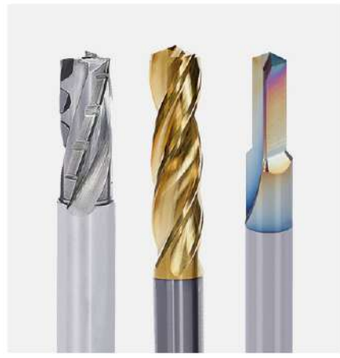
TECHNOLOGY AND INNOVATION

CUTTING TOOLS

ROTATION TOOL
SPECIAL TOOL
CBN/PCD INSERT
MILLING&TURNING
DRILLING

CUTTING TOOLS

DAEHYUP | for the world best CHAMPDIA CO.,LTD. | union Tool-Tech



DAEHYUP

B, 113-119, Suworam-gil, Seotan-myeon, Pyeongtaek-si,
Gyeonggido, 17704, Korea
TEL. +82-31-664-0945 **FAX**. +82-31-667-0944
E-MAIL. daehyup@daehyuptool.co.kr
www.daehyup.com

for the world best CHAMPDIA CO.,LTD.

113-109, Suworam-gil, Seotan-myeon, Pyeongtaek-si,
Gyeonggido, 17704, Korea
TEL. +82-31-664-0951 **FAX**. +82-31-664-0953
E-MAIL. cdtool@champdia.com
www.champdia.com

union Tool-Tech

212, Bupyeongbuk-ro, Bupyeong-gu, Incheon, 21315, Korea
TEL. +82-32-330-7690 **FAX**. +82-32-330-7695
E-MAIL. ssytt@ssytt.com
www.uniontooltech.com

E2309

DAEHYUP

for the world best CHAMPDIA CO.,LTD.

union Tool-Tech

Realizing
Best Customer Value

Since its establishment in 1986, we have been specializing in producing PCD, CBN, Ultra-precision diamond cutting tools, and tungsten carbide cutting tools, and built-up independent technologies at the top of the world through the continuous research and efforts of our excellent technicians.

Based on the management philosophy of producing the excellent products with the superior technology to achieve the best customer value, we have devoted ourselves to intensive equipment investment and advanced personnel expansion. As a result, we have grown into a company recognized for quality not only in Asian countries such as China and Japan, but also in North America and Europe.

We promise to constantly strive for the development of advanced technology based on creativity and innovation, in order to gratify our customers' trust and support, and not settle for less.

Think first
Future and Nature

Prioritize the future, nature, and environmental protection while producing and developing process our products.
We are growing as a sustainable company by creating future value through energy saving, recycling, and producing products with longer tool life.

Equipments with the world's highest precision

We possess multiple state-of-the-art facilities with world-class precision, and produce high-performance precision tools suitable for semiconductor, electronic/communication, and automotive component processing, which require high precision.

- Laser Machining
- Wire-Cutting Machining
- Data Analysis
- Precise Measurement

Certification

Research & Development

- Research and exploration of new business development projects and identification of new growth businesses.
- Conduct research on new projects and development of commissioned projects.
- Establishment and implementation of strategies for the development of new projects.

Securing Future Technological Competitiveness

We lead the market through the development of new technologies.

Enhancing Research Capabilities

We continuously improve our R&D capabilities through constant research and development.

Preceding Technology Research

We are striving to enhance the company's long-term competitiveness and secure growth by collecting information and conducting research on promising industries of the future.

Application

Optics

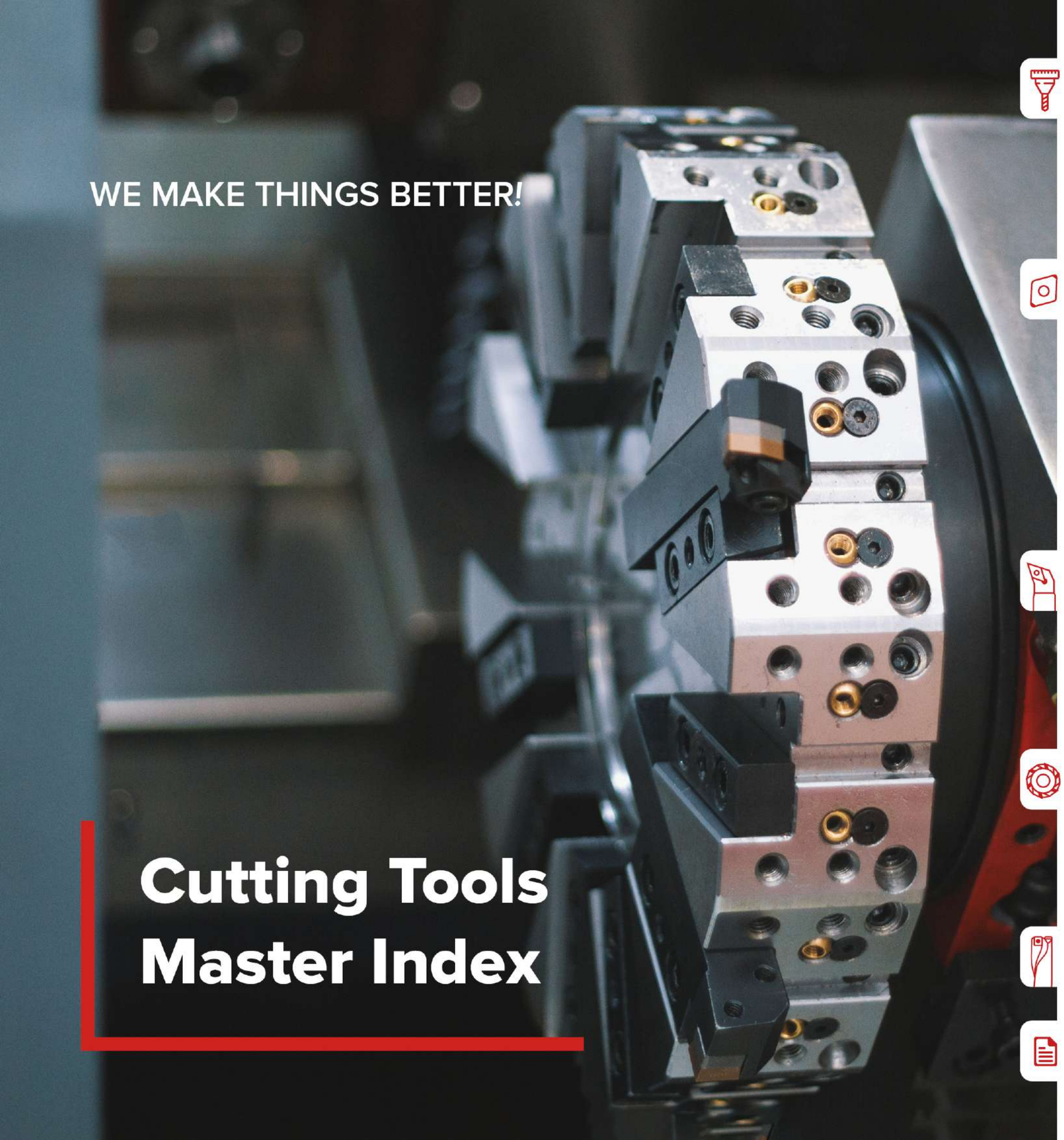
Precision Components

Medical

Aerospace

Automobile

IT



WE MAKE THINGS BETTER!

Cutting Tools Master Index

ROTATION · SPECIAL TOOL

Technology and Innovation

CBN/PCD Tool

- CBN Ball Cutter
- Holder Shank Type
- PCD Reamer
- PCD Burnishing Drill
- PCD Endmill
- PCD Countersink
- Window Bite

Tungsten Carbide Tool

- Twist Drill
- Burnishing Drill
- Endmill
- Reamer
- Router Endmill
- Form Tool

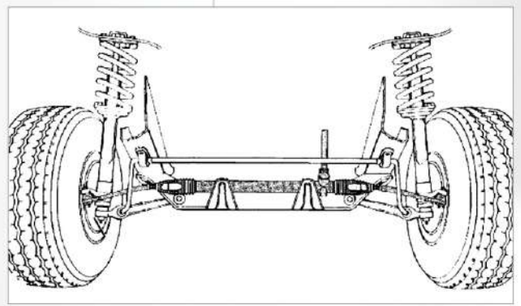
Special TOOL

- Cylinder Block
- Cylinder Head
- T/Mission Case
- Brake Housing
- Brake Carrier
- Knuckle
- Connecting Rod

CBN Ball Cutter

C.V Joint(Constant Velocity Joint)

✓ Coupling method that transmits rotational force without any change in angular velocity of the driving and driven shafts.

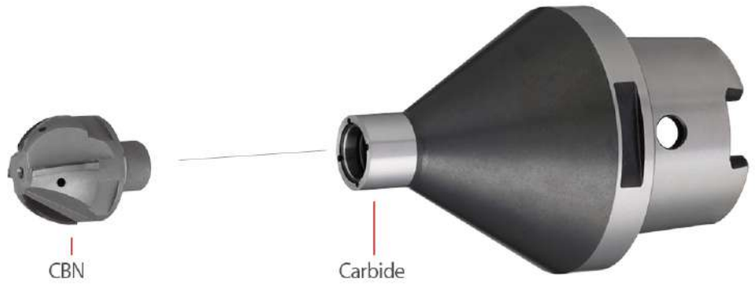


CBN/PCD Tool

CBN Ball Cutter

Hard Machining

- ✓ Vibration optimization through Steel body, Carbide shank, steel-head structure.
- ✓ With a high wear resistant carbide body, the structure remains stable even after 500 or more disassembling and reassembling cycles.



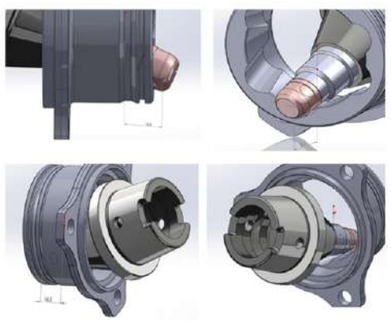
Optimum tool combination method

Adaptor Innerrace

Adaptor Outerrace

Review the optimal tool design through the 3D simulation

Innerrace



Outerrace

CBN/PCD Tool

CBN Ball Cutter

Soft Machining

- ✓ Easy to handle and quick head exchange.
- ✓ High rigidity and stable coupling structure that sufficiently transmits cutting force.
- ✓ Long tool life and high cutting speed through reduction of cutting load with helical shape of cutting edge.

