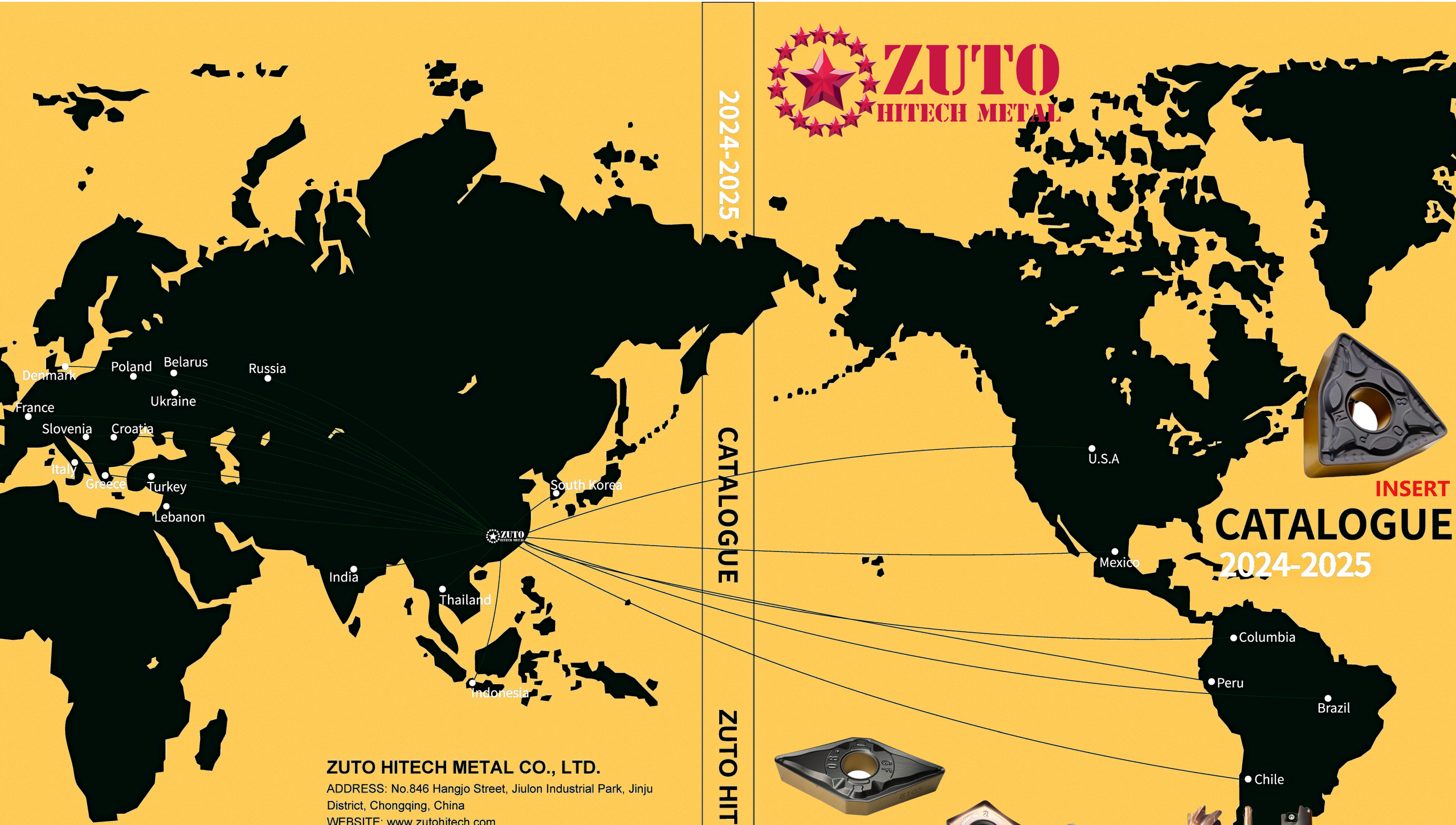

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2024-2025 CATALOGUE ZUTO HITECH METAL

ZUTO HITECH METAL

INSERT CATALOGUE 2024-2025

Selection guidance of general turning insert

Description of turning insert overview

i According to the order of shape:

C - type → D - type → S - type → T - type → V - type → W - type → R - type

ii According to the order of clearance angle:

Negative insert

Positive insert

iii According to the order of machining type:

Finishing → Medium → Roughing → Heavy machining

Workpiece materials:

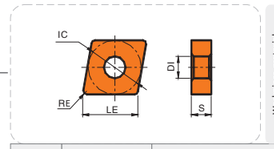
- Steel
- Stainless steel
- Cast iron
- Non-ferrous metal
- Heat-resistant alloy, Titanium alloy

Instructions for insert specifications and models

Cutting conditions:
Stable condition: continuously stable cutting
Average condition: for general cutting
Tough condition: strong intermittent or unstable condition

Insert shape, angle

80° CN□□



Working condition: ● Stable ◐ Average ⌗ Tough

Workpiece material	Stable	Average	Tough
P Steel	●	◐	⌗
M Stainless steel		◐	⌗
K Cast iron		◐	⌗
N Non-ferrous metal	●	◐	
S Heat-resistant alloy Titanium alloy	●	◐	

Machining type	Insert shape	Type	Basic dimension (mm) LE	IC	S	DI	RE	CVD Z8115	Z8125	Z8225	Z6115	PVD Z9105	Z7115	Z7125	Z7225	Z5125	Z5225	Cemented carbide Z10	Z20	Cermet Z10	Z20
Finishing		CNMG120404-GF	12.9	12.7	4.76	5.16	0.4	★	☆	★											
		CNMG120408-GF	12.9	12.7	4.76	5.16	0.8	★	☆	★											
Finishing		CNMG120404-BF	12.9	12.7	4.76	5.16	0.4							☆	★						
		CNMG120408-BF	12.9	12.7	4.76	5.16	0.8							☆	★						
New Semi-finishing		CNMG120404-GM	12.9	12.7	4.76	5.16	0.4	★	☆	★											
		CNMG120408-GM	12.9	12.7	4.76	5.16	0.8	★	☆	★											
		CNMG120412-GM	12.9	12.7	4.76	5.16	1.2	★	☆	★											
		CNMG160608-GM	16.1	15.875	6.35	6.35	0.8	★	☆	★											
		CNMG160612-GM	16.1	15.875	6.35	6.35	1.2	★	☆	★											
		CNMG160616-GM	16.1	15.875	6.35	6.35	1.6	★	☆	★											
Roughing		CNMG120408-KR	12.9	12.7	4.76	5.16	0.8	☆	★												
		CNMG120412-KR	12.9	12.7	4.76	5.16	1.2	☆	★												
		CNMG120416-KR	12.9	12.7	4.76	5.16	1.6	☆	★												

★ Recommended grade ☆ Available grade

Dimensioned structure drawing of inserts with marking
LE: Length of cutting edge
IC: Inscribed circle
S: Thickness
DI: Hole diameter
RE: Nose radius

Insert machining type: Finishing,medium, roughing and heavy machining

Grade

Insert shape | Description | Dimension | Inventory | Grade infomation

A Turning

General turning

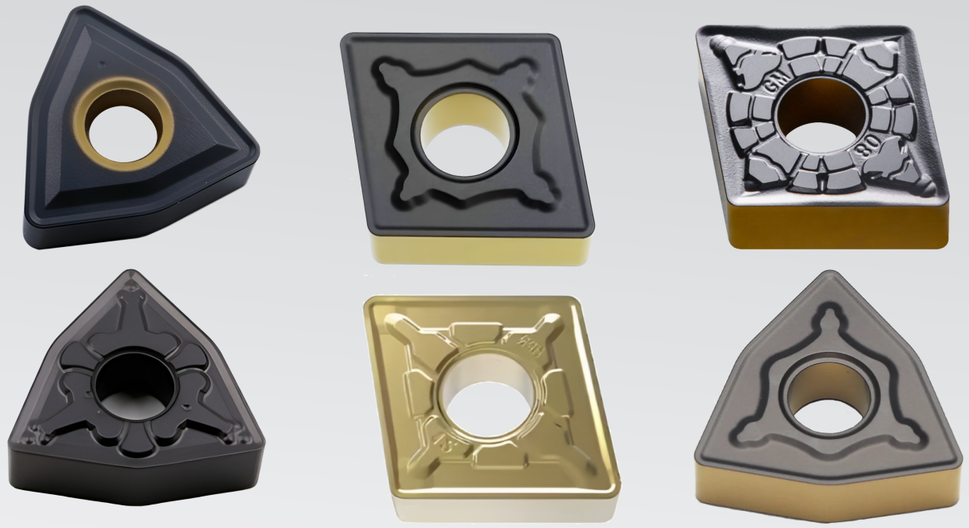
- Turning grade overview ---- A8
- Turning inserts code key ---- A9-A10
- General turning inserts overview ---- A11-A18
- General turning insert ---- A19-A49
  - Cemented carbide turning insert ---- A19-A43
  - Cermet turning insert ---- A44-A49
- Application reference ---- A50-A53
- General turning tools code key ---- A55-A56
  - General external turning tools code key ---- A55
  - General internal turning tools code key ---- A56
- General turning tools overview ---- A57-A60
- General turning tools ---- A61-A82
  - External turning holders by P-type clamping ---- A61-A66
  - External turning holders by M-type clamping ---- A67-A75
  - External turning holders by S-type clamping ---- A76-A82
- Technical information for general turning ---- A83-A88

Parting and grooving

- Parting and grooving inserts code key ---- A91
- Parting and grooving tools ---- A92
- Parting and grooving inserts overview ---- A93-A94
- Parting and grooving holders overview ---- A95-A98
- Technical information for parting and grooving ---- A99-A102

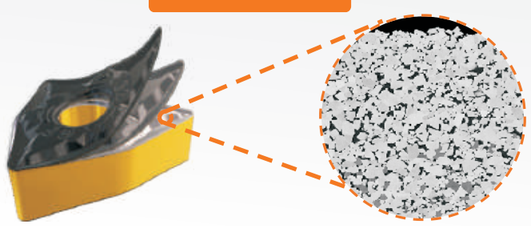
Steel turning

We offer a series of durable and efficient steel turning products, all of which can deliver good machining quality.



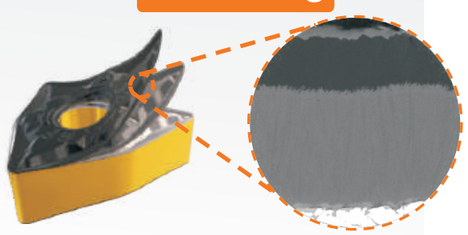
New grade SE6326

New substrate



- Brand-new carbide substrate with high strength, outstanding wear resistance and reliable toughness;
- The strengthened bonding phase can effectively protect the substrate from high temperature plastic deformation;
- The functional gradient layer with high bonding phase ensure good anti-cracking performance;
- Well-distributed refined hard phase particles show both toughness and good wear resistance;
- The improved precision molding technique further improves the size accuracy.

New coating



- High-strength directionally grown alumina is deposited on columnar fine-grained titanium carbonitride, forming a brand-new composite multilayer CVD coating;
- The smooth coating surface effectively reduces chip adhesion.

GF chipbreaker: Supported by a large rake angle design plus a cutting edge inclination, low cutting force and strong chip control ability, it is suitable for small cutting depth and finish machining.

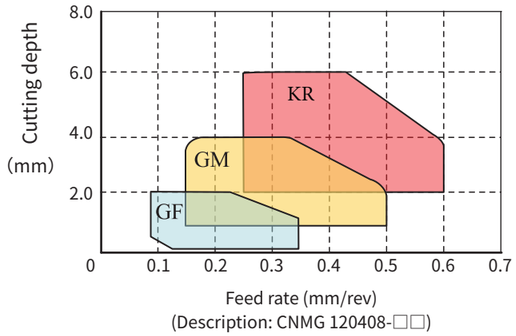
GM chipbreaker: Advanced balance of sharpness and high-strength creates applicability for multiple purposes, and provides efficient cutting and long service life.

KR chipbreaker: With a wide chamfer and high-strength insert, it can achieve good chip control ability, reduce rake face damage and extend the service life.

Z8115

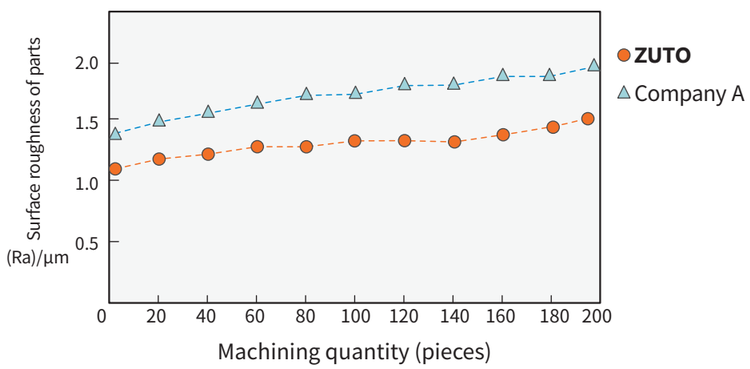
Z8225

Cutting data



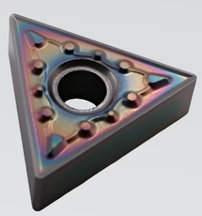
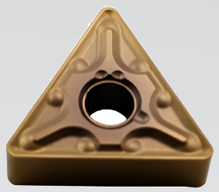
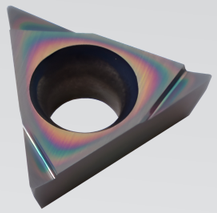
Chipbreaker	Grade	Cutting speed(v_c) (mm/min)	Feed rate(f_n) (mm/r)	Cutting depth(a_p) (mm)
GF	Z8115 Z8225	240-450 240-420	0.08-0.35	0.30-2.00
GM	Z8115 Z8225	200-420 200-400	0.15-0.50	1.00-4.00
GR	Z8225	180-300	0.25-0.60	2.00-6.00

Workpiece name: Shaft parts
Workpiece material: 45# steel
Machining method: Wet external turing
Insert: DNMG150408-GF
Z8115
Machining parameters: v_c=338m/min,
f_n=0.2mm/r
ap=0.4mm



Stainless steel turning

BF, BM, BR and other grooves can meet the requirements of stainless steel turning from finish machining to rough machining.

BF

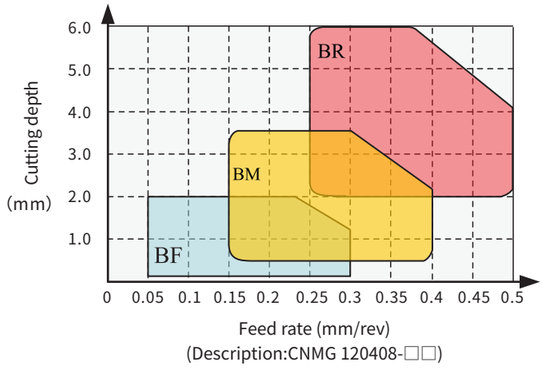
With low cutting force and strong chip control ability, the edge is a good solution for small cutting depth and finish machining.

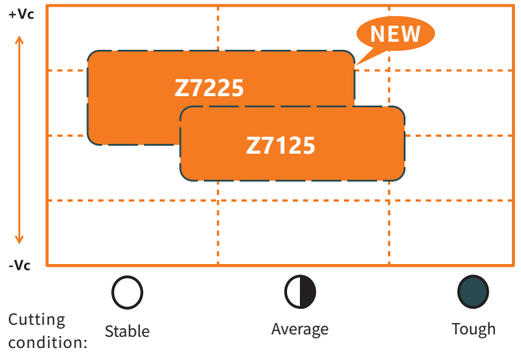
BM

The edge micro-machining technology guarantees both sharpness and high strength, and thus meet the machining requirements of high efficiency and long service life of stainless steel.

BR

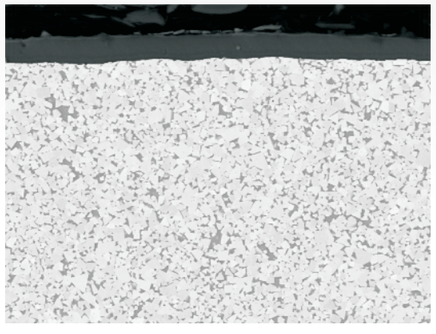
Thanks to the optimized design of chip breaking convex plate with high strength insert, it is suitable for intermittent machining of stainless steel and light-load rough machining.





New grade for stainless steel turning

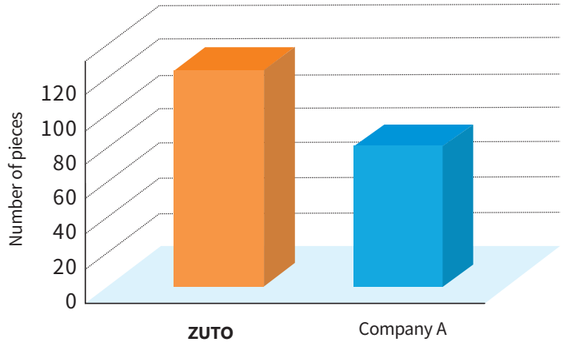
Z7225



Structure of Z7225

- The brand-new nano-gradient composite structure **"H²-Flex"** coating, strengthened by non-metal modified components, has ultra-high nano-hardness, good cohesion failure resistance and film-substrate adhesion.
- The well-distributed refined submicron hard phases and optimized bonding phase composition together improve the wear resistance and toughness of the substrate.

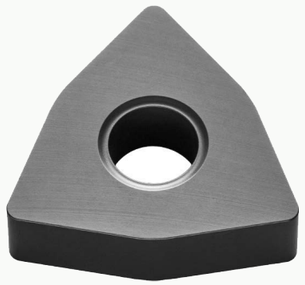
Workpiece material: SUS304
Machining method: wet external semi-finish turning Insert: VNMG160408-BM **Z7225**
Machining parameters: vc=170m/min, fn=0.2mm/r, ap=1.2mm

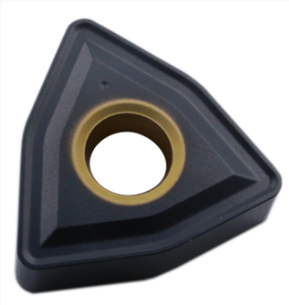


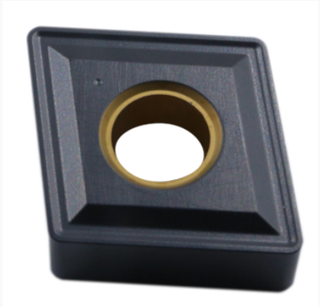
Cutting data (Z7225)

Chipbreaker	Cutting speed (m/min)	Feed rate (mm/r)	Cutting depth (mm)
BF	200 ~ 320	0.05 ~ 0.30	0.20 ~ 2.00
BM	150 ~ 240	0.15 ~ 0.40	0.50 ~ 3.50
BR	140 ~ 200	0.25 ~ 0.50	2.00 ~ 6.00

Cast iron turning







All-round chipbreaker: top choice for cast iron turning

Flat chipbreaker: applicable to cast iron turning under unstable working conditions

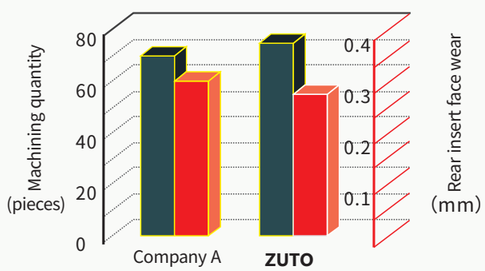
Structure of Z6115

Cutting data (HT300)

Chipbreaker Grade Cutting speed (m/min) Feed rate (mm/r) Cutting depth (mm) Machining type	All-round chipbreaker Z6115 250 --- 600 0.05 --- 0.20 0.20 --- 1.50 Finishing	All-round chipbreaker Flat chipbreaker Z6115 230 --- 550 0.10 --- 0.35 1.00 --- 3.00 Semi-finishing	All-round chipbreaker Flat chipbreaker Z6115 200 --- 500 0.30 --- 0.50 2.50 --- 5.00 Finishing

Cases of cast iron Material machining

Material of workpiece: ht250
Machining method: external turning
Insert: WNMG080412
All-round chipbreaker
Machining parameters:
vc=415m/min,
fn=0.25mm/r,
ap=1.2mm

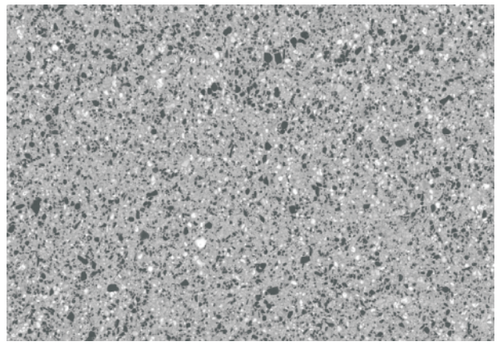


Cermet insert

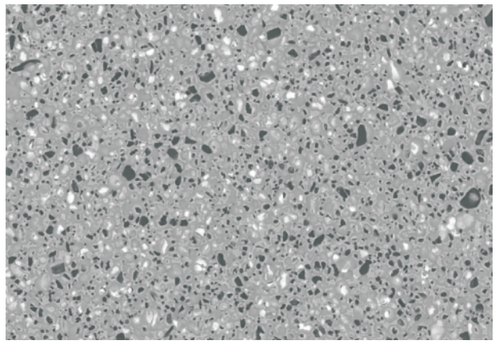
ZC10
ZC20

ZC10: It has excellent wear resistance, good chemical stability and solid adhesion resistance. Therefore, it is an appropriate solution for continuous high-speed turning of carbon steel, alloy steel, ductile iron, etc., with both high quality and high efficiency of finishing.

ZC20: With wide versatility, good wear resistance and collapse resistance, it is suitable for continuous and intermittent finishing and semi-finishing of carbon steel, alloy steel and ductile iron, providing both high surface quality and high machining efficiency.



Structure of ZC10



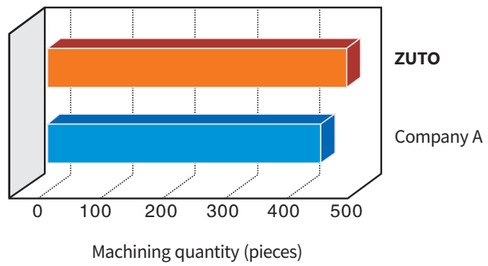
Structure of ZC20

Cutting data for cermet insert

Grade Material hardness	Z10 < 250HB	Z10 > 250HB	Z20 < 250HB	Z20 > 250HB
Cutting speed (m/min)	150 --- 300	150 --- 220	100 --- 250	100 --- 200
Feed rate (mm/r)	0.10 --- 0.30	0.05 --- 0.25	0.15 --- 0.35	0.10 --- 0.25
Cutting depth (mm)	0.20 --- 1.00	0.20 --- 0.80	0.40 --- 2.50	0.40 --- 2.00
Machining range	Finishing		Semi-finishing	

Machining case of cermet insert

Workpiece material: Gear shaft, 20MnTiB, 280-300HB
Machining method: Wet external and end face finish turning
Insert: WNMG080404HQ, Z20
Machining parameters: v_c=240m/min, f_n=0.15-0.25mm/r, external circle ap=0.4mm, end face ap=0.25mm



Grade code key

Z	8	2	25
①	②	③	④

①Grade code

②Classification codes

Number	5	6	7	8	9
Classification of materials	General	Cast iron	Stainless steel	Steel	High-temp alloy

③Number of grades in the same group

1—— 1st Gen

2—— 2nd Gen

3—— 3rd Gen

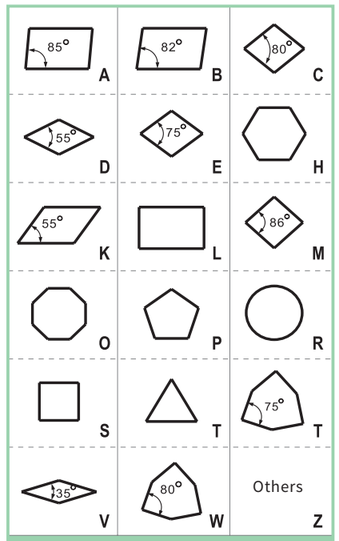
④ISO material classification number

05	10
15	20
25	30
35	40

Overview of general turning grades

Type	Material	ISO	CVD coating				PVD coating						Cemented carbide		Cermet		ISO
			New Z8115	Z8125	New Z8225	Z6115	Z9105	Z7115	Z7125	New Z7225	Z5125	Z5225	Z10	Z20	Z10	Z20	
P	Non-alloyed steel/Alloy steel	P01															P01
		P05															P05
		P10															P10
		P15															P15
		P20															P20
		P25															P25
		P30															P30
		P35															P35
		P40															P40
		P45															P45
		P50															P50
M	Stainless steel	M05															M05
		M10															M10
		M15															M15
		M20															M20
		M25															M25
		M30															M30
		M35															M35
		M40															M40
		M45															M45
K	Cast iron	K01															K01
		K05															K05
		K10															K10
		K15															K15
		K20															K20
		K25															K25
		K30															K30
		K35															K35
		K40															K40
		K45															K45
		K50															K50
N	Aluminum/Aluminum alloy	S01															S01
		S05															S05
		S10															S10
		S15															S15
		S20															S20
		S25															S25
		S30															S30
		S40															S40
S	High-temp alloy	N01															N01
		N05															N05
		N10															N10
		N15															N15
		N20															N20
		N25															N25
		N30															N30

General turning inserts code key



Shape code

Code	Hole	Chipbreaker	Insert section	Code	Hole	Chipbreaker	Insert section
B	Yes	N/A	> 65°	N	N/A	N/A	
H	Yes	Single-sided	> 65°	R	N/A	Single-sided	
C	Yes	N/A	> 65°	F	N/A	Double-sided	
J	Yes	Double-sided	> 65°	A	Yes	N/A	
W	Yes	N/A	≤ 65°	M	Yes	Single-sided	
T	Yes	Single-sided	≤ 65°	G	Yes	Double-sided	
Q	Yes	N/A	≤ 65°	X	---	---	special
U	Yes	Double-sided	≤ 65°				

Chipbreaker and clamping form

32.00			32					
31.75			31					
25.40			25	25				
25.00	25	25	25					
20.00			20					
19.05	19		19	19	33			
16.00		19	16					
15.875	16		15	15	27			
12.70	12	15	12	12	22	22	08	
12.00			12					
10.00			10					
9.525	09	11	09	09	16	16	06	16
8.00			08					
6.35	06	07			11	11		
6.00			06					
5.56					09			
5.50			05					
3.97					06			
Inscribed circle diameter (mm)	C	D	R	S	T	V	W	K
	Insert shape							

Cutting edge length

12	12.70
10	11.11
T9	9.72
09	9.52
07	7.94
T6	6.75
06	6.35
T5	5.95
05	5.56
T4	4.96
04	4.76
T3	3.97
03	3.18
T2	2.58
02	2.38
T1	1.98
01	1.59
T0	0.99
00	0.79
Code	Thickness (mm)

Insert thickness

C N M G

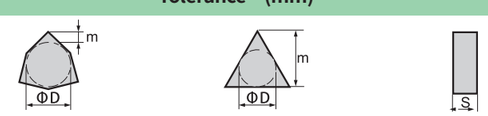
12 04 08 - GM (ISO)

4 3 2 (inch)

Major clearance angle

Code	Clearance angle	Code	Clearance angle
A	3°	B	5°
C	7°	D	15°
E	20°	F	25°
G	30°	N	0°
P	11°	O	Others

Tolerance (mm)



Class	Corner height (m)	Inscribed circle (ΦD)	Thickness (S)
A	±0.005	±0.025	±0.025
F	±0.005	±0.013	±0.025
C	±0.013	±0.025	±0.025
H	±0.013	±0.013	±0.025
E	±0.025	±0.025	±0.025
G	±0.025	±0.025	±0.13
J	±0.005	±0.05-±0.13	±0.025
K	±0.013	±0.05-±0.13	±0.025
L	±0.025	±0.05-±0.13	±0.025
M	±0.08-±0.18	±0.05-±0.13	±0.13
N	±0.08-±0.18	±0.05-±0.13	±0.025
U	±0.13-±0.38	±0.08-±0.25	±0.13

◆ Tolerance requirements M-class (Distinguished by shape and inscribed circle size)
◆ Corner height (m) tolerance

Inscribed circle	Regular triangle	Square	80° rhombus	55° rhombus	35° rhombus	Circular
6.35	±0.08	±0.08	±0.08	±0.11	±0.16	---
9.525	±0.08	±0.08	±0.08	±0.11	±0.16	---
12.7	±0.13	±0.13	±0.13	±0.15	---	---
15.875	±0.15	±0.15	±0.15	±0.18	---	---
19.05	±0.15	±0.15	±0.15	±0.18	---	---
25.4	---	±0.18	---	---	---	---

◆ Inscribed circle (ΦD) tolerance

Inscribed circle	Regular triangle	Square	80° rhombus	55° rhombus	35° rhombus	Circular
6.35	±0.05	±0.05	±0.05	±0.05	±0.05	---
9.525	±0.05	±0.05	±0.05	±0.05	±0.05	±0.05
12.7	±0.08	±0.08	±0.08	±0.08	---	±0.08
15.875	±0.10	±0.10	±0.10	±0.10	---	±0.10
19.05	±0.10	±0.10	±0.10	±0.10	---	±0.10
25.4	---	±0.13	---	---	---	±0.13

Inscribed circle

Code	Inscribed circle diameter (mm)
2	6.35
3	9.525
4	12.7
5	15.875
6	19.05
8	25.4

Thickness

Code	Thickness (mm)
2	3.18
3	4.76
4	6.35
5	7.94
6	9.52

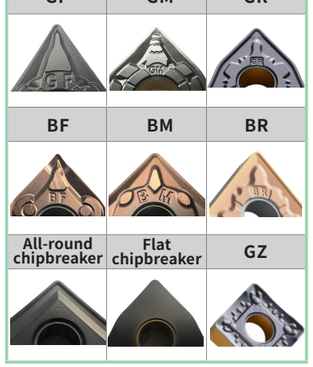
Corner radius

Code	Corner radius(mm)
0	0.2
1	0.4
2	0.8
3	1.2
4	1.6
5	2.0
6	2.4

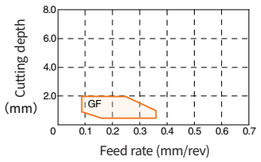
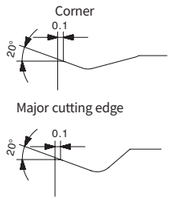
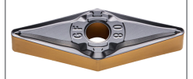
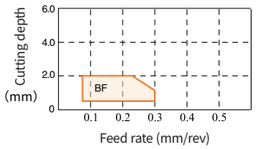
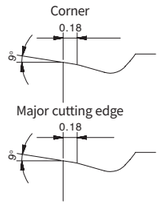
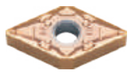
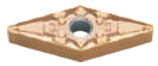
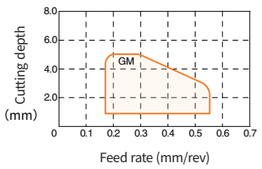
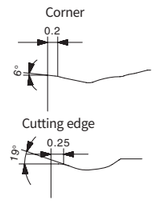
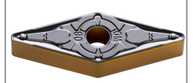
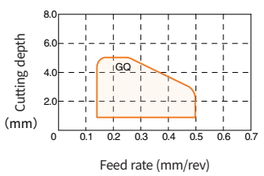
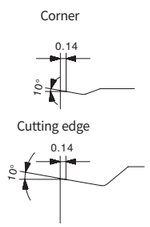
Corner radius code

Code	Corner radius (mm)
00	No fillet
02	0.2
04	0.4
08	0.8
12	1.2
16	1.6
20	2.0
24	2.4
32	3.2
X	Others
Insert diameter Mo (Metric)	Round insert

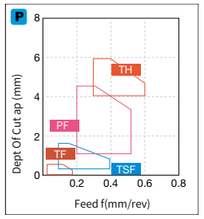
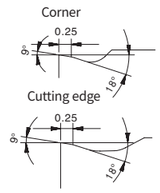
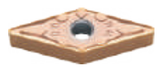
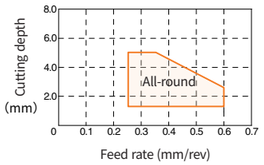
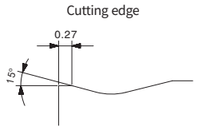
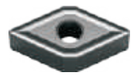
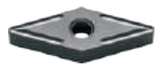
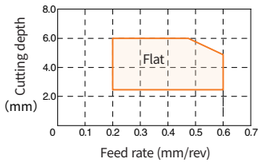
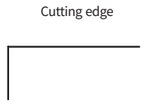
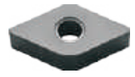
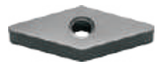
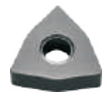
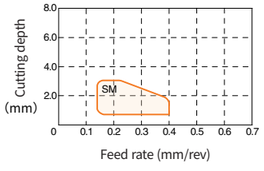
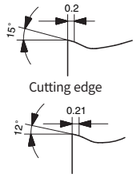
Chipbreaker code



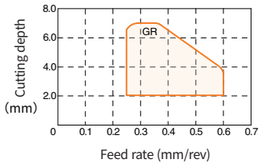
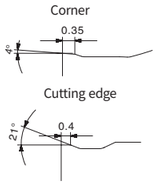
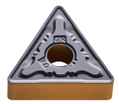
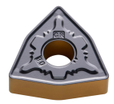
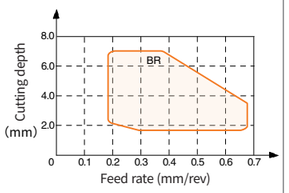
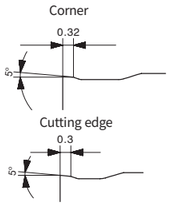
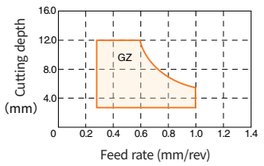
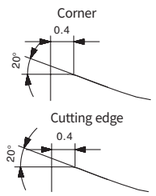
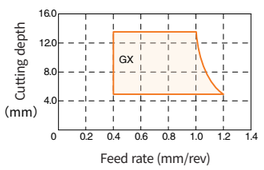
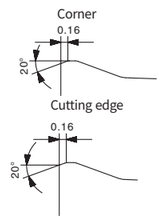
Overview of general turning inserts

Usage	Tolerance	Chipbreaker	Features	Chipbreaker diagram	Sectional view of chipbreaker		80° C-type	55° D-type	90° S-type	60° T-type	35° V-type	80° W-type
For finishing	M	GF	**Recommended chipbreaker for finishing of P-type material** ◆ Extra-large positive rake angle, less cutting resistance. ◆ Positive cutting inclination angle can well control chip flow direction. ◆ The two-stage chip breaking table ensures good chip breaking even at small cutting depth.				A19	A23	A26	A29	 A32	A33
		BF	**Recommended chipbreaker for finishing of M-type material** ◆ Sharp cutting edge, less cutting resistance. ◆ Good chip disposal performance even at small cutting depth.				A19	 A23	A26	A29	 A32	A34
For semi-finishing	M	GM	**Recommended chipbreaker for semi-finishing of P-type material** ◆ Special edge design, ensuring both sharpness and strength. ◆ The curved front face with variable cutting edge width and rake angle ensures the smooth flow and good control of chips. ◆ With high versatility and wide cutting range, efficient and consistent machining is achieved.				A19	A23	A26	A29	 A32	A34
		GQ	**Semi-finishing of P-type material** ◆ It is suitable for finishing to semi-finishing of P-type material. ◆ Good chip removal performance with high versatility.							A29		A34

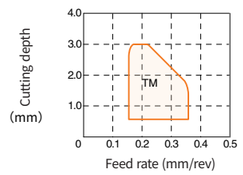
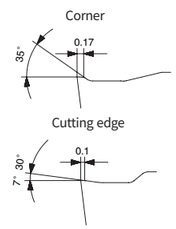
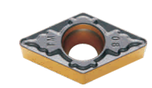
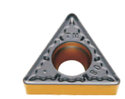
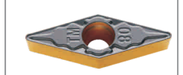
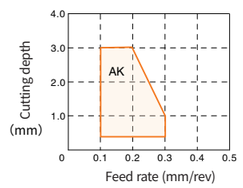
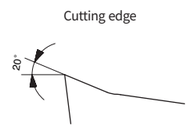
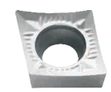
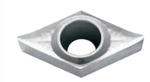
Overview of general turning inserts

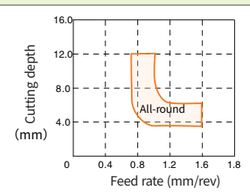
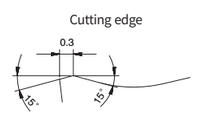
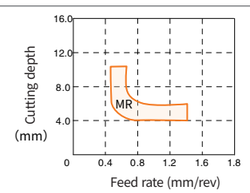
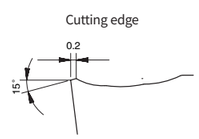
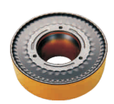
Usage	Tolerance	Chipbreaker	Features	Chipbreaker diagram	Sectional view of chipbreaker		80° C-type	55° D-type	90° S-type	60° T-type	35° V-type	80° W-type
For semi-finishing	M	**BM**	**Recommended chipbreaker for semi-finishing of stainless steel** ◆ Sharp cutting edge, less cutting resistance, good chip disposal performance even at small cutting depth. ◆ The micro-passivated cutting edge reduces the formation of build-up edge.				 A19	 A24	 A26	 A29	 A32	 A34
		All-round	**General machining chipbreaker** ◆ Double-sided chipbreaker, especially suitable for K-type material machining. ◆ Recommended cutting parameters				 A20	 A24	 A27	 A30	 A32	 A35
		Flat	**Machining grooves for brittle materials and H-type materials** ◆ With high structural strength and good fit to the cutter bar, it is more suitable for unstable cutting of cast iron.				 A20	 A25	 A27	 A30	 A33	 A35
		SM	**Semi-finish machining grooves for S-type material and titanium alloys** ◆ Light and fast in cutting, the influence of work hardening and build-up edge on insert is effectively reduced.				 A21	 A25				 A35

Overview of general turning inserts

Usage	Tolerance	Chipbreaker	Features	Chipbreaker diagram	Sectional view of chipbreaker		80° C-type	55° D-type	90° S-type	60° T-type	35° V-type	80° W-type
For rough machining	M	GR	**Recommended chipbreaker for roughing of P-type material** ◆ Chipbreaking table with raised corner can effectively control the chip flow direction at small cutting depth; ◆ With a large rake angle and wide chamfer, both insert strength and sharpness are ensured; ◆ Double-sided groove is more cost-effective with good chip removal performance and enhanced versatility; ◆ It is suitable for roughing and semi-finishing of light-load cutting.				 A21	 A25	 A27	 A30		 A35
		BR	**Recommended chipbreaker for roughing of M-type material** ◆ Even edge passivation; ◆ Optimized chipbreaker convex plate; ◆ With firm cutting chamfer and land, it is capable of intermittent and heavy finishing; ◆ Large chip space enable it to achieve roughing and high feed finishing.				 A21		 A28	 A31		 A35
For heavy machining	M	GZ	**Heavy machining chipbreaker for P-type material** ◆ The unique chipbreaker convex plate design on the rake face reduces the chip contact area at large cutting depth and provides excellent chip control. ◆ The sharp cutting edge can effectively reduce the cutting force.				 A21		 A28			
		GX	**Heavy machining chipbreaker for P-type material** ◆ The variable chamfer design and special chipbreaker provide excellent chip control. ◆ The strong cutting edge can bear great impact.				 A22		 A28			

Overview of general turning inserts

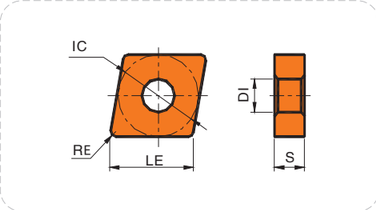
Usage	Tolerance	Chipbreaker	Features	Chipbreaker diagram	Sectional view of chipbreaker		80° C-type	55° D-type	90° S-type	60° T-type	35° V-type	80° W-type
For semi-finish machining	M	TM	**Genral chipbreaker for semi-finishing** ◆ It is suitable for internal or external semi-finishing of steel, stainless steel and cast iron.				 A38	 A39	 A40	 A41	 A42	
Aluminum alloy machining	G	AK	**Aluminum alloy machining chipbreaker** ◆ With a large rake angle and clearance angle, the cutting edge of the insert becomes sharper and therefore, cutting can be done in a faster and lighter pattern with effective chip breaking.				 A38	 A39		 A41	 A42	

Usage	Tolerance	Chipbreaker	Features	Chipbreaker diagram	Sectional view of chipbreaker		R–type
Profiling insert	M	All-round chipbreaker	◆ With high strength, the cutting edge secures high safety and is the first choice for rough profiling. ◆ It is suitable for train wheel turning.				A43
		MR	◆ Large chip-breaking space prevents chip blockage during large cutting depth machining. ◆ The small pit group improves the chip machining performance during small cutting depth machining. ◆ It is suitable for train wheel turning.				 A43

Usage	Tolerance	Chipbreaker	90° S-type	Chipbreaker	90° S-type
Planer milling machining	**M**	HAF	 A36	HSF	 A36

Usage	Tolerance	Chipbreaker	120° H–type	90° S-type
Pipe-stripping machining	**U**	BG	 A37	 A37

80° CN□□



Working condition: ● Stable ◕ Average ⌗ Tough

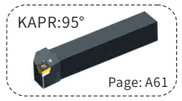
Workpiece material																	
P Steel	●	◕	◕⌗												●	◕
M Stainless steel								●◕	●◕							
K Cast iron				●◕												
N Non-ferrous metal													●	◕		
S Heat-resistant alloy Titanium alloy					●	◕										

Machining type	Insert shape	Type	Basic dimension (mm)					CVD				PVD						Cemented carbide		Cermet	
			LE	IC	S	DI	RE	Z8115	Z8125	Z8225	Z6115	Z9105	Z7115	Z7125	Z7225	Z5125	Z5225	Z10	K20	Z10	Z20
Finishing																					
		CNMG120404-GF	12.9	12.7	4.76	5.16	0.4	★	☆	★											
		CNMG120408-GF	12.9	12.7	4.76	5.16	0.8	★	☆	★											
Finishing																					
		CNMG120404-BF	12.9	12.7	4.76	5.16	0.4							☆	★						
		CNMG120408-BF	12.9	12.7	4.76	5.16	0.8							☆	★						
New Semi-finishing		CNMG120404-GM	12.9	12.7	4.76	5.16	0.4	★	☆	★											
		CNMG120408-GM	12.9	12.7	4.76	5.16	0.8	★	☆	★											
		CNMG120412-GM	12.9	12.7	4.76	5.16	1.2	★	☆	★											
		CNMG160608-GM	16.1	15.875	6.35	6.35	0.8	★	☆	★											
		CNMG160612-GM	16.1	15.875	6.35	6.35	1.2	★	☆	★											
		CNMG160616-GM	16.1	15.875	6.35	6.35	1.6	★	☆	★											
Roughing														☆	★						
		CNMG120408-PR	12.9	12.7	4.76	5.16	0.8							☆	★						
		CNMG120412-PR	12.9	12.7	4.76	5.16	1.2							☆	★						

★ Recommended grade ☆ Available grade

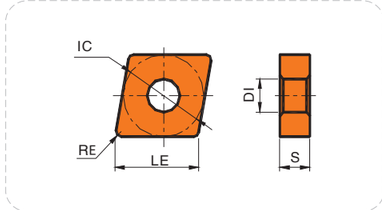
Applicable tools

KAPR:75°
Page: A61
PCBNR/L


KAPR:95°
Page: A61
PCLNR/L

KAPR:95°
Page: A67
MCLNR/L

80° CN□□



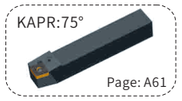
Working condition: ● Stable ◕ Average ⌗ Tough

Workpiece material																	
P Steel	●	◕	◕⌗												●	◕
M Stainless steel								●◕	●◕							
K Cast iron				●◕												
N Non-ferrous metal												●	◕			
S Heat-resistant alloy Titanium alloy					●	◕										

Machining type	Insert shape	Type	Basic dimension (mm)					CVD				PVD						Cemented carbide		Cermet	
			LE	IC	S	DI	RE	Z8115	Z8125	Z8225	Z6115	Z9105	Z7115	Z7125	Z7225	Z5125	Z5225	Z10	K20	Z10	Z20
Cast iron machining		CNMG120404	12.9	12.7	4.76	5.16	0.4				★										
		CNMG120408	12.9	12.7	4.76	5.16	0.8				★										
		CNMG120412	12.9	12.7	4.76	5.16	1.2				★										
		CNMG120416	12.9	12.7	4.76	5.16	1.6				★										
		CNMG160608	16.1	15.875	6.35	6.35	0.8				★										
		CNMG160612	16.1	15.875	6.35	6.35	1.2				★										
		CNMG160616	16.1	15.875	6.35	6.35	1.6				★										
		CNMG190612	19.3	19.05	6.35	7.94	1.2				★										
		CNMG190616	19.3	19.05	6.35	7.94	1.6				★										
Cast iron machining		CNMA120404	12.9	12.7	4.76	5.16	0.4				★										
		CNMA120408	12.9	12.7	4.76	5.16	0.8				★										
		CNMA120412	12.9	12.7	4.76	5.16	1.2				★										
		CNMA120416	12.9	12.7	4.76	5.16	1.6				★										
		CNMA160608	16.1	15.875	6.35	6.35	0.8				★										
		CNMA160612	16.1	15.875	6.35	6.35	1.2				★										
		CNMA160616	16.1	15.875	6.35	6.35	1.6				★										
		CNMA190612	19.3	19.05	6.35	7.94	1.2				★										
		CNMA190616	19.3	19.05	6.35	7.94	1.6				★										

★ Recommended grade ☆ Available grade

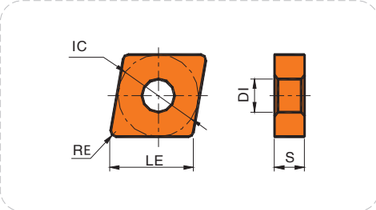
Applicable tools


KAPR:75°
Page: A61
PCBNR/L

KAPR:95°
Page: A61
PCLNR/L

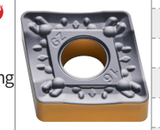
KAPR:95°
Page: A67
MCLNR/L

80° CN□□



Working condition: ● Stable ◕ Average ⌗ Tough

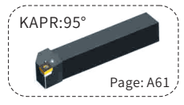
Workpiece material																
P Steel	●	◕	◕⌗											●	◕
M Stainless steel								●◕	●◕						
K Cast iron				●◕											
N Non-ferrous metal												●	◕		
S Heat-resistant alloy Titanium alloy						●	◕								

Machining type	Insert shape	Type	Basic dimension (mm)					CVD				PVD						Cemented carbide		Cermet	
			LE	IC	S	DI	RE	Z8115	Z8125	Z8225	Z6115	Z9105	Z7115	Z7125	Z7225	Z5125	Z5225	Z10	K20	Z10	Z20
New Semi-finishing		CNMG120404-SM	12.9	12.7	4.76	5.16	0.4					☆	★								
		CNMG120408-SM	12.9	12.7	4.76	5.16	0.8					☆	★								
		CNMG120412-SM	12.9	12.7	4.76	5.16	1.2					☆	★								
Rough machining		CNMG120408-GR	12.9	12.7	4.76	5.16	0.8	☆	☆	★											
		CNMG120412-GR	12.9	12.7	4.76	5.16	1.2	☆	☆	★											
		CNMG190608-GR	19.3	19.05	6.35	7.94	0.8	☆	☆	★											
		CNMG190612-GR	19.3	19.05	6.35	7.94	1.2	☆	☆	★											
Rough machining		CNMG120408-BR	12.9	12.7	4.76	5.16	0.8						☆	★							
		CNMG120412-BR	12.9	12.7	4.76	5.16	1.2						☆	★							
		CNMG190616-BR	19.3	19.05	6.35	7.94	1.6						☆	★							
New Heavy machining		CNMM190608-GZ	19.3	19.05	6.35	7.94	0.8	★		★											
		CNMM190612-GZ	19.3	19.05	6.35	7.94	1.2	★		★											
		CNMM190616-GZ	19.3	19.05	6.35	7.94	1.6	★		★											
		CNMM190624-GZ	19.3	19.05	6.35	7.94	2.4	★		★											
		CNMM250924-GZ	25.19	25.4	9.525	9.12	2.4	★		★											
		CNMM250932-GZ	25.19	25.4	9.525	9.12	3.2	★		★											

★ Recommended grade ☆ Available grade

Applicable tools

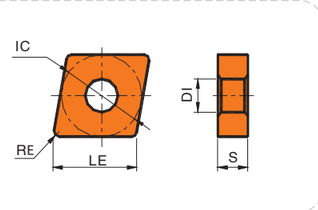
PCBNR/L



PCLNR/L

MCLNR/L

80° CN□□



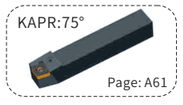
Working condition: ● Stable ◕ Average ⌗ Tough

Workpiece material																
P Steel	●	◕	◕⌗											●	◕
M Stainless steel								●◕	●◕						
K Cast iron			●◕												
N Non-ferrous metal												●	◕		
S Heat-resistant alloy Titanium alloy				●	◕										

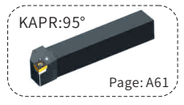
Machining type	Insert shape	Type	Basic dimension (mm)					CVD				PVD						Cemented carbide		Cermet	
			LE	IC	S	DI	RE	Z8115	Z8125	Z8225	Z6115	Z9105	Z7115	Z7125	Z7225	Z5125	Z5225	Z10	K20	Z10	Z20
New Heavy machining		CNMM190608-GX	19.3	19.05	6.35	7.94	0.8	★		★											
		CNMM190612-GX	19.3	19.05	6.35	7.94	1.2	★		★											
		CNMM190616-GX	19.3	19.05	6.35	7.94	1.6	★		★											
		CNMM190624-GX	19.3	19.05	6.35	7.94	2.4	★		★											
		CNMM250716-GX	25.19	25.4	7.94	9.12	1.6	★		★											
		CNMM250724-GX	25.19	25.4	7.94	9.12	2.4	★		★											
		CNMM250732-GX	25.19	25.4	7.94	9.12	3.2	★		★											
		CNMM250916-GX	25.19	25.4	9.525	9.12	1.6	★		★											
		CNMM250924-GX	25.19	25.4	9.525	9.12	2.4	★		★											
		CNMM250932-GX	25.19	25.4	9.525	9.12	3.2	★		★											

★ Recommended grade ☆ Available grade

Applicable tools



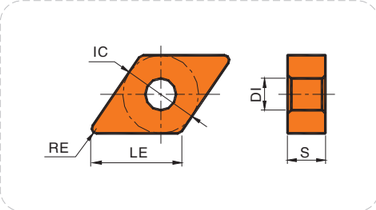
PCBNR/L



PCLNR/L

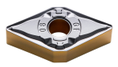
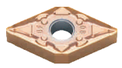
MCLNR/L

55°DN□□

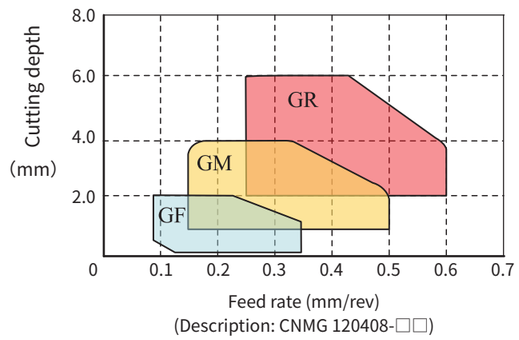


Working condition: ● Stable ◕ Average ⌗ Tough

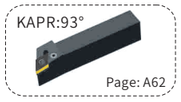
Workpiece material		Z8115	Z8125	Z8225	Z6115	Z9105	Z7115	Z7125	Z7225	Z5125	Z5225	Z10	K20	Z10	Z20
P	Steel	●	◕	◕⌗										●	◕
M	Stainless steel							●◕	●◕						
K	Cast iron				●◕										
N	Non-ferrous metal											●	◕		
S	Heat-resistant alloy Titanium alloy					●	◕								

Machining type	Insert shape	Type	LE	IC	S	DI	RE	Z8115	Z8125	Z8225	Z6115	Z9105	Z7115	Z7125	Z7225	Z5125	Z5225	Z10	K20	Z10	Z20
			Basic dimension (mm)					CVD				PVD						Cemented carbide		Cermet	
Finishing		DNMG150404-GF	15.5	12.7	4.76	5.16	0.4	★	☆	★											
		DNMG150408-GF	15.5	12.7	4.76	5.16	0.8	★	☆	★											
		DNMG150604-GF	15.5	12.7	6.35	5.16	0.4	★	☆	★											
		DNMG150608-GF	15.5	12.7	6.35	5.16	0.8	★	☆	★											
Finishing		DNMG150404-BF	15.5	12.7	4.76	5.16	0.4							☆	★						
		DNMG150408-BF	15.5	12.7	4.76	5.16	0.8							☆	★						
		DNMG150604-BF	15.5	12.7	6.35	5.16	0.4							☆	★						
		DNMG150608-BF	15.5	12.7	6.35	5.16	0.8							☆	★						
Semi-finishing	New	DNMG150404-GM	15.5	12.7	4.76	5.16	0.4	★	☆	★											
		DNMG150408-GM	15.5	12.7	4.76	5.16	0.8	★	☆	★											
		DNMG150412-GM	15.5	12.7	4.76	5.16	1.2	★	☆	★											
		DNMG150604-GM	15.5	12.7	6.35	5.16	0.4	★	☆	★											
		DNMG150608-GM	15.5	12.7	6.35	5.16	0.8	★	☆	★											
		DNMG150612-GM	15.5	12.7	6.35	5.16	1.2	★	☆	★											

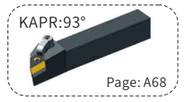
★ Recommended grade ☆ Available grade

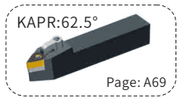


Applicable tools

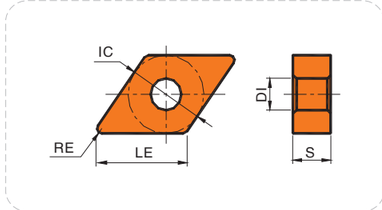

KAPR:93°
Page: A62
PDJNR/L

KAPR:62.5°
Page: A62
PDNN


KAPR:93°
Page: A68
MDJNR/L

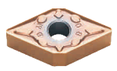
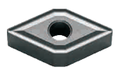

KAPR:62.5°
Page: A69
MDPNN

55°DN□□



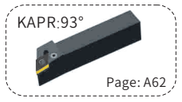
Working condition: ● Stable ◕ Average ⌗ Tough

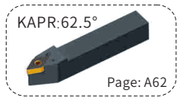
Workpiece material		Z8115	Z8125	Z8225	Z6115	Z9105	Z7115	Z7125	Z7225	Z5125	Z5225	Z10	K20	Z10	Z20
P	Steel	●	◕	◕⌗										●	◕
M	Stainless steel							●◕	●◕						
K	Cast iron				●◕										
N	Non-ferrous metal											●	◕		
S	Heat-resistant alloy Titanium alloy					●	◕								

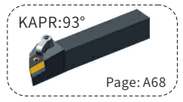
Machining type	Insert shape	Type	LE	IC	S	DI	RE	Z8115	Z8125	Z8225	Z6115	Z9105	Z7115	Z7125	Z7225	Z5125	Z5225	Z10	K20	Z10	Z20
			Basic dimension (mm)					CVD				PVD						Cemented carbide		Cermet	
Semi-finishing		DNMG150404-BM	15.5	12.7	4.76	5.16	0.4							☆	★						
		DNMG150408-BM	15.5	12.7	4.76	5.16	0.8							☆	★						
		DNMG150412-BM	15.5	12.7	4.76	5.16	1.2							☆	★						
		DNMG150604-BM	15.5	12.7	6.35	5.16	0.4							☆	★						
		DNMG150608-BM	15.5	12.7	6.35	5.16	0.8							☆	★						
		DNMG150612-BM	15.5	12.7	6.35	5.16	1.2							☆	★						
Cast iron machining		DNMG150404	15.5	12.7	4.76	5.16	0.4				★										
		DNMG150408	15.5	12.7	4.76	5.16	0.8				★										
		DNMG150412	15.5	12.7	4.76	5.16	1.2				★										
		DNMG150604	15.5	12.7	6.35	5.16	0.4				★										
		DNMG150608	15.5	12.7	6.35	5.16	0.8				★										
		DNMG150612	15.5	12.7	6.35	5.16	1.2				★										

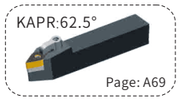
★ Recommended grade ☆ Available grade

Applicable tools

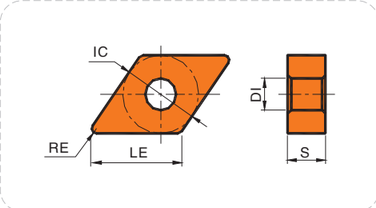

KAPR:93°
Page: A62
PDJNR/L


KAPR:62.5°
Page: A62
PDNN


KAPR:93°
Page: A68
MDJNR/L

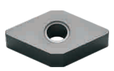
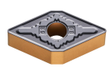

KAPR:62.5°
Page: A69
MDPNN

55°DN□□

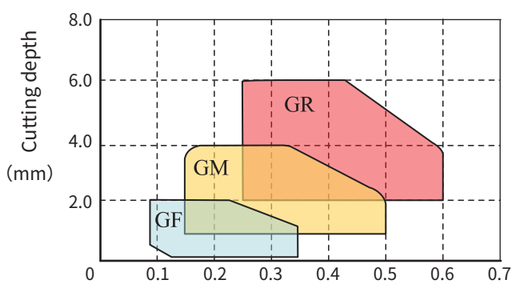


Working condition: ● Stable ◕ Average ⌗ Tough

Workpiece material																
P Steel	●	◕	⌗											●	◕
M Stainless steel							◕	◕							
K Cast iron				◕											
N Non-ferrous metal												●	◕		
S Heat-resistant alloy Titanium alloy					●	◕									

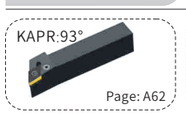
Machining type	Insert shape	Type	Basic dimension (mm)					CVD				PVD						Cemented carbide		Cermet	
			LE	IC	S	DI	RE	Z8115	Z8125	Z8225	Z6115	Z9105	Z7115	Z7125	Z7225	Z5125	Z5225	Z10	K20	Z10	Z20
Cast iron machining		DNMA150404	15.5	12.7	4.76	5.16	0.4				★										
		DNMA150408	15.5	12.7	4.76	5.16	0.8				★										
		DNMA150412	15.5	12.7	4.76	5.16	1.2				★										
		DNMA150604	15.5	12.7	6.35	5.16	0.4				★										
		DNMA150608	15.5	12.7	6.35	5.16	0.8				★										
		DNMA150612	15.5	12.7	6.35	5.16	1.2				★										
Semi-finishing	New	DNMG150404-SM	15.5	12.7	6.35	5.16	0.4					☆	★								
		DNMG150608-SM	15.5	12.7	6.35	5.16	0.8					☆	★								
		DNMG150612-SM	15.5	12.7	6.35	5.16	1.2					☆	★								
Rough machining		DNMG150608-GR	15.5	12.7	6.35	5.16	0.8	☆	☆	★											
		DNMG150612-GR	15.5	12.7	6.35	5.16	1.2	☆	☆	★											

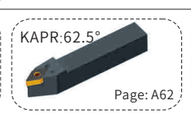
★ Recommended grade ☆ Available grade

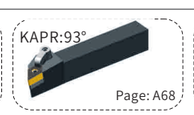


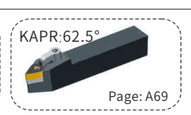
(Description: CNMG 120408-□□)

Applicable tools

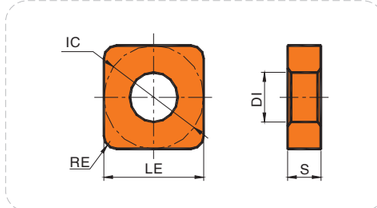

KAPR:93°
Page: A62
PDJNR/L


KAPR:62.5°
Page: A62
PDNN


KAPR:93°
Page: A68
MDJNR/L


KAPR:62.5°
Page: A69
MDPNN

90°SN□□



Working condition: ● Stable ◕ Average ⌗ Tough

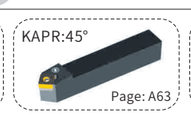
Workpiece material																
P Steel	●	◕	⌗											●	◕
M Stainless steel							◕	◕							
K Cast iron				◕											
N Non-ferrous metal												●	◕		
S Heat-resistant alloy Titanium alloy					●	◕									

