3 - 0.45	-	-	☆ 100 - 150 - 200	-	-	-	-	-
	Ni-based heat-resistant alloys	0.1 - 0.2 - 0.3	☆ 20 - 30 - 50	-	-	-	☆ 20 - 30 - 50	-	-	-
Hard materials (40 HRC or less)	0.05 - 0.1 - 0.2	-	-	-	★ 50 - 80 - 100	-	-	-	-	
AM	Aluminum alloy	0.1 - 0.2 - 0.4	-	-	-	-	-	★ 200 - 600 - 900	☆ 200 - 500 - 800	-

The number in **bold font** is recommended starting conditions. Adjust the cutting speed and the feed rate within the above conditions according to the actual machining situation.
Machining with coolant is recommended for Ni-based heat-resistant alloy and titanium alloy. When choosing wet machining for other workpieces, reduce the cutting speed to 70% or less.
When machining aluminum, be sure to use within recommended conditions. Do not rotate more than the maximum speed listed on the main unit.
Dry machining is recommended for cermet.

MB45 Face mill



Toolholder dimensions

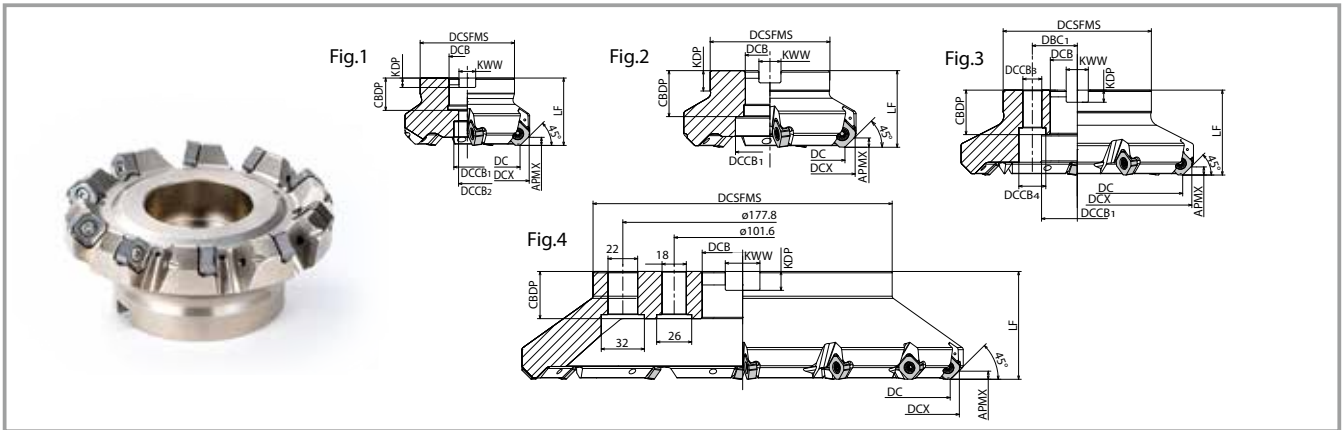
Description	Stock	Number of inserts	Dimensions (mm)													A.R. max.(°)	R.R.(°)	Coolant hole	Weight (kg)	Maximum number of revolutions (min ⁻¹)	Shape					
			DC	DCX	DCSFMS	DCB	DCCB1	DCCB2	DCCB3	DCCB4	DBC1	LF	CBDP	KDP	KWW							APMX				
Bore Dia. Inch spec.	Coarse Pitch	MB45 - 080R-14T5C	●	5	80	94	70	25.4	20	13						50	27	6	9.5	6	13	-12	Yes	1.4	9,000	Fig.1
		100R-14T5C	●	5	100	114	78	31.75	45							34	8	12.7	2.0					8,000	Fig.2	
		125R-14T6C	●	6	125	139	89	38.1	55										3.3					7,200		
		160R-14T7	●	7	160	174	110	50.8	70							63			10				15.9	5.1	6,300	Fig.3
		200R-14T8	●	8	200	214	140		110		18	26	101.6			38			11				19.1	7.6	5,700	
		250R-14T10	●	10	250	264		47.625											14				25.4	10.8	5,100	
	315R-14T14	MTO	14	315	329	222									80						20.4	4,500	Fig.4			
	Fine Pitch	MB45 - 080R-14T6C	●	6	80	94	70	25.4	20	13						50	27	6	9.5	6	13	-12	Yes	1.4	9,000	Fig.1
		100R-14T8C	●	8	100	114	78	31.75	45							34	8	12.7	1.8					8,000	Fig.2	
		125R-14T10C	●	10	125	139	89	38.1	55										10					15.9		3.1
		160R-14T12	●	12	160	174	110	50.8	70							63			11				19.1	4.9	6,300	Fig.3
		200R-14T14	●	14	200	214	140		110		18	26	101.6			38			14				25.4	7.4	5,700	
250R-14T16		●	16	250	264		47.625																10.5	5,100		
315R-14T18	MTO	18	315	329	222									80						20.2	4,500	Fig.4				
Extra Fine Pitch	MB45 - 080R-14T8C	●	8	80	94	70	25.4	20	13						50	27	6	9.5	6	13	-12	Yes	1.3	9,000	Fig.1	
	100R-14T10C	●	10	100	114	78	31.75	45							34	8	12.7	1.8					8,000	Fig.2		
	125R-14T13C	●	13	125	139	89	38.1	55										10					15.9		3.0	7,200
	160R-14T16	●	16	160	174	110	50.8	70							63			11			19.1	4.8	6,300	Fig.3		
	200R-14T18	●	18	200	214	140		110		18	26	101.6			38			14			25.4	7.2	5,700			
	250R-14T20	●	20	250	264		47.625															10.4	5,100			

Maximum number of revolutions
 ●: Standard stock MTO: Made to order
 Set the number of revolutions per minute within the recommended cutting speed specified by the workpiece on page 73.
 Do not use the face mill or shank type at the maximum revolution or higher since the centrifugal force may cause inserts and parts to scatter even under no load.

Parts

Description	Parts			
	Clamp screw	Wrench	Anti-seize compound	Arbor clamp bolt
Face mill MB45- 040R/050R-14T...-M 040R-14T...-22M 063R-14T... 080R-14T... 100R-14T... ? 315R-14T...	SB-50110TRP	TTP-20	P-37	HH8X25 - W10X31 HH10X30 HH12X35 - -
Shank Type MB45- 40S32-14T2C ? 80S32-14T5C	SB-50110TRP	TTP-20	P-37	-

Coat anti-seize compound thinly on portion of taper and thread prior to installation.



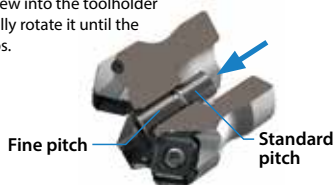
Toolholder dimensions

Description		Stock	Number of inserts	Dimensions (mm)											A.R. max.(°)	R.R.(°)	Coolant hole	Weight (kg)	Maximum number of revolutions (min ⁻¹)	Shape						
				DC	DCX	DCSFMS	DCB	DCCB1	DCCB2	DCCB3	DCCB4	DBC1	LF	CBDP							KDP	KWW	APMX			
Metric	Coarse Pitch	MB45 - 040R-14T2C-M	●	2	40	54	38	16	13.5	9						19	5.6	8.4	6	13	-12	Yes	0.4	12,700	Fig.1	
		050R-14T3C-M	●	3	50	64	48	22	18	11						40	21	6.3					10.4	0.5		11,400
		063R-14T4C-M	●	4	63	77	50									50	24	7					12.4	0.7		10,100
		080R-14T5C-M	●	5	80	94	70	27	20	13						50	24	7	12.4	6	13	-12	No	1.4	9,000	Fig.2
		100R-14T5C-M	●	5	100	114	78	32	45							63	30	8	14.4					1.9	8,000	
		125R-14T6C-M	●	6	125	139	89	40	55							63	33	9	16.4	6	13	-12	No	3.2	7,200	Fig.3
		160R-14T7-M	●	7	160	174	110				14	20	66.7			63	35	14	25.7					5.1	6,300	
		200R-14T8-M	●	8	200	214	142	60	110							63	35	14	25.7	6	13	-12	No	7.3	5,700	Fig.3
		250R-14T10-M	●	10	250	264					18	26	101.6			80	35	14	25.7					10.5	5,100	
		315R-14T14-M	MTO	14	315	329	222									80				19.4	4,500	Fig.4				
Metric	Fine Pitch	MB45 - 040R-14T3C-M	●	3	40	54	38	16	13.5	9					40	19	5.6	8.4	6	13	-12	Yes	0.3	12,700	Fig.1	
		040R-14T3C-22M	●	3	40	54	47	12	-						50								0.5			
		050R-14T4C-M	●	4	50	64	48	22	18	11						40	21	6.3					10.4	0.4		11,400
		063R-14T5C-M	●	5	63	77	50									40	21	6.3	10.4	6	13	-12	Yes	0.6	10,100	Fig.1
		080R-14T6C-M	●	6	80	94	70	27	20	13						50	24	7	12.4					1.4	9,000	
		100R-14T8C-M	●	8	100	114	78	32	45							50	24	7	12.4	6	13	-12	No	1.8	8,000	Fig.2
		125R-14T10C-M	●	10	125	139	89	40	55							63	30	8	14.4					3.0	7,200	
		160R-14T12-M	●	12	160	174	110									63	33	9	16.4	6	13	-12	No	4.9	6,300	Fig.3
		200R-14T14-M	●	14	200	214	142	60	110							63	35	14	25.7					7.0	5,700	
		250R-14T16-M	●	16	250	264										80	35	14	25.7	6	13	-12	No	10.2	5,100	Fig.4
315R-14T18-M	MTO	18	315	329	222									80				19.2	4,500							
Metric	Extra Fine Pitch	MB45 - 040R-14T4C-M	●	4	40	54	38	16	13.5	9					40	19	5.6	8.4	6	13	-12	Yes	0.3	12,700	Fig.1	
		040R-14T4C-22M	●	4	40	54	47	12	-						50								0.4			
		050R-14T5C-M	●	5	50	64	48	22	18	11						40	21	6.3					10.4	0.6		10,100
		063R-14T6C-M	●	6	63	77	50									40	21	6.3	10.4	6	13	-12	Yes	1.3	9,000	Fig.2
		080R-14T8C-M	●	8	80	94	70	27	20	13						50	24	7	12.4					1.7	8,000	
		100R-14T10C-M	●	10	100	114	78	32	45							50	30	8	14.4	6	13	-12	No	2.9	7,200	Fig.2
		125R-14T13C-M	●	13	125	139	89	40	55							63	33	9	16.4					4.8	6,300	
		160R-14T16-M	●	16	160	174	110									63	35	14	25.7	6	13	-13	No	6.9	5,700	Fig.3
		200R-14T18-M	●	18	200	214	142	60	110							63	35	14	25.7					10.1	5,100	
		250R-14T20-M	●	20	250	264										80				10.1	5,100	Fig.4				

Maximum number of revolutions ●: Standard stock MTO: Made to order
 Set the number of revolutions per minute within the recommended cutting speed specified by the workpiece on page 73.
 Do not use the face mill or shank type at the maximum revolution or higher since the centrifugal force may cause inserts and parts to scatter even under no load.

How to Install Double Screw

1. Insert the fine pitch side of the double screw into the toolholder and carefully rotate it until the screw stops.



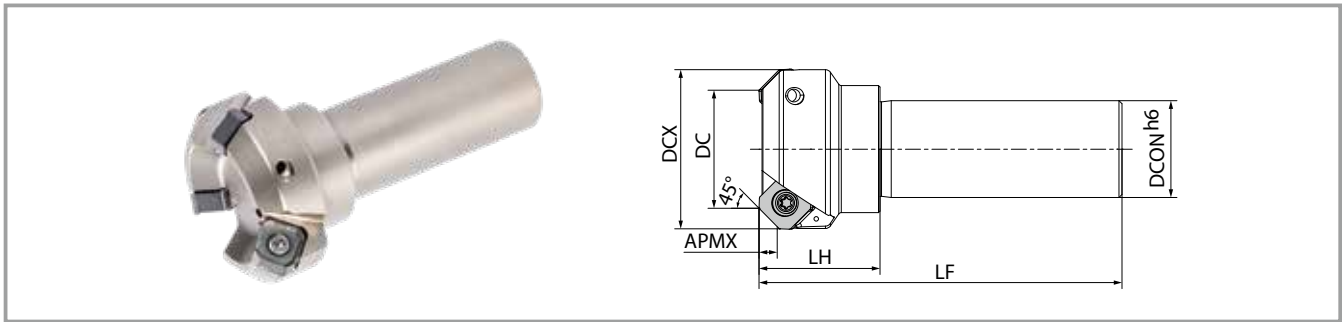
2. To ensure that the holder and arbor are securely connected, provide a clearance of approx. 4 mm between the holder and arbor before tightening the screws.



3. Rotate the screw until there is no clearance, and check the holder is attached to the arbor.



MB45 Shank Type



Toolholder dimensions

	Stock	Number of inserts	Dimensions (mm)				A.R. max.(°)	R.R.(°)	Coolant hole	Weight (kg)	Maximum number of revolutions (min ⁻¹)			
			DC	DCX	DCON	LH						LF	APMX	
MB45-	40S32-14T2C	●	2	40	54	32	40	120	6	13	-12	Yes	0.9	12,700
	50S32-14T3C	●	3	50	64								1.0	11,400
	63S32-14T4C	●	4	63	77								1.1	10,100
	80S32-14T5C	●	5	80	94								1.5	9,000

Maximum number of revolutions

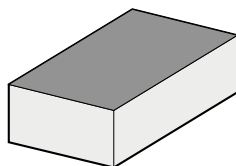
Set the number of revolutions per minute within the recommended cutting speed specified by the workpiece on page 73.

Do not use the face mill or shank type at the maximum revolution or higher since the centrifugal force may cause inserts and parts to scatter even under no load.

●: Standard stock

Precautions

Applications



Facing

How to mount inserts

1. Completely eliminate chips and dust from the insert mounting side.
2. Coat anti-seize compound thinly on portion of taper and thread of clamp screw prior to installation.
3. After mounting a clamp screw on the top edge of wrench, tighten the screw while keeping the insert pushed against the shim seat surface and holder surface (Fig.1).
4. Tighten the wrench in a direction parallel to the clamp screw.
Recommended tightening torque... 4.5 N·m
5. After tightening, check that there is no gap between the contact surface of the insert and the surface of the shim, or between the side surface of insert and the holder surface.

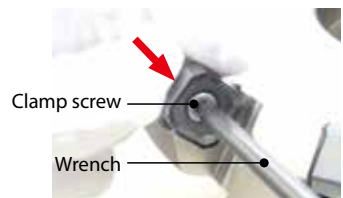


Fig.1

Defining the Machining Diameter (DC)

With respect to the machining diameter (DC) specified in ISO*, the numerical value of the machining diameter (Fig. 2) where the plane surface is finished depends on the insert. Please be careful.

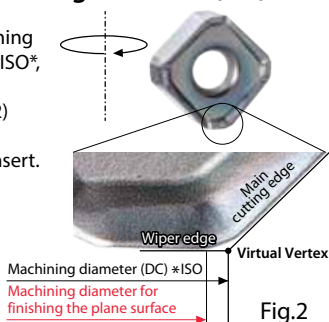


Fig.2

Machining diameter at which the plane surface is finished (for ø125mm)

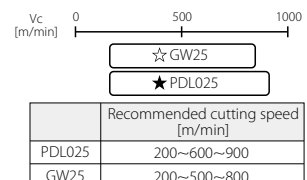
	GM	GH	SM	AM
Difference to machining diameter (DC)	-1.1	-2.0	-1.1	-1.1
Machining diameter (mm) at which the plane surface is finished	123.9	123.0	123.9	123.9
*Dimensional tolerance	$0_{-0.2}$			

*GH has a larger double-edge size, so the machining diameter at which the plane surface is finished is smaller than other inserts.

Precautions when machining

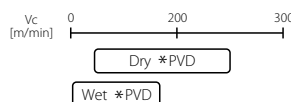
Precautions when machining aluminum

- Be sure to use within recommended conditions.
- Do not rotate more than the maximum speed listed on the main unit.
*The number of revolutions listed on the holder is the maximum number of revolutions without load.



Precautions for wet machining of steel

For wet machining, select PR1835 and use a cutting speed of 70% or less of the recommended condition as a guide.



MB45-125R-14T10C
SCREW:SB-50110TRP WRENCH:

MAX 7,200 RPM

Rotating at maximum speed is prohibited.



Precautions

How to use a wiper insert

1. Use when the feed amount per revolution [mm/rev] becomes large. The table below shows the standard feed amount per revolution and the number of wipers installed.

Feed per rotation	Number of wiper inserts	Pocket for wiper insert
$2.0 < f \text{ [mm/rev]} \leq 4.0$	1 pc	Pocket with "Single dot" (Fig. 3)
$4.0 < f \text{ [mm/rev]}$	2 pcs	"Single dot" and "Double dots" pockets (Figs. 3, 4) * Only holders with 12 or more inserts have "Double dots"

Fig. 3



Fig. 4



"Double dots" are placed in the diagonal pocket of "Single dot"
* For only holders with 12 or more inserts

2. Chipbreaker recommended for use with wiper insert

	GM chipbreaker	GH chipbreaker	SM chipbreaker	AM chipbreaker
Wiper Insert	✓	Not recommended	✓	Not recommended

3. Install the wiper insert correctly as shown in Fig. 5.

* Fig. 6 shows the insert incorrectly attached to the holder.

Fig. 5



Fig. 6





Milling Solution

Achieving Unprecedented Tool Life





Tangential 90° end mill with 4-edge inserts

MA90

Original tangential 90° end mill with economical 4-edge inserts. New grade PR18 series and unique insert cutting edge design creates high-quality machining with longer tool life



1 The MA90 tangential end mills provide a large variety of machining operations

Challenges

Conventional end mill

- Sudden fractures can cause damage to the holder
- Insert defects preventing use of all four corners

Tangential end mill

- Premature tool wear can quickly deteriorate the surface finish quality
- Poor wall accuracy

SOLUTION

Kyocera's MA90 tangential end mill solves these problems with a unique insert shape and PR18 Series grade technology.



Reliable tooling brings peace of mind to machinists.

Large web thickness

High rigidity

Special wiper edge

Large relief angle suppresses wear
High-quality surface finish

Peripheral grinding specifications

Excellent wall accuracy

Multifunctional (G-class insert)

Supports three-dimensional machining

Unique cutting edge design

Excellent fracture resistance and low cutting force design

Newly developed insert grade

MEGACOAT NANO EX PR18 Series delivers longer tool life



2

New insert grade PR18 Series provides a significantly longer tool life

Next-generation insert grade for milling

NEW

PR18 Series

Kyocera's Nano Layer Coating Technology

Longer Tool Life with Next-generation Coating for Milling



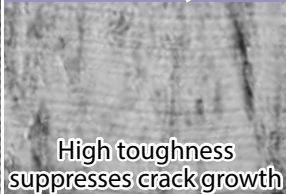
MEGACOAT
NANO EX | Milling |

Double Lamination Technology Maintains Longer Tool Life

Multi-layer structure with two unique nano layers
Superior abrasion resistance and fracture resistance

Special Nano Layer x Multilayer Lamination

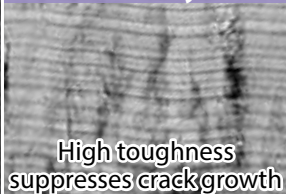
Nano-Layer



High toughness
suppresses crack growth

AlCr-based coating
with excellent abrasion resistance

Nano-Layer



High toughness
suppresses crack growth

AlTi-based coating
with excellent heat resistance

Multi-layering of high-performance nano layers
Increases toughness with suppression of crack growth and optimization of internal stress

CG Image

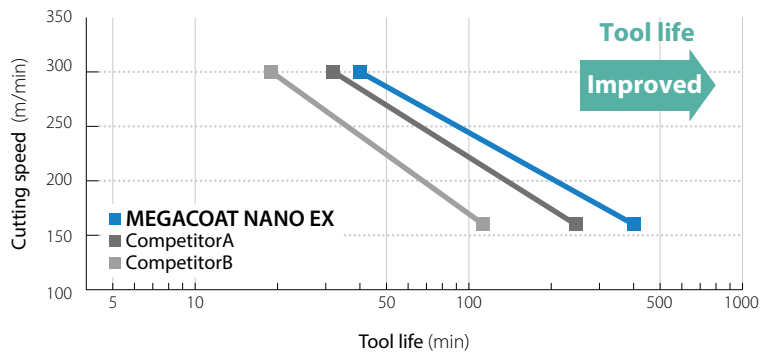
Extensive lineup of insert grades covers a variety of machining materials and applications

Workpiece material	P Steel					M Stainless steel					K Cast iron				
	01	10	20	30	40	01	10	20	30	40	01	10	20	30	40
Lineup	1st recommendation PR1825					1st recommendation PR1835					1st recommendation PR1810				
	Wet PR1835					High-speed machining CA6535									
H Hard materials	PR015S (GH)					S Heat-resistant alloy CA6535 (PR1835)					Titanium alloy PR1835				

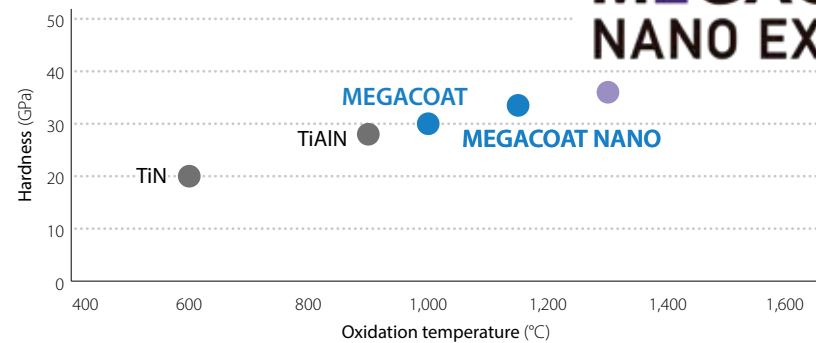
PR1825 Wear resistance comparison (Internal evaluation)
V-T graph

Life criteria:
Flank face wear = 0.10 mm

Cutting conditions:
Vc = **160 / 300** m/min
ap × ae = 2.0 × 110 mm, fz = 0.12 mm/t
SCM440 Dry
PNMU1205ANER-GM (MFPN)



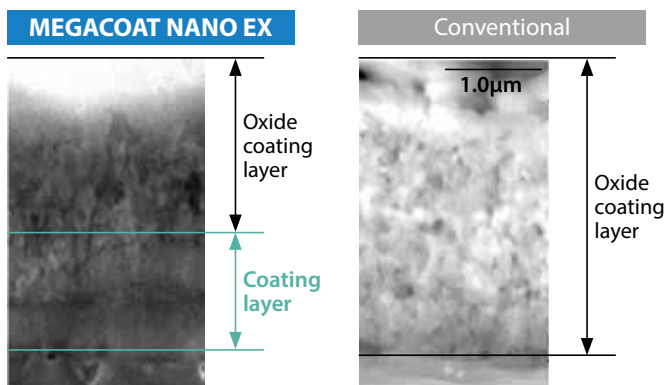
Coating characteristics (Internal evaluation)



MEGACOAT NANO EX | Milling

Oxidation progression comparison (Internal evaluation)

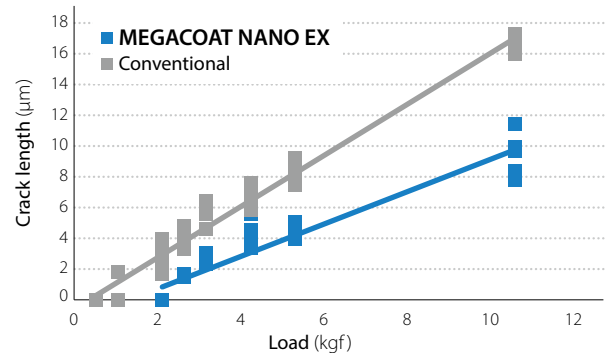
Suppresses oxidation progression with excellent oxidation resistance



*Section after holding at 1,200 degrees for 30 minutes in air

Coating layer toughness evaluation (Internal evaluation)

Excellent coating toughness with small crack length



*Micro-Vickers measurement

3

Achieve reliable results with an insert shape designed for high quality machining and long tool life

Unique cutting edge design delivers high fracture resistance and low cutting forces

Special wiper edge and peripheral grinding specifications provide high quality finish and long tool life

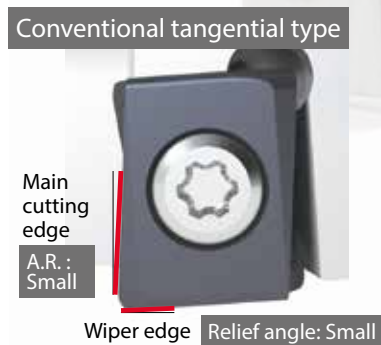
Advantage

Both the A.R. and the relief angle of the wiper edge are large.
Low resistance and excellent surface finish