Machining Process

1) Soft Machining

2) Tempering

3) Hard Machining

4) O.D grinding

5) Ball Track Milling

6) Final Product

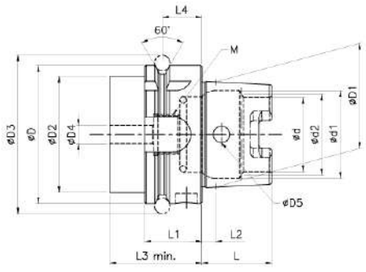
※ All specs customizable upon request

HSK Type

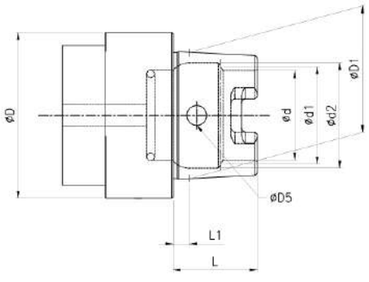
Applications

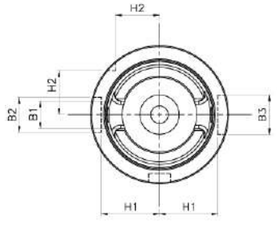
	ØD	ØD1	ØD2	ØD3	ØD4	ØD5	L	L1	L2	L3	L4
HSK 50A	50	38	42	59.3	6.8	6	25	26	5	42	18
HSK 63A	63	48	53	72.3	8.4	7.5	32	26	6.3	42	18
HSK 100A	100	75	88	109.75	12	12	50	29	10	45	20
HSK 80C	80	60	-	-	-	-	40	8	-	-	-

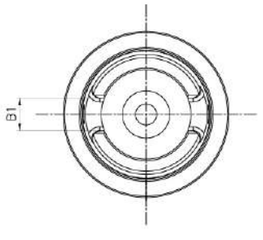
	Ød	Ød1	Ød2	B1	B2	B3	H1	H2
HSK 50A	26	32	29	10.54	14	12	21	15.5
HSK 63A	34	40	37	12.54	18	16	26.5	20
HSK 100A	53	63	58	20.02	22	20	44	31.5
HSK 80C	42	46	50	16	-	-	-	-



HSK A





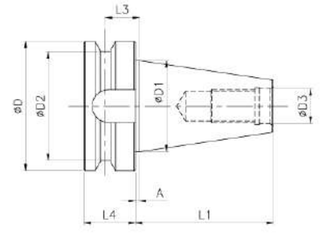


HSK 80C

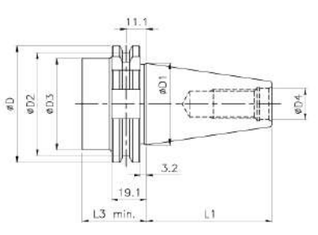
BT Type, SK Type, NT Type

Applications

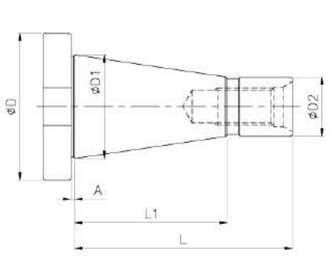
	ØD	ØD1	ØD2	ØD3	ØD4	L	L1	L2	L3	L4	A	B
BT30	46	31.75	38	12.5	-	-	48.4	16.3	13.6	20	2	16.1
BT40	63	44.45	53	17	-	-	65.4	22.6	16.6	25	2	16.1
BT50	100	69.85	85	5	-	-	101.8	35.4	23.2	35	3	25.7
SK40	63.55	44.45	56.25	50	17	-	68.4	22.8	25	18.5	-	16.1
SK50	97.5	69.85	91.25	80	25	-	101.75	35.5	37.7	30	-	25.7
NT30	46	31.75	17.4	-	-	68.4	48.4	16.2	-	-	1.6	16.1
NT35	53	38.1	21.4	-	-	80.4	56.4	19.5	-	-	1.6	16.1
NT40	63	44.45	25.3	-	-	93.4	65.4	22.5	-	-	1.6	16.1
NT45	85	57.15	32.4	-	-	106.8	82.8	29	-	-	3.2	19.3
NT50	100	69.85	39.6	-	-	130	101.8	35	-	-	3.2	25.4



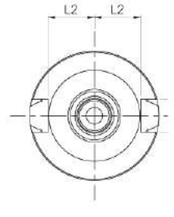
BT Type

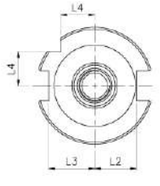


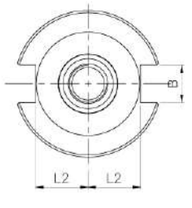
SK Type



NT Type





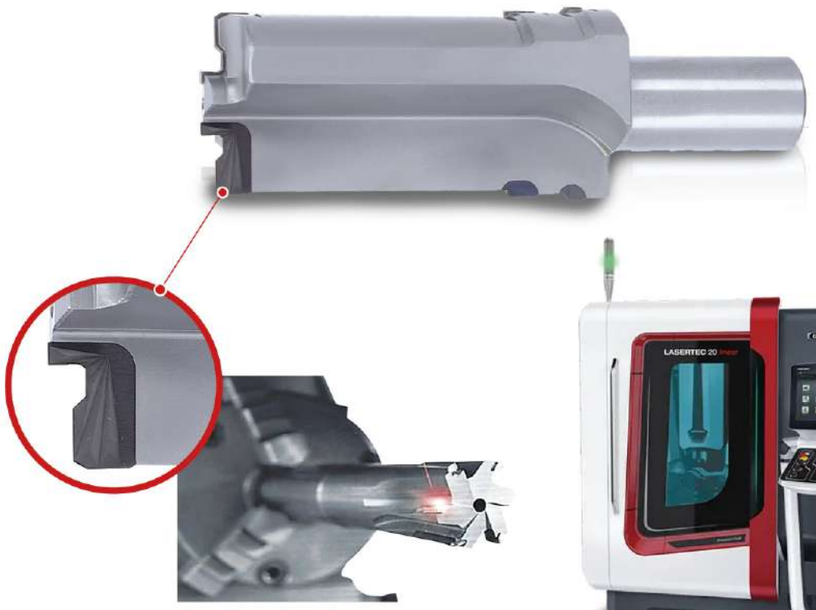


CBN/PCD Tool

PCD Reamer

- ✓ Realize high quality with concentricity, out of roundness and precision in any condition of machining.
- ✓ Maintain precise machining and excellent surface roughness quality by 2μm of machining

- ✓ Secure excellent machinability and stable tool life with fuse prevent of chip and efficient chip discharge



Laser Chip-breaker

Before applying the Chip-breaker

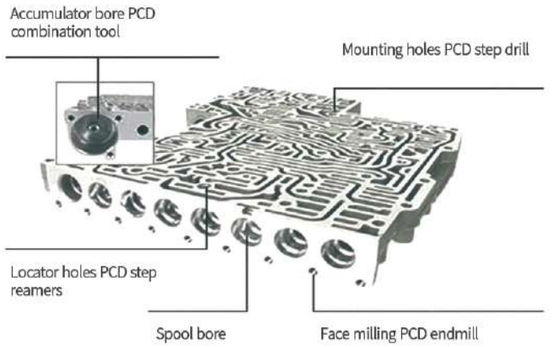
After applying the Chip-breaker

CBN/PCD Tool

PCD Burnishing Drill

- ✓ The PCD (Polycrystalline Diamond) material is used to manufacture the cutting edge, ensuring excellent wear resistance and cutting performance, as well as maintaining consistent quality in high-speed machining.
- ✓ With the addition of the Guide Pad, it serves as a burnishing role along with the margin, thus improving the surface roughness of the workpiece.

Cylinder block machining



CBN/PCD Tool

PCD Endmill

- ✓ Realize high productivity and cost savings by producing in various shapes of cutting.
- ✓ Maintain excellent surface roughness through WEDM (Wire Electric Discharge Machining) processing and precision grinding.

Throttle Body-A

Throttle Body-B

Brake master cylinder machining

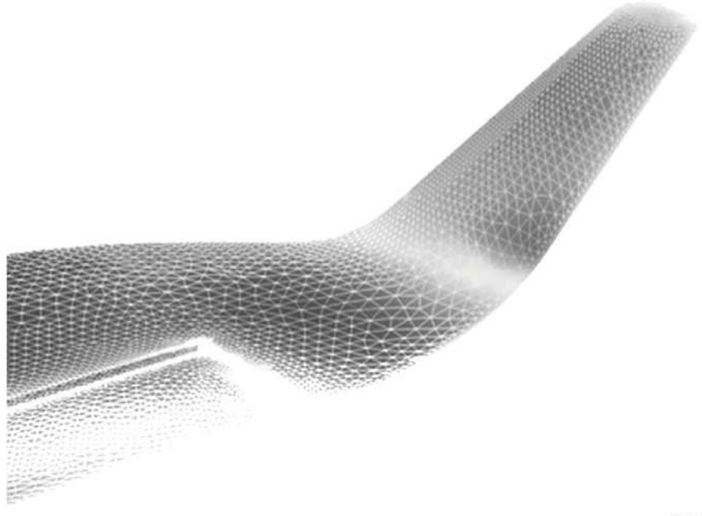
CWT ROTOR machining

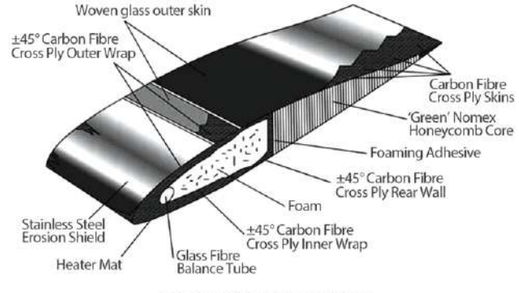
CWT housing machining

CBN/PCD Tool

PCD Countersink

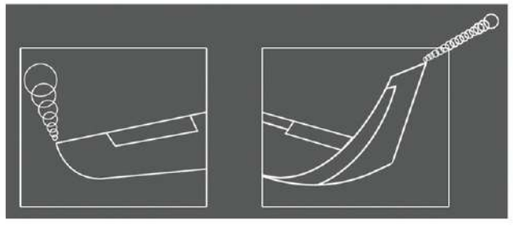
- ✓ Designed for cutting abrasives such as carbon composite materials, rubber, glass fiber, and carbon fiber. It is optimized for processing hard-to-machine materials such as CFRP, CGI, Titanium, Inconel, Sapphire, Gorilla Glass, especially in the aerospace industry.