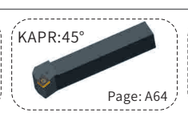
Machining type	Insert shape	Type	Basic dimension (mm)					CVD				PVD						Cemented carbide		Cermet	
			LE	IC	S	DI	RE	Z8115	Z8125	Z8225	Z6115	Z9105	Z7115	Z7125	Z7225	Z5125	Z5225	Z10	K20	Z10	Z20
Finishing		SNMG120404-GF	12.7	12.7	4.76	5.16	0.4	★	☆	★											
		SNMG120408-GF	12.7	12.7	4.76	5.16	0.8	★	☆	★											
Finishing		SNMG120404-BF	12.7	12.7	4.76	5.16	0.4							☆	★						
		SNMG120408-BF	12.7	12.7	4.76	5.16	0.8							☆	★						
Semi-finishing	New	SNMG120404-GM	12.7	12.7	4.76	5.16	0.4	★	☆	★											
		SNMG120408-GM	12.7	12.7	4.76	5.16	0.8	★	☆	★											
		SNMG120412-GM	12.7	12.7	4.76	5.16	1.2	★	☆	★											
Semi-finishing		SNMG120404-BM	12.7	12.7	4.76	5.16	0.4							☆	★						
		SNMG120408-BM	12.7	12.7	4.76	5.16	0.8							☆	★						
		SNMG120412-BM	12.7	12.7	4.76	5.16	1.2							☆	★						

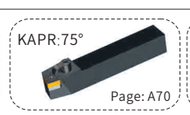
★ Recommended grade ☆ Available grade

Applicable tools

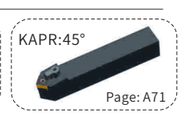
KAPR:75°
Page: A63
PSBNR/L


KAPR:45°
Page: A63
PSDNN

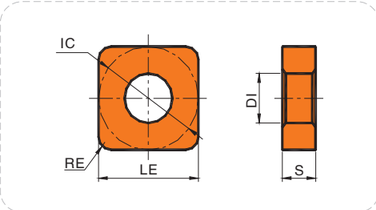

KAPR:45°
Page: A64
PSKNR/L


KAPR:75°
Page: A70
MSBNR/L

KAPR:75°
Page: A71
MSKNR/L


KAPR:45°
Page: A71
MSDNN

90°SN□□



Working condition: ● Stable ◕ Average ⌗ Tough

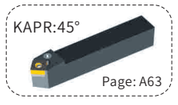
Workpiece material															
P Steel	●	◕	⌗										●	◕
M Stainless steel							◕	◕						
K Cast iron				◕										
N Non-ferrous metal											●	◕		
S Heat-resistant alloy Titanium alloy					●	◕								

Machining type	Insert shape	Type	Basic dimension (mm)					CVD				PVD						Cemented carbide		Cermet	
			LE	IC	S	DI	RE	Z8115	Z8125	Z8225	Z6115	Z9105	Z7115	Z7125	Z7225	Z5125	Z5225	Z10	K20	Z10	Z20
Cast iron machining		SNMG120404	12.7	12.7	4.76	5.16	0.4			★											
		SNMG120408	12.7	12.7	4.76	5.16	0.8			★											
		SNMG120412	12.7	12.7	4.76	5.16	1.2			★											
		SNMG150608	15.875	15.875	6.35	6.35	0.8			★											
		SNMG150612	15.875	15.875	6.35	6.35	1.2			★											
		SNMG150616	15.875	15.875	6.35	6.35	1.6			★											
		SNMG190612	19.05	19.05	6.35	7.94	1.2			★											
		SNMG190616	19.05	19.05	6.35	7.94	1.6			★											
Cast iron machining		SNMA120404	12.7	12.7	4.76	5.16	0.4			★											
		SNMA120408	12.7	12.7	4.76	5.16	0.8			★											
		SNMA120412	12.7	12.7	4.76	5.16	1.2			★											
		SNMA150608	15.875	15.875	6.35	6.35	0.8			★											
		SNMA150612	15.875	15.875	6.35	6.35	1.2			★											
		SNMA150616	15.875	15.875	6.35	6.35	1.6			★											
		SNMA190612	19.05	19.05	6.35	7.94	1.2			★											
		SNMA190616	19.05	19.05	6.35	7.94	1.6			★											
Rough machining		SNMG120408-GR	12.7	12.7	4.76	5.16	0.8	☆	☆	★											
		SNMG120412-GR	12.7	12.7	4.76	5.16	1.2	☆	☆	★											
		SNMG190608-GR	19.05	19.05	6.35	7.94	0.8	☆	☆	★											
		SNMG190612-GR	19.05	19.05	6.35	7.94	1.2	☆	☆	★											
		SNMG190616-GR	19.05	19.05	6.35	7.94	1.6	☆	☆	★											

★ Recommended grade ☆ Available grade

Applicable tools

PSBNR/L

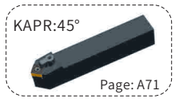


PSDNN

PSKNR/L

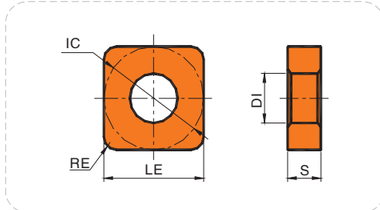
MSBNR/L

MSKNR/L



MSDNN

90°SN□□



Working condition: ● Stable ◕ Average ⌗ Tough

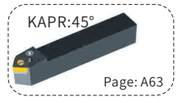
Workpiece material															
P Steel	●	◕	⌗										●	◕
M Stainless steel							◕	◕						
K Cast iron				◕										
N Non-ferrous metal											●	◕		
S Heat-resistant alloy Titanium alloy					●	◕								

Machining type	Insert shape	Type	Basic dimension (mm)					CVD				PVD						Cemented carbide		Cermet	
			LE	IC	S	DI	RE	Z8115	Z8125	Z8225	Z6115	Z9105	Z7115	Z7125	Z7225	Z5125	Z5225	Z10	K20	Z10	Z20
Rough machining																					
		SNMG120408-BR	12.7	12.7	4.76	5.16	0.8							☆	★						
		SNMG120412-BR	12.7	12.7	4.76	5.16	1.2							☆	★						
Heavy machining	New	SNMM190608-GZ	19.05	19.05	6.35	7.94	0.8	★		★											
		SNMM190612-GZ	19.05	19.05	6.35	7.94	1.2	★		★											
		SNMM190616-GZ	19.05	19.05	6.35	7.94	1.6	★		★											
		SNMM190624-GZ	19.05	19.05	6.35	7.94	2.4	★		★											
		SNMM250924-GZ	25.4	25.4	9.525	9.12	2.4	★		★											
		SNMM250932-GZ	25.4	25.4	9.525	9.12	3.2	★		★											
Heavy machining	New	SNMM190608-GX	19.05	19.05	6.35	7.94	0.8	★		★											
		SNMM190612-GX	19.05	19.05	6.35	7.94	1.2	★		★											
		SNMM190616-GX	19.05	19.05	6.35	7.94	1.6	★		★											
		SNMM190624-GX	19.05	19.05	6.35	7.94	2.4	★		★											
		SNMM250716-GX	25.4	25.4	7.94	9.12	1.6	★		★											
		SNMM250724-GX	25.4	25.4	7.94	9.12	2.4	★		★											
		SNMM250732-GX	25.4	25.4	7.94	9.12	3.2	★		★											
		SNMM250916-GX	25.4	25.4	9.525	9.12	1.6	★		★											
		SNMM250924-GX	25.4	25.4	9.525	9.12	2.4	★		★											
		SNMM250932-GX	25.4	25.4	9.525	9.12	3.2	★		★											

★ Recommended grade ☆ Available grade

Applicable tools

PSBNR/L

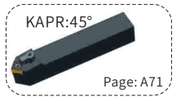


PSDNN

PSKNR/L

MSBNR/L

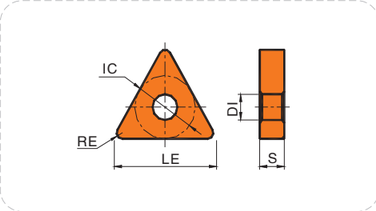
MSKNR/L



MSDNN

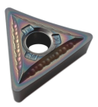
ZUTO HITECH METAL

60°TN□□



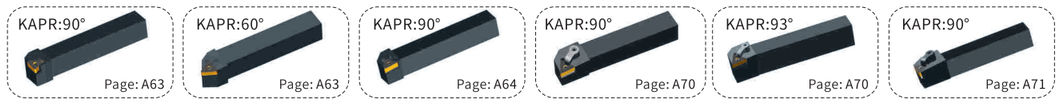
Working condition: ● Stable ◕ Average ⌗ Tough

Workpiece material																	
P Steel	●	◕	⌗												●	◕	
M Stainless steel								◕	◕								
K Cast iron				◕													
N Non-ferrous metal													●	◕			
S Heat-resistant alloy Titanium alloy					●	◕											

Machining type	Insert shape	Type	Basic dimension (mm)					CVD				PVD						Cemented carbide		Cermet	
			LE	IC	S	DI	RE	Z8115	Z8125	Z8225	Z6115	Z9105	Z7115	Z7125	Z7225	Z5125	Z5225	Z10	K20	Z10	Z20
Finishing																					
		TNMG160404-GF	16.5	9.525	4.76	3.81	0.4	★	☆	★											
		TNMG160408-GF	16.5	9.525	4.76	3.81	0.8	★	☆	★											
Finishing																					
		TNMG160404-BF	16.5	9.525	4.76	3.81	0.4							☆	★						
		TNMG160408-BF	16.5	9.525	4.76	3.81	0.8							☆	★						
Semi-finishing		TNMG160404-K99	16.5	9.525	4.76	3.81	0.4							★	☆	★					
		TNMG160408-K99	16.5	9.525	4.76	3.81	0.8							★	☆	★					
		TNMG160412-K99	16.5	9.525	4.76	3.81	1.2							★	☆	★					
		TNMG220412-K99	22	12.7	4.76	5.16	1.2							★	☆	★					
Semi-finishing		TNMG160404-E99	16.5	9.525	4.76	3.81	0.4							☆	★						
		TNMG160408-E99	16.5	9.525	4.76	3.81	0.8							☆	★						
		TNMG160412-E99	16.5	9.525	4.76	3.81	1.2							☆	★						
Semi-finishing		TNMG160404-SE6326I	16.5	9.525	4.76	3.81	0.4	★		★											
		TNMG160408-SE6326I	16.5	9.525	4.76	3.81	0.8	★		★											
		TNMG160412-SE6326I	16.5	9.525	4.76	3.81	1.2	★		★											

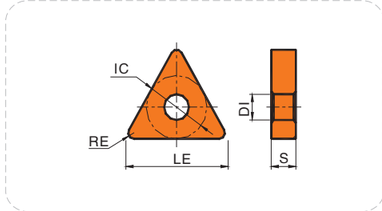
★ Recommended grade ☆ Available grade

Applicable tools



PTFNR/L PTTNR/L PTGNR/L MTGNR/L MTJNR/L MTFNR/L

60°TN□□

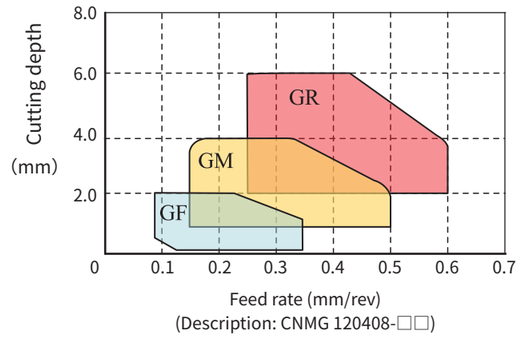


Working condition: ● Stable ◕ Average ⌗ Tough

Workpiece material																	
P Steel	●	◕	⌗												●	◕	
M Stainless steel								◕	◕								
K Cast iron				◕													
N Non-ferrous metal												●	◕				
S Heat-resistant alloy Titanium alloy					●	◕											

Machining type	Insert shape	Type	Basic dimension (mm)					CVD				PVD						Cemented carbide		Cermet	
			LE	IC	S	DI	RE	Z8115	Z8125	Z8225	Z6115	Z9105	Z7115	Z7125	Z7225	Z5125	Z5225	Z10	K20	Z10	Z20
Cast iron machining		TNMG160404	16.5	9.525	4.76	3.81	0.4				★										
		TNMG160408	16.5	9.525	4.76	3.81	0.8				★										
		TNMG160212	16.5	9.525	4.76	3.81	1.2				★										
		TNMG220408	22	12.7	4.76	5.16	0.8				★										
		TNMG220412	22	12.7	4.76	5.16	1.2				★										
		TNMG220416	22	12.7	4.76	5.16	1.6				★										
Cast iron machining		TNMA160404	16.5	9.525	4.76	3.81	0.4				★										
		TNMA160408	16.5	9.525	4.76	3.81	0.8				★										
		TNMA160412	16.5	9.525	4.76	3.81	1.2				★										
		TNMA220408	22	12.7	4.76	5.16	0.8				★										
		TNMA220412	22	12.7	4.76	5.16	1.2				★										
		TNMA220416	22	12.7	4.76	5.16	1.6				★										
Rough machining																					
		TNMG160408-GR	16.5	9.525	4.76	3.81	0.8	☆	☆	★											
		TNMG160412-GR	16.5	9.525	4.76	3.81	1.2	☆	☆	★											

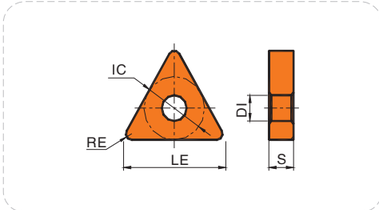
★ Recommended grade ☆ Available grade



Applicable tools

PTFNR/L PTTNR/L PTGNR/L MTGNR/L MTJNR/L MTFNR/L

60°TN□□

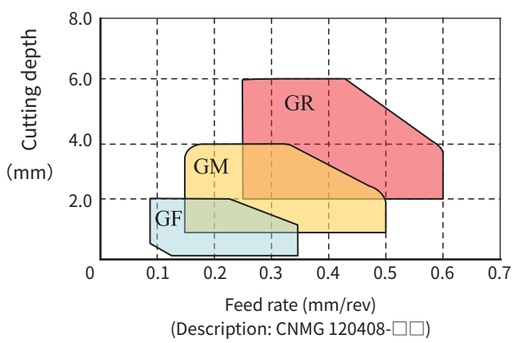


Working condition: ● Stable ◕ Average ⌗ Tough

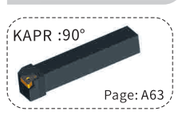
Workpiece material																
P Steel	●	◕	◕⌗											●	◕
M Stainless steel								●◕	●◕						
K Cast iron				●◕											
N Non-ferrous metal												●	◕		
S Heat-resistant alloy Titanium alloy						●	◕								

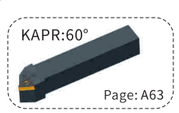
Machining type	Insert shape	Type	Basic dimension (mm)					CVD				PVD					Cemented carbide		Cermet	
			LE	IC	S	DI	RE	Z8115	Z8125	Z8225	Z6115	Z9105	Z7115	Z7125	Z7225	Z5125	Z5225	Z10	K20	Z10	Z20
Rough machining		TNMG160408-BR	16.5	9.525	4.76	3.81	0.8							☆	★						
		TNMG160412-BR	16.5	9.525	4.76	3.81	1.2							☆	★						

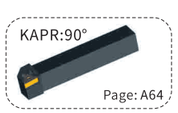
★ Recommended grade ☆ Available grade

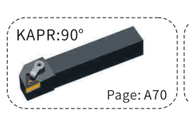


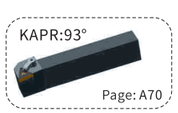
Applicable tools


KAPR :90°
Page: A63
PTFNR/L


KAPR:60°
Page: A63
PTTNR/L

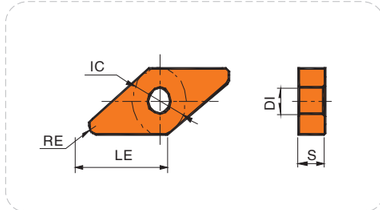

KAPR:90°
Page: A64
PTGNR/L


KAPR:90°
Page: A70
MTGNR/L


KAPR:93°
Page: A70
MTJNR/L

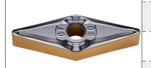
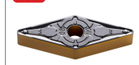
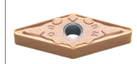
KAPR:90°
Page: A71
MTFNR/L

35°VN□□



Working condition: ● Stable ◕ Average ⌗ Tough

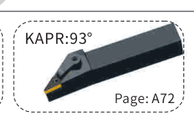
Workpiece material																
P Steel	●	◕	◕⌗											●	◕
M Stainless steel							●◕	●◕							
K Cast iron				●◕											
N Non-ferrous metal											●	◕			
S Heat-resistant alloy Titanium alloy					●	◕									

Machining type	Insert shape	Type	Basic dimension (mm)					CVD				PVD						Cemented carbide		Cermet	
			LE	IC	S	DI	RE	Z8115	Z8125	Z8225	GK1105	Z9105	Z7115	Z7125	Z7225	Z5125	Z5225	Z10	K20	Z10	Z20
Finishing		VNMG160404-GF	16.6	9.525	4.76	3.81	0.4	★	☆	★											
		VNMG160408-GF	16.6	9.525	4.76	3.81	0.8	★	☆	★											
Finishing		VNMG160404-BF	16.6	9.525	4.76	3.81	0.4							☆	★						
		VNMG160408-BF	16.6	9.525	4.76	3.81	0.8							☆	★						
Semi-finishing	New 	VNMG160404-GM	16.6	9.525	4.76	3.81	0.4	★	☆	★											
		VNMG160408-GM	16.6	9.525	4.76	3.81	0.8	★	☆	★											
		VNMG160412-GM	16.6	9.525	4.76	3.81	1.2	★	☆	★											
Semi-finishing		VNMG160404-BM	16.6	9.525	4.76	3.81	0.4							☆	★						
		VNMG160408-BM	16.6	9.525	4.76	3.81	0.8							☆	★						
		VNMG160412-BM	16.6	9.525	4.76	3.81	1.2							☆	★						
Cast iron machining		VNMG160404-UK	16.6	9.525	4.76	3.81	0.4				★										
		VNMG160408-UK	16.6	9.525	4.76	3.81	0.8				★										

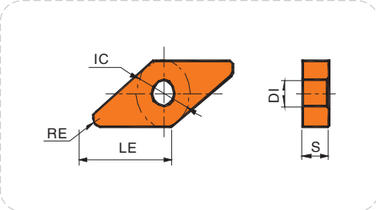
★ Recommended grade ☆ Available grade

Applicable tools

KAPR:72.5°
Page: A71
MVVNN

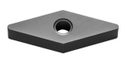

KAPR:93°
Page: A72
MVJNR/L

35°VN□□



Working condition: ● Stable ◕ Average ⌗ Tough

Workpiece material																	
P Steel	●	◕	◕⌗												●	◕
M Stainless steel								●◕	●◕							
K Cast iron				●◕												
N Non-ferrous metal													●	◕		
S Heat-resistant alloy Titanium alloy					●	◕										

Machining type	Insert shape	Type	Basic dimension (mm)					CVD				PVD						Cemented carbide		Cermet	
			LE	IC	S	DI	RE	Z8115	Z8125	Z8225	Z6115	Z9105	Z7115	Z7125	Z7225	Z5125	Z5225	Z10	K20	Z10	Z20
Cast iron machining																					
		VNMA160404	16.6	9.525	4.76	3.81	0.4				★										
		VNMA160408	16.6	9.525	4.76	3.81	0.8				★										

★ Recommended grade ☆ Available grade

Applicable tools

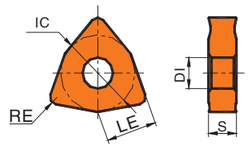
KAPR:72.5°

Page: A71
MVVNN

KAPR:93°

Page: A72
MVJNR/L

80°WN□□



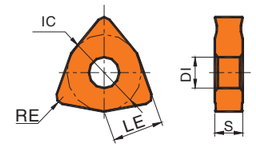
Working condition: ● Stable ◕ Average ⌗ Tough

Workpiece material																	
P Steel	●	◕	◕⌗												●	◕
M Stainless steel								●◕	●◕							
K Cast iron				●◕												
N Non-ferrous metal													●	◕		
S Heat-resistant alloy Titanium alloy					●	◕										

Machining type	Insert shape	Type	Basic dimension (mm)					CVD				PVD						Cemented carbide		Cermet	
			LE	IC	S	DI	RE	WO8115	WO8125	WO8225	WO6115	WO9105	WO7115	WO7125	WO7225	WO5125	WO5225	WK10	WK20	WC10	WC20
Finishing																					
		WNMG080404-GF	8.7	12.7	4.76	5.16	0.4	★	☆	★											
		WNMG080408-GF	8.7	12.7	4.76	5.16	0.8	★	☆	★											

★ Recommended grade ☆ Available grade

80°WN□□



Working condition: ● Stable ◕ Average ⌗ Tough

Workpiece material																	
P Steel	●	◕	◕⌗												●	◕
M Stainless steel								●◕	●◕							
K Cast iron				●◕												
N Non-ferrous metal												●	◕			
S Heat-resistant alloy Titanium alloy					●	◕										

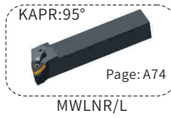
Machining type	Insert shape	Type	Basic dimension (mm)					CVD				PVD						Cemented carbide		Cermet	
			LE	IC	S	DI	RE	Z8115	Z8125	Z8225	Z6115	Z9105	Z7115	Z7125	Z7225	Z5125	Z5225	Z10	K20	Z10	Z20
Finishing		WNMG080402-BF	8.7	12.7	4.76	5.16	0.2							☆	★						
		WNMG080404-BF	8.7	12.7	4.76	5.16	0.4							☆	★						
		WNMG080408-BF	8.7	12.7	4.76	5.16	0.8							☆	★						
Semi-finishing	New	WNMG080404-GM	8.7	12.7	4.76	5.16	0.4	★	☆	★											
		WNMG080408-GM	8.7	12.7	4.76	5.16	0.8	★	☆	★											
		WNMG080412-GM	8.7	12.7	4.76	5.16	1.2	★	☆	★											
Semi-finishing	New	WNMG080404-GQ	8.7	12.7	4.76	5.16	0.4	★		★											
		WNMG080408-GQ	8.7	12.7	4.76	5.16	0.8	★		★											
		WNMG080412-GQ	8.7	12.7	4.76	5.16	1.2	★		★											
Semi-finishing		WNMG06T312-BM	6.6	9.525	3.97	3.81	0.8							☆	★						
		WNMG060412-BM	6.6	9.525	4.76	3.81	1.2							☆	★						
		WNMG080404-BM	8.7	12.7	4.76	5.16	0.4							☆	★						
		WNMG080408-BM	8.7	12.7	4.76	5.16	0.8							☆	★						
		WNMG080412-BM	8.7	12.7	4.76	5.16	1.2							☆	★						

★ Recommended grade ☆ Available grade

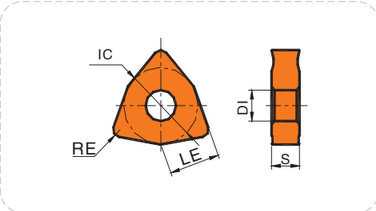
Applicable tools

KAPR:95°

Page: A66
PWLNR/L

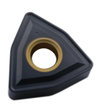
KAPR:95°

Page: A74
MWLNR/L

80°WN□□



Working condition: ● Stable ◕ Average ⌗ Tough

Workpiece material																	
P Steel	●	◕	⌗											●	◕
M Stainless steel								◕	◕						
K Cast iron				◕											
N Non-ferrous metal												●	◕		
S Heat-resistant alloy Titanium alloy					●	◕									

Machining type	Insert shape	Type	Basic dimension (mm)					CVD				PVD						Cemented carbide		Cermet	
			LE	IC	S	DI	RE	GK1105	GK2105	GK3105	GK4105	Z9105	Z7115	Z7125	Z7225	Z5125	Z5225	Z10	K20	Z10	Z20
Cast iron machining		WNMG080404-UK	8.7	12.7	4.76	5.16	0.4	★													
		WNMG080408-UK	8.7	12.7	4.76	5.16	0.8	★													
		WNMG080412-UK	8.7	12.7	4.76	5.16	1.2	★													
Cast iron machining		WNMA060404	6.6	9.525	4.76	3.81	0.4	★													
		WNMA060408	6.6	9.525	4.76	3.81	0.8	★													
		WNMA080404	8.7	12.7	4.76	5.16	0.4	★													
		WNMA080408	8.7	12.7	4.76	5.16	0.8	★													
		WNMA080412	8.7	12.7	4.76	5.16	1.2	★													
		WNMA080416	8.7	12.7	4.76	5.16	1.6	★													
Semi-finishing		WNMG080404-SM	8.7	12.7	4.76	5.16	0.4					☆	★								
		WNMG080408-SM	8.7	12.7	4.76	5.16	0.8					☆	★								
		WNMG080412-SM	8.7	12.7	4.76	5.16	1.2					☆	★								
Rough machining		WNMG080408-GR	8.7	12.7	4.76	5.16	0.8	☆	☆	★											
		WNMG080412-GR	8.7	12.7	4.76	5.16	1.2	☆	☆	★											
Rough machining		WNMG080408-BR	8.7	12.7	4.76	5.16	0.8							☆	★						
		WNMG080412-BR	8.7	12.7	4.76	5.16	1.2							☆	★						

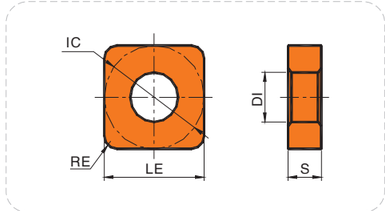
★ Recommended grade ☆ Available grade

Applicable tools

PWLNR/L

MWLNR/L

Planer insert



Working condition: ● Stable ◕ Average ⌗ Tough

Workpiece material																	
P Steel	●	◕	⌗											●	◕
M Stainless steel								◕	◕						
K Cast iron				◕											
N Non-ferrous metal												●	◕		
S Heat-resistant alloy Titanium alloy					●	◕									

Machining type	Insert shape	Type	Basic dimension (mm)					CVD				PVD						Cemented carbide		Cermet	
			LE	IC	S	DI	RE	Z8115	Z8125	Z8225	Z6115	Z9105	Z7115	Z7125	Z7225	Z5125	Z5225	Z10	K20	Z10	Z20
Planer machining		SNMG120404-HAF	12.7	12.7	4.76	5.16	0.4							☆	★						
Planer machining		SNMG120404-HSF	12.7	12.7	4.76	5.16	0.4							☆	★						

★ Recommended grade ☆ Available grade

Applicable tools

PSBNR/L

PSDNN

PSKNR/L

PSSNR/L

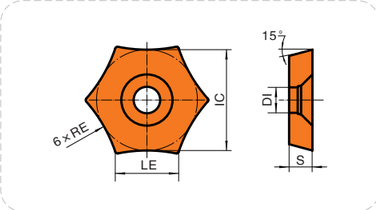
MSBNR/L

MSRNR/L

MSKNR/L

MSDNN

Pipe-stripping insert

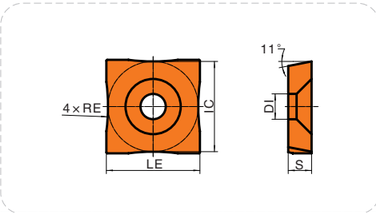


Working condition: ● Stable ◕ Average ⌗ Tough

Workpiece material		Z8115	Z8125	Z8225	Z6115	Z9105	Z7115	Z7125	Z7225	Z5125	Z5225	Z10	K20	Z10	Z20
P	Steel	●	◕	◕⌗										●	◕
M	Stainless steel							●◕	●◕						
K	Cast iron				●◕										
N	Non-ferrous metal											●	◕		
S	Heat-resistant alloy Titanium alloy					●	◕								

Machining type	Insert shape	Type	Basic dimension (mm) LE	IC	S	DI	RE	CVD Z8115	Z8125	Z8225	Z6115	PVD Z9105	Z7115	Z7125	Z7225	Z5125	Z5225	Cemented carbide Z10	K20	Cermet Z10	Z20
Pipe-stripping machining		HDUB250414-BG	12.663	20.58	4.76	5.16	14	★	☆	★											
		HDUB250417-BG	12.663	20.58	4.76	5.16	17	★	☆	★											
		HDUB250422-BG	12.663	20.58	4.76	5.16	22	★	☆	★											
		HDUB250430-BG	12.663	20.58	4.76	5.16	30	★	☆	★											
		HDUB250440-BG	12.663	20.58	4.76	5.16	40	★	☆	★											
		HDUB250450-BG	12.663	20.58	4.76	5.16	50	★	☆	★											

★ Recommended grade ☆ Available grade



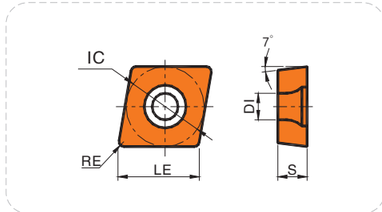
Working condition: ● Stable ◕ Average ⌗ Tough

Workpiece material		WO8115	WO8125	WO8225	WO6115	WO9105	WO7115	WO7125	WO7225	WO5125	WO5225	WK10	WK20	WC10	WC20
P	Steel	●	◕	◕⌗										●	◕
M	Stainless steel							●◕	●◕						
K	Cast iron				●◕										
N	Non-ferrous metal											●	◕		
S	Heat-resistant alloy Titanium alloy					●	◕								

Machining type	Insert shape	Type	Basic dimension (mm) LE	IC	S	DI	RE	CVD WO8115	WO8125	WO8225	WO6115	PVD WO9105	WO7115	WO7125	WO7225	WO5125	WO5225	Cemented carbide WK10	WK20	Cermet WC10	WC20
Pipe-stripping machining		SPUB190409–BG	19.05	19.05	4.76	5.16	9.5	★	☆	★											
		SPUB190412–BG	19.05	19.05	4.76	5.16	12	★	☆	★											
		SPUB190415–BG	19.05	19.05	4.76	5.16	15	★	☆	★											
		SPUB190420–BG	19.05	19.05	4.76	5.16	20	★	☆	★											
		SPUB190425–BG	19.05	19.05	4.76	5.16	25	★	☆	★											
		SPUB190432–BG	19.05	19.05	4.76	5.16	32	★	☆	★											

★ Recommended grade ☆ Available grade

80°CC□□



Working condition: ● Stable ◕ Average ⌗ Tough

Workpiece material		Z8115	Z8125	Z8225	Z6115	Z9105	Z7115	Z7125	Z7225	Z5125	Z5225	Z10	K20	Z10	Z20
P	Steel	●	◕	◕⌗										●	◕
M	Stainless steel							●◕	●◕						
K	Cast iron				●◕										
N	Non-ferrous metal											●	◕		
S	Heat-resistant alloy Titanium alloy					●	◕								

Machining type	Insert shape	Type	Basic dimension (mm) LE	IC	S	DI	RE	CVD Z8115	Z8125	Z8225	Z6115	PVD Z9105	Z7115	Z7125	Z7225	Z5125	Z5225	Cemented carbide Z10	K20	Cermet Z10	Z20
Finishing		CCGT060202-AK	6.4	6.35	2.38	2.8	0.2											★	☆		
		CCGT060204-AK	6.4	6.35	2.38	2.8	0.4											★	☆		
		CCGT09T302-AK	9.7	9.525	3.97	4.4	0.2											★	☆		
		CCGT09T304-AK	9.7	9.525	3.97	4.4	0.4											★	☆		
		CCGT120404-AK	12.9	12.7	4.76	5.56	0.4											★	☆		
		CCGT120408-AK	12.9	12.7	4.76	5.56	0.8											★	☆		
Semi-finishing		CCMT060204-TM	6.4	6.35	2.38	2.8	0.4	★	☆	★			☆	★							
		CCMT060208-TM	6.4	6.35	2.38	2.8	0.8	★	☆	★			☆	★							
		CCMT09T304-TM	9.7	9.525	3.97	4.4	0.4	★	☆	★			☆	★							
		CCMT09T308-TM	9.7	9.525	3.97	4.4	0.8	★	☆	★			☆	★							
		CCMT120404-TM	12.9	12.7	4.76	5.56	0.4	★	☆	★			☆	★							
		CCMT120408-TM	12.9	12.7	4.76	5.56	0.8	★	☆	★			☆	★							
		CCMT120412-TM	12.9	12.7	4.76	5.56	1.2	★	☆	★			☆	★							

★ Recommended grade ☆ Available grade

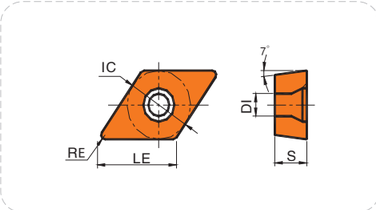
Applicable tools

KAPR:95°

Page: A76

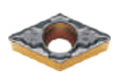
S□□-SCLCR/L

55°DC□□



Working condition: ● Stable ◕ Average ⌗ Tough

Workpiece material																
P Steel	●	◕	◕⌗											●	◕
M Stainless steel								●◕	●◕						
K Cast iron				●◕											
N Non-ferrous metal													●	◕	
S Heat-resistant alloy Titanium alloy						●	◕								

Machining type	Insert shape	Type	Basic dimension (mm)					CVD				PVD					Cemented carbide		Cermet	
			LE	IC	S	DI	RE	Z8115	Z8125	Z8225	Z6115	Z9105	Z7115	Z7125	Z7225	Z5125	Z5225	Z10	K20	Z10	Z20
Finishing		DCGT070202-AK	7.8	6.35	2.38	2.8	0.2											★	☆		
		DCGT070204-AK	7.8	6.35	2.38	2.8	0.4											★	☆		
		DCGT11T302-AK	11.6	9.525	3.97	4.4	0.2											★	☆		
		DCGT11T304-AK	11.6	9.525	3.97	4.4	0.4											★	☆		
Semi-finishing		DCMT070204-TM	7.8	6.35	2.38	2.8	0.4	★	☆	★				☆	★						
		DCMT070208-TM	7.8	6.35	2.38	2.8	0.8	★	☆	★				☆	★						
		DCMT11T304-TM	11.6	9.525	3.97	4.4	0.4	★	☆	★				☆	★						
		DCMT11T308-TM	11.6	9.525	3.97	4.4	0.8	★	☆	★				☆	★						
		DCMT11T312-TM	11.6	9.525	3.97	4.4	1.2	★	☆	★				☆	★						

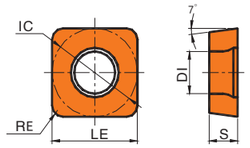
★ Recommended grade ☆ Available grade

Applicable tools

S□□-SDQCR/L

S□□-SDUCR/L

90°SC□□



Working condition: ● Stable ◕ Average ⌗ Tough

Workpiece material																
P Steel	●	◕	◕⌗											●	◕
M Stainless steel							●◕	●◕							
K Cast iron				●◕											
N Non-ferrous metal												●	◕		
S Heat-resistant alloy Titanium alloy					●	◕									

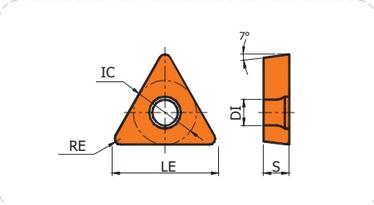
Machining type	Insert shape	Type	Basic dimension (mm)					CVD				PVD					Cemented carbide		Cermet	
			LE	IC	S	DI	RE	Z8115	Z8125	Z8225	Z6115	Z9105	Z7115	Z7125	Z7225	Z5125	Z5225	Z10	K20	Z10	Z20
Semi-finishing		SCMT09T304-TM	9.525	9.525	3.97	4.4	0.4	★	☆	★				☆	★						
		SCMT09T308-TM	9.525	9.525	3.97	4.4	0.8	★	☆	★				☆	★						
		SCMT120404-TM	12.7	12.7	4.76	5.56	0.4	★	☆	★				☆	★						
		SCMT120408-TM	12.7	12.7	4.76	5.56	0.8	★	☆	★				☆	★						
		SCMT120412-TM	12.7	12.7	4.76	5.56	1.2	★	☆	★				☆	★						

★ Recommended grade ☆ Available grade

Applicable tools

S□□-SSKCR/L

60°TP / TC



Working condition: ● Stable ◕ Average ⌗ Tough

Workpiece material																		
P	Steel	●	◕	⌗												●	◕
M	Stainless steel							◕	◕								
K	Cast iron				◕												
N	Non-ferrous metal													●	◕		
S	Heat-resistant alloy Titanium alloy					●	◕										

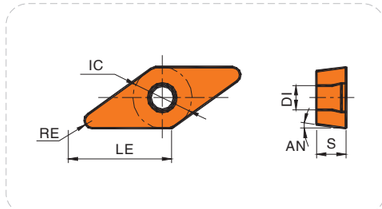
Machining type	Insert shape	Type	Basic dimension (mm)					CVD				PVD						Uncoated Carbide		Cermet	
			LE	IC	S	DI	RE	Z8115	Z8125	Z8225	Z6115	Z9105	Z7115	EA77	SE7346	Z5125	Z5225	Z10	K20	Z10	SE7366
Finishing		TCGT090204-AK	9.7	5.56	2.38	2.8	0.4											★	☆		
		TCGT110204-AK	11.0	6.35	2.38	2.8	0.4											★	☆		
		TCGT16T304-AK	16.5	9.525	3.97	4.4	0.4											★	☆		
Semi-finishing		TCMT110204-TM	11.0	6.35	2.38	2.8	0.4	★	☆	★				☆	★						
		TCMT110208-TM	11.0	6.35	2.38	2.8	0.8	★	☆	★				☆	★						
		TCMT16T304-TM	16.5	9.525	3.97	4.4	0.4	★	☆	★				☆	★						
		TCMT16T308-TM	16.5	9.525	3.97	4.4	0.8	★	☆	★				☆	★						
		TCMT16T312-TM	16.5	9.525	3.97	4.4	1.2	★	☆	★				☆	★						
Finishing	CERMET	TPGT060102L	9.7	5.56	2.38	2.8	0.4							★	★						★
		TPGT060104L	11.0	6.35	2.38	2.8	0.4							★	★						★
		TPGH080202L	16.5	9.525	3.97	4.4	0.4							★	★						★
		TPGH090202L	16.5	9.525	3.97	4.4	0.4							★	★						★
		TPGH090204L	11.0	6.35	2.38	2.8	0.4							★	★						★
	PVD	TPGH090208L	11.0	6.35	2.38	2.8	0.8							★	★						★
		TPGH110302L	16.5	9.525	3.97	4.4	0.4							★	★						★
		TPGH110304L	16.5	9.525	3.97	4.4	0.8							★	★						★
		TPGH110308L	16.5	9.525	3.97	4.4	1.2							★	★						★

★ Recommended grade ☆ Available grade

Applicable tools

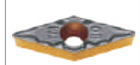
S□□-STFCR/L

35°VB&VC□□



Working condition: ● Stable ◕ Average ⌗ Tough

Workpiece material																		
P	Steel	●	◕	⌗												●	◕
M	Stainless steel						◕	◕									
K	Cast iron			◕													
N	Non-ferrous metal											●	◕				
S	Heat-resistant alloy Titanium alloy				●	◕											

Machining type	Insert shape	Type	Basic dimension (mm)						CVD				PVD						Cemented carbide		Cermet	
			LE	IC	S	DI	RE	AN	Z8115	Z8125	Z8225	Z6115	Z9105	Z7115	Z7125	Z7225	Z5125	Z5225	Z10	K20	Z10	Z20
Finishing		VBGT160402-AK	16.5	9.525	4.76	4.4	0.2	5.0											★	☆		
		VBGT160404-AK	16.5	9.525	4.76	4.4	0.4	5.0											★	☆		
		VBGT160408-AK	16.5	9.525	4.76	4.4	0.8	5.0											★	☆		
		VCGT110302-AK	11.0	6.35	3.18	2.8	0.2	7.0											★	☆		
		VCGT110304-AK	11.0	6.35	3.18	2.8	0.4	7.0											★	☆		
		VCGT160402-AK	16.5	9.525	4.76	4.4	0.2	7.0											★	☆		
		VCGT160404-AK	16.5	9.525	4.76	4.4	0.4	7.0											★	☆		
		VCGT160408-AK	16.5	9.525	4.76	4.4	0.8	7.0											★	☆		
Semi-finishing		VBMT110304-TM	11.0	6.35	3.18	2.8	0.4	5.0	★	☆	★				☆	★						
		VBMT110308-TM	11.0	6.35	3.18	2.8	0.8	5.0	★	☆	★				☆	★						
		VBMT160404-TM	16.5	9.525	4.76	4.4	0.4	5.0	★	☆	★				☆	★						
		VBMT160408-TM	16.5	9.525	4.76	4.4	0.8	5.0	★	☆	★				☆	★						
		VBMT160412-TM	16.5	9.525	4.76	4.4	1.2	5.0	★	☆	★				☆	★						
		VCMT110304-TM	11.0	6.35	3.18	2.8	0.4	7.0	★	☆	★				☆	★						
		VCMT110308-TM	11.0	6.35	3.18	2.8	0.8	7.0	★	☆	★				☆	★						
		VCMT160404-TM	16.5	9.525	4.76	4.4	0.4	7.0	★	☆	★				☆	★						
		VCMT160408-TM	16.5	9.525	4.76	4.4	0.8	7.0	★	☆	★				☆	★						
		VCMT160412-TM	16.5	9.525	4.76	4.4	1.2	7.0	★	☆	★				☆	★						

★ Recommended grade ☆ Available grade

Applicable tools

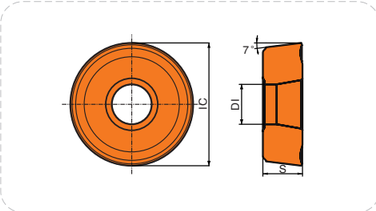
S□□-SVQCR/L

S□□-SVUCR/L

S□□-SVQBR/L

S□□-SVUBR/L

Profile turning insert



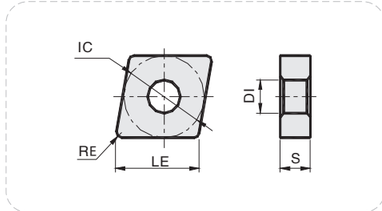
Working condition: ● Stable ◕ Average ⌗ Tough

Workpiece material																
P	Steel	●	◕	◕⌗											●	◕
M	Stainless steel								◕	◕						
K	Cast iron				◕	◕										
N	Non-ferrous metal												●	◕		
S	Heat-resistant alloy Titanium alloy						●	◕								

Machining type	Insert shape	Type	Basic dimension (mm)			CVD				PVD						Cemented carbide		Cermet	
			IC	S	DI	Z8115	Z8125	Z8225	Z6115	Z9105	Z7115	Z7125	Z7225	Z5125	Z5225	Z10	K20	Z10	Z20
Profiling		RCMX1003MO	10	3.18	3.6	★	☆	★											
		RCMX1204MO	12	4.76	4.4	★	☆	★											
		RCMX1606MO	16	6.35	5.5	★	☆	★											
		RCMX2006MO	20	6.35	6.5	★	☆	★											
		RCMX2507MO	25	7.94	7.2	★	☆	★											
		RCMX3209MO	32	9.525	9.5	★	☆	★											
Profiling		RCMX1606MO-MR	16	6.35	5.5	★	☆	★											
		RCMX2006MO-MR	20	6.35	6.5	★	☆	★											
		RCMX2507MO-MR	25	7.94	7.2	★	☆	★											

★ Recommended grade ☆ Available grade

Cermet insert

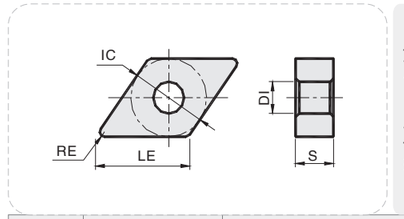


Working condition: ● Stable ◕ Average ⌗ Tough

Workpiece material																
P	Steel	●	◕	◕⌗											●	◕
M	Stainless steel							◕	◕							
K	Cast iron				◕											
N	Non-ferrous metal											●	◕			
S	Heat-resistant alloy Titanium alloy					●	◕									

Machining type	Insert shape	Type	Basic dimension (mm)					CVD				PVD						Cemented carbide		Cermet	
			LE	IC	S	DI	RE														
Finishing and semi-machining																					
		CNMG120404HQ	12.9	12.7	4.76	5.16	0.4													★	★
		CNMG120408HQ	12.9	12.7	4.76	5.16	0.8													★	★

★ Recommended grade ☆ Available grade



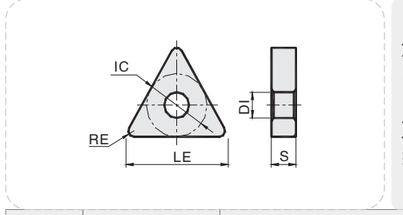
Working condition: ● Stable ◕ Average ⌗ Tough

Workpiece material																
P	Steel	●	◕	◕⌗											●	◕
M	Stainless steel							◕	◕							
K	Cast iron				◕											
N	Non-ferrous metal											●	◕			
S	Heat-resistant alloy Titanium alloy					●	◕									

Machining type	Insert shape	Type	Basic dimension (mm)					CVD				PVD						Cemented carbide		Cermet	
			LE	IC	S	DI	RE	Z8115	Z8125	Z8225	Z6115	Z9105	Z7115	Z7125	Z7225	Z5125	Z5225	Z10	K20	Z10	Z20
Finishing and semi-machining																					
		DNMG150404HQ	15.5	12.7	4.76	5.16	0.4													★	★
		DNMG150408HQ	15.5	12.7	4.76	5.16	0.8													★	★

★ Recommended grade ☆ Available grade

Cermet insert



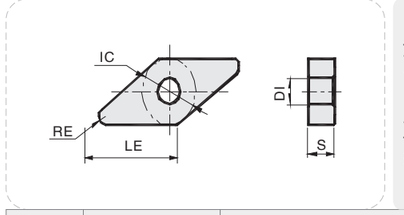
Working condition: ● Stable ◕ Average ⌗ Tough

Workpiece material																		
P Steel	●	◕	◕⌗													●	◕
M Stainless steel								●◕	●◕								
K Cast iron				●◕													
N Non-ferrous metal													●	◕			
S Heat-resistant alloy Titanium alloy					●	◕											

Machining type	Insert shape	Type	Basic dimension (mm)					CVD				PVD						Cemented carbide		Cermet	
			LE	IC	S	DI	RE	Z8115	Z8125	Z8225	Z6115	Z9105	Z7115	Z7125	Z7225	Z5125	Z5225	Z10	K20	Z10	Z20
Finishing and semi-machining		TNMG160404HQ	16.5	9.525	4.76	3.81	0.4													★	★
		TNMG160408HQ	16.5	9.525	4.76	3.81	0.8													★	★

★ Recommended grade ☆ Available grade

Cermet insert

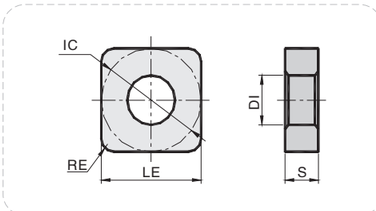


Working condition: ● Stable ◕ Average ⌗ Tough

Workpiece material																		
P Steel	●	◕	◕⌗													●	◕
M Stainless steel										●◕	●◕						
K Cast iron				●◕													
N Non-ferrous metal												●	◕				
S Heat-resistant alloy Titanium alloy					●	◕											

Machining type	Insert shape	Type	Basic dimension (mm)					CVD				PVD						Cemented carbide		Cermet	
			LE	IC	S	DI	RE	Z8115	Z8125	Z8225	Z6115	Z9105	Z7115	Z7125	Z7225	Z5125	Z5225	Z10	K20	Z10	Z20
Finishing and semi-machining		VNMG160404HQ	16.5	9.525	4.76	3.81	0.4													★	★
		VNMG160408HQ	16.5	9.525	4.76	3.81	0.8													★	★

★ Recommended grade ☆ Available grade

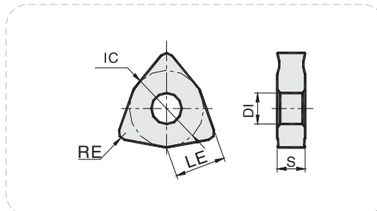


Working condition: ● Stable ◕ Average ⌗ Tough

Workpiece material																		
P Steel	●	◕	◕⌗													●	◕
M Stainless steel								●◕	●◕								
K Cast iron				●◕													
N Non-ferrous metal												●	◕				
S Heat-resistant alloy Titanium alloy					●	◕											

Machining type	Insert shape	Type	Basic dimension (mm)					CVD				PVD						Cemented carbide		Cermet	
			LE	IC	S	DI	RE	Z8115	Z8125	Z8225	Z6115	Z9105	Z7115	Z7125	Z7225	Z5125	Z5225	Z10	K20	Z10	Z20
Finishing and semi-machining		SNMG120404HQ	12.7	12.7	4.76	5.16	0.4													★	★

★ Recommended grade ☆ Available grade



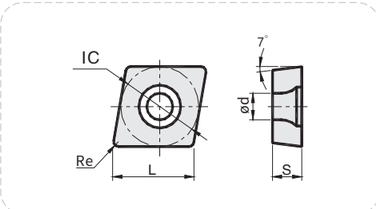
Working condition: ● Stable ◕ Average ⌗ Tough

Workpiece material																		
P Steel	●	◕	◕⌗													●	◕
M Stainless steel								●◕	●◕								
K Cast iron				●◕													
N Non-ferrous metal												●	◕				
S Heat-resistant alloy Titanium alloy					●	◕											

Machining type	Insert shape	Type	Basic dimension (mm)					CVD				PVD						Cemented carbide		Cermet	
			LE	IC	S	DI	RE	Z8115	Z8125	Z8225	Z6115	Z9105	Z7115	Z7125	Z7225	Z5125	Z5225	Z10	K20	Z10	Z20
Finishing and semi-machining		WNMG080404HQ	8.7	12.7	4.76	5.16	0.4													★	★
		WNMG080408HQ	8.7	12.7	4.76	5.16	0.8													★	★

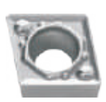
★ Recommended grade ☆ Available grade

Cermet insert



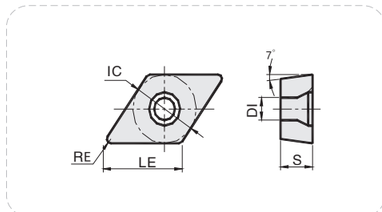
Working condition: ● Stable ◕ Average ⌗ Tough

Workpiece material																		
P	Steel	●	◕	◕⌗												●	◕
M	Stainless steel							●◕	●◕								
K	Cast iron				●◕												
N	Non-ferrous metal												●	◕			
S	Heat-resistant alloy Titanium alloy					●	◕										

Machining type	Insert shape	Type	Basic dimension (mm)					CVD				PVD						Cemented carbide		Cermet	
			LE	IC	S	DI	RE	Z8115	Z8125	Z8225	Z6115	Z9105	Z7115	Z7125	Z7225	Z5125	Z5225	Z10	K20	Z10	Z20
Finishing and semi-machining		CCMT060204HQ	6.4	6.35	2.38	2.8	0.4													★	★
		CCMT09T304HQ	9.7	9.525	3.97	4.4	0.4													★	★
		CCMT09T308HQ	9.7	9.525	3.97	4.4	0.8													★	★
		CPMH090308HQ	9.7	9.525	3.18	4.4	0.8													★	★

★ Recommended grade ☆ Available grade

Cermet insert

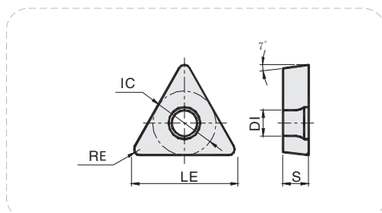


Working condition: ● Stable ◕ Average ⌗ Tough

Workpiece material																		
P	Steel	●	◕	◕⌗												●	◕
M	Stainless steel							●◕	●◕								
K	Cast iron				●◕												
N	Non-ferrous metal												●	◕			
S	Heat-resistant alloy Titanium alloy					●	◕										

Machining type	Insert shape	Type	Basic dimension (mm)					CVD				PVD						Cemented carbide		Cermet	
			LE	IC	S	DI	RE	Z8115	Z8125	Z8225	Z6115	Z9105	Z7115	Z7125	Z7225	Z5125	Z5225	Z10	K20	Z10	Z20
Finishing and semi-machining		DCMT070202HQ	7.8	6.35	2.38	2.8	0.2													★	★
		DCMT070204HQ	7.8	6.35	2.38	2.8	0.4													★	★
		DCMT070208HQ	7.8	6.35	2.38	2.8	0.8													★	★
		DCMT11T302HQ	11.6	9.525	3.97	4.4	0.2													★	★
		DCMT11T304HQ	11.6	9.525	3.97	4.4	0.4													★	★
		DCMT11T308HQ	11.6	9.525	3.97	4.4	0.8													★	★

★ Recommended grade ☆ Available grade



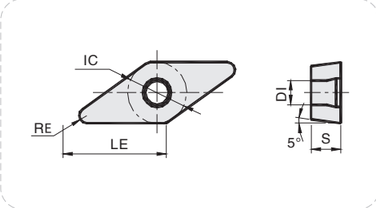
Working condition: ● Stable ◕ Average ⌗ Tough

Workpiece material																		
P	Steel	●	◕	◕⌗												●	◕
M	Stainless steel							●◕	●◕								
K	Cast iron				●◕												
N	Non-ferrous metal												●	◕			
S	Heat-resistant alloy Titanium alloy					●	◕										

Machining type	Insert shape	Type	Basic dimension (mm)					CVD				PVD						Cemented carbide		Cermet	
			LE	IC	S	DI	RE	Z8115	Z8125	Z8225	Z6115	Z9105	Z7115	Z7125	Z7225	Z5125	Z5225	Z10	K20	Z10	Z20
Finishing and semi-machining		TCMT110204-PS	11.0	6.35	2.38	2.8	0.4													★	★

★ Recommended grade ☆ Available grade

Cermet insert



Working condition: ● Stable ◕ Average ⌗ Tough

Workpiece material		Z8115	Z8125	Z8225	Z6115	Z9105	Z7115	Z7125	Z7225	Z5125	Z5225	Z10	K20	Z10	Z20
P	Steel	●	◕	◕ ⌗										●	◕
M	Stainless steel							● ◕	● ◕						
K	Cast iron				● ◕										
N	Non-ferrous metal											●	◕		
S	Heat-resistant alloy Titanium alloy					●	◕								

Machining type	Insert shape	Type	Basic dimension (mm) LE	IC	S	DI	RE	CVD Z8115	Z8125	Z8225	Z6115	PVD Z9105	Z7115	Z7125	Z7225	Z5125	Z5225	Cemented carbide Z10	K20	Cermet Z10	Z20
Finishing and semi-finishing		VBMT110304-HQ	11.0	6.35	3.18	2.8	0.4													★	★
		VBMT110308-HQ	11.0	6.35	3.18	2.8	0.8													★	★

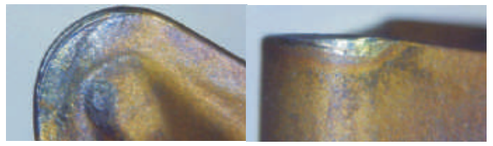
★ Recommended grade ☆ Available grade

Application - P-type material turning

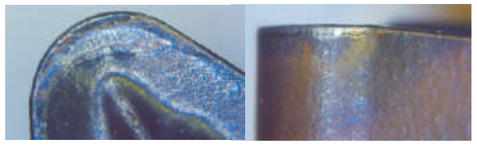
Flange plate

- Workpieces materials: 40Cr，quenching and tempering
- Machining method: Finishing of end face
- Insert: DNMG150408-GF WO8115Vc=338.5m/min，
- Machining parameters: f_n=0.14~0.32mm/r，ap=0.2mmWater cooling
- Cooling method

After machining 200 workpieces, **ZUTO** products have less wear extent on rear insert face andbetter surface quality.



Company A

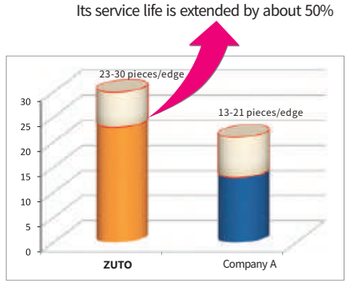


GF

Hub unit

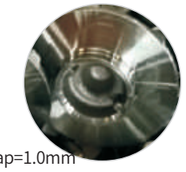
- Workpieces materials: 65Mn
- Machining method: Semi-finishing of end face
- Insert: WNMG080408-GF
- Machining parameters: WO8115Vc=330m/min，f n=0.3mm/r，ap=0.8mm
- Cooling method: Water cooling

Its service life is extended by about 50%

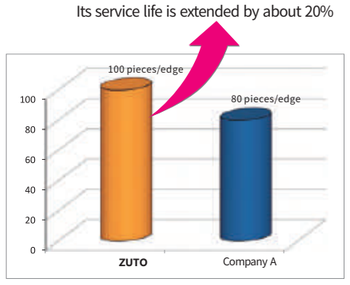


Flange plate

- Workpieces materials: 65Mn
- Machining method: Rough turning of end face
- Insert: WNMG080412-GM WO8225
- Machining parameters: Vc=260m/min，fn=0.32mm/r，ap=1.0mm
- Cooling method: Water cooling



Its service life is extended by about 20%

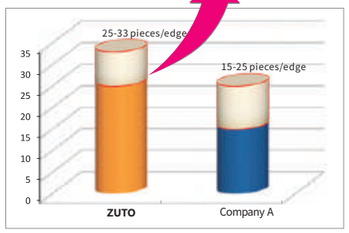


Application - P-type material turning

Flange machining

- Workpieces materials: 45# steel
- Machining method: Strong intermittent rough turning of end face
- Insert: WNMG080408-GM Z8225 Vc=180~358m/min，fn=0.275mm/r，ap=1.3-3mmWater cooling
- Machining parameters
- Cooling method

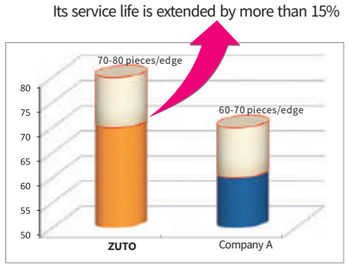
Its service life is extended by 45%



Flange plate

- Workpieces materials: 55# steel
- Machining method: External and end face turning
- Insert: WNMG080408-GM Z8225
- Machining parameters: Vc=285.7m/min，fn=0.27mm/r，ap=0.6mm Water cooling
- Cooling method

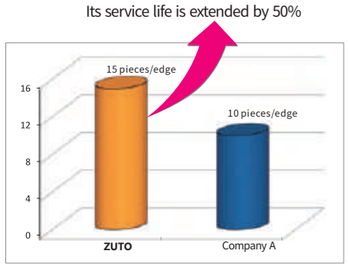
Its service life is extended by more than 15%



Tropid housing

- Workpieces materials: CF53
- Machining method: Rough turning of axle neck and small axle
- Insert: WNMG080412-GR Z8225
- Machining parameters: Vc=351m/min，fn=0.45mm/r，ap=2.0mm
- Cooling method: Water cooling

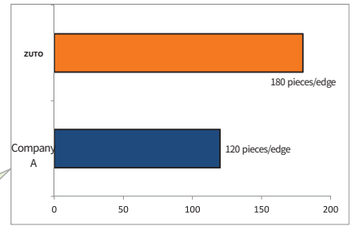
Its service life is extended by 50%



Machining case - stainless steel turning

Flange plate

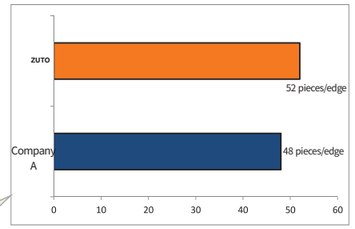
- Workpieces materials: SUS304
- Machining method: External and end face turning
- Insert: VNMG160408-BF Z7225Vc=171~180m/min，f
- Machining parameters: n=0.08mm/r，ap=0.30mmWater cooling
- Cooling method



With good machined surface quality, **ZUTO** products' service life is extended by about 50%

Flange plate

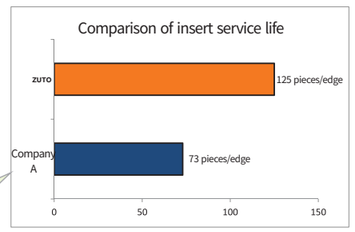
- Workpieces materials: SUS304
- Machining method: Continuous external and end face finishing
- Insert: WNMG080408-BF Z7225
- Machining parameters: Vc=259m/min，fn=0.15mm/r，ap=0.50mm
- Cooling method: Water cooling



With good machined surface quality, **ZUTO** products' service life is extended by about 50%

Flange plate

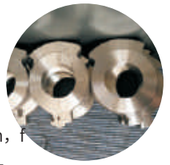
- Workpieces materials: SUS304
- Machining method: Semi-finishing of cone and end faces
- Insert: WNMG080408-BM Z7225
- Machining parameters: Vc=150~243m/min，fn=0.2mm/r，ap=1.2mm
- Cooling method: Water cooling



With less groove wear, **ZUTO** products' service life is extended by about 70%

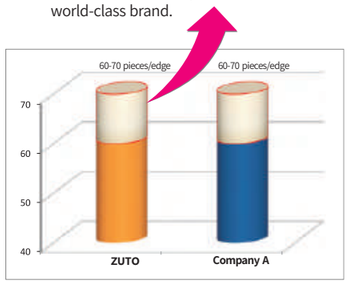
Machining case - cast iron turning

Compressor cylinder



- Workpieces materials: HT250
- Machining method: External and end face rough turning
- Insert: WNMG080412 WO6115Vc=415m/min，f
- Machining parameters: n=0.15mm/r，ap=0.4mmWater cooling
- Cooling method

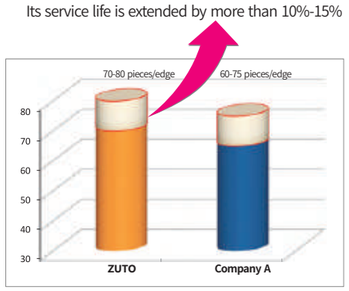
It has the equivalent performance with the world-class brand.