Unique cutting edge design

Superior fracture resistance and low cutting force



Special wiper edge

Large relief angle: Excellent surface finish and wear suppression
Stepped corners: Designed to prevent seat damage

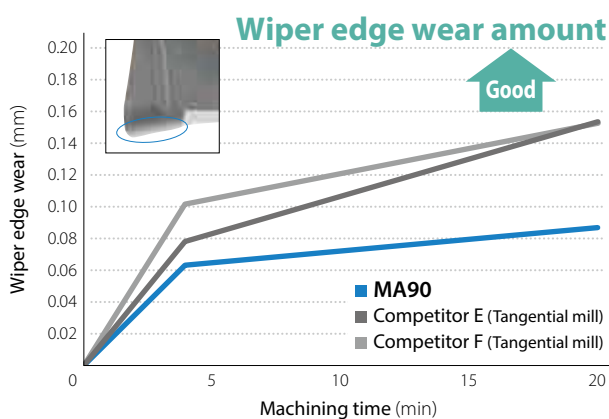
Excellent

Excellent surface finish >>>

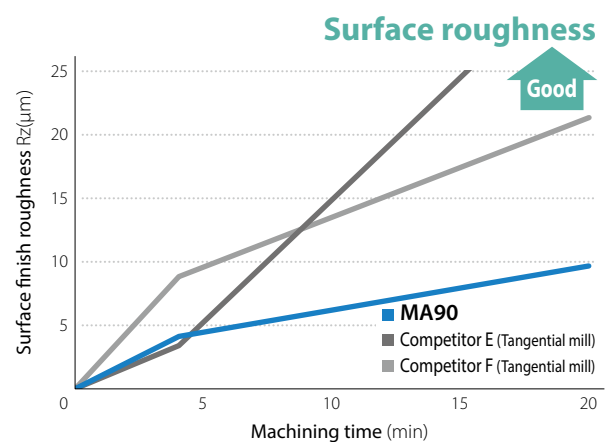
Special wiper edge design suppresses abrasion progress of the edge. Maintains high-quality finished surface

Wear and Surface Finish Comparison (Internal evaluation)

Wiper edge wear



Surface finish roughness (Bottom surface)



Cutting conditions: $V_c = 200$ m/min, $a_p \times a_e = 1 \times 37.5$ mm, $f_z = 0.1/0.12$ mm/t, Dry S50C $\phi 50$ (6/7 inserts) BT50

Excellent wall accuracy

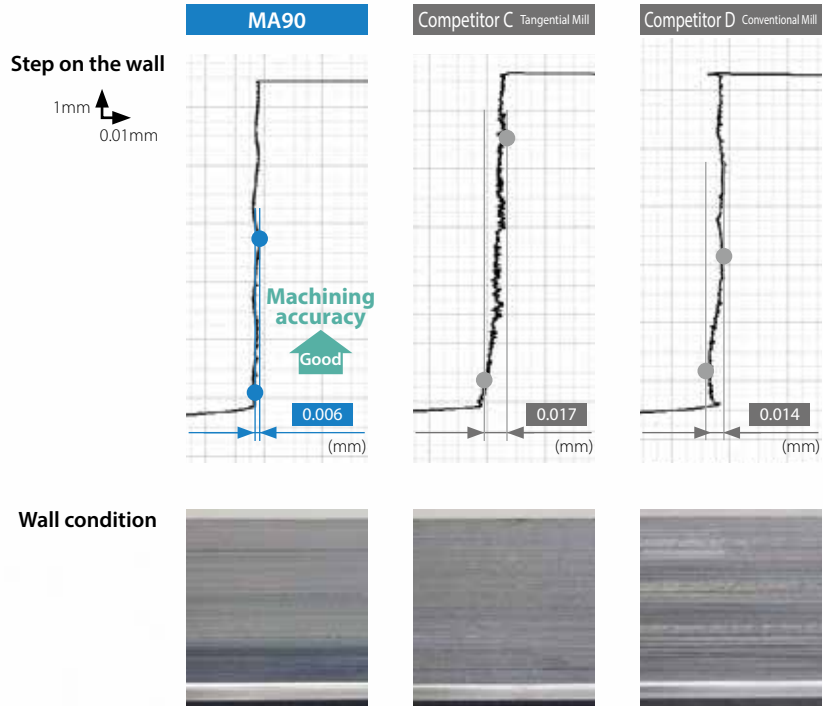
Excellent

Peripheral grinding specifications

Unique, sloped, edge shape
Grounded peripheral provides higher precision



Wall accuracy comparison (Internal evaluation)



Cutting conditions: $V_c = 150$ m/min, $a_p \times a_e = 3 \times 5$ mm 4 passes, $f_z = 0.1$ mm/t, Dry S50C $\varnothing 20$ (3 inserts) BT50

>>> Long tool life and high-speed machining

Test 1

Even if the main cutting edge is in good condition, the tool reached the end of life due to deterioration of the finished surface.

MA90



Test 2

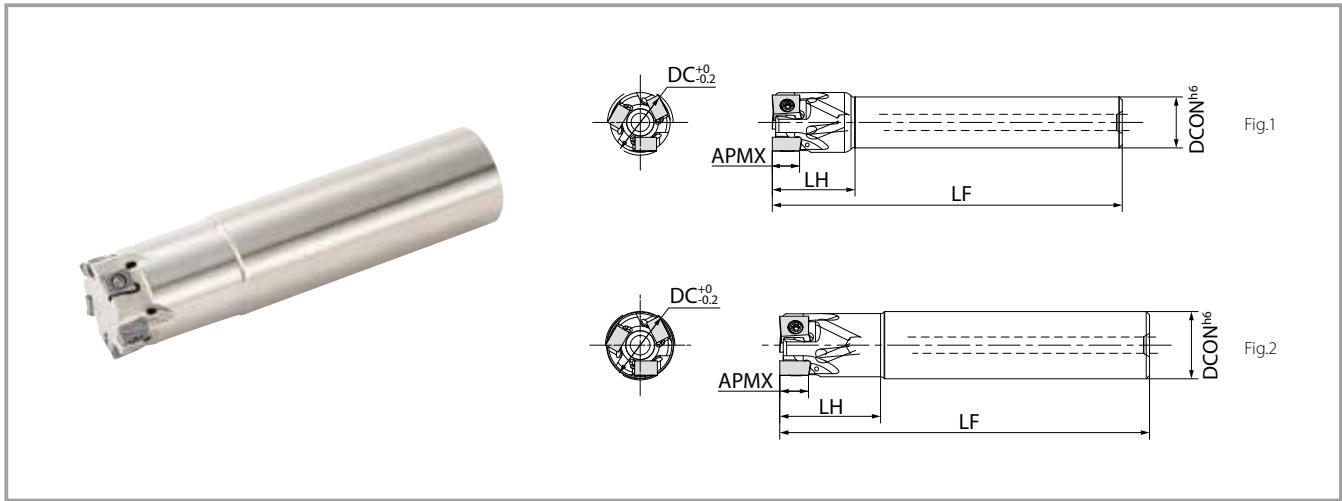
Machined with reduced cutting speed because the surface finish deteriorated early.

MA90



Edge condition and finished surface

		MA90	Competitor E Tangential	Competitor F Tangential
Wiper edge	After 3.8 min			
	After 6.5 min			
Main cutting edge		Abrasion progress: Small Good	Wear progress: Large Spark generation Good	Wear progress: Large Spark generation Good
Finished surface	After 13.1 min	Good 8.0 μ mRz (1.3 μ mRa)	Cloudy finish 20.6 μ mRz (2.2 μ mRa)	Surface finish deteriorating 14.9 μ mRz (3.0 μ mRa)
		Results	Main cutting edge: Good Wiper edge wear: Small wear Good finished surface and can continue to use	Main cutting edge: Good Wiper edge wear: Progressive Worse finished surface



Toolholder Dimensions 09 Size (LOGU09 ...)

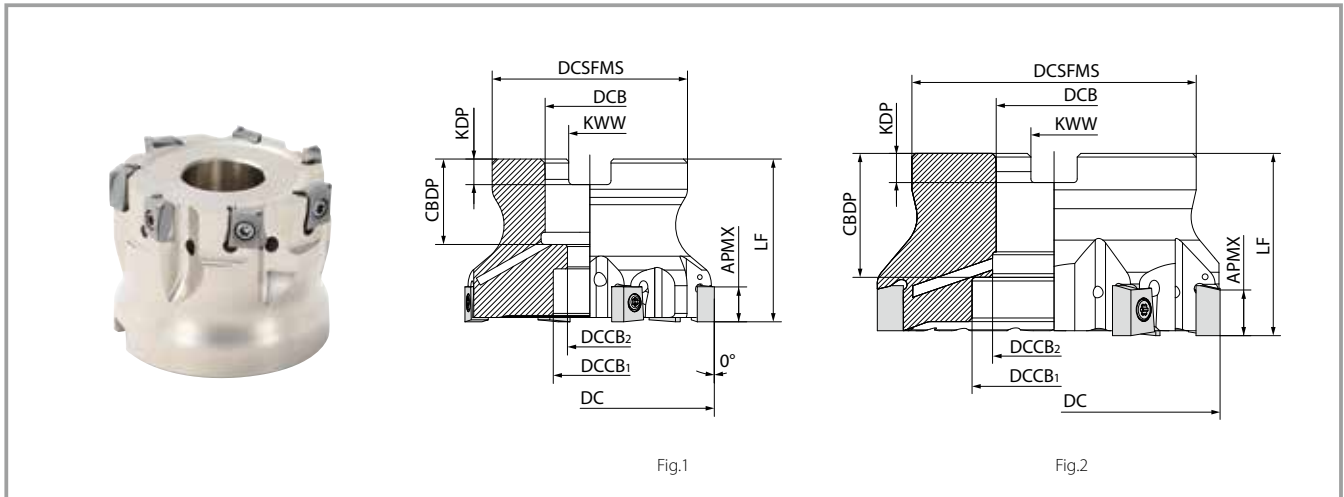
Description	Stock	Number of Inserts	Dimensions (mm)					Coolant hole	Shape	Weight	Maximum number of revolutions (min ⁻¹)					
			DC	DCON	LF	LH	APMX									
Standard shank	●	2	16	12	100	23	8	Yes	Fig.1	0.1	29,500					
			18S16-09T2C	18							16	27,900				
	●	3	20	20	110	26				0.2	26,600					
	20S16-09T3C		22		120	29					25,400					
	22S20-09T3C		25								21,900					
	●	4	28	25	130	32				0.3		22,600				
	25S20-09T4C		30								150	50	1.0	21,200		
	●	5	32	32	40	0.9				20,300						
	32S25-09T4C		35							40	32	120	40	0.9	19,000	
	●	6	40	50	7	17,000										
	32S25-09T5C		50							120	40	0.9	17,000			
	●	7	50	120	40	0.9							17,000			
	50S32-09T5C		50							120	40	0.9	17,000			
	50S32-09T7C	50	120	40	0.9	17,000										
	Same size shank	●				2				16	16	100	26	8	Yes	Fig.2
20S20-09T2C			20	20	110		30	0.2	26,600							
●		3	25	25	120	32	0.4		23,900							
20S20-09T3C			25					32	32	130	40	0.7	21,200			
25S25-09T3C			32										32			
●		4	32	32	130	40	0.7	21,200								
25S25-09T4C			32					32	130	40	0.7	21,200				
●	5	32	32	130	40	0.7	21,200									
32S32-09T4C		32					32	130	40	0.7	21,200					
●	5	32	32	130	40	0.7					21,200					
32S32-09T5C		32					32	130	40	0.7	21,200					
Long shank	●	2	20	18	150	30					8	Yes	Fig.1	0.3	26,600	
			20S18-09T2CL	20		20	40	Fig.2	0.6	23,900						
	●	2	25	25	170	50	1.1						21,200			
	20S20-09T2CL		25					25	170	50				1.1	21,200	
●	2	32	32	200	65	1.1	21,200									
25S25-09T2CL		32						32	200	65	1.1	21,200				
●	2	32	32	200	65	1.1	21,200									
32S32-09T2CL		32						32	200	65	1.1	21,200				

Maximum number of revolutions

Set the number of revolutions per minute within the recommended cutting speed specified by the workpiece on Page 89.

Do not use the end mill or cutter at the maximum revolution or higher since the centrifugal force may cause chips and parts to scatter even under no load.

● : Standard stock



Toolholder dimensions 09 size (LOGU09...)

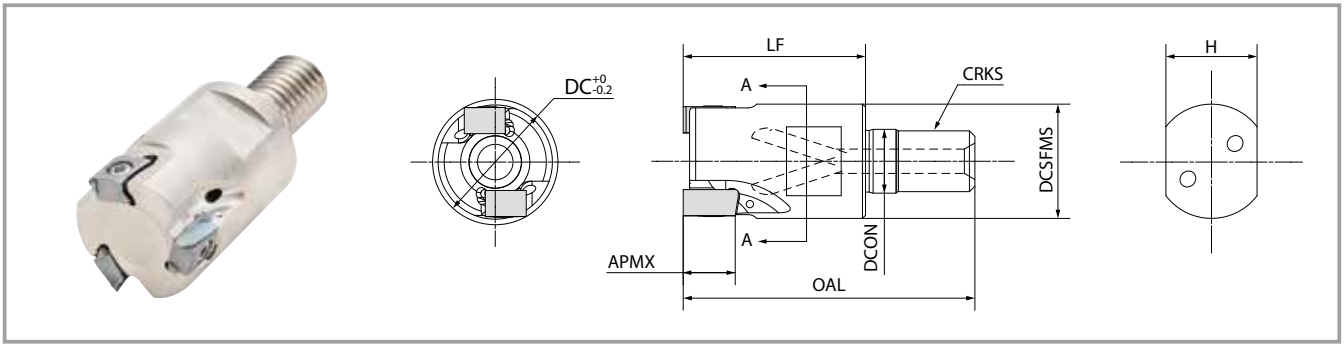
Description	Stock	Number of Inserts	Dimensions (mm)											Coolant hole	Shape	Weight (kg)	Maximum number of revolutions (min ⁻¹)
			DC	DCSFMS	DCB	DCCB ₁	DCCB ₂	LF	CDBP	KDP	KWW	APMX					
Metric Spec	MA90 - 040R-09T4C-M	●	4	40	38	16	15	9	40	19	5.6	8.4	8	Yes	Fig.1	0.2	26,600
	040R-09T6C-M	●	6														
	050R-09T5C-M	●	5	50	48	22	18	11		21	6.3	10.4				0.4	23,900
	050R-09T7C-M	●	7														
	063R-09T6C-M	●	6	63	0.5	21,200											
	063R-09T9C-M	●	9														

Maximum number of revolutions ● : Standard stock
 Set the number of revolutions per minute within the recommended cutting speed specified by the workpiece on Page 89.
 Do not use the end mill or cutter at the maximum revolution or higher since the centrifugal force may cause chips and parts to scatter even under no load.

Toolholder dimensions 12 size (LOGU12...)

Description	Stock	Number of Inserts	Dimensions (mm)											Coolant hole	Shape	Weight (kg)	Maximum number of revolutions (min ⁻¹)
			DC	DCSFMS	DCB	DCCB ₁	DCCB ₂	LF	CDBP	KDP	KWW	APMX					
Metric Spec	MA90 - 040R-12T3C-M	●	3	40	38	16	14	9	40	19	5.6	8.4	12	Yes	Fig.1	0.2	14,600
	040R-12T4C-M	●	4														
	050R-12T4C-M	●	50	48	22	18	11	21		6.3	10.4	0.3				13,100	
	050R-12T6C-M	●															6
	063R-12T6C-M	●	63	1.2	10,400												
	063R-12T8C-M	●				8											
	080R-12T7C-M	●	7	80	70	27	20	13	24	7	12.4	1.5			9,300		
	080R-12T10C-M	●	10														
	100R-12T9C-M	●	9	100	78	32	45	50	30	8	14.4	2.5			8,300		
	100R-12T13C-M	●	13														
	125R-12T12C-M	●	12	125	89	40	55	63	33	9	16.4	Fig.2					
	125R-12T16C-M	●	16														
Bore Dia. Inch Spec	MA90 - 080R-12T7C	●	7	80	70	25.4	20	13	50	27	6	9.5	12	Yes	Fig.1	1.2	10,400
	080R-12T10C	●	10														
	100R-12T9C	●	9	100	78	31.75	45	50		34	8	12.7			Fig.2	1.5	9,300
	100R-12T13C	●	13														
	125R-12T12C	●	12	125	89	38.1	55	63		38	10	15.9			2.6	8,300	
	125R-12T16C	●	16														

Maximum number of revolutions ● : Standard stock
 Set the number of revolutions per minute within the recommended cutting speed specified by the workpiece on Page 89.
 Do not use the end mill or cutter at the maximum revolution or higher since the centrifugal force may cause chips and parts to scatter even under no load.



Toolholder dimensions 09 size (LOGU09...)

Description	Stock	Number of Inserts	Dimensions (mm)								Coolant hole	Maximum number of revolutions (min ⁻¹)
			DC	DCSFMS	DCON	OAL	LF	CRKS	H	APMX		
MA90 - 20M10-09T2C	●	2	20	18.8	10.5	48	30	M10×1.5	15	8	Yes	19,000
20M10-09T3C	●	3										
25M12-09T3C	●	4	25	23	12.5	56	35	M12×1.75	19			17,000
25M12-09T4C	●											
32M16-09T4C	●	5	32	30	17	62	40	M16×2.0	24			15,100
32M16-09T5C	●											

●: Standard stock

Toolholder dimensions 12 size (LOGU12...)

Description	Stock	Number of Inserts	Dimensions (mm)								Coolant hole	Maximum number of revolutions (min ⁻¹)
			DC	DCSFMS	DCON	OAL	LF	CRKS	H	APMX		
MA90 - 25M12-12T2C	●	2	25	23	12.5	56	35	M12×1.75	19	12	Yes	18,300
32M16-12T2C	●		32	30	17	62	40	M16×2.0	24			16,300
32M16-12T3C	●	3										

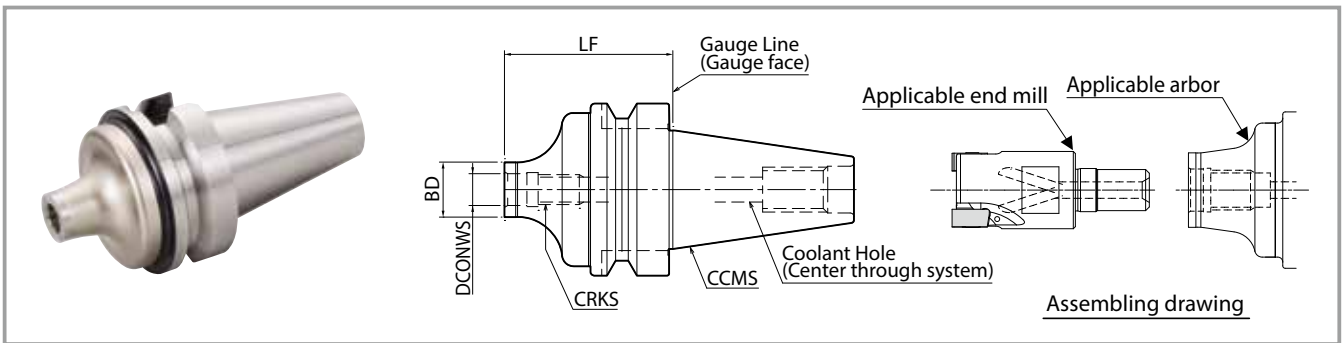
●: Standard stock

Maximum number of revolutions

Set the number of revolutions per minute within the recommended cutting speed specified by the workpiece on Page 89.

Do not use the end mill or cutter at the maximum revolution or higher since the centrifugal force may cause chips and parts to scatter even under no load.

BT Arbor for Modular (for exchangeable head/two face contact)



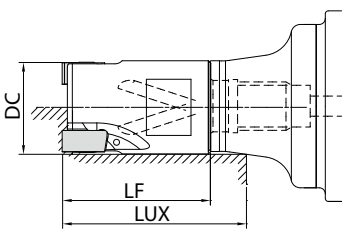
Dimensions

Description	Stock	Dimensions (mm)					Coolant hole	Arbor (Two-face clamping)	Applicable End Mill (Head)
		LF	BD	DCONWS	CRKS	CCMS			
BT30K- M10-45	●	45	18.7	10.5	M10×1.5	Yes	BT30	MA90-...M10-..	
M12-45	●	45	23	12.5	M12×1.75			MA90-...M12-..	
BT40K- M10-60	●	60	18.7	10.5	M10×1.5	Yes	BT40	MA90-...M10-..	
M12-55	●	55	23	12.5	M12×1.75			MA90-...M12-..	
M16-65	●	65	30	17	M16×2.0			MA90-...M16-..	

●: Standard stock

BT Arbor for Modular (for exchangeable head/two face contact)

Actual End Mill Depth



Arbor description	Applicable End Mill (Head)			Actual End Mill Depth(mm)
	Description	Cutting Dia. (mm)	Dimensions (mm)	LUX
		DC	LF	
BT30K- M10-45	MA90-20M10-...	20	30	36.8
	MA90-25M12-...	25	35	42.8
BT40K- M10-60	MA90-20M10-...	20	30	38.7
	MA90-25M12-...	25	35	44.6
	MA90-32M16-...	32	40	51.2

Applicable Insert

Shape	Description	Dimensions (mm)						MEGACOAT (PVD coating)				CVD Coating																																																																																																																			
		W1	S	D1	INSL	BS	RE	PR1825	PR1835	PR1810	PR015S	CA6535																																																																																																																			
		Usage Classification: <table border="1"> <tr> <td>P</td> <td>Carbon steel/Alloy steel</td> <td>★</td> <td>☆</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td>Mold steel</td> <td>★</td> <td>☆</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td rowspan="3">M Stainless steel</td> <td>Austenitic</td> <td></td> <td>★</td> <td>☆</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Martensitic</td> <td></td> <td></td> <td>☆</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>★</td> </tr> <tr> <td>Precipitation hardening</td> <td></td> <td></td> <td>★</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td rowspan="2">K</td> <td>Gray cast iron</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>★</td> <td></td> <td></td> </tr> <tr> <td>Nodular cast iron</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>★</td> <td></td> <td></td> </tr> <tr> <td rowspan="2">S</td> <td>Heat-resistant alloys</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>☆</td> <td></td> <td></td> <td>★</td> </tr> <tr> <td>Titanium alloy</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>★</td> <td></td> <td></td> <td></td> </tr> <tr> <td>H</td> <td>Hard materials</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>★</td> </tr> </table>												P	Carbon steel/Alloy steel	★	☆										Mold steel	★	☆									M Stainless steel	Austenitic		★	☆								Martensitic			☆							★	Precipitation hardening			★								K	Gray cast iron								★			Nodular cast iron								★			S	Heat-resistant alloys							☆			★	Titanium alloy							★				H	Hard materials								
P	Carbon steel/Alloy steel	★	☆																																																																																																																												
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	Titanium alloy							★																																																																																																																							
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Shape	Description	Dimensions (mm)						MEGACOAT (PVD coating)				CVD Coating	
		W1	S	D1	INSL	BS	RE	PR1825	PR1835	PR1810	PR015S	CA6535	
		Legend: <table border="1"> <tr> <td>●</td> <td>Standard stock</td> </tr> </table>											
●	Standard stock												