Cross-Sectional View of a Composite Blade

SHARKLETS



Conventional Wingtip = More Drag

Sharkelt = Less Drag

CBN/PCD Tool

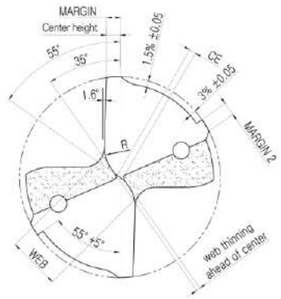
Window Bite

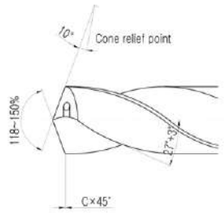
- Excellent machinability in machining of acrylic, engineering plastic materials, and mobile phone PCB boards.
- PCD's high wear resistance enables high-speed machining and maintains excellent tool life.

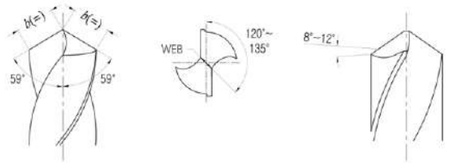
Tungsten Carbide Tool

Twist Drill

- High-quality ultra-fine carbide grade used. Increased processability through smooth chip flow and minimized cutting load during machining of aluminum and cast iron.





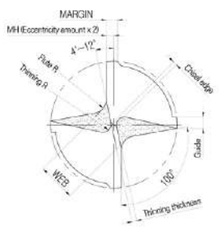


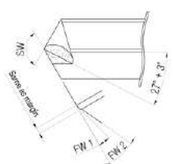
Burnishing Drill

- Guide Pad provides support for torsional force and serves as a self-guide to satisfy optimal cutting conditions with precision positioning and minimal load.

Recommended cutting conditions of Burnishing drill

Workpiece	Cutting speed (m/min)	Feed (m/min)
Aluminum, Zinc	40 ~ 100	0.05 ~ 0.1
Cast iron	30 ~ 80	0.05 ~ 0.1
Free cutting steel	30 ~ 50	0.05 ~ 0.1

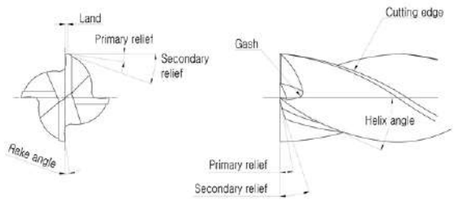


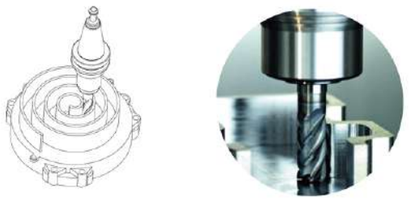


Tungsten Carbide Tool

Endmill

✓ Aluminum, steel, and other materials for cutting tools are selected based on their properties and uses, with a focus on high toughness and wear resistance. This results in improved cutting performance, tool life, and cost savings.





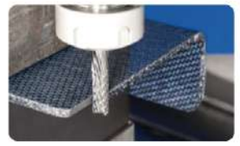
Scroll comp machining

Tungsten Carbide Tool

Router Endmill

✓ Excellent performance in the machining of various composite materials in the non-ferrous and non-metallic categories, such as carbon fiber reinforced plastic (CFRP), glass, and carbon fibers.

✓ Excellent wear resistance with high hardness of diamond coating.



CFRP machining

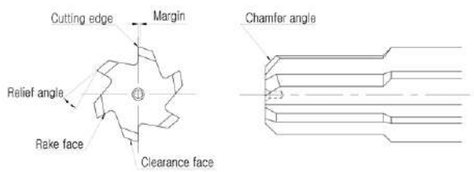
Carbon fiber machining

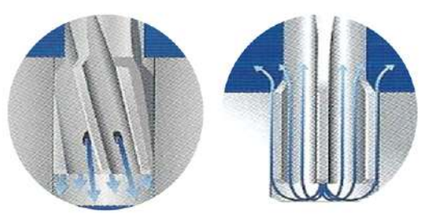
Plastic plane machining

Fiber glass machining

Reamer

✓ Provides precise cutting speed, accurate origin, and clean processing surface even when processing non-penetrating or penetrating holes in 2μm unit precision.





Through hole

Blind hole

Form Tool

✓ Simplified process due to cutting edge design according to cutting condition and shape of workpiece.

✓ Reduction machining times with singular tool.