Compressor flange

- Workpieces materials: HT250
- Machining method: External and end face rough turning
- Insert: WNMG080408 WO6115Vc=563m/min f
- Machining parameters: n=0.25mm/r，ap=1mmWater cooling
- Cooling method

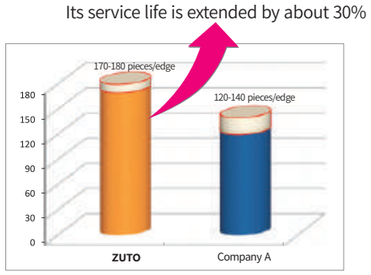
Its service life is extended by more than 10%-15%



Tripod housing

- Workpieces materials: QT500
- Machining method: External turning
- Insert: WNMG080408 WO6115
- Machining parameters: Vc=190m/min，fn=0.4mm/r，ap=1mm
- Cooling method: Water cooling

Its service life is extended by about 30%



A Turning

General turning tool

- Code key of general turning tools ---------- A55-A56
  - Code key of general external turning tools ------ A55
  - Code key of general internal turning tools ------ A56
- Overview of general turning tools ---------- A57-A60
- General turning tools ---------- A61-A82
  - P-type clamping external turning tool ---------- A67-A66
  - M-type clamping external turning tool ---------- A67-A75
  - S-type clamping internal turning tool ---------- A76-A82

Code key of general external turning tools

P	C	L	N	R	25	25	M	12
①	②	③	④	⑤	⑥	⑦	⑧	⑨

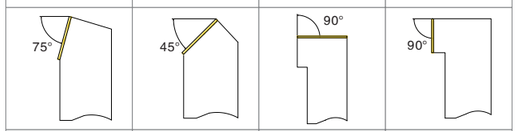
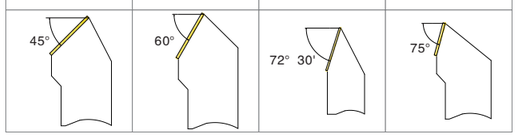
① Clamping method

Mark	Locking method
M	Rigid clamping
P	Lever clamping

②Insert shape

C	80° rhombus	80°
D	55° rhombus	55°
R	Circular	
S	Square	90°
T	Regular triangle	60°
V	35° rhombus	35°
W	Equilateral unequal hexagon	80°

③ Cutting edge angle KAPR

B	D	F	G
			
J	K	L	P
S	T	V	R
			

④ Insert clearance angle

N	Negative style (0°)

⑤Cutting direction

R	Right hand
L	Left hand
N	Left and right hands

⑥Corner height (mm)

8	08
10	10
12	12
16	16
20	20
25	25
32	32

⑦Width of tool holder (mm)

8	08
10	10
12	12
16	16
20	20
25	25
32	32

⑧ Tool length (mm)

D	60
E	70
F	80
H	100
K	125
M	150
P	170
Q	180
R	200

⑨Cutting edge length (mm)

Inscribed circle of insert	Insert shape					
	Square	Regular triangle	Circular	80°rhombus	55°rhombus	35°rhombus
6.00	--	--	06	--	--	--
6.35	--	11	--	06	07	11
7.94	--	13	--	--	--	--
8.00	--	--	08	--	--	--
9.525	09	16	--	09	11	16
10.00	--	--	10	--	--	--
12.00	--	--	12	--	--	--
12.70	12	22	--	12	15	--
15.875	15	27	--	16	--	--
16.00	--	--	16	--	--	--
19.05	19	--	--	19	--	--
20.00	--	--	20	--	--	--
25.00	--	--	25	--	--	--
25.40	25	--	--	--	--	--
32.00	-	-	32	-	-	-

Code key of general internal turning tools

S	16	M	-	S	C	L	C	R	09
①	②	③		④	⑤	⑥	⑦	⑧	⑨

① Material of cutter bar

Mark	Material
S	Steel cutter bar

② Cutter bar diameter (mm)

08	08
10	10
12	12
16	16
20	20
25	25
32	32

③ Shank length (mm)

K	125
M	150
Q	180
R	200
S	250
T	300
U	350

④ Clamping method

S	Screw clamp design

⑥ Cutting edge angle KAPR

F	K	L	Q
U			

⑤ Insert shape

C	80° rhombus	80°
D	55° rhombus	55°
S	Square	90°
T	Regular triangle	60°
V	35° rhombus	35°

⑦ Insert clearance angle

C	7°
P	11°

⑧Cutting direction

R	Right hand
L	Left hand
N	Left and right hands

⑨Cutting edge length (mm)

Inscribed circle of insert	Insert shape				
	Square	Regular triangle	80° rhombus	55° rhombus	35° rhombus
5.556	--	09	--	--	--
6.350	--	11	06	07	11
9.525	09	16	09	11	--
12.70	12	--	12	--	--

Overview of general turning tools (external machining)

Clamping method	Model	Cutting edge angle (KAPR)°	Turning method: External turning	End face turning	External and end face turning	Profiling	Profiling	Profiling	Workpiece shape suitable for machining: Short and thick	Long and thin	Page
P	PCBNR/L	75°	Recommended						Recommended		A61
P	PCLNR/L	95°			Recommended				Recommended		A61
P	PDJNR/L	93°					Recommended		Recommended	Available	A62
P	PDPNN	62.5°						Recommended	Recommended		A62
P	PSBNR/L	75°	Recommended						Recommended		A63
P	PSDNN	45°						Recommended	Recommended		A63
P	PSKNR/L	75°		Recommended					Recommended		A64
P	PSSNR/L	45°	Recommended						Recommended		A64
P	PTFNR/L	90°		Recommended					Recommended	Available	A65
P	PTTNR/L	60°	Recommended						Recommended		A65
P	PTGNR/L	90°	Recommended						Recommended		A66
P	PWLNR/L	95°			Recommended				Recommended	Available	A66
M	MCBNR/L	75°	Recommended						Recommended		A67
M	MCLNR/L	95°			Recommended				Recommended		A67

Recommended Available

Overview of general turning tools (external machining)

Clamping method	Model	Cutting edge angle (KAPR)°	Turning method: External turning	End face turning	External and end face turning	Profiling	Profiling	Profiling	Workpiece shape suitable for machining: Short and thick	Long and thin	Page
M	MDJNR/L	93°					Recommended		Recommended		A68
M	MDPNN	62.5°						Recommended	Recommended		A69
M	MSBNR/L	75°	Recommended						Recommended	Available	A70
M	MSRNR/L	75°	Recommended						Recommended		A70
M	MSKNR/L	75°		Recommended					Recommended		A71
M	MSDNN	45°						Recommended	Recommended		A71
M	MTGNR/L	90°	Recommended						Recommended		A72
M	MTJNR/L	93°	Recommended						Recommended		A72
M	MTFNR/L	90°		Recommended					Recommended	Available	A73
M	MVVNN	72.5°						Recommended	Recommended		A73
M	MVJNR/L	93°					Recommended		Recommended		A74
M	MWLNR/L	95°			Recommended				Recommended	Available	A74
M	MRGCR/L	/				Recommended			Recommended		A75
M	MRDCN	/				Recommended			Recommended		A75

Recommended Available

Overview of general turning tools (internal machining)

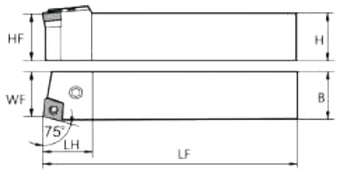
Model	Cutter bar shape	Cutting edge angle (KAPR) °	Shank diameter of cutter bar	Tool length	Machined workpiece diameter minimum	Page
S□□-SCLCR/L		95°	12	150	16	A76
			16	180	20	
			20	200	25	
			25	250	32	
S□□-SDQCR/L		107.5°	12	150	16	A76
			16	180	20	
			20	200	25	
			25	250	32	
S□□-SDUCR/L		93°	12	150	16	A77
			16	180	20	
			20	200	25	
S□□-SSKCR/L		75°	12	150	16	A77
			16	180	20	
			20	200	25	
			25	250	32	
S□□-STFCR/L		90°	16	180	20	A78
			20	200	25	
			25	250	32	
S□□-SVQBR/L		107.5°				A78
			20	200	27	
			25	250	35	
S□□-SVUBR/L		93°				A79
			25	250	35	
S□□-SVQCR/L		107.5°				A79
			16	180	22	
			25	250	35	
S□□-SVUCR/L		93°	20	200	28	A80
			25	250	35	
S□□-SCLPR/L		95°	12	150	16	A80
			16	180	20	
			20	200	25	
S□□-SDQPR/L		107.3°	12	150	16	A81
			16	180	20	
			20	200	25	

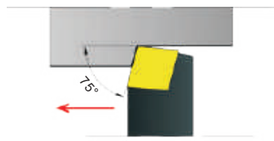
Overview of general turning tools (internal machining)

Model	Cutter bar shape	Cutting edge angle (KAPR) °	Shank diameter of cutter bar	Tool length	Machined workpiece diameter minimum	Page
S□□-SDUPR/L		93°	12	150	16	A81
			16	180	20	
S□□-STUPR/L		93°	12	180	16	A82
			16	180	20	

External turning tool

PCBNR/L
KAPR:75°

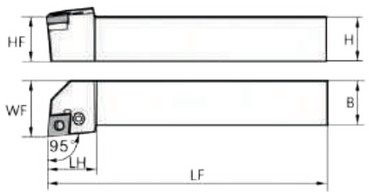


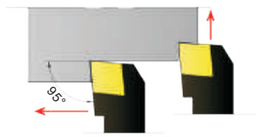


Model		Inventory		Basic dimension (mm)						Accessories					Matching insert
				Size of cutter square		Length size		Corner height	Head width	Screw	Shim	Wrench	Lever	Stopper cushion	
		R	L	H	B	LF	LH	HF	WF						
PCBNR/L	2020K12	△	△	20	20	125	27	20	17	LLS0821	HC12WE	WR30L	GH4	DD4L	CN**1204
	2525M12	▲	▲	25	25	150	27	25	22						
	3232P12	△	△	32	32	170	32	32	27						
	2525M16	▲	▲	25	25	150	38	25	22	LLS0825	HC16WE	WR30L	GH5	DD5L	CN**1606
	3232P16	△	△	32	32	170	38	32	27						
	3232P19	△	△	32	32	170	42	32	27	LLS1027	HC19WE	WR40L	GH6	DD6L	CN**1906

▲Running stock △Make-to-order

PCLNR/L
KAPR:95°



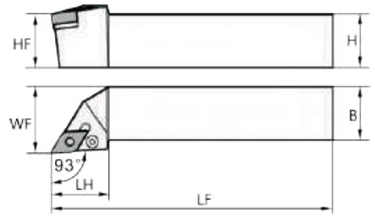


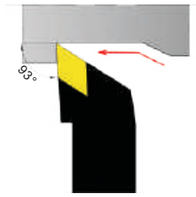
Model		Inventory		Basic dimension (mm)						Accessories					Matching insert
				Size of cutter square		Length size		Corner height	Head width	Screw	Shim	Wrench	Lever	Stopper cushion	
		R	L	H	B	LF	LH	HF	WF						
PCLNR/L	2020K12	△	△	20	20	125	28	20	25	LLS0821	HC12WE	WR30L	GH4	DD4L	CN**1204
	2525M12	▲	▲	25	25	150	32	25	32						
	3232P12	△	△	32	32	170	32	32	40						
	2525M16	▲	▲	25	25	150	38	25	32	LLS0825	HC16WE	WR30L	GH5	DD5L	CN**1606
	3232P16	△	△	32	32	170	38	32	40						
	3232P19	△	△	32	32	170	42	32	40	LLS1027	HC19WE	WR40L	GH6	DD6L	CN**1906

▲Running stock △Make-to-order

External turning tool

PDJNR/L
KAPR:93°

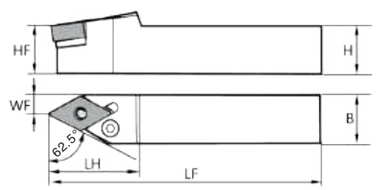


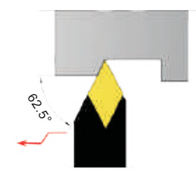


Model		Inventory		Basic dimension (mm)						Accessories					Matching insert
				Size of cutter square		Length size		Corner height	Head width	Screw	Shim	Wrench	Lever	Stopper cushion	
		R	L	H	B	LF	LH	HF	WF						
PDJNR/L	2020K11	△	△	20	20	125	25	20	25	LLS0617	HD11WE	WR25L	GH3	DD3L	DN**1104
	2525M11	▲	▲	25	25	150	28	25	32						
	2020K15	△	△	20	20	125	38	20	25	LLS0821	HD15WE	WR30L	GH4B	DD4L	DN**1506
	2525M15	▲	▲	25	25	150	38	25	32						
	3232P15	△	△	32	32	170	38	32	40						
	2020K15H	△	△	20	20	125	38	20	25	LLS0821	HD15WE	WR30L	GH4	DD4L	DN**1504
	2525M15H	▲	▲	25	25	150	38	25	32						
	3232P15H	△	△	32	32	170	38	32	40						

▲Running stock △Make-to-order

PDPNN
KAPR:62.5°



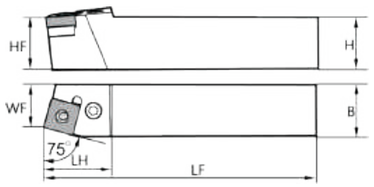


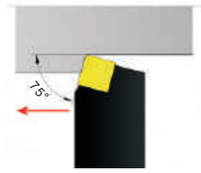
Model		Inventory	Basic dimension (mm)						Accessories					Matching insert
			Size of cutter square		Length size		Corner height	Head width	Screw	Shim	Wrench	Lever	Stopper cushion	
			H	B	LF	LH	HF	WF						
PDPNN	2020K15	▲	20	20	125	38	20	8	LLS0821	HD15WE	WR30L	GHB	DD4L	DN**1506
	2525M15	▲	25	25	150	38	25	12.5						
	3232P15	△	32	32	170	38	32	16						
	2020K15H	△	20	20	125	38	20	8	LLS0821	HD15WE	WR30L	GH4	DD4L	DN**1504
	2525M15H	▲	25	25	150	38	25	12.5						
	3232P15H	△	32	32	170	38	32	16						

▲Running stock △Make-to-order

External turning tool

PSBNR/L
KAPR:75°

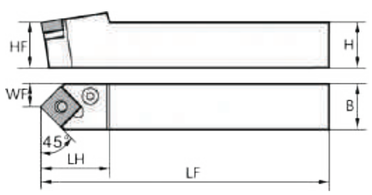


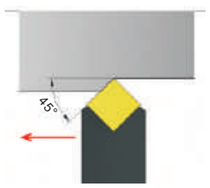


Model		Inventory		Basic dimension (mm)						Accessories					Matching insert
				Size of cutter square		Length size		Corner height	Head width	Screw	Shim	Wrench	Lever	Stopper cushion	
		R	L	H	B	LF	LH	HF	WF						
PSBNR/L	2020K12	△	△	20	20	125	28	20	17	LLS0821	HS12WE	WR30L	GH4	DD4L	SN**1204
	2525M12	▲	▲	25	25	150	28	25	22						
	3232P12	△	△	32	32	170	32	32	27						
	2525M15	▲	▲	25	25	150	28	25	22	LLS0825	HS15WE	WR30L	GH5	DD5L	SN**1506
	3232P15	△	△	32	32	170	32	32	27						
	3232P19	△	△	32	32	170	32	32	27	LLS1027	HS19WE	WR40L	GH6	DD6L	SN**1906

▲Running stock △Make-to-order

PSDNN
KAPR:45°



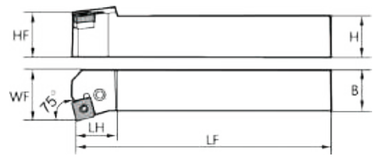


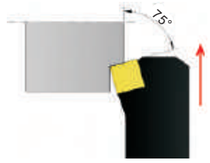
Model		Inventory		Basic dimension (mm)						Accessories					Matching insert
				Size of cutter square		Length size		Corner height	Head width	Screw	Shim	Wrench	Lever	Stopper cushion	
		R	L	H	B	LF	LH	HF	WF						
PSDNN	2020K12	△	△	20	20	125	30	20	10	LLS0821	HS12WE	WR30L	GH4	DD4L	SN**1204
	2525M12	▲	▲	25	25	150	30	25	12.5						
	3232P12	△	△	32	32	170	40	32	16						
	2525M15	▲	▲	25	25	150	40	25	12.5	LLS0825	HS15WE	WR30L	GH5	DD5L	SN**1506
	3232P15	△	△	32	32	170	40	32	16						
	3232P19	△	△	32	32	170	40	32	16	LLS1027	HS19WE	WR40L	GH6	DD6L	SN**1906

▲Running stock △Make-to-order

External turning tool

PSKNR/L
KAPR:75°

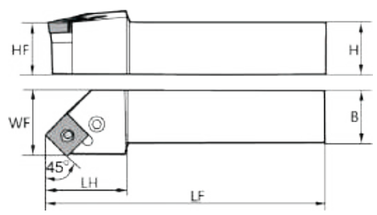


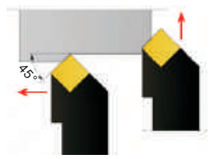


Model		Inventory		Basic dimension (mm)						Accessories					Matching insert
				Size of cutter square		Length size		Corner height	Head width	Screw	Shim	Wrench	Lever	Stopper cushion	
		R	L	H	B	LF	LH	HF	WF						
PSKNR/L	2020K12	△	△	20	20	125	28	20	25	LLS0821	HS12WE	WR30L	GH4	DD4L	SN**1204
	2525M12	▲	▲	25	25	150	28	25	32						
	3232P12	△	△	32	32	170	32	32	40						
	2525M15	▲	▲	25	25	150	28	25	32	LLS0825	HS15WE	WR30L	GH5	DD5L	SN**1506
	3232P15	△	△	32	32	170	32	32	40						
	3232P19	△	△	32	32	170	32	32	40	LLS1027	HS19WE	WR40L	GH6	DD6L	SN**1906

▲Running stock △Make-to-order

PSSNR/L
KAPR:45°



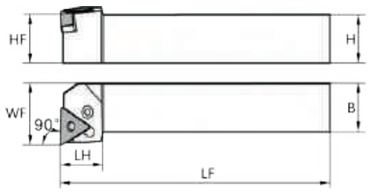


Model		Inventory		Basic dimension (mm)						Accessories					Matching insert
				Size of cutter square		Length size		Corner height	Head width	Screw	Shim	Wrench	Lever	Stopper cushion	
		R	L	H	B	LF	LH	HF	WF						
PSSNR/L	2020K12	△	△	20	20	125	28	20	25	LLS0821	HS12E	WR30L	GH4	DD4L	SN**1204
	2525M12	▲	▲	25	25	150	28	25	32						
	3232P12	△	△	32	32	170	32	32	40						
	2525M15	▲	▲	25	25	150	28	25	32	LLS0825	HS15WE	WR30L	GH5	DD5L	SN**1506
	3232P15	△	△	32	32	170	32	32	40						
	3232P19	△	△	32	32	170	32	32	40	LLS1027	HS19WE	WR40L	GH6	DD6L	SN**1906

▲Running stock △Make-to-order

External turning tool

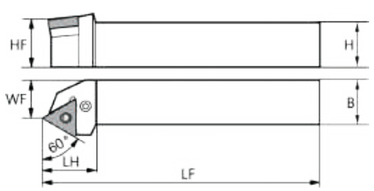
PTFNR/L
KAPR:90°

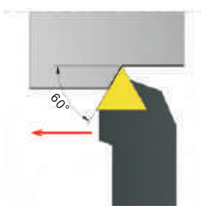


Model		Inventory		Basic dimension (mm)						Accessories					Matching insert
				Size of cutter square		Length size		Corner height	Head width	Screw	Shim	Wrench	Lever	Stopper cushion	
		R	L	H	B	LF	LH	HF	WF						
PTFNR/L	2020K16	△	△	20	20	125	23	20	25	LLS0617	HT16WE	WR25L	GH3	DD3L	TN**1604
	2525M16	▲	▲	25	25	150	23	25	32						
	2525M22	△	△	25	25	150	28	25	32	LLS0821	HT22WE	WR30L	GH4	DD4L	TN**2204
	3232P22	▲	▲	32	32	170	28	32	40						
	3232P27	△	△	32	32	170	34	32	40	LLS0825	HT27WE	WR30L	GH5	DD5L	TN**2706

▲Running stock △Make-to-order

PTTNR/L
KAPR:60°



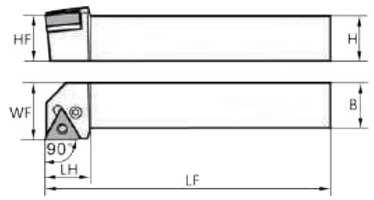


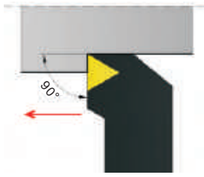
Model		Inventory		Basic dimension (mm)						Accessories					Matching insert
				Size of cutter square		Length size		Corner height	Head width	Screw	Shim	Wrench	Lever	Stopper cushion	
		R	L	H	B	LF	LH	HF	WF						
PTTNR/L	2020K16	△	△	20	20	125	23	20	17	LLS0617	HT16WE	WR25L	GH3	DD3L	TN**1604
	2525M16	▲	▲	25	25	150	23	25	22						
	2525M22	▲	▲	25	25	150	32	20	22	LLS0821	HT22WE	WR40L	GH4	DD4L	TN**2204

▲Running stock △Make-to-order

External turning tool

PTGNR/L
KAPR:90°

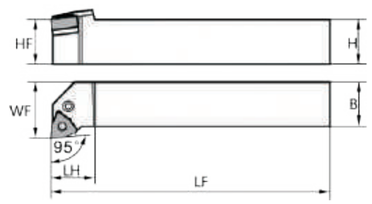


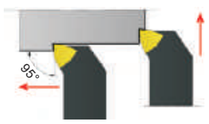


Model		Inventory		Basic dimension (mm)						Accessories					Matching insert
				Size of cutter square		Length size		Corner height	Head width	Screw	Shim	Wrench	Lever	Stopper cushion	
		R	L	H	B	LF	LH	HF	WF						
PTGNR/L	2020K16	△	△	20	20	125	23	20	25						
	2525M16	▲	▲	25	25	150	23	25	32	LLS0617	HT16WE	WR25L	GH3	DD3L	TN**1604
	3232P16	△	△	32	32	170	28	32	40						
	2525M22	▲	▲	25	25	150	28	25	32	LLS0821	HT22WE	WR30L	GH4	DD4L	TN**2204
	3232P22	△	△	32	32	170	28	32	40						
	3232P27	△	△	32	32	170	33	32	40	LLS0825	HT27WE	WR40L	GH5	DD5L	TN**2706

▲Running stock △Make-to-order

PWLNR/L
KAPR:95°



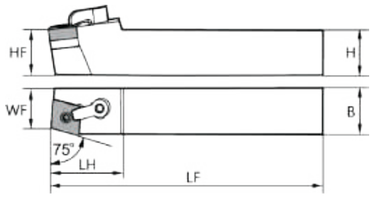


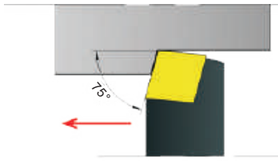
Model		Inventory		Basic dimension (mm)						Accessories					Matching insert
				Size of cutter square		Length size		Corner height	Head width	Screw	Shim	Wrench	Lever	Stopper cushion	
		R	L	H	B	LF	LH	HF	WF						
PWLNR/L	2020K06	△	△	20	20	125	23	20	25	LLS0617	HW06WE	WR25L	GH3	DD3L	WN**0604
	2525M06	▲	▲	25	25	150	23	25	32						
	2020K08	△	△	20	20	125	28	20	25	LLS0821	HW08WE	WR30L	GH4	DD4L	WN**0804
	2525M08	▲	▲	25	25	150	28	25	32						
	3232P08	△	△	32	32	170	28	32	40						

▲Running stock △Make-to-order

External turning tool

MCBNR/L
KAPR:75°

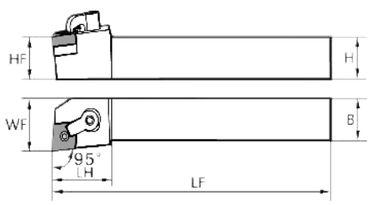


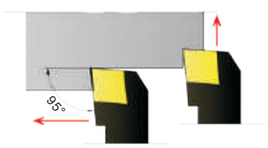


Model		Inventory		Basic dimension (mm)						Accessories					Matching insert
				Size of cutter square		Length size		Corner height	Head width	Stud screw	Shim	Wrench	Pressure plate	Pin bolt	
		R	L	H	B	LF	LH	HF	WF						
MCBNR/L	2020K12	△	△	20	20	125	35	20	17	HM6×20	HC12WI	WR25L WR30L	HYD1	MP6×17	CN**1204
	2525M12	▲	▲	25	25	150	35	25	22						
	3232P12	△	△	32	32	170	35	32	27						
	2525M16	▲	▲	25	25	150	42	25	22	HM6×25	HC16WI		HYD2	MP8×21	CN**1606
	3232P16	△	△	32	32	170	42	32	27	HM6×28		WR30L			
	3232P19	△	△	32	32	170	42	32	27	HM8×35	HC19WI	WR40L	HYD5X	MP10×21	CN**1906

▲Running stock △Make-to-order

MCLNR/L
KAPR:95°



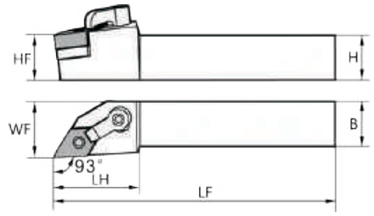


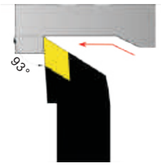
Model		Inventory		Basic dimension (mm)						Accessories					Matching insert
				Size of cutter square		Length size		Corner height	Head width	Stud screw	Shim	Wrench	Pressure plate	Pin bolt	
		R	L	H	B	LF	LH	HF	WF						
MCLNR/L	2020K12	△	△	20	20	125	32	20	25	HM6×20	HC12WI	WR25L WR30L	HYD1	MP6×17	CN**1204
	2525M12	▲	▲	25	25	150	32	25	32	HM6×25					
	3232P12	▲	▲	32	32	170	32	32	40	HM6×28					
	2525M16	△	△	25	25	150	38	25	32	HM6×25	HC16WI	WR30L	HYD2	MP8×21	CN**1606
	3232P16	△	△	32	32	170	38	32	40	HM6×28					
	3232P19	△	△	32	32	170	42	32	40	HM8×35	HC19WI	WR40L	HYD5X	MP10×21	CN**1906

▲Running stock △Make-to-order

External turning tool

MDJNR/L
KAPR:93°



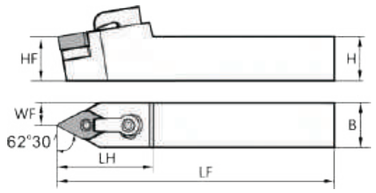


Model		Inventory		Basic dimension (mm)						Accessories					Matching insert
				Size of cutter square		Length size		Corner height	Head width	Stud screw	Shim	Wrench	Pressure plate	Pin bolt	
		R	L	H	B	LF	LH	HF	WF						
MDJNR/L	2020K11	△	△	20	20	125	32	20	25	HM6×25	HD11WI	WR20L WR30L	HYD1	MP5×13	DN**1104
	2525M11	▲	▲	25	25	150	32	25	32						
	3232P11	△	△	32	32	170	32	32	40	HM6×28					
	2020K15	△	△	20	20	125	38	20	25		HD15WI	WR25L WR30L	HYD2	MP6×19	DN**1506
	2525M15	▲	▲	25	25	150	38	25	32	HM6×25					
	3232P15	△	△	32	32	170	38	32	40	HM6×28					
	2020K15H	△	△	20	20	125	38	20	25	HM6×20				MP6×17	DN**1504
	2525M15H	▲	▲	25	25	150	38	25	32	HM6×25					
	3232P15H	△	△	32	32	170	38	32	40	HM6×28					

▲Running stock △Make-to-order

External turning tool

MDPNN
KAPR:62.5°

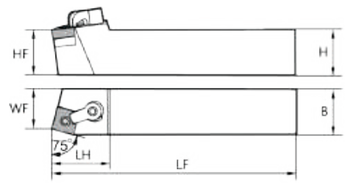


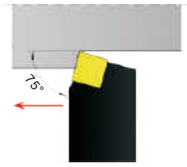
Model		Inventory		Basic dimension (mm)						Accessories					Matching insert
				Size of cutter square		Length size		Corner height	Head width	Stud screw	Shim	Wrench	Pressure plate	Pin bolt	
		R	L	H	B	LF	LH	HF	WF						
MDPNN	2020K11	△	△	20	20	125	35	20	10	HM6×20	HD11WI	WR20L WR30L	HYD1	MP5×13	DN**1104
	2525M11	▲	▲	25	25	150	35	25	12.5	HM6×25					
	3232P11	△	△	32	32	170	42	32	16	HM6×28					
	2020K15	△	△	20	20	125	42	20	12.5	HM6×20	HD15WI	WR25L WR30L	HYD2	MP6×19	DN**1506
	2525M15	▲	▲	25	25	150	42	25	12.5	HM6×25					
	3232P15	△	△	32	32	170	42	32	16	HM6×28					
	2020K15H	△	△	20	20	125	42	20	12.5	HM6×20				MP6×17	DN**1504
	2525M15H	▲	▲	25	25	150	42	25	12.5	HM6×25					
	3232R15H	△	△	32	32	200	42	32	16	HM6×28					

▲Running stock △Make-to-order

External turning tool

MSBNR/L
KAPR:75°

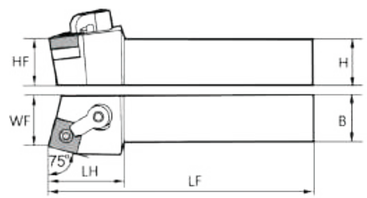


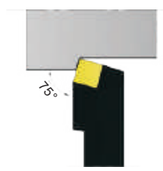


Model		Inventory		Basic dimension (mm)						Accessories					Matching insert
				Size of cutter square		Length size		Corner height	Head width	Stud screw	Shim	Wrench	Pressure plate	Pin bolt	
		R	L	H	B	LF	LH	HF	WF						
MSBNR/L	2020K12	△	△	20	20	125	32	20	17	HM6×20	HS12WI	WR25L WR30L	HYD1	MP6×17	SN**1204
	2525M12	▲	▲	25	25	150	32	25	22	HM6×25					
	3232P12	△	△	32	32	170	32	32	27	HM6×28					
	2525M15	▲	▲	25	25	150	38	25	22	HM6×25	HS15WI	WR30L	HYD2	MP8×21	SN**1506
	3232P15	△	△	32	32	170	38	32	27	HM6×28					
	3232P19	△	△	32	32	170	42	32	27	HM8×35	HS19WI	WR40L	HYD5X	MP10×21	SN**1906

▲Running stock △Make-to-order

MSRNR/L
KAPR:75°



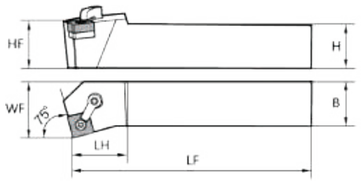


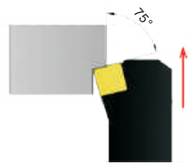
Model		Inventory		Basic dimension (mm)						Accessories					Matching insert
				Size of cutter square		Length size		Corner height	Head width	Stud screw	Shim	Wrench	Pressure plate	Pin bolt	
		R	L	H	B	LF	LH	HF	WF						
MSRNR/L	2020K12	△	△	20	20	125	32	20	22	HM6×20	HS12WI	WR25L WR30L	HYD1	MP6×17	SN**1204
	2525M12	▲	▲	25	25	150	32	25	27	HM6V25					
	3232P12	△	△	32	32	170	32	32	35	HM6×28					
	2525M15	▲	▲	25	25	150	38	25	27	HM6×25	HS15WI	WR30L	HYD2	MP8×21	SN**1506
	3232P15	△	△	32	32	170	38	32	35	HM6×28					
	3232P19	△	△	32	32	170	42	32	35	HM8×35	HS19WI	WR40L	HYD5X	MP10×21	SN**1906

▲Running stock △Make-to-order

External turning tool

MSKNR/L
KAPR:75°

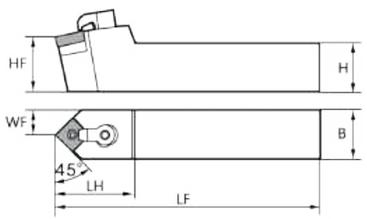


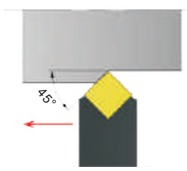


Model		Inventory		Basic dimension (mm)						Accessories					Matching insert
				Size of cutter square		Length size		Corner height	Head width	Stud screw	Shim	Wrench	Pressure plate	Pin bolt	
		R	L	H	B	LF	LH	HF	WF						
MSKNR/L	2020K12	△	△	20	20	125	32	20	25	HM6×20	HS12WI	WR25L WR30L	HYD1	MP6×17	SN**1204
	2525M12	▲	▲	25	25	150	32	25	32	HM6×25					
	3232P12	△	△	32	32	170	32	32	40	HM6×28					
	2525M15	▲	▲	25	25	150	38	25	32	HM6×25	HS15WI	WR30L	HYD2	MP8×21	SN**1506
	3232P15	△	△	32	32	170	38	32	40	HM6×28					
	3232P19	△	△	32	32	170	42	32	40	HM8×35	HS19WI	WR40L	HYD5X	MP10×21	SN**1906

▲Running stock △Make-to-order

MSDNN
KAPR:45°



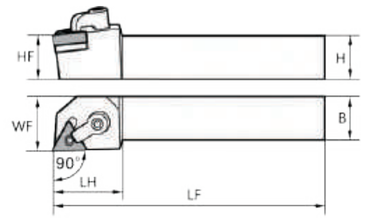


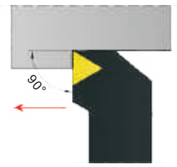
Model		Inventory	Basic dimension (mm)						Accessories					Matching insert
			Size of cutter square		Length size		Corner height	Head width	Stud screw	Shim	Wrench	Pressure plate	Pin bolt	
			H	B	LF	LH	HF	WF						
MSDNN	2020K12	△	20	20	125	35	20	10	HM6×25	HS12WI	WR25L WR30L	HYD1	MP6×17	SN**1204
	2525M12	▲	25	25	150	35	25	12.5						
	3232P12	△	32	32	170	42	32	16	HM6×28					
	2525M15	▲	25	25	150	42	25	12.5		HS15WI	WR30L	HYD2	MP8×21	SN**1506
	3232P15	△	32	32	170	42	32	16						

▲Running stock △Make-to-order

External turning tool

MTGNR/L
KAPR:90°

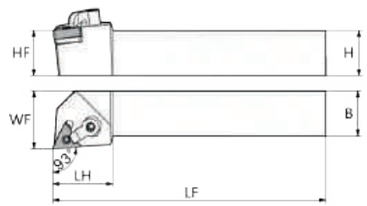


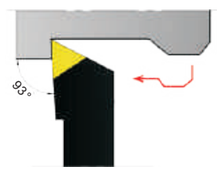


Model		Inventory		Basic dimension (mm)						Accessories					Matching insert
				Size of cutter square		Length size		Corner height	Head width	Stud screw	Shim	Wrench	Pressure plate	Pin bolt	
		R	L	H	B	LF	LH	HF	WF						
MTGNR/L	2020K16	△	△	20	20	125	32	20	25	HM6×25	HT16WI	WR20L WR30L	HYD1	MP5×13	TN**1604
	2525M16	▲	▲	25	25	150	32	25	32						
	3232P16	△	△	32	32	170	32	32	40	HM6×28					
	2525M22	▲	▲	25	25	150	38	25	32	HM6×25	HT22WI	WR25L WR30L	HYD2	MP6×17	TN**2204
	3232P22	△	△	32	32	170	38	32	40	HM6×28					

▲Running stock △Make-to-order

MTJNR/L
KAPR:93°



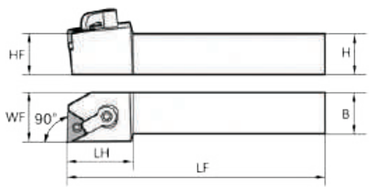


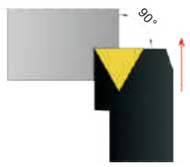
Model		Inventory		Basic dimension (mm)						Accessories					Matching insert
				Size of cutter square		Length size		Corner height	Head width	Stud screw	Shim	Wrench	Pressure plate	Pin bolt	
		R	L	H	B	LF	LH	HF	WF						
MTJNR/L	2020K16	△	△	20	20	125	32	20	25	HM6×25	HT16WI	WR20L WR30L	HYD1	MP5×13	TN**1604
	2525M16	▲	▲	25	25	150	32	25	32	HM6×30					
	3232P16	△	△	32	32	170	32	32	40						
	2525M22	▲	▲	25	25	150	38	25	32		HT22WI	WR30L	HYD2	MP6×17	TN**2204
	3232P22	△	△	32	32	170	38	32	40						

▲Running stock △Make-to-order

External turning tool

MTFNR/L
KAPR:90°

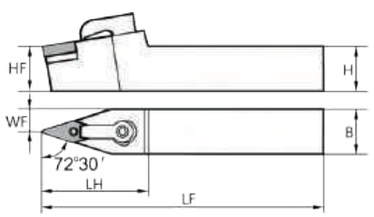


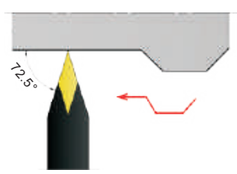


Model		Inventory		Basic dimension (mm)						Accessories					Matching insert
				Size of cutter square		Length size		Corner height	Head width	Stud screw	Shim	Wrench	Pressure plate	Pin bolt	
		R	L	H	B	LF	LH	HF	WF						
MTFNR/L	2020K16	△	△	20	20	125	32	20	25	HM6×25	HT16WI	WR20L WR30L	HYD1	MP5×13	TN**1604
	2525M16	▲	▲	25	25	150	32	25	32						
	3225P16	△	△	32	25	170	32	32	32	HM6×28					
	3232P16	△	△	32	32	170	32	32	40						
	2525M22	▲	▲	25	25	150	38	25	32	HM6×25	HT22WI	WR25L WR30L	HYD2	MP6×17	TN**2204
	3225P22	△	△	32	25	170	38	32	32	HM6×28					
	3232P22	△	△	32	32	170	38	32	40						

▲Running stock △Make-to-order

MVVNN
KAPR:72.5°



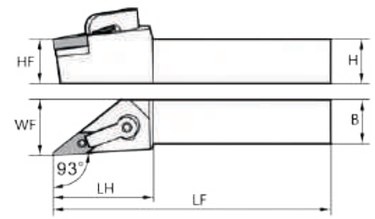


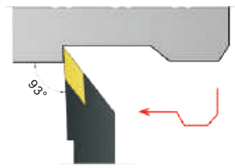
Model		Inventory	Basic dimension (mm)						Accessories					Matching insert
			Size of cutter square		Length size		Corner height	Head width	Stud screw	Shim	Wrench	Pressure plate	Pin bolt	
			H	B	LF	LH	HF	WF						
MVVNN	2020K16	△	20	20	125	45	20	10	HM6×25	HV16WI	WR20L WR30L	HYD3	MP5×13	VN**1604
	2525M16	▲	25	25	150	45	25	12.5						
	3232P16	△	32	32	170	45	32	16	HM6×28					

▲Running stock △Make-to-order

External turning tool

MVJNR/L
KAPR:93°

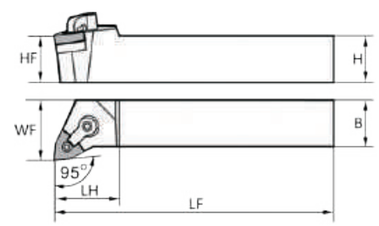


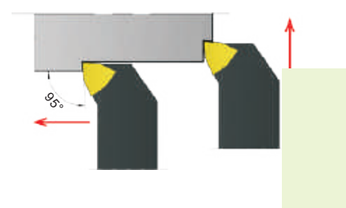


Model		Inventory		Basic dimension (mm)						Accessories					Matching insert
				Size of cutter square		Length size		Corner height	Head width	Stud screw	Shim	Wrench	Pressure plate	Pin bolt	
		R	L	H	B	LF	LH	HF	WF						
MVJNR/L	2020K16	△	△	20	20	125	45	20	25	HM6×25	HV16WI	WR20L MR30L	HYD3	MP5×13	VN**1604
	2525M16	▲	▲	25	25	150	45	25	32						
	3232P16	△	△	32	32	170	45	32	40	HM6×28					

▲Running stock △Make-to-order

MWLNR/L
KAPR:95°



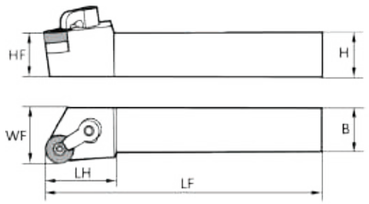


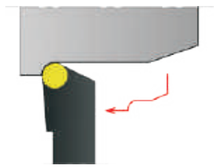
Model		Inventory		Basic dimension (mm)						Accessories					Matching insert
				Size of cutter square		Length size		Corner height	Head width	Stud screw	Shim	Wrench	Pressure plate	Pin bolt	
		R	L	H	B	LF	LH	HF	WF						
MWLNR/L	2020K06	△	△	20	20	125	28	20	25	HM5×20	HW06WI	WR20L WR30L	HYD0	MP5×13	WN**0604
	2525M06	▲	▲	25	25	150	28	25	32						
	2020K08	△	△	20	20	125	32	20	25	HM6×20	HW08WI	WR25L WR30L	HYD1	MP6×17	WN**0804
	2525M08	▲	▲	25	25	150	32	25	32	HM6×25					
	3232P08	△	△	32	32	170	32	32	40	HM6×28					

▲Running stock △Make-to-order

External turning tool

MRGNR/L

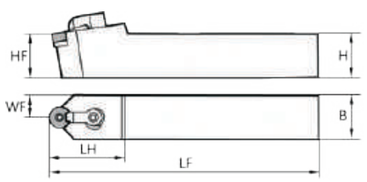




Model		Inventory		Basic dimension (mm)						Accessories					Matching insert
				Size of cutter square		Length size		Corner height	Head width	Stud screw	Shim	Wrench	Pressure plate	Pin bolt	
		R	L	H	B	LF	LH	HF	WF						
MRGNR/L	2525M12	△	△	25	25	150	45	25	32	HM6×25	WO12WI	WR25L	HYD1	MP6×17	RN**1204
	3232P12	▲	▲	32	32	170	45	32	40	HM6×28		WR30L			

▲Running stock △Make-to-order

MRDNN



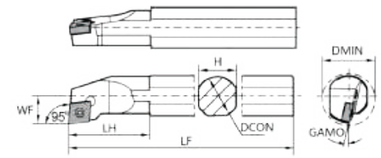
Model		Inventory		Basic dimension (mm)						Accessories					Matching insert
				Size of cutter square		Length size		Corner height	Head width	Stud screw	Shim	Wrench	Pressure plate	Pin bolt	
		R	L	H	B	LF	LH	HF	WF						
MRDNN	2020K12	△	△	20	20	125	35	20	10	HM6×25	WO12WI	WR30L	HYD1	MP6×17	RN**1204
	2525M12	▲	▲	25	25	150	35	25	12.5	HM6×30					
	3232P12	△	△	32	32	170	35	32	16						

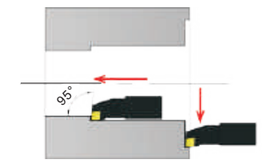
▲Running stock △Make-to-order

Internal turning tool

S□□-SCLCR/L

KAPR:95°



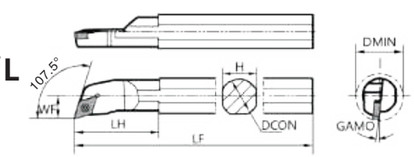


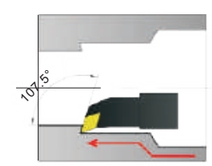
Model		Inventory		Basic dimension (mm)					Accessories		Matching insert
									Insert screw	Wrench	
		R	L	DMIN	DCON	H	LF	WF			
	S12M-SCLCR/L06	△	△	16	12	11	150	7.5	M2.5×5.5	WR15	CC**0602
	S12M-SCLCR/L09	△	△	16	12	11	150	8	M3.5×8		CC**09T3
	S16Q-SCLCR/L09	△	△	20	16	15	180	10			
	S20R-SCLCR/L09	▲	▲	25	20	19	200	12	M3.5×10		
	S25S-SCLCR/L09	▲	▲	32	25	24	250	15.5			
	S20R-SCLCR/L12	▲	▲	25	20	19	200	12.5	M4.0×11		CC**1204
	S25S-SCLCR/L12	▲	▲	32	25	24	250	15.5			

▲Running stock △Make-to-order

S□□-SDQCR/L

KAPR:107.5°





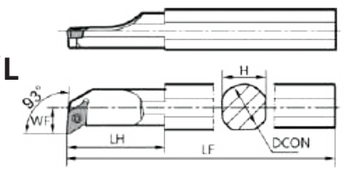
Model		Inventory		Basic dimension (mm)					Accessories		Matching insert
									Insert screw	Wrench	
		R	L	DMIN	DCON	H	LF	WF			
	S12M-SDQCR/L07	△	△	16	12	11	150	9	M2.5×6.5	WR07	DC**0702
	S16Q-SDQCR/L07	△	△	20	16	15	180	11			
	S20R-SDQCR/L11	▲	▲	25	20	19	200	13	M3.5×8	WR15	DC**11T3
	S25S-SDQCR/L11	▲	▲	32	25	24	250	17	M3.5×10		

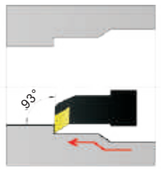
▲Running stock △Make-to-order

Internal turning tool

S□□-SDUCR/L

KAPR:93°



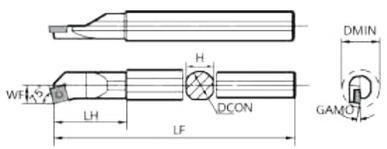


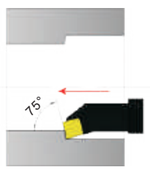
Model		Inventory		Basic dimension (mm)					Accessories		Matching insert
		R	L	DMIN	DCON	H	LF	WF	Insert screw	Wrench	
	S12M-SDUCR/L07	△	△	16	12	11	150	9	M2.5×6.5	WR07	DC**0702
	S16Q-SDUCR/L07	△	△	20	16	15	180	11			
	S20R-SDUCR/L11	▲	▲	25	20	19	200	13	M3.5×8	WR15	DC**11T3

▲Running stock △Make-to-order

S□□-SSKCR/L

KAPR:75°





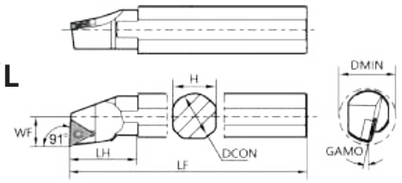
Model		Inventory		Basic dimension (mm)					Accessories		Matching insert
		R	L	DMIN	DCON	H	LF	WF	Insert screw	Wrench	
	S12M- SSKCR/L09	△	△	16	12	11	150	9	M3.5×8	WR15	SC**09T3
	S16Q- SSKCR/L09	△	△	20	16	15	180	11			
	S20R- SSKCR/L09	▲	▲	25	20	19	200	13			
	S25S- SSKCR/L12	▲	▲	32	25	24	250	17	M4×1	WR15	SC**1204

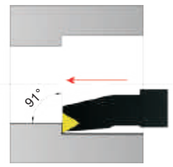
▲Running stock △Make-to-order

Internal turning tool

S□□-STFCR/L

KAPR:90°



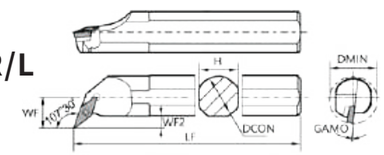


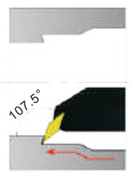
Model		Inventory		Basic dimension (mm)					Accessories		Matching insert
		R	L	DMIN	DCON	H	LF	WF	Insert screw	Wrench	
	S16Q-STFCR/L11	△	△	20	16	15	180	10	M2.5×6.5	WR07	TC**1102
	S20R-STFCR/L11	△	△	25	20	19	200	12			
	S25S-STFCR/L16	▲	▲	32	25	24	250	16	M3.5×10	WR15	TC**16T3

▲Running stock △Make-to-order

S□□-SVQBR/L

KAPR:107.5°



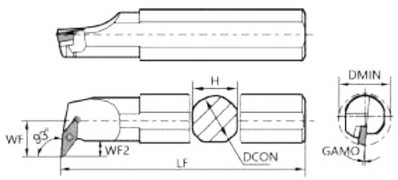


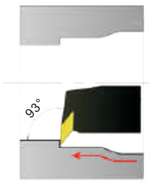
Model		Inventory		Basic dimension (mm)					Accessories		Matching insert
		R	L	DMIN	DCON	H	LF	WF	Insert screw	Wrench	
									M3.5×12	WR15	VB**1604
	S20R-SVQBR/L16	▲	▲	27	20	19	200	14			
	S25S-SVQBR/L16	▲	▲	35	25	24	250	20			

▲Running stock △Make-to-order

Internal turning tool

S□□-SVUBR/L
KAPR:93°



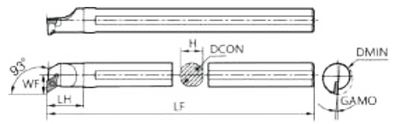


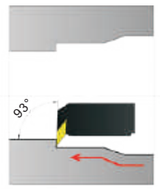
Model		Inventory R	Inventory L	Basic dimension (mm) DMIN	DCON	H	LF	WF	Accessories: Insert screw	Wrench	Matching insert
	S25S- SVUBR/L16	▲	▲	35	25	24	250	20	M3.5×12	WR15	VB**1604

▲Running stock △Make-to-order

Internal turning tool

S□□-SVUCR/L
KAPR:93°

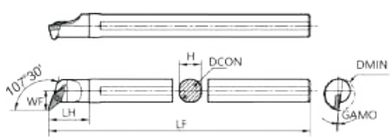


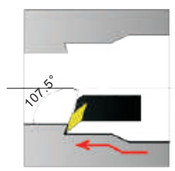


Model		Inventory R	Inventory L	Basic dimension (mm) DMIN	DCON	H	LF	WF	Accessories: Insert screw	Wrench	Matching insert
	S20R-SVUCR/L11	▲	▲	28	20	19	200	14	M3.5×12	WR15	VC**1604
	S25S-SVUCR/L16	▲	▲	35	25	24	250	20			

▲Running stock △Make-to-order

S□□-SVQCR/L
KAPR:107.5°

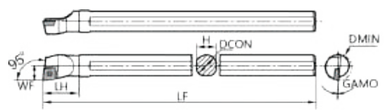


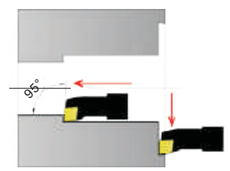


Model		Inventory R	Inventory L	Basic dimension (mm) DMIN	DCON	H	LF	WF	Accessories: Insert screw	Wrench	Matching insert
	S16Q-SVQCR/L11	▲	▲	22	16	15	180	12	M2.5×6.5	WR07	VC**1103
	S25S-SVQCR/L16	▲	▲	35	25	24	250	20	M3.5×12	WR15	VC**1604

▲Running stock △Make-to-order

S□□-SCLPR/L
KAPR:95°





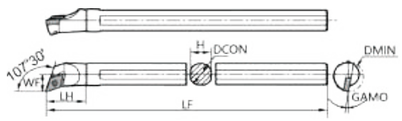
Model		Inventory R	Inventory L	Basic dimension (mm) DMIN	DCON	H	LF	WF	GAMO	Accessories: Insert screw	Wrench	Matching insert
	S12M-SCLPR/L06	△	△	16	12	11	150	8	-4°	M2.5×5.5	WR07	CP**0602
	S16Q-SCLPR/L09	△	△	20	16	15	180	10	-4°	M3.5×8	WR15	CP**09T3
	S20R-SCLPR/L09	▲	▲	25	20	18	200	13	-4°			

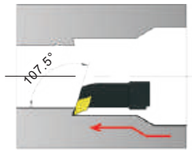
▲Running stock △Make-to-order

Internal turning tool

S□□-SDQPR/L

KAPR:107.5°



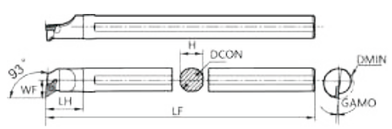


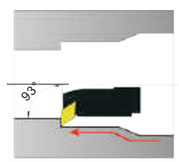
Model		Inventory		Basic dimension (mm)						Accessories		Matching insert
		R	L	DMIN	DCON	H	LF	WF	GAMO	Insert screw	Wrench	
	S12M-SDQPR/L07	△	△	16	12	11	150	9	-8°	M2.5×5.5	WR07	DP**0702
	S16Q-SDQPR/L07	△	△	20	16	15	180	11	-6°	M2.5×6.5		
	S20R-SDQPR/L11	▲	▲	25	20	18	200	13	-6°	M3.5×8	WR15	DP**11T3

▲Running stock △Make-to-order

S□□-SDUPR/L

KAPR:93°





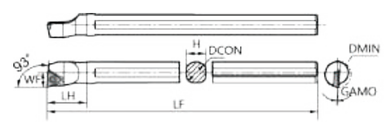
Model		Inventory		Basic dimension (mm)						Accessories		Matching insert
		R	L	DMIN	DCON	H	LF	WF	GAMO	Insert screw	Wrench	
	S12M-SDUPR/L07	△	△	16	12	11	150	9	-8°	M2.5×5.5	WR07	DP**0702
	S16Q-SDUPR/L07	▲	▲	20	16	15	180	11	-6°	M2.5×6.5		

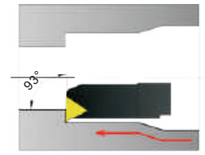
▲Running stock △Make-to-order

Internal turning tool

S□□-STUPR/L

KAPR:93°





Model		Inventory		Basic dimension (mm)					Accessories		Matching insert
		R	L	DMIN	DCON	H	LF	WF	Insert screw	Wrench	
	S12Q-STUPR/L11	△	△	16	12	11.4	180	7.5	M2.5×6.5	WR07	TP**1103
	S16R-STUPR/L11	▲	▲	20	16	15	180	10			

▲Running stock △Make-to-order

Comparison table of general turning inserts in metric and British systems

C-type negative angle	ISO	Inch
CNMG	090304	321
	090308	322
	120404	431
	120408	432
	120412	433
	120416	434
	160608	542
	160612	543
	160616	544
	190608	642
	190612	643
	190616	644
	190624	646
	250724	856
	250732	858
	250924	866
	250932	868

D-type negative angle	ISO	Inch
DNMG	110404	331
	110408	332
	110412	333
	150404	431
	150408	432
	150412	433
	150604	441
	150608	442
	150612	443
	150616	444
	190608	542
	190612	543

S-type negative angle	ISO	Inch
SNMG	090304	321
	090308	322
	090312	323
	120404	431
	120408	432
	120412	433
	120416	434
	150608	542
	150612	543
	150616	544
	190412	633
	190424	636
	190612	643
	190616	644
	250724	856
	250732	858
	250924	866
	250932	868

T-type negative angle	ISO	Inch
TNMG	110304	221
	110308	222
	160404	331
	160408	332
	160412	333
	220404	431
	220408	432
	220412	433
	220416	434
	270608	542
	270612	543
	270616	544

W-type negative angle	ISO	Inch
WNMG	06T304	3(2.5)1
	06T308	3(2.5)2
	06T312	3(2.5)3
	060404	331
	060408	332
	060412	333
	080404	431
	080408	432
	080412	433

V-type negative angle	ISO	Inch
VNMG	160404	331
	160408	332
	160412	333

R-type negative angle	ISO	Inch
RNMG	0903MO	32
	1204MO	43

Comparison table of chipbreaker grooves of general turning

Material to be cut	Usage	ZUTO	Sandvik	Kennametal	Iscar	Mitsubishi	Hitachi	Tungaloy	Kyocera	Sumitomo Electric	Taegutec	ZCC.CT
P	Finishing	GF	LC XF MF	PMFN CT	---- NF	SA SY SH	BE CE B BH	NM TS TSF	PP XQ CQ HQ	LU FE SU	FG FC	DF PF SF
	Semi-finishing	GM GQ	XM、QM PMC、PM SM、KM HM	P、MG MN MP1	GN RF、LF	MA MV MH MP	AH AE AY	TM TQ DM AM	HS、PS PQ、GS PT、PG	GU(UG) GE UX	ML MP MC PC MT	DM PM
	Roughing	GR	PR、XMR ---- KR	RP RN	M3P、NR ----	RP GH MAS MT	RE AR ----	TH S CH	HT GT PH ----	MU ME MX	RT ----	DR LR
	Heavy machining	GZ GX	QR WO、 SR ---- MR	RM、MR RH ---- ----	NM TNM ---- R3P	HZ、HX HL、HH HXD WO HV HCS	TE、UE ---- H HX、HE	THS TRS 65 ---- TUS	PX All-round ---- ---- ----	HG HP HU HW HF	RX RH HT HD HY HZ	HDR HPR
	Positive style	TM	UM、PM MX、PR	MF MP	----	MV MP	JE	PM	HQ XQ GK	MU	MT PC	HM
M	Finishing	BF	MF	FP、FS LF	----	LM SH	SE、MP	SS	MQ GU	SU EF	EA SF	EF
	Semi-finishing	BM	MM、MMC SMR	MP	M3M、PP	MM	DE	SM	----	GU	ET	EM
	Roughing	BR	---- MR、MRR	UP ----	---- MR	ES、1M 2M、HL RM、GH HM	---- ----	S SH	---- TK	HM EM MU	VF SU	ER
	Positive style	TM	MM	MP	----	MW	----	PM	HQ GK	MU	----	EM
K	Semi-finishing	All-round	KF	UN	GN	LK MA MK	V、VA	CM CF	All-round C	UZ	MT	All-round
	Roughing	Flat Plate	KM、KR KRR	----	----	GK RK GH	Y、RE	Ch 33 All-round	ZS、GC	GZ(UX)	RT	----
N	Metals for non-ferrous metal machining	AK	----	MS	----	----		P	AH	AX	----	Flat
S	Finishing	----	SF、SGF	----	----	LS FJ	----	WOF	----	EF	----	NF NGF
	Semi-finishing	SM	SM、SMC	----	----	MS MJ	VI	HMM SA WO	----	EG、EX	----	NM
H	Finishing	----	----	----	----	----		MP*	----	FV*	----	Flat
	Semi-finishing	----	----	----	----	----		----	----	GH	----	Flat