Shape	Description	Dimensions (mm)						MEGACOAT (PVD coating)				CVD Coating
		W1	S	D1	INSL	BS	RE	PR1825	PR1835	PR1810	PR015S	CA6535
General Purpose (G-class)	LOGU 090404ER-GM	4.3	6.77	3.33	8.89	1.29	0.4	●	●	●	-	●
	LOGU 090408ER-GM	4.3	6.71	3.33	8.89	0.90	0.8	●	●	●	-	●
	LOGU 090412ER-GM	4.3	6.65	3.33	8.89	0.49	1.2	●	●	●	-	●
	LOGU 090416ER-GM	4.3	6.59	3.33	8.89	0.10	1.6	●	●	●	-	●
Low Cutting Force (G-class)	LOGU 090404ER-SM	4.3	6.77	3.33	8.89	1.29	0.4	●	●	-	-	●
	LOGU 090408ER-SM	4.3	6.71	3.33	8.89	0.89	0.8	●	●	-	-	●
	LOGU 090412ER-SM	4.3	6.65	3.33	8.89	0.49	1.2	●	●	-	-	●
	LOGU 090416ER-SM	4.3	6.59	3.33	8.89	0.10	1.6	●	●	-	-	●
Tough Edge (G-class)	LOGU 090408ER-GH	4.3	6.71	3.33	8.89	0.90	0.8	●	●	●	●	-
General Purpose (G-class)	LOGU 120604ER-GM	6.6	10.10	4.55	13.28	2.50	0.4	●	●	●	-	●
	LOGU 120608ER-GM	6.6	10.04	4.55	13.28	2.14	0.8	●	●	●	-	●
	LOGU 120612ER-GM	6.6	9.97	4.55	13.28	1.79	1.2	●	●	●	-	●
	LOGU 120616ER-GM	6.6	9.92	4.55	13.28	1.44	1.6	●	●	●	-	●
	LOGU 120620ER-GM	6.6	9.85	4.55	13.28	1.08	2.0	●	●	●	-	●
	LOGU 120624ER-GM	6.6	9.79	4.55	13.28	0.72	2.4	●	●	●	-	●
	LOGU 120630ER-GM	6.6	9.69	4.55	13.28	0.20	3.0	●	●	●	-	●
Low Cutting Force (G-class)	LOGU 120604ER-SM	6.6	10.10	4.55	13.28	2.50	0.4	●	●	-	-	●
	LOGU 120608ER-SM	6.6	10.04	4.55	13.28	2.14	0.8	●	●	-	-	●
	LOGU 120612ER-SM	6.6	9.97	4.55	13.28	1.79	1.2	●	●	-	-	●
	LOGU 120616ER-SM	6.6	9.92	4.55	13.28	1.44	1.6	●	●	-	-	●
	LOGU 120620ER-SM	6.6	9.85	4.55	13.28	1.08	2.0	●	●	-	-	●
	LOGU 120624ER-SM	6.6	9.79	4.55	13.28	0.72	2.4	●	●	-	-	●
	LOGU 120630ER-SM	6.6	9.69	4.55	13.28	0.20	3.0	●	●	-	-	●
Tough Edge (G-class)	LOGU 120608ER-GH	6.6	10.16	4.55	13.25	2.26	0.8	●	●	●	●	-

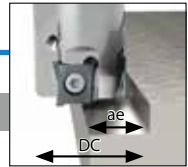
● : Standard stock

Recommended Cutting Conditions ★1st recommendation ☆2nd recommendation

Insert Shape	Workpiece Material	Toolholder Description and Feed rate (fz: mm/t)				Recommended Insert Grade (Cutting speed Vc: m/min)				
		09 Size (LOGU09...)		12 Size (LOGU12...)		MEGACOAT NANO EX			MEGACOAT HARD	CVD coating
		MA90-16~MA90-18	MA90-20~MA90-50 MA90-040~MA90-063	MA90-25~MA90-30	MA90-32~MA90-50 MA90-040~MA90-125	PR1825	PR1835	PR1810	PR015S	CA6535
General GM	Carbon steel (SxxC)	0.05 - 0.1 - 0.14	0.05 - 0.1 - 0.16	0.05 - 0.1 - 0.18	0.06 - 0.15 - 0.23	★ 120 - 180 - 250	☆ 120 - 180 - 250	-	-	-
	Alloy steel (SCM, etc.)	0.05 - 0.08 - 0.12	0.05 - 0.1 - 0.14	0.05 - 0.1 - 0.16	0.06 - 0.13 - 0.2	★ 100 - 160 - 220	☆ 100 - 160 - 220	-	-	-
	Mold steel (SKD, etc.)	0.05 - 0.08 - 0.1	0.05 - 0.1 - 0.12	0.05 - 0.1 - 0.14	0.06 - 0.12 - 0.18	★ 80 - 140 - 180	☆ 80 - 140 - 180	-	-	-
	Austenitic stainless steel (SUS304, etc.)	0.05 - 0.08 - 0.1	0.05 - 0.1 - 0.12	0.05 - 0.1 - 0.14	0.06 - 0.12 - 0.18	☆ 100 - 160 - 200	★ 100 - 160 - 200	-	-	-
	Martensitic stainless steel (SUS403, etc.)	0.05 - 0.08 - 0.1	0.05 - 0.1 - 0.12	0.05 - 0.1 - 0.14	0.06 - 0.12 - 0.18	-	☆ 150 - 200 - 250	-	-	★ 180 - 240 - 300
	Precipitation hardened stainless steel(SUS630, etc.)	0.05 - 0.08 - 0.1	0.05 - 0.1 - 0.12	0.05 - 0.1 - 0.14	0.06 - 0.12 - 0.18	-	★ 90 - 120 - 150	-	-	-
	Grey cast iron (FC)	0.05 - 0.1 - 0.14	0.05 - 0.1 - 0.16	0.05 - 0.1 - 0.18	0.06 - 0.15 - 0.23	-	-	☆ 120 - 180 - 250	-	-
	Nodular cast iron (FCD)	0.05 - 0.08 - 0.1	0.05 - 0.1 - 0.12	0.05 - 0.1 - 0.14	0.06 - 0.12 - 0.18	-	-	☆ 100 - 150 - 200	-	-
	Ni-based heat-resistant alloys	0.05 - 0.06 - 0.08	0.05 - 0.08 - 0.1	0.05 - 0.08 - 0.12	0.06 - 0.1 - 0.15	-	-	-	-	★ 20 - 30 - 50
	Titanium alloy (Ti -6Al -4 V)	0.05 - 0.08 - 0.1	0.05 - 0.09 - 0.12	0.05 - 0.09 - 0.12	0.06 - 0.1 - 0.15	-	☆ 30 - 50 - 70	-	-	-
Low Cutting Force SM	Carbon steel (SxxC)	0.05 - 0.08 - 0.11	0.05 - 0.1 - 0.14	0.05 - 0.1 - 0.14	0.06 - 0.1 - 0.18	★ 120 - 180 - 250	☆ 120 - 180 - 250	-	-	-
	Alloy steel (SCM, etc.)	0.05 - 0.07 - 0.1	0.05 - 0.08 - 0.12	0.05 - 0.08 - 0.12	0.06 - 0.1 - 0.14	★ 100 - 160 - 220	☆ 100 - 160 - 220	-	-	-
	Mold steel (SKD, etc.)	0.05 - 0.07 - 0.1	0.05 - 0.08 - 0.1	0.05 - 0.08 - 0.12	0.06 - 0.1 - 0.14	★ 80 - 140 - 180	☆ 80 - 140 - 180	-	-	-
	Austenitic stainless steel (SUS304, etc.)	0.05 - 0.08 - 0.11	0.05 - 0.08 - 0.12	0.05 - 0.08 - 0.12	0.06 - 0.1 - 0.14	☆ 100 - 160 - 200	★ 100 - 160 - 200	-	-	-
	Martensitic stainless steel (SUS403, etc.)	0.05 - 0.08 - 0.11	0.05 - 0.08 - 0.12	0.05 - 0.08 - 0.12	0.06 - 0.1 - 0.14	-	☆ 150 - 200 - 250	-	-	★ 180 - 240 - 300
	Precipitation hardened stainless steel(SUS630, etc.)	0.05 - 0.08 - 0.11	0.05 - 0.08 - 0.12	0.05 - 0.08 - 0.12	0.06 - 0.1 - 0.14	-	★ 90 - 120 - 150	-	-	-
	Ni-based heat-resistant alloys	0.05 - 0.06 - 0.08	0.05 - 0.08 - 0.1	0.05 - 0.08 - 0.1	0.06 - 0.08 - 0.12	-	-	-	-	★ 20 - 30 - 50
	Titanium alloy (Ti-6 Al-4V)	0.05 - 0.08 - 0.1	0.05 - 0.08 - 0.12	0.05 - 0.08 - 0.12	0.06 - 0.09 - 0.12	-	★ 30 - 50 - 70	-	-	-
Tough Edge GH	Carbon steel (SxxC)	0.05 - 0.1 - 0.14	0.05 - 0.1 - 0.16	0.05 - 0.1 - 0.18	0.06 - 0.15 - 0.23	★ 120 - 180 - 250	☆ 120 - 180 - 250	-	-	-
	Alloy steel (SCM, etc.)	0.05 - 0.08 - 0.12	0.05 - 0.1 - 0.14	0.05 - 0.1 - 0.16	0.06 - 0.13 - 0.2	★ 100 - 160 - 220	☆ 100 - 160 - 220	-	-	-
	Mold steel (SKD, etc.)	0.05 - 0.08 - 0.1	0.05 - 0.1 - 0.12	0.05 - 0.1 - 0.14	0.06 - 0.12 - 0.18	★ 80 - 140 - 180	☆ 80 - 140 - 180	-	-	-
	Austenitic stainless steel (SUS304, etc.)	0.05 - 0.08 - 0.1	0.05 - 0.1 - 0.12	0.05 - 0.1 - 0.14	0.06 - 0.12 - 0.18	☆ 100 - 160 - 200	☆ 100 - 160 - 200	-	-	-
	Martensitic stainless steel (SUS403, etc.)	0.05 - 0.08 - 0.1	0.05 - 0.1 - 0.12	0.05 - 0.1 - 0.14	0.06 - 0.12 - 0.18	-	☆ 150 - 200 - 250	-	-	-
	Precipitation hardened stainless steel(SUS630, etc.)	0.05 - 0.08 - 0.1	0.05 - 0.1 - 0.12	0.05 - 0.1 - 0.14	0.06 - 0.12 - 0.18	-	☆ 90 - 120 - 150	-	-	-
	Grey cast iron (FC)	0.05 - 0.1 - 0.14	0.05 - 0.1 - 0.16	0.05 - 0.1 - 0.18	0.06 - 0.15 - 0.23	-	-	★ 120 - 180 - 250	-	-
	Nodular cast iron (FCD) 0	0.05 - 0.08 - 0.1	0.05 - 0.1 - 0.12	0.05 - 0.1 - 0.14	0.06 - 0.12 - 0.18	-	-	★ 100 - 150 - 200	-	-
	Ni-based heat-resistant alloys	0.05 - 0.06 - 0.08	0.05 - 0.08 - 0.1	0.05 - 0.08 - 0.12	0.06 - 0.1 - 0.15	-	-	-	-	-
	Titanium alloy (Ti-6 Al-4V)	0.05 - 0.08 - 0.1	0.05 - 0.09 - 0.12	0.05 - 0.09 - 0.12	0.06 - 0.1 - 0.15	-	☆ 30 - 50 - 70	-	-	-

The number in **bold font** is recommended starting conditions. Adjust the cutting speed and the feed rate within the above conditions according to the actual machining situation. Machining with coolant is recommended for Ni-base heat-resistant alloys and titanium alloys. When choosing wet machining for other workpieces, reduce the cutting speed to 70% or less. Face milling does not recommend slotting or pocketing. We recommend setting the ae to 75% or less. We recommend the small number insert type for ae of 30% or more. Working above recommended conditions or long-term use can damage the screws. It is recommended to replace the screws regularly.

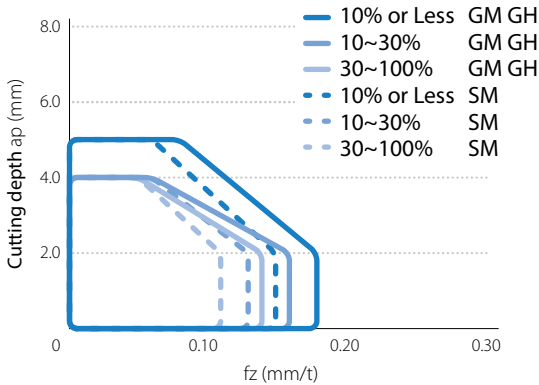
Cutting Performance



09 Size (LOGU09...) Machining for Steel (Dry)

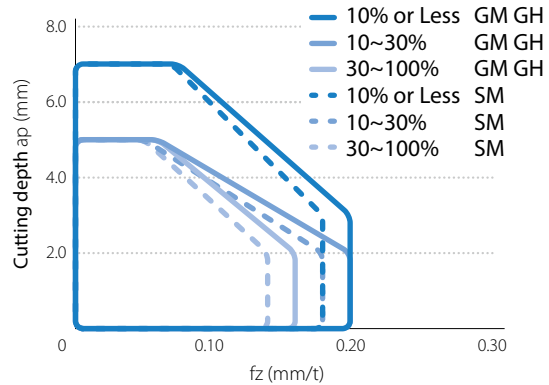
Cutting Dia. DC : $\phi 16 \sim \phi 18$

ae/DC



Cutting Dia. DC : $\phi 20 \sim \phi 63$

ae/DC

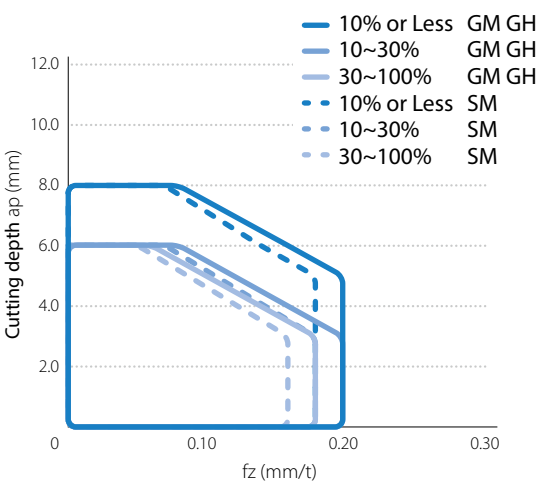


For other workpiece material, set ap and fz appropriately for each ae.

12 Size (LOGU12...) Machining for Steel (Dry)

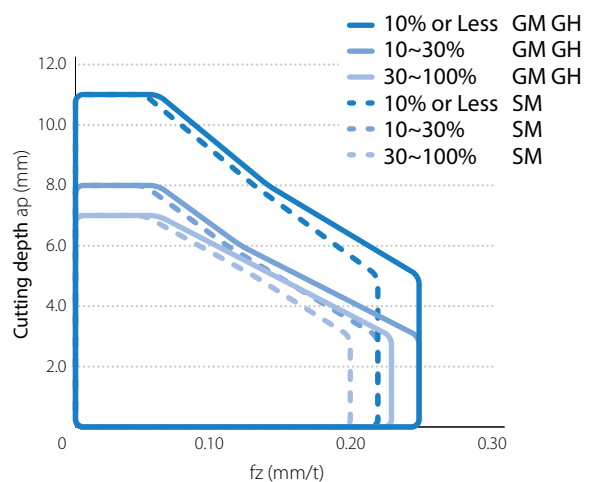
Cutting Dia. DC : $\phi 25 \sim \phi 30$

ae/DC



Cutting Dia. DC : $\phi 32 \sim \phi 125$

ae/DC



For other workpiece material, set ap and fz appropriately for each ae.

Case Studies

Brake parts FCD500

Vc = 135 m/min
 n = 535 min⁻¹
 ap x ae = 3.4 x 25 mm
 fz = 0.15 mm/t
 Vf = 560 mm/min
 Wet
 MA90-080R-12T7C-M
 LOGU120616ER-GM (PR1810)



Number of Workpieces

MA90
(7 inserts)

1,000 pcs

Tool life

x1.6

Competitor G
(7 inserts)

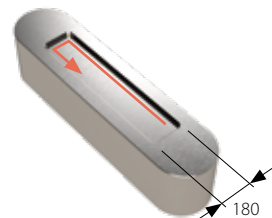
600 pcs

MA90 showed good cutting edge condition and stable machining. Achieved 1.6 times longer tool life.

(User evaluation)

Mold parts Stainless steel

Vc = 125 m/min
 n = 1,600 min⁻¹
 ap x ae = 1.0 x 25 mm
 fz = 0.12 mm/t
 Vf = 570 mm/min
 Dry
 MA90-25S20-09T3C
 LOGU090408ER-GM (PR1835)



Machining efficiency

MA90
(3 inserts)

Q = 14.5 cc/min

Machining efficiency

x1.5

Competitor H
(3 inserts)

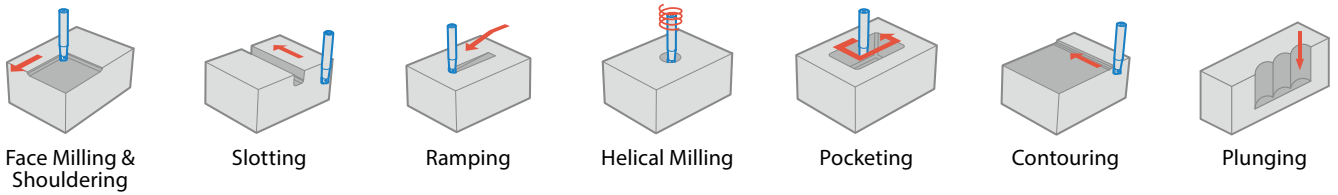
Q = 9.5 cc/min

MA90 showed 1.5 times higher machining efficiency than its competitors. Improved tool life (3 to 4 pcs)

(User evaluation)

Notes

Applications



Ramping Reference Table

Description	Cutter Diameter DC (mm)	16	20	25	32	40	50
MA... - 09 - ...	Max. Ramping Angle RMPX	1.16°	0.97°	0.64°	0.4°	0.23°	0.11°
	tan RMPX	0.020	0.017	0.011	0.007	0.004	0.002
Description	Cutter Diameter DC (mm)	25	28	30	32	35	40
MA... - 12 - ...	Max. Ramping Angle RMPX	2°	1.7°	1.6°	1.5°	1.2°	1°
	tan RMPX	0.034	0.030	0.027	0.026	0.021	0.017

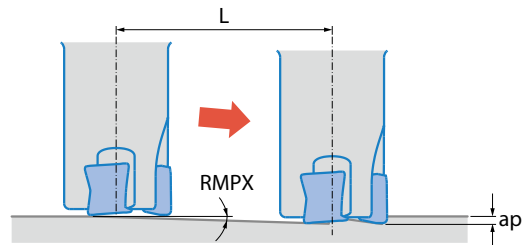
Decrease the angle of inclination when the chips extend longer.

Ramping Tips

Ramping angle should be under RMPX.
Reduce recommended feed rate by 70%

Formula for Min. Cutting Length (L) at Max. Ramping Angle

$$L = \frac{ap}{\tan RMPX}$$

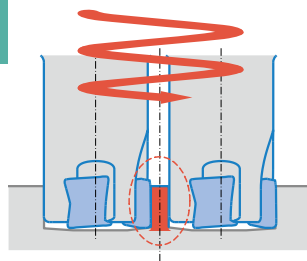


Helical Milling Tips

For Helical milling, use between min. cutting dia. and max. cutting dia.

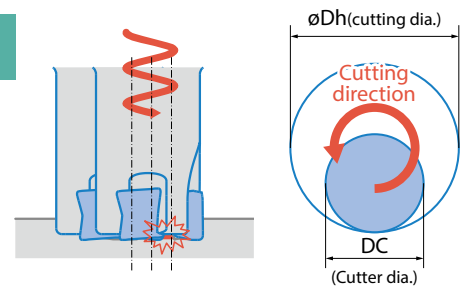
Exceeding max. cutting dia.

Center core remains after machining



Less than min. cutting dia.

Center core hits holder body

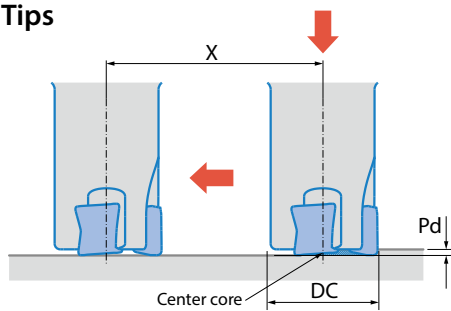


Units: mm

Description	Minimum cutting diameter øDh1	Maximum cutting diameter øDh2
MA... - 09 - ...	2×DC-4	2×DC-2
MA... - 12 - ...	2×DC-6	2×DC-2

For helical milling, use between min. cutting dia. and max. cutting dia..
The cutter direction should be counterclockwise (down cut) (see above).
Please machining in a safe environment as long chips may be produced.

Drilling Tips



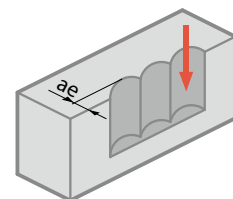
Units: mm

Description	Maximum drilling depth Pd	Min. cutting length X for flat bottom surface
MA... - 09 - ...	0.25	DC-3
MA... - 12 - ...	0.5	DC-5

It is recommended to reduce feed by 25% of recommendation until the center core is removed when traversing after drilling.

Axial feed rate recommendation per revolution is $f = 0.1\text{mm/rev}$ or less when drilling.

Plunging Tips



Available for vertical milling (plunging)
Feed should be set within $fz = 0.1$ (mm/t) when plunging.

Units: mm

Description	Maximum width of cut (ae)
09 Size (LOGU09...)	2
12 Size (LOGU12...)	3

Milling insert grade

Next-generation PVD coating for milling

PR18 Series

Double lamination technology with special nano layer

MEGACOAT NANO EX provides longer tool life

Features 3 grades: PR1825/PR1835/PR1810. Available for various machining environments



1

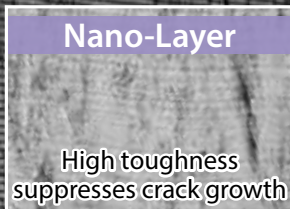
New PVD coating MEGACOAT NANO EX provides long tool life



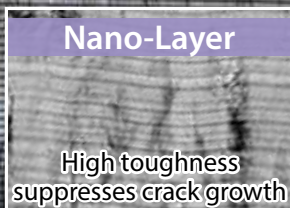
Double Lamination Technology Maintains Longer Tool Life

Multi-layer structure with two unique nano layers
Superior abrasion resistance and fracture resistance

Special Nano Layer x Multilayer Lamination



AlCr-based coating
with excellent abrasion resistance



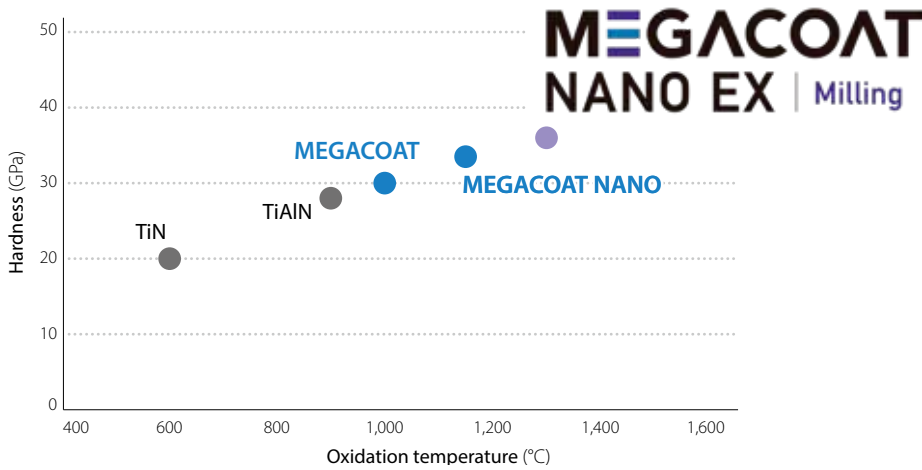
AlTi-based coating
with excellent heat resistance

Multi-layering of high-performance nano layers

Increases toughness with the suppression of crack growth and optimization of internal stress

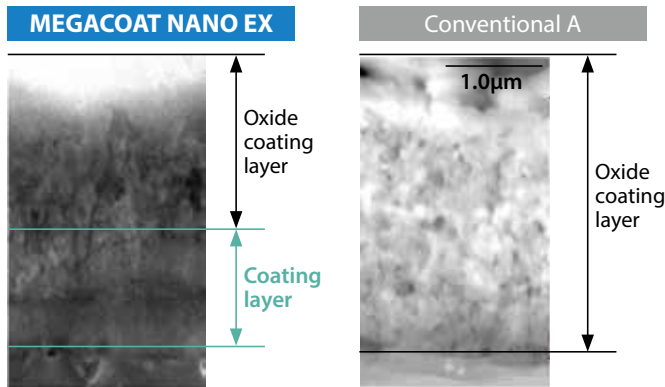
CG Image

Coating characteristics (Internal evaluation)



Excellent oxidation resistance

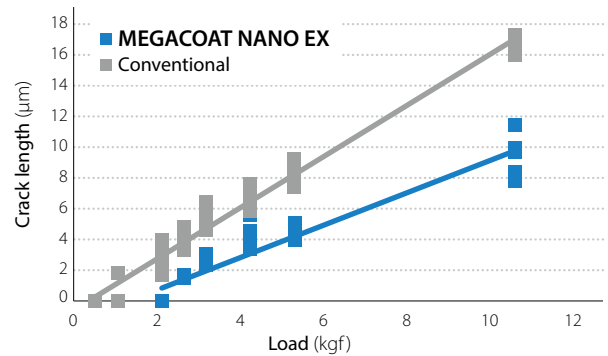
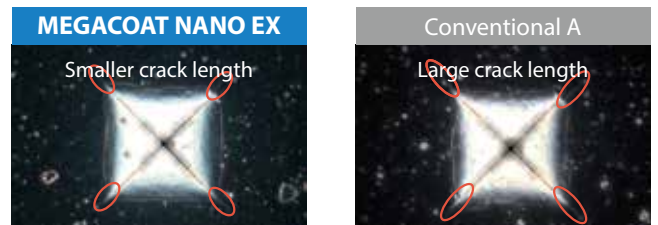
Oxidation progression comparison (Internal evaluation)
 Suppresses oxidation progression with excellent oxidation resistance



*Section after holding at 1,200 degrees for 30 minutes in air

High coating toughness

Coating layer toughness evaluation (Internal evaluation)
 Excellent coating toughness with small crack length

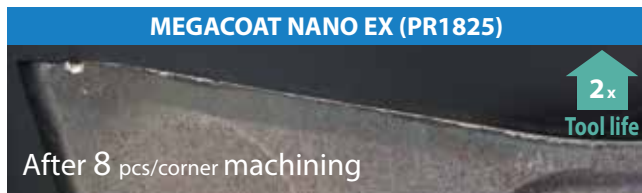


*Micro-Vickers measurement

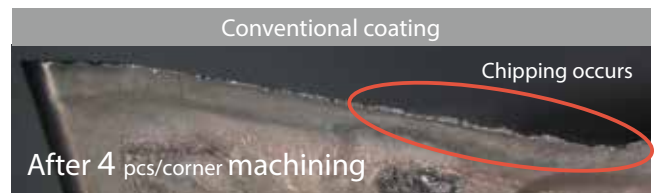
Case Study 2x longer tool life. Cutting edge remains in good condition.