Computer hard disk part machining

Cylinder Block

Face Oil Pan Cutter

Bearing Cap Cutter

Lock Notch Cutter

Face Nozzle Piston Cooling Endmill

Block Heads Cutter

Manufacturing Index Hole Processing Tool

Cylinder Block

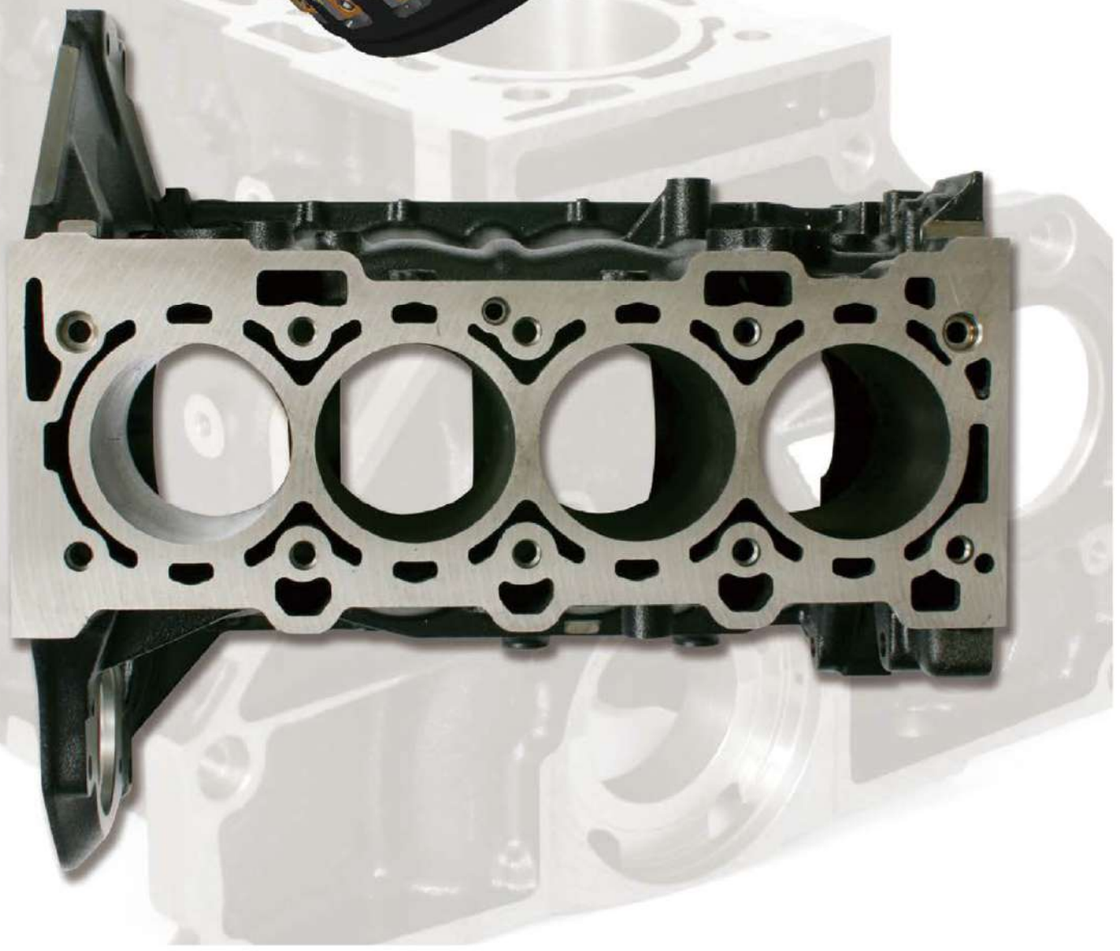
Cylinder Bore Semi & Finish Boring Tool

Cylinder Bore Honing Holder

Cylinder Bore Rough Boring Tool

Top Face Milling Cutter

Front Face Milling Cutter



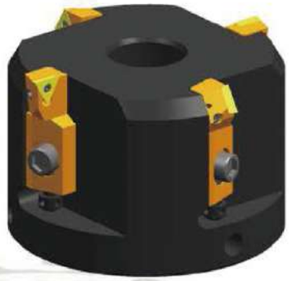
Cylinder Block

Rear Face Milling Cutter

Oil Main Channel Drill

Face Hole Transmission Drill

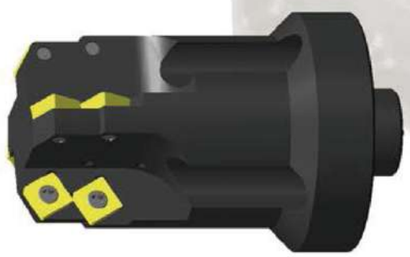
Slot Speed Sensor Endmill



Stop Face Sealing Crank Shaft Boring Tool

Crank Honing Holder

Face Mounting Bosses Milling Cutter



Cut Out Starter Boring Tool

Cylinder Head

Exhaust Face Milling Cutter

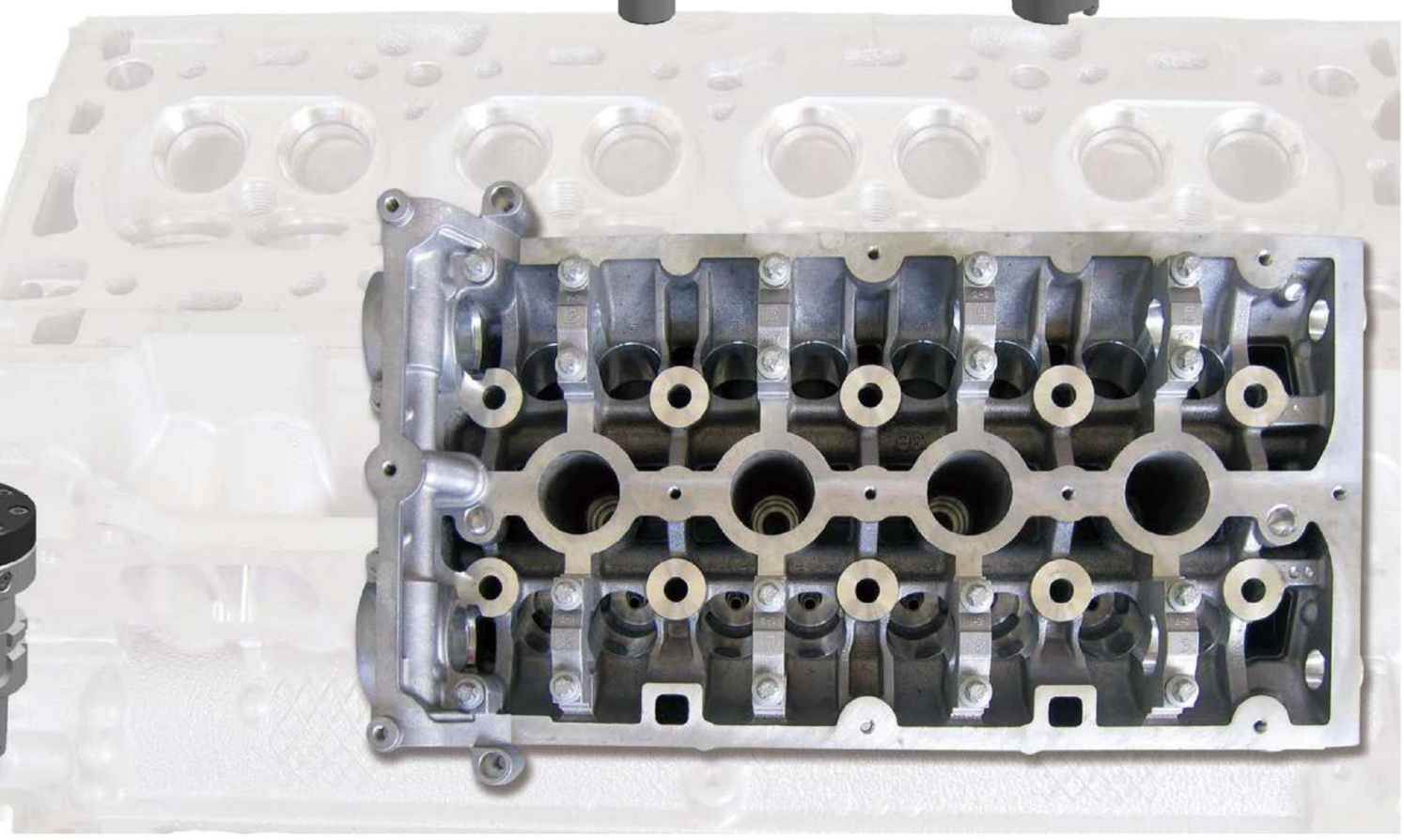
Top Face Milling Cutter

Seat Lifter-Valve In & Ex Boring Tool

Seat Lifter-Valve In & Ex Boring Tool

Spark Plug Hole Reamer

Valve Guide Seat Lifter Valve Boring Tool



Cylinder Head

Camshaft Bearing Chamfer

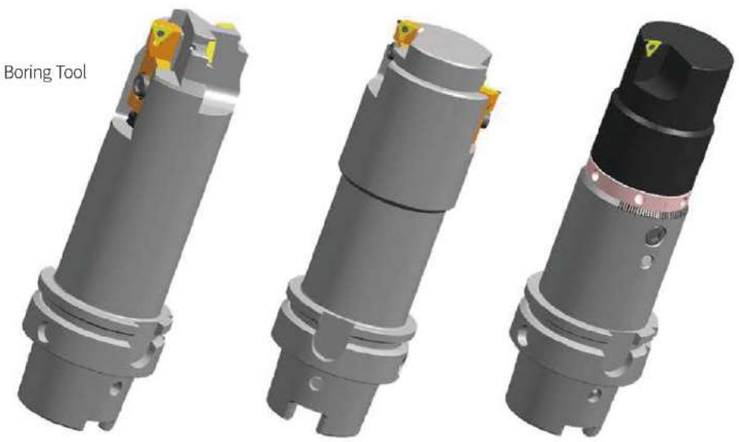
Valve Seat Guide Finish Boring Tool

Valve Seat Guide Boring Tool

Camshaft Bearing Finish Boring Tool

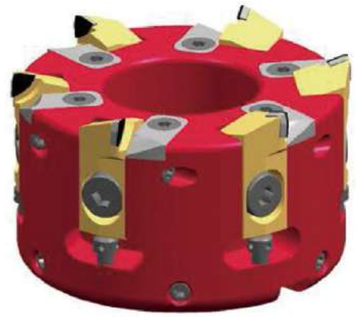
T/Mission Case

Gear Shift Shaft Lock Hole Boring Tool

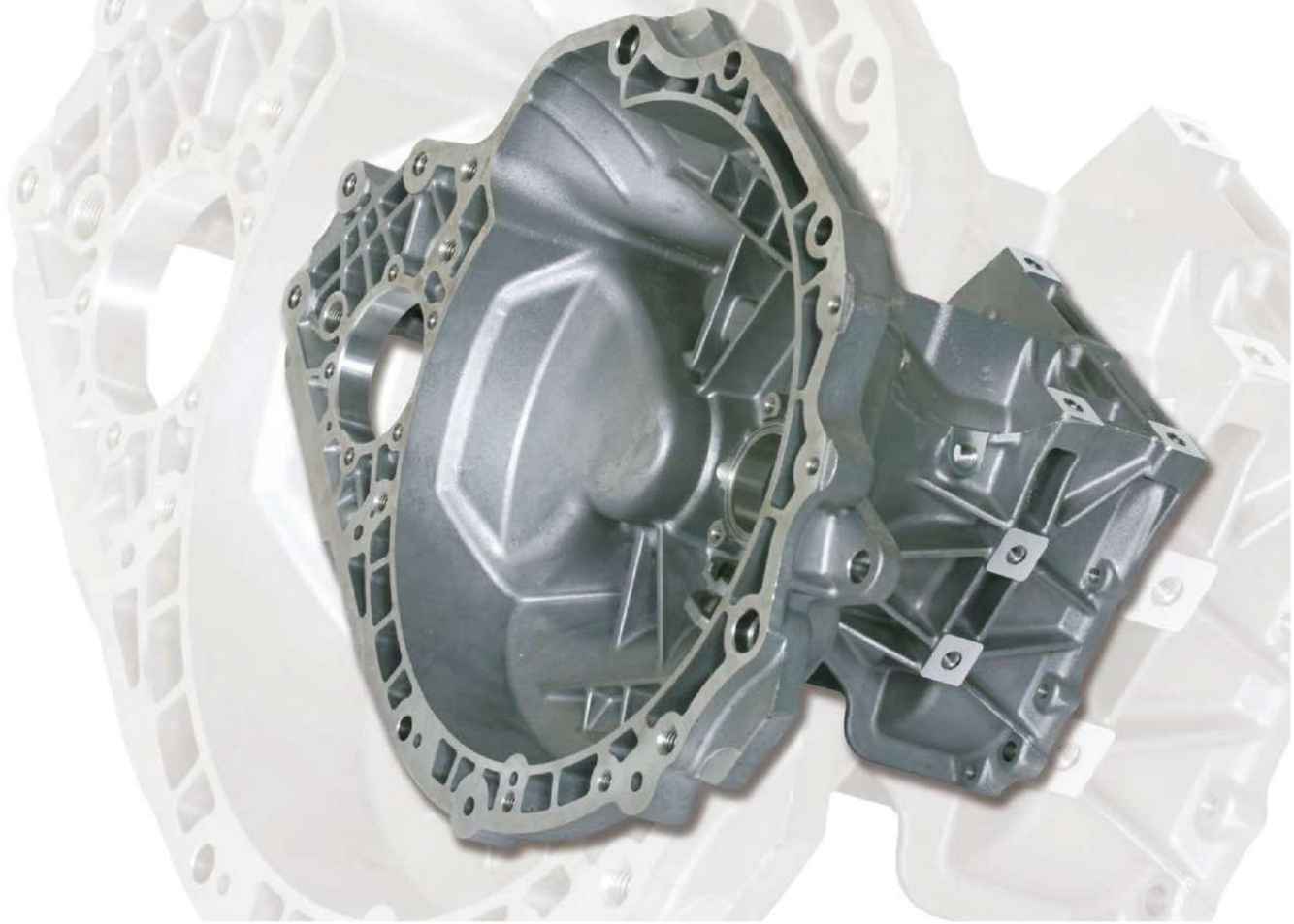


Dift Housing & Oil Seal Hole Boring Tool

Clutch Release Lever Hole Reamer

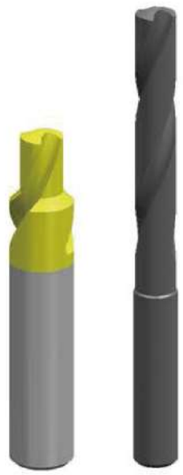


CPS Cover Attatched Face Milling Cutter



T/Mission Case

Counter Shaft Boring, Hole Boring Tool



Engine Mounting Hole Boring Tool

Special Tool

Brake Housing

Disc Path Milling Cutter

Main Bore Processing Tool

Lug Cutter

Special Tool

Brake Carrier

Hole Processing Tool

Carrier Cutter

Broach Holder

Special Tool

Knuckle

Special Tool

Connecting Rod

CBN· PCD Insert

Technology and Innovation

CBN Insert

- CBN Grade
- Turning Insert
- Milling Insert
- Rolling Insert
- Grooving Insert
- Solid Insert
- Coating Insert
- Chip-Breaker Insert (CBG)
- Wiper Insert

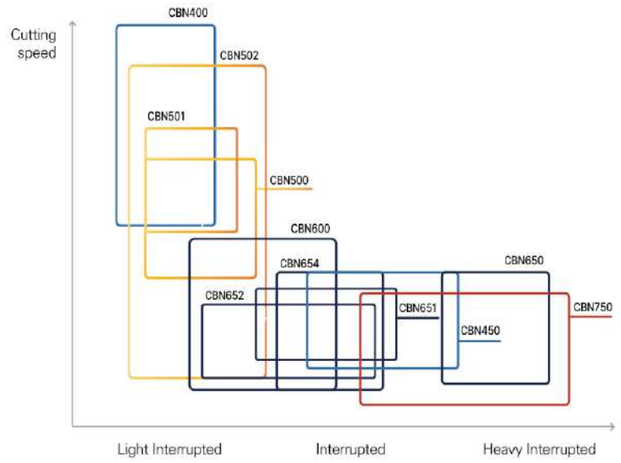
PCD Insert

- PCD Grade
- Turning Insert
- Milling Insert
- Grooving Insert
- Chip-Breaker Insert (CBL)

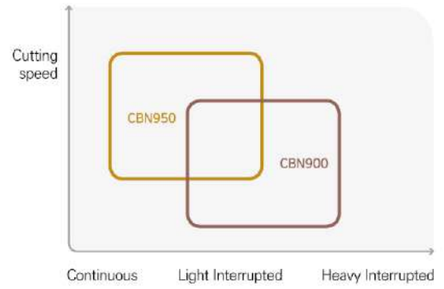
CBN Grade

✓ CBN Tool is a polycrystal CBN tool made by sintering particles of cubic boron nitride with high hardness next to diamond in a special environment of high temperature and high pressure.
As it is a high hardness material, it has excellent wear resistance for long life machining, provides high speed machining for heat-treated steel (high hardness material), sintered metal, casting iron, etc. due to non-reactivity with iron and as it also has high heat conductivity, it can quickly disperse heat and allows stable machining.