Recommended cutting parameters for general external turning

Machined workpiece materials						Product grade																							
ISO	Classification of materials			Hardness of Brinell (HB)	Tensile strength (N/mm²)	Z8115			Z8125			Z8225			Z7125			Z7225			Z6115			Z10			Z20		
						Feed rate /(mm/r)																							
						0.1	0.4	0.6	0.1	0.4	0.6	0.1	0.4	0.6	0.1	0.4	0.6	0.1	0.4	0.6	0.1	0.3	0.5	0.1	0.4	0.6	0.1	0.4	0.6
						Cutting speed /(m/min)																							
P	Non-alloyed steel	C≤0.25%	Annealing	125	428	500	360	280	450	330	260	430	340	260															
		0.25<C≤0.55%	Annealing	190	639	460	320	260	420	310	240	420	310	240															
		0.25<C≤0.55%	Quenching and tempering	210	708	420	280	220	380	270	220	380	280	200															
		C>0.55%	Annealing	190	639	420	280	220	380	270	220	380	280	200															
		C>0.55%	Quenching and tempering	300	1013	420	280	220	380	270	220	380	280	200															
		Short chip steel	Annealing	220	745	360	280	210	320	290	275	360	270	210															
	Low-alloyed steel	Annealing		175	591	420	350	300	400	330	280	400	330	280															
		Quenching and tempering		300	1013	280	220	180	260	200	160	260	200	160															
		Quenching and tempering		380	1282	200	150	140	100	85	65	180	150	120															
		Quenching and tempering		430	430	140	130		65	55		120	100																
	High alloy steel and high alloy tool steel	Annealing		200	675	260	200	180	270	240	220	260	200	180															
		Quenching and tempering		300	1013	200	180	160	170	140	120	200	180	160															
		Quenching and tempering		400	1361	130	120		65	55		130	120																
M	Stainless steel	Ferrite/martensite, annealing		200	675										250	220	210	190	170	150									
		Martensite, quenching and tempering		330	1114										130	110	100	90	80	60									
	Stainless steel	Austenite, quenching		200	675										200	160	130	210	170	150									
		Austenite, precipitation hardening stainless steel (PH stainless steel)		300	1013										160	130	70	170	150	90									
		Austenite- ferrite, duplex stainless steel		230	778										180	140	110	180	170	120									
K	Malleable cast iron	Ferrite		200	400																400	300	200						
		Pearlite		260	700																300	250	180						
	Grey cast iron	Low tensile strength		180	200																550	400	250						
		High tensile strength/austenite		245	350																240	180	120						
	Ductile iron	Ferrite		155	400																320	240	150						
		Pearlite		265	700																320	240	150						
	Compacted graphite iron GGV (CGI)			230	400																300	220	130						

Recommended cutting parameters for general external turning

Machined workpiece materials						Product grade																							
ISO	Classification of materials			Hardness of Brinell (HB)	Tensile strength (N/mm²)	Z8115			Z8125			Z8225			Z7125			Z7225			Z6115			Z10			Z20		
						Feed rate /(mm/r)																							
						0.1	0.4	0.6	0.1	0.4	0.6	0.1	0.4	0.6	0.1	0.4	0.6	0.1	0.4	0.6	0.1	0.3	0.5	0.1	0.4	0.6	0.1	0.4	0.6
						Cutting speed /(m/min)																							
N	Wrought aluminum alloy	Non-aging		30	—																								
		Ageable and aged		100	340																			650	600	300			
	Foundry aluminum alloy	≤ 12% silicon, non-aging		75	260																			700	450	300			
		≤ 12% silicon, ageable and aged		90	310																			500	300	200			
		> 12% silicon, non-aging		130	450																								
	Magnesium alloy			70	250																								
	Copper and copper alloys (bronze/brass)	Non-alloyed, electrolytic copper		100	340																			500	400	270			
		Brass, bronze, red brass		90	310																			400	300	250			
		Copper alloy, short chip		110	380																			280	200	130			
		Ampco alloy of high strength		300	1010																								
S	Iron-based alloy	Iron-based	Annealing	200	680																						90	70	
			Aged	280	940																						70	60	
		Nickel-based or cobalt-based	Annealing	250	840																						70	60	
			Aged	350	1180																						60	50	
			Annealing	320	1080																						50	40	
	Cobalt-based alloy	Pure titanium		200	680																								
		α and β phase alloys, aged		375	1260																						70	50	40
		β phase alloy		410	1400																						40	35	30
	Nickel-based alloy	1177		300	1010																								
	Titanium alloy	1262		300	1010																								
H	Hardened steel	Quenching and tempering		50WC																									
		Quenching and tempering		55WC																									
		Quenching and tempering		60WC																									
	Hardened cast steel	Quenching and tempering		50WC																									

Recommended cutting parameters for internal turning

(Positive style: standard machining diameter ＞ϕ10)

[Cutting depth: radius value (radial cutting depth)]

ISO classification	Material to be cut	Hardness	Cutting field	Machining form	Recommended material	Corner (RE)	Lower limit - recommended value -upper limit		
							Speed Vc (m/min)	Cutting depth ap (mm)	Feed fn (mm/rev)
P	Low carbon steel Low carbon alloy Steel	HB ≤ 300	Precision finishing	Continuous Intermittent	Z8115 Z8225	0.4	250- 300- 350 120- 170- 220	0.05 -0.3 -0.5 0.05 -0.3 -0.5	0.03- 0.1- 0.15 0.03- 0.1- 0.15
			Finishing	Continuous Intermittent	Z8115 Z8225	0.4 0.8	200- 250- 300 150- 200- 250	0.2 -0.5 -1.0 0.2 -0.5 -1.0	0.05- 0.1- 0.2 0.05- 0.1- 0.2
			Finishing - semi-finishing	Continuous Intermittent	Z8115 Z8225	0.4 0.8	150- 200- 250 100- 150- 200	0.5 -1.0 -2.0 0.5 -1.0 -1.5	0.1- 0.15- 0.25 0.1- 0 15- 0.2
			Semi-finishing	Continuous Intermittent	Z8115 Z8225	0.4 0.8	100- 150- 200 80- 120- 150	1.0 -1.5 -2.5 1.0 -1.5 -2.0	0.1- 0.15- 0.3 0.1- 0.15- 0.2
	Medium carbon steel Medium carbon alloy	HB ≤ 300	Precision finishing	Continuous Intermittent	Z8115 Z8225	0.4 0.8	150- 200- 250 120- 140- 170	0.05 -0.3 -0.5 0.05 -0.3 -0.5	0.03- 0.1- 0.15 0.03- 0.1- 0.15
			Finishing	Continuous Intermittent	Z8115 Z8225	0.4 0.8	150- 200- 250 120- 180- 200	0.2 -0.5 -1.0 0.2 -0.5 -1.0	0.05- 0.1- 0.2 0.05- 0.1- 0.2
			Finishing - semi-finishing	Continuous Intermittent	Z8115 Z8225	0.4 0.8	120- 180- 220 100- 150- 200	0.5 -1.0 -2.0 0.5 -1.0 -1.5	0.1- 0.15- 0.25 0.1- 0.15- 0.2
			Semi-finishing	Continuous Intermittent	Z8115 Z8225	0.4 0.8	100- 150- 200 80- 120- 150	1.0 -1.5 -2.5 1.0 -1.5 -2.0	0.1- 0.15- 0.3 0.1- 0.15 - 0.2
	High carbon Alloy steel	HB ≤ 280	Precision finishing	Continuous Intermittent	Z8115 Z8225	0.4 0.8	120- 150- 180 110- 130- 160	0.05 -0.3 -0.5 0.05 -0.3 -0.5	0.03- 0.1- 0.15 0.03- 0.1- 0.15
			Finishing	Continuous Intermittent	Z8115 Z8225	0.4 0.8	120- 150- 180 100- 120- 150	0.2 -0.5 -1.0 0.2 -0.5 -1.0	0.05- 0.1- 0.2 0.05- 0.1- 0.2
			Finishing - semi-finishing	Continuous Intermittent	Z8115 Z8225	0.4 0.8	120- 150- 180 100- 120- 150	0.5 -1.0 -2.0 0.5 -1.0 -1.5	0.1- 0.15- 0.25 0.1- 0.15- 0.2
			Semi-finishing	Continuous Intermittent	Z8115 Z8225	0.4 0.8	100- 120- 150 80- 100- 120	1.0 -1.5 -2.5 1.0 -1.5 -2.0	0.1- 0.15- 0.3 0.1- 0 15- 0.2
M	Stainless steel (austenite)	HB ≤ 220	Finishing	Continuous Intermittent	Z7125 Z7225	0.4 0.8	120- 150- 180 100- 120- 150	0.2 -0.5 -0.8 0.2 -0.5 -0.8	0.05 - 0.08- 0.1 0.05- 0.08 - 0.1
			Semi-finishing	Continuous Intermittent	Z7125 Z7225	0.4 0.8	120- 150- 180 100- 120- 150	0.5 -1.0 -1.5 0.5 -1.0 -1.5	0.05 - 0.1 - 0.2 0.05- 0.1 - 0.2
	Stainless steel (precipitation and hardening)	HB ≤ 300	Finishing	Continuous Intermittent	Z7125 Z7225	0.4 0.8	80- 100- 120 60- 80- 100	0.2 -0.7 -1.0 0.2 -0.7 -1.0	0.05- 0.1 - 0.15 0.05- 0.1 - 0.15
			Semi-finishing	Continuous Intermittent	Z7125 Z7225	0.4 0.8	80- 100- 120 60- 80- 100	0.5 -1.0 -1.5 0.5 -1.0 -1.5	0.05- 0.1 - 0.2 0.05- 0.1 - 0.2
K	Grey cast iron	HB ≤ 250	High speed finishing	Continuous Intermittent	Z6115	0.4 0.8	400- 500- 600 200- 250- 350	0.05 -0.2 -0.5 0.2 -0.5 -1.0	0.05- 0.1 - 0.15 0.05- 0.1 - 0.15
			Finishing (with high luster)	Continuous Intermittent	Z6115	0.4 0.8	200- 250- 300 120- 180- 230	0.2 -0.5 -1.0 0.2 -0.5 -1.0	0.05- 0.1 - 0.2 0.05- 0.1 - 0.2
			Finishing	Continuous Intermittent	Z6115	0.4 0.8	150- 180- 200 100- 150- 180	0.2 -0.5 -1.0 0.2 -0.5 -1.0	0.05- 0.1 - 0.2 0.05- 0.1 - 0.2
			Semi-finishing	Continuous Intermittent	Z6115	0.4 0.8	100- 150- 200 80- 120- 150	0.5 -1.0 -2.0 0.5 -1.0 -2.0	0.1- 0.15- 0.2 0.05- 0.1 - 0.15
	Ductile iron	HB ≤ 270	High speed finishing	Continuous Intermittent	Z6115	0.4 0.8	200- 300- 400 150- 200- 250	0.05 -0.2 -0.5 0.2 -0.5 -1.0	0.03- 0.05- 0.1 0.05- 0 1 - 0.15
			Finishing (with high luster)	Continuous Intermittent	Z6115	0.4 0.8	150- 200- 250 120- 150- 200	0.2 -0.5 -1.0 0.2 -0.5 -1.0	0.05- 0.1 - 0.2 0.05- 0.1- 0.2
			Finishing	Continuous Intermittent	Z6115	0.4 0.8	120- 150- 180 100- 120- 150	0.2 -0.5 -1.0 0.2 -0.5 -1.0	0.05- 0.1 - 0.2 0.05- 0.1 - 0.2
			Semi-finishing	Continuous Intermittent	Z6115	0.4 0.8	100- 120- 150 80- 100- 120	0.5 -1.0 -2.0 0.5 -1.0 -2.0	0.05- 0.1 - 0.2 0.05- 0.1 - 0.15
N	Non-ferrous metal Copper - copper alloy Aluminum/ aluminum alloy (Si ＜ 10%), etc.	HB ≤ 100	High speed finishing (Iridescence surface luster)	Continuous	Z10 Z20	0.4 0.8	200-400-1000	0.05-0.1-0.3	0.05-0.1-0.15
			Finishing	Continuous Intermittent	Z10 Z20	0.4 0.8	100- 200- 400 100- 200- 400	0.05 -0.5 -1.0 0.05 -0.5 -1.0	0.03- 0.1- 0.2 0.03- 0.1- 0.2
S	Titanium alloy	HB ≤ 400	Precision finishing (Iridescence surface luster)	Continuous Intermittent	Z9105 Z7115	0.4 0.8	100- 120- 150 70- 100- 120	0.05 -0.1 -0.3 0.05 -0.1 -0.3	0.03- 0.07- 0.1 0.03- 0.07- 0.1
			Finishing	Continuous Intermittent	Z9105 Z7115	0.4 0.8	30- 50- 70 30- 50- 70	0.05 -0.5 -1.0 0.05 -0.5 -1.0	0.03- 0.1- 0.2 0.03- 0.1- 0.2
	Heat-resistant alloy	HB ≤ 350	Finishing	Continuous Intermittent	Z9105 Z7115	0.4 0.8	10- 30- 50 10- 30- 50	0.05 -0.5 -1.0 0.05 -0.5 -1.0	0.03- 0.1- 0.2 0.03- 0.1- 0.2
			Finishing	Continuous Intermittent	Z9105 Z7115	0.4 0.8	40- 60- 80 40- 60- 80	0.1 -0.3 -0.5 0.1 -0.3 -0.5	0.03- 0.05- 0.1 0.03- 0.05- 0.1
H	Quenched steel High hardness material	40~50 WC	Finishing	Continuous Intermittent	Z10	0.4 0.8	60- 80- 100 30- 50- 70	0.05 -0.3 -0.5 0.05 -0.3 -0.5	0.05- 0.08- 0.1 0.05- 0.08- 0.1
		45~68 WC	Finishing	Continuous Intermittent	Z10	0.4 0.8	100- 140- 180 90- 120- 160	0.1 -0.2 -0.3 0.1 -0.2 -0.3	0.02- 0.07- 0.1 0.02- 0.07- 0.1
			Semi-finishing	Continuous	Z10	0.4 0.8	60-80-100	0.3-0.7-1.0	0.03-01-0.15

Recommended cutting parameters for cermet brand

	Material name	Low carbon steel/ low carbon alloy steel	Middle carbon steel/ middle carbon alloy steel	High carbon alloy steel
	Hardness	< 150HB	< 250HB	< 350HB
WC10	Vc/（m/min）	150-200-300		150-170-220
	fn/（mm/rev）	0.10~0.30		0.05~0.25
WC20	Vc/（m/min）	100-150-250		100-130-200
	fn/（mm/rev）	0.15~0.35		0.10~0.25

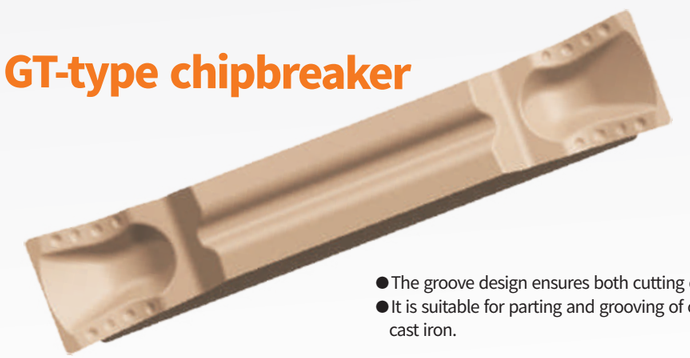
Correction table of cutting parameters for S-type internal turning

Workpiece material		Hardness	Machining form	L/D≤3		L/D=4		L/D=5		L/D=6	
				Feed (mm/rev)	Cutting depth (mm)	Feed (mm/rev)	Cutting depth (mm)	Feed (mm/rev)	Cutting depth (mm)	Feed (mm/rev)	Cutting depth (mm)
P	Carbon steel, alloy steel 45#、42CrMo	HB 180-280	Finishing	0.05-0.1-0.15	＜0.2	0.05-0.1-0.15	＜0.2				
			semi-finishing	0.15-0.25-0.35	＜3.0	0.1-0.15-0.2	＜1.5				
M	Stainless steel 1Cr18Ni9Ti 0Cr18Ni9	≤ HB220	Finishing	0.05-0.1-0.15	＜0.2	0.05-0.1-0.15	＜0.2				
			semi-finishing	0.15-0.2-0.25	＜2.0	0.1-0.15-0.2	＜1.0				
N	Aluminum alloy	---	Finishing	0.05-0.1-0.15	＜0.2	0.05-0.1-0.15	＜0.2	0.05-0.1-0.15	-0.15	0.05-0.1-0.15	＜0.1
			semi-finishing	0.05-0.1-0.15	＜2.0	0.05-0.1-0.15	＜1.5	0.05-0.1-0.15	-1.0	0.05-0.1-0.15	＜1.0

CT-type chipbreaker

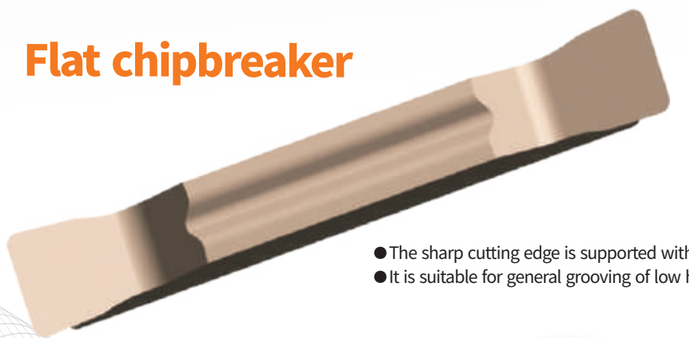
- The unique groove design ensures good chip control.
- It is suitable for external, internal and end face grooving as well as plunge turning.

GT-type chipbreaker



- The groove design ensures both cutting edge strength and sharpness;
- It is suitable for parting and grooving of carbon steel, alloy steel and cast iron.

Flat chipbreaker

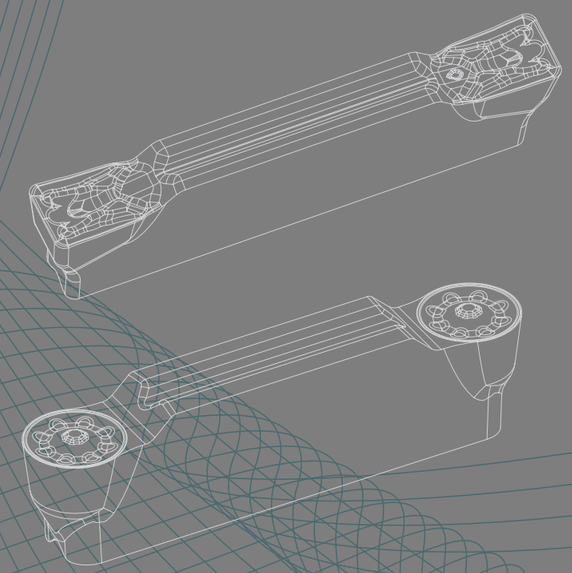


- The sharp cutting edge is supported with lower cutting resistance.
- It is suitable for general grooving of low hardness materials.

A Turning

Parting and grooving

- Code key of parting and grooving inserts ---------- A91
- Overview of parting and grooving tools ---------- A92
- Parting and grooving inserts ---------- A93-A94
- Parting and grooving tools ---------- A95-A98
- Technical information for parting and grooving ---------- A99-A102



Code key of grooving inserts

QC	M	B	30	04 –	CT
①	②	③	④	⑤	⑥

①Insert type	
Code	Type
QD	Parting insert
QC	Grooving insert
QP	Profile insert

②Tolerance class	
Code	Standard
M	M—class tolerance
K	K—class tolerance
E	E—class tolerance

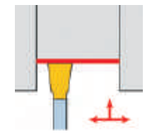
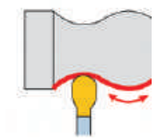
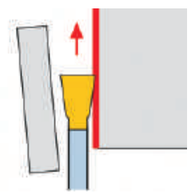
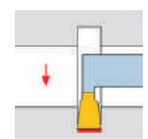
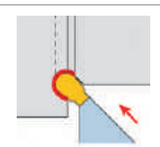
③Cutting edge count	
Code	Number of cutting edges
A	Single insert
B	Double inserts
C	Triple inserts

④ Cutting edge width	
Code	Insert width (mm)
25	2.50
30	3.00
40	4.00
50	5.00
60	6.00
124	12.40

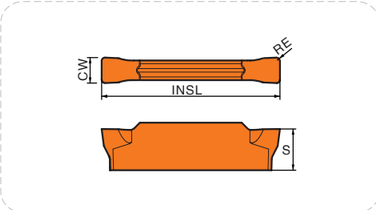
⑤ Corner radius	
Code	Corner radius (mm)
00	0.00
02	0.20
03	0.30
04	0.40
08	0.80

⑥Chipbreaker groove	
Default	Flat
CT	CT-type groove
GT	GT-type groove
RM	RM-type groove
AK	AK-type groove

Overview of parting and grooving tools

Machining form	Diagram	Applicable tools	Applicable inserts	Features
External grooving and plunge turning	 	WOEH□□	QCMB□□ QCKB□□ QPMB□□ QPEB□□	• The multi-purpose cutting tool is compatible with different inserts such as grooving, profile and parting inserts. • The insert can produce either pressing groove or grinding groove, which meet different machining requirements. • The maximum groove depth is 20mm. • With a profiling insert, it can be used to machines a variety of materials.
Parting		WOEH□□	QCMB□□ QCKB□□	• With our parting inserts, it can be used to cut and process various materials. • Maximum parting diameter: 60mm.
End face grooving and plunge turning		WOFH**	QCMB□□ QCKB□□	• The multi-purpose cutting tool is compatible with different inserts such as grooving, profiling and parting inserts. • Groove depth: 10-20mm.
Internal grooving and turning		WOIV□□	QCMB□□ QCKB□□ QPMB□□	• The multi-purpose cutting tool is compatible with different inserts such as grooving, profile and parting inserts. • Minimum inscribed circle diameter for machining: 25mm. • Maximum groove depth: 6mm.
Relief groove machining		WOEU□□	QCMB□□ QCKB□□ QPMB□□	• The 45°cutting tool structure shall complete a variety of forms of relief groove machining. • Maximum vertical depth of the relief groove: 3.3mm.

Parting and grooving insert



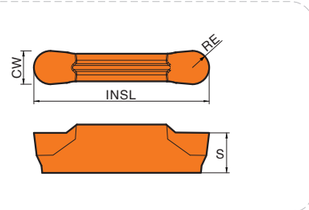
Working condition: ● Stable ◕ Average ⌗ Tough

Workpiece material																
P Steel	●	◕	◕⌗											●	◕
M Stainless steel							●◕	●◕							
K Cast iron				●◕											
N Non-ferrous metal												●	◕		
S Heat-resistant alloy Titanium alloy					●	◕									

Machining type	Insert shape	Type	Basic dimension (mm)				CVD				PVD						Cemented carbide		Cermet	
			INSL	CW	S	RE	Z8115	Z8125	Z8225	Z6115	Z9105	Z7115	Z7125	Z7225	Z5125	Z5225	Z10	K20	Z10	Z20
Parting and grooving		QCMB1502-GT	16.0	1.5	3.50	0.2	★		★	★			★	☆						
		QCMB2002-GT	16.0	2.0	3.55	0.2	★		★	★			★	☆						
		QCMB3002-GT	21.0	3.0	4.86	0.2	★		★	★			★	☆						
		QCMB4002-GT	21.0	4.0	4.86	0.2	★		★	★			★	☆						
		QCMB5003-GT	26.0	5.0	5.80	0.3	★		★	★			★	☆						
		QCMB6003-GT	26.0	6.0	5.90	0.3	★		★	★			★	☆						
Grooving		QCKB2002	16.0	2.0	3.55	0.2							★	☆						
		QCKB3004	21.0	3.0	4.86	0.4							★	☆						
		QCKB4004	21.0	4.0	4.86	0.4							★	☆						
		QCKB5008	26.0	5.0	5.80	0.8							★	☆						
Grooving and plunge turning		QCMB2002-CT	16.0	2.0	3.55	0.2	★		★	★			★	☆						
		QCMB2502-CT	18.5	2.5	3.90	0.2	★		★	★			★	☆						
		QCMB3004-CT	21.0	3.0	4.86	0.4	★		★	★			★	☆						
		QCMB4004-CT	21.0	4.0	4.86	0.4	★		★	★			★	☆						
		QCMB5008-CT	26.0	5.0	5.80	0.8	★		★	★			★	☆						

★ Recommended grade ☆ Available grade

Profile groove insert



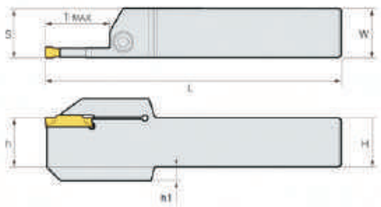
Working condition: ● Stable ◕ Average ⌗ Tough

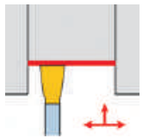
Workpiece material																
P Steel	●	◕	◕⌗											●	◕
M Stainless steel							●◕	●◕							
K Cast iron				●◕											
N Non-ferrous metal												●	◕		
S Heat-resistant alloy Titanium alloy					●	◕									

Machining type	Insert shape	Type	Basic dimension (mm)				CVD				PVD						Cemented carbide		Cermet	
			INSL	CW	S	RE	Z8115	Z8125	Z8225	Z6115	Z9105	Z7115	Z7125	Z7225	Z5125	Z5225	Z10	K20	Z10	Z20
Profile		QPMB2010-RM	16.0	2.0	3.5	1.0	★		★	★			★	☆						
		QPMB3015-RM	21.0	3.0	4.8	1.5	★		★	★			★	☆						
		QPMB4020-RM	21.0	4.0	4.8	2.0	★		★	★			★	☆						
		QPMB5025-RM	26.0	5.0	5.8	2.5	★		★	★			★	☆						
		QPMB6030-RM	26.0	6.0	5.9	3.0	★		★	★			★	☆						
Aluminum hub groove insert		QPEB8040-AK	30.0	8.0	8.365	4.0											★	★		

★ Recommended grade ☆ Available grade

External grooving, parting and turning tools

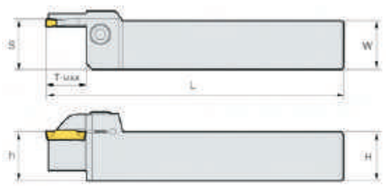


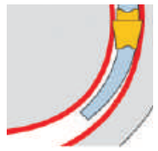


Type		Basic dimension (mm)							Screw	Wrench	Applicable inserts
		Inventory	H=h	W	L	S	H1	T-MAX			
WOEWO/L	1212-2-T08	△	12	12	100	12.2	/	8	HHA0512	WR40L	QCMB□□ QCKB□□ QPMB□□ QPEB□□
	1616-2-T08	△	16	16	100	16.2	/	8			
	2020-2-T08	▲	20	20	125	20.2	/	8			
	2525-2-T08	▲	25	25	150	25.2	/	8			
	1616-2-T12	△	16	16	100	16.2	/	12			
	2020-2-T12	△	20	20	125	20.2	/	12			
	2525-2-T12	▲	25	25	150	25.2	/	12			
	1616-2.5-T17	△	16	16	100	16.3	/	17			
	2020-2.5-T17	△	20	20	125	20.3	/	17			
	2525-2.5-T17	△	25	25	150	25.3	/	17			
	1616-3-T10	△	16	16	100	16.4	/	10			
	2020-3-T10	▲	20	20	125	20.4	/	10			
	2525-3-T10	▲	25	25	150	25.4	/	10			
	1616-3-T13	△	16	16	100	16.4	/	13			
	2020-3-T13	▲	20	20	125	20.4	/	13			
	2525-3-T13	▲	25	25	150	25.4	/	13			
	1616-3-T20	△	16	16	100	16.4	/	20			
	2020-3-T20	△	20	20	125	20.4	/	20			
	2525-3-T20	△	25	25	150	25.4	/	20			
	2020-4-T10	▲	20	20	125	20.4	/	10	HHA0616	WR50L	
	2525-4-T10	▲	25	25	150	25.4	/	10			
	3232-4-T10	△	32	32	150	32.4	/	10			
	2020-4-T15	△	20	20	125	20.4	/	15			
	2525-4-T15	△	25	25	150	25.4	/	15			
	2020-4-T20	△	20	20	125	20.4	/	20			
	2525-4-T20	△	25	25	150	25.4	/	20			
	3232-4-T20	△	32	32	170	32.4	/	20			

▲Running stock △Make-to-order

90° end face grooving tool

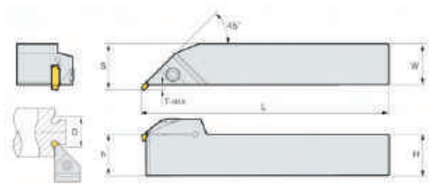


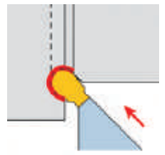


Type		Basic dimension (mm)						ΦD		Screw	Wrench	Applicable inserts
		Inventory	H=h	W	L	S	T-MAX	Min	Max			
WOFWO/L	325-34/50-T10	△	25	25	150	25.5	10	34	50	HHA0512	WR40L	QCMB□□ QCKB□□
	325-44/70-T15	▲	25	25	150	25.5	15	44	70			
	325-64/100-T15	△	25	25	150	25.5	15	64	100			
	425-40/60-T10	△	25	25	150	25.6	10	40	60	HHA0616	WR50L	
	425-44/70-T20	▲	25	25	150	25.6	20	44	70			
	425-84/92-T20	△	25	25	150	25.6	20	84	92			
	425-60/120-T20	▲	25	25	150	25.6	20	60	120			
	425-112/200-T20	△	25	25	150	25.6	20	112	200			
	525-190/220-T10	▲	25	25	150	25.6	10	190	200			
	625-170/190-T10	△	25	25	150	25.6	10	170	190			
	625-190/220-T10	△	25	25	150	25.6	10	190	200			

▲Running stock △Make-to-order

Relief groove tool

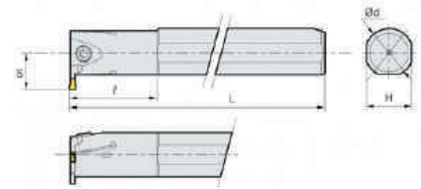


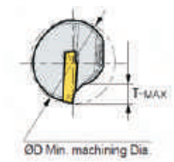


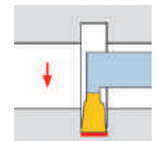
Type		Basic dimension (mm)							Screw	Wrench	Applicable inserts
		Inventory	H=h	W	L	S	ΦD Max	T-MAX			
WOEUR/L	2020-3	△	20	20	125	23	40	2.8	HHA0512	WR40L	QCMB□□ QCKB□□ QPMB□□
	2525-3	▲	25	25	150	28	40	2.8			
	3232-3	△	32	32	170	35	40	2.8			
	2020-4	▲	20	20	125	23	40	2.8	HHA0616	WR50L	
	2525-4	▲	25	25	150	28	40	2.8			
	3232-4	△	32	32	170	35	40	2.8			
	2020-5	▲	20	20	125	23.5	50	3.3			
	3232-5	△	32	32	170	35.5	50	3.3			
	2020-6	▲	20	20	125	23.5	50	3.3			
	2525-6	▲	25	25	150	28.5	50	3.3			

▲Running stock △Make-to-order

Internal grooving and turning tools







Type		Basic dimension (mm)								Screw	Wrench	Applicable inserts
		Inventory	ΦD	Φd	L	ℓ	T-MAX	H	S			
WOIVR/L	2516-2	△	25	16	125	35	6.5	15	14	HHB0410	WR30L	QCMB□□ QCKB□□ QPMB□□
	2520-2	△	25	20	150	45	6.5	18	15.5	HHA0512	WR40L	
	3225-2	△	32	25	200	45	7	23	19			
	2516-2.5	△	25	16	125	35	6.5	15	14	HHB0410	WR30L	
	2520-2.5	▲	25	20	150	45	6.5	18	15.5	HHA0512	WR40L	
	3225-2.5	△	32	25	200	45	7	23	19			
	2520-3	▲	25	20	150	45	6.5	18	15.5	HHB0410	WR30L	
	3225-3	△	32	25	200	45	7	23	19	HHA0512	WR40L	
	4032-3	△	40	32	250	55	7.5	30	22.5	HHA0616	WR50L	
	2520-4	▲	25	20	150	45	6.5	18	15.5	HHB0410	WR30L	
	3225-4	△	32	25	200	45	7	23	19	HHA0512	WR40L	
	4032-4	△	40	32	250	55	7.5	30	22.5	BHA0616	WR50L	
	3225-5	△	32	25	200	45	7.5	23	19.5	HHA0512	WR40L	
	4032-5	△	40	32	250	55	8.5	30	23.5	BHA0616	WR50L	
	3225-6	▲	32	25	200	45	7.5	23	19.5	HHA0512	WR40L	
	4032-6	△	40	32	250	55	8.5	30	23.5	BHA0616	WR50L	

▲Running stock △Make-to-order

Cutting speed recommendations for parting and grooving

ISO	Classification of materials			Hardness of Brinell (HB)	Tensile strength (N/mm^2)	Cutting Speed Recommendations (m/min)											
						Z8225			Z7125			Z7225			Z6115		
						Feed (mm/rev)											
						0.1	0.3	0.5	0.1	0.3	0.5	0.1	0.3	0.5	0.1	0.3	0.5
P	Non-alloyed steel	C≤0.25%	Annealing	125	428	280	200	130	260	180	120	260	180	120			
		0.25<C≤0.55%	Annealing	190	639	240	160	115	220	150	105	200	140	105			
		0.25<C≤0.55%	Quenching and tempering	210	708	130	115	100	120	110	100	120	110	100			
		C>0.55%	Annealing	190	639	145	130	115	130	120	110	130	120	110			
		C>0.55%	Quenching and tempering	300	1013	115	100	80	110	95	70	110	95	70			
		Short chip steel	Annealing	220	745	130	115	100	120	105	90	120	105	90			
	Low-alloyed steel	Annealing		175	591	280	200	130	170	135	120	170	135	120			
		Quenching and tempering		300	1013	115	100	80	105	90	70	105	90	70			
		Quenching and tempering		380	1282	170	90	70	160	80	60	160	80	60			
		Quenching and tempering		430	430												
	High-alloyed steel and high alloy tool steel	Annealing		200	675												
		Quenching and tempering		300	1013												
		Quenching and tempering		400	1361												
M	Stainless steel	Ferrite/martensite, annealing		200	675				200	150	105	200	150	105			
		Martensite, quenching and tempering		330	1114				150	115	70	150	115	70			
	Stainless steel	Austenite, quenching		200	675				165	135	105	185	155	125			
		Austenite, precipitation hardening stainless steel (PH stainless steel)		300	1013				155	120	80	165	135	95			
		Austenite- ferrite, duplex stainless steel		230	778				135	110	85	145	110	85			
K	Malleable cast iron	Ferrite		200	400										220	160	80
		Pearlite		260	700										115	90	65
	Grey cast iron	Low tensile strength		180	200										200	150	95
		High tensile strength/austenite		245	350										185	140	95
	Ductile iron	Ferrite		155	400										160	130	80
		Pearlite		265	700										145	110	80
	Compacted graphite iron GGV (CGI)			230	400										150	120	90

Notes: 1. Cutting parameters are suitable for wet cutting.

2. For internal and section machining, it is recommended to reduce the cutting speed by 30%-50% Precautions for Parting and Grooving:

Precautions for parting and grooving:

Parting

- When the insert gets close to the center of the workpiece, the feed rate should be reduced by 30% for longer tool service life and good surface quality.
- If allowed, the overhang should be minimized to ensure good stability.

External grooving and turning, profile turning

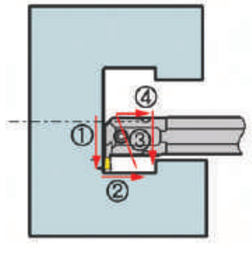
- Pass sequence: When cutting depth > 0.5mm, radial feed (the maximum cutting depth can reach 0.75 x insert width S) → radial return about 0.1mm → axial pass → oblique return → axial pass → radial machining to the required depth.

End face grooving and turning

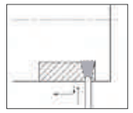
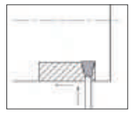
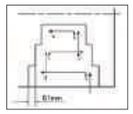
- Finish machining (multi-groove cutting)
  Cutting inwards from the largest diameter, and the insert is slightly offset towards the central insert when returning the insert.
- Recess turning
  Axial turning depth: ≦0.75 xS (insert width)
  If the groove width is greater than the depth, recess turning is recommended.
  If the groove depth is greater than the width, multi-recess cutting is recommended.
- Finish machining
  Machine the bottom and outer diameter edge in a finished way, and then the inner diameter to the required size.

Internal grooving and turning

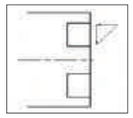
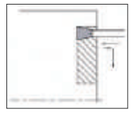
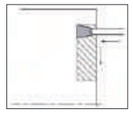
- Please follow the machining sequence as shown.
  In order to facilitate cutting outflow, please always feed outward from the far end face side.



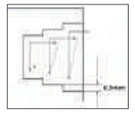
Precautions for external parting, grooving and turning

S/N	Machining subjects	Precautions	Diagram
1	Grooving first and then transverse turning	When roughing (groove depth > 0.5mm), please do not adopt transverse feed machining immediately after grooving. Instead, return the insert about 0.1mm before starting transverse feed machining.	
		When finishing (groove depth < 0.5mm), the corner is subjected to small force, and transverse feed machining can be carried out immediately after grooving.	
2	Groove width expanding machining	Please stagger them into step shape for machining.	
	Finishing	(1) When machining towards the center side without using a center fixing, please lower the feeding speed. (2) A cutting depth more than 0.5mm on one side can effectively improve chip disposal.	

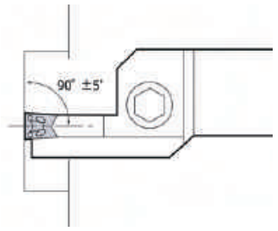
Precautions for end face grooving turning

S/N	Machining subjects	Precautions	Diagram
1	Precautions for cutter bar selection	(1) Choose the model that fits the groove width of the cut material. (2) Check the groove depth. (3) It is recommended to mount the cutter bar facing downwards (reversed).	
		Perform transverse feed machining from the outer section to the inner end face with good chip discharge.	
2	End face turning	When roughing (groove depth > 0.5mm), please do not feed transversely immediately after grooving. Instead, return the insert about 0.1mm before starting transverse feed machining.	
		When finishing (groove depth < 0.5mm), the corner is subjected to small force, and transverse feed machining can be carried out immediately after grooving. (No need to stop the knife)	

Precautions for end face grooving turning

S/N	Machining subjects	Precautions	Diagram
3	End face groove expansion machining	During rough machining, please stagger them into step shape for machining.	
		Finish machining: When the cutting depth is set to 0.5mm or above on one side, the chip disposal performs well.	

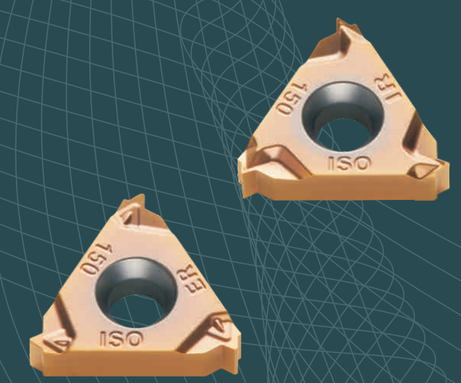
FAQs of parting and grooving

Condition	Countermeasures
There is white turbidity at the bottom of the end face	(1) Increase the cutting speed only in the finish machining. (2) When method 1 does not work, please readjust the parallelism of the insert and the corner. Correction method: Adjust the cutter bar to within ±5° tolerance of the perpendicularity between the cut-in angle and the material to be cut. 
When grooving, the tool gets entangled with chips.	(1) Install the cutter bar facing downwards (reversed). Please spray the coolant from the rear side of the insert to the corner. (2) When expanding the groove, please process it shallowly and extensively as a whole. (Deep recess machining cannot be done at the same time)
The insert collapses during the transverse feed machining.	Please replace the outside-inside machining by the inside-outside machining.
The recesses cannot be accessed vertically.	Please correct the parallelism of the corner Reduce the feeding speed.

A Turning

Threading

- Code key of thread inserts ---------- A105
- Overview of threading ---------- A106
- Tread inserts ---------- A107-A120
- Tread tools ---------- A121-A122
- Technical infomation for threading -------- A123-A130



Code key of thread inserts

16	E	R	150	ISO	—	P
①	②	③	④	⑤		⑥

① Insert size (inch)	
Code	Inscribed circle diameter
11	Φ6.35
16	Φ9.525
22	Φ12.70

② Cutting type	
Code	Type
E	External threading
I	Internal threading

③ Cutting direction	
Code	Direction
R	Dextral
L	Sinistral

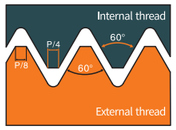
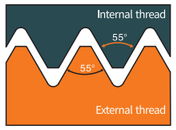
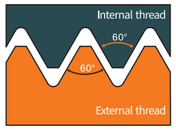
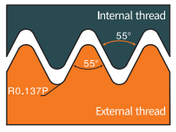
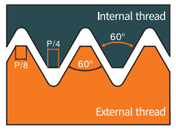
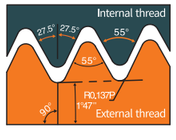
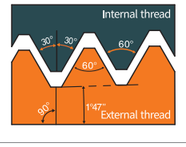
④Thread pitch	
Full form (indicated by pitch × 100)	
mm	TPI
0.35-9.0	72-2

V-profile (pitch indicated by letters)		
	mm	TPI
A	0.5-1.5	48-16
AG	0.5-3.0	48-8
G	1.75-3.0	14-8
N	3.5-5.0	7-5
Q	5.5-6.0	41/2-4

⑤Thread type	
Code	Type
ISO	ISO metric thread
UN	UN thread
W	Whitworth thread
BSPT	BSPT
NPT	NPT

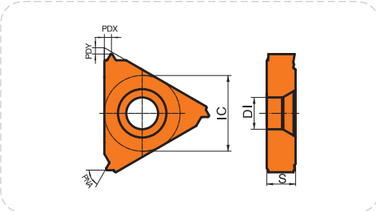
⑥Shaping method	
Code	Type
default	Molded groove
P	Grinding groove

Overview of threading

Industry	Diagram	Thread type	Thread profile	Insert shape	Pitch/number of teeth
General industry		ISO metric thread	ISO Metric 60° thread		1-6
General industry		Universal thread	55 ° universal pitch thread		0.5-5
			60 ° universal pitch thread		
General industry		Whitworth thread	W		8-28
Aerospace industry equipment		UN thread	UN		12-20
Pipe threads for gas, heating and tap water		BSPT	BSPT		11-28
For pipelines connection with gas and tap water faucets		NPT	NPT		8-27

ISO metric 60° thread (Molded)

Standard: R262（DIN 13）
Tolerance class: 6g/6H



Working condition: ● Stable ◕ Average ⌗ Tough

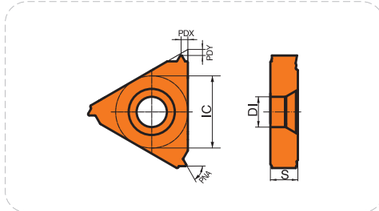
Workpiece material		CVD 8115	CVD 8125	CVD 8225	CVD 6115	PVD 9105	PVD 7115	PVD 7125	PVD 7225	PVD 5125	PVD 5225	Cemented carbide K10	Cemented carbide K20	Cermet C10	Cermet C20
P	Steel	●	◕	⌗										●	◕
M	Stainless steel							◕	◕						
K	Cast iron			◕											
N	Non-ferrous metal											●	◕		
S	Heat-resistant alloy Titanium alloy					●	◕								

Machining type	Insert shape	Type	Pitch/ number of teeth	Basic dimension (mm) IC	PDX	PDY	S	DI	PNA	CVD 8115	CVD 8125	CVD 8225	CVD 6115	PVD 9105	PVD 7115	PVD 7125	PVD 7225	PVD 5125	PVD 5225	Cemented carbide K10	Cemented carbide K20	Cermet C10	Cermet C20
External thread		16ER100ISO	1.00	9.525	0.7	0.7	3.52	4.0	60°									☆	★				
		16ER125ISO	1.25	9.525	0.9	0.8	3.52	4.0	60°									☆	★				
		16ER150ISO	1.50	9.525	1.0	0.8	3.52	4.0	60°									☆	★				
		16ER175ISO	1.75	9.525	1.2	0.9	3.52	4.0	60°									☆	★				
		16ER200ISO	2.00	9.525	1.3	1.0	3.52	4.0	60°									☆	★				
		16ER250ISO	2.50	9.525	1.5	1.2	3.52	4.0	60°									☆	★				
		16ER300ISO	3.00	9.525	1.6	1.3	3.52	4.0	60°									☆	★				
		22ER350ISO	3.50	12.700	2.3	1.6	4.65	5.0	60°									☆	★				
		22ER400ISO	4.00	12.700	2.3	1.6	4.65	5.0	60°									☆	★				
		22ER450ISO	4.50	12.700	2.4	1.7	4.65	5.0	60°									☆	★				
		22ER500ISO	5.00	12.700	2.4	1.7	4.65	5.0	60°									☆	★				
		22ER600ISO	6.00	12.700	2.7	1.7	4.65	5.0	60°									☆	★				

★ Recommended grade ☆ Available grade

ISO metric 60° thread (Molded)

Standard: R262（DIN 13）
Tolerance class: 6g/6H



Working condition: ● Stable ◕ Average ⌗ Tough

Workpiece material		CVD 8115	CVD 8125	CVD 8225	CVD 6115	PVD 9105	PVD 7115	PVD 7125	PVD 7225	PVD 5125	PVD 5225	Cemented carbide K10	Cemented carbide K20	Cermet C10	Cermet C20
P	Steel	●	◕	⌗										●	◕
M	Stainless steel							◕	◕						
K	Cast iron			◕											
N	Non-ferrous metal											●	◕		
S	Heat-resistant alloy Titanium alloy				●	◕									

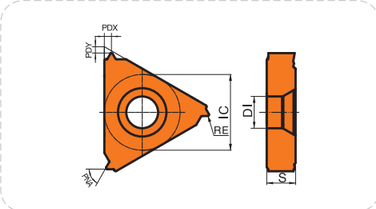
Machining type	Insert shape	Type	Pitch/ number of teeth	Basic dimension (mm) IC	PDX	PDY	S	DI	PNA	CVD 8115	CVD 8125	CVD 8225	CVD 6115	PVD 9105	PVD 7115	PVD 7125	PVD 7225	PVD 5125	PVD 5225	Cemented carbide K10	Cemented carbide K20	Cermet C10	Cermet C20
Internal thread		11IR100ISO	1.00	6.35	0.7	0.7	3.05	3.2	60°									☆	★				
		11IR125ISO	1.25	6.35	0.9	0.8	3.05	3.2	60°									☆	★				
		11IR150ISO	1.50	6.35	1.0	0.8	3.05	3.2	60°									☆	★				
		11IR175ISO	1.75	6.35	1.2	0.9	3.05	3.2	60°									☆	★				
		11IR200ISO	2.00	6.35	1.3	0.9	3.05	3.2	60°									☆	★				
		11IR250ISO	2.50	6.35	1.5	1.0	3.05	3.2	60°									☆	★				
		16IR100ISO	1.00	9.525	0.7	0.7	3.52	4.0	60°									☆	★				
		16IR125ISO	1.25	9.525	0.9	0.8	3.52	4.0	60°									☆	★				
		16IR150ISO	1.50	9.525	1.0	0.8	3.52	4.0	60°									☆	★				
		16IR175ISO	1.75	9.525	1.2	0.9	3.52	4.0	60°									☆	★				
		16IR200ISO	2.00	9.525	1.3	1.0	3.52	4.0	60°									☆	★				
		16IR250ISO	5.50	9.525	1.5	1.1	3.52	4.0	60°									☆	★				
		16IR300ISO	3.00	9.525	1.5	1.1	3.52	4.0	60°									☆	★				
		22IR350ISO	3.50	12.700	2.3	1.6	4.65	5.0	60°									☆	★				
		22IR400ISO	4.00	12.700	2.3	1.6	4.65	5.0	60°									☆	★				
		22IR450ISO	4.50	12.700	2.4	1.6	4.65	5.0	60°									☆	★				
		22IR500ISO	5.00	12.700	2.4	1.6	4.65	5.0	60°									☆	★				
		22IR600ISO	6.00	12.700	2.5	1.8	4.65	5.0	60°									☆	★				

★ Recommended grade ☆ Available grade

Universal thread (Molded)

Standard: B.S.84:1956,DIN 259,ISO228/1:1982
Tolerance class: Medium, A-class

Working condition: ● Stable ◕ Average ⌗ Tough

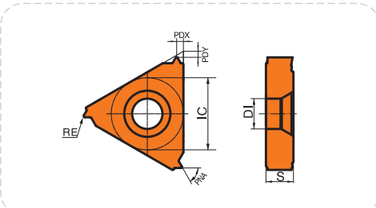


Workpiece material											
P	Steel	●	◕	⌗						●	◕
M	Stainless steel						◕	◕			
K	Cast iron				◕	◕					
N	Non-ferrous metal								●	◕	
S	Heat-resistant alloy Titanium alloy					●	◕				

Machining type	Insert shape	Type	Pitch/ number of teeth	Basic dimension (mm)							CVD				PVD					Cemented carbide		Cermet	
				IC	PDX	PDY	S	RE	DI	PNA	8115	8125	8225	6115	9105	7115	7125	7225	5125	5225	K10	K20	C10	C20
External thread		16ERA55	0.5-1.5	9.525	0.9	0.8	3.52	0.05	4.0	55°									☆	★				
		16ERG55	1.75-3.0	9.525	1.7	1.2	3.52	0.23	4.0	55°									☆	★				
		16ERAG55	0.5-3.0	9.525	1.7	1.2	3.52	0.06	4.0	55°									☆	★				
		16ERA60	0.5-1.5	9.525	0.9	0.8	3.52	0.06	4.0	60°									☆	★				
		16ERG60	1.75-3.0	9.525	1.7	1.2	3.52	0.18	4.0	60°									☆	★				
		16ERAG60	0.5-3.0	9.525	1.7	1.2	3.52	0.07	4.0	60°									☆	★				
		22ERN60	3.5-5.0	12.700	2.5	1.7	4.65	0.51	5.0	60°									☆	★				

★ Recommended grade ☆ Available grade

Working condition: ● Stable ◕ Average ⌗ Tough



Workpiece material											
P	Steel	●	◕	⌗						●	◕
M	Stainless steel						◕	◕			
K	Cast iron				◕	◕					
N	Non-ferrous metal								●	◕	
S	Heat-resistant alloy Titanium alloy					●	◕				

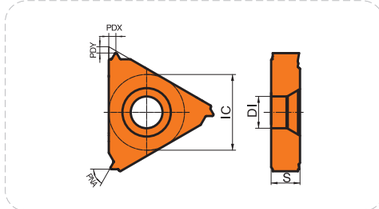
Machining type	Insert shape	Type	Pitch/ number of teeth	Basic dimension (mm)							CVD				PVD					Cemented carbide		Cermet	
				IC	PDX	PDY	S	RE	DI	PNA	8115	8125	8225	6115	9105	7115	7125	7225	5125	5225	K10	K20	C10	C20
Internal thread		11IRA55	0.5-1.5	6.350	0.9	0.8	3.05	0.05	3.2	55°									☆	★				
		16IRA55	0.5-1.5	9.525	0.9	0.8	3.52	0.05	4.0	55°									☆	★				
		16IRG55	1.75-3.0	9.525	1.7	1.2	3.52	0.21	4.0	55°									☆	★				
		16IRAG55	0.5-3.0	9.525	1.7	1.2	3.52	0.06	4.0	55°									☆	★				
		11IRA60	0.5-1.5	6.350	0.9	0.8	3.05	0.05	3.2	60°									☆	★				
		16IRA60	0.5-1.5	9.525	0.9	0.8	3.52	0.05	4.0	60°									☆	★				
		16IRG60	1.75-3.0	9.525	1.7	1.2	3.52	0.10	4.0	60°									☆	★				
		16IRAG60	0.5-3.0	9.525	1.7	1.2	3.52	0.08	4.0	60°									☆	★				
		22IRN60	3.5-5.0	12.700	2.5	1.7	4.65	0.26	5.0	60°									☆	★				

★ Recommended grade ☆ Available grade

Whiteworth thread (Molded)

Standard: B.S.84:1956,DIN 259,ISO228/1:1982
Tolerance class: Medium, A-class

Working condition: ● Stable ◕ Average ⌗ Tough

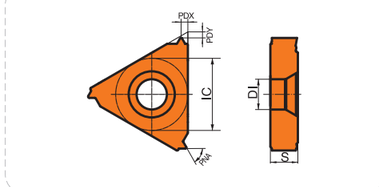


Workpiece material											
P	Steel	●	◕	⌗						●	◕
M	Stainless steel						◕	◕			
K	Cast iron				◕						
N	Non-ferrous metal								●	◕	
S	Heat-resistant alloy Titanium alloy					●	◕				

Machining type	Insert shape	Type	Pitch/ number of teeth	Basic dimension (mm)						CVD				PVD					Cemented carbide		Cermet	
				IC	PDX	PDY	S	DI	PNA	8115	8125	8225	6115	9105	7115	7125	7225	5125	5225	K10	K20	C10	C20
External thread		16ER11W	11	9.525	1.5	1.1	3.52	4.0	55°									☆	★				
		16ER12W	12	9.525	1.4	1.1	3.52	4.0	55°									☆	★				
		16ER14W	14	9.525	1.2	1.0	3.52	4.0	55°									☆	★				
		16ER19W	19	9.525	1.0	0.8	3.52	4.0	55°									☆	★				

★ Recommended grade ☆ Available grade

Working condition: ● Stable ◕ Average ⌗ Tough



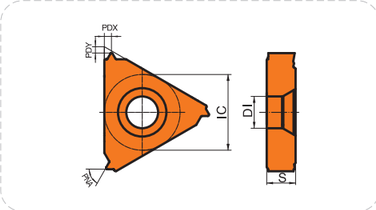
Workpiece material											
P	Steel	●	◕	⌗						●	◕
M	Stainless steel						◕	◕			
K	Cast iron				◕						
N	Non-ferrous metal								●	◕	
S	Heat-resistant alloy Titanium alloy					●	◕				

Machining type	Insert shape	Type	Pitch/ number of teeth	Basic dimension (mm)						CVD				PVD					Cemented carbide		Cermet	
				IC	PDX	PDY	S	DI	PNA	8115	8125	8225	6115	9105	7115	7125	7225	5125	5225	K10	K20	C10	C20
Internal thread		16IR11W	11	9.525	1.5	1.1	3.52	4.0	55°									☆	★				
		16IR12W	12	9.525	1.4	1.1	3.52	4.0	55°									☆	★				
		16IR14W	14	9.525	1.2	1.0	3.52	4.0	55°									☆	★				
		16IR19W	19	9.525	1.0	0.8	3.52	4.0	55°									☆	★				

★ Recommended grade ☆ Available grade

UN united thread (Molded)

Standard: ANSI B1.1:74
Tolerance class: 2A/2B



Working condition: ● Stable ◕ Average ⌗ Tough

Workpiece material		8115	8125	8225	6115	9105	7115	7125	7225	5125	5225	K10	K20	C10	C20
P	Steel	●	◕	◕ ⌗										●	◕
M	Stainless steel							● ◕	● ◕						
K	Cast iron			● ◕											
N	Non-ferrous metal											●	◕		
S	Heat-resistant alloy Titanium alloy					●	◕								

Machining type	Insert shape	Type	Pitch/ number of teeth	Basic dimension (mm) IC	PDX	PDY	S	DI	PNA	CVD 8115	8125	8225	6115	PVD 9105	7115	7125	7225	5125	5225	Cemented carbide K10	K20	Cermet C10	C20
External thread		16ER12UN	12	9.525	1.4	1.1	3.52	4.0	60°									☆	★				
		16ER16UN	16	9.525	1.1	0.9	3.52	4.0	60°									☆	★				
		16ER18UN	18	9.525	1.1	0.8	3.52	4.0	60°									☆	★				
		16ER20UN	20	9.525	1.1	0.8	3.52	4.0	60°									☆	★				

★ Recommended grade ☆ Available grade

Working condition: ● Stable ◕ Average ⌗ Tough

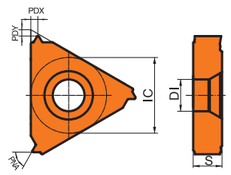
Workpiece material		8115	8125	8225	6115	9105	7115	7125	7225	5125	5225	K10	K20	C10	C20
P	Steel	●	◕	◕ ⌗										●	◕
M	Stainless steel							● ◕	● ◕						
K	Cast iron			● ◕											
N	Non-ferrous metal											●	◕		
S	Heat-resistant alloy Titanium alloy					●	◕								

Machining type	Insert shape	Type	Pitch/ number of teeth	Basic dimension (mm) IC	PDX	PDY	S	DI	PNA	CVD 8115	8125	8225	6115	PVD 9105	7115	7125	7225	5125	5225	Cemented carbide K10	K20	Cermet C10	C20
Internal thread		16IR12UN	12	9.525	1.4	1.1	3.52	4.0	60°									☆	★				
		16IR16UN	16	9.525	1.1	0.9	3.52	4.0	60°									☆	★				
		16IR18UN	18	9.525	1.1	0.8	3.52	4.0	60°									☆	★				
		16IR20UN	20	9.525	1.1	0.8	3.52	4.0	60°									☆	★				

★ Recommended grade ☆ Available grade

BSPT (Molded)

Standard: B.S.21:1985
Tolerance standard: BSPT



Working condition: ● Stable ◕ Average ⌗ Tough

Workpiece material		8115	8125	8225	6115	9105	7115	7125	7225	5125	5225	K10	K20	C10	C20
P	Steel	●	◕	◕ ⌗										●	◕
M	Stainless steel							● ◕	● ◕						
K	Cast iron			● ◕											
N	Non-ferrous metal											●	◕		
S	Heat-resistant alloy Titanium alloy					●	◕								

Machining type	Insert shape	Type	Pitch/ number of teeth	Basic dimension (mm) IC	PDX	PDY	S	DI	PNA	CVD 8115	8125	8225	6115	PVD 9105	7115	7125	7225	5125	5225	Cemented carbide K10	K20	Cermet C10	C20
External thread		16ER11BSPT	11	9.525	1.5	1.1	3.52	4.0	55°									☆	★				
		16ER14BSPT	14	9.525	1.2	1.0	3.52	4.0	55°									☆	★				
		16ER19BSPT	19	9.525	0.9	0.8	3.52	4.0	55°									☆	★				

★ Recommended grade ☆ Available grade

Working condition: ● Stable ◕ Average ⌗ Tough

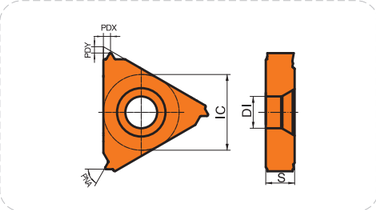
Workpiece material		8115	8125	8225	6115	9105	7115	7125	7225	5125	5225	K10	K20	C10	C20
P	Steel	●	◕	◕ ⌗										●	◕
M	Stainless steel							● ◕	● ◕						
K	Cast iron			● ◕											
N	Non-ferrous metal											●	◕		
S	Heat-resistant alloy Titanium alloy					●	◕								

Machining type	Insert shape	Type	Pitch/ number of teeth	Basic dimension (mm) IC	PDX	PDY	S	DI	PNA	CVD 8115	8125	8225	6115	PVD 9105	7115	7125	7225	5125	5225	Cemented carbide K10	K20	Cermet C10	C20
Internal thread		16IR11BSPT	11	9.525	1.5	1.1	3.52	4.0	55°									☆	★				
		16IR14BSPT	14	9.525	1.2	1.0	3.52	4.0	55°									☆	★				
		16IR19BSPT	19	9.525	0.9	0.8	3.52	4.0	55°									☆	★				

★ Recommended grade ☆ Available grade

NPT (Molded)

Standard: USAS B2.1:1968
Tolerance standard: American Standard NPT Thread



Working condition: ● Stable ◕ Average ⌗ Tough

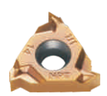
Workpiece material		8115	8125	8225	6115	9105	7115	7125	7225	5125	5225	K10	K20	C10	C20
P	Steel	●	◕	◕ ⌗										●	◕
M	Stainless steel							● ◕	● ◕						
K	Cast iron			● ◕											
N	Non-ferrous metal											●	◕		
S	Heat-resistant alloy Titanium alloy					●	◕								

Machining type	Insert shape	Type	Pitch/ number of teeth	Basic dimension (mm) IC	PDX	PDY	S	DI	PNA	CVD 8115	8125	8225	6115	PVD 9105	7115	7125	7225	5125	5225	Cemented carbide K10	K20	Cermet C10	C20
External thread		16ER115NPT	11.5	9.525	1.5	1.1	3.52	4.0	60°									☆	★				
		16ER14NPT	14.0	9.525	1.2	0.9	3.52	4.0	60°									☆	★				
		16ER18NPT	18.0	9.525	1.0	0.8	3.52	4.0	60°									☆	★				