Guides S50C

Edge condition



MEGACOAT NANO EX has 2x longer tool life than conventional coating. The cutting edge remains in good condition.
 Quiet cutting noise



Cutting conditions: Vc = 200 m/min, ap = 2.0 mm, fz = 0.13 mm/t, Dry BDMT170408ER-JT (MEC)

(User evaluation)

2

Compatible with various machining environments. Substantial lineup

PR1825

P

for Steel (Wear resistance oriented)

PR1835

M

for Steel (Stability oriented)
for Stainless steel (1st recommendation)

PR1810

K

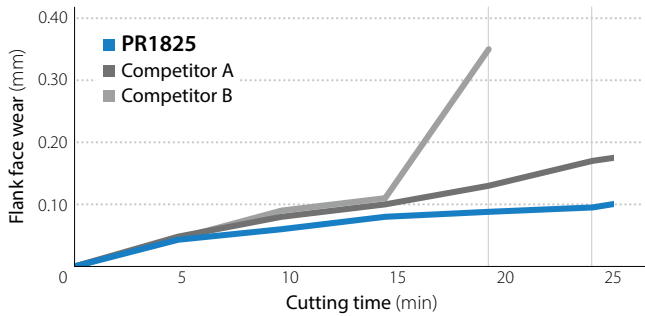
for Cast iron

Workpiece Material	P Steel					M Stainless steel					K Cast iron						
	ISO	01	10	20	30	40	01	10	20	30	40	01	10	20	30	40	
Lineup			Wear resistance oriented PR1825					1st recommendation PR1835				1st recommendation PR1810					
			Stability oriented PR1835														

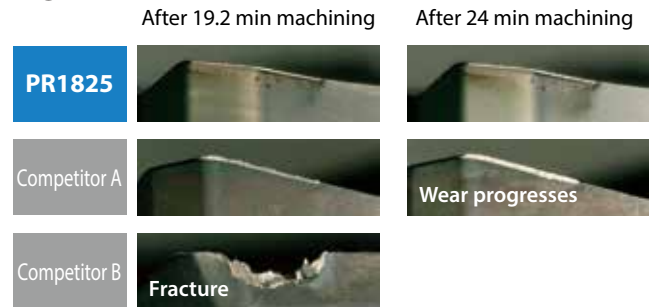
PR1825

Carbide base material with an excellent balance of hardness, toughness and versatility

Wear resistance comparison (Internal evaluation)



Edge condition

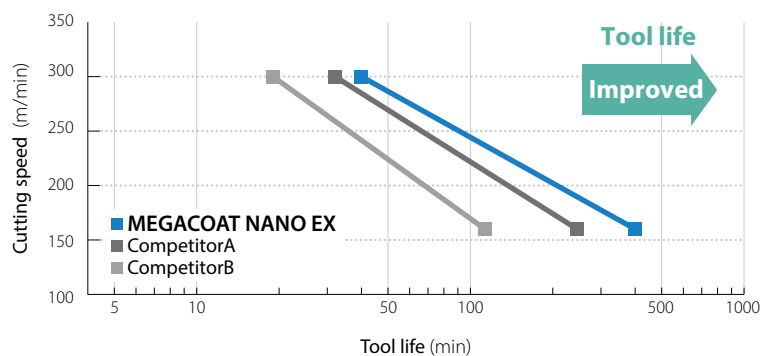


Cutting conditions : $V_c = 150$ m/min, $a_p \times a_e = 2$ mm x 65 mm, $f_z = 0.12$ mm/t, SKD11, Dry PNMU1205ANER-GM (MFPN45)

V-T graph (Internal evaluation)

Life criteria :
Flank face wear = 0.10 mm

Cutting conditions :
 $V_c = 160 / 300$ m/min
 $a_p \times a_e = 2 \times 110$ mm, $f_z = 0.12$ mm/t
SCM440 Dry
PNMU1205ANER-GM (MFPN45)





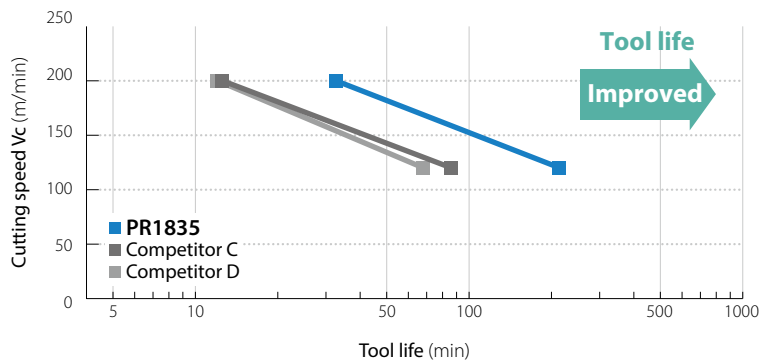
PR1835

Carbide base material with superior impact resistance and stability oriented
Improves the toughness of the base material by optimizing the particle shape and homogenizing the structure.

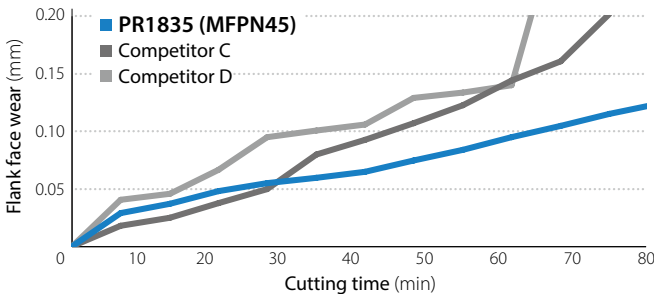
V-T graph (Internal evaluation)

Life criteria :
Flank face wear = 0.10 mm

Cutting conditions :
Vc = 120 / 200 m/min
ap x ae = 2 x 110 mm, fz = 0.12 mm/t
SUS304 Dry
PNMU1205ANER-SM (MFPN45)

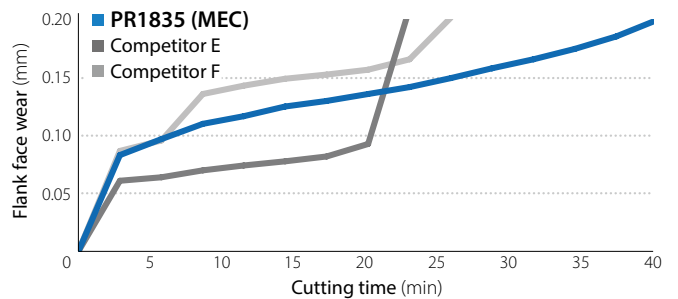


Wear resistance comparison (Internal evaluation)



Cutting conditions : Vc = 150 m/min, ap x ae = 2 x 80 mm, fz = 0.1 mm/t
SUS304, Dry PNMU1205ANER-SM

Wear resistance comparison (Internal evaluation)

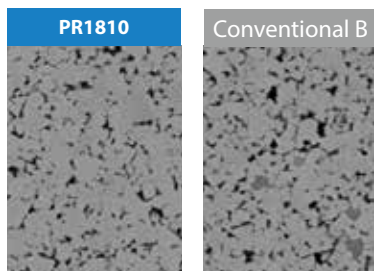


Cutting conditions : Vc = 120 m/min, ap x ae = 2 x 15 mm, fz = 0.1 mm/t
SUS304, Dry BDMT11T308ER-JS

PR1810

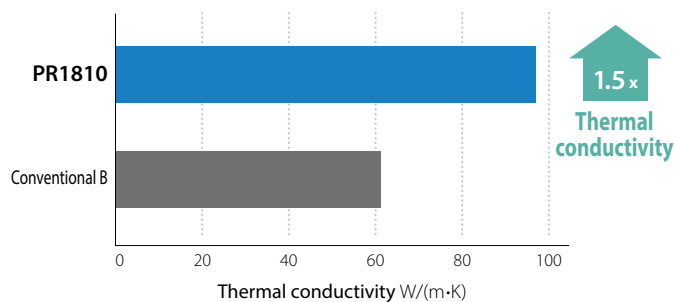
Uses a proprietary base material with excellent thermal conductivity.
Achieving stable processing of cast iron

Carbide Substrate



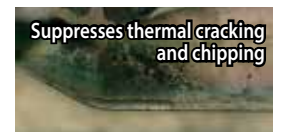
Coarse fine granules Fine grain

Thermal conductivity comparison (Internal evaluation)



Cutting edge condition (Internal evaluation)

After about 60 min machining



Suppresses thermal cracking and chipping

Cutting conditions :
Vc = 200 m/min
ap x ae = 2 x 85 mm
fz = 0.2 mm/t
FCD450, Wet
PNMU1205ANER-GM (MFPN45)

PR1810 uses a mixture of coarse and fine grains. Improved thermal conductivity and reduced thermal cracking and chipping

90° Cutting Edge Angle Type

Shouldering

Slotting

Facing

Tangential 90° End Mill with 4-Edge Inserts

MA90

NEW

Original tangential 90° end mill with economical 4-edge inserts









90° End Mill with Double Sided 4-edge Inserts

MEW/MEWH




Reduces cutting force equivalent to positive inserts
Excellent surface finish



Shape	Description	MEGACOAT NANO EX		
		PR1825	PR1835	PR1810
 General Purpose (G-Class)	LOGU 090404ER-GM	●	●	●
	090408ER-GM	●	●	●
	090412ER-GM	●	●	●
	090416ER-GM	●	●	●
 Low Cutting Force (G-Class)	LOGU 090404ER-SM	●	●	-
	090408ER-SM	●	●	-
	090412ER-SM	●	●	-
	090416ER-SM	●	●	-
 Tough Edge (G-class)	LOGU 090408ER-GH	●	●	●
 General Purpose (G-Class)	LOGU 120604ER-GM	●	●	●
	120608ER-GM	●	●	●
	120612ER-GM	●	●	●
	120616ER-GM	●	●	●
	120620ER-GM	●	●	●
	120624ER-GM	●	●	●
	120630ER-GM	●	●	●
 Low Cutting Force (G-Class)	LOGU 120604ER-SM	●	●	-
	120608ER-SM	●	●	-
	120612ER-SM	●	●	-
	120616ER-SM	●	●	-
	120620ER-SM	●	●	-
	120624ER-SM	●	●	-
	120630ER-SM	●	●	-
 Tough Edge (G-class)	LOGU 120608ER-GH	●	●	●

Right-Handed Insert Shown

● : Standard stock

Shape	Description	MEGACOAT NANO EX		
		PR1825	PR1835	PR1810
 General Purpose	LOMU 100404ER-GM	●	●	●
	100408ER-GM	●	●	●
	100412ER-GM	●	●	●
	100416ER-GM	●	●	●
	100420ER-GM	●	●	●
	LOMU 150504ER-GM	●	●	●
	150508ER-GM	●	●	●
	150510ER-GM	●	-	-
	150512ER-GM	●	●	●
	150516ER-GM	●	●	●
 Low Cutting Force	LOMU 100408ER-SM	●	●	●
	LOMU 150508ER-SM	●	●	●
 Tough Edge (for Heavy Cutting)	LOMU 100408ER-GH	●	●	●
	LOMU 150508ER-GH	●	●	●

Right-Handed Insert Shown

● : Standard stock

90° Cutting Edge Angle Type

Shouldering

Slotting



Facing

High-Efficiency End Mill

MEC

Excellent surface finish with low cutting forces
Large lineup for various applications



Shape	Description	MEGACOAT NANO EX		
		PR1825	PR1835	PR1810
	BDMT 110302ER-JT	●	●	●
	110304ER-JT	●	●	●
	110308ER-JT	●	●	●
	BDMT 11T302ER-JT	●	●	●
	11T304ER-JT	●	●	●
	11T308ER-JT	●	●	●
	11T312ER-JT	●	●	●
	11T316ER-JT	●	●	●
	11T320ER-JT	●	●	●
	11T324ER-JT	●	●	●
	11T331ER-JT	●	●	●
	BDMT 170404ER-JT	●	●	●
	170408ER-JT	●	●	●
	170412ER-JT	●	●	●
170416ER-JT	●	●	●	
170420ER-JT	●	●	●	
170424ER-JT	●	●	●	
170431ER-JT	●	●	●	
170440ER-JT	●	●	●	
	BDMT 110302ER-JS	●	●	-
	110304ER-JS	●	●	-
	110308ER-JS	●	●	-
	BDMT 11T302ER-JS	●	●	-
	11T304ER-JS	●	●	-
	11T308ER-JS	●	●	-
	BDMT 170404ER-JS	●	●	-
	170408ER-JS	●	●	-

Right-Handed Insert Shown

● : Standard stock





Low Cutting Force/
for Stainless Steel

High-Efficiency End Mill

MECH

Notched inserts reduce chattering
High efficiency heavy machining with large D.O.C.



Shape	Description	MEGACOAT NANO EX		
		PR1825	PR1835	PR1810
 2-Notched	BDMT 11T308ER-N2	●	●	●
 3-Notched	BDMT 11T308ER-N3	●	●	●
 3-Notched	BDMT 170408ER-N3	●	●	●
 4-Notched	BDMT 170408ER-N4	●	●	●



Right-Handed Insert Shown

● : Standard stock

High-Efficiency End Mill

MECX

High-efficiency machining with fine pitch styles
Compatible with low-rigidity facilities

Shape	Description	MEGACOAT NANO EX		
		PR1825	PR1835	PR1810
	BDMT 070302ER-JT	●	●	●
	070304ER-JT	●	●	●
	070308ER-JT	●	●	●
 Low Cutting Force/ for Stainless Steel	BDMT 070302ER-JS	●	●	-
	070304ER-JS	●	●	-
	070308ER-JS	●	●	-

Right-Handed Insert Shown

● : Standard stock

90° Cutting Edge Angle Type

Shouldering

Slotting




Facing

Double-sided 6-edge Insert, Low Cutting Force Cutter

MFWN Mini

MFWN's superior performance remains intact
Economical small diameter milling cutter



Shape	Description	MEGACOAT NANO EX		
		PR1825	PR1835	PR1810
 General Purpose	WNMU 050408EN-GM	●	●	●
 Low Cutting Force	WNMU 050408EN-SM	●	●	●
 Tough Edge (for Heavy Cutting)	WNMU 050408EN-GH	●	●	●

● : Standard stock




Highly Efficient Cutter with a 88° Cutting Edge Angle

MFSN88

88° Cutting edge angle

Economical inserts with 8 cutting edges. Reduces chattering with low cutting force design. Suitable for shoulder roughing



Shape	Description	MEGACOAT NANO EX		
		PR1825	PR1835	PR1810
 General Purpose	SNMU 130508EN-GM	●	●	●
 Low Cutting Force	SNMU 130508EN-SM	●	●	●
 Tough Edge (for Heavy Cutting)	SNMU 130508EN-GH	●	●	●





● : Standard stock

Double-sided 6-edge Insert, Low Cutting Force Cutter

MFWN

Economical double-sided 6-edge insert
Superior fracture resistance due to thick edge design



Shape	Description	MEGACOAT NANO EX		
		PR1825	PR1835	PR1810
 Surface Finish Oriented (Precision Class)	WNEU 080608EN-GL	●	●	●
 Tough Edge (for Heavy Cutting)	WNMU 080608EN-GH	●	●	●
 General Purpose	WNMU 080604EN-GM	●	●	●
	080608EN-GM	●	●	●
 Low Cutting Force	WNMU 080608EN-SM	●	●	●



● : Standard stock

4-edge Face Mill with Vertical Inserts for Heavy Milling

MFLN90

Tough and reliable 4-edge vertical inserts for large D.O.C. and high feed machining. Stable heavy milling



Shape	Description	MEGACOAT NANO EX		
		PR1825	PR1835	PR1810
 Corner-R	LOGU 221616ER-GM	●	●	-
 Corner Chamfer	LOGU 2216PAER-GM	●	●	-






● : Standard stock

High-Efficiency Face Mill for Heavy Milling

MSRS90

Face mill for heavy milling. Notched insert reduced cutting force when entering the workpiece



Shape	Description	MEGACOAT NANO EX		
		PR1825	PR1835	PR1810
 3-Notched	SPMT 180616EN-NB3	-	●	●
 3-Notched/ Low cutting force	SPMT 180616EN-NB3P	-	●	●
 4-Notched	SPMT 180616EN-NB4	-	●	●
 4-Notched/ Low cutting force	SPMT 180616EN-NB4P	-	●	●
 Without notch	SPMT 180616EN-V	-	●	●





● : Standard stock

High-Efficiency Face Mill for Heavy Milling

MSR

High-efficiency notched inserts provide low cutting force and suppress chattering. Improves machining efficiency in heavy milling with larger depth of cut.



Shape	Description	MEGACOAT NANO EX		
		PR1825	PR1835	PR1810
 3-Notched	APMT 250608ER-NB3	-	●	●
	250616ER-NB3	-	●	●
	250640ER-NB3	-	●	-
 4-Notched	APMT 250616EL-NB3	-	●	-
	APMT 250608ER-NB4	-	●	●
	250616ER-NB4	-	●	●
 3-Notched/ Low cutting force	250640ER-NB4	-	●	-
	APMT 250616EL-NB4	-	●	-
 3-Notched/ Low cutting force	APMT 250616ER-NB3P	-	●	●
	APMT 250616ER-NB4P	-	●	●

● : Standard stock

45° Cutting Edge Angle Type

Facing


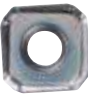


45° Cutting Edge Angle - New General Purpose Cutter

MB45

NEW

Delivers the "low cutting force" benefits of positive inserts and the "fracture resistance" benefits of negative inserts. Excellent surface finish



Shape	Description	MEGACOAT NANO EX		
		PR1825	PR1835	PR1810
 General Purpose	SNMU 1406ANER-GM	●	●	●
 Tough Edge	SNMU 1406ANER-GH	●	●	●
 General Purpose	SNEU 1406ANER-GM	●	●	●
 Low Cutting Force	SNEU 1406ANER-SM	●	●	-

Right-Handed Insert Shown

● : Standard stock




Highly Efficient Cutter with a 66° Cutting Edge Angle

MFPN66

66° Cutting edge angle

Economical 10-edge insert. Reduces cutting costs when machining auto parts and other general purpose machining applications



Shape	Description	MEGACOAT NANO EX		
		PR1825	PR1835	PR1810
 General Purpose	PNMU 0905XNER-GM	●	●	●
 Low Cutting Force	PNMU 0905XNER-SM	●	●	●
 Tough Edge (for Heavy Cutting)	PNMU 0905XNER-GH	●	●	●

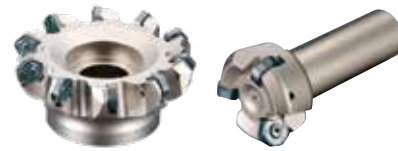
Right-Handed Insert Shown








● : Standard stock

45° Face Mill with Double-sided 10-edge Inserts

MFPN45

Reduced chattering with low cutting force design and excellent fracture resistance. Economical 10-edge insert



Shape	Description	MEGACOAT NANO EX		
		PR1825	PR1835	PR1810
 General Purpose	PNMU 1205ANER-GM	●	●	●
 General Purpose	PNMU 1205ANEL-GM	●	●	●
 Low Cutting Force	PNMU 1205ANER-SM	●	●	●
 Tough Edge (for Heavy Cutting)	PNMU 1205ANER-GH	●	●	●
 Surface Finish Oriented (Precision Class)	PNEU 1205ANER-GL	●	●	●
 Surface Finish Oriented (Precision Class)	PNEU 1205ANEL-GL	●	●	●
 Wiper Insert (2-edge)	PNEU 1205ANER-W	●	●	●



● : Standard stock

High Precision and High Efficiency High Rake Cutter

MFSE45

Rough and finish in 1 pass with excellent surface finish



Shape	Description	MEGACOAT NANO EX		
		PR1825	PR1835	PR1810
 General Purpose	SEET 13T3AGSN-GL	●	●	-
 Stainless Steel	SEET 13T3AGSN-SL	●	●	-








● : Standard stock

High-Efficiency Face Mill for Heavy Milling

MSRS15 75° Cutting edge angle

Large depth of cut and high feed machining provide high efficiency machining. Max. D.O.C. is 12 mm



Shape	Description	MEGACOAT NANO EX		
		PR1825	PR1835	PR1810
 2-Notched	SPMT 1806EDER-NB2	●	●	●
 3-Notched	SPMT 1806EDER-NB3	●	●	●
 4-Notched/ Low cutting force	SPMT 1806EDER-NB2P	●	●	●
 5-Notched/ Low cutting force	SPMT 1806EDER-NB3P	●	●	●
 2-Notched/Tough edge	SPMT 1806EDSR-NB2T	-	●	●
 3-Notched/Tough edge	SPMT 1806EDSR-NB3T	-	●	●
 Without notch	SPMT 1806EDER-V	●	●	●


● : Standard stock

4-edge Face Mill with Vertical Inserts for Heavy Milling

MFLN45/MFLN70

Tough and reliable 4-edge vertical inserts for large D.O.C. and high feed machining. Stable heavy milling



Shape	Description	MEGACOAT NANO EX		
		PR1825	PR1835	PR1810
 Corner-R	LOGU 221616ER-GM	●	●	-





● : Standard stock

High Efficiency Multi-edge Cutter for Cast Iron

MFK 70° Cutting edge angle

Multi-edge cutter provides high efficiency in cast iron machining. Economical inserts with 10 cutting edges



Shape	Description	MEGACOAT NANO EX		
		PR1825	PR1835	PR1810
 General purpose	PNMG 1106XNEN-GM	●	-	●
 Tough edge	PNMG 1106XNEN-GH	●	-	●
 Surface Finish Oriented	PNEG 1106XNEN-GL	●	-	●
 Wiper Insert (2-edge)	PNEG 1106XNER-W	●	-	●


● : Standard stock

High Feed and Large Depth of Cut Milling

MFH Boost

High feed milling with larger depths of cut. Excellent performance in a wide range of applications, including automotive parts, difficult-to-cut materials, and molds



Shape	Description	MEGACOAT NANO EX		
		PR1825	PR1835	PR1810
 General Purpose	LOMU 040410ER-GM	●	●	●

Right-Handed Insert Shown


● : Standard stock

Micro Dia. Cutter for High Feed Machining (Cutter Dia. $\phi 8 - \phi 16$)

MFH Micro

Low resistance and durable against chatter for highly efficient machining. Maximum ap 0.5 mm. Stable high feed machining on a wide range of applications



Shape	Description	MEGACOAT NANO EX		
		PR1825	PR1835	PR1810
 General Purpose	LPGT 010210ER-GM	●	●	-

Right-Handed Insert Shown



● : Standard stock

Small Dia. Cutter for High Feed Machining (Cutter Dia. $\phi 16 - \phi 50$)

MFH Mini

Economical inserts with 4 cutting edges. Small Dia. fine pitch type for high efficiency and high feed machining



Shape	Description	MEGACOAT NANO EX		
		PR1825	PR1835	PR1810
 General Purpose	LOGU 030310ER-GM	●	●	●
 Tough Edge	LOGU 030310ER-GH	●	●	●

Right-Handed Insert Shown





● : Standard stock

Highly Efficiency and High Feed Cutter (Cutter Dia. $\phi 25 - \phi 160$)