Workpiece	Grade	particle size(㎛)	Contenst of CBN (%)	Binder	Features
High-hardness steel	CBN400	2~3	40	TiCN	Excellent both wear resistance and breakage resistance by high bonding force between binder and abrasives Use : High speed finishing machining for hardened steel
	CBN450	Sub-㎛(1<)	45	TiCN	Excellent loss resistance and wear resistance by combination of fine particle CBN Use : Machining of heat-treated steel and continuous ~ light-interrupted for hardened steel
	CBN500	2	55	TiN/TiC	Excellent both wear resistance and breakage resistance by high bonding force between binder and abrasives Use : Finish cutting and continuous ~ light-interrupted machining for high-hardness steel
	CBN501	1~2	50	TiC	Excellent wear resistance material with high heat resistance. Use : Continuous machining and finish cutting machining for hardened steel
	CBN502	1~2	50	TiCN	Suitable for high efficiency machining with high cutting temperature due to excellent wear resistance and high heat resistance inherent in the material Use : General-purpose machining from continuous ~ interrupted cutting of hardened steel
	CBN600	2	60	TiN	Excellent fracture resistance by using the optimized binder. Use : Interrupted and general-purpose machining for high-hardness at high-precision machining.
	CBN650	1~4	65	TiCN	Applicable to various cutting with both heat resistance and wear resistance Use : General purpose machining from continuous ~ medium-interrupted cutting of hardened steel
	CBN651	2~3	65	TiN	Excellent both fracture resistance and wear resistance by using the optimized binder Use : Machining from continuous ~ heavy-interrupted cutting of hardened steel
	CBN652	2~3	60	TiCN	Excellent both crater resistance and chipping resistance, suitable for wet and dry cutting. Use : Stable machining at hardened alloy steel of interrupted, optimized for heat-treated steel.
	CBN654	3	65	TiN	Excellent both wear resistance and heat resistance Use : High speed ~ interrupted machining of hardened steel
	CBN73S	10	75	Ceramic	Superior toughness and excellent heat resistance Use : Machining of continuous ~ interrupted cut of hardened steel
	CBN750	2	85	Ti	
Sintered alloy and cast iron	CBN900	2	90	Ceramic	Strong sintered structure with balance between wear resistance and breakage resistance due to high CBN content Use : General purpose of high speed finishing for cast iron and sintered alloy
	CBN950	3	95	Ti alloy	Excellent loss resistance by using the optimized binder to strengthen CBN retention power Use : Finish cutting for cast iron



High-hardness steel machining



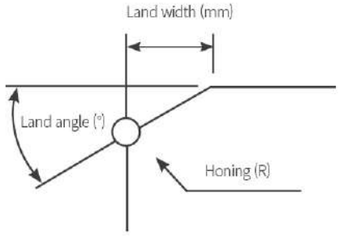
Sintering alloy and cast iron machining

CBN CUTTING EDGE SPECIFICATION GUIDE

Cutting edge specification

Workpiece	Land width (mm)	Land angle (°)	Honing (R)
Steel	0.1 ~ 0.2	25°	0.01 ~ 0.02
Cast iron	0.1 ~ 0.5	20°	<0.01
Interrupted	0.2	30°	0.01 ~ 0.03

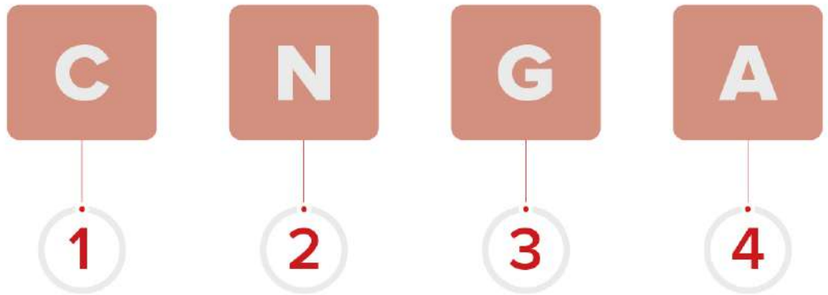
Code System



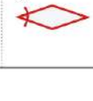
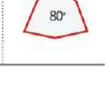
CNGA120408 0150250020

015	025	0020
Land width 0.15mm	Land angle 0.25°	Honing 0.02mm

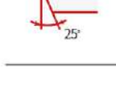
ISO Insert Code System



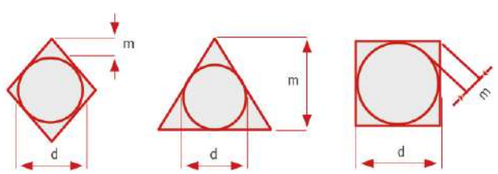
1. Shape of Insert

C	D	E	K	L
				
R	S	T	V	W
				

2. Relief angle

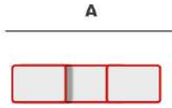
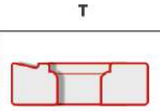
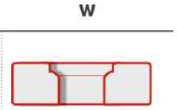
B	C	D	E
			
F	N	P	O
			Special

3. Tolerance



	Inscribe circle diameter (d)	Corner height (m)	Thickness (t)
H	±0.013	±0.013	±0.025
G	±0.025	±0.025	±0.13
M	±0.05 ~ ±0.15	±0.08 ~ ±0.20	±0.13

4. Insert type

A	T	W
		

N	X
	Special

5. Length of cutting edge

ISO							mm
03	04	03	06	03	-	02	3.97
04	05	04	08	04	08	S3	4.76
05	06	05	09	05	09	03	5.56
-	-	-	-	06	-	-	6.00
06	07	06	11	06	11	04	6.35
08	09	07	13	07	13	05	7.94
-	-	-	-	08	-	-	8.00
09	11	09	16	09	16	06	9.525
-	-	-	-	10	-	-	10.00
11	13	11	19	11	19	07	11.11
-	-	-	-	12	-	-	12.00
12	15	12	22	12	22	08	12.70
14	17	14	24	14	24	09	14.29
16	19	15	27	15	27	10	15.875
-	-	-	-	16	-	-	16.00
17	21	17	30	17	30	11	17.46
19	23	19	33	19	33	13	19.05
-	-	-	-	20	-	-	20.00
22	27	22	38	22	38	15	22.23
-	-	-	-	25	-	-	25.00
25	31	25	44	25	44	17	25.40
32	38	31	54	31	54	21	31.75
-	-	-	-	32	-	-	32.00

6. Thickness

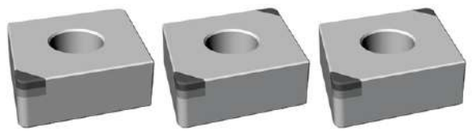
ISO	mm
01	1.59
T1	1.98
02	2.38
T2	2.78
03	3.18
T3	3.97
04	4.76
05	5.56
06	6.35
07	7.94
09	9.52
11	11.11
12	12.70

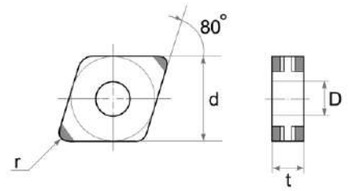
7. Nose radius

ISO	mm
01	0.1
02	0.2
04	0.4
08	0.8
12	1.2
16	1.6
20	2.0
24	2.4
28	2.8
32	3.2
00	Round Insert (Inch)
M0	Round Insert (Metric)

Turning Insert

CNGA

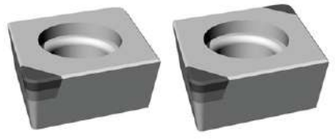


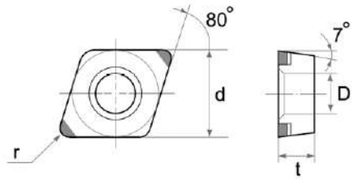


Product Code	Tip Size	d	t	r	D	CBN 450	CBN 500	CBN 501	CBN 650	CBN 73S	CBN 900	CBN 950
CNGA120404	2.6	12.7	4.76	0.4	5.16							
CNGA120408	2.5	12.7	4.76	0.8	5.16				▶			▶
CNGA120412	2.4	12.7	4.76	1.2	5.16							
CNGA120404N2	2.6	12.7	4.76	0.4	5.16							
CNGA120408N2	2.5	12.7	4.76	0.8	5.16				▶			▶
CNGA120412N2	2.4	12.7	4.76	1.2	5.16							
CNGA120404N4	2.6	12.7	4.76	0.4	5.16							
CNGA120408N4	2.5	12.7	4.76	0.8	5.16							
CNGA120412N4	2.4	12.7	4.76	1.2	5.16							

▶ Stock

CCGW

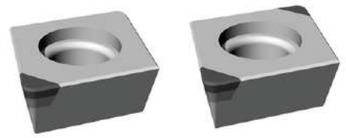


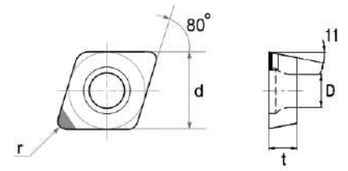


Product Code	Tip Size	d	t	r	D	CBN 450	CBN 500	CBN 501	CBN 650	CBN 73S	CBN 900	CBN 950
CCGW060204	2.6	6.35	2.38	0.4	2.8							
CCGW060208	2.5	6.35	2.38	0.8	2.8				▶			▶
CCGW09T304	2.6	9.525	3.97	0.4	4.4							
CCGW09T308	2.5	9.525	3.97	0.8	4.4				▶			▶
CCGW120404	2.6	12.7	4.76	0.4	5.5							
CCGW120408	2.5	12.7	4.76	0.8	5.5							
CCGW060204N2	2.6	6.35	2.38	0.4	2.8							
CCGW060208N2	2.5	6.35	2.38	0.8	2.8				▶			▶
CCGW09T304N2	2.6	9.525	3.97	0.4	4.4							
CCGW09T308N2	2.5	9.525	3.97	0.8	4.4				▶			▶
CCGW120404N2	2.6	12.7	4.76	0.4	5.5							
CCGW120408N2	2.5	12.7	1.76	0.8	5.5							