★ Recommended grade ☆ Available grade

Working condition: ● Stable ◕ Average ⌗ Tough

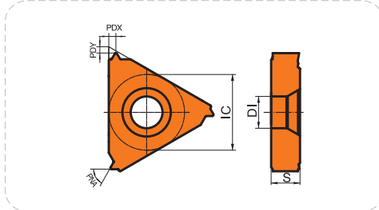
Workpiece material		8115	8125	8225	6115	9105	7115	7125	7225	5125	5225	K10	K20	C10	C20
P	Steel	●	◕	◕ ⌗										●	◕
M	Stainless steel							● ◕	● ◕						
K	Cast iron			● ◕											
N	Non-ferrous metal											●	◕		
S	Heat-resistant alloy Titanium alloy					●	◕								

Machining type	Insert shape	Type	Pitch/ number of teeth	Basic dimension (mm) IC	PDX	PDY	S	DI	PNA	CVD 8115	8125	8225	6115	PVD 9105	7115	7125	7225	5125	5225	Cemented carbide K10	K20	Cermet C10	C20
Internal thread		16IR115NPT	11.5	9.525	1.5	1.1	3.52	4.0	60°									☆	★				
		16IR14NPT	14.0	9.525	1.2	0.9	3.52	4.0	60°									☆	★				
		16IR18NPT	18.0	9.525	1.0	0.8	3.52	4.0	60°									☆	★				

★ Recommended grade ☆ Available grade

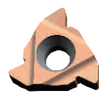
ISO metric 60° thread (Grinding)

Standard: R262 (DIN 13)
Tolerance class: 6g/6H



Working condition: ● Stable ◕ Average ⌗ Tough

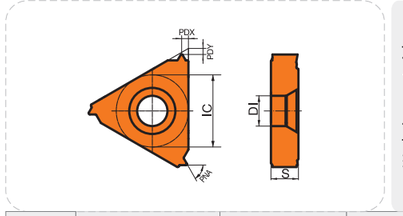
Workpiece material		8115	8125	8225	6115	9105	7115	7125	7225	5125	5225	K10	K20	C10	C20
P	Steel	●	◕	◕ ⌗										●	◕
M	Stainless steel							● ◕	● ◕						
K	Cast iron			● ◕											
N	Non-ferrous metal											●	◕		
S	Heat-resistant alloy Titanium alloy					●	◕								

Machining type	Insert shape	Type	Pitch/ number of teeth	Basic dimension (mm) IC	PDX	PDY	S	DI	PNA	CVD 8115	8125	8225	6115	PVD 9105	7115	7125	7225	5125	5225	Cemented carbide K10	K20	Cermet C10	C20
External thread		16ER100ISO-P	1.00	9.525	0.7	0.7	3.52	4.0	60°									☆	★				
		16EL100ISO-P	1.00	9.525	0.7	0.7	3.52	4.0	60°									☆	★				
		16ER125ISO-P	1.25	9.525	0.9	0.8	3.52	4.0	60°									☆	★				
		16EL125ISO-P	1.25	9.525	0.9	0.8	3.52	4.0	60°									☆	★				
		16ER150ISO-P	1.50	9.525	1.0	0.8	3.52	4.0	60°									☆	★				
		16EL150ISO-P	1.50	9.525	1.0	0.8	3.52	4.0	60°									☆	★				
		16ER175ISO-P	1.75	9.525	1.2	0.9	3.52	4.0	60°									☆	★				
		16EL175ISO-P	1.75	9.525	1.2	0.9	3.52	4.0	60°									☆	★				
		16ER200ISO-P	2.00	9.525	1.3	1.0	3.52	4.0	60°									☆	★				
		16EL200ISO-P	2.00	9.525	1.3	1.0	3.52	4.0	60°									☆	★				
		16ER250ISO-P	2.50	9.525	1.5	1.2	3.52	4.0	60°									☆	★				
		16EL250ISO-P	2.50	9.525	1.5	1.2	3.52	4.0	60°									☆	★				
		16ER300ISO-P	3.00	9.525	1.6	1.3	3.52	4.0	60°									☆	★				
		16EL300ISO-P	3.00	9.525	1.6	1.3	3.52	4.0	60°									☆	★				
		22ER350ISO-P	3.50	12.700	2.3	1.6	4.65	5.0	60°									☆	★				
		22EL350ISO-P	3.50	12.700	2.3	1.6	4.65	5.0	60°									☆	★				
		22ER400ISO-P	4.00	12.700	2.3	1.6	4.65	5.0	60°									☆	★				
		22EL400ISO-P	4.00	12.700	2.3	1.6	4.65	5.0	60°									☆	★				
		22ER450ISO-P	4.50	12.700	2.4	1.7	4.65	5.0	60°									☆	★				
		22EL450ISO-P	4.50	12.700	2.4	1.7	4.65	5.0	60°									☆	★				
		22ER500ISO-P	5.00	12.700	2.4	1.7	4.65	5.0	60°									☆	★				
		22EL500ISO-P	5.00	12.700	2.4	1.7	4.65	5.0	60°									☆	★				
		22ER550ISO-P	5.50	12.700	2.6	1.7	4.65	5.0	60°									☆	★				
		22EL550ISO-P	5.50	12.700	2.6	1.7	4.65	5.0	60°									☆	★				
		22ER600ISO-P	6.00	12.700	2.7	1.7	4.65	5.0	60°									☆	★				
		22EL600ISO-P	6.00	12.700	2.7	1.7	4.65	5.0	60°									☆	★				

★ Recommended grade ☆ Available grade

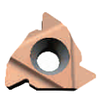
ISO metric 60° thread (Grinding)

Standard: R262（DIN 13）
Tolerance class: 6g/6H



Working condition: ● Stable ◕ Average ⌗ Tough

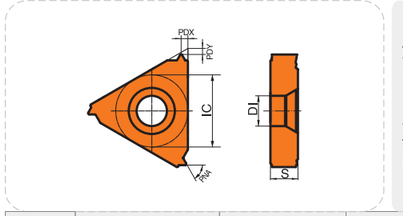
Workpiece material																		
P Steel	●	◕	⌗													●	◕	
M Stainless steel								●	●									
K Cast iron				●														
N Non-ferrous metal														●	◕			
S Heat-resistant alloy Titanium alloy					●	◕												

Machining type	Insert shape	Type	Pitch/ number of teeth	Basic dimension (mm)						CVD				PVD					Cemented carbide		Cermet	
				IC	PDX	PDY	S	DI	PNA	8115	8125	8225	6115	9105	7115	7125	7225	5125	5225	K10	K20	C10	C20
Internal thread		11IR100ISO-P	1.00	6.35	0.7	0.7	3.05	3.2	60°									☆	★				
		11IL100ISO-P	1.00	6.35	0.7	0.7	3.05	3.2	60°									☆	★				
		11IR125ISO-P	1.25	6.35	0.9	0.8	3.05	3.2	60°									☆	★				
		11IL125ISO-P	1.25	6.35	0.9	0.8	3.05	3.2	60°									☆	★				
		11IR150ISO-P	1.50	6.35	1.0	0.8	3.05	3.2	60°									☆	★				
		11IL150ISO-P	1.50	6.35	1.0	0.8	3.05	3.2	60°									☆	★				
		11IR175ISO-P	1.75	6.35	1.2	0.9	3.05	3.2	60°									☆	★				
		11IL175ISO-P	1.75	6.35	1.2	0.9	3.05	3.2	60°									☆	★				
		11IR200ISO-P	2.00	6.35	1.3	0.9	3.05	3.2	60°									☆	★				
		11IL200ISO-P	2.00	6.35	1.3	0.9	3.05	3.2	60°									☆	★				
		11IR250ISO-P	2.50	6.35	1.5	1.0	3.05	3.2	60°									☆	★				
		11IL250ISO-P	2.50	6.35	1.5	1.0	3.05	3.2	60°									☆	★				
		16IR100ISO-P	1.00	9.525	0.7	0.7	3.52	4.0	60°									☆	★				
		16IL100ISO-P	1.00	9.525	0.7	0.7	3.52	4.0	60°									☆	★				
		16IR125ISO-P	1.25	9.525	0.9	0.8	3.52	4.0	60°									☆	★				
		16IL125ISO-P	1.25	9.525	0.9	0.8	3.52	4.0	60°									☆	★				
		16IR150ISO-P	1.50	9.525	1.0	0.8	3.52	4.0	60°									☆	★				
		16IL150ISO-P	1.50	9.525	1.0	0.8	3.52	4.0	60°									☆	★				
		16IR175ISO-P	1.75	9.525	1.2	0.9	3.52	4.0	60°									☆	★				
		16IL175ISO-P	1.75	9.525	1.2	0.9	3.52	4.0	60°									☆	★				
		16IR200ISO-P	2.00	9.525	1.3	1.0	3.52	4.0	60°									☆	★				
		16IL200ISO-P	2.00	9.525	1.3	1.0	3.52	4.0	60°									☆	★				
		16IR250ISO-P	2.50	9.525	1.5	1.1	3.52	4.0	60°									☆	★				
		16IL250ISO-P	2.50	9.525	1.5	1.1	3.52	4.0	60°									☆	★				
		16IR300ISO-P	3.00	9.525	1.5	1.1	3.52	4.0	60°									☆	★				
		16IL300ISO-P	3.00	9.525	1.5	1.1	3.52	4.0	60°									☆	★				

★ Recommended grade ☆ Available grade

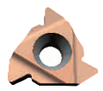
ISO metric 60° thread (Grinding)

Standard: R262（DIN 13）
Tolerance class: 6g/6H



Working condition: ● Stable ◕ Average ⌗ Tough

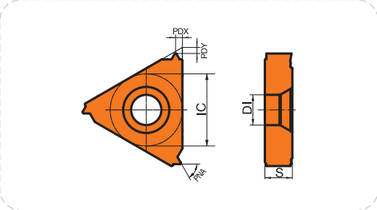
Workpiece material																		
P Steel	●	◕	⌗													●	◕	
M Stainless steel								●	●									
K Cast iron				●														
N Non-ferrous metal														●	◕			
S Heat-resistant alloy Titanium alloy					●	◕												

Machining type	Insert shape	Type	Pitch/ number of teeth	Basic dimension (mm)						CVD				PVD					Cemented carbide		Cermet	
				IC	PDX	PDY	S	DI	PNA	8115	8125	8225	6115	9105	7115	7125	7225	5125	5225	K10	K20	C10	C20
Internal thread		22IR350ISO-P	3.50	12.700	2.3	1.6	4.65	5.0	60°									☆	★				
		22IL350ISO-P	3.50	12.700	2.3	1.6	4.65	5.0	60°									☆	★				
		22IR400ISO-P	4.00	12.700	2.3	1.6	4.65	5.0	60°									☆	★				
		22IL400ISO-P	4.00	12.700	2.3	1.6	4.65	5.0	60°									☆	★				
		22IR450ISO-P	4.50	12.700	2.4	1.6	4.65	5.0	60°									☆	★				
		22IL450ISO-P	4.50	12.700	2.4	1.6	4.65	5.0	60°									☆	★				
		22IR500ISO-P	5.00	12.700	2.4	1.6	4.65	5.0	60°									☆	★				
		22IL500ISO-P	5.00	12.700	2.4	1.6	4.65	5.0	60°									☆	★				
		22IR550ISO-P	5.50	12.700	2.5	1.7	4.65	5.0	60°									☆	★				
		22IL550ISO-P	5.50	12.700	2.5	1.7	4.65	5.0	60°									☆	★				
		22IR600ISO-P	6.00	12.700	2.5	1.8	4.65	5.0	60°									☆	★				
		22IL600ISO-P	6.00	12.700	2.5	1.8	4.65	5.0	60°									☆	★				

★ Recommended grade ☆ Available grade

Whiteworth thread (Grinding)

Standard: B.S.84:1956,DIN 259,ISO228/1:1982
Tolerance class: Medium,A-class



Working condition: ● Stable ◕ Average ⌗ Tough

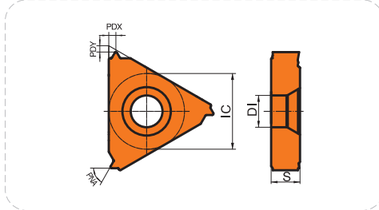
Workpiece material																		
P Steel	●	◕	⌗													●	◕
M Stainless steel								●	●								
K Cast iron				●	◕												
N Non-ferrous metal													●	◕			
S Heat-resistant alloy Titanium alloy						●	◕										

Machining type	Insert shape	Type	Pitch/ number of teeth	Basic dimension (mm)						CVD				PVD					Cemented carbide		Cermet	
				IC	PDX	PDY	S	DI	PNA	8115	8125	8225	6115	9105	7115	7125	7225	5125	5225	K10	K20	C10	C20
Internal thread		16IR8W-P	8	9.525	1.5	1.2	3.52	4.0	55°									☆	★				
		16IL8W-P	8	9.525	1.5	1.2	3.52	4.0	55°									☆	★				
		16IR9W-P	9	9.525	1.7	1.2	3.52	4.0	55°									☆	★				
		16IL9W-P	9	9.525	1.7	1.2	3.52	4.0	55°									☆	★				
		16IR10W-P	10	9.525	1.5	1.1	3.52	4.0	55°									☆	★				
		16IL10W-P	10	9.525	1.5	1.1	3.52	4.0	55°									☆	★				
		16IR11W-P	11	9.525	1.5	1.1	3.52	4.0	55°									☆	★				
		16IL11W-P	11	9.525	1.5	1.1	3.52	4.0	55°									☆	★				
		16IR12W-P	12	9.525	1.4	1.1	3.52	4.0	55°									☆	★				
		16IL12W-P	12	9.525	1.4	1.1	3.52	4.0	55°									☆	★				
		16IR14W-P	14	9.525	1.2	1.0	3.52	4.0	55°									☆	★				
		16IL14W-P	14	9.525	1.2	1.0	3.52	4.0	55°									☆	★				
		16IR16W-P	16	9.525	1.1	0.9	3.52	4.0	55°									☆	★				
		16IL16W-P	16	9.525	1.1	0.9	3.52	4.0	55°									☆	★				
		16IR18W-P	18	9.525	1.0	0.8	3.52	4.0	55°									☆	★				
		16IL18W-P	18	9.525	1.0	0.8	3.52	4.0	55°									☆	★				
		16IR19W-P	19	9.525	1.0	0.8	3.52	4.0	55°									☆	★				
		16IL19W-P	19	9.525	1.0	0.8	3.52	4.0	55°									☆	★				
		16IR20W-P	20	9.525	0.9	0.8	3.52	4.0	55°									☆	★				
		16IL20W-P	20	9.525	0.9	0.8	3.52	4.0	55°									☆	★				
		16IR26W-P	26	9.525	0.8	0.7	3.52	4.0	55°									☆	★				
		16IL26W-P	26	9.525	0.8	0.7	3.52	4.0	55°									☆	★				
		16IR28W-P	28	9.525	0.7	0.6	3.52	4.0	55°									☆	★				
		16IL28W-P	28	9.525	0.7	0.6	3.52	4.0	55°									☆	★				

★ Recommended grade ☆ Available grade

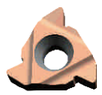
Whiteworth thread (Grinding)

Standard: B.S.84:1956,DIN 259,ISO228/1:1982
Tolerance class: Medium,A-class



Working condition: ● Stable ◕ Average ⌗ Tough

Workpiece material																		
P Steel	●	◕	⌗													●	◕
M Stainless steel								●	●								
K Cast iron				●	◕												
N Non-ferrous metal													●	◕			
S Heat-resistant alloy Titanium alloy						●	◕										

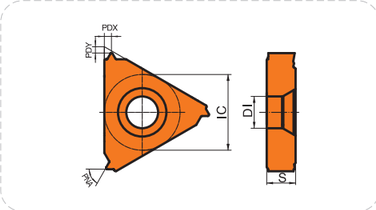
Machining type	Insert shape	Type	Pitch/ number of teeth	Basic dimension (mm)						CVD				PVD					Cemented carbide		Cermet	
				IC	PDX	PDY	S	DI	PNA	8115	8125	8225	6115	9105	7115	7125	7225	5125	5225	K10	K20	C10	C20
Internal thread		16ER8W-P	8	9.525	1.5	1.2	3.52	4.0	55°									☆	★				
		16EL8W-P	8	9.525	1.5	1.2	3.52	4.0	55°									☆	★				
		16ER9W-P	9	9.525	1.7	1.2	3.52	4.0	55°									☆	★				
		16EL9W-P	9	9.525	1.7	1.2	3.52	4.0	55°									☆	★				
		16ER10W-P	10	9.525	1.5	1.1	3.52	4.0	55°									☆	★				
		16EL10W-P	10	9.525	1.5	1.1	3.52	4.0	55°									☆	★				
		16ER11W-P	11	9.525	1.5	1.1	3.52	4.0	55°									☆	★				
		16EL11W-P	11	9.525	1.5	1.1	3.52	4.0	55°									☆	★				
		16ER12W-P	12	9.525	1.4	1.1	3.52	4.0	55°									☆	★				
		16EL12W-P	12	9.525	1.4	1.1	3.52	4.0	55°									☆	★				
		16ER14W-P	14	9.525	1.2	1.0	3.52	4.0	55°									☆	★				
		16EL14W-P	14	9.525	1.2	1.0	3.52	4.0	55°									☆	★				
		16ER16W-P	16	9.525	1.1	0.9	3.52	4.0	55°									☆	★				
		16EL16W-P	16	9.525	1.1	0.9	3.52	4.0	55°									☆	★				
		16ER18W-P	18	9.525	1.0	0.8	3.52	4.0	55°									☆	★				
		16EL18W-P	18	9.525	1.0	0.8	3.52	4.0	55°									☆	★				
		16ER19W-P	19	9.525	1.0	0.8	3.52	4.0	55°									☆	★				
		16EL19W-P	19	9.525	1.0	0.8	3.52	4.0	55°									☆	★				
		16ER20W-P	20	9.525	0.9	0.8	3.52	4.0	55°									☆	★				
		16EL20W-P	20	9.525	0.9	0.8	3.52	4.0	55°									☆	★				
		16ER26W-P	26	9.525	0.8	0.7	3.52	4.0	55°									☆	★				
		16EL26W-P	26	9.525	0.8	0.7	3.52	4.0	55°									☆	★				
		16ER28W-P	28	9.525	0.7	0.6	3.52	4.0	55°									☆	★				
		16EL28W-P	28	9.525	0.7	0.6	3.52	4.0	55°									☆	★				

★ Recommended grade ☆ Available grade

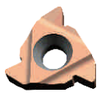
BSPT (Grinding)

Standard: B.S.21:1985
Tolerance standard: BSPT

Working condition: ● Stable ◕ Average ⌗ Tough

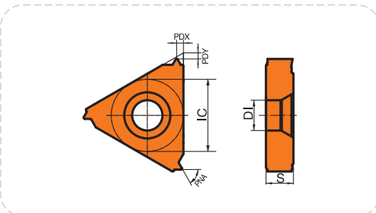


Workpiece material																							
P	Steel	●	◕	◕ ⌗														●	◕				
M	Stainless steel								●	◕													
K	Cast iron				●	◕																	
N	Non-ferrous metal															●	◕						
S	Heat-resistant alloy Titanium alloy						●	◕															

Machining type	Insert shape	Type	Pitch/ number of teeth	Basic dimension (mm)						CVD				PVD					Cemented carbide		Cermet	
				IC	PDX	PDY	S	DI	PNA	8115	8125	8225	6115	9105	7115	7125	7225	5125	5225	K10	K20	C10	C20
External thread		16ER11BSPT-P	11	9.525	1.5	1.1	3.52	4.0	55°									☆	★				
		16ER14BSPT-P	14	9.525	1.2	1.0	3.52	4.0	55°									☆	★				
		16ER19BSPT-P	19	9.525	0.9	0.8	3.52	4.0	55°									☆	★				
		16ER28BSPT-P	28	9.525	0.6	0.6	3.52	4.0	55°									☆	★				

★ Recommended grade ☆ Available grade

Working condition: ● Stable ◕ Average ⌗ Tough



Workpiece material																							
P	Steel	●	◕	◕ ⌗														●	◕				
M	Stainless steel								●	◕													
K	Cast iron				●	◕																	
N	Non-ferrous metal															●	◕						
S	Heat-resistant alloy Titanium alloy						●	◕															

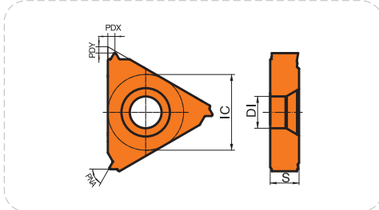
Machining type	Insert shape	Type	Pitch/ number of teeth	Basic dimension (mm)						CVD				PVD					Cemented carbide		Cermet	
				IC	PDX	PDY	S	DI	PNA	8115	8125	8225	6115	9105	7115	7125	7225	5125	5225	K10	K20	C10	C20
External thread		16IR11BSPT-P	11	9.525	1.5	1.1	3.52	4.0	55°									☆	★				
		16IR14BSPT-P	14	9.525	1.2	1.0	3.52	4.0	55°									☆	★				
		16IR19BSPT-P	19	9.525	0.9	0.8	3.52	4.0	55°									☆	★				
		16IR28BSPT-P	28	9.525	0.6	0.6	3.52	4.0	55°									☆	★				

★ Recommended grade ☆ Available grade

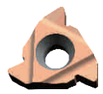
NPT (Grinding)

Standard: USAS B2.1:1968
Tolerance standard: American Standard NPT Thread

Working condition: ● Stable ◕ Average ⌗ Tough

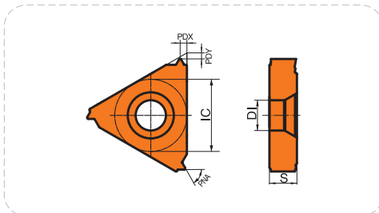


Workpiece material																							
P	Steel	●	◕	◕ ⌗																●	◕		
M	Stainless steel										●	◕											
K	Cast iron				●	◕																	
N	Non-ferrous metal																	●	◕				
S	Heat-resistant alloy Titanium alloy						●	◕															

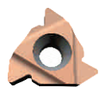
Machining type	Insert shape	Type	Pitch/ number of teeth	Basic dimension (mm)						CVD				PVD						Cemented carbide		Cermet	
				IC	PDX	PDY	S	DI	PNA	HR8115	HR8125	HR8225	HR6115	HR9105	HR7115	HR7125	HR7225	HR5125	HR5225	HRK10	HRK20	HRC10	HRC20
External thread		16ER8NPT-P	8	9.525	1.8	1.3	3.52	4.0	60°									☆	★				
		16ER115NPT-P	11.5	9.525	1.5	1.1	3.52	4.0	60°									☆	★				
		16ER14NPT-P	14	9.525	1.2	0.9	3.52	4.0	60°									☆	★				
		16ER18NPT-P	18	9.525	1.0	0.8	3.52	4.0	60°									☆	★				
		16ER27NPT-P	27	9.525	0.8	0.7	3.52	4.0	60°									☆	★				

★ Recommended grade ☆ Available grade

Working condition: ● Stable ◕ Average ⌗ Tough

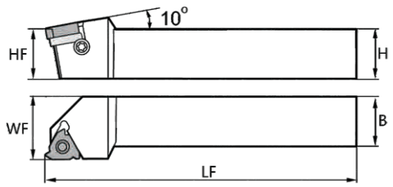


Workpiece material																							
P	Steel	●	◕	◕ ⌗																●	◕		
M	Stainless steel										●	◕											
K	Cast iron				●	◕																	
N	Non-ferrous metal															●	◕						
S	Heat-resistant alloy Titanium alloy						●	◕															

Machining type	Insert shape	Type	Pitch/ number of teeth	Basic dimension (mm)						CVD				PVD						Cemented carbide		Cermet	
				IC	PDX	PDY	S	DI	PNA	8115	8125	8225	6115	9105	7115	7125	7225	5125	5225	K10	K20	C10	C20
Internal thread		16IR8NPT-P	8	9.525	1.8	1.3	3.52	4.0	60°									☆	★				
		16IR115NPT-P	11.5	9.525	1.5	1.1	3.52	4.0	60°									☆	★				
		16IR14NPT-P	14	9.525	1.2	0.9	3.52	4.0	60°									☆	★				
		16IR18NPT-P	18	9.525	1.0	0.8	3.52	4.0	60°									☆	★				
		16IR27NPT-P	27	9.525	0.8	0.7	3.52	4.0	60°									☆	★				

★ Recommended grade ☆ Available grade

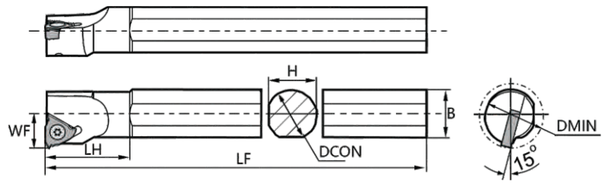
External threading tools



Type		Inventoty	Basic dimension (mm)					Accessories				
			H	HF	B	LF	WF	Insert screw	Shim	Insert shim screw	Wrench	Matching insert
SWR	2020K16	△	20	20	20	125	25	M3.5×12	HT16-□□M	HM4×8C	WR15	16□□
	2525M16	▲	25	25	25	150	32					
	3232P16	△	32	32	32	170	40					
	2525M22	▲	25	25	25	150	32	M5×17	HT22-□□M	HM5×8.5	WR20	22□□
	3232P22	△	32	32	32	170	40					
SWL	2020K16	△	20	20	20	125	25	M3.5×12	HT16-□□M	HM4×8C	WR15	16□□
	2525M16	▲	25	25	25	150	32					
	3232P16	△	32	32	32	170	40					
	2525M22	▲	25	25	25	150	32	M5×17	HT22-□□M	HM5×8.5	WR20	22□□
	3232P22	△	32	32	32	170	40					

▲Running stock △Make-to-order

Internal threading tools



Type		Inventoty	Basic dimension (mm)							Accessories				
			DCON	LF	B	DMIN	WF	H	LH	Insert screw	Shim	Insert shim screw	Wrench	Matching insert
SWR	0016K11	△	16	125	16	12	10	15	20.9	M2.5×6.5	–	–	WR07	11□□
	0016M11	▲	16	150	15.5	16	10.5	15	25.9					
	0016M16	△	16	150	15.5	20	12	15	27	M3.5×8			WR15	16□□
	0020M16	△	20	150	19	25	14	18	28.7	M3.5×12	HT16-□□M	HM4×8		
	0020Q16	△	20	180	19	25	14	18	34					
	0025M16	▲	25	150	24	32	17	23	28.8					
	0032R16	△	32	200	31	40	22	30	30.9					
	0032S16	△	32	250	31	40	22	30	30.9					
	0020Q22	△	20	180	21.5	25	15	18	35	M5×10	–	–	WR20	22□□
	0025R22	▲	25	200	24	32	19	23	39	M5×17	HT22-□□M	HM4×8		
	0032S22	△	32	250	31	40	22	30	36.4					
SWL	0016K11	△	16	125	16	12	10	15	20.9	M2.5×6.5	–	–	WR07	11□□
	0016M11	▲	16	150	15.5	16	10.5	15	25.9					
	0016M16	△	16	150	15.5	20	12	15	27	M3.5×8			WR15	16□□
	0020M16	△	20	150	19	25	14	18	28.7	M3.5×12	HT16-□□M	HM4×8		
	0020Q16	△	20	180	19	25	14	18	34					
	0025M16	▲	25	150	24	32	17	23	28.8					
	0032R16	△	32	200	31	40	22	30	30.9					
	0032S16	△	32	250	31	40	22	30	30.9					
	0020Q22	△	20	180	21.5	25	15	18	35	M5×10	–	–	WR20	22□□
	0025R22	▲	25	200	24	32	19	23	39	M5×17	HT22-□□M	HM4×8		
	0032S22	△	32	250	31	40	22	30	36.4					

▲Running stock △Make-to-order

Cutting speed recommendations for threading

Workpiece materials						Application scope of Huareal turning grade (HR5225)	
ISO	Classification of materials			Hardness of Brinell (HB)	Tensile strength (N/mm²)	Cutting speed Vc (m/min)	
						HR5125	HR5225
P	Non-alloyed steel	C≤0.25%	Annealing	125	428	160-180	168-185
		0.25<C≤0.55%	Annealing	190	639	150-160	155-165
		0.25<C≤0.55%	Quenching and tempering	210	708	145-155	155-165
		C>0.55%	Annealing	190	639	135-150	140-155
		C>0.55%	Quenching and tempering	300	1013	120-140	125-140
	Low-alloyed steel	Annealing		175	591	120-140	130-145
		Quenching and tempering		300	1013	90-110	95-115
		Quenching and tempering		380	1282	80-100	85-100
		Quenching and tempering		430	430	70-95	80-95
	High-alloyed steel	Annealing		200	675	90-120	98-125
		Quenching and tempering		300	1013	80-100	85-110
M	Stainless steel	Austenite		180	675	120-140	120-140
		Martensite/ferrite		200	778	140-180	145-180
K	Malleable cast iron	Ferrite		200	400	120-145	130-145
		Pearlite		260	700	80-115	85-120
	Grey cast iron	Low tensile strength		180	200	115-150	110-160
		High tensile strength/austenite		245	350	90-115	90-125
	Ductile iron	Ferrite		155	400	110-130	110-140
		Pearlite		265	700	90-115	95-120
N	Wrought aluminum alloy	Non-aging		60	—	1000-1400	1100-1500
		Aged		100	340	500-600	550-650
	Foundry aluminum alloy	Non-aging		75	260	450-500	450-550
		Aged		90	310	300-400	320-450
S	Nickel-based alloy	Nickel-based	Annealing	200	680	35-50	35-55
			Aged	280	940	25-35	25-40
		Nickel-based or cobalt-based	Annealing	250	840	20-30	22-35
			Aged	350	1180	10-25	10-30
			Casting	320	1080	10-20	10-25
	Titanium alloy	1262		300	1010	20-25	20-30
H	Hardened steel	Quenching and tempering		50HRC		60-70	60-75
		Quenching and tempering		55HRC		40-50	45-55
		Quenching and tempering		60HRC		30-40	30-48

Feed rate recommendation table

ISO Metric 60° external thread

Pitch (mm)	Total cutting depth	Steps of machining													
		1	2	3	4	5	6	7	8	9	10	11	12	13	14
0.50	0.31	0.01	0.08	0.07	0.06										
0.75	0.46	0.16	0.14	0.10	0.06										
1.00	0.61	0.18	0.15	0.12	0.10	0.06									
1.25	0.77	0.19	0.17	0.14	0.11	0.10	0.06								
1.50	0.92	0.22	0.21	0.17	0.14	0.12	0.06								
1.75	1.07	0.22	0.21	0.16	0.13	0.11	0.09	0.09	0.06						
2.00	1.23	0.24	0.23	0.17	0.16	0.14	0.12	0.11	0.06						
2.50	1.53	0.26	0.23	0.19	0.17	0.15	0.13	0.12	0.11	0.11	0.06				
3.00	1.84	0.27	0.25	0.20	0.18	0.16	0.14	0.13	0.12	0.12	0.11	0.10	0.06		
3.50	2.15	0.33	0.30	0.24	0.21	0.18	0.17	0.15	0.14	0.14	0.12	0.11	0.06		
4.00	2.45	0.34	0.31	0.24	0.22	0.19	0.17	0.16	0.14	0.14	0.13	0.12	0.12	0.11	0.06
4.50	2.76	0.38	0.34	0.28	0.24	0.22	0.20	0.18	0.16	0.16	0.15	0.14	0.13	0.12	0.06
5.00	3.07	0.42	0.38	0.32	0.27	0.24	0.22	0.20	0.18	0.18	0.17	0.16	0.15	0.12	0.06

ISO Metric 60° internal thread

Pitch (mm)	Total cutting depth	Steps of machining													
		1	2	3	4	5	6	7	8	9	10	11	12	13	14
0.50	0.29	0.09	0.07	0.07	0.06										
0.75	0.43	0.15	0.13	0.09	0.06										
1.00	0.58	0.17	0.15	0.11	0.09	0.06									
1.25	0.72	0.18	0.16	0.12	0.11	0.09	0.06								
1.50	0.87	0.21	0.20	0.16	0.13	0.11	0.06								
1.75	1.01	0.21	0.20	0.15	0.12	0.10	0.09	0.08	0.06						
2.00	1.15	0.24	0.22	0.18	0.14	0.12	0.10	0.09	0.06						
2.50	1.44	0.25	0.24	0.21	0.15	0.13	0.12	0.10	0.09	0.09	0.06				
3.00	1.73	0.26	0.25	0.22	0.17	0.14	0.13	0.12	0.11	0.10	0.09	0.08	0.06		
3.50	2.02	0.32	0.30	0.23	0.19	0.17	0.15	0.14	0.13	0.12	0.11	0.10	0.06		
4.00	2.31	0.33	0.31	0.24	0.22	0.18	0.15	0.14	0.13	0.12	0.12	0.11	0.10	0.10	0.06
4.50	2.60	0.36	0.33	0.28	0.24	0.21	0.19	0.16	0.15	0.14	0.13	0.12	0.12	0.11	0.06
5.00	2.89	0.41	0.38	0.32	0.27	0.24	0.21	0.18	0.16	0.15	0.14	0.13	0.12	0.12	0.06

Feed rate recommendation table

Whitworth external thread

Pitch (number of teeth/inch)	Total cutting depth	Steps of machining													
		1	2	3	4	5	6	7	8	9	10	11	12	13	14
28	0.58	0.17	0.14	0.11	0.10	0.06									
26	0.63	0.18	0.15	0.13	0.11	0.06									
20	0.81	0.20	0.18	0.14	0.12	0.11	0.06								
19	0.86	0.21	0.19	0.15	0.13	0.12	0.06								
18	0.90	0.25	0.19	0.15	0.13	0.12	0.06								
16	1.02	0.21	0.18	0.15	0.13	0.11	0.09	0.09	0.06						
14	1.16	0.23	0.21	0.17	0.14	0.12	0.12	0.11	0.06						
12	1.36	0.27	0.25	0.20	0.16	0.15	0.14	0.13	0.06						
11	1.48	0.27	0.24	0.20	0.17	0.15	0.14	0.13	0.12	0.06					
10	1.63	0.27	0.25	0.20	0.17	0.15	0.15	0.13	0.13	0.12	0.06				
9	1.81	0.28	0.26	0.21	0.18	0.16	0.15	0.14	0.13	0.12	0.12	0.06			
8	2.03	0.30	0.27	0.22	0.19	0.17	0.16	0.15	0.14	0.13	0.12	0.12	0.06		
7	2.32	0.34	0.32	0.26	0.22	0.20	0.18	0.17	0.16	0.15	0.14	0.12	0.06		
6	2.71	0.35	0.33	0.27	0.23	0.21	0.20	0.19	0.17	0.16	0.15	0.14	0.13	0.12	0.06
5	3.25	0.42	0.40	0.35	0.29	0.26	0.24	0.22	0.20	0.19	0.18	0.17	0.15	0.12	0.06

Whitworth internal thread

Pitch (number of teeth/inch)	Total cutting depth	Steps of machining													
		1	2	3	4	5	6	7	8	9	10	11	12	13	14
28	0.58	0.17	0.14	0.11	0.10	0.06									
26	0.63	0.18	0.15	0.13	0.11	0.06									
20	0.81	0.20	0.18	0.14	0.12	0.11	0.06								
19	0.86	0.21	0.19	0.15	0.13	0.12	0.06								
18	0.90	0.25	0.19	0.15	0.13	0.12	0.06								
16	1.02	0.21	0.18	0.15	0.13	0.11	0.09	0.09	0.06						
14	1.16	0.23	0.21	0.17	0.14	0.12	0.12	0.11	0.06						
12	1.36	0.27	0.25	0.20	0.16	0.15	0.14	0.13	0.06						
11	1.48	0.27	0.24	0.20	0.17	0.15	0.14	0.13	0.12	0.06					
10	1.63	0.27	0.25	0.20	0.17	0.15	0.15	0.13	0.13	0.12	0.06				
9	1.81	0.28	0.26	0.21	0.18	0.16	0.15	0.14	0.13	0.12	0.12	0.06			
8	2.03	0.30	0.27	0.22	0.19	0.17	0.16	0.15	0.14	0.13	0.12	0.12	0.06		
7	2.32	0.34	0.32	0.26	0.22	0.20	0.18	0.17	0.16	0.15	0.14	0.12	0.06		
6	2.71	0.35	0.33	0.27	0.23	0.21	0.20	0.19	0.17	0.16	0.15	0.14	0.13	0.12	0.06
5	3.25	0.42	0.40	0.35	0.29	0.26	0.24	0.22	0.20	0.19	0.18	0.17	0.15	0.12	0.06

Feed rate recommendation table

UN external thread

Pitch (number of teeth/inch)	Total cutting depth	Steps of machining													
		1	2	3	4	5	6	7	8	9	10	11	12	13	14
28	0.58	0.17	0.14	0.11	0.10	0.06									
26	0.63	0.18	0.15	0.13	0.11	0.06									
20	0.81	0.20	0.18	0.14	0.12	0.11	0.06								
19	0.86	0.21	0.19	0.15	0.13	0.12	0.06								
18	0.90	0.25	0.19	0.15	0.13	0.12	0.06								
16	1.02	0.21	0.18	0.15	0.13	0.11	0.09	0.09	0.06						
14	1.16	0.23	0.21	0.17	0.14	0.12	0.12	0.11	0.06						
12	1.36	0.27	0.25	0.20	0.16	0.15	0.14	0.13	0.06						
11	1.48	0.27	0.24	0.20	0.17	0.15	0.14	0.13	0.12	0.06					
10	1.63	0.27	0.25	0.20	0.17	0.15	0.15	0.13	0.13	0.12	0.06				
9	1.81	0.28	0.26	0.21	0.18	0.16	0.15	0.14	0.13	0.12	0.12	0.06			
8	2.03	0.30	0.27	0.22	0.19	0.17	0.16	0.15	0.14	0.13	0.12	0.12	0.06		
7	2.32	0.34	0.32	0.26	0.22	0.20	0.18	0.17	0.16	0.15	0.14	0.12	0.06		
6	2.71	0.35	0.33	0.27	0.23	0.21	0.20	0.19	0.17	0.16	0.15	0.14	0.13	0.12	0.06
5	3.25	0.42	0.40	0.35	0.29	0.26	0.24	0.22	0.20	0.19	0.18	0.17	0.15	0.12	0.06

UN internal thread

Pitch (number of teeth/inch)	Total cutting depth	Steps of machining													
		1	2	3	4	5	6	7	8	9	10	11	12	13	14
28	0.58	0.17	0.14	0.11	0.10	0.06									
26	0.63	0.18	0.15	0.13	0.11	0.06									
20	0.81	0.20	0.18	0.14	0.12	0.11	0.06								
19	0.86	0.21	0.19	0.15	0.13	0.12	0.06								
18	0.90	0.25	0.19	0.15	0.13	0.12	0.06								
16	1.02	0.21	0.18	0.15	0.13	0.11	0.09	0.09	0.06						
14	1.16	0.23	0.21	0.17	0.14	0.12	0.12	0.11	0.06						
12	1.36	0.27	0.25	0.20	0.16	0.15	0.14	0.13	0.06						
11	1.48	0.27	0.24	0.20	0.17	0.15	0.14	0.13	0.12	0.06					
10	1.63	0.27	0.25	0.20	0.17	0.15	0.15	0.13	0.13	0.12	0.06				
9	1.81	0.28	0.26	0.21	0.18	0.16	0.15	0.14	0.13	0.12	0.12	0.06			
8	2.03	0.30	0.27	0.22	0.19	0.17	0.16	0.15	0.14	0.13	0.12	0.12	0.06		
7	2.32	0.34	0.32	0.26	0.22	0.20	0.18	0.17	0.16	0.15	0.14	0.12	0.06		
6	2.71	0.35	0.33	0.27	0.23	0.21	0.20	0.19	0.17	0.16	0.15	0.14	0.13	0.12	0.06
5	3.25	0.42	0.40	0.35	0.29	0.26	0.24	0.22	0.20	0.19	0.18	0.17	0.15	0.12	0.06

A
General turning
Parting and grooving
Threading
B
Indexable milling
Solid carbide end mills
C
Short hole drills
Solid carbide drills

Feed rate recommendation table

BSPT - external thread

Pitch (number of teeth/inch)	Total cutting depth	Steps of machining													
		1	2	3	4	5	6	7	8	9	10	11	12	13	14
28	0.58	0.17	0.14	0.11	0.1	0.06									
19	0.86	0.22	0.19	0.15	0.12	0.12	0.06								
14	1.16	0.24	0.20	0.17	0.14	0.12	0.12	0.11	0.06						
11	1.48	0.25	0.23	0.21	0.18	0.16	0.14	0.13	0.12	0.06					

BSPT - internal thread

Pitch (number of teeth/inch)	Total cutting depth	Steps of machining													
		1	2	3	4	5	6	7	8	9	10	11	12	13	14
19	0.86	0.22	0.19	0.15	0.12	0.12	0.06								
14	1.16	0.24	0.20	0.17	0.14	0.12	0.12	0.11	0.06						
11	1.48	0.25	0.23	0.21	0.18	0.16	0.14	0.13	0.12	0.06					

NPT - external thread

Pitch (number of teeth/inch)	Total cutting depth	Steps of machining														
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
27	0.66	0.15	0.13	0.12	0.11	0.09	0.06									
18	1.01	0.20	0.16	0.14	0.13	0.12	0.11	0.09	0.06							
14	1.33	0.23	0.19	0.16	0.14	0.13	0.12	0.11	0.10	0.09	0.06					
11.5	1.64	0.24	0.19	0.17	0.15	0.15	0.13	0.13	0.12	0.11	0.10	0.09	0.06			
8	2.42	0.33	0.28	0.23	0.20	0.18	0.16	0.15	0.14	0.13	0.12	0.12	0.11	0.11	0.10	0.06

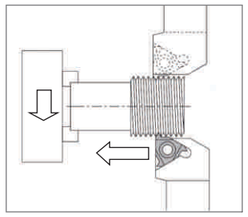
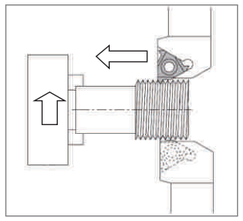
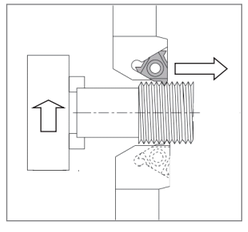
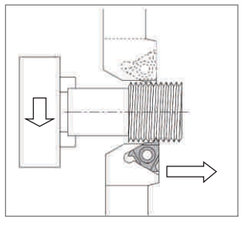
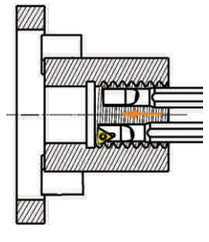
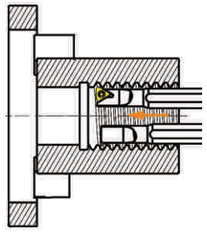
NPT - internal thread

Pitch (number of teeth/inch)	Total cutting depth	Steps of machining														
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
27	0.66	0.15	0.13	0.12	0.11	0.09	0.06									
18	1.01	0.20	0.16	0.14	0.13	0.12	0.11	0.09	0.06							
14	1.33	0.23	0.19	0.16	0.14	0.13	0.12	0.11	0.10	0.09	0.06					
11.5	1.64	0.24	0.19	0.17	0.15	0.15	0.13	0.13	0.12	0.11	0.10	0.09	0.06			
8	2.42	0.33	0.28	0.23	0.20	0.18	0.16	0.15	0.14	0.13	0.12	0.12	0.11	0.11	0.10	0.06

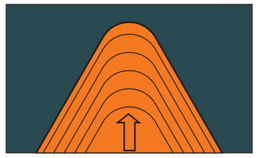
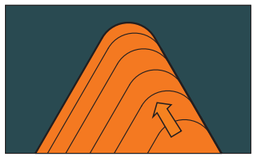
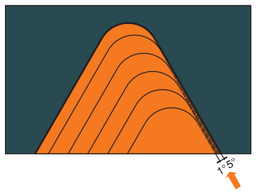
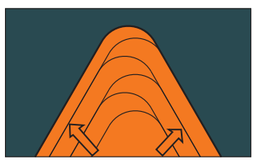
Features of thread insert

- Precision molded and sophistication grinded inserts are available.
- Strict size control ensures a smaller range of size fluctuations from insert to insert and aconsistent quality.
- The unique edge with small arc corners can realize more specialized and rationalized machining.
- The inserts are equipped with chipbreakers to improve chip handling capability during machining and provide excellent machining stability.
- HR5225 and HR5125 dedicated for thread turning can ensure that the insert can effectively resist plastic deformation and wear during threading.

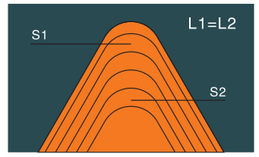
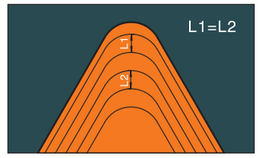
Machining type of thread tools

1. External threading with dextral thread	2. External threading with sinistral thread
	
	
3. Internal threading with dextral thread	4. Internal threading with sinistral thread
	

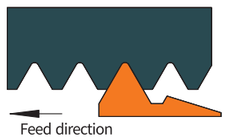
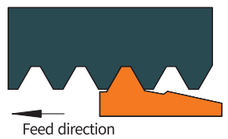
Threading (crosscutting) method

Graph	Machining method	Features	
		Advantage	Disadvantage
	Radial crosscutting (vertical feeding)	• Easiest to use (standard procedure for threading) • High versatility (easy to change conditions such as cutting depth) • Average wear on the rear insert face of the left and right cutting edges	• It is difficult to dispose chips. • Vibrations tend to occur in the second half of machining (due to increased cutting edge contact length). • It is not suitable for large pitch machining. • There is a heavy load for the Corner radius (R) (because chips from both left and right sides will gather at the top)
	Tooth side feeding (One-way feeding)	• Relatively easy to use (standard procedure for threading) • The cutting forces can be reduced. • It is especially suitable for large pitch or materials prone to squeezing and cracking • Its chip handling performance is excellent. (Because it can control chip discharge direction).	• The right rear insert face is badly worn (because the cutting depth on the right side is always zero). • It is difficult to change the cutting depth (NC program is required).
	Modified crosscutting of tooth side (One-way modified feeding)	• Its rear insert face wear can be effectively controlled. • The cutting forces can be reduced. • It is especially suitable for large pitch or materials prone to squeezing and cracking • Its chip handling performance is excellent (because it can control chip discharge direction).	• It is difficult to program the machining (some machines can use standard methods directly) • It is difficult to change the cutting depth (NC program is required).
	Alternating crosscutting (Staggered feeding)	• Average wear on the rear insert face of the left and right cutting edges (Due to the staggered use of cutting edge) • The cutting forces can be reduced. • It is especially suitable for large pitch or materials prone to squeezing and cracking	• It is difficult to program the machining (some machines can use standard methods directly) • It is difficult to change the cutting depth (NC program is required). • It is difficult to dispose chips (because they are discharged from both sides and may get tangled sometimes.)

Cutting depth of threading

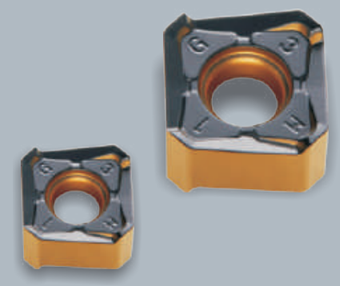
Machining method	Features	
	Advantage	Disadvantage
 Fixed cutting area	• Easy to use (standard procedure for threading) • It has good vibration resistance (to keep cutting force stable).	• The last chip is resistant to breaking (because the chip thickness becomes very thin). • The calculation of cutting depth when the number of machining steps is changed is slightly complicated.
 Fixed cutting depth	• It can reduce the load in the first half of the corner radius R. • It is easy to adjust the performance of chip handling (chip thickness can be set at will). • The calculation of cutting depth when the number of machining steps is changed is easy. • It maintains good chip handling performance through whole machining.	• Vibrations tend to occur in the second half of machining (cutting force rises) • Sometimes it is necessary to change the NC (it is more common for fixed areas).

Wiper edge

Without wiper edge	With wiper edge	With semi-wiper edge (trapezoidal thread only)
• One insert can machine different pitches. • The corner radius R is less than that of a wiper edge insert, resulting in a short tool service life. • Additional finishing is required.	• No burrs will appear on the thread teeth. • Different inserts are required for different pitches and shapes.	• No burrs will appear on the thread teeth. • Different inserts are required for different pitches and shapes. • Additional finishing is required.
		

CFM145

Face milling tool



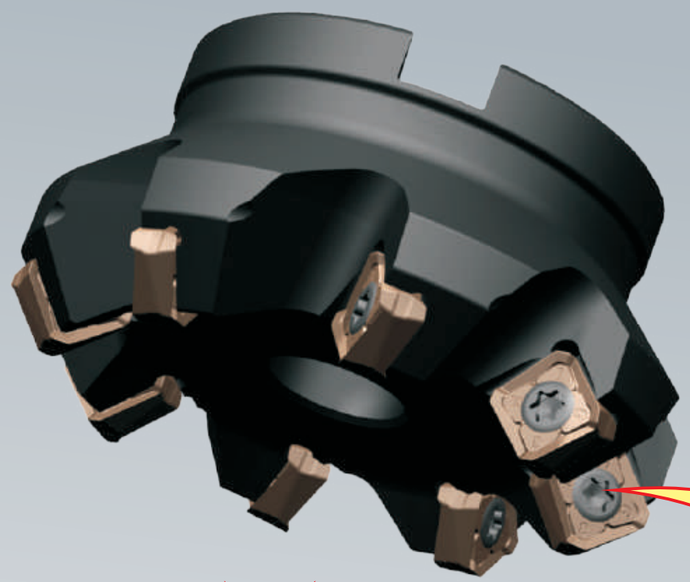
New

C/SSM190

Square shoulder milling tool

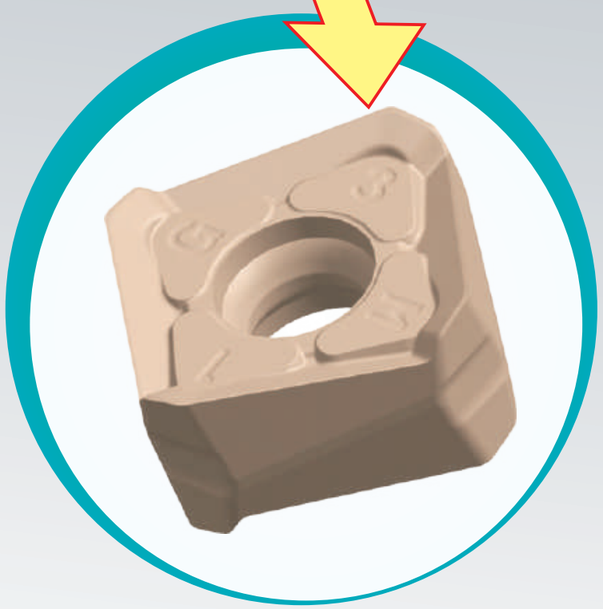
CFM345

Load-bearing universal face milling tool



- Sparse teeth, dense teeth and ultra-dense teeth are optional to meet different working conditions and machining efficiency requirements.
- The wedge-shaped installation structure has a greater bearing capacity, safety and reliability.

New



- Its precise double-side slotted inserts are cost-effective. The main cutting edge has high strength and strong impact resistance.
- The cutting edge is sharp and can produce excellent surface machining quality.

C/SSM390

Square shoulder milling tool

New

Overview of indexable milling inserts

Type	Material	ISO	CVD coating	PVD coating					Carbide	Cermet	ISO
			Z8140	Z5110	Z5120	Z5130	Z7130	Z7140	Z10	Z20	
P	Non-alloyed steel/alloy steel	P01									P01
		P05									P05
		P10		Z5110							P10
		P15								Z20	P15
		P20			Z5120						P20
		P25				Z5130					P25
		P30	Z8140				Z7130				P30
		P35						Z7140			P35
		P40									P40
		P45									P45
		P50									P50
M	Stainless steel	M05									M05
		M10		Z5110							M10
		M15			Z5120						M15
		M20				Z5130					M20
		M25									M25
		M30						Z7140			M30
		M35									M35
		M40									M40
		M45									M45
K	Cast iron	K01									K01
		K05									K05
		K10									K10
		K15									K15
		K20									K20
		K25			Z5120						K25
		K30									K30
		K35	Z8140								K35
		K40									K40
		K45									K45
		K50									K50
N	Aluminum/ aluminum alloy	N01									N01
		N05									N05
		N10							Z10		N10
		N15									N15
		N20									N20
		N25									N25
		N30									N30
S	High-temp alloy	S01									S01
		S05									S05
		S10									S10
		S15									S15
		S20									S20
		S25									S25
		S30									S30
		S40									S40

B Milling

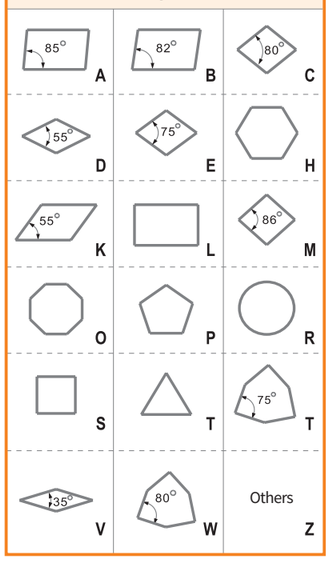
Indexable milling

- Code key of indexable milling inserts ---------- B1-B2
- Code key of indexable milling tools ---------- B3-B4
- Overview of indexable milling tools ---------- B5-B8
- Overview of indexable milling inserts ---------- B9-B10
- Details of indexable milling tools ---------- B11-B85
  - Face milling tool series ---------- B11-B25
  - Square shoulder milling tool series ---------- B26-B49
  - Profile milling tool series ---------- B50-B61
  - High feed milling tool series ---------- B62-B65
  - Helical end milling cutter series ---------- B66-B67
  - Heavy milling inserts ---------- B71-B84

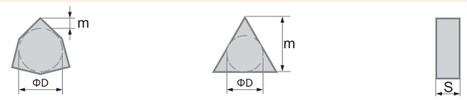
Code key of indexable milling inserts

A	P	M	T	16	05	PD	E	R	-	FM
①	②	③	④	⑤	⑥	⑦	⑧	⑨		⑩

① Shape code



③ Tolerance (mm)



Class	Corner height (m)	Inscribed circle (ΦD)	Thickness (S)
A	±0.005	±0.025	±0.025
F	±0.005	±0.013	±0.025
C	±0.013	±0.025	±0.025
H	±0.013	±0.013	±0.025
E	±0.025	±0.025	±0.025
G	±0.025	±0.025	±0.13
J	±0.005	±0.05-±0.13	±0.025
K	±0.013	±0.05-±0.13	±0.025
L	±0.025	±0.05-±0.13	±0.025
M	±0.08-±0.18	±0.05-±0.13	±0.13
N	±0.08-±0.18	±0.05-±0.13	±0.025
U	±0.13-±0.38	±0.08-±0.25	±0.13

◆ M-class tolerance requirements (distinguished by shape and inscribed circle size)
◆ Corner height (m) tolerance

Inscribed circle	Regular triangle	Square	80° Rhombus	55° Rhombus	35° Rhombus	Circular
6.35	±0.08	±0.08	±0.08	±0.11	±0.16	---
9.525	±0.08	±0.08	±0.08	±0.11	±0.16	---
12.7	±0.13	±0.13	±0.13	±0.15	---	---
15.875	±0.15	±0.15	±0.15	±0.18	---	---
19.05	±0.15	±0.15	±0.15	±0.18	---	---
25.4	---	±0.18	---	---	---	---

◆ Inscribed circle (ΦD) tolerance

Inscribed circle	Regular triangle	Square	80° Rhombus	55° Rhombus	35° Rhombus	Circular
6.35	±0.05	±0.05	±0.05	±0.05	±0.05	---
9.525	±0.05	±0.05	±0.05	±0.05	±0.05	±0.05
12.7	±0.08	±0.08	±0.08	±0.08	---	±0.08
15.875	±0.10	±0.10	±0.10	±0.10	---	±0.10
19.05	±0.10	±0.10	±0.10	±0.10	---	±0.10
25.4	---	±0.13	---	---	---	±0.13

⑤ Cutting edge length

Inscribed circle diameter (mm)	Insert shape C	D	R	S	T	V	W	K
32.00			32					
31.75			31					
25.40			25	25				
25.00	25	25	25					
20.00			20					
19.05	19		19	19	33			
16.00		19	16					
15.875	16		15	15	27			
12.70	12	15	12	15	22	22	08	
12.00			12					
10.00			10					
9.525	09	11	09	19	16	16	06	16
8.00			08					
6.35	06	07			11	11		
6.00			06					
5.56					09			
5.50			05					
3.97					06			

⑥ Insert thickness

Code	Thickness(mm)
12	12.70
10	11.11
T9	9.72
09	9.52
07	7.94
T6	6.75
06	6.35
T5	5.95
05	5.56
T4	4.96
04	4.76
T3	3.97
03	3.18
T2	2.58
02	2.38
T1	1.98
01	1.59
T0	0.99
00	0.79

② Cutting edge clearance angle major

Code	Clearance angle	Code	Clearance angle
A	3°	B	5°
C	7°	D	15°
E	20°	F	25°
G	30°	N	0°
P	11°	O	Others

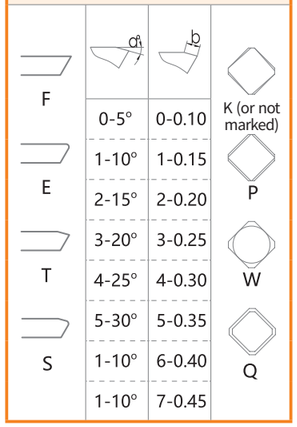
④ Chipbreaker and clamping form

Code	Hole	Chipbreaker	Sectional view	Code	Hole	Chipbreaker	Sectional view
B	Y	N/A	>65°	N	N/A	N/A	
H	Y	Single-sided	>65°	R	N/A	Single-sided	
C	Y	N/A	>65°	F	N/A	Double-sided	
J	Y	Double-sided	>65°	A	Y	N/A	
W	Y	N/A	≤65°	M	Y	Single-sided	
T	Y	Single-sided	≤65°	G	Y	Double-sided	
Q	Y	N/A	≤65°	X	---	---	Exception
U	Y	Double-sided	≤65°				

⑦ Wiper edge

A	45°	A	3°
D	60°	B	5°
E	75°	C	7°
F	85°	D	15°
P	90°	E	20°
Z	Others	F	25°
		G	30°
		N	0°
		P	11°
		Z	Others

⑧ Cutting edge form



	0-5°	0-0.10
	1-10°	1-0.15
	2-15°	2-0.20
	3-20°	3-0.25
	4-25°	4-0.30
	5-30°	5-0.35
	1-10°	6-0.40
	1-10°	7-0.45

⑨ Cutting direction

Code	Direction
R	Right
L	Left
N	Two-way

⑩ Chipbreaker code

Code key of indexable milling tools

C	FM	1	45	L	-	063	A
①	②	③	④	⑤		⑥	⑦

① Tool type	
C	Disc-type tools
S	Rod-type tools

② Usage	
FM	Face milling
TM	Slot milling
SM	Square shoulder milling
PM	Profile milling
CM	Chamfer milling
EM	High feed
HM	Helical end milling

③ Type	
1	Type 1
2	Type 2
…	…

④ Cutting edge angle	
45	45°
60	60°
75	75°
90	90°
00	Exception

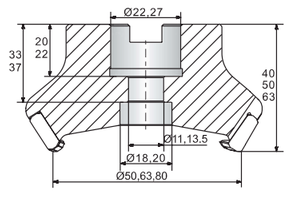
⑤ Cutting direction	
R	Default
L	Sinistral cutting

⑥ Outside diameter	
016	Ø 16mm
020	Ø 20mm
025	Ø 25mm
032	Ø 32mm
040	Ø 40mm
050	Ø 50mm
063	Ø 63mm
080	Ø 80mm
100	Ø 100mm
125	Ø 125mm

⑦ Interface type	
A	A-type interface
B	B-type interface
C	C-type interface
D	D-type interface
G	Straight shank
X	Flat shank
BT	BT taper shank
JT	JT taper shank
MT	Morse taper shank
XPX	Compound shank
HSK	Short taper shank

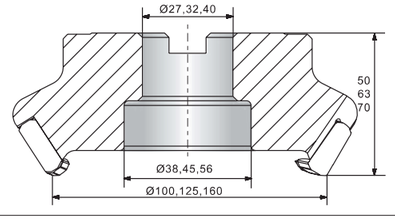
Structure of tool installation part (Sleeve structure)

A-type interface



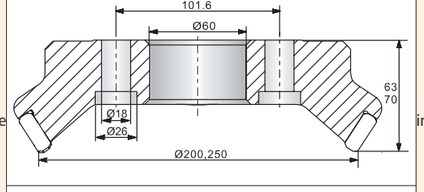
ϕ200-ϕ250 sleeve face milling tools specified in GB5342-96

B-type interface



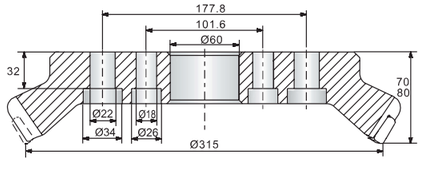
ϕ100-ϕ160 sleeve face milling tools specified in GB5342-96

C-type interface



ϕ200-ϕ250 sleeve face milling tools specified in GB5342-96

D-type interface



Sleeve face milling tools with ϕ315 and above specified in GB5342-96

See the technical data of the tool system section for the connection of flat shank, straight and taper shank.