MFH Harrier

Wide range of products for high feed machining
Large depths of cut and low cutting forces



Shape	Description	MEGACOAT NANO EX		
		PR1825	PR1835	PR1810
 General Purpose	SOMT 100420ER-GM	●	●	●
	140520ER-GM	●	●	●
 Large ap	SOMT 100420ER-LD	●	●	●
	140520ER-LD	●	●	●
 Wiper Insert	SOMT 100420ER-FL	●	●	●
	140514ER-FL	●	●	●
 Tough Edge	SOMT 100420ER-GH	●	●	●
	140520ER-GH	●	●	●

Right-Handed Insert Shown

● : Standard stock

High-efficiency Radius Cutter with Multiple Edges

MRW

Economical double-sided 8-edge Inserts. Excellent sharpness and cutting edge strength, suitable for a wide range of workpiece materials






Low-Cutting-Force and High-Efficiency Radius Cutter

MRX






Excellent cutting performance due to low cutting force design
High-efficiency radius cutter



Shape	Description	MEGACOAT NANO EX		
		PR1825	PR1835	PR1810
 General purpose	ROMU 1204M0ER-GM	●	●	●
	1605M0ER-GM	●	●	●
 Low cutting force	ROMU 1204M0ER-SM	●	●	-
	1605M0ER-SM	●	●	-
 Tough edge (for heavy milling)	ROMU 1204M0ER-GH	●	●	●
	1605M0ER-GH	●	●	●

Right-Handed Insert Shown

●: Standard stock

Shape	Description	MEGACOAT NANO EX		
		PR1825	PR1835	PR1810
 General Purpose	RDGT 0803M0ER-GM	●	●	●
	RPGT 10T3M0ER-GM	●	●	●
	1204M0ER-GM	●	●	●
 General Purpose	RDMT 0803M0ER-GM	●	●	●
	RPMT 10T3M0ER-GM	●	●	●
	1204M0ER-GM	●	●	●
 Low Cutting Force	1605M0ER-GM	●	●	●
	RDGT 0803M0ER-SM	●	●	-
	RPGT 10T3M0ER-SM	●	●	-
 Low Cutting Force	1204M0ER-SM	●	●	-
	1605M0ER-SM	●	●	-
	RDMT 0803M0EN-GH	●	●	●
 Tough Edge (for Heavy Cutting)	RPMT 10T3M0EN-GH	●	●	●
	1204M0EN-GH	●	●	●
	1605M0EN-GH	●	●	●

Right-Handed Insert Shown



●: Standard stock

Other Inserts for Milling

Multi-function End Mill

MEY

Multi-function machining (Drilling/Ramping/Shouldering/
Grooving). Full 2-insert structure and high stability


Shape	Description	MEGACOAT NANO EX		
		PR1825	PR1835	PR1810
	GOMT 08T208ER-D	●	-	●
	100308ER-D	●	-	●
	13T308ER-D	●	-	●
	160408ER-D	●	-	●
	JOMT 08T208ER-D	●	-	●
	100308ER-D	●	-	●
	13T308ER-D	●	-	●
	160408ER-D	●	-	●

● : Standard stock

T-Slot Mill

METS

For T-slotting. Recommended for high feed machining
with 2 flute design. Economical 4-edge insert



Shape	Description	MEGACOAT NANO EX		
		PR1825	PR1835	PR1810
	SDMT 060304E-K	-	●	●
	080308E-K	-	●	●
	120408E-K	-	●	●

● : Standard stock

Chamfering End Mill

MCSE

For 30°, 45°, 60° chamfering.
Economical 4-edge insert

Shape	Description	MEGACOAT NANO EX		
		PR1825	PR1835	PR1810
	SDKW 09T204TN	●	-	-
	SEKW 120304TN	●	-	-
	120308TN	●	-	-
	SDMT 09T204C	●	-	-
	SEMT 120304C	●	-	-


Low cutting force

● : Standard stock

Bolt Countersink End Mill

MEF

Countersink for hexagon socket bolt (M6 ~ M30).
Economical 4-edge insert

Shape	Description	MEGACOAT NANO EX		
		PR1825	PR1835	PR1810
	SPMT 060204E-Z	●	-	●
	060208E-Z	●	-	●
	090304E-Z	●	-	●
	090308E-Z	●	-	●

● : Standard stock

ISO Standard Inserts for Milling

Description	MEGACOAT NANO EX		
	PR1825	PR1835	PR1810
SDMR 1203AUER-H	●	-	-
SEMR 1203AFER-H	●	-	-
SPEN 1203EESR	-	-	●
SPMR 1203EDER-H	●	-	-
TEMR 1603PTER-H	●	-	-
TEMR 2204PTER-H	●	-	-
TPMR 1603PDER-H	●	-	-
TPMR 2204PDER-H	●	-	-
RDHX 0702M0T	-	●	-
RDHX 1003M0T	-	●	-
RDHX 12T3M0T	-	●	-
RDMT 08T2M0-H	-	●	●
RPMT 10T3M0	-	●	●
RPMT 1204M0	-	●	●
RPMT 1204M0-H	-	●	●
RPMT 1606M0-H	-	●	●
RPMT 2006M0-H	-	●	●
SDMT 1204AESR-H	●	-	-

● : Standard stock

Up to 2.5 times longer tool life than conventional tools
 Delivers excellent performance with a wide variety of cutters



Case Studies

Mechanical parts S45C

Vc = 160 m/min
 ap = 1.0 mm
 fz = 0.15 mm/t
 Wet
 MA90-25S20-09T3C
 LOGU090408ER-GM

MA90



Number of parts

PR1825

15 pcs/corner

2.5x
Tool life

Conventional C 6 pcs/corner

Proprietary insert shape suppresses wear progression of main cutting edge and wiper edge
 Provides superior surface finish and 2.5x longer tool life

(User evaluation)

Housing SUS316

MB45

Vc = 90 m/min
 ap = 2.0 mm
 fz = 0.18 mm/t
 Dry
 MB45-063R-14T5C-M
 SNMU1406ANER-GM



Number of parts

PR1825

30 pcs/corner

1.6x
Tool life

Conventional D 18 pcs/corner

Unique low cutting force wiper edge design reduces chattering
 Shows 1.6x longer tool life

(User evaluation)

General machine parts FCD450

MFWN

Vc = 120 m/min
 ap = 1.0 mm
 fz = 0.19 mm/t
 Dry
 MFWN90080R-S32-5T
 WNMU080608EN-GM



Number of parts

PR1825

65 pcs/corner

1.6x
Tool life

Conventional E 40 pcs/corner

Shows stable machining without insert fracture
 Shows 1.6x longer tool life

(User evaluation)

Mechanical parts SCM420

MECH

Vc = 130 m/min
 ap = 13.0 mm
 fz = 0.07 mm/t
 Wet
 MECH025-S25-11-4-2T
 BDMT11T308ER-N2/N3



Number of parts

PR1825

6 pcs/corner

(Cutting distance : 38.1 m)

1.5x
Tool life

Conventional F 4 pcs/corner
 (Cutting distance : 25.4 m)

Good cutting edge condition in heavy machining with large D.O.C.
 1.5x longer tool life

(User evaluation)

Mold parts Plastic mold steel

MFH Mini

Vc = 120 m/min
 ap = 0.3 mm
 fz = 1.3 mm/t
 Wet
 MFH25-S25-03-5T
 LOGU030310ER-GM



Number of parts

PR1835

150 pcs/corner

2.5x
Tool life

Conventional G 60 pcs/corner

Stable machining without chatter even in high-feed machining
 Maintains good cutting edge condition and achieves 2.5x longer tool life

(User evaluation)

Body parts FC250

MFPN45

Vc = 360 m/min
 ap = 0.35 mm
 fz = 0.08 mm/t
 Wet
 MFPN45100R-8T
 PNMU1205ANER-GH



Number of parts

PR1810

200 pcs/corner

2x
Tool life

Conventional H 100 pcs/corner

Improved tool life and 10 corners on both sides for significant cost savings

(User evaluation)

Solid tools

High performance flat bottom drill

KDZ Series

New flat bottom drills with unique coating technology

Provides long tool life, high precision and stable machining



Various styles available

Stability-oriented

KDZ

Standard Type

Tough Edge



Short

Total 111 Items
Drilling Dia. ϕ 1.0~ ϕ 12.0

Regular

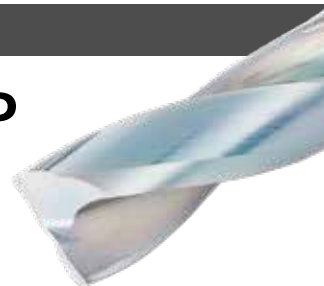
Total 91 Items
Drilling Dia. ϕ 3.0~ ϕ 12.0

Sharp edge

KDZ-HP

High precision machining

Low resistance



Short

Total 146 Items
Drilling Dia. ϕ 1.0~ ϕ 20.0
Long Shank LS
Now Available **NEW**
(ϕ 3.0~ ϕ 12.0)

Regular

Total 182 Items
Drilling Dia. ϕ 3.0~ ϕ 12.0
Type C with internal coolant for
stainless steel machining
Now Available **NEW**
(ϕ 3.0~ ϕ 12.0)

Standard type

High stability in various machining environments

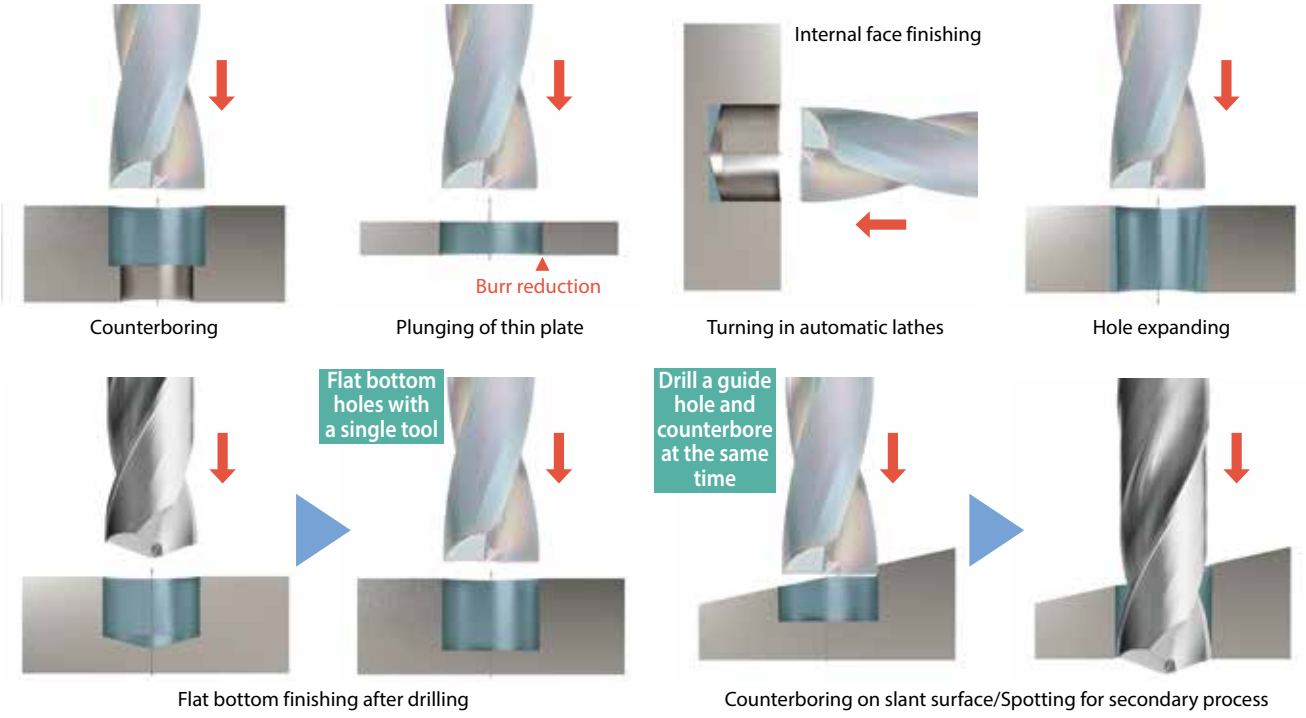
- Flat land specifications on corners
- Excellent chip evacuation with special flute shape
- Long tool life with MEGACOAT NANO EX coating technology

High-precision and Stable Machining with Special Chip Thinning Shape

- Improved machining accuracy when entering the workpiece
- Long tool life with MEGACOAT NANO EX coating technology
- Stable machining accuracy even when drilling into cylindrical or curved surfaces. (KDZ-HP is recommended)



1 Excellent for drilling in many different applications



2 Excellent wear resistance and fracture resistance




Special nano lamination x multilayer lamination

Point

1. Improved toughness by optimizing the lamination period of the film
2. Increased Cr content for excellent lubricity and with adhesion resistance to suppress wear and chipping


Nano-Lamination

AlCrN based coating
Excellent lubricity and adhesion resistance



Nano-Lamination

TiAlN based coating
Superior wear resistance

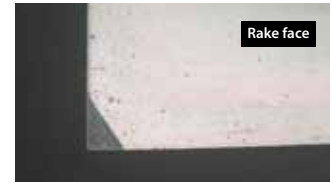
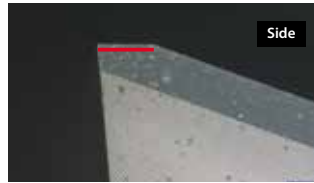


CG Image

3 Unique shape for excellent machining performance

KDZ Stability-oriented

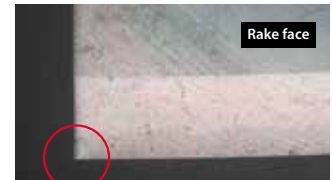
A Large Chip Pocket
Excellent Chip Evacuation



Flat land specifications to improve fracture resistance

KDZ-HP Sharp edge

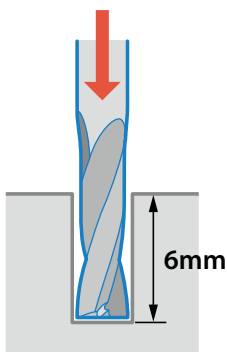
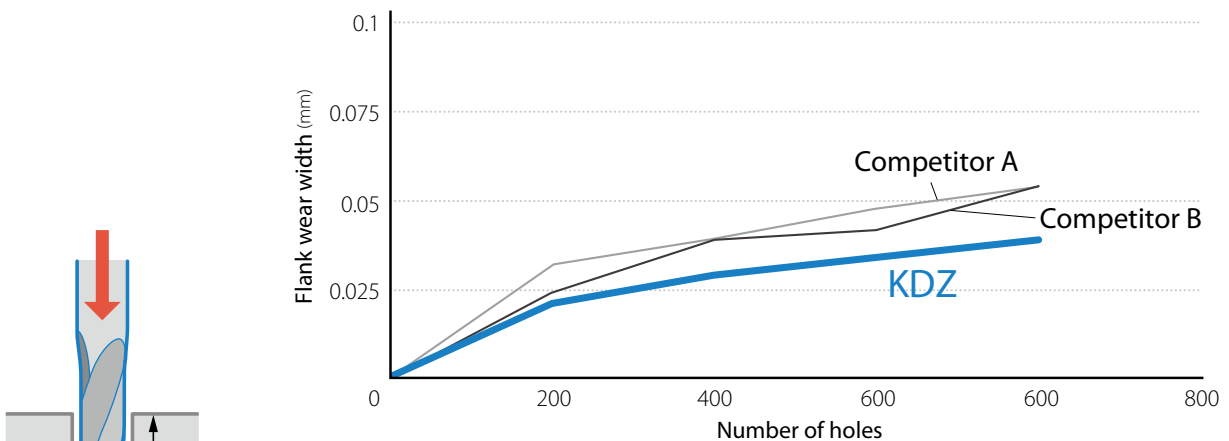
Special design improves
chip thinning and discharge
Reducing the load on the
center of the cutting edge



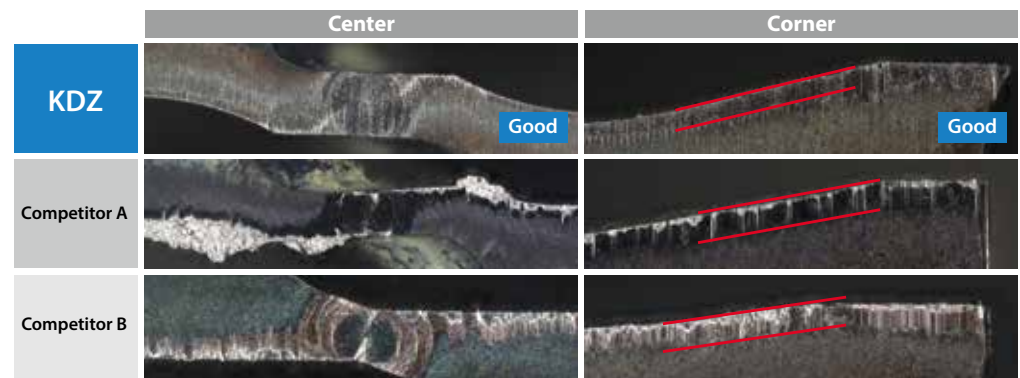
There is no land and a rake face is formed from the cutting edge
Reduced impact forces when entering provides high-precision and stable machining (~ $\phi 12$)

Drilling Performance (Internal evaluation)

Wear Resistance Comparison



Edge condition



Cutting conditions: $V_c = 80$ m/min, $f = 0.06$ mm/rev, Cutting Dia. $\phi 3$, Drilling depth: 6 mm Wet (External Coolant) Workpiece material: S50C

KDZ restrains wear. Less welding and chipping
Showed high wear resistance, adhesion resistance and chipping resistance

4 New KDZ-HP Type C with Internal Coolant NEW


High-precision, stable machining with five advantages

Both sharpness and edge strength, which are difficult to achieve with conventional tools



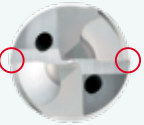
1 Special chip thinning design

High rigidity and excellent chip control




2 Corner: Flat land specifications

Sharpness and chipping resistance



3 Micro honing

Maintains sharpness and improves wear resistance



4 Unique flute shape

Optimized chip evacuation and rigidity



5 Double Margin

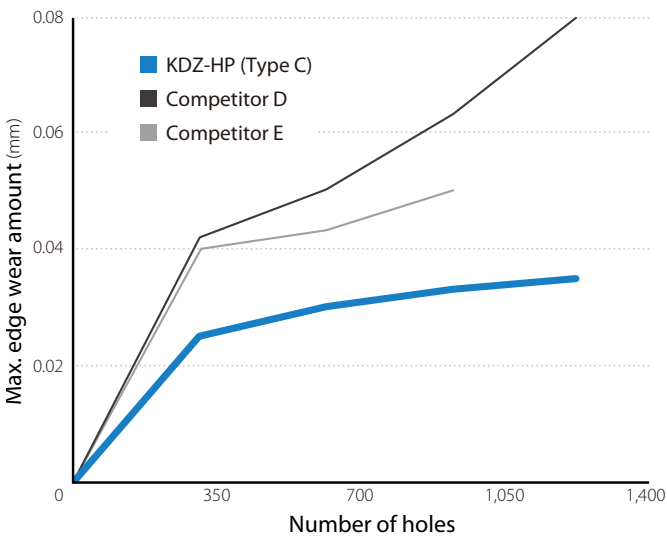
High-precision machining with guiding action



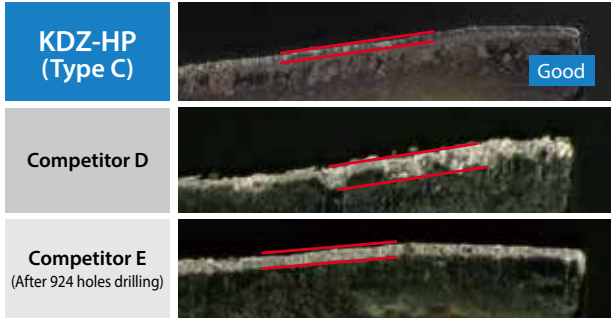
Solution

Excellent wear resistance in stainless steel machining

Wear resistance comparison (Internal evaluation)



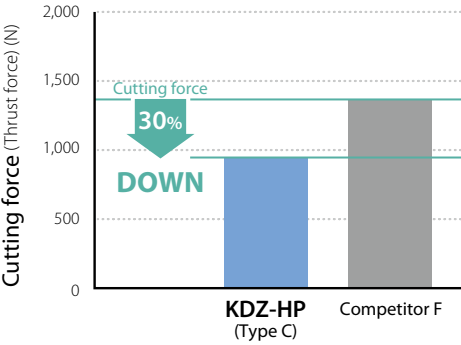
Flank wear condition (After 1,232 holes drilling)



Cutting conditions: $V_c = 80$ m/min, $f = 0.07$ mm/rev, $H = 12$ mm, Internal Coolant
Workpiece material: SUS304

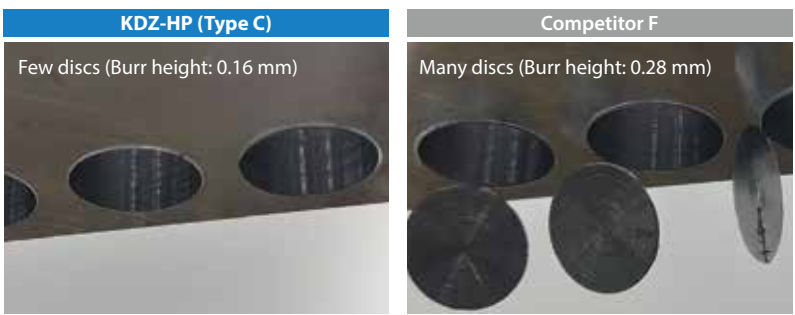
KDZ-HP (Type C) showed less adhesion to the cutting edge
Provides excellent wear resistance

Cutting force comparison (Internal evaluation)



Cutting conditions: $n = 3,180$ min⁻¹, $V_f = 795$ mm/min, Drilling Depth 10 mm, Wet (Internal Coolant) Cutting Dia. $\phi 10$ mm Workpiece material: S50C

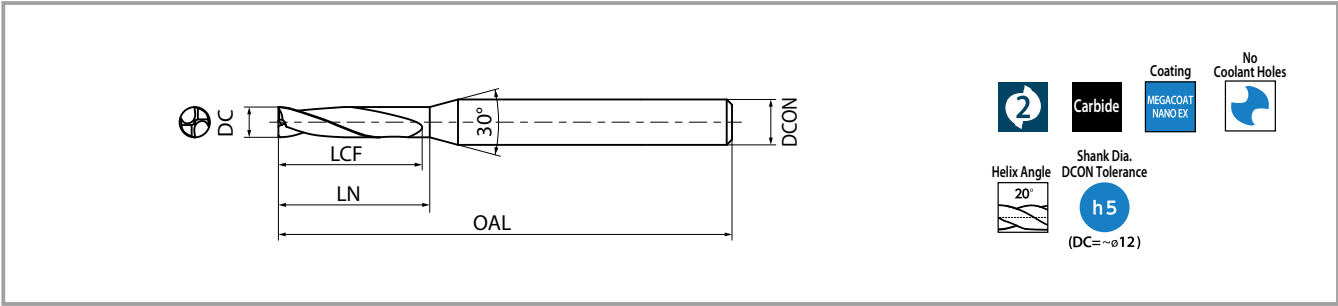
Burr Formation Comparison (Internal evaluation)



Cutting conditions: $n = 3,800$ min⁻¹, $V_f = 950$ mm/min, Drilling Depth 12 mm, Wet (Internal Coolant) Cutting Dia. $\phi 10$ mm Workpiece material: S50C

KDZ-HP (Type C) is lower in cutting force. There is few remaining discs and the sharpness is good.