▶ Stock

CPGW

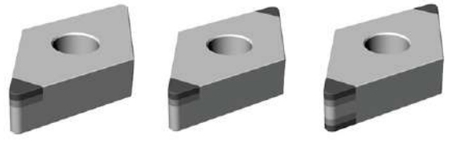


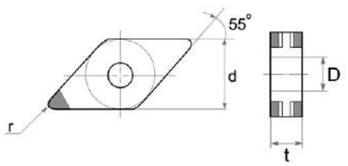


Product Code	Tip Size	d	t	r	D	CBN 450	CBN 500	CBN 501	CBN 650	CBN 73S	CBN 900	CBN 950
CPGW060204	2.6	6.35	2.38	0.4	2.8							
CPGW060208	2.5	6.35	2.38	0.8	2.8				▶			▶
CPGW090304	2.6	9.525	3.18	0.4	4.4							
CPGW090308	2.5	9.525	3.18	0.8	4.4				▶			▶
CPGW120404	2.6	12.7	4.76	0.4	5.5							
CPGW120408	2.5	12.7	4.76	0.8	5.5				▶			▶
CPGW060204N2	2.6	6.35	2.38	0.4	2.8							
CPGW060208N2	2.5	6.35	2.38	0.8	2.8				▶			▶
CPGW090304N2	2.6	9.525	3.18	0.4	4.4							
CPGW090308N2	2.5	9.525	3.18	0.8	4.4				▶			▶
CPGW120404N2	2.6	12.7	4.76	0.4	5.5							
CPGW120408N2	2.5	12.7	4.76	0.8	5.5				▶			▶

▶ Stock

DNGA



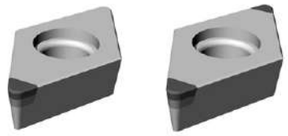


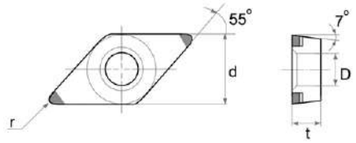
Product Code	Tip Size	d	t	r	D	CBN 450	CBN 500	CBN 501	CBN 650	CBN 73S	CBN 900	CBN 950
DNGA150404	2.5	12.7	4.76	0.4	5.16							
DNGA150408	2.1	12.7	4.76	0.8	5.16				▶			▶
DNGA150412	1.8	12.7	4.76	1.2	5.16							
DNGA150604	2.5	12.7	6.35	0.4	5.16							
DNGA150608	2.1	12.7	6.35	0.8	5.16				▶			▶
DNGA150612	1.8	12.7	6.35	1.2	5.16							
DNGA150404N2	2.5	12.7	4.76	0.4	5.16							
DNGA150408N2	2.1	12.7	4.76	0.8	5.16				▶			▶
DNGA150412N2	1.8	12.7	4.76	1.2	5.16							
DNGA150604N2	2.5	12.7	6.35	0.4	5.16							
DNGA150608N2	2.1	12.7	6.35	0.8	5.16				▶			▶
DNGA150612N2	1.8	12.7	6.35	1.2	5.16							
DNGA150404N4	2.5	12.7	4.76	0.4	5.16							
DNGA150408N4	2.1	12.7	4.76	0.8	5.16							
DNGA150412N4	1.8	12.7	4.76	1.2	5.16							
DNGA150604N4	2.5	12.7	6.35	0.4	5.16							
DNGA150608N4	2.1	12.7	6.35	0.8	5.16							
DNGA150612N4	1.8	12.7	6.35	1.2	5.16							

▶ Stock

Turning Insert

DCGW

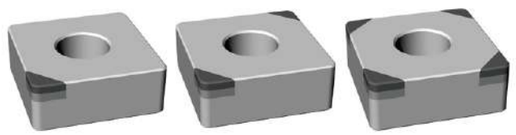


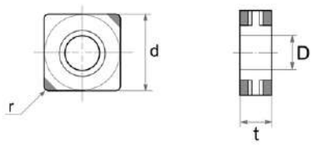


Product Code	Tip Size	d	t	r	D	CBN 450	CBN 500	CBN 501	CBN 650	CBN 73S	CBN 900	CBN 950
DCGW070204	2.5	6.35	2.38	0.4	2.8							
DCGW070208	2.1	6.35	2.38	0.8	2.8				▶			▶
DCGW11T304	2.5	9.525	3.97	0.4	4.4							
DCGW11T308	2.1	9.525	3.97	0.8	4.4				▶			▶
DCGW11T312	1.7	9.525	3.97	1.2	4.4							
DCGW070204N2	2.5	6.35	2.38	0.4	2.8							
DCGW070208N2	2.1	6.35	2.38	0.8	2.8				▶			▶
DCGW11T304N2	2.5	9.525	3.97	0.4	4.4							
DCGW11T308N2	2.1	9.525	3.97	0.8	4.4				▶			▶
DCGW11T312N2	1.7	9.525	3.97	1.2	4.4							

▶ Stock

SNGA

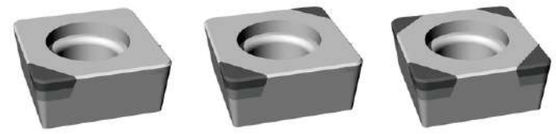


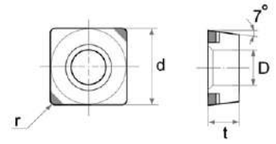


Product Code	Tip Size	d	t	r	D	CBN 450	CBN 500	CBN 501	CBN 650	CBN 73S	CBN 900	CBN 950
SNGA120404	2.8	12.7	4.76	0.4	5.16							
SNGA120408	2.8	12.7	4.76	0.8	5.16				▶			▶
SNGA120412	2.8	12.7	4.76	1.2	5.16							
SNGA120404N2	2.8	12.7	4.76	0.4	5.16							
SNGA120408N2	2.8	12.7	4.76	0.8	5.16				▶			▶
SNGA120412N2	2.8	12.7	4.76	1.2	5.16							
SNGA120404N4	2.8	12.7	4.76	0.4	5.16							
SNGA120408N4	2.8	12.7	4.76	0.8	5.16							
SNGA120412N4	2.8	12.7	4.76	1.2	5.16							

▶ Stock

SCGW

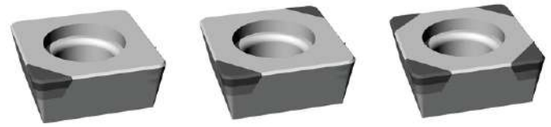


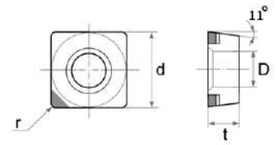


Product Code	Tip Size	d	t	r	D	CBN 450	CBN 500	CBN 501	CBN 650	CBN 73S	CBN 900	CBN 950
SCGW09T304	2.8	9.525	3.97	0.4	2.8							
SCGW09T308	2.8	9.525	3.97	0.8	2.8				▶			▶
SCGW09T304N2	2.8	9.525	3.97	0.4	4.4							
SCGW09T308N2	2.8	9.525	3.97	0.8	4.4				▶			▶
SCGW09T304N4	2.8	9.525	3.97	0.4	4.4							
SCGW09T308N4	2.8	9.525	3.97	0.8	4.4							

▶ Stock

SPGW



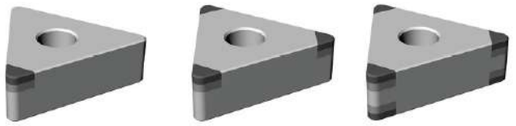


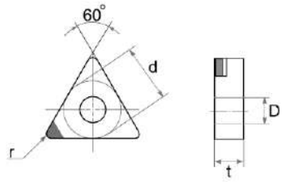
Product Code	Tip Size	d	t	r	D	CBN 450	CBN 500	CBN 501	CBN 650	CBN 73S	CBN 900	CBN 950
SPGW09T304	2.8	9.525	3.97	0.4	2.8							
SPGW09T308	2.8	9.525	3.97	0.8	2.8				▶			▶
SPGW09T304N2	2.8	9.525	3.97	0.4	4.4							
SPGW09T308N2	2.8	9.525	3.97	0.8	4.4				▶			▶
SPGW09T304N4	2.8	9.525	3.97	0.4	4.4							
SPGW09T308N4	2.8	9.525	3.97	0.8	4.4							

▶ Stock

Turning Insert

TNGA

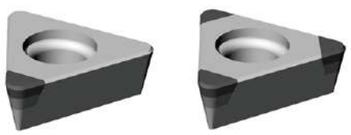


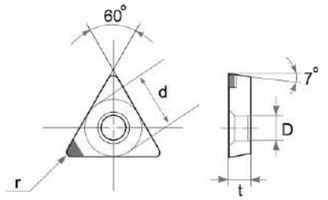


Product Code	Tip Size	d	t	r	D	CBN 450	CBN 500	CBN 501	CBN 650	CBN 73S	CBN 900	CBN 950
TNGA160404	2.6	9.525	4.76	0.4	3.81							
TNGA160408	2.3	9.525	4.76	0.8	3.81				▶			▶
TNGA160412	2.0	9.525	4.76	1.2	3.81							
TNGA160404N3	2.6	9.525	4.76	0.4	3.81							
TNGA160408N3	2.3	9.525	4.76	0.8	3.81							
TNGA160412N3	2.0	9.525	4.76	1.2	3.81							
TNGA160404N6	2.6	9.525	4.76	0.4	3.81							
TNGA160408N6	2.3	9.525	4.76	0.8	3.81							
TNGA160412N6	2.0	9.525	4.76	1.2	3.81							