Code key of indexable milling tools

22	I	05	L	-	S	N	10
⑧	⑨	⑩	⑪		⑫	⑬	⑭

⑧ Sizes of tool installation parts	
16	Ø 16mm
22	Ø 22mm
27	Ø 27mm
32	Ø 32mm
40	Ø 40mm
60	Ø 60mm

⑨ Unit	
Inch	I
Metric	Default

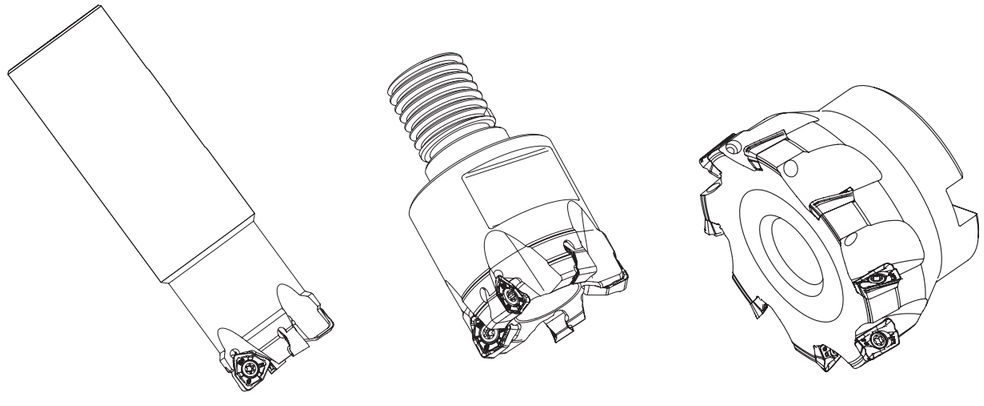
⑩ Number of teeth	
02	Two teeth
03	TWOee teeth
04	Four teeth
…	…

⑪ Length type	
Cutterhead style	Omit
Shank style	Omit
S	Short
L	Long
XL	Lengthened

⑫ Insert shape	
A	85°
H	
L	
O	
R	
S	
T	
W	80°
Others	

⑬ Insert clearance angle	
A	3°
B	5°
C	7°
D	15°
E	20°
F	25°
G	30°
N	0°
P	11°
O	Others

⑭ Cutting edge length	
09	9mm
10	10mm
12	12mm
15	15mm
19	19mm
Others	



Overview of indexable milling tools

Machining form	Series/shape	Cutting edge angle	Applicable inserts	Insert shape	Usage and features	Page
Face milling tool	**CFM143**	KAPR=43°	OD□□		◎ Light and fast in cutting, it is cost-effective with unilateral octagonal inserts; ◎ It is suitable for face milling P, M, K and other materials.	B11-B12
	CFM145	KAPR=45°	SNGX1005ANR-GM SNGX1005ANR-GE		◎ Supported by grinding level/precision molded level quadrilateral negative angle inserts, cutting can be finished in a light and fast manner; ◎ Tools with either sparse or dense tooth structure are suitable for different working conditions and machining efficiency requirements. ◎ It is suitable for face milling P, M, K and other materials and the first choice of general machining.	B13-B14
	CFM245	KAPR=45°	SEET13T3-GM SEMT13T3AGTN-FM		◎ Supported by grinding level/precision molded level quadrilateral 20° clearance angle inserts, the cutting force is decreased; ◎ They are convenient to clamp with screwing down construction, thus suitable for light cutting.	B15-B16
	CFM345	KAPR=45°	SZMX1206ANR-GM		◎ It is equipped with self-developed new structured groove inserts, ensuring both high machining efficiency and long service life. ◎ It is suitable for machining P, M, K and other materials and the first choice for roughing.	B17-B18
	CFM445	KAPR=45°	SEEN1203AFTN SEKR1203AFTN SEMR1203AFTN		◎ With 20° clearance angle cutting inserts, the milling tool is for multiple purposes and can finish cutting in a light and fast manner. ◎ It is suitable for face milling of P, M, K and other materials.	B19-B20
	CFM645	KAPR=45°	HNMX0906ANSN-M		◎ Cost-effective face milling tool series ◎ It has double-sided high strength hexagonal insert with 12 cutting edges.	B21-B22
	CFM745	KAPR=45°	XNGX0705ANN-R		◎ Cost-effective face milling tools series ◎ It has double-sided heptagon insert with 14 cutting edges.	B23-B24

Overview of indexable milling tools

Machining form	Series/shape	Cutting edge angle	Applicable inserts	Insert shape	Usage and features	Page
Square shoulder milling tool	**CSM188**	KAPR=88°	SNGX1005ZNN-GM SNMX100512-GM		◎ Supported by grinding level/precision molded level quadrilateral negative angle inserts, the cutting process proceeds stably. ◎ It is suitable for general face milling of P, M, K and other materials, being both cost-effective and multi-functional.	B26-B28
	CSM190	KAPR=90°	AOKT06□□ AOKT11□□ AOKT16□□		◎ High-precision shoulder milling tool series ◎ It is a 90° shoulder milling tool with a helical edge design providing low cutting forces. ◎ The tool is available in diameters ϕ11-ϕ80. ◎ It is suitable for side milling, groove milling, Ramp Milling and other multifunctional machining of P-, M-, K- and S-type materials, and it is a preferred tool for shoulder milling.	B29-B32
	SSM190					
	KH					
	CSM290	KAPR=90°	APKT11□□ APKT16□□		◎ Square shoulder milling tool series with high performance. It is suitable for milling mild steel, stainless steel, titanium alloy, high-temp alloy, etc. ◎ The tool is available in diameters ϕ16-ϕ80, with a 90° cutting edge angle structure. ◎ It is suitable for shoulder milling, groove milling, Ramp Milling , face milling and other machining.	B34-B36
	SSM290					
	CSM390	KAPR=90°	ZNMU0403□□ ZNMU0806□□		◎ Cost-effective shoulder milling cutter series. It has 6 edges on both sides. ◎ The tool's locating is stable. As a result, the cutting process is reliable. ◎ There are rod-shaped, sleeve-type cutterhead and replaceable tools for option.	B37-B44
	SSM390					
	KH					

Overview of indexable milling tools

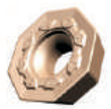
Machining form	Series/shape	Cutting edge angle	Applicable inserts	Insert shape	Usage and features	Page
Square shoulder milling tool	**CSM590** **SSM590**	KAPR=90°	APMT11□□ APGT11□□ APMT16□□ APGT16□□		◎ Universal shoulder milling tool series ◎ It is suitable for shoulder milling, groove milling, Ramp Milling and face milling of P, K and N materials.	B45-B47
Profile milling tool	**CPM100** **SPM100**		RC□□		◎ It is suitable for machining P, M, K and other materials. ◎ It is of different diameters and can be used for machining planes, curved surfaces and cavities.	B50-B52
	CPM200 **SPM200**		RP□□		◎ It is suitable for machining P, M, K and other materials. ◎ It is of different diameters and can be used for machining planes, curved surfaces and cavities.	B53-B55

Overview of indexable milling tools

Machining form	Series/shape	Cutting edge angle	Applicable inserts	Insert shape	Usage and features	Page
Profile milling tool	**CPM300** **SPM300**		RD□□		◎ It is suitable for the machining of P, K ◎ materials and hardened materials. It is of different diameters and can be used for machining flat, curved surfaces and cavities.	B56-B58
High-feed milling tool	**CEM100** **SEM100**		SD□□		◎ It is suitable for cavity milling and face milling of P, K and other materials, which can realize high Feed rate, and can also be used for insert milling. ◎ The tool is available in diameters Φ20-Φ160mm.	B62-B64
Helical end mill	**CHM190**	KAPR=90°	SP12□□ AP15□□		◎ Large cutting depth milling tools are made of steel, alloy steel and cast iron. ◎ The tool is available in diameters ϕ 63 mm and ϕ 80 mm with BT and JT interface.	B66-B67

Overview of indexable milling inserts

Insert shape	Insert model	Page
	APMT1135PDER-HM APMT1605PDER-HM	B47
	APGT1135PDFR-AK APGT1604PDFR-AK	B47
	APKT113604PEER-FM APKT1136PEER-FM APKT113612PEER-FM APKT113620PEER-FM APKT1605PDER-FM APKT160512PDER-FM APKT160520PDER-FM	B36
	SPMT120408-MM APMT150412-MM SPHX120408T21 APHX1504	B67
	AOKT060202PEER-VM AOKT060204PEER-VM AOKT060208PEER-VM AOKT113504PEER-VM AOKT113508PEER-VM AOKT113512PEER-VM AOKT113516PEER-VM AOKT160408PEER-VM AOKT160412PEER-VM AOKT160416PEER-VM	B32

Insert shape	Insert model	Page
	HNMX0906ANSN-M	B22
	ODKT0605ADN ODMT060508-R	B12
	RCKT10T3MO-FM RCKT1204MO-FM RCKT1606MO-FM RCKT2006MO-FM	B52
	RDMW0602MO RDMW0802MO RDMW10T3MO RDMW1204MO RDMW1605MO	B58
	RDKW10T3MO RDKW1204MO RDKW1604MO	B58
	RPMT08T2MO-HM RPMT1003MO RPMT1204MO-HM	B55

Insert shape	Insert model	Page
	RPKT10T3MO-MS RPKT1204MO-MS RPKT1606MO-MS	B55
	RPMT10T3MO-SM RPMT1204MO-SM RPMT1606MO-SM	B55
	SDMT1205ZTN-FM SDMT1505ZTN-FM	B64
	SDMW1205ZTN SDMW1505ZTN	B64
	SEET13T3-GM SEMT13T3AGTN-FM	B16
	SEKR1203AFTN SEMR1203AFTN	B20
	SEEN1203AFTN	B20
	SPKN1504EDTL SPKN1504EDTR	

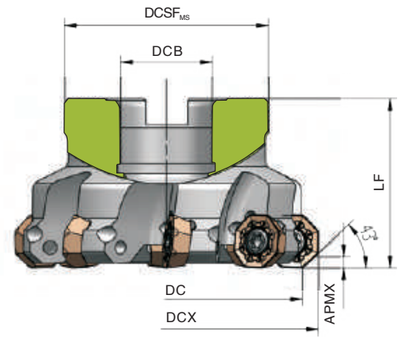
Insert shape	Insert model	Page
	SNGX1005ANR-GM	B14
	SNGX1005ANR-GE	B14
	SNGX1005ZNN-GM SNMX100512-GM	B28
	SZMX1206ANR-GM	B18
	XNGX0705ANN-R	B24
	ZNMU040308PNR-GM ZNMU080608PNR-GM	B41
	ZNMU040308PNR-GL ZNMU080608PNR-GL	B41

ZUTO HITECH METAL

Face milling

CFM143 series

KAPR=43°

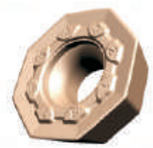


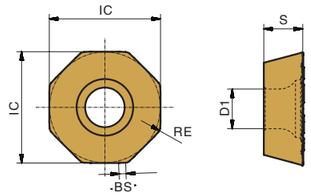
Tool specification	Number of edges	Inventory	Basic dimension (mm)					APMX (mm)	Interface form	Applicable inserts	Screw	Wrench
			DC	DCB	DCSF$_{MS}$	DCX	LF					
CFM143-040A1603-OD06	3	△	40	16	35	50	40	4	A	OD□□	M5×13	WR20S
CFM143-050A2204-OD06	4	△	50	22	42	60	40	4				
CFM143-063A2205-OD06	5	▲	63	22	50	72	40	4				
CFM143-080A2206-OD06	6	▲	80	22	60	90	50	4				
CFM143-100B3207-OD06	7	▲	100	32	70	110	50	4	B			
CFM143-125B4008-OD06	8	▲	125	40	85	135	63	4				
CFM143-160C4010-OD06	10	△	160	40	100	170	63	4	C			
CFM143-200C6012-OD06	12	▲	200	60	175	210	63	4				

▲Running stock △Make-to-order

Applicable inserts

OD□□





Working condition: ● Stable ◕ Average ⌗ Tough

Applicable inserts	Workpiece material								
	P Steel	⌗	●	◕	⌗	⌗	⌗		●
	M Stainless steel		●	◕	⌗		⌗		
	K Cast iron	⌗	●	◕	⌗				
	N Non-ferrous metal							◕	
	S Heat-resistant alloy，titanium alloy								

Type	Basic dimension (mm)					APMX (mm)	CVD	PVD					Cemented carbide	Cermet
	IC	S	D1	BS	RE		Z8140	Z5110	Z5120	Z5130	Z7130	Z7140	Z10	Z20
ODKT0605ADN	15.875	5.56	5.5	1.2	0.8	4		☆	★	★				
ODMT060508-R	15.875	5.56	5.5	1.2	0.8	4		☆	★	★				

★ Recommended grade ☆ Available grade

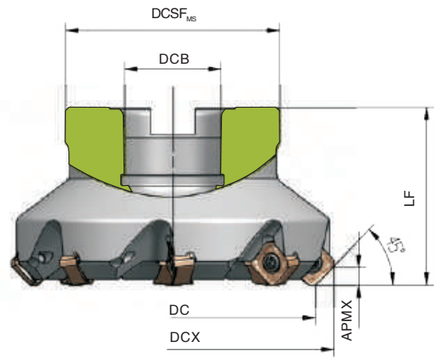
Recommended cutting parameters

Workpiece material		Hardness (HB)	Insert grade	Cutting data	
				Cutting speed v_c (m/min)	Feed rate f_z(mm/z)
P	Low-carbon steel, mild steel	≤180	Z5110	270(220-350)	0.3(0.1-0.5)
			Z5120	270(220-360)	
			Z5130	270(220-360)	
	High-carbon steel, alloy steel	180-280	Z5110	240(200-320)	0.2(0.1-0.4)
			Z5120	240(180-350)	
			Z5130	240(180-350)	
	Alloy tool steel	280-350	Z5110	220(180-200)	0.15(0.1-0.3)
			Z5120	220(170-340)	
			Z5130	220(170-340)	
M	Stainless steel	≤270	Z5110	230(180-300)	0.2(0.1-0.3)
			Z5120	150(120-250)	
			Z5130	150(120-250)	
K	Cast iron	180-250	Z5110	240(180-300)	0.2(0.1-0.4)
			Z5120	200(150-250)	
			Z5130	200(150-250)	

Face milling

CFM145 series

KAPR=45°

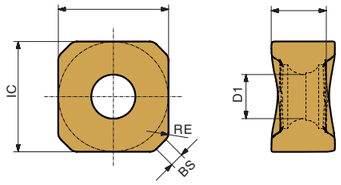


Tool specification	Number of edges	Inventory	Basic dimension (mm)					APMX (mm)	Interface form	Applicable inserts	Screw	Wrench
			DC	DCB	DCSF$_{MS}$	DCX	LF					
CFM145-050A2204-SN10	4	▲	50	22	42	60.5	40	4.7	A	SNGX□□	M3.5×10	WR15S
CFM145-050A2205-SN10	5	△	50	22	42	60.5	40	4.7				
CFM145-063A2205-SN10	5	△	63	22	50	73.5	40	4.7				
CFM145-063A2206-SN10	6	▲	63	22	50	73.5	40	4.7				
CFM145-080A2706-SN10	6	△	80	27	60	90.5	50	4.7				
CFM145-080A2708-SN10	8	▲	80	27	60	90.5	50	4.7				
CFM145-100B3206-SN10	6	△	100	32	70	110.5	50	4.7	B			
CFM145-100B3208-SN10	8	△	100	32	70	110.5	50	4.7				
CFM145-100B3205-SN10	10	▲	100	32	70	110.5	50	4.7				
CFM145-125B4008-SN10	8	△	125	40	85	135.5	63	4.7				
CFM145-125B4010-SN10	10	▲	125	40	85	135.5	63	4.7				
CFM145-125B4012-SN10	12	△	125	40	85	135.5	63	4.7				
CFM145-160C4008-SN10	8	△	160	40	100	170.5	63	4.7	C			
CFM145-160C4012-SN10	12	▲	160	40	100	170.5	63	4.7				
CFM145-160C4014-SN10	14	△	160	40	100	170.5	63	4.7				

▲Running stock △Make-to-order

Applicable inserts

SN□□



Working condition: ● Stable ◕ Average ⌗ Tough

Applicable inserts	Workpiece material								
	P	Steel	⌗	●	◕	⌗	⌗	⌗		●
	M	Stainless steel		●	◕	⌗		⌗		
	K	Cast iron	⌗	●	◕	⌗				
	N	Non-ferrous metal							◕	
	S	Heat-resistant alloy，titanium alloy								

Type	Basic dimension (mm)					APMX (mm)	CVD	PVD					Cemented carbide	Cermet
	IC	S	D1	BS	RE		Z8140	Z5110	Z5120	Z5130	Z7130	Z7140	Z10	Z20
SNGX1005ANR-GM	10.0	5.0	4.0	1.2	0.8	4.7		☆	★	★				
SNGX1005ANR-GE	10.0	5.0	4.0	1.2	0.8	4.7		☆	★	★				

★ Recommended grade ☆ Available grade

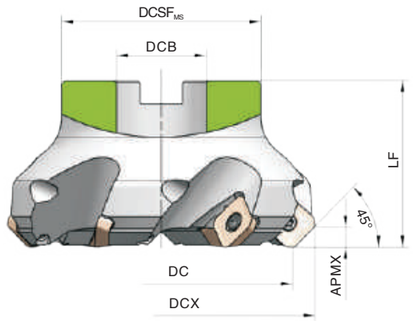
Recommended cutting parameters

Workpiece material		Hardness (HB)	Insert grade	Cutting data	
				Cutting speed v_c (m/min)	Feed rate f_z(mm/z)
P	Low-carbon steel, mild steel	≤180	Z5110	270(220-350)	0.2(0.1-0.4)
			Z5120	270(220-350)	
			Z5130	270(220-350)	
	High-carbon steel, alloy steel	180-280	Z5110	260(200-320)	0.2(0.1-0.4)
			Z5120	260(200-320)	
			Z5130	260(200-320)	
	Alloy tool steel	280-350	Z5110	240(180-300)	0.2(0.1-0.4)
			Z5120	240(180-300)	
			Z5130	240(180-300)	
M	Stainless steel	≤270	Z5110	150(120-240)	0.2(0.1-0.4)
			Z5120	160(110-270)	
			Z5130	140(100-250)	
K	Cast iron	180-250	Z5110	270(150-300)	0.3(0.1-0.5)
			Z5120	200(150-250)	
			Z5130	200(150-250)	

Face milling

CFM245 series

KAPR=45°

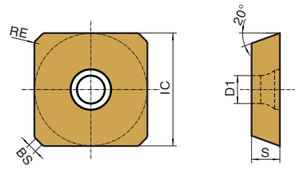


Tool specification	Number of edges	Inventory	Basic dimension (mm)					APMX (mm)	Interface form	Applicable inserts	Screw	Wrench
			DC	DCB	DCSF$_{MS}$	DCX	LF					
CFM245-050A2203-SE13	3	△	50	22	42	61	40	6	A	SEET□□	M3.5×10	WR15S
CFM245-050A2204-SE13	4	▲	50	22	42	61	40	6				
CFM245-063A2204-SE13	4	△	63	22	50	74	40	6				
CFM245-063A2205-SE13	5	▲	63	22	50	74	40	6				
CFM245-080A2704-SE13	4	△	80	27	60	91	50	6				
CFM245-080A2706-SE13	6	▲	80	27	60	91	50	6				
CFM245-100B3205-SE13	5	△	100	32	70	107	50	6	B			
CFM245-100B3207-SE13	7	△	100	32	70	107	50	6				
CFM245-125B4006-SE13	6	▲	125	40	85	131	63	6				
CFM245-125B4008-SE13	8	△	125	40	85	136	63	6				
CFM245-160C4010-SE13	10	▲	160	40	100	170	63	6	C			
CFM245-160C4012-SE13	12	△	160	40	100	210	63	6				
CFM245-200C6014-SE13	14	▲	200	60	175	260	63	6				
CFM245-200C6018-SE13	18	△	200	60	175	325	70	6				

▲Running stock △Make-to-order

Applicable inserts

SE□□



Working condition: ● Stable ◕ Average ⌗ Tough

Applicable inserts	Workpiece material								
	P	Steel	⌗	●	◕	⌗	⌗	⌗		●
	M	Stainless steel		●	◕	⌗		⌗		
	K	Cast iron	⌗	●	◕	⌗				
	N	Non-ferrous metal							◕	
	S	Heat-resistant alloy，titanium alloy								

Type	Basic dimension (mm)					APMX (mm)	CVD	PVD					Cemented carbide	Cermet
	IC	S	D1	BS	RE		Z8140	Z5110	Z5120	Z5130	Z7130	Z7140	Z10	Z20
SEET13T3-GM	13.4	3.97	4.1	1.4	1.5	6		☆	★	★				
SEMT13T3AGTN-FM	13.4	3.97	4.1	1.4	1.5	6		☆	★	★				

★ Recommended grade ☆ Available grade

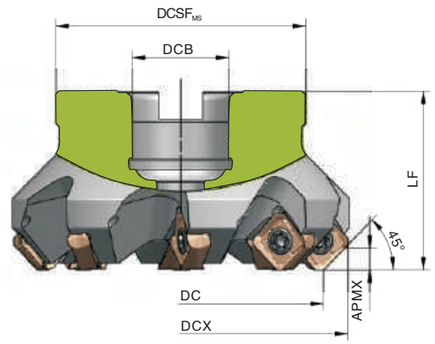
Recommended cutting parameters

Workpiece material		Hardness (HB)	Insert grade	Cutting data	
				Cutting speed v_c (m/min)	Feed rate f_z(mm/z)
P	Low-carbon steel, mild steel		Z5110	270(220-350)	0.2(0.1-0.3)
			Z5120		
			Z5130	230(170-350)	
	High-carbon steel, alloy steel	180-280	Z5110	240(200-320)	0.2(0.1-0.3)
			Z5120	240(180-350)	
			Z5130	220(180-350)	
	Alloy tool steel	280-350	Z5110	220(180-300)	0.2(0.1-0.3)
			Z5120	220(170-340)	
			Z5130	190(130-300)	
M	Stainless steel	≤270	Z5110	150(120-240)	0.2(0.1-0.3)
			Z5120	160(110-270)	
			Z5130	140(100-250)	
K	Cast iron	180-250	Z5110	240(180-300)	0.2(0.1-0.3)
			Z5120	200(150-250)	
			Z5130	200(150-250)	

Face milling

CFM345 series

KAPR=45°

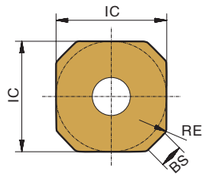


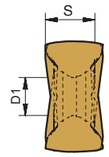
Tool specification	Number of edges	Inventory	Basic dimension (mm)					APMX (mm)	Interface form	Applicable inserts	Screw	Wrench
			DC	DCB	DCSF$_{MS}$	DCX	LF					
CFM345-050A2204-SZ12	4	△	50	22	42	63.7	40	6	A	SZMX□□	M4×10	WR15S
CFM345-050A2205-SZ12	5	▲	50	22	42	63.7	40	6				
CFM345-063A2205-SZ12	5	△	63	22	50	76.7	40	6				
CFM345-063A2206-SZ12	6	▲	63	22	50	76.7	40	6				
CFM345-080A2706-SZ12	6	△	80	27	60	93.7	50	6				
CFM345-080A2708-SZ12	8	▲	80	27	60	93.7	50	6				
CFM345-100B3206-SZ12	6	△	100	32	70	113.7	50	6	B			
CFM345-100B3208-SZ12	8	△	100	32	70	113.7	50	6				
CFM345-100B3210-SZ12	10	▲	100	32	70	113.7	50	6				
CFM345-125B4008-SZ12	8	△	125	40	85	138.7	63	6				
CFM345-125B4010-SZ12	10	△	125	40	85	138.7	63	6				
CFM345-125B4012-SZ12	12	▲	125	40	85	138.7	63	6				
CFM345-160C4008-SZ12	8	△	160	40	100	173.7	63	6	C			
CFM345-160C4012-SZ12	12	△	160	40	100	173.7	63	6				
CFM345-160C4014-SZ12	14	▲	160	40	100	173.7	63	6				

▲Running stock △Make-to-order

Applicable inserts

SZMX □□





Working condition: ● Stable ◕ Average ⌗ Tough

Applicable inserts	Workpiece material								
	P	Steel	⌗	●	◕	⌗	⌗	⌗		●
	M	Stainless steel		●	◕	⌗		⌗		
	K	Cast iron	⌗	●	◕	⌗				
	N	Non-ferrous metal							◕	
	S	Heat-resistant alloy，titanium alloy								

Type	Basic dimension (mm)					APMX (mm)	CVD	PVD					Cemented carbide	Cermet
	IC	S	D1	BS	RE		Z8140	Z5110	Z5120	Z5130	Z7130	Z7140	Z10	Z20
SZMX1206ANR-GM	13.4	6.0	4.6	1.4	0.8	6		☆	★	★				

★ Recommended grade ☆ Available grade

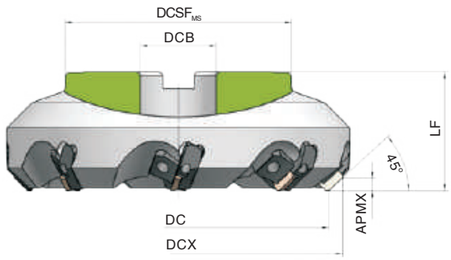
Recommended cutting parameters

Workpiece material		Hardness (HB)	Insert grade	Cutting data	
				Cutting speed v_c (m/min)	Feed rate f_z(mm/z)
P	Low-carbon steel, mild steel	≤180	Z5110	270(220-350)	0.2(0.1-0.4)
			Z5120	270(220-350)	
			Z5130	270(220-350)	
	High-carbon steel, alloy steel	180-280	Z5110	260(200-320)	0.2(0.1-0.4)
			Z5120	260(200-320)	
			Z5130	260(200-320)	
	Alloy tool steel	280-350	Z5110	240(180-300)	0.2(0.1-0.4)
			Z5120	240(180-300)	
			Z5130	240(180-300)	
M	Stainless steel	≤270	Z5110	150(120-240)	0.2(0.1-0.4)
			Z5120	160(110-270)	
			Z5130	140(100-250)	
K	Cast iron	180-250	Z5110	270(150-300)	0.3(0.1-0.5)
			Z5120	200(150-250)	
			Z5130	200(150-250)	

Face milling

CFM445 series

KAPR=45°



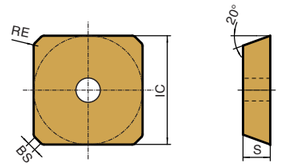
Tool specification	Number of edges	Inventory	Basic dimension (mm)					APMX (mm)	Interface form	Applicable inserts
			DC	DCB	DCSF$_{MS}$	DCX	LF			
CFM445-080A2704-SE12	4	▲	80	27	60	103	50	5.5	A	SE□R1203□
CFM445-100B3205-SE12	5	▲	100	32	70	122	50	5.5	B	
CFM445-125B4006-SE12	6	▲	125	40	85	147	63	5.5		
CFM445-160C4008-SE12	8	▲	160	40	100	181	63	5.5	C	
CFM445-200C6010-SE12	10	▲	200	60	175	221	63	5.5		
CFM445-250C6012-SE12	12	△	250	60	210	270	63	5.5		
CFM445-315D6015-SE12	15	△	315	60	250	353	63	5.5	D	

▲Running stock △Make-to-order

Insert	Toolholder	Brale	Stud screw	Clamping screw	Wrench
SE□□12	HSERR/L	H05R/L	HM8×21	HOM5×15.4	HT20T HH40T

Applicable inserts

SE□□



Working condition: ● Stable ◕ Average ⌗ Tough

Applicable inserts	Workpiece material								
	P	Steel	⌗	●	◕	⌗	⌗	⌗		●
	M	Stainless steel		●	◕	⌗		⌗		
	K	Cast iron	⌗	●	◕	⌗				
	N	Non-ferrous metal							◕	
	S	Heat-resistant alloy，titanium alloy								

Type	Basic dimension (mm)					APMX (mm)	CVD	PVD					Cemented carbide	Cermet
	IC	S	D1	BS	RE		Z8140	Z5110	Z5120	Z5130	Z7130	Z7140	Z10	Z20
SEEN1203AFTN	12.7	3.18	2.5	1.2	0.8	5.5								★
SEKR1203AFTN	12.7	3.18	2.5	1.3	1.6	5.5		☆	★	★				
SEMR1203AFTN	12.7	3.18	2.5	1.3	1.6	5.5		☆	★	★				

★ Recommended grade ☆ Available grade

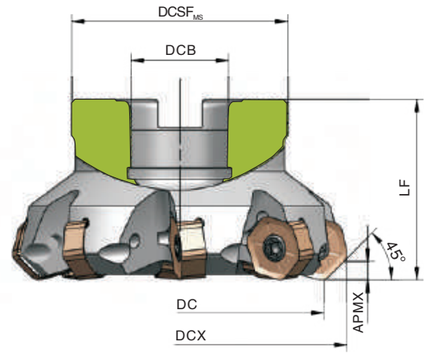
Recommended cutting parameters

Workpiece material		Hardness (HB)	Insert grade	Cutting data	
				Cutting speed v_c (m/min)	Feed rate f_z(mm/z)
P	Low-carbon steel, mild steel	≤180	Z5110	270(220-350)	0.3(0.1-0.5)
			Z5120	270(220-360)	
			Z5130	270(220-360)	
	High-carbon steel, alloy steel	180-280	Z5110	240(200-320)	0.15(0.1-0.4)
			Z5120	240(180-350)	
			Z5130	240(180-350)	
	Alloy tool steel	280-350	Z5110	220(180-200)	0.15(0.1-0.3)
			Z5120	220(170-340)	
			Z5130	220(170-340)	
M	Stainless steel	≤270	Z5110	230(180-300)	0.15(0.1-0.3)
			Z5120	150(120-250)	
			Z5130	150(120-250)	
K	Cast iron	180-250	Z5110	240(180-300)	0.2(0.1-0.4)
			Z5120	200(150-250)	
			Z5130	200(150-250)	

Face milling

CFM645 series

KAPR=45°

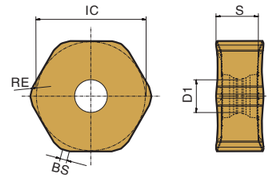


Tool specification	Number of edges	Inventory	Basic dimension (mm)					APMX (mm)	Interface form	Applicable inserts	Screw	Wrench
			DC	DCB	DCSF$_{MS}$	DCX	LF					
CFM645-050A1604-HN09	4	△	50	16	42	61.7	40	5	A	HNMX0906□□	M4×11	WR15S
CFM645-063A2206-HN09	6	▲	63	22	50	74.7	40	5				
CFM645-080A2706-HN09	6	△	80	27	60	91.7	50	5				
CFM645-080A2708-HN09	8	▲	80	27	60	91.7	50	5				
CFM645-100B3206-HN09	6	△	100	32	70	111.7	50	5	B			
CFM645-100B3208-HN09	8	▲	100	32	70	111.7	50	5				
CFM645-100B3210-HN09	10	△	100	32	70	111.7	50	5				
CFM645-125B4006-HN09	6	△	125	40	85	136.7	63	5				
CFM645-125B4008-HN09	8	▲	125	40	85	136.7	63	5				
CFM645-125B4010-HN09	10	△	125	40	85	136.7	63	5				
CFM645-125B4012-HN09	12	▲	125	40	85	136.7	63	5				
CFM645-160C4008-HN09	8	△	160	40	100	171.7	63	5	C			
CFM645-160C4012-HN09	12	▲	160	40	100	171.7	63	5				
CFM645-160C4014-HN09	14	△	160	40	100	171.7	63	5				
CFM645-200C6010-HN09	10	△	200	60	175	211.7	63	5				
CFM645-250C6014-HN09	14	▲	250	60	210	261.7	63	5				
CFM645-315D6016-HN09	16	△	315	60	250	326.7	80	5				

▲Running stock △Make-to-order

Applicable inserts

HNMX □□



Working condition: ● Stable ◕ Average ⌗ Tough

Applicable inserts	Workpiece material								
	P	Steel	⌗	●	◕	⌗	⌗	⌗		●
	M	Stainless steel		●	◕	⌗		⌗		
	K	Cast iron	⌗	●	◕	⌗				
	N	Non-ferrous metal							◕	
	S	Heat-resistant alloy，titanium alloy								

Type	Basic dimension (mm)					APMX (mm)	CVD	PVD					Cemented carbide	Cermet
	IC	S	D1	BS	RE		Z8140	Z5110	Z5120	Z5130	Z7130	Z7140	Z10	Z20
HNMX0906ANSN-M	16.5	6.34	4.9	1.0	1.2	5		☆	★	★				

★ Recommended grade ☆ Available grade

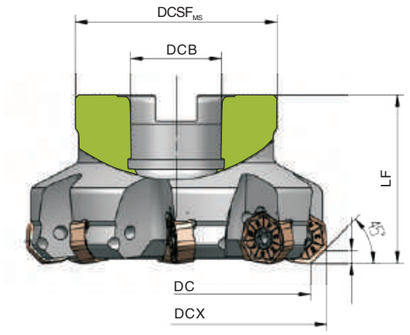
Recommended cutting parameters

Workpiece material		Hardness (HB)	Insert grade	Cutting data	
				Cutting speed v_c (m/min)	Feed rate f_z(mm/z)
P	Low-carbon steel, mild steel	≤180	Z5110	270(220-350)	0.2(0.1-0.4)
			Z5120	270(220-350)	
			Z5130	270(220-350)	
	High-carbon steel, alloy steel	180-280	Z5110	260(200-320)	0.2(0.1-0.4)
			Z5120	260(200-320)	
			Z5130	260(200-320)	
	Alloy tool steel	280-350	Z5110	240(180-300)	0.2(0.1-0.4)
			Z5120	240(180-300)	
			Z5130	240(180-300)	
M	Stainless steel	≤270	Z5110	150(120-240)	0.2(0.1-0.4)
			Z5120	160(110-270)	
			Z5130	140(100-250)	
K	Cast iron	180-250	Z5110	270(150-300)	0.3(0.1-0.5)
			Z5120	200(150-250)	
			Z5130	200(150-250)	

Face milling

CFM745 series

KAPR=45°

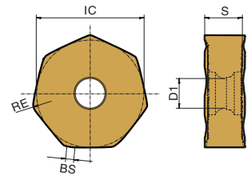


Tool specification	Number of edges	Inventory	Basic dimension (mm)					APMX (mm)	Interface form	Applicable inserts	Screw	Wrench
			DC	DCB	DCSF	DCX	LF					
CFM745-040A1603-XN07	3	△	40	16	35	49.6	40	4.4	A	XMIX0705□□	M3.5×10	WR15S
CFM745-050A2204-XN07	4	▲	50	22	42	59.6	40	4.4				
CFM745-050A2205-XN07	5	△	50	22	42	59.6	40	4.4				
CFM745-063A2205-XN07	5	▲	63	22	50	72.6	40	4.4				
CFM745-063A2206-XN07	6	△	63	22	50	72.6	40	4.4				
CFM745-080A2706-XN07	6	△	80	27	60	89.6	50	4.4				
CFM745-080A2707-XN07	7	▲	80	27	60	89.6	50	4.4				
CFM745-100B3207-XN07	7	△	100	32	70	109.6	50	4.4	B			
CFM745-100B3208-XN07	8	▲	100	32	70	109.6	50	4.4				
CFM745-125B4008-XN07	8	▲	125	40	85	134.6	63	4.4				
CFM745-125B4010-XN07	10	▲	125	40	85	134.6	63	4.4				
CFM745-160C4011-XN07	11	△	160	40	100	169.6	63	4.4	C			
CFM745-160C4012-XN07	12	▲	160	40	100	169.6	63	4.4				

▲Running stock △Make-to-order

Applicable inserts

XN □□



Working condition: ● Stable ◕ Average ⌗ Tough

Applicable inserts	Workpiece material								
	P	Steel	⌗	●	◕	⌗	⌗	⌗		●
	M	Stainless steel		●	◕	⌗		⌗		
	K	Cast iron	⌗	●	◕	⌗				
	N	Non-ferrous metal							◕	
	S	Heat-resistant alloy，titanium alloy								

Type	Basic dimension (mm)					APMX (mm)	CVD	PVD					Cemented carbide	Cermet
	IC	S	D1	BS	RE		Z8140	Z5110	Z5120	Z5130	Z7130	Z7140	Z10	Z20
XNGX0705ANN-R	14.5	5.02	4.0	1.0	0.8	4.4		☆	★	★				

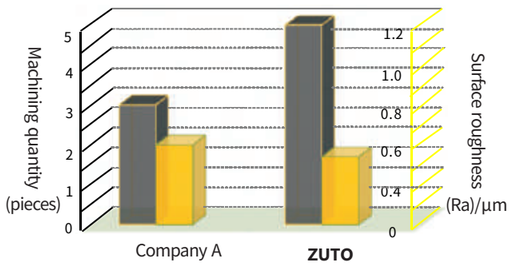
★ Recommended grade ☆ Available grade

Recommended cutting parameters

Workpiece material		Hardness (HB)	Insert grade	Cutting data	
				Cutting speed v_c (m/min)	Feed rate f_z(mm/z)
P	Low-carbon steel, mild steel	≤180	Z5110	270(220-350)	0.2(0.1-0.3)
			Z5120	270(200-360)	
			Z5130	230(170-350)	
	High-carbon steel, alloy steel	180-280	Z5110	240(200-320)	0.2(0.1-0.3)
			Z5120	240(180-350)	
			Z5130	220(180-350)	
	Alloy tool steel	280-350	Z5110	220(180-300)	0.2(0.1-0.3)
			Z5120	220(170-340)	
			Z5130	190(130-300)	
M	Stainless steel	≤270	Z5110	150(120-240)	0.2(0.1-0.3)
			Z5120	160(110-270)	
			Z5130	140(100-250)	
K	Cast iron	180-250	Z5110	240(180-300)	0.2(0.1-0.3)
			Z5120	200(150-250)	
			Z5130	200(150-250)	

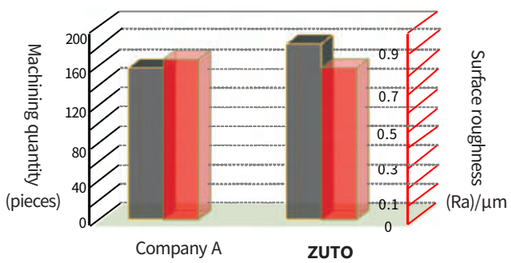
Machining cases

- **Workpiece material** 1Cr18Ni9Ti
- **Machining method** Face milling
- **Cooling method** Water cooling
- **Insert** SNGX1005ANR-GM，Z5120
- **Cutting tools** CFM145-063A2206-SN10
- **Machining parameters** Vc=130m/min, f_z=0.15mm/z, ap=1mm



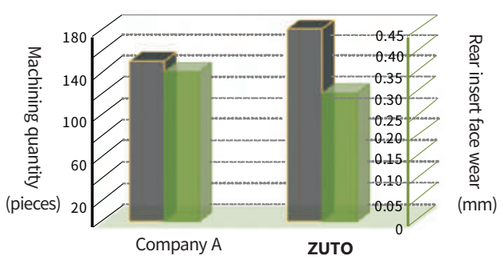
Machining cases

- **Workpiece material** HT250
- **Machining method** Face milling
- **Cooling method** No cooling
- **Insert** SZMX1206ANN-GM，Z5130
- **Cutting tools** CFM345-063A2206-SZ12
- **Machining parameters** Vc=150m/min, f_z=0.2mm/z, ap=3mm



Machining cases

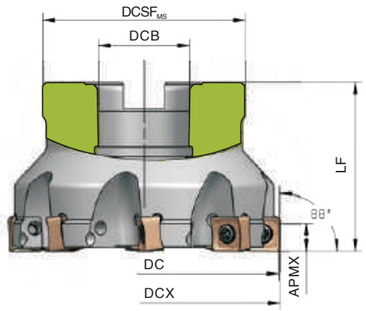
- **Workpiece material** QT500
- **Machining method** Face milling
- **Cooling method** No cooling
- **Insert** HNMX0906ANSN-M Z5110
- **Cutting tools** CFM645-063A2206-HN09
- **Machining parameters** Vc=240m/min, f_z=0.15mm/z, ap=2mm



Square shoulder milling

CSM188 series

KAPR=88°



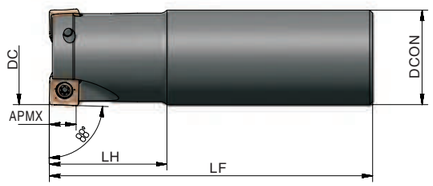
Tool specification and model	Number of edges	Inventory	Basic dimension (mm)					APMX (mm)	Interface form	Applicable inserts	Screw	Wrench
			DC	DCB	DCSFMS	DCX	LF					
CSM188-050A2204-SN10	4	▲	50	22	42	50.7	40	8	A	SN□X1005□	M3.5×10	WR15S
CSM188-050A2205-SN10	5	△	50	22	42	50.7	40	8				
CSM188-063A2205-SN10	5	△	63	22	50	63.7	40	8				
CSM188-063A2206-SN10	6	▲	63	22	50	63.7	40	8				
CSM188-080A2706-SN10	6	△	80	27	60	80.7	50	8				
CSM188-080A2708-SN10	8	▲	80	27	60	80.7	50	8				
CSM188-100B3206-SN10	6	△	100	32	70	100.7	50	8	B			
CSM188-100B3208-SN10	8	△	100	32	70	100.7	50	8				
CSM188-100B3211-SN10	11	▲	100	32	70	100.7	50	8				
CSM188-125B4008-SN10	8	△	125	40	85	125.7	63	8				
CSM188-125B4010-SN10	10	▲	125	40	85	125.7	63	8				
CSM188-125B4014-SN10	14	△	125	40	85	125.7	63	8				
CSM188-160C4008-SN10	8	△	160	40	100	160.7	63	8	C			
CSM188-160C4012-SN10	12	▲	160	40	100	160.7	63	8				
CSM188-160C4014-SN10	14	△	160	40	100	160.7	63	8				

▲Running stock △Make-to-order

Square shoulder milling

SFM188 series

KAPR=88°

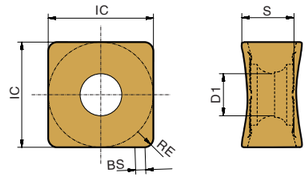


Tool specification	Number of edges	Inventory	Basic dimension (mm)				APMX (mm)	Applicable inserts	Screw	Wrench
			DC	DCON	LF	LH				
SSM188-032G3202-SN10	2	▲	32	32	110	32.8	8	SN□X1005□	M3.5×10	WR15
SSM188-032G3203-SN10	3	△	32	32	110	32.8	8			
SSM188-040G3203-SN10	3	△	40	32	110	40.8	8			
SSM188-040G3204-SN10	4	△	40	32	110	40.8	8			

▲Running stock △Make-to-order

Applicable inserts

SN □□



Working condition: ● Stable ◕ Average ⌗ Tough

Applicable inserts	Workpiece material								
	P	Steel	⌗	●	◕	⌗	⌗	⌗		●
	M	Stainless steel		●	◕	⌗		⌗		
	K	Cast iron	⌗	●	◕	⌗				
	N	Non-ferrous metal							◕	
	S	Heat-resistant alloy，titanium alloy								

Type	Basic dimension (mm)					APMX (mm)	CVD	PVD					Cemented carbide	Cermet
	IC	S	D1	BS	RE		Z8140	Z5110	Z5120	Z5130	Z7130	Z7140	Z10	Z20
SNGX1005ZNN-GM	10.0	5.0	4.0	1.0	0.8	8		☆	★	★				
SNMX100512-GM	10.0	5.0	4.0	\	1.2	8		☆	★	★				

★ Recommended grade ☆ Available grade

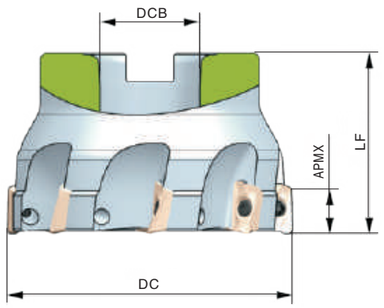
Recommended cutting parameters

Workpiece material		Hardness (HB)	Insert grade	Cutting data	
				Cutting speed v_c (m/min)	Feed rate f_z(mm/z)
P	Low-carbon steel, mild steel	≤180	Z5110	270(220-350)	0.2(0.1-0.4)
			Z5120	270(220-350)	
			Z5130	270(220-350)	
	High-carbon steel, alloy steel	180-280	Z5110	260(200-320)	0.2(0.1-0.4)
			Z5120	260(200-320)	
			Z5130	260(200-320)	
	Alloy tool steel	280-350	Z5110	240(180-300)	0.2(0.1-0.4)
			Z5120	240(180-300)	
			Z5130	240(180-300)	
M	Stainless steel	≤270	Z5110	150(120-240)	0.2(0.1-0.4)
			Z5120	160(110-270)	
			Z5130	140(100-250)	
K	Cast iron	180-250	Z5110	270(150-300)	0.3(0.1-0.5)
			Z5120	200(150-250)	
			Z5130	200(150-250)	

Square shoulder milling

CSM190 series

KAPR=90°



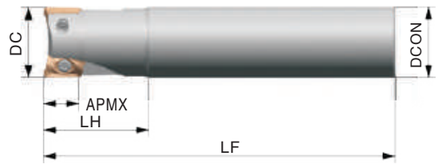
Tool specification	Number of edges	Inventory	Basic dimension (mm)			APMX (mm)	Interface form	Applicable inserts	Screw	Wrench
			DC	DCB	LF					
CSM190-040A1605-AO11	5	△	40	16	40	9.5	A	AOKT11□□	M2.5×6.5	WR08S
CSM190-050A2206-AO11	6	▲	50	22	50	9.5				
CSM190-063A2207-AO11	7	▲	63	22	63	9.5				
CSM190-050A2204-AO16	4	△	50	22	50	14.5		AOKT16□□	M4×8.4	WR15S
CSM190-063A2205-AO16	5	▲	63	22	63	14.5				
CSM190-080A2706-AO16	6	▲	80	27	80	14.5				

▲Running stock △Make-to-order

Square shoulder milling

SSM190 series

KAPR=90°



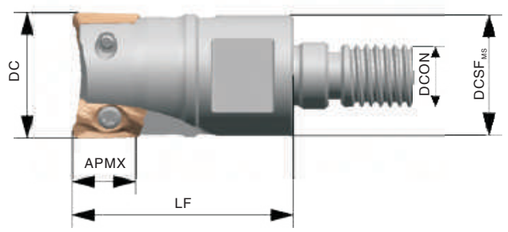
Tool specification	Number of edges	Inventory	Basic dimension (mm)				APMX (mm)	Applicable inserts	Screw	Wrench
			DC	DCON	LF	LH				
SSM190-016G1602-AO11	2	▲	16	16	130	40	9.5	AOKT11□□	M2.5×6.5	WR08
SSM190-016G1602L-AO11	2	△	16	16	160	40	9.5			
SSM190-017G1602-AO11	2	△	17	16	160	40	9.5			
SSM190-017G1602L-AO11	2	△	17	16	200	40	9.5			
SSM190-020G2002-AO11	2	▲	20	20	130	40	9.5			
SSM190-020G2002L-AO11	2	△	20	20	160	40	9.5			
SSM190-021G2002L-AO11	2	△	21	20	200	50	9.5			
SSM190-021G2002-AO11	2	△	21	20	160	50	9.5			
SSM190-025G2503-AO11	3	▲	25	25	120	50	9.5			
SSM190-025G2503L-AO11	3	△	25	25	160	50	9.5			
SSM190-025G2502-AO16	2	▲	25	25	160	50	14.5	AOKT16□□	M4×8.4	WR15
SSM190-025G2502L-AO16	2	△	25	25	200	50	14.5			
SSM190-026G2502-AO16	2	△	26	25	160	50	14.5			
SSM190-026G2502L-AO16	2	△	26	25	200	50	14.5			
SSM190-032G3202-AO16	2	▲	32	32	160	80	14.5			
SSM190-032G3202L-AO16	2	△	32	32	200	80	14.5			

▲Running stock △Make-to-order

Square shoulder milling

KH- series

KAPR=90°

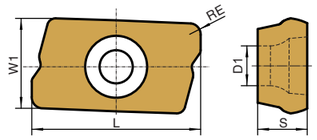


Tool specification	Number of edges	Inventory	Basic dimension (mm)				APMX (mm)	Applicable inserts	Screw	Wrench
			DC	DCSF$_{MS}$	LF	DCON				
KH-1102-AOKT06-M05	2	△	11	9	18	5	6.0	AO06	M1.8×3.9	WR06
KH-1303-AOKT06-M06	3	△	13	10	18	6	6.0			
KH-1503-AOKT06-M08	3	▲	15	14	22	8	6.0			
KH-1704-AOKT06-M08	4	△	17	15	22	8	6.0			
KH-1702-AOKT11-M08	2	△	17	15	25	8	9.5	AO11	M2.5×6.5	WR08
KH-2102-AOKT11-M10	2	▲	21	19	30	10	9.5			
KH-2603-AOKT11-M12	3	△	26	24	35	12	9.5			
KH-3304-AOKT11-M16	4	△	33	30	40	16	9.5			

▲Running stock △Make-to-order

Applicable inserts

AO □□



Working condition: ● Stable ◕ Average ⌗ Tough

Applicable inserts	Workpiece material								
	P Steel	⌗	●	◕	⌗	⌗	⌗		●
	M Stainless steel		●	◕	⌗		⌗		
	K Cast iron	⌗	●	◕	⌗				
	N Non-ferrous metal							◕	
	S Heat-resistant alloy，titanium alloy								

Type	Basic dimension (mm)					APMX (mm)	CVD	PVD					Cemented carbide	Cermet
	IC	S	D1	BS	RE		Z8140	Z5110	Z5120	Z5130	Z7130	Z7140	Z10	Z20
AOKT060202PEER-VM	7.61	4.20	2.38	2.10	0.20	6.0		☆	★	★				☆
AOKT060204PEER-VM	7.61	4.20	2.38	2.10	0.40	6.0		☆	★	★				☆
AOKT060208PEER-VM	7.61	4.20	2.38	2.10	0.80	6.0		☆	★	★				☆
AOKT113504PEER-VM	11.75	6.42	3.50	2.80	0.40	9.5		☆	★	★				☆
AOKT113508PEER-VM	11.75	6.42	3.50	2.80	0.80	9.5		☆	★	★				☆
AOKT113512PEER-VM	11.75	6.42	3.50	2.80	1.20	9.5		☆	★	★				☆
AOKT113516PEER-VM	11.75	6.42	3.50	2.80	1.60	9.5		☆	★	★				☆
AOKT160408PEER-VM	17.65	9.64	4.76	4.40	0.80	14.5		☆	★	★				☆
AOKT160412PEER-VM	17.65	9.64	4.76	4.40	1.20	14.5		☆	★	★				☆
AOKT160416PEER-VM	17.65	9.64	4.76	4.40	1.60	14.5		☆	★	★				☆

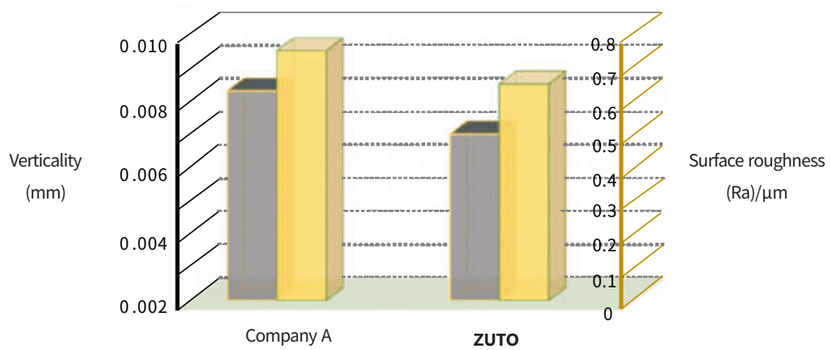
★ Recommended grade ☆ Available grade

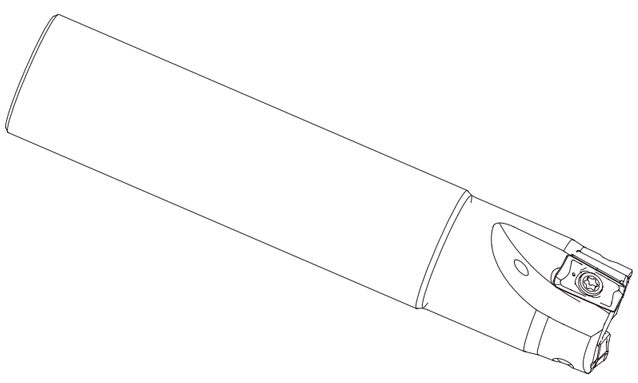
Recommended cutting parameters

Workpiece material		Hardness (HB)	Insert grade	Cutting data	
				Cutting speed v_c (m/min)	Feed rate f_z(mm/z)
P	Low-carbon steel, mild steel	≤180	Z5110	330(240-400)	0.2(0.1-0.3)
			Z5120	310(200-400)	
			Z5130	300(220-350)	
	High-carbon steel, alloy steel	180-280	Z5110	290(210-380)	0.2(0.1-0.3)
			Z5120	260(180-350)	
			Z5130	260(150-380)	
	Alloy tool steel	280-350	Z5110	290(180-350)	0.2(0.1-0.3)
			Z5120	260(160-330)	
			Z5130	220(150-280)	
M	Stainless steel	≤270	Z5110	220(110-300)	0.2(0.1-0.3)
			Z5120	200(150-300)	
			Z5130	200(150-300)	
K	Cast iron	180-250	Z5110	200(150-250)	0.2(0.1-0.3)
			Z5120	180(150-250)	
			Z5130	180(150-250)	

Machining cases

- **Workpiece material** Mold material P20
- **Machining method** Mold sidewall finish milling
- **Insert** AOKT113508PEER-VM
- **Cutting tools** SSM190-020G2002-AO11
- **Machining parameters** Vc=259m/min, f_z=0.25mm/z, ae=0.12mm, ap=1mm

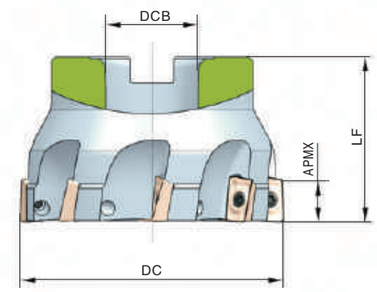




Square shoulder milling

CSM290 series

KAPR=90°



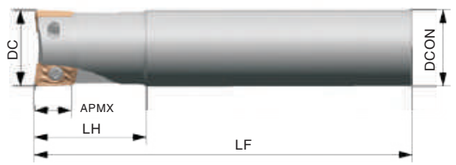
Tool specification	Number of edges	Inventory	Basic dimension (mm)			APMX (mm)	Interface form	Applicable inserts	Screw	Wrench
			DC	DCB	LF					
CSM290-050A2206-AP11	6	▲	50	22	40	9.5	A	APKT11	M2.5×6.5	WR08S
CSM290-063A2207-AP11	7	▲	63	22	40	9.5				
CSM290-080A2708-AP11	8	▲	80	27	50	9.5				
CSM290-100B3210-AP11	10	△	100	32	50	9.5	B			
CSM290-050A2204-AP16	4	▲	50	22	40	14.5	A	APKT16	M4×8.4	WR15S
CSM290-063A2205-AP16	5	▲	63	22	40	14.5				
CSM290-080A2706-AP16	6	▲	80	27	50	14.5				
CSM290-100B3208-AP16	8	▲	100	32	50	14.5	B			
CSM290-125B4010-AP16	10	△	125	40	63	14.5				

▲Running stock △Make-to-order

Square shoulder milling

SSM290 series

KAPR=90°

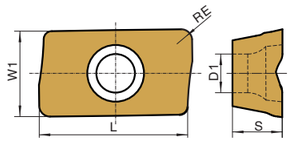


Tool specification	Number of edges	Inventory	Basic dimension (mm)				APMX (mm)	Applicable inserts	Screw	Wrench
			DC	DCON	LF	LH				
SSM290-016G1602-AP11	2	△	16	16	130	40	9.5	APKT11	M2.5×6.5	WR08
SSM290-016G1602L-AP11	2	△	16	16	160	50	9.5			
SSM290-020G2002-AP11	2	△	20	20	130	40	9.5			
SSM290-020G2002L-AP11	2	△	20	20	160	50	9.5			
SSM290-025G2503-AP11	3	▲	25	25	130	40	9.5			
SSM290-025G2503L-AP11	3	△	25	25	160	50	9.5			
SSM290-032G3204-AP11	4	▲	32	32	130	40	9.5			
SSM290-032G3204L-AP11	4	△	32	32	160	50	9.5			
SSM290-025G2502-AP16	2	▲	25	25	160	50	14.5	APKT16	M4×8.4	WR15
SSM290-025G2502L-AP16	2	△	25	25	200	75	14.5			
SSM290-032G3202-AP16	2	▲	32	32	160	50	14.5			
SSM290-032G3202L-AP16	2	△	32	32	200	80	14.5			
SSM290-040G3204-AP16	4	△	40	32	160	50	14.5			
SSM290-040G3204L-AP16	4	△	40	32	200	80	14.5			

▲Running stock △Make-to-order

Applicable inserts

AP□□



Working condition: ● Stable ◕ Average ⌗ Tough

Applicable inserts	Workpiece material								
	P	Steel	⌗	●	◕	⌗	⌗	⌗		●
	M	Stainless steel		●	◕	⌗		⌗		
	K	Cast iron	⌗	●	◕	⌗				
	N	Non-ferrous metal							◕	
	S	Heat-resistant alloy，titanium alloy								

Type	Basic dimension (mm)					APMX (mm)	CVD	PVD					Cemented carbide	Cermet
	L	W1	S	D1	RE		Z8140	Z5110	Z5120	Z5130	Z7130	Z7140	Z10	Z20
APKT113604PEER-FM	11.30	6.25	3.60	2.80	0.40	9.5		☆	★	★				
APKT1136PEER-FM	11.30	6.25	3.60	2.80	0.80	9.5		☆	★	★				
APKT113612PEER-FM	11.30	6.25	3.60	2.80	1.20	9.5		☆	★	★				
APKT113620PEER-FM	11.30	6.25	3.60	2.80	2.00	9.5		☆	★	★				
APKT1605PDER-FM	17.42	9.33	5.20	4.50	0.80	14.5		☆	★	★				
APKT160512PDER-FM	17.42	9.33	5.20	4.50	1.20	14.5		☆	★	★				
APKT160520PDER-FM	17.42	9.33	5.20	4.50	2.00	14.5		☆	★	★				

★ Recommended grade ☆ Available grade

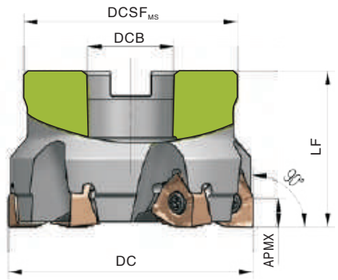
Recommended cutting parameters

Workpiece material		Hardness (HB)	Insert grade	Cutting data	
				Cutting speed v_c (m/min)	Feed rate f_z(mm/z)
P	Low-carbon steel, mild steel	≤180	Z5110	320(240-400)	0.2(0.1-0.3)
			Z5120	320(200-400)	
			Z5130	300(220-350)	
	High-carbon steel, alloy steel	180-280	Z5110	280(210-380)	0.2(0.1-0.3)
			Z5120	280(180-350)	
			Z5130	260(150-380)	
	Alloy tool steel	280-350	Z5110	260(180-350)	0.2(0.1-0.3)
			Z5120	260(160-330)	
			Z5130	220(150-280)	
M	Stainless steel	≤270	Z5110	200(110-300)	0.2(0.1-0.3)
			Z5120	180(150-300)	
			Z5130	180(150-300)	
K	Cast iron	180-250	Z5110	180(150-250)	0.2(0.1-0.3)
			Z5120	200(150-250)	
			Z5130	200(150-250)	