KDZ Short



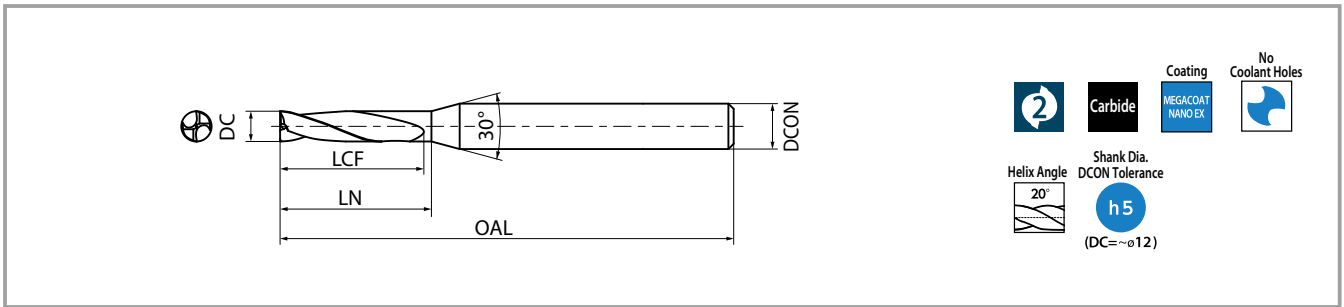
Description	Stock	Dimension (mm)					
		DC	Outside Dia. Tolerance	LCF	LN	DCON	OAL
KDZ0100X1.5S040N	●	1.0	0 -0.010	3	4	4	50
KDZ0110X1.5S040N	●	1.1	0 -0.010	3.5	4.5	4	50
KDZ0120X1.5S040N	●	1.2					
KDZ0130X1.5S040N	●	1.3	0 -0.010	4	5	4	50
KDZ0140X1.5S040N	●	1.4	0 -0.010	4.5	5.5	4	50
KDZ0150X1.5S040N	●	1.5	0 -0.010	5	6	4	50
KDZ0160X1.5S040N	●	1.6					
KDZ0170X1.5S040N	●	1.7	0 -0.010	5.5	6.5	4	50
KDZ0180X1.5S040N	●	1.8	0 -0.010	6	7	4	50
KDZ0190X1.5S040N	●	1.9					
KDZ0200X1.5S040N	●	2.0	0 -0.010	7	8	4	50
KDZ0210X1.5S040N	●	2.1					
KDZ0220X1.5S040N	●	2.2	0 -0.010	8	9	4	50
KDZ0230X1.5S040N	●	2.3					
KDZ0240X1.5S040N	●	2.4	0 -0.010	9	10	4	50
KDZ0250X1.5S040N	●	2.5					
KDZ0260X1.5S040N	●	2.6	0 -0.010	10	11	6	60
KDZ0270X1.5S040N	●	2.7					
KDZ0280X1.5S040N	●	2.8	0 -0.010	11	12	6	60
KDZ0290X1.5S040N	●	2.9					
KDZ0300X1.5S060N	●	3.0	0 -0.012	10	11	6	60
KDZ0310X1.5S060N	●	3.1					
KDZ0320X1.5S060N	●	3.2	0 -0.012	11	12	6	60
KDZ0330X1.5S060N	●	3.3					
KDZ0340X1.5S060N	●	3.4	0 -0.012	12	13	6	60
KDZ0350X1.5S060N	●	3.5					
KDZ0360X1.5S060N	●	3.6					

The standard drilling depth is 1.5 D (1.5 x DC).

Description	Stock	Dimension (mm)					
		DC	Outside Dia. Tolerance	LCF	LN	DCON	OAL
KDZ0370X1.5S060N	●	3.7	0 -0.012	12	13	6	60
KDZ0380X1.5S060N	●	3.8					
KDZ0390X1.5S060N	●	3.9					
KDZ0400X1.5S060N	●	4.0					
KDZ0410X1.5S060N	●	4.1	0 -0.012	13	14	6	60
KDZ0420X1.5S060N	●	4.2					
KDZ0430X1.5S060N	●	4.3					
KDZ0440X1.5S060N	●	4.4	0 -0.012	14	15	6	60
KDZ0450X1.5S060N	●	4.5					
KDZ0460X1.5S060N	●	4.6					
KDZ0470X1.5S060N	●	4.7	0 -0.012	15	16	6	60
KDZ0480X1.5S060N	●	4.8					
KDZ0490X1.5S060N	●	4.9	0 -0.012	16	17	6	60
KDZ0500X1.5S060N	●	5.0					
KDZ0510X1.5S060N	●	5.1					
KDZ0520X1.5S060N	●	5.2					
KDZ0530X1.5S060N	●	5.3	0 -0.012	17	18	6	60
KDZ0540X1.5S060N	●	5.4					
KDZ0550X1.5S060N	●	5.5					
KDZ0560X1.5S060N	●	5.6	0 -0.012	18	19	6	60
KDZ0570X1.5S060N	●	5.7					
KDZ0580X1.5S060N	●	5.8					
KDZ0590X1.5S060N	●	5.9					

●: Standard stock

KDZ Short



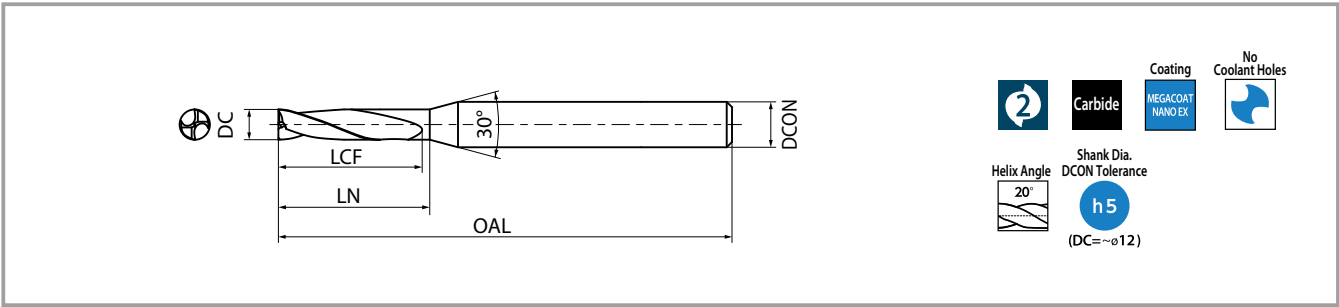
Description	Stock	Dimension (mm)					
		DC	Outside Dia. Tolerance	LCF	LN	DCON	OAL
KDZ0600X1.5S060N	●	6.0	0 -0.012	19	21	6	60
KDZ0610X1.5S080N	●	6.1	0 -0.015			8	70
KDZ0620X1.5S080N	●	6.2		0 -0.015	20	22	8
KDZ0630X1.5S080N	●	6.3					
KDZ0640X1.5S080N	●	6.4					
KDZ0650X1.5S080N	●	6.5					
KDZ0660X1.5S080N	●	6.6					
KDZ0670X1.5S080N	●	6.7					
KDZ0680X1.5S080N	●	6.8	0 -0.015	21	23	8	70
KDZ0690X1.5S080N	●	6.9					
KDZ0700X1.5S080N	●	7.0					
KDZ0710X1.5S080N	●	7.1	0 -0.015	22	24	8	70
KDZ0720X1.5S080N	●	7.2					
KDZ0730X1.5S080N	●	7.3	0 -0.015	23	25	8	70
KDZ0740X1.5S080N	●	7.4					
KDZ0750X1.5S080N	●	7.5					
KDZ0760X1.5S080N	●	7.6					
KDZ0770X1.5S080N	●	7.7					
KDZ0780X1.5S080N	●	7.8					
KDZ0790X1.5S080N	●	7.9	0 -0.015	24	25	8	70
KDZ0800X1.5S080N	●	8.0					
KDZ0810X1.5S100N	●	8.1	0 -0.015	25	27	8	70
KDZ0820X1.5S100N	●	8.2				10	80
KDZ0830X1.5S100N	●	8.3	0 -0.015	26	28	10	80
KDZ0840X1.5S100N	●	8.4					
KDZ0850X1.5S100N	●	8.5					
KDZ0860X1.5S100N	●	8.6					
KDZ0870X1.5S100N	●	8.7					
KDZ0880X1.5S100N	●	8.8					
KDZ0890X1.5S100N	●	8.9	0 -0.015	27	29	10	80
KDZ0900X1.5S100N	●	9.0					
KDZ0910X1.5S100N	●	9.1	0 -0.015	28	30	10	80
KDZ0920X1.5S100N	●	9.2					

Description	Stock	Dimension (mm)					
		DC	Outside Dia. Tolerance	LCF	LN	DCON	OAL
KDZ0920X1.5S100N	●	9.2	0 -0.015	29	31	10	80
KDZ0930X1.5S100N	●	9.3					
KDZ0940X1.5S100N	●	9.4					
KDZ0950X1.5S100N	●	9.5					
KDZ0960X1.5S100N	●	9.6	0 -0.015	30	32	10	80
KDZ0970X1.5S100N	●	9.7					
KDZ0980X1.5S100N	●	9.8					
KDZ0990X1.5S100N	●	9.9					
KDZ1000X1.5S100N	●	10.0	0 -0.015	31	33	10	80
KDZ1010X1.5S120N	●	10.1					
KDZ1020X1.5S120N	●	10.2	0 -0.018	32	34	12	100
KDZ1030X1.5S120N	●	10.3					
KDZ1040X1.5S120N	●	10.4					
KDZ1050X1.5S120N	●	10.5					
KDZ1060X1.5S120N	●	10.6	0 -0.018	33	35	12	100
KDZ1070X1.5S120N	●	10.7					
KDZ1080X1.5S120N	●	10.8					
KDZ1090X1.5S120N	●	10.9					
KDZ1100X1.5S120N	●	11.0	0 -0.018	34	36	12	100
KDZ1110X1.5S120N	●	11.1					
KDZ1120X1.5S120N	●	11.2					
KDZ1130X1.5S120N	●	11.3	0 -0.018	35	37	12	100
KDZ1140X1.5S120N	●	11.4					
KDZ1150X1.5S120N	●	11.5					
KDZ1160X1.5S120N	●	11.6					
KDZ1170X1.5S120N	●	11.7	0 -0.018	36	38	12	100
KDZ1180X1.5S120N	●	11.8					
KDZ1190X1.5S120N	●	11.9					
KDZ1200X1.5S120N	●	12.0					

●: Standard stock

The standard drilling depth is 1.5 D (1.5 x DC).

KDZ Regular



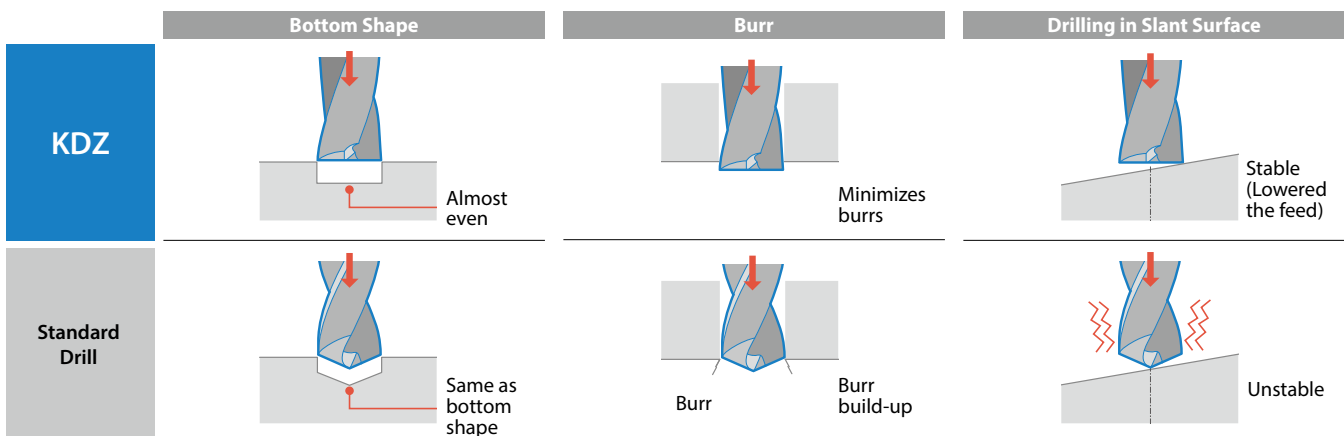
Description	Stock	Dimension (mm)					
		DC	Outside Dia. Tolerance	LCF	LN	DCON	OAL
KDZ0300X3.0S060N	●	3.0	0 -0.010	14	15	6	60
KDZ0310X3.0S060N	●	3.1	0 -0.012				
KDZ0320X3.0S060N	●	3.2		15	16	6	60
KDZ0330X3.0S060N	●	3.3	0 -0.012				
KDZ0340X3.0S060N	●	3.4		17	18	6	60
KDZ0350X3.0S060N	●	3.5	0 -0.012				
KDZ0360X3.0S060N	●	3.6		19	20	6	60
KDZ0370X3.0S060N	●	3.7	0 -0.012				
KDZ0380X3.0S060N	●	3.8		20	21	6	60
KDZ0390X3.0S060N	●	3.9	0 -0.012				
KDZ0400X3.0S060N	●	4.0		21	22	6	60
KDZ0410X3.0S060N	●	4.1	0 -0.012				
KDZ0420X3.0S060N	●	4.2		20	21	6	60
KDZ0430X3.0S060N	●	4.3	0 -0.012				
KDZ0440X3.0S060N	●	4.4		21	22	6	60
KDZ0450X3.0S060N	●	4.5	0 -0.012				
KDZ0460X3.0S060N	●	4.6		0 -0.012			
KDZ0470X3.0S060N	●	4.7					

Description	Stock	Dimension (mm)					
		DC	Outside Dia. Tolerance	LCF	LN	DCON	OAL
KDZ0480X3.0S060N	●	4.8	0 -0.012	21	22	6	60
KDZ0490X3.0S060N	●	4.9					
KDZ0500X3.0S060N	●	5.0	0 -0.012	23	24	6	60
KDZ0510X3.0S060N	●	5.1					
KDZ0520X3.0S060N	●	5.2	0 -0.012	24	25	6	60
KDZ0530X3.0S060N	●	5.3					
KDZ0540X3.0S060N	●	5.4	0 -0.012	25	26	6	60
KDZ0550X3.0S060N	●	5.5					
KDZ0560X3.0S060N	●	5.6	0 -0.012	26	27	6	60
KDZ0570X3.0S060N	●	5.7					
KDZ0580X3.0S060N	●	5.8	0 -0.012	28	6	60	
KDZ0590X3.0S060N	●	5.9					
KDZ0600X3.0S060N	●	6.0	0 -0.012	28	6	60	
KDZ0610X3.0S080N	●	6.1					
KDZ0620X3.0S080N	●	6.2	0 -0.015	28	29	8	70
KDZ0630X3.0S080N	●	6.3					
KDZ0640X3.0S080N	●	6.4	0 -0.015	30	31	8	70
KDZ0650X3.0S080N	●	6.5					

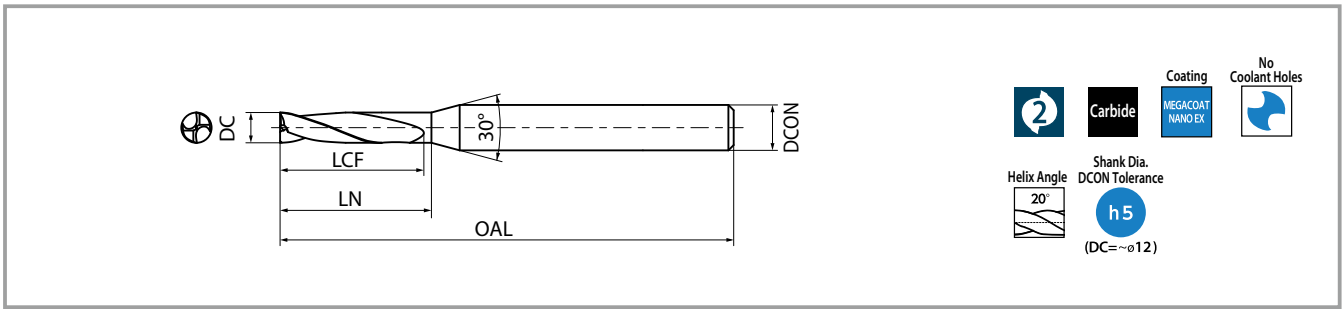
The standard drilling depth is 2.0 D (2.0 x DC).
Pecking is recommended when drilling depth is 2D or over

● Standard stock

Advantages of Flat Bottom Drill



KDZ Regular



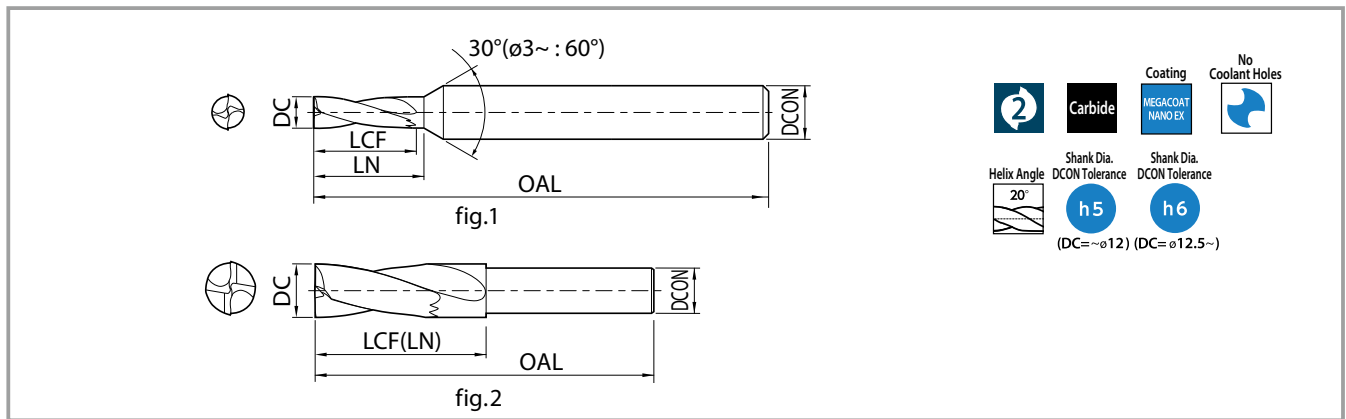
Description	Stock	Dimension (mm)					
		DC	Outside Dia. Tolerance	LCF	LN	DCON	OAL
KDZ0660X3.0S080N	●	6.6	0 -0.015	30	31	8	70
KDZ0670X3.0S080N	●	6.7					
KDZ0680X3.0S080N	●	6.8	0 -0.015	31	32	8	70
KDZ0690X3.0S080N	●	6.9					
KDZ0700X3.0S080N	●	7.0	0 -0.015	32	33	8	70
KDZ0710X3.0S080N	●	7.1					
KDZ0720X3.0S080N	●	7.2					
KDZ0730X3.0S080N	●	7.3					
KDZ0740X3.0S080N	●	7.4					
KDZ0750X3.0S080N	●	7.5					
KDZ0760X3.0S080N	●	7.6	0 -0.015	34	35	8	70
KDZ0770X3.0S080N	●	7.7					
KDZ0780X3.0S080N	●	7.8					
KDZ0790X3.0S080N	●	7.9					
KDZ0800X3.0S080N	●	8.0	0 -0.015	36	36	8	70
KDZ0810X3.0S100N	●	8.1					
KDZ0820X3.0S100N	●	8.2			37	10	80
KDZ0830X3.0S100N	●	8.3					
KDZ0840X3.0S100N	●	8.4	0 -0.015	38	39	10	80
KDZ0850X3.0S100N	●	8.5					
KDZ0860X3.0S100N	●	8.6					
KDZ0870X3.0S100N	●	8.7	0 -0.015	39	40	10	80
KDZ0880X3.0S100N	●	8.8					
KDZ0890X3.0S100N	●	8.9	0 -0.015	40	41	10	80
KDZ0900X3.0S100N	●	9.0					
KDZ0910X3.0S100N	●	9.1					
KDZ0920X3.0S100N	●	9.2					
KDZ0930X3.0S100N	●	9.3	0 -0.015	40	41	10	80
KDZ0940X3.0S100N	●	9.4					

Description	Stock	Dimension (mm)					
		DC	Outside Dia. Tolerance	LCF	LN	DCON	OAL
KDZ0950X3.0S100N	●	9.5	0 -0.015	42	43	10	80
KDZ0960X3.0S100N	●	9.6					
KDZ0970X3.0S100N	●	9.7					
KDZ0980X3.0S100N	●	9.8					
KDZ0990X3.0S100N	●	9.9	0 -0.015	45	10	80	
KDZ1000X3.0S100N	●	10.0					
KDZ1010X3.0S120N	●	10.1	0 -0.018	45	46	12	100
KDZ1020X3.0S120N	●	10.2					
KDZ1030X3.0S120N	●	10.3	0 -0.018	46	47	12	100
KDZ1040X3.0S120N	●	10.4					
KDZ1050X3.0S120N	●	10.5	0 -0.018	47	48	12	100
KDZ1060X3.0S120N	●	10.6					
KDZ1070X3.0S120N	●	10.7					
KDZ1080X3.0S120N	●	10.8					
KDZ1090X3.0S120N	●	10.9	0 -0.018	51	52	12	100
KDZ1100X3.0S120N	●	11.0					
KDZ1110X3.0S120N	●	11.1					
KDZ1120X3.0S120N	●	11.2					
KDZ1130X3.0S120N	●	11.3	0 -0.018	53	54	12	100
KDZ1140X3.0S120N	●	11.4					
KDZ1150X3.0S120N	●	11.5					
KDZ1160X3.0S120N	●	11.6	0 -0.018	54	54	12	100
KDZ1170X3.0S120N	●	11.7					
KDZ1180X3.0S120N	●	11.8					
KDZ1190X3.0S120N	●	11.9					
KDZ1200X3.0S120N	●	12.0	0 -0.018	54	54	12	100

●: Standard stock

The standard drilling depth is 2.0 D (2.0 x DC).
Pecking is recommended when drilling depth is 2D or over

KDZ-HP Short



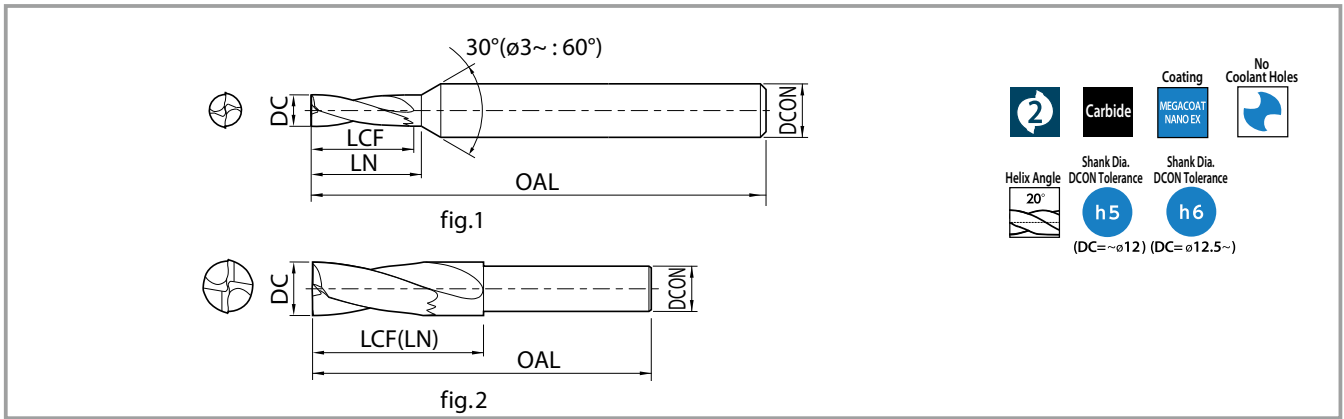
Description	Stock	Dimension (mm)						Shape
		DC	Outside Dia. Tolerance	LCF	LN	DCON	OAL	
KDZ0100X1.5S040N-HP	●	1.0	$\begin{matrix} 0 \\ -0.010 \end{matrix}$	3.5	4.3	4	50	fig.1
KDZ0110X1.5S040N-HP	●	1.1	$\begin{matrix} 0 \\ -0.010 \end{matrix}$	3.9	4.7	4	50	fig.1
KDZ0120X1.5S040N-HP	●	1.2	$\begin{matrix} 0 \\ -0.010 \end{matrix}$	4.3	5.1	4	50	fig.1
KDZ0130X1.5S040N-HP	●	1.3	$\begin{matrix} 0 \\ -0.010 \end{matrix}$	4.7	5.5	4	50	fig.1
KDZ0140X1.5S040N-HP	●	1.4	$\begin{matrix} 0 \\ -0.010 \end{matrix}$	5.1	5.9	4	50	fig.1
KDZ0150X1.5S040N-HP	●	1.5	$\begin{matrix} 0 \\ -0.010 \end{matrix}$	5.5	6.3	4	50	fig.1
KDZ0160X1.5S040N-HP	●	1.6	$\begin{matrix} 0 \\ -0.010 \end{matrix}$	5.7	6.5	4	50	fig.1
KDZ0170X1.5S040N-HP	●	1.7	$\begin{matrix} 0 \\ -0.010 \end{matrix}$	5.9	6.7	4	50	fig.1
KDZ0180X1.5S040N-HP	●	1.8	$\begin{matrix} 0 \\ -0.010 \end{matrix}$	6.1	6.9	4	50	fig.1
KDZ0190X1.5S040N-HP	●	1.9	$\begin{matrix} 0 \\ -0.010 \end{matrix}$	6.3	7.1	4	50	fig.1
KDZ0200X1.5S040N-HP	●	2.0	$\begin{matrix} 0 \\ -0.010 \end{matrix}$	6.5	7.3	4	50	fig.1
KDZ0210X1.5S040N-HP	●	2.1	$\begin{matrix} 0 \\ -0.010 \end{matrix}$	6.9	7.7	4	50	fig.1
KDZ0220X1.5S040N-HP	●	2.2	$\begin{matrix} 0 \\ -0.010 \end{matrix}$	7.3	8.1	4	50	fig.1
KDZ0230X1.5S040N-HP	●	2.3	$\begin{matrix} 0 \\ -0.010 \end{matrix}$	7.7	8.5	4	50	fig.1
KDZ0240X1.5S040N-HP	●	2.4	$\begin{matrix} 0 \\ -0.010 \end{matrix}$	8.1	8.9	4	50	fig.1
KDZ0250X1.5S040N-HP	●	2.5	$\begin{matrix} 0 \\ -0.010 \end{matrix}$	8.5	9.3	4	50	fig.1
KDZ0260X1.5S040N-HP	●	2.6	$\begin{matrix} 0 \\ -0.010 \end{matrix}$	8.8	9.5	4	50	fig.1
KDZ0270X1.5S040N-HP	●	2.7	$\begin{matrix} 0 \\ -0.010 \end{matrix}$	9.1	9.8	4	50	fig.1
KDZ0280X1.5S040N-HP	●	2.8	$\begin{matrix} 0 \\ -0.010 \end{matrix}$	9.3	10.0	4	50	fig.1
KDZ0290X1.5S040N-HP	●	2.9	$\begin{matrix} 0 \\ -0.010 \end{matrix}$	9.5	10.3	4	50	fig.1
KDZ0300X1.5S060N-HP	●	3.0	$\begin{matrix} 0 \\ -0.010 \end{matrix}$	9	10	6	60	fig.1
KDZ0310X1.5S060N-HP	●	3.1	$\begin{matrix} 0 \\ -0.012 \end{matrix}$	10	11	6	60	fig.1
KDZ0320X1.5S060N-HP	●	3.2						
KDZ0330X1.5S060N-HP	●	3.3						
KDZ0340X1.5S060N-HP	●	3.4	$\begin{matrix} 0 \\ -0.012 \end{matrix}$	11	12	6	60	fig.1
KDZ0350X1.5S060N-HP	●	3.5						
KDZ0360X1.5S060N-HP	●	3.6						
KDZ0370X1.5S060N-HP	●	3.7	$\begin{matrix} 0 \\ -0.012 \end{matrix}$	12	13	6	60	fig.1
KDZ0380X1.5S060N-HP	●	3.8						
KDZ0390X1.5S060N-HP	●	3.9						
KDZ0400X1.5S060N-HP	●	4.0	$\begin{matrix} 0 \\ -0.012 \end{matrix}$	13	14	6	60	fig.1
KDZ0410X1.5S060N-HP	●	4.1						
KDZ0420X1.5S060N-HP	●	4.2						
KDZ0430X1.5S060N-HP	●	4.3						

The standard drilling depth is 1.5 D (1.5 x DC).