▶ Stock

TCGW

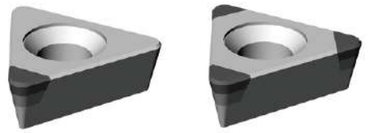


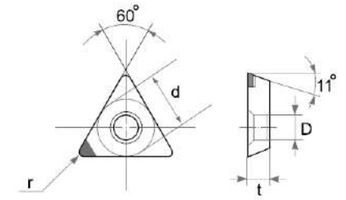


Product Code	Tip Size	d	t	r	D	CBN 450	CBN 500	CBN 501	CBN 650	CBN 73S	CBN 900	CBN 950
TCGW090204	2.6	5.56	2.38	0.4	2.8							
TCGW090208	2.3	5.56	2.38	0.8	2.8				▶			▶
TCGW110204	2.6	6.35	2.38	0.4	2.8							
TCGW110208	2.3	6.35	2.38	0.8	2.8				▶			▶
TCGW16T304	2.6	9.525	3.97	0.4	4.4							
TCGW16T308	2.3	9.525	3.97	0.8	4.4				▶			▶
TCGW090204N3	2.6	5.56	2.38	0.4	2.8							
TCGW090208N3	2.3	5.56	2.38	0.8	2.8							
TCGW110204N3	2.6	6.35	2.38	0.4	2.8							
TCGW110208N3	2.3	6.35	2.38	0.8	2.8							
TCGW16T304N3	2.6	9.525	3.97	0.4	4.4							
TCGW16T308N3	2.3	9.525	3.97	0.8	4.4							

▶ Stock

TPGB

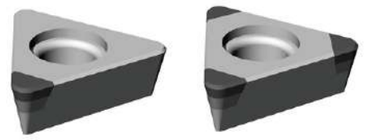


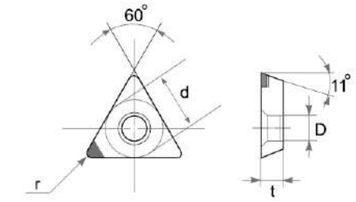


Product Code	Tip Size	d	t	r	D	CBN 450	CBN 500	CBN 501	CBN 650	CBN 73S	CBN 900	CBN 950
TPGB110304	2.6	6.35	3.18	0.4	3.3							
TPGB110308	2.3	6.35	3.18	0.8	3.3				▶			▶
TPGB110304N3	2.6	6.35	3.18	0.4	3.3							
TPGB110308N3	2.3	6.35	3.18	0.8	3.3							

▶ Stock

TPGW

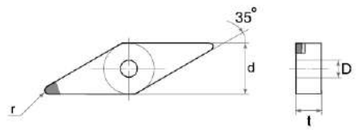




Product Code	Tip Size	d	t	r	D	CBN 450	CBN 500	CBN 501	CBN 650	CBN 73S	CBN 900	CBN 950
TPGW110304	2.6	6.35	3.18	0.4	3.3							
TPGW110308	2.3	6.35	3.18	0.8	3.3				▶			▶
TPGW160304	2.6	9.525	3.18	0.4	4.4							
TPGW160308	2.3	9.525	3.18	0.8	4.4				▶			▶
TPGW110304N3	2.6	6.35	3.18	0.4	3.3							
TPGW110308N3	2.3	6.35	3.18	0.8	3.3							
TPGW160304N3	2.6	9.525	3.18	0.4	4.4							
TPGW160308N3	2.3	9.525	3.18	0.8	4.4							

▶ Stock

VNGA



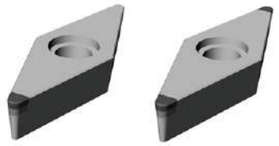
Product Code	Tip Size	d	t	r	D	CBN 450	CBN 500	CBN 501	CBN 650	CBN 73S	CBN 900	CBN 950
VNGA160404	2.8	9.525	4.76	0.4	3.81							
VNGA160408	2.0	9.525	4.76	0.8	3.81				▶			▶
VNGA160404N2	2.8	9.525	4.76	0.4	3.81							
VNGA160408N2	2.0	9.525	4.76	0.8	3.81				▶			▶
VNGA160404N4	2.8	9.525	4.76	0.4	3.81							
VNGA160408N4	2.0	9.525	4.76	0.8	3.81							

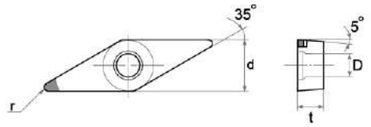
▶ Stock

CBN Insert

Turning Insert

VBGW

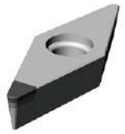


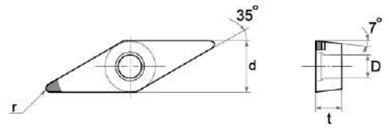


Product Code	Tip Size	d	t	r	D	CBN 450	CBN 500	CBN 501	CBN 650	CBN 73S	CBN 900	CBN 950
VBGW110304	2.8	6.35	3.18	0.4	2.8							
VBGW110308	2.0	6.35	3.18	0.8	2.8				▶			▶
VBGW160404	2.8	9.525	4.76	0.4	4.4							
VBGW160408	2.0	9.525	4.76	0.8	4.4				▶			▶
VBGW110304N2	2.8	6.35	3.18	0.4	2.8							
VBGW110308N2	2.0	6.35	3.18	0.8	2.8				▶			▶
VBGW160404N2	2.8	9.525	4.76	0.4	4.4							
VBGW160408N2	2.0	9.525	4.76	0.8	4.4				▶			▶

▶ Stock

VCGW

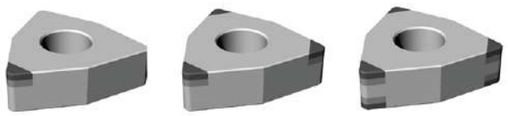


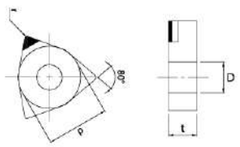


Product Code	Tip Size	d	t	r	D	CBN 450	CBN 500	CBN 501	CBN 650	CBN 73S	CBN 900	CBN 950
VCGW110304	4.3	6.35	3.18	0.4	2.8							
VCGW110308	3.4	6.35	3.18	0.8	2.8				▶			▶
VCGW160404	4.3	9.525	4.76	0.4	4.4							
VCGW160408	3.4	9.525	4.76	0.8	4.4				▶			▶

▶ Stock

WNGA



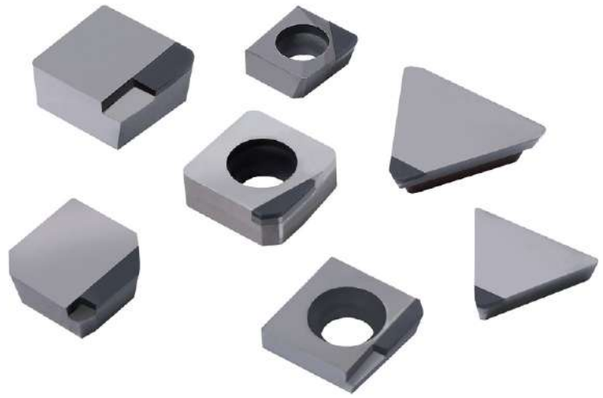


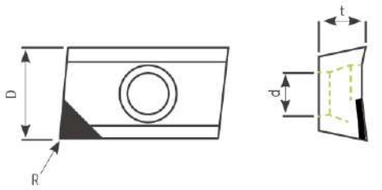
Product Code	Tip Size	d	t	r	D	CBN 450	CBN 500	CBN 501	CBN 650	CBN 73S	CBN 900	CBN 950
WNGA080404	2.6	12.7	4.76	0.4	5.16							
WNGA080408	2.5	12.7	4.76	0.8	5.16				▶			▶
WNGA080412	2.4	12.7	4.76	1.2	5.16							
WNGA080404N3	2.6	12.7	4.76	0.4	5.16							
WNGA080408N3	2.5	12.7	4.76	0.8	5.16							
WNGA080412N3	2.4	12.7	4.76	1.2	5.16							
WNGA080404N6	2.6	12.7	4.76	0.4	5.16							
WNGA080408N6	2.5	12.7	4.76	0.8	5.16							
WNGA080412N6	2.4	12.7	4.76	1.2	5.16							

▶ Stock

CBN Insert

Milling Insert





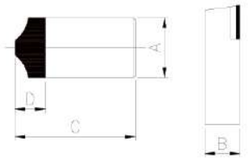
Product Code		D	t	R	d	CBN 500	CBN 650	CBN 900	CBN 950
OFC□	0704□□□□	18.0	4.863	-	-				
SE□N	1203□□□□	12.7	3.18	-	-				
	1504□□□□	15.875	4.76	-	-				
SNEW (Wiper)	09T3□□□□	9.525	3.97	-	4.4				
	1203□□□□	12.7	3.18	-	5.5				
	1204□□□□	12.7	4.78	-	6.0				▶
SNGN (Wiper)	1206□□□□	12.7	6.35	-	-				
SN□N	1203□□□□	12.7	4.76	-	-				
	1504□□□□	15.875	4.76	-	-				
S□CN	1203□□□□	12.7	3.18	-	-				
	1504□□□□	15.875	4.76	-	-				
TP□N	1603□□□□	9.525	3.18	-	-				
	2204□□□□	12.7	4.76	-	-				
YPEN (Wiper)	1406□□□□-L/R	14.5	6.35	-	-				
	1504□□□□-L/R	15.875	4.76	-	-				▶
	1505□□□□-L/R	15.0	5.7	-	-			▶	

▶ Stock

CBN Insert

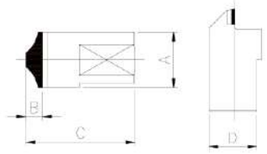
Rolling Insert

Notch Insert (F Type)



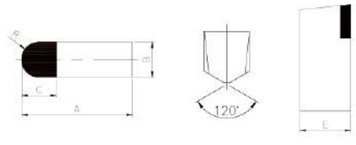
Product Code	A	B	C	D	CBN 950
D10	5.0	3.0	8.0	3.0	
D13	6.0	3.0	12.0	3.5	
D16	8.0	6.0	15.0	4.0	
D19	10.0	6.0	17.0	4.5	
D22	12.0	8.0	21.0	4.0	
D25	12.0	8.0	24.0	4.0	
D29	14.0	8.0	27.5	4.2	

Notch Insert (A Type)



Product Code	A	B	C	D	CBN 950
D10A	4.0	1.5	7.2	3.5	
D13A	4.0	1.5	9.0	3.5	
D16A	6.0	1.8	11.8	5.5	
D19A	8.0	3.0	15.0	7.4	
D22A	8.0	3.0	16.5	7.4	
D25A	10.0	4.0	2.0	9.2	