Square shoulder milling

CSM390 series

KAPR=90°

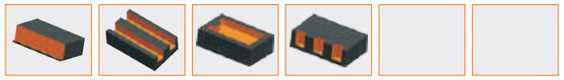


Tool specification	Number of edges	Inventory	Basic dimension (mm)				APMX (mm)	Interface form	Applicable inserts	Screw	Wrench
			DC	DCB	DCSF$_{MS}$	LF					
CSM390-040A1605-ZN04	5	△	40	16	35	40	4.2	A	ZNMU0403□□	M2.5×6.5	WR08S
CSM390-040A1607-ZN04	7	△	40	16	35	40	4.2				
CSM390-050A2206-ZN04	6	△	50	22	42	40	4.2				
CSM390-050A2208-ZN04	8	△	50	22	42	40	4.2				
CSM390-063A2207-ZN04	7	△	63	22	50	40	4.2				
CSM390-063A2210-ZN04	10	△	63	22	50	40	4.2				
CSM390-040A1604-ZN08	4	△	40	16	35	40	7.3		ZNMU0806□□	M4×8.4	WR15S
CSM390-050A2204-ZN08	4	▲	50	22	42	40	7.3				
CSM390-050A2205-ZN08	5	△	50	22	42	40	7.3				
CSM390-063A2205-ZN08	5	▲	63	22	50	40	7.3				
CSM390-063A2206-ZN08	6	△	63	22	50	40	7.3				
CSM390-080A2706-ZN08	6	▲	80	27	60	50	7.3				
CSM390-080A2707-ZN08	7	△	80	27	60	50	7.3				
CSM390-080A2709-ZN08	9	△	80	27	60	50	7.3				
CSM390-100A3207-ZN08	7	▲	100	32	70	50	7.3				
CSM390-100A3208-ZN08	8	△	100	32	70	50	7.3				
CSM390-100A3211-ZN08	11	△	100	32	70	50	7.3				
CSM390-125B4008-ZN08	8	▲	125	40	85	63	7.3	B			
CSM390-125B4011-ZN08	11	▲	125	40	85	63	7.3				
CSM390-125B4014-ZN08	14	△	125	40	85	63	7.3				
CSM390-160C4010-ZN08	10	△	160	40	100	63	7.3	C			
CSM390-160C4012-ZN08	12	▲	160	40	100	63	7.3				
CSM390-160C4016-ZN08	16	△	160	40	100	63	7.3				
CSM390-200C6012-ZN08	12	△	200	60	175	63	7.3				
CSM390-200C6016-ZN08	16	△	200	60	175	63	7.3				
CSM390-250C6014-ZN08	14	△	250	60	210	63	7.3				
CSM390-250C6018-ZN08	18	△	250	60	210	63	7.3				

▲Running stock △Make-to-order

Square shoulder milling

SSM390 series



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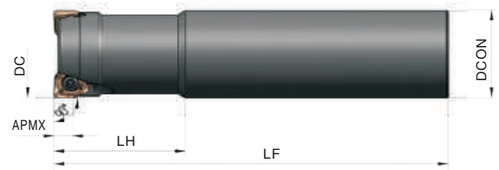
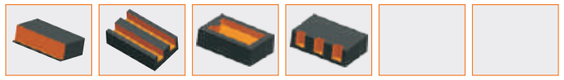


Tool specification	Number of edges	Inventory	Basic dimension (mm)				APMX (mm)	Applicable inserts	Screw	Wrench
			DC	DCON	LF	LH				
SSM390-018G1602L-ZN04	2	△	18	16	150	30	4.2	ZNMU0403□□	M2.5×6.5	WR08
SSM390-020G2002L-ZN04	2	▲	20	20	150	30	4.2			
SSM390-020G2003L-ZN04	3	△	20	20	150	30	4.2			
SSM390-021G2002L-ZN04	2	▲	21	20	150	30	4.2			
SSM390-021G2003L-ZN04	3	△	21	20	150	30	4.2			
SSM390-025G2502L-ZN04	2	▲	25	25	170	30	4.2			
SSM390-025G2503L-ZN04	3	▲	25	25	170	30	4.2			
SSM390-025G2504L-ZN04	4	△	25	25	170	30	4.2			
SSM390-025G2505L-ZN04	5	△	25	25	170	30	4.2			
SSM390-026G2502L-ZN04	2	▲	26	25	170	30	4.2			
SSM390-026G2503L-ZN04	3	△	26	25	170	30	4.2			
SSM390-032G3202L-ZN04	2	▲	32	32	200	30	4.2			
SSM390-032G3203L-ZN04	3	▲	32	32	200	30	4.2			
SSM390-032G3204L-ZN04	4	△	32	32	200	30	4.2			
SSM390-032G3205L-ZN04	5	△	32	32	200	30	4.2			
SSM390-032G3206L-ZN04	6	△	32	32	200	30	4.2			
SSM390-035G3202L-ZN04	2	▲	35	32	200	30	4.2			
SSM390-035G3203L-ZN04	3	▲	35	32	200	30	4.2			
SSM390-035G3204L-ZN04	4	△	35	32	200	30	4.2			
SSM390-040G3204L-ZN04	4	△	40	32	200	30	4.2			
SSM390-040G3205L-ZN04	5	△	40	32	200	30	4.2			
SSM390-040G3206L-ZN04	6	△	40	32	200	30	4.2			

▲Running stock △Make-to-order

Square shoulder milling

SSM390 series



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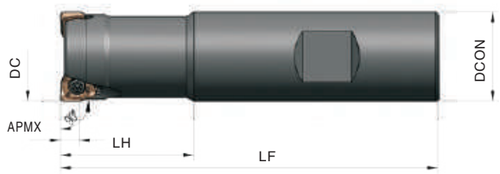
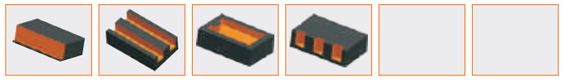


Tool specification	Number of edges	Inventory	Basic dimension (mm)				APMX (mm)	Applicable inserts	Screw	Wrench
			DC	DCON	LF	LH				
SSM390-020X2002-ZN04	2	△	20	20	90	30	4.2	ZNMU0403□□	M2.5×6.5	WR08
SSM390-020X2003-ZN04	3	△	20	20	90	30	4.2			
SSM390-025X2502-ZN04	2	▲	25	25	100	30	4.2			
SSM390-025X2503-ZN04	3	▲	25	25	100	30	4.2			
SSM390-025X2504-ZN04	4	△	25	25	100	30	4.2			
SSM390-025X2505-ZN04	5	△	25	25	100	30	4.2			
SSM390-032X3202-ZN04	2	▲	32	32	110	30	4.2			
SSM390-032X3203-ZN04	3	▲	32	32	110	30	4.2			
SSM390-032X3204-ZN04	4	△	32	32	110	30	4.2			
SSM390-032X3205-ZN04	5	△	32	32	110	30	4.2			
SSM390-032X3206-ZN04	6	△	32	32	110	30	4.2			

▲Running stock △Make-to-order

Square shoulder milling

KH- series



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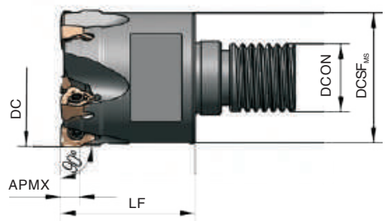
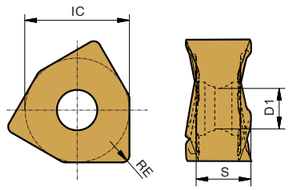


Tool specification	Number of edges	Inventory	Basic dimension (mm)				APMX (mm)	Applicable inserts	Screw	Wrench
			DC	DCSF	LF	DCON				
KH-2002-ZN04-M10	2	△	20	18	30	10	4.2	ZNMU0403□□	M2.5×6.5	WR08
KH-2003-ZN04-M10	3	△	20	18	30	10	4.2			
KH-2502-ZN04-M12	2	▲	25	23	30	12	4.2			
KH-2503-ZN04-M12	3	▲	25	23	30	12	4.2			
KH-2504-ZN04-M12	4	△	25	23	30	12	4.2			
KH-2505-ZN04-M12	5	△	25	23	30	12	4.2			
KH-3202-ZN04-M16	2	▲	32	30	40	16	4.2			
KH-3203-ZN04-M16	3	▲	32	30	40	16	4.2			
KH-3204-ZN04-M16	4	△	32	30	40	16	4.2			
KH-3205-ZN04-M16	5	△	32	30	40	16	4.2			
KH-3206-ZN04-M16	6	△	32	30	40	16	4.2			

▲Running stock △Make-to-order

Applicable inserts

ZU



Working condition: ● Stable ◕ Average ⌗ Tough

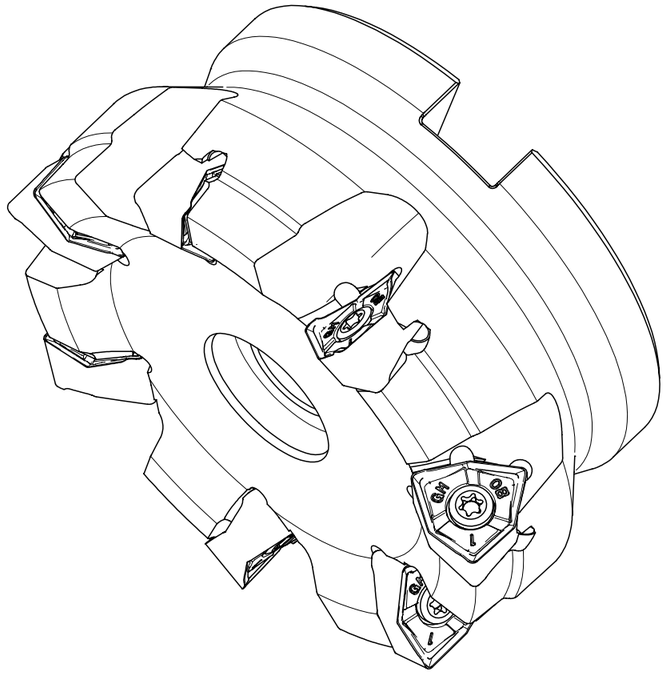
Applicable inserts	Workpiece material								
	P	Steel	⌗	●	◕	⌗	⌗	⌗		●
	M	Stainless steel		●	◕	⌗		⌗		
	K	Cast iron	⌗	●	◕	⌗				
	N	Non-ferrous metal							◕	
	S	Heat-resistant alloy，titanium alloy								

Type	Basic dimension (mm)				APMX (mm)	CVD	PVD					Cemented carbide	Cermet
	IC	S	D1	RE		Z8140	Z5110	Z5120	Z5130	Z7130	Z7140	Z10	Z20
ZNMU040308PNR-GM	7.00	3.65	2.80	0.80	4.2		☆	★	★				
ZNMU080608PNR-GM	12.00	6.35	4.60	0.80	7.3		☆	★	★				
ZNMU040308PNR-GL	7.00	3.65	2.80	0.80	4.2		☆	★	★				
ZNMU080608PNR-GL	12.00	6.35	4.60	0.80	7.3		☆	★	★				

★ Recommended grade ☆ Available grade

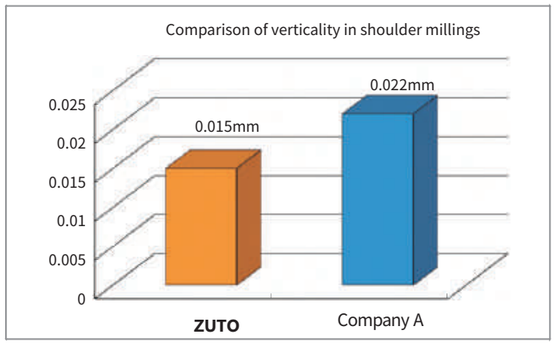
Recommended cutting parameters

Workpiece material		Hardness (HB)	Insert grade	Cutting data	
				Cutting speed v_c (m/min)	Feed rate f_z(mm/z)
P	Low-carbon steel, mild steel	≤180	Z5110	310(240-400)	0.2(0.1-0.3)
			Z5120	300(200-400)	
			Z5130	300(220-350)	
	High-carbon steel, alloy steel	180-280	Z5110	270(210-380)	0.2(0.1-0.3)
			Z5120	270(180-350)	
			Z5130	250(150-380)	
	Alloy tool steel	280-350	Z5110	250(180-350)	0.2(0.1-0.3)
			Z5120	250(160-330)	
			Z5130	210(150-280)	
M	Stainless steel	≤270	Z5110	200(110-300)	0.2(0.1-0.3)
			Z5120	180(150-300)	
			Z5130	180(150-300)	
K	Cast iron	180-250	Z5110	180(150-250)	0.2(0.1-0.3)
			Z5120	200(150-250)	
			Z5130	200(150-250)	



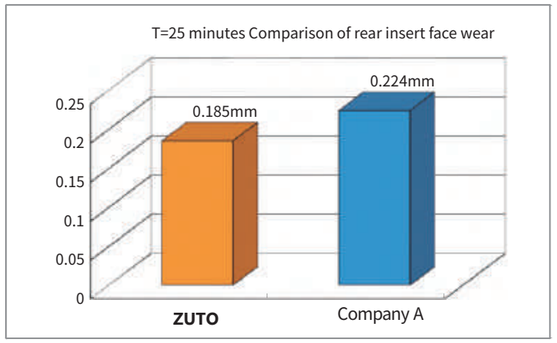
Machining cases

- **Machining method** Square shoulder milling NAK80（28-32WC）
- **Workpiece material** ZNMU040308PNR-GM
- **Insert** SSM390-025G2502L-ZN04
- **Cutting tools** vc=220m/min，fz=0.2mm/z，ap=4mm，ae=0.5mm
- **Cutting parameter** Air cooling
- **Cooling method**



Machining cases

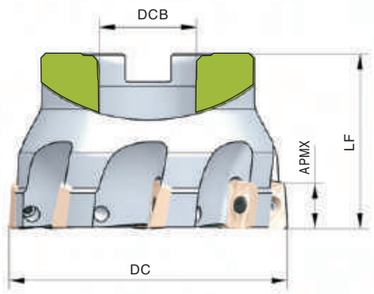
- **Machining method** Face milling
- **Workpiece material** 45# steel (200-220HB)
- **Insert** ZNMU080608PNR-GM
- **Cutting tools** CSM390-080A2706-ZN08
- **Cutting parameter** v_c=280m/min，f_z=0.2mm/z，ap=1mm，ae=65mm
- **Cooling method** Air cooling



Square shoulder milling

CSM590 series

KAPR=90°



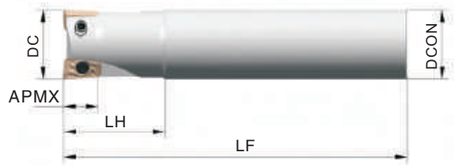
Tool specification	Number of edges	Inventory	Basic dimension (mm)			APMX (mm)	Interface form	Applicable inserts	Screw	Wrench
			DC	DCB	LF					
CSM590-050A2206-AP11	6	△	50	22	40	9.5	A	APMT11□□ APGT11□□	M2.5×6.5	WR08S
CSM590-063A2208-AP11	8	△	63	22	40	9.5				
CSM590-080A2708-AP11	8	▲	80	27	50	9.5				
CSM590-100B3210-AP11	10	△	100	32	50	9.5				
CSM590-050A2205-AP16	5	△	50	22	40	14.5		APMT16□□ APGT16□□	M4×10	WR15S
CSM590-063A2206-AP16	6	▲	63	22	40	14.5				
CSM590-080A2707-AP16	7	△	80	27	50	14.5				
CSM590-100B3208-AP16	8	△	100	32	50	14.5	B			
CSM590-125B4010-AP16	10	△	125	40	63	14.5				

▲Running stock △Make-to-order

Square shoulder milling

SSM590 series

KAPR=90°

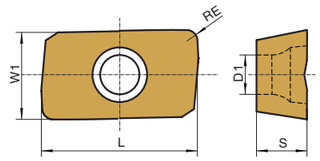


Tool specification	Number of edges	Inventory	Basic dimension (mm)				APMX (mm)	Applicable inserts	Screw	Wrench
			DC	DCON	LF	LH				
SSM590-016G1602-AP11	2	△	16	16	130	40	9.5	APMT11□□ APGT11□□	M2.5×6.5	WR08
SSM590-016G1602L-AP11	2	△	16	16	160	50	9.5			
SSM590-020G2002-AP11	2	△	20	20	130	40	9.5			
SSM590-020G2002L-AP11	2	△	20	20	160	50	9.5			
SSM590-025G2503-AP11	3	▲	25	25	130	40	9.5			
SSM590-025G2503L-AP11	3	△	25	25	160	50	9.5			
SSM590-032G3204-AP11	4	▲	32	32	130	40	9.5			
SSM590-032G3204L-AP11	4	△	32	32	160	50	9.5			
SSM590-025G2502-AP16	2	▲	25	25	160	50	15	APMT16□□ APGT16□□	M4×10	WR15
SSM590-025G2502L-AP16	2	△	25	25	200	75	15			
SSM590-032G3202-AP16	2	▲	32	32	160	50	15			
SSM590-032G3202L-AP16	2	△	32	32	200	80	15			
SSM590-040G3204-AP16	4	△	40	32	160	50	15			
SSM590-040G3204L-AP16	4	△	40	32	200	80	15			

▲Running stock △Make-to-order

Applicable inserts

AP□□



Working condition: ● Stable ◕ Average ⌗ Tough

Applicable inserts	Workpiece material								
	P Steel	⌗	●	◕	⌗	⌗	⌗		●
	M Stainless steel		●	◕	⌗		⌗		
	K Cast iron	⌗	●	◕	⌗				
	N Non-ferrous metal							◕	
	S Heat-resistant alloy，titanium alloy								

Type	Basic dimension (mm)					APMX (mm)	CVD	PVD					Cemented carbide	Cermet
	L	W1	S	D1	RE		Z8140	Z5110	Z5120	Z5130	Z7130	Z7140	Z10	Z20
APMT1135PDER-HM	11.30	6.25	3.50	2.80	0.80	9.5			★	★				
APMT1605PDER-HM	17.25	9.25	5.22	4.40	0.80	14.5			★	★				
APGT1135PDFR-AK	11.30	6.25	3.50	2.80	0.80	9.5							★	
APGT1604PDFR-AK	17.25	9.25	4.76	4.40	0.80	14.5							★	

★ Recommended grade ☆ Available grade

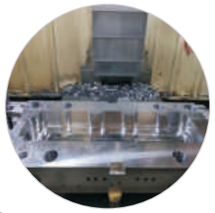
Recommended cutting parameters

Workpiece material		Hardness (HB)	Insert grade	Cutting data	
				Cutting speed v_c (m/min)	Feed rate f_z(mm/z)
P	Low-carbon steel, mild steel	≤180	Z5110	190(140-250)	0.2(0.04-0.15)
			Z5120	190(140-250)	
			Z5130	190(140-250)	
	High-carbon steel, alloy steel	180-280	Z5110	170(130-250)	0.2(0.04-0.15)
			Z5120	170(130-250)	
			Z5130	170(130-250)	
	Alloy tool steel	280-350	Z5110	150(110-240)	0.2(0.04-0.15)
			Z5120	150(110-240)	
			Z5130	150(110-240)	
M	Stainless steel	≤270	Z5110	120(80-190)	0.2(0.04-0.15)
			Z5120	120(80-190)	
			Z5130	120(80-190)	
K	Cast iron	180-250	Z5110	120(80-210)	0.2(0.04-0.15)
			Z5120	120(80-210)	
			Z5130	120(80-210)	

Machining cases

Mold sidewall finish milling

- **Workpiece material** 45# steel
- **Machining method** Sidewall finish milling
- **Insert** AOKT113508PEER-VM **Z5130**
- **Cutting tools** SSM190-025G2503L-AO11
- **Machining parameters** Vc=220m/min，ap=1.5mm，ae=0.25mm，fz=0.36mm/z
- **Machining quality** Verticality of the workpiece <0.012mm, which meets the needs of customers and is a good replacement of imported products.

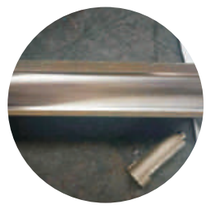


Cylinder side milling

- **Workpiece material** HT250
- **Machining method** Side milling machiningAOKT113508PEER-VM **Z5130** KH-2603-
- **Insert** AOKT11-M12
- **Cutting tools** Vc=285m/min, ap=0.8mm, ae=0.15mm, fz=0.1mm/z
- **Machining parameters** Verticality of workpiece <0.008mm, a good replacement of
- **Machining quality** high quality products of other brands .

Groove milling

- **Workpiece material** Cr15
- **Machining method** Groove milling
- **Insert** AOKT113508PEER-VM **Z5120**
- **Cutting tools** SSM190-020G2002-AO11
- **Machining parameters** Vc=138m/min，ap=0.12mm，ae=5mm，fz=0.25mm/z
- **Machining quality** Compared with a competitor , parts machined products have better surface quality (no burrs on the sidewall).



Machining cases

Rough milling of bogies

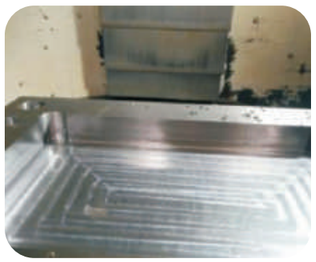
- **Workpiece material** Cast steel
- **Insert** ZNMU080608PNR-GM **Z5120**
- **Cutting tools** CSM390-200C6012-ZN08
- **Machining parameters** N=300 rev/min，F=700 mm/min，ap=2~5 mm
- **Cooling method** No cooling
- **Service life** **ZUTO** : 3 hours; A competitor: 2.5 hoursThe
- **Machining quality** workpiece processed by **ZUTO** products hasbetter surface quality and longer cutting life.

Face milling with leaf spring mounting

- **Workpiece material** 40CrMo（HB285-333）
- **Insert** ZNMU080608PNR-GM **Z5120**
- **Cutting tools** CSM390-063A2205-ZN08
- **Machining parameters** N=720 rev/min ，F=540mm/min，ap=1.5-3mm
- **Cooling method** No cooling
- **Service life** **ZUTO** : 27 pieces; A competitor: 12 piecesThe
- **Machining quality** workpiece processed by **ZUTO** products has bettersurface quality and longer cutting life. Thus, **ZUTO** products are more cost-effective.

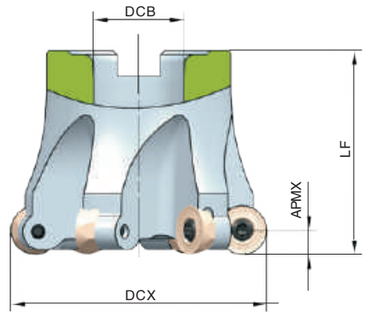
Clean-up machining of mold frame

- **Workpiece material** 45# steel
- **Insert** ZNMU040308PNR-GM **Z5130**
- **Cutting tools** SSM390-021G2002L-ZN04
- **Machining parameters** N=2750 rev/min，F=2500mm/min，ap=0.5mm ，ae=0.5~21mm
- **Previous insert** APMT1135
- **Previous machining parameters** N=2750rev/min，F=2500mm/min，ap=0.3mm，ae=0.5~21mm
- **Service life** **ZUTO**: 3 hours; A competitor: 2 hours
- **Machining quality** **ZUTO** products are light and fast-cutting, with higher machiningefficiency, good surface quality and high cost-effectiveness.



Profile milling

CPM100 series

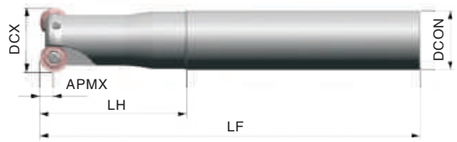


Tool specification	Number of edges	Inventory	Basic dimension (mm)			APMX (mm)	Interface form	Applicable inserts	Screw	Wrench
			DCX	DCB	LF					
CPM100-063A2204-RC12	4	▲	63	22	50	6	A	RC12	M4×8.4	WR15S
CPM100-080B2705-RC16	5	▲	80	27	50	8	B	RC16	M5×13	WR20S
CPM100-100B3206-RC16	6	△	100	32	50	8				
CPM100-125B4007-RC20	7	△	125	40	63	10		RC20	M6×16	WR20S
CPM100-160B4008-RC20	8	△	160	40	63	10				

▲Running stock △Make-to-order

Profile milling

SPM100 series

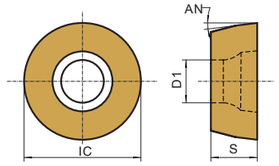


Tool specification	Number of edges	Inventory	Basic dimension (mm)				APMX (mm)	Applicable inserts	Screw	Wrench
			DCX	DCON	LF	LH				
SPM100-025G2502-RC10	2	▲	25	25	100	30	5	RC10	M4×8.4	WR15
SPM100-032G3202-RC10	2	▲	32	32	120	35	5			
SPM100-040G4003-RC12	3	△	40	40	120	40	6	RC12	M4×8.4	WR15

▲Running stock △Make-to-order

Applicable inserts

RC□□



Working condition: ● Stable ◕ Average ⌗ Tough

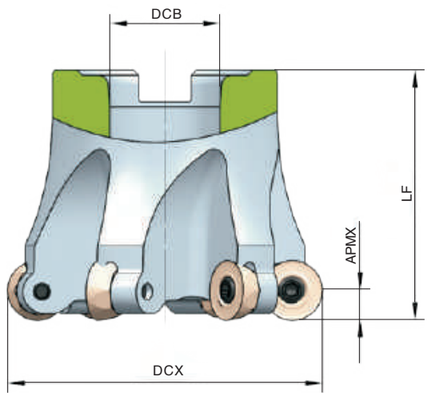
Applicable inserts	Workpiece material								
	P Steel	⌗	●	◕	⌗	⌗	⌗		●
	M Stainless steel		●	◕	⌗		⌗		
	K Cast iron	⌗	●	◕	⌗				
	N Non-ferrous metal							◕	
	S Heat-resistant alloy，titanium alloy								

Type	Basic dimension (mm)				APMX (mm)	CVD	PVD					Cemented carbide	Cermet
	IC	S	D1	AN		Z8140	Z5110	Z5120	Z5130	Z7130	Z7140	Z10	Z20
RCKT10T3MO-FM	10.00	3.97	4.40	7°	5		☆	★	★				
RCKT1204MO-FM	12.00	4.76	4.40	7°	6		☆	★	★				
RCKT1606MO-FM	16.00	6.35	5.50	7°	8		☆	★	★				
RCKT2006MO-FM	20.00	6.35	6.55	7°	10		☆	★	★				

★ Recommended grade ☆ Available grade

Profile milling

CPM200 series

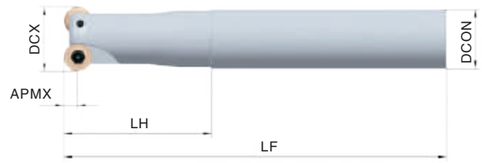


Tool specification	Number of edges	Inventory	Basic dimension (mm)			APMX (mm)	Interface form	Applicable inserts	Screw	Wrench
			DCX	DCB	LF					
CPM200-050A2203-RP12	3	△	50	22	40	6	A	RP12	M4×8.4	WR15S
CPM200-063A2204-RP12	4	▲	63	22	50	6				
CPM200-080B2706-RP12	6	▲	80	27	50	6	B			
CPM200-063A2205-RP16	5	▲	63	22	40	8	A	RP16	M5×13	WR20S
CPM200-080B2707-RP16	7	▲	80	27	50	8	B			
CPM200-100B3208-RP16	8	△	100	32	50	8				
CPM200-125B4010-RP16	10	△	125	40	63	8				

▲Running stock △Make-to-order

Profile milling

SPM200 series

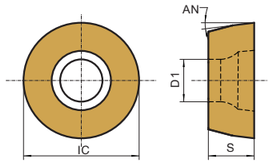


Tool specification	Number of edges	Inventory	Basic dimension (mm)				APMX (mm)	Applicable inserts	Screw	Wrench
			DCX	DCON	LF	L H				
SPM200-025G2502-RP08	2	▲	25	25	100	30	4	RP08	M3×7	WR09
SPM200-032G3202-RP08	2	▲	32	32	120	35	4			
SPM200-025G2502-RP10	2	▲	25	25	100	30	5	RP10	M4×8.4	WR15
SPM200-032G3202-RP10	2	▲	32	32	120	35	5			
SPM200-040G3203-RP12	3	△	40	32	120	40	6	RP12	M5×13	WR20

▲Running stock △Make-to-order

Applicable inserts

RP□□



Working condition: ● Stable ◕ Average ⌗ Tough

Applicable inserts	Workpiece material								
	P	Steel	⌗	●	◕	⌗	⌗	⌗		●
	M	Stainless steel		●	◕	⌗		⌗		
	K	Cast iron	⌗	●	◕	⌗				
	N	Non-ferrous metal							◕	
	S	Heat-resistant alloy，titanium alloy								

Type	Basic dimension (mm)				APMX (mm)	CVD	PVD					Cemented carbide	Cermet
	IC	S	D1	AN		Z8140	Z5110	Z5120	Z5130	Z7130	Z7140	Z10	Z20
RPMT08T2MO-HM	8.00	2.78	3.40	11°	4			★	★				
RPMT1003MO	10.00	3.18	4.50	11°	5			★	★				
RPMT1204MO-HM	12.00	4.76	4.40	11°	6			★	★				

★ Recommended grade ☆ Available grade

Turbine blade milling

Working condition: ● Stable ◕ Average ⌗ Tough

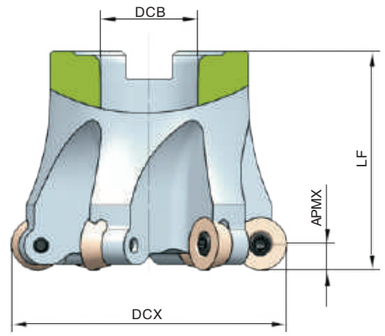
Applicable inserts	Workpiece material									
	P	Steel	⌗	●	◕	⌗	⌗	⌗	⌗		●
	M	Stainless steel		●	◕	⌗		⌗	⌗		
	K	Cast iron	⌗	●	◕	⌗					
	N	Non-ferrous metal								◕	
	S	Heat-resistant alloy，titanium alloy									

Type	Basic dimension (mm)				APMX (mm)	CVD	PVD						Cemented carbide	Cermet
	IC	S	D1	AN		Z8140	Z5110	Z5120	Z5130	Z7130	Z7140	Z9140	Z10	Z20
RPKT10T3MO-MS	10.00	3.97	3.40	11°	5						★	★		
RPKT1204MO-MS	12.00	4.76	4.40	11°	6						★	★		
RPKT1606MO-MS	16.00	6.35	5.50	11°	8	★					★	★		
RPMT10T3MO-SM	10.00	3.97	4.40	11°	5						★	★		
RPMT1204MO-SM	12.00	4.76	4.40	11°	6						★	★		
RPMT1606MO-SM	16.00	6.35	5.50	11°	8	★					★	★		

★ Recommended grade ☆ Available grade

Profile milling

CPM300 series



Tool specification	Number of edges	Inventory	Basic dimension (mm)			APMX (mm)	Interface form	Applicable inserts	Screw	Wrench
			DCX	DCB	LF					
CPM300-050A2203-RD12	3	△	50	22	40	6	A	RD12	M4×8.4	WR15S
CPM300-063A2204-RD12	4	▲	63	22	50	6				
CPM300-080B2705-RD16	5	▲	80	27	50	8	B	RD16	M5×13	WR20S
CPM300-100B3206-RD16	6	△	100	32	50	8				
CPM300-125B4008-RD16	8	△	125	40	63	8				
CPM300-160B4010-RD16	10	△	160	40	63	8				

▲Running stock △Make-to-order

Profile milling

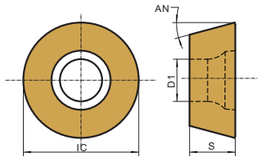
SPM300 series

Tool specification	Number of edges	Inventory	Basic dimension (mm)				APMX (mm)	Applicable inserts	Screw	Wrench
			DCX	DCON	LF	LH				
SPM300-020G2002-RD06	2	△	20	20	100	30	3	RD06	M2.2×6.5	WR07
SPM300-020G2002-RD08	2	△	20	20	100	30	4	RD08	M3×7	WR09
SPM300-025G2502-RD10	2	▲	25	25	100	30	5	RD10	M4×8.4	WR15
SPM300-032G3202-RD10	2	▲	32	32	120	35	5			
SPM300-040G3203-RD12	3	△	40	32	120	40	6	RD12	M4×8.4	WR15

▲Running stock △Make-to-order

Applicable inserts

RD□□



Working condition: ● Stable ◕ Average ⌗ Tough

Applicable inserts	Workpiece material								
	P	Steel	⌗	●	◕	⌗	⌗	⌗		●
	M	Stainless steel		●	◕	⌗		⌗		
	K	Cast iron	⌗	●	◕	⌗				
	N	Non-ferrous metal							◕	
	S	Heat-resistant alloy，titanium alloy								

Type	Basic dimension (mm)				APMX (mm)	CVD	PVD					Cemented carbide	Cermet
	IC	S	D1	AN		Z8140	Z5110	Z5120	Z5130	Z7130	Z7140	Z10	Z20
RDMW0602MO	6.00	2.38	2.50	15°	3		☆	★	★				
RDMW0802MO	8.00	2.38	3.40	15°	4		☆	★	★				
RDMW10T3MO	10.00	3.97	4.50	15°	5		☆	★	★				
RDMW1204MO	12.00	4.76	5.50	15°	6		☆	★	★				
RDMW1605MO	16.00	5.56	5.50	15°	8		☆	★	★				
RDKW10T3MO	10.00	3.97	4.50	15°	5		☆	★	★				
RDKW1204MO	12.00	4.76	4.40	15°	6		☆	★	★				
RDKW1604MO	16.00	4.76	5.50	15°	8		☆	★	★				

★ Recommended grade ☆ Available grade

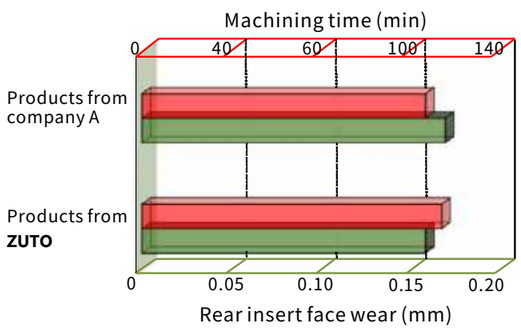
Recommended cutting parameters

Workpiece material		Hardness (HB)	Insert grade	Cutting data	Tool specification		
					Ø20	Ø25	Ø32
P	Low-carbon steel, mild steel	≤180	Z5110	vc(m/min)	100-200	100-200	100-200
				fz(mm/z)	0.2-0.3	0.25-0.35	0.25-0.35
			Z5120	ap(mm)	1.25	1.5	2
				ae(mm)	1.25	1.5	2
	High-carbon steel, alloy steel	180-280	Z5110	vc(m/min)	80-180	80-180	80-180
				fz(mm/z)	0.2-0.3	0.25-0.35	0.25-0.35
			Z5130	ap(mm)	1.25	1.5	2
			Z5120	ae(mm)	1.25	1.5	2
	Alloy tool steel	280-350	Z5110	vc(m/min)	60-150	60-150	60-150
				fz(mm/z)	0.2-0.3	0.25-0.35	0.25-0.35
			Z5130	ap(mm)	1.25	1.5	2
			Z5120	ae(mm)	1.25	1.5	2
M	Stainless steel	≤180	Z5110	vc(m/min)	70-150	70-150	70-150
				fz(mm/z)	0.1-0.25	0.2-0.3	0.2-0.3
			Z5130	ap(mm)	1	1.25	1.5
			Z5120	ae(mm)	1	1.25	1.5
K	Cast iron	180-250	Z5110	vc(m/min)	160-300	160-300	160-300
				fz(mm/z)	0.25-0.35	0.3-0.4	0.3-0.4
			Z5130	ap(mm)	1.8	2	2.5
			Z5120	ae(mm)	1.8	2	2.5

Machining cases

Z513

Workpiece material	NAK80(28-32)
Machining method	Face milling without coolant
Insert	RCKT10T3M0-FM，Z5130
Cutting tools	SPM100-025G2502-RC10vc=150m/min,
Machining parameters	fz=0.35mm/z, ap=0.5mm



Technical data of application of profile milling tools

◆ Conversion factor for feed rate (based on the benchmark of cutting depth)

Model	Maximum cutting depth ap	Conversion factor for feed rate							
		ap/(mm)							
		0.5mm	1mm	1.5mm	2mm	2.5mm	3mm	4mm	5mm
R□□08□□	4	1.7	1.3	1.1	1(Benchmark)	0.9	0.8	0.7	0.7
R□□10□□	5	1.9	1.4	1.2	1	1(Benchmark)	0.9	0.8	0.7
R□□12□□	6	2.1	1.5	1.3	1.1	1	1(Benchmark)	0.9	0.8
R□□16□□	8	2.4	1.7	1.4	1.3	1.1	1.1	1(Benchmark)	0.9
R□□20□□	10	2.5	1.8	1.5	1.4	1.2	1.1	1	1(Benchmark)

Calculation example:

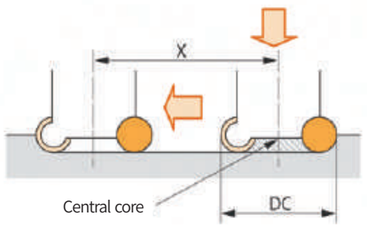
The recommended feed rate for RCKT10T3MO-FM to process 45# steel is 0.2mm/r. When ap=1mm, the corresponding recommendation for feed rate is:

f=1.4*0.2mm/r=0.28mm/r

◆ Recommended machining parameters for ramp milling, helical milling, drill-milling, etc.

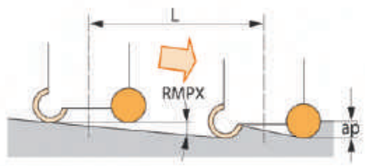
Tool specification			Ramp milling		Helical milling		Drill-milling	
Insert	Tool diameter (mm)	Cutting depth maximum (mm)	Ramping angle maximum	Cutting length (mm)	Machined hole diameter minimum (mm)	Machined hole diameter maximum (mm)	Machining depth maximum (mm)	Machining diameter minimum (mm)
R08	16	4	8°	28	20	30	0.7	9
	20		9°	25	26	38	1.4	13
	25		5°	45	36	48	1.4	18
R10	25	5	5°	28	33	48	0.6	16
	32		6°	47	47	62	1.9	23
	40		4°	71	63	78	1.9	31
	63		3°	95	109	124	1.9	54
R12	40	6	5°	68	59	78	2.4	29
	63		2°	171	105	124	2.4	52
	80		2°	171	139	158	2.4	69
	100		1°	171	179	198	2.4	89
R16	63	8	4°	114	97	124	3.4	48
	80		3°	152	131	158	3.4	65
	100		2°	229	171	198	3.4	85
	125		1°	458	221	248	3.4	110

◆ Precautions for drill-milling



When transverse feed machining after drill-milling:
① The feed rate of the table should be reduced to that of half of the general horizontal machining until the central section is completely removed.
② The cutting length minimum X for flattening the bottom is shown in the table above.

◆ Precautions for ramp milling



Please set the angle of machining below RMPX.

Set the feed rate below 70% of the standard.

◆ Precautions for helical machining

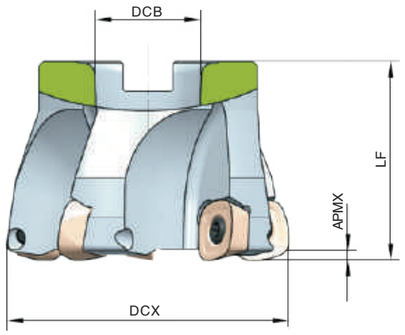
① Please set the feed rate per revolution of the helical machining below the cutting depth ap maximum.
② The axial angle created by the trajectory of the tool center should not exceed the inclination angle RMPX maximum for machining.
③ Set the feed rate below 70% of the standard.

◆ Recommended maximum cutting depth (ap) and applicable teeth number

Teeth number of cutterhead	R08	R10	R12	R16	R20
≤3	ap=2.0-4.0mm	ap=2.5-5.0 mm	ap=3.0-6.0 mm	ap=4.0-8.0 mm	ap=5.0-10.0 mm
>3	ap<2.0 mm	ap<2.5 mm	ap<6.0 mm	ap<4.0 mm	ap<5.0 mm

Millings with high feed

CEM100 series

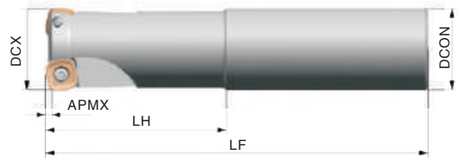


Tool specification	Number of edges	Inventory	Basic dimension (mm)			APMX (mm)	Interface form	Applicable inserts	Screw	Wrench
			DCX	DCB	LF					
CEM100-050A2204-SD12	4	△	50	22	40	2.3	A	SD12	M5×13	WR20S
CEM100-063A2705-SD12	5	▲	63	27	50	2.3				
CEM100-080A2706-SD12	6	▲	80	27	50	2.3				
CEM100-063A2704-SD15	4	▲	63	27	50	2.9		SD15	M5×13	WR20S
CEM100-080A3205-SD15	5	▲	80	32	50	2.9				
CEM100-100B3206-SD15	6	△	100	32	50	2.9	B			

▲Running stock △Make-to-order

Millings with high feed

SEM100 series

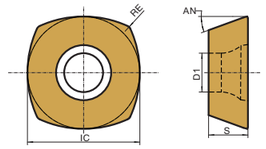


Tool specification	Number of edges	Inventory	Basic dimension (mm)				APMX (mm)	Applicable inserts	Screw	Wrench
			DCX	DCB	LF	LH				
SEM100-032G3202-SD12	2	▲	32	32	150	70	2.3	SD12	M4×13	WR20
SEM100-040G4003-SD12	3	△	40	40	150	70	2.3			
SEM100-040G4002-SD15	2	▲	40	40	200	70	2.9	SD15	M5×13	WR20

▲Running stock △Make-to-order

Applicable inserts

SD □□



Working condition: ● Stable ◕ Average ⌗ Tough

Applicable inserts	Workpiece material									
	P	Steel	⌗	●	◕	⌗	⌗	⌗		●
	M	Stainless steel		●	◕	⌗		⌗		
	K	Cast iron	⌗	●	◕	⌗				
	N	Non-ferrous metal							◕	
	S	Heat-resistant alloy，titanium alloy								

Type	Basic dimension (mm)					APMX (mm)	CVD	PVD					Cemented carbide	Cermet
	IC	S	D1	AN	RE		Z8140	Z5110	Z5120	Z5130	Z7130	Z7140	Z10	Z20
SDMT1205ZTN-FM	12.700	5.56	4.6	15°	3.00	2.3		☆	★	★				
SDMT1505ZTN-FM	15.875	5.56	5.5	15°	0.80	2.9		☆	★	★				
SDMW1205ZTN	12.700	5.56	4.6	15°	3.00	2.3		☆	★	★				
SDMW1505ZTN	15.875	5.56	5.5	15°	0.80	2.9		☆	★	★				

★ Recommended grade ☆ Available grade

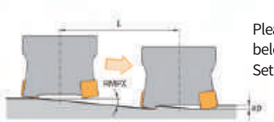
Recommended cutting parameters

Workpiece material		Hardness (HB)	Insert grade	Cutting speed vc (m/min)	Ø20 / Ø25		Ø30 / Ø35		Ø40	
					Axial cutting depth (mm)	Feed rate per tooth (mm)	Axial cutting depth (mm)	Feed rate per tooth (mm)	Axial cutting depth (mm)	Feed rate per tooth (mm)
P	Low-carbon steel, mild steel	≤180	Z5110	200(120-220)	0.3-1.5	0.6-1.2	0.3-1.2	0.5-1.4	0.3-1.5	0.8-1.5
			Z5120	200(120-220)	0.3-1.5	0.6-1.2	0.3-1.2	0.5-1.4	0.3-1.5	0.8-1.5
			Z5130	200(120-220)	0.3-1.5	0.6-1.2	0.3-1.2	0.5-1.4	0.3-1.5	0.8-1.5
	High-carbon steel, alloy steel	180–280	Z5110	160(80-180)	0.2-1.2	0.6-1.2	0.2-1.0	0.5-1.4	0.2-1.2	0.6-1.5
			Z5120	160(80-180)	0.2-1.2	0.6-1.2	0.2-1.0	0.5-1.4	0.2-1.2	0.6-1.5
			Z5130	160(80-180)	0.2-1.2	0.6-1.2	0.2-1.0	0.5-1.4	0.2-1.2	0.6-1.5
	Alloy tool steel	280–350	Z5110	150(80-160)	0.2-1.0	0.5-1.0	0.2-1.0	0.5-1.0	0.2-1.0	0.5-1.0
			Z5120	150(80-160)	0.2-1.0	0.5-1.0	0.2-1.0	0.5-1.0	0.2-1.0	0.5-1.0
			Z5130	150(80-160)	0.2-1.0	0.5-1.0	0.2-1.0	0.5-1.0	0.2-1.0	0.5-1.0
M	Stainless steel	≤180	Z5110	150(80-190)	0.3-1.0	0.6-1.0	0.3-1.2	0.6-1.2	0.3-1.2	0.5-1.6
			Z5120	150(80-190)	0.3-1.0	0.6-1.0	0.3-1.2	0.6-1.2	0.3-1.2	0.5-1.6
			Z5130	150(80-190)	0.3-1.0	0.6-1.0	0.3-1.2	0.6-1.2	0.3-1.2	0.5-1.6
K	Cast iron	180–250	Z5110	180(80-190)	0.3-1.0	0.5-1.2	0.2-1.0	0.5-1.4	0.2-1.2	0.8-1.6
			Z5120	180(80-190)	0.3-1.0	0.5-1.2	0.2-1.0	0.5-1.4	0.2-1.2	0.8-1.6
			Z5130	180(80-190)	0.3-1.0	0.5-1.2	0.2-1.0	0.5-1.4	0.2-1.2	0.8-1.6

Technical information of application of high feed milling tools

◆ Ramp milling angle and cutting length

Type	Tool diameter mm	32	40	50	63	80	100
SD□□12□□	Maximum ramping angle (RMPX)	3.5°	2.8°	2.5°	1.7°	1°	
SD□□15□□	Maximum ramping angle (RMPX)		2.5°	2.2°	1.5°	0.8°	0.5°
	Cutting length (L)	ap/ tanRMPX					

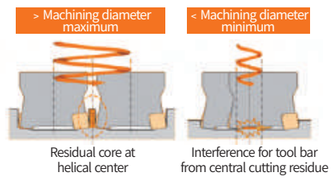


Please set the angle of ramping machining below RMPX.
Set the feed rate below 70% of the standard.

Figure Illustration of ramp milling

◆ Precautions for helical machining

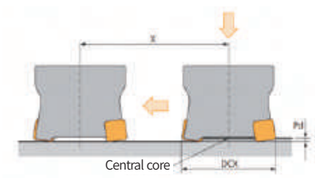
Please conduct helical machining within the range of maximum and minimum machining diameters.



Tool model	Machining diameter minimum	Machining diameter maximum
C/SEM100**12	2*DC-16	2*DC-2
C/SEM100**15	2*DC-26	2*DC-2

Notes: ① The sinking depth (h) per circle is lower than the longitudinal cutting depth maximum (APMX);
② Set the table feed below 50% of the recommended value.

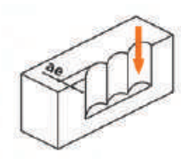
◆ Precautions for drill-milling



Tool model	Drilling depth maximum	Cutting length minimum for bottom flattening
C/SEM100**SD12	1.5mm	Tool diameterDc-16
C/SEM100**SD15	2mm	Tool diameterDc-25

Notes: When transverse feed machining after drilling:
① The feed rate should be reduced to that of half of the general horizontal machining until the core is completely removed.
② When drilling holes, set the axial feed rate per revolution below f=0.2 (mm/rev).

◆ Sidewall drill-milling



Notes: The recommended feed of sidewall milling is below 0.2 mm/z.

Insert model	Crosscutting depth maximum (ae)
SD**12	10mm
SD**15	12mm

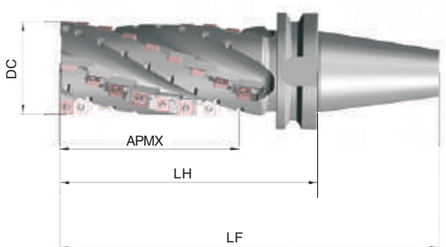
Setting approximate R angle--in writing program

Model	Cutting edge angle	Approximate R angle	Cutting residual amount (K/mm)	Inclination angle maximum during contour machining
C/SEM100**SD12	10°	3.0	0.85	90°
C/SEM100**SD15	10°	3.5	1.37	90°

Helical end milling

CHM190 series

KAPR=90°

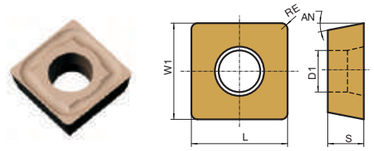


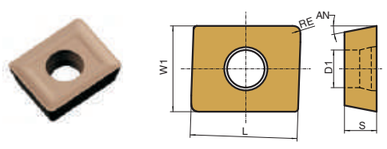
Tool specification	Number of slots	Inventory	Basic dimension (mm)			APMX (mm)	Applicable inserts	Screw	Wrench
			DC	LH	LF				
CHM190-063JT5004-SP12	4	▲	63	165	266.75	104	SP□□12 AP□□15	M5×13	WR20S
CHM190-063JT50L04-SP12	4	△	63	195	296.75	134			
CHM190-080JT5004-SP12	4	▲	80	165	266.75	104			
CHM190-080JT50L04-SP12	4	△	80	205	306.75	144			
CHM190-063BT5004-SP12	4	▲	63	165	266.75	104			
CHM190-063BT50L04-SP12	4	△	63	195	296.75	134			
CHM190-080BT5004-SP12	4	▲	80	165	266.75	104			
CHM190-080BT50L04-SP12	4	△	80	205	306.75	144			

▲Running stock △Make-to-order

Applicable inserts

SP□□
AP□□





Working condition: ● Stable ◕ Average ⌗ Tough

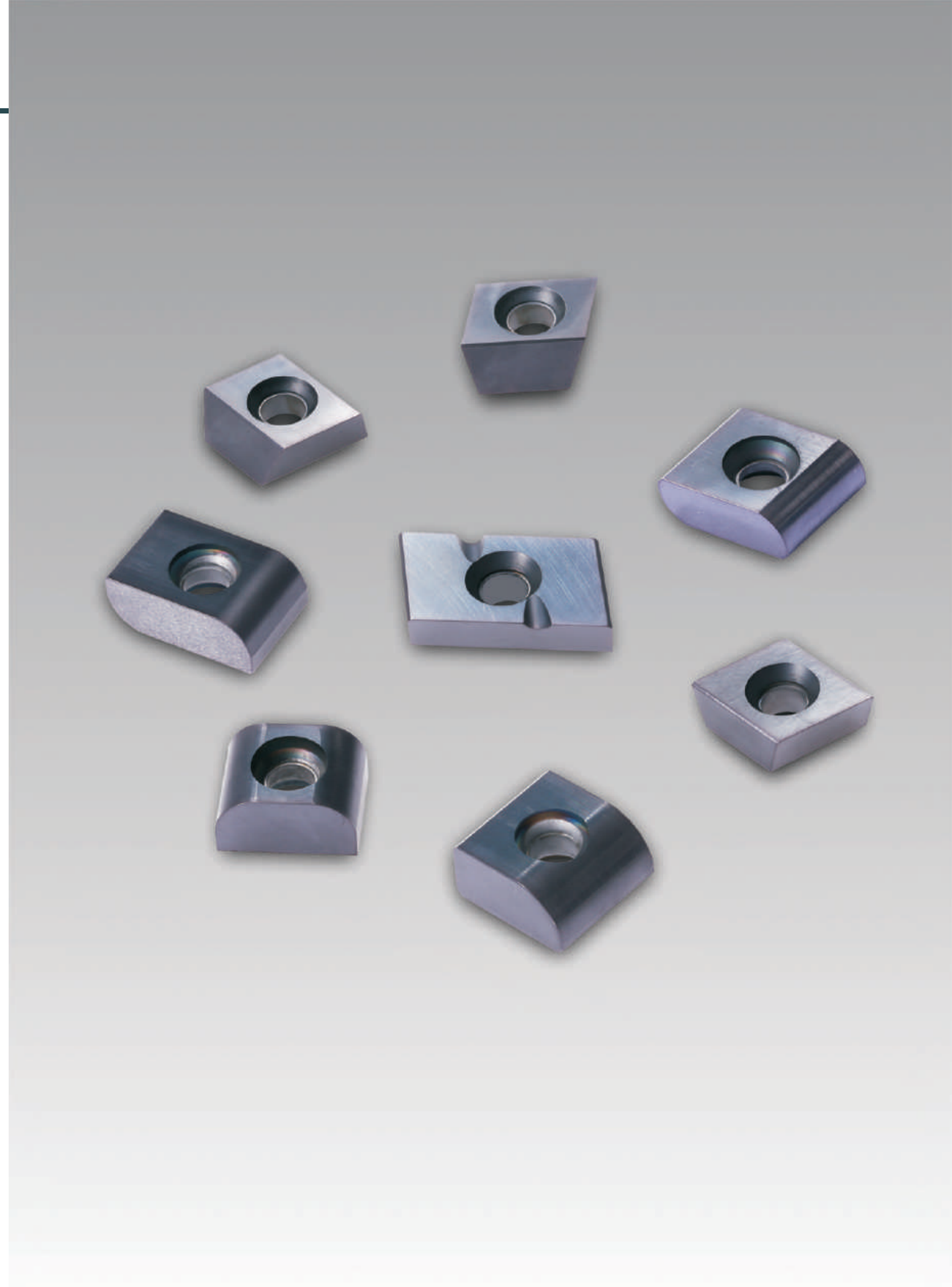
Applicable inserts	Workpiece material												
	P	Steel	⌗	●	◕	⌗	⌗	⌗		●
	M	Stainless steel		●	◕	⌗		⌗		
	K	Cast iron	⌗	●	◕	⌗				
	N	Non-ferrous metal							◕	
	S	Heat-resistant alloy，titanium alloy								

Type	Basic dimension (mm)					AN	CVD	PVD					Cemented carbide	Cermet
	L	W1	S	D1	RE		Z8140	Z5110	Z5120	Z5130	Z7130	Z7140	Z10	Z20
SPMT120408-MM	12.700	12.70	4.76	5.50	0.80	11°			★	★				
APMT150412-MM	15.865	12.69	4.76	5.56	1.20	11°			★	★				
SPHX120408T21	12.700	12.70	4.76	5.50	0.80	11°			★	★				
APHX1504	15.875	12.70	4.76	5.70	0.40	11°			★	★				

★ Recommended grade ☆ Available grade

Recommended cutting parameters

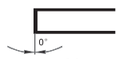
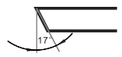
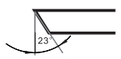
Workpiece material		Hardness (HB)	Insert grade	Cutting data	
				Cutting speed v_c (m/min)	Feed rate f_z(mm/z)
P	Low-carbon steel, mild steel	≤180	Z5110	130(60-150)	0.25(0.1-0.35)
			Z5120	140(70-170)	0.3(0.15-0.4)
			Z5130	140(70-170)	0.3(0.15-0.4)
	High-carbon steel, alloy steel	180-280	Z5110	120(60-150)	0.2(0.1-0.35)
			Z5120	130(60-170)	0.25(0.15-0.35)
			Z5130	140(70-170)	0.25(0.15-0.35)
	Alloy tool steel	280-350	Z5110	100(60-150)	0.15(0.08-0.25)
			Z5120	110(70-170)	0.2(0.1-0.35)
			Z5130	120(70-170)	0.2(0.1-0.35)
M	Stainless steel	≤270	Z5110	140(110-200)	0.2(0.1-0.3)
			Z5120	120(100-200)	0.2(0.1-0.3)
			Z5130	120(100-200)	0.2(0.1-0.3)
K	Cast iron	180-250	Z5110	170(90-200)	0.2(0.1-0.35)
			Z5120	130(90-200)	0.25(0.15-0.35)
			Z5130	130(100-210)	0.25(0.15-0.35)



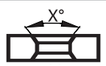
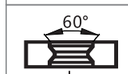
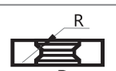
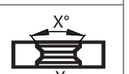
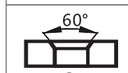
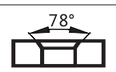
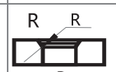
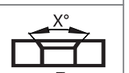
Code key of heavy milling inserts

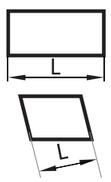
L	N	E	H	15	12	07	-	2R45
①	②	③	④	⑤	⑥	⑦		⑧

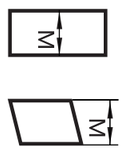
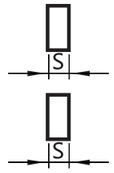
① Insert shape						
C	F	G	L	S	X	Others Z

② Clearance angle major			
 N	 Q	 T	Others O

③ Tolerance class		
C: ± 0.013 ± 0.025	E: ± 0.025	R: Blank

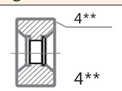
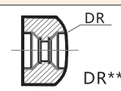
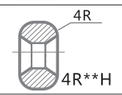
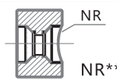
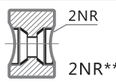
④ Clamping form					
B	D	F	H	 V	Others (Special requirements such as different clamping forms or hole diameter) X
 J	L	N	 R	 Y	
 S	 U	W	 P	 Z	

⑤ Length
 Integer of length

⑥ Width	⑦ Thickness
 Integer of width	 Integer of thickness

Corresponding sizes of the size codes of length, width and thickness												
Code	03	03A	04	05	05A	05B	06	06A	06B	06C	06D	06E
Size	3.80	3.97	4.76	5.00	5.95	5.80	6.35	6.00	6.94	6.84	6.55	6.70
Code	07	07A	07B	07C	07D	07E	07F	07G	08	08A	09	09A
Size	7.94	7.05	7.15	7.24	7.35	7.60	7.50	7.82	8.50	8.00	9.52	
Code	09B	10	11	11A	11B	11C	12	12A	12B	12C	13	13A
Size	9.43	10.00	11.50	11.11	11.90	11.00	12.70	12.00	12.40	12.80	13.50	13.00
Code	13B	13C	14	14A	14B	14C	15	15A	15B	15C	15D	15E
Size	13.85	13.75	14.29	14.20	14.50	14.05	15.87	15.00	15.10	15.28	15.50	15.78
Code	15F	15G	16	16A	16B	16C	17	17A	18	18A	18B	19
Size	15.68	15.40	16.30	16.00	16.50	16.78	17.50	17.00	18.47	18.00	18.35	19.05
Code	20	22	22A	23	25	26	28					
Size	20.00	22.80	20.00	23.99	25.00	26.50	28.57					

Notes: Coding principle: Add zero before Single-digit integer and take the two-digit integer as code; for sizes that differ in decimal bits, letters A, B, C, etc. are added to distinguish them.

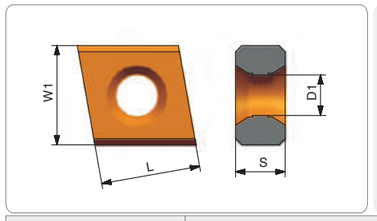
⑧ Eigenvalue or code		
2R**	 4**	 DR**
4R**	 4R**H	 NR**
4A**	4A**M	 2NR**

* "(L)" before the feature codes means that the eigenvalue is on the length side, "(S)" means that the eigenvalue is on the thickness side, and no letter means that the eigenvalue is on the width (W) side.
* "(R)" after the feature code indicates the right knife, "(L)" indicates the left knife, and no letter indicates that there is no distinction between left and right.
* Other feature codes may also be compiled according to other features of products.