Description	Stock	Dimension (mm)						Shape
		DC	Outside Dia. Tolerance	LCF	LN	DCON	OAL	
KDZ0440X1.5S060N-HP	●	4.4	$\begin{matrix} 0 \\ -0.012 \end{matrix}$	14	15	6	60	fig.1
KDZ0450X1.5S060N-HP	●	4.5						
KDZ0460X1.5S060N-HP	●	4.6	$\begin{matrix} 0 \\ -0.012 \end{matrix}$	15	16	6	60	fig.1
KDZ0470X1.5S060N-HP	●	4.7						
KDZ0480X1.5S060N-HP	●	4.8	$\begin{matrix} 0 \\ -0.012 \end{matrix}$	16	17	6	60	fig.1
KDZ0490X1.5S060N-HP	●	4.9						
KDZ0500X1.5S060N-HP	●	5.0	$\begin{matrix} 0 \\ -0.012 \end{matrix}$	16	17	6	60	fig.1
KDZ0510X1.5S060N-HP	●	5.1						
KDZ0520X1.5S060N-HP	●	5.2						
KDZ0530X1.5S060N-HP	●	5.3	$\begin{matrix} 0 \\ -0.012 \end{matrix}$	17	18	6	60	fig.1
KDZ0540X1.5S060N-HP	●	5.4						
KDZ0550X1.5S060N-HP	●	5.5						
KDZ0560X1.5S060N-HP	●	5.6	$\begin{matrix} 0 \\ -0.012 \end{matrix}$	18	19	6	60	fig.1
KDZ0570X1.5S060N-HP	●	5.7						
KDZ0580X1.5S060N-HP	●	5.8	$\begin{matrix} 0 \\ -0.012 \end{matrix}$	18	19	6	60	fig.1
KDZ0590X1.5S060N-HP	●	5.9						
KDZ0600X1.5S060N-HP	●	6.0						
KDZ0610X1.5S080N-HP	●	6.1	$\begin{matrix} 0 \\ -0.015 \end{matrix}$	19	21	8	70	fig.1
KDZ0620X1.5S080N-HP	●	6.2						
KDZ0630X1.5S080N-HP	●	6.3	$\begin{matrix} 0 \\ -0.015 \end{matrix}$	20	22	8	70	fig.1
KDZ0640X1.5S080N-HP	●	6.4						
KDZ0650X1.5S080N-HP	●	6.5						
KDZ0660X1.5S080N-HP	●	6.6	$\begin{matrix} 0 \\ -0.015 \end{matrix}$	21	23	8	70	fig.1
KDZ0670X1.5S080N-HP	●	6.7						
KDZ0680X1.5S080N-HP	●	6.8	$\begin{matrix} 0 \\ -0.015 \end{matrix}$	21	23	8	70	fig.1
KDZ0690X1.5S080N-HP	●	6.9						
KDZ0700X1.5S080N-HP	●	7.0						
KDZ0710X1.5S080N-HP	●	7.1	$\begin{matrix} 0 \\ -0.015 \end{matrix}$	22	24	8	70	fig.1
KDZ0720X1.5S080N-HP	●	7.2						
KDZ0730X1.5S080N-HP	●	7.3	$\begin{matrix} 0 \\ -0.015 \end{matrix}$	23	25	8	70	fig.1
KDZ0740X1.5S080N-HP	●	7.4						
KDZ0750X1.5S080N-HP	●	7.5						

●: Standard stock

KDZ-HP Short



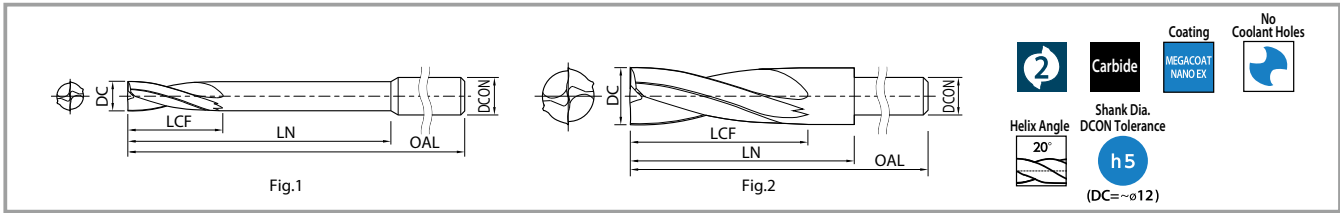
Description	Stock	Dimension (mm)						Shape
		DC	Outside Dia. Tolerance	LCF	LN	DCON	OAL	
KDZ0760X1.5S080N-HP	●	7.6	0 -0.015	24	25	8	70	fig.1
KDZ0770X1.5S080N-HP	●	7.7						
KDZ0780X1.5S080N-HP	●	7.8						
KDZ0790X1.5S080N-HP	●	7.9						
KDZ0800X1.5S080N-HP	●	8.0	0 -0.015	25	27	8	70	fig.1
KDZ0810X1.5S100N-HP	●	8.1	0 -0.015	25	27	10	80	fig.1
KDZ0820X1.5S100N-HP	●	8.2						
KDZ0830X1.5S100N-HP	●	8.3	0 -0.015	26	28	10	80	fig.1
KDZ0840X1.5S100N-HP	●	8.4						
KDZ0850X1.5S100N-HP	●	8.5						
KDZ0860X1.5S100N-HP	●	8.6						
KDZ0870X1.5S100N-HP	●	8.7	0 -0.015	27	29	10	80	fig.1
KDZ0880X1.5S100N-HP	●	8.8	0 -0.015	28	30	10	80	fig.1
KDZ0890X1.5S100N-HP	●	8.9						
KDZ0900X1.5S100N-HP	●	9.0						
KDZ0910X1.5S100N-HP	●	9.1						
KDZ0920X1.5S100N-HP	●	9.2	0 -0.015	29	31	10	80	fig.1
KDZ0930X1.5S100N-HP	●	9.3						
KDZ0940X1.5S100N-HP	●	9.4						
KDZ0950X1.5S100N-HP	●	9.5						
KDZ0960X1.5S100N-HP	●	9.6	0 -0.015	30	32	10	80	fig.1
KDZ0970X1.5S100N-HP	●	9.7						
KDZ0980X1.5S100N-HP	●	9.8						
KDZ0990X1.5S100N-HP	●	9.9						
KDZ1000X1.5S100N-HP	●	10.0	0 -0.015	31	33	10	80	fig.1
KDZ1010X1.5S120N-HP	●	10.1	0 -0.018	31	33	12	100	fig.1
KDZ1020X1.5S120N-HP	●	10.2	0 -0.018	32	34	12	100	fig.1
KDZ1030X1.5S120N-HP	●	10.3						
KDZ1040X1.5S120N-HP	●	10.4						
KDZ1050X1.5S120N-HP	●	10.5						
KDZ1060X1.5S120N-HP	●	10.6	0 -0.018	33	35	12	100	fig.1
KDZ1070X1.5S120N-HP	●	10.7						
KDZ1080X1.5S120N-HP	●	10.8						

The standard drilling depth is 1.5 D (1.5 x DC).

Description	Stock	Dimension (mm)						Shape						
		DC	Outside Dia. Tolerance	LCF	LN	DCON	OAL							
KDZ1090X1.5S120N-HP	●	10.9	0 -0.018	34	36	12	100	fig.1						
KDZ1100X1.5S120N-HP	●	11.0												
KDZ1110X1.5S120N-HP	●	11.1	0 -0.018	35	37	12	100	fig.1						
KDZ1120X1.5S120N-HP	●	11.2												
KDZ1130X1.5S120N-HP	●	11.3												
KDZ1140X1.5S120N-HP	●	11.4												
KDZ1150X1.5S120N-HP	●	11.5	0 -0.018	36	38	12	100	fig.1						
KDZ1160X1.5S120N-HP	●	11.6												
KDZ1170X1.5S120N-HP	●	11.7												
KDZ1180X1.5S120N-HP	●	11.8												
KDZ1190X1.5S120N-HP	●	11.9	0 -0.018	37	39	12	100	fig.1						
KDZ1200X1.5S120N-HP	●	12.0												
KDZ1250X1.5S120N-HP	●	12.5							0 -0.018	41	41	12	100	fig.2
KDZ1300X1.5S120N-HP	●	13.0												
KDZ1350X1.5S120N-HP	●	13.5												
KDZ1400X1.5S120N-HP	●	14.0	0 -0.018	43	43	12	100	fig.2						
KDZ1450X1.5S120N-HP	●	14.5												
KDZ1500X1.5S120N-HP	●	15.0												
KDZ1550X1.5S120N-HP	●	15.5												
KDZ1600X1.5S160N-HP	●	16.0	0 -0.018	52	52	16	115	fig.1						
KDZ1650X1.5S160N-HP	●	16.5	0 -0.018	53	53	16	115	fig.2						
KDZ1700X1.5S160N-HP	●	17.0												
KDZ1750X1.5S160N-HP	●	17.5												
KDZ1800X1.5S160N-HP	●	18.0												
KDZ1850X1.5S160N-HP	●	18.5	0 -0.021	59	59	16	125	fig.2						
KDZ1900X1.5S160N-HP	●	19.0												
KDZ1950X1.5S160N-HP	●	19.5												
KDZ2000X1.5S200N-HP	●	20.0							0 -0.021	63	63	20	125	fig.1

●: Standard stock

KDZ-HP Short (Long shank)



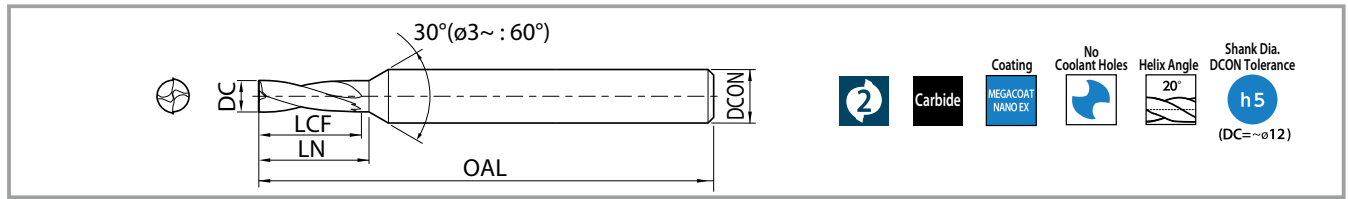
Description	Stock	Dimension (mm)					Shape	
		DC	Outside Dia. Tolerance	LCF	LN	DCON		OAL
KDZ0300X1.5S060N-HPL	●	3.0	0 -0.010	9.0	30	6	100	fig.1
KDZ0310X1.5S060N-HPL	MTO	3.1	0 -0.012	10	31	6	100	fig.1
KDZ0320X1.5S060N-HPL	MTO	3.2			32			
KDZ0330X1.5S060N-HPL	MTO	3.3			33			
KDZ0340X1.5S060N-HPL	MTO	3.4	0 -0.012	11	34	6	100	fig.1
KDZ0350X1.5S060N-HPL	●	3.5			35			
KDZ0360X1.5S060N-HPL	MTO	3.6			36			
KDZ0370X1.5S060N-HPL	MTO	3.7	0 -0.012	12	37	6	100	fig.1
KDZ0380X1.5S060N-HPL	MTO	3.8			38			
KDZ0390X1.5S060N-HPL	MTO	3.9			39			
KDZ0400X1.5S060N-HPL	●	4.0	0 -0.012	13	40	6	100	fig.1
KDZ0410X1.5S060N-HPL	MTO	4.1			41			
KDZ0420X1.5S060N-HPL	MTO	4.2			42			
KDZ0430X1.5S060N-HPL	MTO	4.3	0 -0.012	14	43	6	100	fig.1
KDZ0440X1.5S060N-HPL	MTO	4.4			44			
KDZ0450X1.5S060N-HPL	●	4.5			45			
KDZ0460X1.5S060N-HPL	MTO	4.6	0 -0.012	15	46	6	100	fig.1
KDZ0470X1.5S060N-HPL	MTO	4.7			47			
KDZ0480X1.5S060N-HPL	MTO	4.8			48			
KDZ0490X1.5S060N-HPL	MTO	4.9	0 -0.012	16	49	6	110	fig.1
KDZ0500X1.5S060N-HPL	●	5.0			50			
KDZ0510X1.5S060N-HPL	MTO	5.1			51			
KDZ0520X1.5S060N-HPL	MTO	5.2	0 -0.012	17	52	6	110	fig.1
KDZ0530X1.5S060N-HPL	MTO	5.3			53			
KDZ0540X1.5S060N-HPL	MTO	5.4			54			
KDZ0550X1.5S060N-HPL	●	5.5	0 -0.012	18	55	6	110	fig.1
KDZ0560X1.5S060N-HPL	MTO	5.6			56			
KDZ0570X1.5S060N-HPL	MTO	5.7			57			
KDZ0580X1.5S060N-HPL	MTO	5.8	0 -0.012	19	58	6	110	fig.1
KDZ0590X1.5S060N-HPL	MTO	5.9			59			
KDZ0600X1.5S060N-HPL	●	6.0			60			
KDZ0610X1.5S060N-HPL	MTO	6.1	0 -0.015	20	29	6	120	fig.2
KDZ0620X1.5S060N-HPL	MTO	6.2			29			
KDZ0630X1.5S060N-HPL	MTO	6.3			29			
KDZ0640X1.5S060N-HPL	MTO	6.4	0 -0.015	21	29.5	6	120	fig.2
KDZ0650X1.5S060N-HPL	●	6.5			29.5			
KDZ0660X1.5S060N-HPL	MTO	6.6			29.5			
KDZ0670X1.5S060N-HPL	MTO	6.7	0 -0.015	22	30	6	120	fig.2
KDZ0680X1.5S060N-HPL	MTO	6.8			30			
KDZ0690X1.5S060N-HPL	MTO	6.9			30			
KDZ0700X1.5S060N-HPL	●	7.0	0 -0.015	23	30.5	6	120	fig.2
KDZ0710X1.5S060N-HPL	MTO	7.1			30.5			
KDZ0720X1.5S060N-HPL	MTO	7.2			30.5			
KDZ0730X1.5S060N-HPL	MTO	7.3	0 -0.015	24	30.5	6	120	fig.2
KDZ0740X1.5S060N-HPL	MTO	7.4			30.5			
KDZ0750X1.5S060N-HPL	●	7.5			30.5			

Description	Stock	Dimension (mm)					Shape	
		DC	Outside Dia. Tolerance	LCF	LN	DCON		OAL
KDZ0760X1.5S060N-HPL	MTO	7.6	0 -0.015	24	31	6	120	fig.2
KDZ0770X1.5S060N-HPL	MTO	7.7						
KDZ0780X1.5S060N-HPL	MTO	7.8						
KDZ0790X1.5S060N-HPL	MTO	7.9						
KDZ0800X1.5S080N-HPL	●	8.0	0 -0.015	25	80	8	130	fig.1
KDZ0810X1.5S080N-HPL	MTO	8.1			31.5			fig.2
KDZ0820X1.5S080N-HPL	MTO	8.2			31.5			
KDZ0830X1.5S080N-HPL	MTO	8.3	0 -0.015	26	32	8	130	fig.2
KDZ0840X1.5S080N-HPL	MTO	8.4			32			
KDZ0850X1.5S080N-HPL	●	8.5			32			
KDZ0860X1.5S080N-HPL	MTO	8.6	0 -0.015	27	32	8	130	fig.2
KDZ0870X1.5S080N-HPL	MTO	8.7			32.5			
KDZ0880X1.5S080N-HPL	MTO	8.8			32.5			
KDZ0890X1.5S080N-HPL	MTO	8.9	0 -0.015	28	32.5	8	130	fig.2
KDZ0900X1.5S080N-HPL	●	9.0			32.5			
KDZ0910X1.5S080N-HPL	MTO	9.1			32.5			
KDZ0920X1.5S080N-HPL	MTO	9.2	0 -0.015	29	32.5	8	130	fig.2
KDZ0930X1.5S080N-HPL	MTO	9.3			32.5			
KDZ0940X1.5S080N-HPL	MTO	9.4			32.5			
KDZ0950X1.5S080N-HPL	●	9.5	0 -0.015	30	33.5	8	130	fig.2
KDZ0960X1.5S080N-HPL	MTO	9.6			33.5			
KDZ0970X1.5S080N-HPL	MTO	9.7			33.5			
KDZ0980X1.5S080N-HPL	MTO	9.8	0 -0.015	31	34.5	8	130	fig.2
KDZ0990X1.5S080N-HPL	MTO	9.9			34.5			
KDZ1000X1.5S100N-HPL	●	10.0			100			
KDZ1010X1.5S100N-HPL	MTO	10.1	35.5	fig.2				
KDZ1020X1.5S100N-HPL	MTO	10.2	0 -0.018	32	35.5	10	150	fig.2
KDZ1030X1.5S100N-HPL	MTO	10.3			36			
KDZ1040X1.5S100N-HPL	MTO	10.4			36			
KDZ1050X1.5S100N-HPL	●	10.5	0 -0.018	33	36.5	10	150	fig.2
KDZ1060X1.5S100N-HPL	MTO	10.6			36.5			
KDZ1070X1.5S100N-HPL	MTO	10.7			36.5			
KDZ1080X1.5S100N-HPL	MTO	10.8	0 -0.018	34	37.5	10	150	fig.2
KDZ1090X1.5S100N-HPL	MTO	10.9			37.5			
KDZ1100X1.5S100N-HPL	●	11.0			37.5			
KDZ1110X1.5S100N-HPL	MTO	11.1	0 -0.018	35	38.5	10	150	fig.2
KDZ1120X1.5S100N-HPL	MTO	11.2			38.5			
KDZ1130X1.5S100N-HPL	MTO	11.3			38.5			
KDZ1140X1.5S100N-HPL	MTO	11.4	0 -0.018	36	39.5	10	150	fig.2
KDZ1150X1.5S100N-HPL	●	11.5			39.5			
KDZ1160X1.5S100N-HPL	MTO	11.6			39.5			
KDZ1170X1.5S100N-HPL	MTO	11.7	0 -0.018	37	120	12	170	fig.1
KDZ1180X1.5S100N-HPL	MTO	11.8			120			
KDZ1190X1.5S100N-HPL	MTO	11.9			120			
KDZ1200X1.5S120N-HPL	●	12.0	0 -0.018	37	120	12	170	fig.1

● : Standard stock MTO: Made to order

The standard drilling depth is 1.0 D (1.0 x DC).

KDZ-HP Regular



Carbide

Coating
MEGACOAT
NANO EX

No Coolant Holes

Helix Angle
20°

Shank Dia.
DCON Tolerance
h5
(DC=ø12)

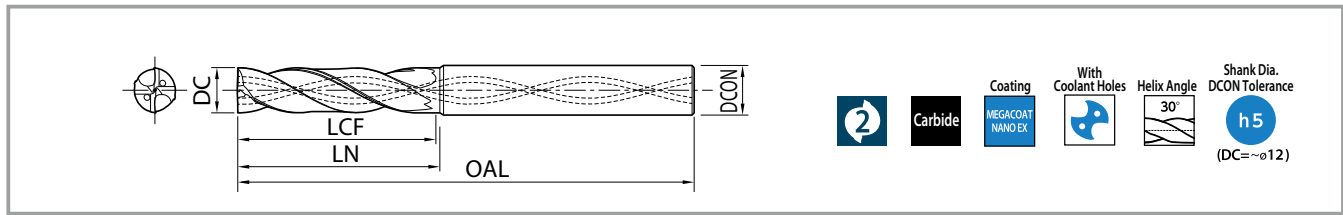
Description	Stock	Dimension (mm)					
		DC	Outside Dia. Tolerance	LCF	LN	DCON	OAL
KDZ0300X3.0S060N-HP	●	3.0	0 -0.010	14	15	6	60
KDZ0310X3.0S060N-HP	●	3.1	0 -0.012	14	15	6	60
KDZ0320X3.0S060N-HP	●	3.2	0 -0.012	15	16	6	60
KDZ0330X3.0S060N-HP	●	3.3	0 -0.012	17	18	6	60
KDZ0340X3.0S060N-HP	●	3.4	0 -0.012	19	20	6	60
KDZ0350X3.0S060N-HP	●	3.5	0 -0.012	20	21	6	60
KDZ0360X3.0S060N-HP	●	3.6	0 -0.012	21	22	6	60
KDZ0370X3.0S060N-HP	●	3.7	0 -0.012	23	24	6	60
KDZ0380X3.0S060N-HP	●	3.8	0 -0.012	24	25	6	60
KDZ0390X3.0S060N-HP	●	3.9	0 -0.012	25	26	6	60
KDZ0400X3.0S060N-HP	●	4.0	0 -0.012	26	27	6	60
KDZ0410X3.0S060N-HP	●	4.1	0 -0.012	28	(28)	6	60
KDZ0420X3.0S060N-HP	●	4.2	0 -0.012	28	29	8	70
KDZ0430X3.0S060N-HP	●	4.3	0 -0.012	30	31	8	70
KDZ0440X3.0S060N-HP	●	4.4	0 -0.012	31	32	8	70
KDZ0450X3.0S060N-HP	●	4.5	0 -0.012	32	33	8	70
KDZ0460X3.0S060N-HP	●	4.6	0 -0.012	34	35	8	70
KDZ0470X3.0S060N-HP	●	4.7	0 -0.012	34	35	8	70
KDZ0480X3.0S060N-HP	●	4.8	0 -0.012	34	35	8	70
KDZ0490X3.0S060N-HP	●	4.9	0 -0.012	34	35	8	70
KDZ0500X3.0S060N-HP	●	5.0	0 -0.012	34	35	8	70
KDZ0510X3.0S060N-HP	●	5.1	0 -0.012	34	35	8	70
KDZ0520X3.0S060N-HP	●	5.2	0 -0.012	34	35	8	70
KDZ0530X3.0S060N-HP	●	5.3	0 -0.012	34	35	8	70
KDZ0540X3.0S060N-HP	●	5.4	0 -0.012	34	35	8	70
KDZ0550X3.0S060N-HP	●	5.5	0 -0.012	34	35	8	70
KDZ0560X3.0S060N-HP	●	5.6	0 -0.012	34	35	8	70
KDZ0570X3.0S060N-HP	●	5.7	0 -0.012	34	35	8	70
KDZ0580X3.0S060N-HP	●	5.8	0 -0.012	34	35	8	70
KDZ0590X3.0S060N-HP	●	5.9	0 -0.012	34	35	8	70
KDZ0600X3.0S060N-HP	●	6.0	0 -0.012	34	35	8	70
KDZ0610X3.0S080N-HP	●	6.1	0 -0.015	34	35	8	70
KDZ0620X3.0S080N-HP	●	6.2	0 -0.015	34	35	8	70
KDZ0630X3.0S080N-HP	●	6.3	0 -0.015	34	35	8	70
KDZ0640X3.0S080N-HP	●	6.4	0 -0.015	34	35	8	70
KDZ0650X3.0S080N-HP	●	6.5	0 -0.015	34	35	8	70
KDZ0660X3.0S080N-HP	●	6.6	0 -0.015	34	35	8	70
KDZ0670X3.0S080N-HP	●	6.7	0 -0.015	34	35	8	70
KDZ0680X3.0S080N-HP	●	6.8	0 -0.015	34	35	8	70
KDZ0690X3.0S080N-HP	●	6.9	0 -0.015	34	35	8	70
KDZ0700X3.0S080N-HP	●	7.0	0 -0.015	34	35	8	70
KDZ0710X3.0S080N-HP	●	7.1	0 -0.015	34	35	8	70
KDZ0720X3.0S080N-HP	●	7.2	0 -0.015	34	35	8	70
KDZ0730X3.0S080N-HP	●	7.3	0 -0.015	34	35	8	70
KDZ0740X3.0S080N-HP	●	7.4	0 -0.015	34	35	8	70
KDZ0750X3.0S080N-HP	●	7.5	0 -0.015	34	35	8	70

Description	Stock	Dimension (mm)					
		DC	Outside Dia. Tolerance	LCF	LN	DCON	OAL
KDZ0760X3.0S080N-HP	●	7.6	0 -0.015	34	35	8	70
KDZ0770X3.0S080N-HP	●	7.7					
KDZ0780X3.0S080N-HP	●	7.8					
KDZ0790X3.0S080N-HP	●	7.9					
KDZ0800X3.0S080N-HP	●	8.0	0 -0.015	36	(36)	8	70
KDZ0810X3.0S100N-HP	●	8.1	0 -0.015	36	37	10	80
KDZ0820X3.0S100N-HP	●	8.2					
KDZ0830X3.0S100N-HP	●	8.3					
KDZ0840X3.0S100N-HP	●	8.4					
KDZ0850X3.0S100N-HP	●	8.5	0 -0.015	38	39	10	80
KDZ0860X3.0S100N-HP	●	8.6					
KDZ0870X3.0S100N-HP	●	8.7					
KDZ0880X3.0S100N-HP	●	8.8					
KDZ0890X3.0S100N-HP	●	8.9	0 -0.015	39	40	10	80
KDZ0900X3.0S100N-HP	●	9.0	0 -0.015	40	41	10	80
KDZ0910X3.0S100N-HP	●	9.1					
KDZ0920X3.0S100N-HP	●	9.2					
KDZ0930X3.0S100N-HP	●	9.3					
KDZ0940X3.0S100N-HP	●	9.4	0 -0.015	42	43	10	80
KDZ0950X3.0S100N-HP	●	9.5					
KDZ0960X3.0S100N-HP	●	9.6					
KDZ0970X3.0S100N-HP	●	9.7					
KDZ0980X3.0S100N-HP	●	9.8	0 -0.015	45	(45)	10	80
KDZ0990X3.0S100N-HP	●	9.9					
KDZ1000X3.0S100N-HP	●	10.0					
KDZ1010X3.0S120N-HP	●	10.1					
KDZ1020X3.0S120N-HP	●	10.2	0 -0.018	46	47	12	100
KDZ1030X3.0S120N-HP	●	10.3					
KDZ1040X3.0S120N-HP	●	10.4					
KDZ1050X3.0S120N-HP	●	10.5					
KDZ1060X3.0S120N-HP	●	10.6	0 -0.018	47	48	12	100
KDZ1070X3.0S120N-HP	●	10.7					
KDZ1080X3.0S120N-HP	●	10.8					
KDZ1090X3.0S120N-HP	●	10.9					
KDZ1100X3.0S120N-HP	●	11.0	0 -0.018	51	52	12	100
KDZ1110X3.0S120N-HP	●	11.1					
KDZ1120X3.0S120N-HP	●	11.2					
KDZ1130X3.0S120N-HP	●	11.3					
KDZ1140X3.0S120N-HP	●	11.4	0 -0.018	53	54	12	100
KDZ1150X3.0S120N-HP	●	11.5					
KDZ1160X3.0S120N-HP	●	11.6					
KDZ1170X3.0S120N-HP	●	11.7					
KDZ1180X3.0S120N-HP	●	11.8	0 -0.018	54	(54)	12	100
KDZ1190X3.0S120N-HP	●	11.9					
KDZ1200X3.0S120N-HP	●	12.0					

●: Standard stock

The standard drilling depth is 2.0 D (2.0 x DC).
Pecking is recommended when drilling depth is 2D or over

KDZ-HP Regular (with coolant hole) Type C



Description	Stock	Dimension (mm)								
		DC	Outside Dia. Tolerance	LCF	LN	DCON	OAL			
KDZ0300X3.0S030C-HP	●	3.0	0 -0.010	13.5	15.5	3	68			
KDZ0310X3.0S040C-HP	●	3.1	0 -0.012	14.0	16.0	4	72			
KDZ0320X3.0S040C-HP	●	3.2		14.4	16.4					
KDZ0330X3.0S040C-HP	●	3.3		14.9	16.9					
KDZ0340X3.0S040C-HP	●	3.4		15.3	17.3					
KDZ0350X3.0S040C-HP	●	3.5		15.8	17.8					
KDZ0360X3.0S040C-HP	●	3.6		16.2	18.2					
KDZ0370X3.0S040C-HP	●	3.7	0 -0.012	16.7	18.7	4	72			
KDZ0380X3.0S040C-HP	●	3.8		17.1	19.1					
KDZ0390X3.0S040C-HP	●	3.9		17.6	19.6					
KDZ0400X3.0S040C-HP	●	4.0		18.0	20.0					
KDZ0410X3.0S050C-HP	●	4.1		0 -0.012	18.5			20.5	5	80
KDZ0420X3.0S050C-HP	●	4.2			18.9			20.9		
KDZ0430X3.0S050C-HP	●	4.3	19.4		21.4					
KDZ0440X3.0S050C-HP	●	4.4	19.8		21.8					
KDZ0450X3.0S050C-HP	●	4.5	20.3		22.3					
KDZ0460X3.0S050C-HP	●	4.6	0 -0.012		20.7	22.7	5	80		
KDZ0470X3.0S050C-HP	●	4.7		21.2	23.2					
KDZ0480X3.0S050C-HP	●	4.8		21.6	23.6					
KDZ0490X3.0S050C-HP	●	4.9		22.1	24.1					
KDZ0500X3.0S050C-HP	●	5.0		22.5	24.5					
KDZ0510X3.0S060C-HP	●	5.1		0 -0.012	23.0	25.0			6	82
KDZ0520X3.0S060C-HP	●	5.2	23.4		25.4					
KDZ0530X3.0S060C-HP	●	5.3	23.9		25.9					
KDZ0540X3.0S060C-HP	●	5.4	24.3		26.3					
KDZ0550X3.0S060C-HP	●	5.5	24.8		26.8					
KDZ0560X3.0S060C-HP	●	5.6	0 -0.012		25.2	27.2	6	82		
KDZ0570X3.0S060C-HP	●	5.7		25.7	27.7					
KDZ0580X3.0S060C-HP	●	5.8		26.1	28.1					
KDZ0590X3.0S060C-HP	●	5.9		26.6	28.6					
KDZ0600X3.0S060C-HP	●	6.0		27.0	29.0					
KDZ0610X3.0S070C-HP	●	6.1		0 -0.015	27.5	29.5			7	88
KDZ0620X3.0S070C-HP	●	6.2	27.9		29.9					
KDZ0630X3.0S070C-HP	●	6.3	28.4		30.4					
KDZ0640X3.0S070C-HP	●	6.4	28.8		30.8					
KDZ0650X3.0S070C-HP	●	6.5	29.3		31.3					
KDZ0660X3.0S070C-HP	●	6.6	0 -0.015		29.7	31.7	7	88		
KDZ0670X3.0S070C-HP	●	6.7		30.2	32.2					
KDZ0680X3.0S070C-HP	●	6.8		30.6	32.6					
KDZ0690X3.0S070C-HP	●	6.9		31.1	33.1					
KDZ0700X3.0S070C-HP	●	7.0		31.5	33.5					
KDZ0710X3.0S080C-HP	●	7.1		0 -0.015	32.0	34.0			8	94
KDZ0720X3.0S080C-HP	●	7.2	32.4		34.4					
KDZ0730X3.0S080C-HP	●	7.3	32.9		34.9					
KDZ0740X3.0S080C-HP	●	7.4	33.3		35.3					
KDZ0750X3.0S080C-HP	●	7.5	33.8		35.8					

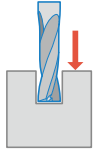
Description	Stock	Dimension (mm)								
		DC	Outside Dia. Tolerance	LCF	LN	DCON	OAL			
KDZ0760X3.0S080C-HP	●	7.6	0 -0.015	34.2	36.2	8	94			
KDZ0770X3.0S080C-HP	●	7.7		34.7	36.7					
KDZ0780X3.0S080C-HP	●	7.8		35.1	37.1					
KDZ0790X3.0S080C-HP	●	7.9		35.6	37.6					
KDZ0800X3.0S080C-HP	●	8.0		36.0	38.0					
KDZ0810X3.0S090C-HP	●	8.1		0 -0.015	36.5			38.5	9	100
KDZ0820X3.0S090C-HP	●	8.2	36.9		38.9					
KDZ0830X3.0S090C-HP	●	8.3	37.4		39.4					
KDZ0840X3.0S090C-HP	●	8.4	37.8		39.8					
KDZ0850X3.0S090C-HP	●	8.5	38.3		40.3					
KDZ0860X3.0S090C-HP	●	8.6	0 -0.015		38.7	40.7	9	100		
KDZ0870X3.0S090C-HP	●	8.7		39.2	41.2					
KDZ0880X3.0S090C-HP	●	8.8		39.6	41.6					
KDZ0890X3.0S090C-HP	●	8.9		40.1	42.1					
KDZ0900X3.0S090C-HP	●	9.0		40.5	42.5					
KDZ0910X3.0S100C-HP	●	9.1		0 -0.015	41.0	43.0			10	106
KDZ0920X3.0S100C-HP	●	9.2	41.4		43.4					
KDZ0930X3.0S100C-HP	●	9.3	41.9		43.9					
KDZ0940X3.0S100C-HP	●	9.4	42.3		44.3					
KDZ0950X3.0S100C-HP	●	9.5	42.8		44.8					
KDZ0960X3.0S100C-HP	●	9.6	43.2		45.2					
KDZ0970X3.0S100C-HP	●	9.7	0 -0.018	43.7	45.7	11	116			
KDZ0980X3.0S100C-HP	●	9.8		44.1	46.1					
KDZ0990X3.0S100C-HP	●	9.9		44.6	46.6					
KDZ1000X3.0S100C-HP	●	10.0		45.0	47.0					
KDZ1010X3.0S110C-HP	●	10.1		0 -0.018	45.5			47.5	11	116
KDZ1020X3.0S110C-HP	●	10.2			45.9			47.9		
KDZ1030X3.0S110C-HP	●	10.3	46.4		48.4					
KDZ1040X3.0S110C-HP	●	10.4	46.8		48.8					
KDZ1050X3.0S110C-HP	●	10.5	47.3		49.3					
KDZ1060X3.0S110C-HP	●	10.6	0 -0.018		47.7	49.7	11	116		
KDZ1070X3.0S110C-HP	●	10.7		48.2	50.2					
KDZ1080X3.0S110C-HP	●	10.8		48.6	50.6					
KDZ1090X3.0S110C-HP	●	10.9		49.1	51.1					
KDZ1100X3.0S110C-HP	●	11.0		49.5	51.5					
KDZ1110X3.0S120C-HP	●	11.1		0 -0.018	50.0	52.0			12	122
KDZ1120X3.0S120C-HP	●	11.2	50.4		52.4					
KDZ1130X3.0S120C-HP	●	11.3	50.9		52.9					
KDZ1140X3.0S120C-HP	●	11.4	51.3		53.3					
KDZ1150X3.0S120C-HP	●	11.5	51.8		53.8					
KDZ1160X3.0S120C-HP	●	11.6	52.2		54.2					
KDZ1170X3.0S120C-HP	●	11.7	0 -0.018	52.7	54.7	12	122			
KDZ1180X3.0S120C-HP	●	11.8		53.1	55.1					
KDZ1190X3.0S120C-HP	●	11.9		53.6	55.6					
KDZ1200X3.0S120C-HP	●	12.0		54.0	56.0					

●: Standard stock

The standard drilling depth is 2.0 D (2.0 x DC).
Pecking is recommended when drilling depth is 2D or over

Recommended Cutting Conditions

KDZ

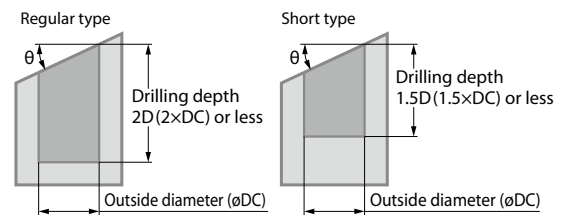
Workpiece Material	Application	Outside Diameter DC (mm)	ø1	ø2	ø3	ø4	ø5	ø6	ø8	ø10	ø12
Structural steel Carbon steel SS400, S45C	 Plunging	Spindle Revolution (min ⁻¹)	19,500	11,200	8,300	6,200	5,000	4,200	3,200	2,500	2,100
		Feed Rate (mm/min)	300	380	520	520	520	520	520	520	450
Alloy steel SCM, SNCM		Spindle Revolution (min ⁻¹)	19,000	10,000	7,200	5,400	4,400	3,600	2,700	2,200	1,800
		Feed Rate (mm/min)	300	320	450	450	450	450	450	450	400
Pre-hardened steel (30~45HRC)		Spindle Revolution (min ⁻¹)	16,000	8,000	3,900	2,900	2,300	1,900	1,500	1,200	1,000
		Feed Rate (mm/min)	210	210	210	210	210	210	210	190	190
Nodular cast iron FCD400		Spindle Revolution (min ⁻¹)	16,000	10,000	7,200	5,400	4,400	3,600	2,700	2,200	1,800
		Feed Rate (mm/min)	200	300	390	390	390	390	390	390	340
Aluminum alloy A7075		Spindle Revolution (min ⁻¹)	20,000	20,000	17,800	13,100	10,500	8,900	6,700	5,400	4,500
		Feed Rate (mm/min)	500	850	1,270	1,270	1,270	1,270	1,270	1,270	1,270
Aluminum alloy casting AC, ADC		Spindle Revolution (min ⁻¹)	20,000	20,000	13,100	10,000	8,000	6,700	5,000	4,000	3,400
		Feed Rate (mm/min)	450	750	820	820	820	820	820	820	820

Precautions

- This tool is specially designed for plunging and NOT recommended for traversing
- Coolant is recommended
- Adjust ap to suit machine rigidity and overhang length
- Pecking is recommended when drilling depth is 2D or over
- Use chuck and machine with the highest rigidity possible
- Drilling stainless steel (SUS 304, SUS 316, etc.) is not recommended
- Cutting condition modifications may be needed when cutting a slant surface, depending on the slant angle (Right Figure)

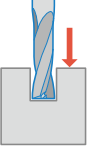
When workpiece slant is 30° or less, reduce the feed rate below 50%

When workpiece slant is over 30°, lower the revolution to 70% or less and the feed rate to 30% or less



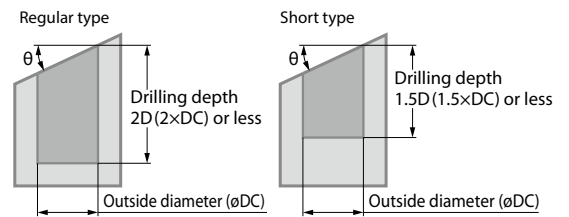
Recommended Cutting Conditions

KDZ-HP

Workpiece Material	Application	Outside Diameter DC (mm)	DC																
			ø1	ø1.5	ø2	ø2.5	ø3	ø3.5	ø4	ø4.5	ø5	ø6	ø8	ø10	ø12	ø14	ø16	ø18	ø20
Structural steel Carbon steel SS400, S45C	 Plunging	Spindle Revolution (min ⁻¹)	20,700	13,800	11,150	9,200	9,100	7,800	6,800	6,100	5,500	4,600	3,500	2,800	2,300	1,800	1,600	1,400	1,300
		Feed Rate (mm/min)	350	350	430	430	520	520	520	520	520	520	520	520	520	520	480	480	480
Alloy steel SCM, SNCM		Spindle Revolution (min ⁻¹)	17,500	11,700	9,600	7,650	7,200	6,200	5,400	4,800	4,400	3,600	2,700	2,200	1,800	1,500	1,350	1,200	1,100
		Feed Rate (mm/min)	290	290	380	380	450	450	450	450	450	450	450	450	450	450	420	420	420
Pre-hardened steel (30~45HRC)		Spindle Revolution (min ⁻¹)	9,600	6,400	5,570	4,460	3,900	3,400	2,900	2,600	2,300	1,900	1,500	1,200	1,000	850	750	650	600
		Feed Rate (mm/min)	120	120	170	170	210	210	210	210	210	210	210	210	210	200	200	200	200
Nodular cast iron FCD400		Spindle Revolution (min ⁻¹)	15,900	10,600	10,360	8,290	7,200	6,200	5,400	4,800	4,400	3,600	2,700	2,200	1,800	1,550	1,350	1,200	1,100
		Feed Rate (mm/min)	220	250	390	390	390	390	390	390	390	390	390	390	390	360	360	360	360
Aluminum alloy A7075		Spindle Revolution (min ⁻¹)	39,800	26,600	23,000	18,500	17,800	15,200	13,100	11,800	10,500	8,900	6,700	5,400	4,500	3,800	3,400	3,000	2,700
		Feed Rate (mm/min)	900	1,000	1,270	1,270	1,270	1,270	1,270	1,270	1,270	1,270	1,270	1,270	1,270	1,270	1,270	1,270	1,270
Aluminum alloy casting AC, ADC		Spindle Revolution (min ⁻¹)	29,000	19,200	17,500	14,000	13,100	11,500	10,000	8,800	8,000	6,700	5,000	4,000	3,400	2,900	2,500	2,200	2,000
		Feed Rate (mm/min)	550	550	820	820	820	820	820	820	820	820	820	820	820	820	820	820	820

Precautions

- This tool is specially designed for plunging and NOT recommended for traversing
- Coolant is recommended
- Adjust ap to suit machine rigidity and overhang length
- Pecking is recommended when drilling depth is 2D or over
- Use chuck and machine with the highest rigidity possible
- Drilling stainless steel (SUS 304, SUS 316, etc.) is not recommended
- Cutting condition modifications may be needed when cutting a slant surface, depending on the slant angle (Right Figure)
- When workpiece slant is 30° or less, reduce the feed rate below 50%
- When workpiece slant is over 30°, lower the revolution to 70% or less and the feed rate to 30% or less



Recommended Cutting Conditions

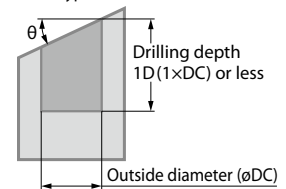
KDZ-HP Short (Long shank)

Workpiece Material	Application	Outside Diameter DC (mm)	ø3	ø3.5	ø4	ø4.5	ø5	ø6	ø8	ø10	ø12
			Structural steel Carbon steel SS400, S45C	 Plunging	Spindle Revolution (min ⁻¹)	10,600	9,100	8,000	7,100	6,400	5,300
Feed Rate (mm/min)	830	830	830		830	830	830	830	830	830	830
Alloy steel SCM, SNCM	Spindle Revolution (min ⁻¹)	9,500	8,200		7,200	6,400	5,700	4,800	3,600	2,900	2,400
Feed Rate (mm/min)	630	630	630		630	630	630	630	630	630	630
Pre-hardened steel (30~45HRC)	Spindle Revolution (min ⁻¹)	7,400	6,400		5,600	5,000	4,500	3,700	2,800	2,200	1,900
Feed Rate (mm/min)	365	365	365		365	365	365	365	365	365	365
Nodular cast iron FCD400	Spindle Revolution (min ⁻¹)	9,600	8,200		7,200	6,400	5,700	4,800	3,600	2,900	2,400
Feed Rate (mm/min)	475	475	475		475	475	475	475	475	475	475
Aluminum alloy A7075	Spindle Revolution (min ⁻¹)	12,700	10,900		9,600	8,500	7,600	6,400	4,800	3,800	3,200
Feed Rate (mm/min)	1,050	1,050	1,050		1,050	1,050	1,050	1,050	1,050	1,050	1,050
Aluminum alloy casting AC, ADC	Spindle Revolution (min ⁻¹)	9,500	8,200		7,200	6,400	5,700	4,800	3,600	2,900	2,400
Feed Rate (mm/min)	675	675	675		675	675	675	675	675	675	675

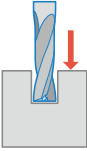
Precautions

- This tool is specially designed for plunging and NOT recommended for traversing
- Coolant is recommended
- Adjust ap to suit machine rigidity and overhang length
- Use chuck and machine with the highest rigidity possible
- Drilling stainless steel (SUS 304, SUS 316, etc.) is not recommended
- Cutting condition modifications may be needed when cutting a slant surface, depending on the slant angle (Right Figure)
When workpiece slant is 30° or less, reduce the feed rate below 50%
When workpiece slant is over 30°, lower the revolution to 70% or less and the feed rate to 30% or less

Short type



KDZ-HP (Type C)

Workpiece Material	Application	Outside Diameter DC (mm)	ø3	ø4	ø5	ø6	ø8	ø10	ø12
			Structural steel Carbon steel SS400, S45C	 Plunging	Spindle Revolution (min ⁻¹)	10,600	7,950	6,350	5,300
Feed Rate (mm/min)	750	750	750		750	750	750	750	750
Alloy steel SCM, SNCM	Spindle Revolution (min ⁻¹)	9,550	7,160		5,730	4,770	3,580	2,860	2,390
Feed Rate (mm/min)	700	680	630		600	600	600	600	
Pre-hardened steel (30~45HRC)	Spindle Revolution (min ⁻¹)	5,300	3,980		3,180	2,650	1,990	1,590	1,330
Feed Rate (mm/min)	300	300	300		300	300	280	280	
Stainless steel SUS304	Spindle Revolution (min ⁻¹)	7,430	5,570		5,100	4,240	3,180	2,550	2,120
Feed Rate (mm/min)	400	400	400		500	500	500	500	
Nodular cast iron FCD400	Spindle Revolution (min ⁻¹)	9,550	7,160		5,730	4,770	3,580	2,860	2,390
Feed Rate (mm/min)	580	580	500		500	500	450	450	
Aluminum alloy A7075	Spindle Revolution (min ⁻¹)	18,000	13,500		10,800	9,000	6,800	5,400	4,500
Feed Rate (mm/min)	1,270	1,270	1,270		1,270	1,270	1,270	1,270	
Aluminum alloy casting AC, ADC	Spindle Revolution (min ⁻¹)	13,100	10,000	8,000	6,700	5,000	4,000	3,400	
Feed Rate (mm/min)	900	900	850	850	850	850	850		

Precautions

- This tool is specially designed for plunging and NOT recommended for traversing
- Coolant is recommended
- Adjust ap to suit machine rigidity and overhang length
- Pecking is recommended when drilling depth is 2D or over
- Use chuck and machine with the highest rigidity possible
- Cutting condition modifications may be needed when cutting a slant surface, depending on the slant angle (Right Figure)
When workpiece slant is 30° or less, reduce the feed rate below 50%
When workpiece slant is over 30°, lower the revolution to 70% or less and the feed rate to 30% or less
- If there is insufficient chip evacuation at the specified drill depth, it is recommended to peck or change cutting conditions
- Pre-drilling is recommended if cutting is unstable
- Pre-drilling and pecking are recommended for stainless steel machining

Regular type