Groove code

Heavy milling inserts

Working condition: ● Stable ◕ Average ⌗ Tough



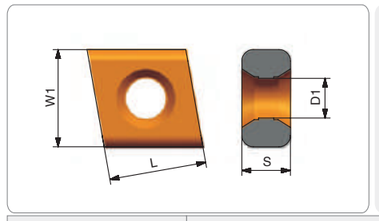
Workpiece material		Z8140	Z5110	Z5120	Z5130	Z7130	Z7140	Z10	Z20
P	Steel	⌗	●	◕	⌗	⌗	⌗		●
M	Stainless steel		●	◕	⌗		⌗		
K	Cast iron	⌗	●	◕	⌗				
N	Non-ferrous metal							◕	
S	Heat-resistant alloy Titanium alloy								

Insert shape	Type	Basic dimension (mm) L	W1	S	D1	CVD Z8140	PVD Z5110	Z5120	Z5130	Z7130	Z7140	Cemented carbide Z10	Cermet Z20
	CNEF121206-405	12.7	12.70	6.35	5.4	☆				★			
	CNEF121206-408	12.7	12.70	6.35	5.4	☆				★			
	CNEL161406-408	16.3	14.29	6.35	5.4	☆				★			

★ Recommended grade ☆ Available grade

Heavy milling inserts

Working condition: ● Stable ◕ Average ⌗ Tough

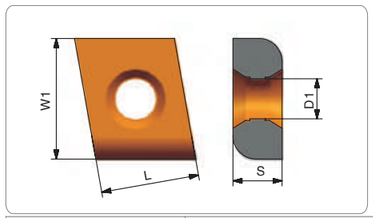


Workpiece material		Z8140	Z5110	Z5120	Z5130	Z7130	Z7140	Z10	Z20
P	Steel	⌗	●	◕	⌗	⌗	⌗		●
M	Stainless steel		●	◕	⌗		⌗		
K	Cast iron	⌗	●	◕	⌗				
N	Non-ferrous metal							◕	
S	Heat-resistant alloy Titanium alloy								

Insert shape	Type	Basic dimension (mm) L	W1	S	D1	CVD Z8140	PVD Z5110	Z5120	Z5130	Z7130	Z7140	Cemented carbide Z10	Cermet Z20
	CNEF161406-4R10	16.3	14.29	6.35	5.4	☆				★			
	CNEF161406-4R15	16.3	14.29	6.35	5.4	☆				★			
	CNEF161406-4R30	16.3	14.29	6.35	5.4	☆				★			

★ Recommended grade ☆ Available grade

Working condition: ● Stable ◕ Average ⌗ Tough

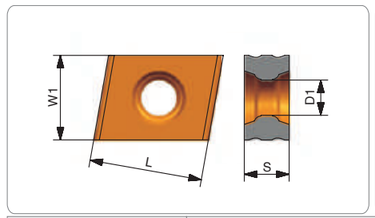


Workpiece material		Z8140	Z5110	Z5120	Z5130	Z7130	Z7140	Z10	Z20
P	Steel	⌗	●	◕	⌗	⌗	⌗		●
M	Stainless steel		●	◕	⌗		⌗		
K	Cast iron	⌗	●	◕	⌗				
N	Non-ferrous metal							◕	
S	Heat-resistant alloy Titanium alloy								

Insert shape	Type	Basic dimension (mm) L	W1	S	D1	CVD Z8140	PVD Z5110	Z5120	Z5130	Z7130	Z7140	Cemented carbide Z10	Cermet Z20
	CNEF161406-2R30	16.3	14.29	6.35	5.4	☆				★			
	CNEF161406-2R50	16.3	14.29	6.35	5.4	☆				★			

★ Recommended grade ☆ Available grade

Working condition: ● Stable ◕ Average ⌗ Tough



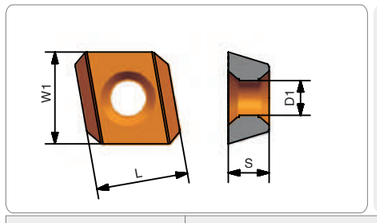
Workpiece material		Z8140	Z5110	Z5120	Z5130	Z7130	Z7140	Z10	Z20
P	Steel	⌗	●	◕	⌗	⌗	⌗		●
M	Stainless steel		●	◕	⌗		⌗		
K	Cast iron	⌗	●	◕	⌗				
N	Non-ferrous metal							◕	
S	Heat-resistant alloy Titanium alloy								

Insert shape	Type	Basic dimension (mm) L	W1	S	D1	CVD Z8140	PVD Z5110	Z5120	Z5130	Z7130	Z7140	Cemented carbide Z10	Cermet Z20
	CNER16A12A06-L2M	16.00	12.00	6.35	5.4	☆				★			
	CNEF161406-L2M	16.30	14.29	6.35	5.4	☆				★			

★ Recommended grade ☆ Available grade

Heavy milling inserts

Working condition: ● Stable ◕ Average ⌗ Tough



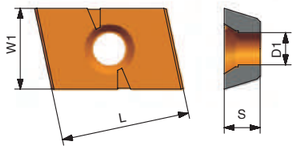
Workpiece material									
P Steel	⌗	●	◕	⌗	⌗	⌗		●
M Stainless steel		●	◕	⌗		⌗		
K Cast iron	⌗	●	◕	⌗				
N Non-ferrous metal							◕	
S Heat-resistant alloy Titanium alloy								

Insert shape	Type	Basic dimension (mm)				CVD	PVD					Cemented carbide	Cermet
		L	W1	S	D1	Z8140	Z5110	Z5120	Z5130	Z7130	Z7140	Z10	Z20
	CQEH141406--R02R	14.29	14.29	6.35	5.4	☆				★			
	CQER11A11A04-R01R	11.10	11.10	4.76	5.4	☆				★			

★ Recommended grade ☆ Available grade

Heavy milling inserts

Working condition: ● Stable ◕ Average ⌗ Tough

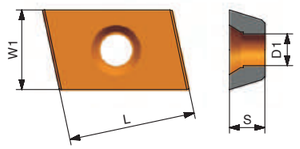


Workpiece material									
P Steel	⌗	●	◕	⌗	⌗	⌗		●
M Stainless steel		●	◕	⌗		⌗		
K Cast iron	⌗	●	◕	⌗				
N Non-ferrous metal							◕	
S Heat-resistant alloy Titanium alloy								

Insert shape	Type	Basic dimension (mm)				CVD	PVD					Cemented carbide	Cermet
		L	W1	S	D1	Z8140	Z5110	Z5120	Z5130	Z7130	Z7140	Z10	Z20
	FQEW221406-R04R	22.8	14.29	6.35	5.4	☆				★			

★ Recommended grade ☆ Available grade

Working condition: ● Stable ◕ Average ⌗ Tough

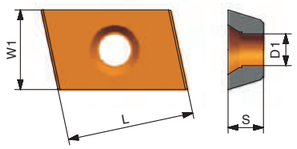


Workpiece material									
P Steel	⌗	●	◕	⌗	⌗	⌗		●
M Stainless steel		●	◕	⌗		⌗		
K Cast iron	⌗	●	◕	⌗				
N Non-ferrous metal							◕	
S Heat-resistant alloy Titanium alloy								

Insert shape	Type	Basic dimension (mm)				CVD	PVD					Cemented carbide	Cermet
		L	W1	S	D1	Z8140	Z5110	Z5120	Z5130	Z7130	Z7140	Z10	Z20
	FQES190906-2R30R	19.05	9.525	6.35	4.4	☆				★			
	FQES190906-2R40R	19.05	9.525	6.35	4.4	☆				★			
	FQES190906-2R45R	19.05	9.525	6.35	4.4	☆				★			
	FQES190906-2R50R	19.05	9.525	6.35	4.4	☆				★			

★ Recommended grade ☆ Available grade

Working condition: ● Stable ◕ Average ⌗ Tough



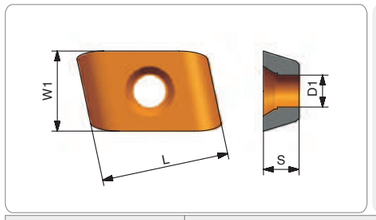
Workpiece material									
P Steel	⌗	●	◕	⌗	⌗	⌗		●
M Stainless steel		●	◕	⌗		⌗		
K Cast iron	⌗	●	◕	⌗				
N Non-ferrous metal							◕	
S Heat-resistant alloy Titanium alloy								

Insert shape	Type	Basic dimension (mm)				CVD	PVD					Cemented carbide	Cermet
		L	W1	S	D1	Z8140	Z5110	Z5120	Z5130	Z7130	Z7140	Z10	Z20
	FQEP120904-210L	12.70	9.525	4.76	4.4	☆				★			
	FQEP120904-210R	12.70	9.525	4.76	4.4	☆				★			
	FQEP120904-2R05L	12.70	9.525	4.76	4.4	☆				★			

★ Recommended grade ☆ Available grade

Heavy milling inserts

Working condition: ● Stable ◕ Average ⌗ Tough

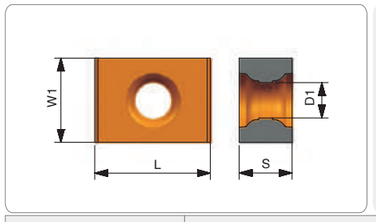


Workpiece material									
P Steel	⌗	●	◕	⌗	⌗	⌗		●
M Stainless steel		●	◕	⌗		⌗		
K Cast iron	⌗	●	◕	⌗				
N Non-ferrous metal							◕	
S Heat-resistant alloy Titanium alloy								

Insert shape	Type	Basic dimension (mm)				CVD	PVD					Cemented carbide	Cermet
		L	W1	S	D1	Z8140	Z5110	Z5120	Z5130	Z7130	Z7140	Z10	Z20
	FQES191906-4RXR	19.05	9.525	6.35	4.4	☆				★			

★ Recommended grade ☆ Available grade

Working condition: ● Stable ◕ Average ⌗ Tough



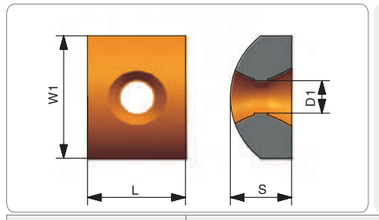
Workpiece material									
P Steel	⌗	●	◕	⌗	⌗	⌗		●
M Stainless steel		●	◕	⌗		⌗		
K Cast iron	⌗	●	◕	⌗				
N Non-ferrous metal							◕	
S Heat-resistant alloy Titanium alloy								

Insert shape	Type	Basic dimension (mm)				CVD	PVD					Cemented carbide	Cermet
		L	W1	S	D1	Z8140	Z5110	Z5120	Z5130	Z7130	Z7140	Z10	Z20
	LNED150906-408	15.875	9.525	6.35	4.4	☆				★			
	LNER151207-404	15.875	12.70	7.94	5.5	☆				★			
	LNER151208B-408	15.875	12.70	7.82	5.5	☆				★			
	LNER151207-400	15.875	12.70	7.94	5.5	☆				★			
	LNER151207-408	15.875	12.70	7.94	5.5	☆				★			
	LNEF191206-405	19.05	12.70	12.70	5.4	☆				★			
	LNEL191207-400	19.05	12.70	7.94	5.4	☆				★			
	LNEL191406-402	19.05	14.29	6.35	5.4	☆				★			
	LNER191406-400	19.05	14.29	6.35	5.4	☆				★			
	LNER191406-405	19.05	14.29	6.35	5.4	☆				★			
	LNER191406-408	19.05	14.29	6.35	5.5	☆				★			
	LNER191406-410	19.05	14.29	6.35	5.4	☆				★			
	LNER191407A-406	19.05	14.29	7.05	5.4	☆				★			

★ Recommended grade ☆ Available grade

Heavy milling inserts

Working condition: ● Stable ◕ Average ⌗ Tough

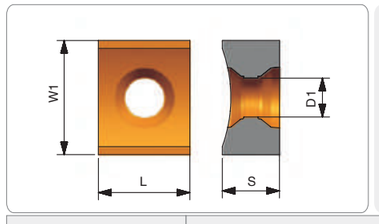


Workpiece material									
P Steel	⌗	●	◕	⌗	⌗	⌗		●
M Stainless steel		●	◕	⌗		⌗		
K Cast iron	⌗	●	◕	⌗				
N Non-ferrous metal							◕	
S Heat-resistant alloy Titanium alloy								

Insert shape	Type	Basic dimension (mm)				CVD	PVD					Cemented carbide	Cermet
		L	W1	S	D1	Z8140	Z5110	Z5120	Z5130	Z7130	Z7140	Z10	Z20
	LNER151207-DR100	15.875	12.70	7.94	5.4	☆				★			
	LNER151207-DR115	15.875	12.70	7.94	5.4	☆				★			
	LNER151207-DR130	15.875	12.70	7.94	5.4	☆				★			
	LNER151207-DR145	15.875	12.70	7.94	5.4	☆				★			
	LNER151207-DR160	15.875	12.70	7.94	5.4	☆				★			
	LNER151207-DR190	15.875	12.70	7.94	5.4	☆				★			
	LNER151207-DR200	15.875	12.70	7.94	5.4	☆				★			
	LNER151207-DR250	15.875	12.70	7.94	5.4	☆				★			
	LNER151207-DR400	15.875	12.70	7.94	5.4	☆				★			
	LNER151207-DR800	15.875	12.70	7.94	5.4	☆				★			

★ Recommended grade ☆ Available grade

Working condition: ● Stable ◕ Average ⌗ Tough



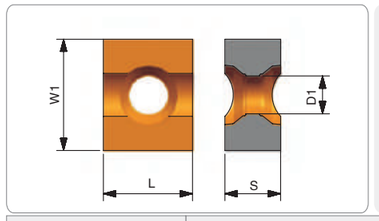
Workpiece material									
P Steel	⌗	●	◕	⌗	⌗	⌗		●
M Stainless steel		●	◕	⌗		⌗		
K Cast iron	⌗	●	◕	⌗				
N Non-ferrous metal							◕	
S Heat-resistant alloy Titanium alloy								

Insert shape	Type	Basic dimension (mm)				CVD	PVD					Cemented carbide	Cermet
		L	W1	S	D1	Z8140	Z5110	Z5120	Z5130	Z7130	Z7140	Z10	Z20
	LNER151207-NR100	15.875	12.70	7.94	5.4	☆				★			
	LNER151207-NR130	15.875	12.70	7.94	5.4	☆				★			
	LNER151207-NR140	15.875	12.70	7.94	5.4	☆				★			
	LNER151207-NR150	15.875	12.70	7.94	5.4	☆				★			
	LNER151207-NR190	15.875	12.70	7.94	5.4	☆				★			
	LNER151207-NR200	15.875	12.70	7.94	5.4	☆				★			
	LNER151207-NR800	15.875	12.70	7.94	5.4	☆				★			
	LNER151207-NR3000	15.875	12.70	7.94	5.4	☆				★			

★ Recommended grade ☆ Available grade

Heavy milling inserts

Working condition: ● Stable ◕ Average ⌗ Tough



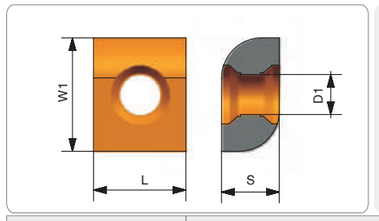
Workpiece material								
P Steel	⌗	●	◕	⌗	⌗	⌗		●
M Stainless steel		●	◕	⌗		⌗		
K Cast iron	⌗	●	◕	⌗				
N Non-ferrous metal							◕	
S Heat-resistant alloy Titanium alloy								

Insert shape	Type	Basic dimension (mm)				CVD	PVD					Cemented carbide	Cermet
		L	W1	S	D1	Z8140	Z5110	Z5120	Z5130	Z7130	Z7140	Z10	Z20
	LNEN151207-2NR100	15.875	12.70	7.94	5.4	☆				★			
	LNEN151207-2NR130	15.875	12.70	7.94	5.4	☆				★			
	LNEN151207-2NR140	15.875	12.70	7.94	5.4	☆				★			
	LNEN151207-2NR190	15.875	12.70	7.94	5.4	☆				★			

★ Recommended grade ☆ Available grade

Heavy milling inserts

Working condition: ● Stable ◕ Average ⌗ Tough



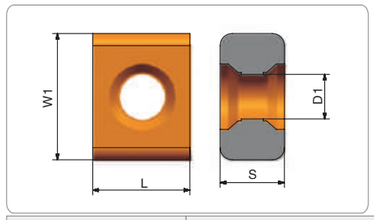
Workpiece material								
P Steel	⌗	●	◕	⌗	⌗	⌗		●
M Stainless steel		●	◕	⌗		⌗		
K Cast iron	⌗	●	◕	⌗				
N Non-ferrous metal							◕	
S Heat-resistant alloy Titanium alloy								

Insert shape	Type	Basic dimension (mm)				CVD	PVD					Cemented carbide	Cermet
		L	W1	S	D1	Z8140	Z5110	Z5120	Z5130	Z7130	Z7140	Z10	Z20
	LNER151207-2R20	15.875	12.70	7.94	5.4	☆				★			
	LNER151207-2R30	15.875	12.70	7.94	5.4	☆				★			
	LNER151207-2R35	15.875	12.70	7.94	5.4	☆				★			
	LNER151207-2R40	15.875	12.70	7.94	5.4	☆				★			
	LNER151207-2R45	15.875	12.70	7.94	5.4	☆				★			
	LNER151207-2R50	15.875	12.70	7.94	5.4	☆				★			
	LNER151207A-2R50	15.875	12.70	7.05	5.4	☆				★			
	LNER151207-2R55	15.875	12.70	7.94	5.4	☆				★			
	LNER15C1207-2R50	15.28	12.70	7.94	5.4	☆				★			
	LNER15F1207-2R50	15.68	12.70	7.94	5.4	☆				★			
	LNER191406-2R30	19.05	14.29	6.35	5.4	☆				★			
	LNER191406-2R35	19.05	14.29	6.35	5.4	☆				★			
	LNER190906-2R50	19.05	9.525	6.35	5.4	☆				★			
	LNER191407-2R60	19.05	14.29	7.94	5.4	☆				★			
	LNER191406-2R30M22	19.05	14.29	6.35	5.4	☆				★			
	LNER191406-2R46M15	19.05	14.29	6.35	5.4	☆				★			
	LNER191407-2R60M15	19.05	14.29	7.94	5.4	☆				★			
	LNER191407-2R70M20	19.05	14.29	7.94	5.4	☆				★			
	LNER191408-2R70M20	19.05	14.29	8.50	5.4	☆				★			

★ Recommended grade ☆ Available grade

Heavy milling inserts

Working condition: ● Stable ◕ Average ⌗ Tough

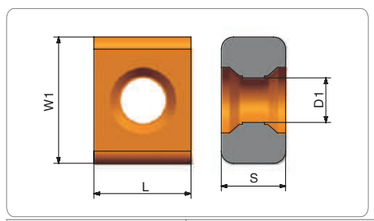


Workpiece material		Z8140	Z5110	Z5120	Z5130	Z7130	Z7140	Z10	Z20
P	Steel	⌗	●	◕	⌗	⌗	⌗		●
M	Stainless steel		●	◕	⌗		⌗		
K	Cast iron	⌗	●	◕	⌗				
N	Non-ferrous metal							◕	
S	Heat-resistant alloy Titanium alloy								

Insert shape	Type	Basic dimension (mm) L	W1	S	D1	CVD Z8140	PVD Z5110	Z5120	Z5130	Z7130	Z7140	Cemented carbide Z10	Cermet Z20
	LNER151206-4R10	15.875	12.70	6.35	5.4	☆				★			
	LNER151206B-4R20	15.875	12.70	6.94	5.4	☆				★			
	LNER151207-4R10	15.875	12.70	7.94	5.5	☆				★			
	LNER151207-4R20	15.875	12.70	7.94	5.5	☆				★			
	LNER191406-4R02	19.05	14.29	6.35	5.4	☆				★			
	LNER191406-4R12	19.05	14.29	6.35	5.4	☆				★			
	LNER191406-4R20	19.05	14.29	6.35	5.4	☆				★			
	LNER191406-4R24	19.05	14.29	6.35	5.4	☆				★			

★ Recommended grade ☆ Available grade

Working condition: ● Stable ◕ Average ⌗ Tough



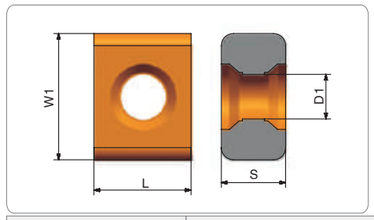
Workpiece material		Z8140	Z5110	Z5120	Z5130	Z7130	Z7140	Z10	Z20
P	Steel	⌗	●	◕	⌗	⌗	⌗		●
M	Stainless steel		●	◕	⌗		⌗		
K	Cast iron	⌗	●	◕	⌗				
N	Non-ferrous metal							◕	
S	Heat-resistant alloy Titanium alloy								

Insert shape	Type	Basic dimension (mm) L	W1	S	D1	CVD Z8140	PVD Z5110	Z5120	Z5130	Z7130	Z7140	Cemented carbide Z10	Cermet Z20
	LNER151206-4R30	15.875	12.70	6.35	5.4	☆				★			
	LNER151206-4R40	15.875	12.70	6.35	5.4	☆				★			
	LNER151206-4R50	15.875	12.70	6.35	5.4	☆				★			
	LNER151206-4R55	15.875	12.70	6.35	5.4	☆				★			
	LNER151206-4R65	15.875	12.70	6.35	5.4	☆				★			
	LNER151207-4R40	15.875	12.70	7.94	5.4	☆				★			
	LNER151207-4R50	15.875	12.70	7.94	5.4	☆				★			

★ Recommended grade ☆ Available grade

Heavy milling inserts

Working condition: ● Stable ◕ Average ⌗ Tough

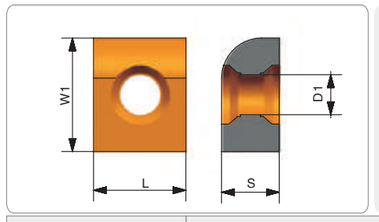


Workpiece material		Z8140	Z5110	Z5120	Z5130	Z7130	Z7140	Z10	Z20
P	Steel	⌗	●	◕	⌗	⌗	⌗		●
M	Stainless steel		●	◕	⌗		⌗		
K	Cast iron	⌗	●	◕	⌗				
N	Non-ferrous metal							◕	
S	Heat-resistant alloy Titanium alloy								

Insert shape	Type	Basic dimension (mm) L	W1	S	D1	CVD Z8140	PVD Z5110	Z5120	Z5130	Z7130	Z7140	Cemented carbide Z10	Cermet Z20
	LNER150904-4R30H	15.875	9.525	4.76	4.4	☆				★			
	LNER151206-4R40H	15.875	12.70	6.35	5.4	☆				★			
	LNER151206-4R50H	15.875	12.70	6.35	5.4	☆				★			
	LNER151207-4R40H	15.875	12.70	7.94	5.4	☆				★			
	LNER151207-4R50H	15.875	12.70	7.94	5.4	☆				★			

★ Recommended grade ☆ Available grade

Working condition: ● Stable ◕ Average ⌗ Tough



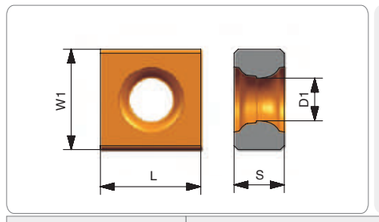
Workpiece material		Z8140	Z5110	Z5120	Z5130	Z7130	Z7140	Z10	Z20
P	Steel	⌗	●	◕	⌗	⌗	⌗		●
M	Stainless steel		●	◕	⌗		⌗		
K	Cast iron	⌗	●	◕	⌗				
N	Non-ferrous metal							◕	
S	Heat-resistant alloy Titanium alloy								

Insert shape	Type	Basic dimension (mm) L	W1	S	D1	CVD Z8140	PVD Z5110	Z5120	Z5130	Z7130	Z7140	Cemented carbide Z10	Cermet Z20
	LNER151207-1R30M20	15.875	12.70	7.94	5.4	☆				★			

★ Recommended grade ☆ Available grade

Heavy milling inserts

Working condition: ● Stable ◕ Average ⌗ Tough

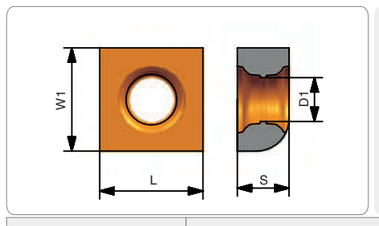


Workpiece material		Z8140	Z5110	Z5120	Z5130	Z7130	Z7140	Z10	Z20
P	Steel	⌗	●	◕	⌗	⌗	⌗		●
M	Stainless steel		●	◕	⌗		⌗		
K	Cast iron	⌗	●	◕	⌗				
N	Non-ferrous metal							◕	
S	Heat-resistant alloy Titanium alloy								

Insert shape	Type	Basic dimension (mm) L	W1	S	D1	CVD Z8140	PVD Z5110	Z5120	Z5130	Z7130	Z7140	Cemented carbide Z10	Cermet Z20
	SNED121206-408	12.70	12.70	6.35	5.5	☆				★			
	SNEN151507-400	15.875	15.875	7.94	5.4	☆				★			
	SNEN151507-408	15.875	15.875	7.94	5.4	☆				★			
	SNER151507-405	15.875	15.875	7.94	5.4	☆				★			

★ Recommended grade ☆ Available grade

Working condition: ● Stable ◕ Average ⌗ Tough



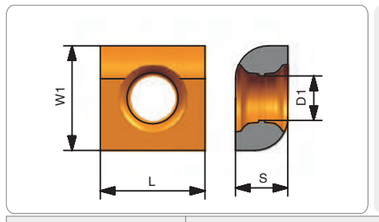
Workpiece material		Z8140	Z5110	Z5120	Z5130	Z7130	Z7140	Z10	Z20
P	Steel	⌗	●	◕	⌗	⌗	⌗		●
M	Stainless steel		●	◕	⌗		⌗		
K	Cast iron	⌗	●	◕	⌗				
N	Non-ferrous metal							◕	
S	Heat-resistant alloy Titanium alloy								

Insert shape	Type	Basic dimension (mm) L	W1	S	D1	CVD Z8140	PVD Z5110	Z5120	Z5130	Z7130	Z7140	Cemented carbide Z10	Cermet Z20
	SNER151507-1R70	15.875	15.875	7.94	5.4	☆				★			

★ Recommended grade ☆ Available grade

Heavy milling inserts

Working condition: ● Stable ◕ Average ⌗ Tough

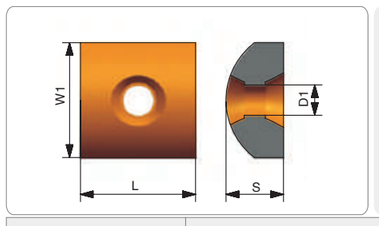


Workpiece material		Z8140	Z5110	Z5120	Z5130	Z7130	Z7140	Z10	Z20
P	Steel	⌗	●	◕	⌗	⌗	⌗		●
M	Stainless steel		●	◕	⌗		⌗		
K	Cast iron	⌗	●	◕	⌗				
N	Non-ferrous metal							◕	
S	Heat-resistant alloy Titanium alloy								

Insert shape	Type	Basic dimension (mm) L	W1	S	D1	CVD Z8140	PVD Z5110	Z5120	Z5130	Z7130	Z7140	Cemented carbide Z10	Cermet Z20
	SNEB151507-2R40	15.875	15.875	7.94	5.4	☆				★			
	SNEH151507-2R20	15.875	15.875	7.94	5.4	☆				★			
	SNEH151507-2R50	15.875	15.875	7.94	5.4	☆				★			

★ Recommended grade ☆ Available grade

Working condition: ● Stable ◕ Average ⌗ Tough



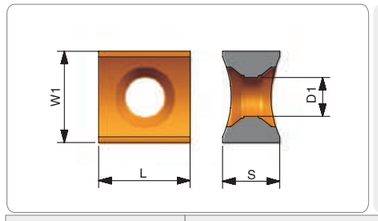
Workpiece material		Z8140	Z5110	Z5120	Z5130	Z7130	Z7140	Z10	Z20
P	Steel	⌗	●	◕	⌗	⌗	⌗		●
M	Stainless steel		●	◕	⌗		⌗		
K	Cast iron	⌗	●	◕	⌗				
N	Non-ferrous metal							◕	
S	Heat-resistant alloy Titanium alloy								

Insert shape	Type	Basic dimension (mm) L	W1	S	D1	CVD Z8140	PVD Z5110	Z5120	Z5130	Z7130	Z7140	Cemented carbide Z10	Cermet Z20
	SNEX121206-DR400	12.70	12.70	6.35	4.4	☆				★			
	SNEN151507-DR130	15.875	15.875	7.94	5.4	☆				★			
	SNEN151507G-DR140	15.875	15.875	7.82	5.4	☆				★			

★ Recommended grade ☆ Available grade

Heavy milling inserts

Working condition: ● Stable ◕ Average ⌗ Tough



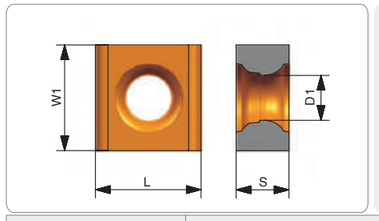
Workpiece material		Z8140	Z5110	Z5120	Z5130	Z7130	Z7140	Z10	Z20
P	Steel	⌗	●	◕	⌗	⌗	⌗		●
M	Stainless steel		●	◕	⌗		⌗		
K	Cast iron	⌗	●	◕	⌗				
N	Non-ferrous metal							◕	
S	Heat-resistant alloy Titanium alloy								

Insert shape	Type	Basic dimension (mm) L	W1	S	D1	CVD Z8140	PVD Z5110	Z5120	Z5130	Z7130	Z7140	Cemented carbide Z10	Cermet Z20
	SNER121207-2NR80	12.70	12.70	7.94	5.4	☆				★			

★ Recommended grade ☆ Available grade

Heavy milling inserts

Working condition: ● Stable ◕ Average ⌗ Tough

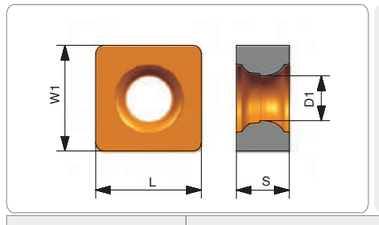


Workpiece material		Z8140	Z5110	Z5120	Z5130	Z7130	Z7140	Z10	Z20
P	Steel	⌗	●	◕	⌗	⌗	⌗		●
M	Stainless steel		●	◕	⌗		⌗		
K	Cast iron	⌗	●	◕	⌗				
N	Non-ferrous metal							◕	
S	Heat-resistant alloy Titanium alloy								

Insert shape	Type	Basic dimension (mm) L	W1	S	D1	CVD Z8140	PVD Z5110	Z5120	Z5130	Z7130	Z7140	Cemented carbide Z10	Cermet Z20
	SNED121206-4R20	12.70	12.70	6.35	5.5	☆				★			
	SNEH151507-4R20	15.875	15.875	7.94	5.4	☆				★			
	SNER121206-4R25	12.70	12.70	6.35	4.4	☆				★			
	SNEY090904-4R30H	9.525	9.525	4.76	4.4	☆				★			

★ Recommended grade ☆ Available grade

Working condition: ● Stable ◕ Average ⌗ Tough

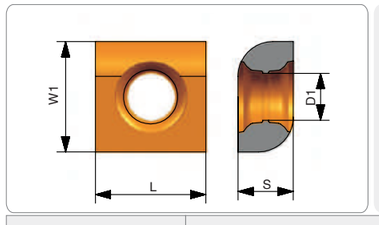


Workpiece material		Z8140	Z5110	Z5120	Z5130	Z7130	Z7140	Z10	Z20
P	Steel	⌗	●	◕	⌗	⌗	⌗		●
M	Stainless steel		●	◕	⌗		⌗		
K	Cast iron	⌗	●	◕	⌗				
N	Non-ferrous metal							◕	
S	Heat-resistant alloy Titanium alloy								

Insert shape	Type	Basic dimension (mm) L	W1	S	D1	CVD Z8140	PVD Z5110	Z5120	Z5130	Z7130	Z7140	Cemented carbide Z10	Cermet Z20
	SNED121206-S4R02	12.70	12.70	6.35	5.5								
	SNED121206-S4R08	12.70	12.70	6.35	5.5	☆				★			
	SNEY090904-S4R04	9.525	9.525	4.76	4.4								

★ Recommended grade ☆ Available grade

Working condition: ● Stable ◕ Average ⌗ Tough



Workpiece material		Z8140	Z5110	Z5120	Z5130	Z7130	Z7140	Z10	Z20
P	Steel	⌗	●	◕	⌗	⌗	⌗		●
M	Stainless steel		●	◕	⌗		⌗		
K	Cast iron	⌗	●	◕	⌗				
N	Non-ferrous metal							◕	
S	Heat-resistant alloy Titanium alloy								

Insert shape	Type	Basic dimension (mm) L	W1	S	D1	CVD Z8140	PVD Z5110	Z5120	Z5130	Z7130	Z7140	Cemented carbide Z10	Cermet Z20
	SNEN151507-2R20	15.875	15.875	7.94	5.4	☆				★			
	SNEN151507-2R30	15.875	15.875	7.94	5.4	☆				★			
	SNEN151507-2R40	15.875	15.875	7.94	5.4	☆				★			
	SNEN151507-2R50	15.875	15.875	7.94	5.4	☆				★			
	SNEN151507-2R60	15.875	15.875	7.94	5.4	☆				★			

★ Recommended grade ☆ Available grade

- Basic deviation value of the hole

μm

Basic deviation value												Δ value					
Upper deviation ES																	
Standard tolerance class > IT7												All standard tolerance classes					
P	R	S	T	U	V	X	Y	Z	ZA	ZB	ZC	IT3	IT4	IT5	IT6	IT7	IT8
−6	−10	−14		−18		−20		−26	−32	−40	−60	0	0	0	0	0	0
−12	−15	−19		−23		−28		−35	−42	−50	−80	1	1.5	1	3	4	6
−15	−19	−23		−28		−34		−42	−52	−67	−97	1	1.5	2	3	6	7
−18	−23	−28		−33		−40		−50	−64	−90	−130	1	2	3	3	7	9
					−39	−45		−60	−77	−108	−150						
−22	−28	−35		−41	−47	−54	−63	−73	−98	−136	−188	1.5	2	3	4	8	12
			−41	−48	−55	−64	−75	−88	−118	−160	−218						
−26	−34	−43	−48	−60	−68	−80	−94	−112	−148	−200	−274	1.5	3	4	5	9	14
			−54	−70	−81	−97	−114	−136	−180	−242	−325						
−32	−41	−53	−66	−87	−102	−122	−144	−172	−226	−300	−405	2	3	5	6	11	16
	−43	−59	−75	−102	−120	−146	−174	−210	−274	−360	−480						
−37	−51	−71	−91	−124	−146	−178	−214	−258	−335	−445	−585	2	4	5	7	13	19
	−54	−79	−104	−144	−172	−210	−254	−310	−400	−525	−690						
−43	−63	−92	−122	−170	−202	−248	−300	−365	−470	−620	−800	3	4	6	7	15	23
	−65	−100	−134	−190	−228	−280	−340	−415	−535	−700	−900						
	−68	−108	−146	−210	−252	−310	−380	−465	−600	−780	−1000						
−50	−77	−122	−166	−236	−284	−350	−425	−520	−670	−880	−1150	3	4	6	9	17	26
	−80	−130	−180	−258	−310	−385	−470	−575	−740	−960	−1250						
	−84	−140	−196	−284	−340	−425	−520	−640	−820	−1050	−1350						
−56	−94	−158	−218	−315	−385	−475	−580	−710	−920	−1200	−1550	4	4	7	9	20	29
	−98	−170	−240	−350	−425	−525	−650	−790	−1000	−1300	−1700						
−62	−108	−190	−268	−390	−475	−590	−730	−900	−1150	−1500	−1900	4	5	7	11	21	32
	−114	−208	−294	−435	−530	−660	−820	−1000	−1300	−1650	−2100						
−68	−126	−232	−330	−490	−595	−740	−920	−1100	−1450	−1850	−2400	5	5	7	13	23	34
	−132	−252	−360	−540	−660	−820	−1000	−1250	−1600	−2100	−2600						
−78	−150	−280	−400	−600													
	−155	−310	−450	−660													
−88	−175	−340	−500	−740													
	−185	−380	−560	−840													
100	−210 −220	−430 −470	−620 −680	−940 −1050													
−120	−250 −260	−520 −580	−780 −840	−1150 −1300													
−140	−300 −330	−640 −720	−960 −1050	−1450 −1600													
−170	−370	−820	−1200	−1850													
	−400	−920	−1350	−2000													
−195	−440 −460	−1000 −1100	−1500 −1650	−2300 −2500													
−240	−550 −580	−1250 −1400	−1900 −2100	−2900 −3200													

Comparison table of PVD turning grades

Type	Classification codes: IOS classification	Classification codes: Groups of materials	ZUTO	SANDVIK	KENNAMETAL	ISCAR	MITSUBISHI	TUNGALOY	KYOCERA	SUMITOMO	TAGUTEC	ZCC
PVD milling	P	P10	**Z5225, Z1135, Z5555**	GC1025 GC1125	KCS10 KCU10 KC5010	IC807	VP10MF MS6015	AH710	PR930 PR1005 PR1025 PR1115 PR1215 PR1425 PR1225	AC1030U ACZ150 AC5025S AC520U		YBG102
		P20	**Z5125, Z5225, Z7125 Z7225 Z5555**	GC1025 GC1125	KCS10 KCU10 KCU25 KC5010 KC5025	IC807 IC808 IC810	VP10RT VP20RT VP15TF VP20MF	AH120 AH725 AH730 SH725 SH730 J740	PR930 PR1025 PR1115 PR1215 PR1225 PR1625	AC1030U AC5025S AC520U AC530U	TT9020 TT9030	YBG202
		P30	**Z5125, Z5225, Z7125 Z7225 Z5555**	GC1025 GC1125	KCU25 KC5025	IC328 IC330 IC830 IC928	VP10RT VP20RT VP15TF VP20MF	AH725 AH7025 AH730 SH725 SH730 GH730 GH330 J740	PR1025 PR1225 PR1535	AC1030U AC530U	TT8020 TT8080 TT9030	YBG202
		P40	**Z5125, Z7125, Z5555**	GC1025		IC830		AH120 AH725 AH645		AC1030U	TT8020 TT8080 TT9080	
	M	M10	**Z9105, Z7115, Z6235**	GC1115 GC1125	KCS10 KCU10 KC5010	IC807 IC808 IC907 IC908	VP10MF MS6015	AH8005 AH630	PR1025 PR1215 PR1225	AC515S AC5025S AC510U AC520U ACZ150	TT5080	YBG202 YBG205
		M20	**Z5125, Z5225, Z7115 Z7125 Z7225 Z6235**	GC1115 GC1125 GC2035	KCS10 KCU10 KCU25 KC5010 KC5025	IC330 IC806 IC808 IC830 IC908 IC330 IC806 IC808 IC830 IC908 IC928	VP10RT VP20RT VP15TF VP20MF	AH8015 AH630 AH120 AH7025 AH725 SH725 SH730	PR930 PR1025 PR1125 PR1215 PR1425 PR1225 PR1515	AC5015S AC5025S AC1030U AC520U	TT5080 TT9080	YBG202 YBG205
		M30	**Z5125, Z5225, Z7115 Z7125 Z7225 Z6235**	GC1125 GC2035	KCU25 KC5025	IC328 IC330 IC830 IC840 IC882	VP10RT VP20RT VP15TF VP20MF MP7035	AH645 AH120 AH725 SH725 SH730 J740	PR1125 PR1535	AC5025S AC6040M AC1030U AC520U AC530U	TT8020 TT8080 TT9020 TT9080	
		M40	**Z5125, Z7125, Z5555**	GC2035		IC830 IC928	MP7035	AH645		AC6040M AC1030U AC530U	TT8020 TT8080 TT9020 TT9080	

Comparison table of PVD turning grades

Type	Classification codes		ZUTO	SANDVIK	KENNAMETAL	ISCAR	MITSUBISHI	TUNGALOY	KYOCERA	SUMITOMO	TAGUTEC	ZCC
	IOS classification	Groups of materials										
PVD milling	K	K10	**Z6115, Z5255 Z5555**	GC3330 GC3220 K20W K20D K20M K15W	KCS10 KCU10 KC5010	IC810		GH110 AH110	PR905 PR1215	AC1030U AC510U ACZ150		
		K20	**Z6115, Z5255 Z5555**	GC3330 GC3220 GC3040 K20W K20D GC4230 K20M K15W	KCS10 KCU10 KCU25 KC5010 KC5025		VP10RT VP20RT VP15TF	AH120 AH725 AH730 SH725 SH730 J740	PR905 PR1215	AC1030U AC5025S AC520U AC530U		
		K30	**Z6115, Z5255 Z5555**	GC3330 GC3040 K20W GC4240 GC4230		IC830 IC908 IC910 IC928	VP10RT VP20RT VP15TF	AH725 AH7025 AH730 SH725 SH730 GH730 GH330 J740		AC1030U AC530U		
	S	S01	**ZJX820,**			IC804 IC806	MP9005 VP05RT	AH8005 AH905			PR005S	YBG102
		S10	**Z9105, Z7115 ZJX820**	GC1105 GC1005 GC1025	KC5010 KC5510 KCU10 KCS10	IC807 IC808 IC907 IC908	MP9005 MP9015 VP10RT	AH8015 AH905 SH730 AH110	PR005S PR015S	AC510U AC5015S	TT9080 TT9030	YBG102 YBG105 YBG202 YBG103
		S20	**ZJX820, Z7115**	GC1025 GC1125	KC5025 KC5525 KCU25	IC806 IC808 IC908	MP9015 MT9015 VP20RT MP9025	AH8015 AH120 AH725	PR015S PR1535	AC510U AC520U AC5025S	TT8080 TT8020	YBG212 YBG105 YBS103
		S30	**ZJX820, Z7225**	GC1125		IC3028	MP9025	AH725	PR1535	AC520U		YBG212

Comparison table of PVD turning grades

Type	Classification codes		ZUTO	SANDVIK	KENNAMETAL	ISCAR	MITSUBISHI	TUNGALOY	KYOCERA	SUMITOMO	TAGUTEC	ZCC
	IOS classification	Groups of materials										
PVD milling	P	P10	**Z5225, Z1135, Z5555**	GC1010 GC1025 GC1030	KC5010M KC515M	IC807 IC903		AH120 AH725	PR830 PR1025 PR1225	ACP2500 ACP200	TT2510 TT7080	YBG252
		P20	**Z5125, Z5225, Z7125 Z7225 Z5555**	GC1025 GC1030 GC2030	KC522M KC525M KCSM30 SP6519	IC807 IC808 IC810 IC380 IC330	MP6120 VP15TF	AH120 AH725 AH3135 AH9030 AH3225 AH9130	PR1525 PR830 PR1025 PR1225 PR1230	ACP3000 ACU2500 ACP200 ACP300	TT2510 TT7080 TT8020 TT9030 TT9080	YBG202 YBG205 YBG9320 YBG252
		P30	**Z5125, Z5225, Z7125 Z7225 Z5555**	GC1030 GC1010 GC2030	KC525M KC530 KC725M KC735M KCPM40 KCSM30 X400	IC328 IC330 IC380 IC830 IC928	MP6120 VP15TF MP6130 VP30RT	AH120 AH725 AH3135 AH130 AH3225 AH9130	PR1230 PR1535	ACP3000 ACU2500 ACP200 ACP300	TT8020 TT8080 TT9030 TT9080	YBG302
		P40	**Z5125, Z7125, Z5555**	GC1030 GC2030	KC725M KC735M KCPM40	IC830	VP30RT	AH120 AH725 AH645		ACP3000 ACU2500 ACP300	TT8020 TT8080 TT9030 TT9080	YBG302
	M	M10	**Z9105, Z7115, Z6235**	GC1010 GC1030	KC515M SP4019 SP6519	IC807 IC808 IC903 IC907 IC908		AH725	PR1025 PR1225	ACU2500 ACM100 ACK300 ACP300		YBG252
		M20	**Z5125, Z5225, Z7115 Z7125 Z7225 Z6235**	GC1030 GC1040 GC2030 S30T	KC522M KC525M SP4019 SP6519 X700	IC330 IC808 IC830 IC840 IC882 IC908 IC928	VP15TF MP7130 MP7030 VP20RT	AH725 AH3135 AH130 AH6030 AH3225 AH9130	PR1525 PR1025 PR1225	ACU2500 ACK300 ACP300	TT9030 TT9080	YBG202 YBG205 YBG9320 YBG252
		M30	**Z5125, Z5225, Z7115 Z7125 Z7225 Z6235**	GC1040 S30T GC2030	KC522M KC525M KC725M KC735M KCPM40 KCSM30 KCSM40 SC6525 X700	IC328 IC330 IC830 IC840 IC882	VP15TF MP7130 MP7030 VP20RT MP7140	AH3135 AH130 AH9130	PR1535	TT8020 TT8080 TT9030 TT9080	TT8020 TT8080 TT9020 TT9080	YBG302
		M40	**Z5125, Z7125, Z5555**		KC725M KCPM40 KCSM40	IC830 IC928	MP7140 VP30RT	AH140		TT8020 TT8080 TT9030 TT9080	TT8020 TT8080 TT9020 TT9080	YBG302

Comparison table of PVD turning grades

Type	Classification codes		ZUTO	SANDVIK	KENNAMETAL	ISCAR	MITSUBISHI	TUNGALOY	KYOCERA	SUMITOMO	TAGUTEC	ZCC
	IOS classification	Groups of materials										
PVD milling	K	K10	Z6115, Z5255 Z5555	GC1010 GC1020	KC514M KC515M KCK20 SP4019	IC810	MP8010	AH110 GH120	PR510 PR905 PR1210	ACK3000 ACU2500	TT6080	YBG102 YBG252
		K20	Z6115, Z5255 Z5555	GC1020	KC514M KC520M KC524M KCK20 SP6519	IC808 IC810 IC83	VP15TF VP20RT	AH120 AH9030 AH9130	PR905 PR1210	ACK3000 ACU2500 ACK300	TT6080	YBG152
		K30	Z6115, Z5255 Z5555		KC522M KC524M SP6519	IC830 IC810 IC908 IC910 IC928 IC950	VP15TF VP20RT	AH120		ACK3000 ACU2500 ACK300		

Comparison table of CVD turning grades

Type	Classification codes		ZUTO	SANDVIK	KENNAMETAL	ISCAR	MITSUBISHI	TUNGALOY	KYOCERA	SUMITOMO	TAGUTEC	ZCC
	IOS classification	Groups of materials										
CVD turning	P	P01	Z5225, Z1135, Z5555	GC4305 GC4315	KCP05P KCPK05 KCK05B KCK15B	IC8005 IC8150 IC428	UE6105	T9205 T9105	CA510 CA5505	AC8105P AC810P	TT8105	
		P10	Z5125, Z5225, Z7125 Z7225 Z5555	GC4305 GC4415 GC4325	KCP05P KCPK05 KCP10B KCK15B KCK20B	IC5100 IC8150 IC8250 IC9015	UE6105 MC6015 UE6110 MY5015	T9205 T9105 T9215 T9115	CA510 CA515 CA5505 CA5515	AC8105P AC810P	TT8105 TT8115	YBC151 YBC152
		P20	Z5125, Z5225, Z7125 Z7225 Z5555	GC4225 GC4325 GC4425	KCP10B KCP25B KCM15B	IC8105 IC8250 IC8350 IC9015	MC6015 UE6110 MC6025 UE6020 MY5015	T9215 T9115 T9225 T9125	CA025P CA525 CA5515 CA5525 CR9025	AC8025P AC820P	TT5100 TT8125	YBC251 YBC252
		P30	Z5125, Z7125, Z5555	GC4315 GC4325 GC4335 GC2025	KCP25B KCP30B KCM15B	IC8350 IC8025	MC6025 UE6020 MC6035 UE6035 UH6400	T9225 T9125 T9235 T9135 T6130	CA025P CA525 CA5525 CA530 CA5535 CA9025	AC8035P AC830P AC6030M AC630M	TT8125 T5100	YBC252 YBC351 YBC352
		P40	Z9105, Z7115, Z6235	GC4325 GC4335	KCP30B KCP40B KCM25B KCM35B	IC8350 IC8025	MC6035 UE6035 UH6400		CA530 CA5535	AC8035P AC830P AC6030M AC630M	TT8135 TT7100	YBC351 YBC352
	M	M10	Z5125, Z5225, Z7115 Z7125 Z7225 Z6235	GC2015 GC1515	KCM15B	IC6015 IC8025 IC8150 IC8250 IC5820	MC7015 US7020	T9235 T9135 T6130	CA6515	AC6020M AC610M	TT9215	
		M20	Z5125, Z5225, Z7115 Z7125 Z7225 Z6235	GC2015 GC2025 GC2020	KCP30B KCP40B KCM15B KCM25B	IC6015 IC6025 IC8320	MC7015 US7020 MC7025	T9215 T9115	CA6525	AC6020M AC6030M AC610M AC630M	TT9225	YBM151 YBM153
		M30	Z5125, Z7125, Z5555	GC2025 GC2020	KCP40B KCM25B KCM35B	IC6025	MC7025 US735	T6120 T9215 T9115		AC6030M AC630M AC8035P AC830P	TT9235	YBM151 YBM251
		M40	Z5125, Z7125, Z5555		KCM35B KCM35		US735	T6130		AC6030M AC630M	TT9235	YB253

Comparison table of CVD turning grades

Type	Classification codes		ZUTO	SANDVIK	KENNAMETAL	ISCAR	MITSUBISHI	TUNGALOY	KYOCERA	SUMITOMO	TAGUTEC	ZCC
	IOS classification	Groups of materials										
CVD turning	K	K01	**Z6115, Z5255 Z5555**	GC3210	KCK05B KCK05	IC5005	MC5005 UC5105	T5105	CA310 CA4010 CA4505 CA5505	AC4010K AC405K	TT7005	YBD052
		K10	**Z6115, Z5255 Z5555**	GC3210	KCK05B KCK05 KCK15B KCK15	IC5005 IC5010 IC5100	MC5015 UC5115 MY5015	T5105 T515 T5115 T9215	CA310 CA315 CA4010 CA4115 CA4505 CA4515 CA5505	AC4010K AC4015K AC405K AC415K	TT7015	YBD102
		K20	**Z6115, Z5255 Z5555**	GC3210 GC3225	KCK15B KCK15 KCK20B KCK20	IC5010 IC8150	MC5015 UC5115 UE6110 MY5115	T515 T5115 T5125 T9215	CA315 CA320 CA4115 CA4120 CA4515	AC4015K AC415K AC420K AC425K AC8025P	TT7015 TT7025	YBD152 YBD252
		K30	**Z6115, Z5255 Z5555**	GC3225	KCP05B KCPK05 KCP10B KCP25B KCK20B		UE6110	T5125	CA320			

Comparison table of CVD turning grades

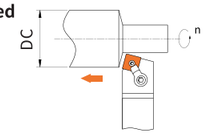
Type	Classification codes		ZUTO	SANDVIK	KENNAMETAL	ISCAR	MITSUBISHI	TUNGALOY	KYOCERA	SUMITOMO	TAGUTEC	ZCC
	IOS classification	Groups of materials										
CVD milling	P	P10	**Z5225, Z1135, Z5555**	GC4220 GC4230 GC3040	KC930M KC935P	IC4100 IC520M IC4050 DT7150 IC5400				ACP2000 ACP100	TT7515	
		P20	**Z5125, Z5225, Z7125 Z7225 Z5555**	GC4220 GC4230 GC3040	SC6525 SP6519		F7030 MC7020	T3225		ACP2000 ACP100	TT7515	YBC301 YBC251
		P30	**Z5125, Z5225, Z7125 Z7225 Z5555**	GC4230 GC3040 GC2040 M30B	MP91M SC6525 KCPK30 X500		F7030 MC7020	T3130 T3225		ACP2000 ACP100	TT7800	YBM351
		P40	**Z5125, Z7125, Z5555**	GC4240 GC4230 GC3040 GC2040 M30B	KCPK30 X500						TT7800	YBC302
	M	M10	**Z9105, Z6235**							ACM200		
		M20	**Z6235**	GC2040 GC4230	SC6525		F7030 MC7020	T3225	CA6535	ACM200		YBM251 YBM253
		M30	**Z5125, Z5225, Z7115 Z7125 Z7225**	GC2040 GC4230 GC4240 M30B S40T	SC6525 X500	IC5820	F7030 MC7020	T3225 T3130		ACM200	TT7800	YBM302
		M40	**Z5125, Z5225, Z7115 Z7125 Z7225 Z6235**	GC2040 M30B S40T GC4240	X500					ACM200	TT7800	
	K	K10	**Z5125, Z7125, Z5555**		SC3025 KCK15	IC5100	MC5020	T1215 T1115		ACK2000 ACK100 ACK200	TT7515	YBD151
		K20	**Z6115, Z5255 Z5555**	GC3220 K20W	KCK15 SC3025 MP91M	IC5100 DT7150 IC4010 IC4050 IC4100	MC5020	T1215	CA420M	ACK200 ACK200	TT7515	YBD252
		K30	**Z6115, Z5255 Z5555**	GC3040	MP91M KCPK30 SC6525							YBD252

Comparison table of cermet grades

Type	Classification codes: IOS classification	Classification codes: Groups of materials	HUAREAL	SANDVIK	KENNAMETAL	ISCAR	MiTSUBiSHi	TUNGALOY	KYOCERA	SUMITOMO	TEAGUTEC	ZCC.CT
Cermet	P	P10	**Z10**		KT1120	IC20N	NX1010	NS520	TN610	T110A T1000A		
		P20	**Z20**	CT5015	KT1120 KT175	IC20N IC75T	NX2525	NS520 NS9530	TN610 TN60	T1200A T1500A	CT3000	YNG151 YNG151C
		P30		CT5015	KT125	IC20N IC75T IC30N	NX2525 NX3035	NS9530 NS530 NS730	TN620 TN90	T1200A T1500A	CT3000	
		P40				IC75T IC30N	NX3035 NX4545	NS740		T250A		

Formulas for turning

● **Cutting speed**



$$Vc = \frac{\pi * Dc * n}{1000} (m/min)$$

Vc :Cutting speed(m/min) π: ≈ 3.14
Dc:Workpiece diameter(mm) n:Spindle speed~(rev/min)

● **Feed rate**

$$Vf = f * n \ (mm/min)$$

Vf :Feed rate (mm/min) f :Feed pre revolutio(mm/rev)
n: Spindle speed~(rev/min)

● **Chip thickness**

$$h = f * sinkr \ (mm)$$

h :Chip thickness (mm) f:Feed pre revolutio(mm/rev)

● **Chip width**

$$b = \frac{ap}{sinkr} (m/min)$$

b :Chip width (mm) ap :Cutting depth (mm)

● **Chip cross section**

$$A = h * b = ap * f \ (mm^2)$$

A :Chip cross section (mm^2) ap :Cutting depth (mm)
f :Feed pre revolutio (mm/rev)

● **Cutting force**

$$Fc = Kc * ap * f \ (N)$$

Fc :Cutting force (N) Kc :Specific cutting force (N/mm^2)
ap :Cutting depth(mm) f:Feed pre revolutio(mm/rev)

● **Cutting power**

$$Pmot = \frac{Kc * Vc * ap * f}{60000 * \eta} (KW)$$

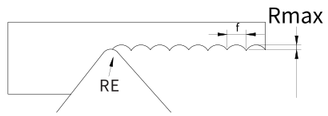
Pmot:Cutting power (KW) Kc:Specific cutting force(N/mm^2)
Vc:Cutting speed(m/min) ap:Cutting depth(mm)
f:Feed pre revolutio(mm/rev) η: Efficient of machine

● **Metal removal rate**

$$Q = ap * f * Vc \ (cm^3/min)$$

Q:Metal removal rate (cm^3/min) ap:Cutting depth(mm)
f :Feed pre revolutio(mm/rev) Vc:Cutting speed (m/min)

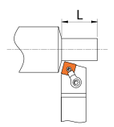
● **Roughness profile depth**



$$Rmax = \frac{f^2}{8 * RE} * 1000 \ (um)$$

Rmax: Roughness profile depth (um)
f:Feed pre revolutio(mm/rev) RE: Corner radius of insert(mm)

● **Machining time**



$$Tc = \frac{L}{f * n} (min)$$

Tc: Machining time f:Feed pre revolutio(mm/rev)
n: Spindle speed(rev/min) L:Machined length (mm)

Formulas for milling

● Cutting Speed

$$Vc = \frac{\pi * Dc * n}{1000} \ (m/min)$$

Vc :Cutting speed (m/min) π : ≈ 3.14
Dc :Cutter diameter (mm) n: Spindle speed(rev/min)

● Spindle Speed

$$n = \frac{1000 * Vc}{\pi * Dc} \ (rev/min)$$

Vc :Cutting speed(m/min) π : ≈ 3.14
Dc :Cutter diameter (mm) n: Spindle speed(rev/min)

● Feed Rate

$$Vf = fz * n * Z \ (mm/min)$$

Vf :Feed rate (mm/min) fz :Feed per tooth(mm/z)
n: Spindle speed(rev/min) Z :Number of tooth

● Feed Per Tooth

$$fz = \frac{Vf}{n * Z} \ (mm/z)$$

fz :Feed per tooth (mm/z) Vf :Feed rate (mm/min)
n: Spindle speed(rev/min) Z :Number of tooth

● Feed per revolution

$$f = \frac{Vf}{n} \ (mm/rev)$$

f :Feed per revolution (mm/rev) Vf :Feed rate (mm/min)
n: Spindle speed(rev/min)

● Cutting Time

$$Tc = \frac{L}{Vf} \ (min)$$

Tc :Cutting time (min) L :Length of cut (mm)
Vf :Feed rate (mm/min)

● Horse Power

$$Hp = \frac{Pmot}{0.75}$$

Hp :Horse power Pmot:Cutting power(KW)

● Power Requirement

$$Pmot = \frac{ap * ae * Vf * Kc}{6 * 10^7 * \eta} \ (KW)$$

Pmot: Cutting power (KW) ap: Cutting depth ae: Cutting width
Kc: Sepecific cutting force(N/mm^2) η: Machine efficiency rate (0.7-0.95)

● Medium Chip Thickness

$$hm = \frac{114.7 * fz * sink * (ae/Dc)}{\psi s} \ (mm)$$

hm: Medium chip thickness fz :Feed per tooth(mm/z) ae: Cutting width
Dc :Cutter diameter (mm) ψs :Engagement angle

● Feed Force

Where cutter is positioned centrally

$$\psi s = 2 * \arcsin\left(\frac{ae}{Dc}\right) \ [°]$$

Where cutter is positioned eccentrically

$$\psi s = 90° + \arcsin\frac{ae-(Dc/2)}{(Dc/2)} \ [°]$$

ψs :Engagement angle
ae: Cutting width Dc :Cutter diameter (mm)

● Metal Removal Rate

$$Q = \frac{ap * ae * Vf}{1000} \ (cm^3/min)$$

Q: Metal removal rate (cm^3/min) ap: Cutting depth ae: Cutting width
Vf :Feed rate (mm/min)

Formulas for drilling

● Cutting speed

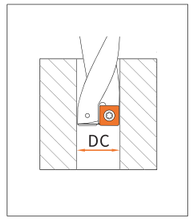
$$Vc = \frac{\pi * Dc * n}{1000} \ (m/min)$$

Vc :Cutting speed(m/min) π : ≈ 3.14
Dc :Cutter diameter (mm) n: Spindle speed(rev/min)

● Spindle speed

$$n = \frac{1000 * Vc}{\pi * Dc} \ (rev/min)$$

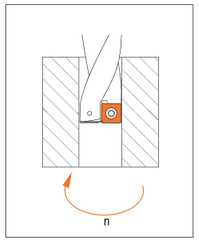
Vc :Cutting speed(m/min) π : ≈ 3.14
Dc :Cutter diameter (mm) n: Spindle speed(rev/min)



● Feed rate

$$Vf = fz * n * Z \ (mm/min)$$

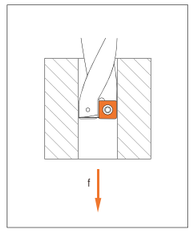
Vf:Feed rate (mm/min) fz:Feed per tooth(mm/z)
n: Spindle speed(rev/min) Z :Number of tooth



● Feed per revolution

$$fz = \frac{Vf}{n * Z} \ (mm/z)$$

fz:Feed per tooth(mm/z) Vf:Feed rate (mm/min)
n: Spindle speed(rev/min) Z :Number of tooth



● Feed per revolution

$$f = \frac{Vf}{n} \ (mm/rev)$$

f:Feed per revolution (mm/rev) Vf :Feed rate (mm/min)
n: Spindle speed(rev/min)

● Metal removal rate

$$Q = \frac{Vf * \pi * Dc^2}{4 * 1000} \ (cm^3/min)$$

Q: Metal removal rate (cm^3/min) Vf:Feed rate (mm/min)
π : ≈ 3.14 Dc :Drilling tool diameter(mm)

● Horse power

$$Hp = \frac{Pmot}{0.75}$$

Hp:Horse power Pmot: Cutting power(KW)

● Power requirment

$$Pmot = \frac{Q * Kc}{60000 * \eta} \ (KW)$$

Pmot: Cutting power (KW) Q: Metal removal rate (cm^3/min)
Kc: Sepecific cutting force(N/mm^2) η: Machine efficiency rate (0.7-0.95)

● Torque

$$Mc = \frac{Dc^2 * Kc * f}{8000} \ (N*m)$$

Mc: Torque Dc :Drilling tool diameter (mm)
Kc: Sepecific cutting force(N/mm^2) f:Feed per revolution(mm/rev)

● Feed force

$$Ff = 0.63 * \frac{f * Dc * Kc}{2} \ (N)$$

Ff: Feed force f :Feed per revolution (mm/rev)
Dc :Drilling tool diameter(mm) Kc: Sepecific cutting force(N/mm^2)

● Chip thickness

$$h = fz * sink \ (mm)$$

h:Chip thickness (mm) fz :Feed pre revolution(mm/rev)