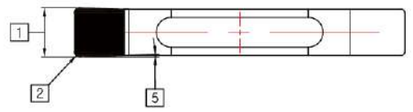
R Insert

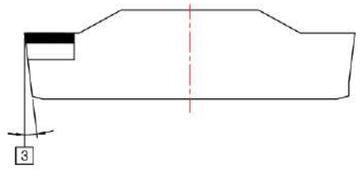


Product Code	A	B	C	R	E	CBN 950
CBN-6(3R)	25.0	6.0	7.0	3.0	9.0	
CBN-8(4R)	25.0	8.0	9.0	4.0	9.0	
CBN-12(6R)	25.0	12.0	11.0	6.0	9.0	

CBN Insert

Grooving Insert





G 1 - R 2 -3 / 4 -5 □□□□

- 1 — Width
- 2 — Corner R
- 3 — Front relief
- 4 — Side relief
- 5 — Back taper
- □□□□ — Insert type

Product Code	Width	Corner R	Front relief (°)	Side relief (°)	Back taper(°)
G1.5-R04-06/05-01-□□□□	1.5	0.4	6	5	1
G1.5-R08-06/05-02-□□□□	1.5	0.8	6	5	2
G2.0-R04-06/05-01-□□□□	2.0	0.4	6	5	1
G2.0R08-06/05-02-□□□□	2.0	0.8	6	5	2
G2.5-R04-06/05-01-□□□□	2.5	0.4	6	5	1
G2.5-R08-06/05-02-□□□□	2.5	0.8	6	5	2
G3.0-R04-06/05-01-□□□□	3.0	0.4	6	5	1
G3.0-R08-06/05-02-□□□□	3.0	0.8	6	5	2
G3.5-R04-06/05-01-□□□□	3.5	0.4	6	5	1
G3.5-R08-06/05-02-□□□□	3.5	0.8	6	5	2
G4.0-R04-06/05-01-□□□□	4.0	0.4	6	5	1
G4.0-R08-06/05-02-□□□□	4.0	0.8	6	5	2
G4.5-R04-06/05-01-□□□□	4.5	0.4	6	5	1
G4.5-R08-06/05-02-□□□□	4.5	0.8	6	5	2
G5.0-R04-06/05-01-□□□□	5.0	0.4	6	5	1
G5.0-R08-06/05-02-□□□□	5.0	0.8	6	5	2

▶ Stock

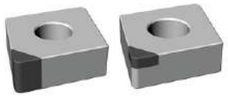
CBN Insert

Solid Insert

✓ AS types that maximize both wear resistance and breakage resistance of the entire insert and enable the use of the insert as a cutting edge and TS, HS, and FT types that allow efficient machining and cost savings in high-volume machining with the use of the cutting edge of the Corner itself.
It is effective for high-speed finishing as well as roughing, which is difficult in a normal tip brazing method.
Also available for wide range of cutting area by adding solid grade in low diamond content.

AS(ALL-SOLID) - All corner used.

As various solid grade from low content to high content are added, solid CBN tools from the existing high content-oriented solid CBN to low content can be made.



TS(TIP-SOLID) - Upper/lower corner used
HS(HALF-SOLID) - Only one corner cutting edge used

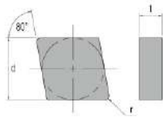
As solid CBN tool material is brazed to substrate, it makes solid CBN available at a little cost and it is also available for application to insert with a hole it can be used for more various sizes.

FT(FULL-TOP-SOLID) - Upper surface all corner used

It can perform more stable and efficient machining that normal brazing CBN insert in machining for large depth of cutting and also perform chamfering process using side edge.

Solid Insert (AS)

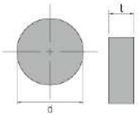
CNGN



Product Code	Tip Size	d	t	r	D	CBN 73S	CBN 900S	CBN 10S	CBN 60S
CNGN090304AS	-	9.525	3.18	0.4	-				
CNGN090308AS	-	9.525	3.18	0.8	-				
CNGN090312AS	-	9,525	3.18	1.2	-				
CNGN120404AS	-	12.7	476	0.4	-				
CNGN120408AS	-	12.7	4.76	0.8	-				
CNGN120412AS	-	12.7	4.76	1.2	-				

▶ Stock

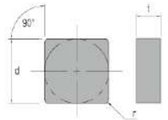
RNGN



Product Code	Tip Size	d	t	r	D	CBN 73S	CBN 900S	CBN 10S	CBN 60S
RNGN090300AS	-	9.525	3.18	-	-				
RNGN120300AS	-	12.7	3.18	-	-				
RNGN120400AS	-	12.7	4.75	-	-				

▶ Stock

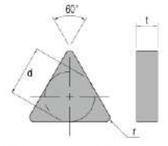
SNGN



Product Code	Tip Size	d	t	r	D	CBN 73S	CBN 900S	CBN 10S	CBN 60S
SNGN090304AS	-	9.525	3.18	0.4	-				
SNGN090308AS	-	9.525	3.18	0.8	-				
SNGN090312AS	-	9,525	3.18	1.2	-				
SNGN120304AS	-	12.7	3.18	0.4	-				
SNGN120308AS	-	12.7	3.18	0.8	-				
SNGN120312AS	-	12.7	3.18	1.2	-				
SNGN120404AS	-	12.7	4.76	0.4	-				
SNGN120408AS	-	12.7	4.76	0.8	-				
SNGN120412AS	-	12.7	4.76	1.2	-				

▶ Stock

TNGN



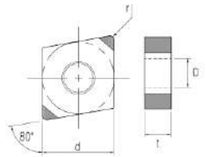
Product Code	Tip Size	d	t	r	D	CBN 73S	CBN 900S	CBN 10S	CBN 60S
TNGN110304AS	-	6.35	3.18	0.4	-				
TNGN110308AS	-	6.35	3.18	0.8	-				
TNGN110312AS	-	6.35	3.18	1.2	-				
TNGN160404AS	-	9.525	4.76	0.4	-				
TNGN160408AS	-	9.525	4.76	0.8	-				
TNGN160412AS	-	9.525	4.76	1.2	-				

▶ Stock

CBN Insert

Solid Insert (TS)

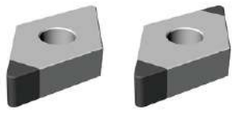
CNGA

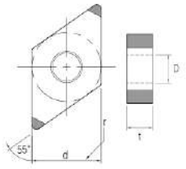


Product Code	Tip Size	d	t	r	D	CBN 73S	CBN 900S	CBN 10S	CBN 60S
CNGA090304TS1	3.6	9.525	3.18	0.4	5.16				
CNGA090308TS1	3.5	9.525	3.18	0.8	5.16				
CNGA090312TS1	3.4	9.525	3.18	1.2	5.16				
CNGA120404TS1	3.6	12.7	4.76	0.4	5.16				
CNGA120408TS1	3.5	127	4.76	0.8	5.16				
CNGA120412TS1	3.4	12.7	4.76	1.2	5.16				
CNGA090304TS2	3.6	9.525	3.18	0.4	5.16				
CNGA090308TS2	3.5	9.525	3.18	0.8	5.16				
CNGA090312TS2	3.4	9.525	3.18	1.2	5.16				
CNGA120404TS2	3.6	12.7	4.76	0.4	5.16				
CNGA120408TS2	3.5	127	4.76	0.8	5.16				
CNGA120412TS2	3.4	12.7	4.76	1.2	5.16				

▶ Stock

DNGA

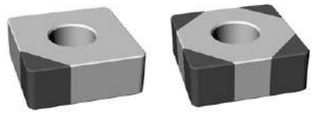


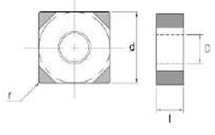


Product Code	Tip Size	d	t	r	D	CBN 73S	CBN 900S	CBN 10S	CBN 60S
DNGA150404TS1	4.0	12.7	4.76	0.4	5.16				
DNGA150408TS1	3.6	12.7	4.76	0.8	5.16				
DNGA150404TS2	4.0	12.7	476	0.4	5.16				
DNGA150408TS2	3.6	12.7	476	0.8	5.16				

▶ Stock

SNGA

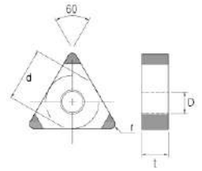




Product Code	Tip Size	d	t	r	D	CBN 73S	CBN 900S	CBN 10S	CBN 60S
SNGA120404TS1	3.7	12.7	4.76	0.4	5.16				
SNGA120408TS1	3.7	12.7	4.76	0.8	5.16				
SNGA120412TS1	3.7	12.7	4.76	1.2	5.16				
SNGA120404TS4	3.7	12.7	4.76	0.4	5.16				
SNGA120408TS4	3.7	12.7	4.76	0.8	5.16				
SNGA120412TS4	3.7	12.7	4.76	1.2	5.16				

▶ Stock

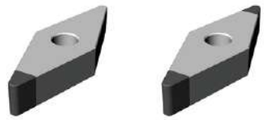
TNGA

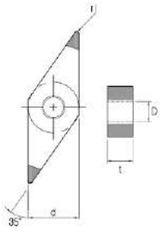


Product Code	Tip Size	d	t	r	D	CBN 73S	CBN 900S	CBN 10S	CBN 60S
TNGA160404TS1	3.6	9.525	4.76	0.4	3.81				
TNGA160408TS1	3.3	9.525	4.76	0.8	3.81				
TNGA160404TS3	3.6	9.525	4.76	0.4	3.81				
TNGA160408TS3	3.3	9.525	4.76	0.8	3.81				

▶ Stock

VNGA

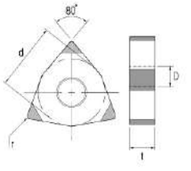




Product Code	Tip Size	d	t	r	D	CBN 73S	CBN 900S	CBN 10S	CBN 60S
VNGA160404TS1	4.3	9.525	4.76	0.4	3.81				
VNGA160408TS1	3.4	9.525	4.76	0.8	3.81				
VNGA160404TS2	4.3	9.525	4.76	0.4	3.81				
VNGA160408TS2	3.4	9.525	4.76	0.8	3.81				

▶ Stock

WNGA



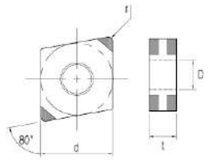
Product Code	Tip Size	d	t	r	D	CBN 73S	CBN 900S	CBN 10S	CBN 60S
WNGA080404TS1	3.6	12.7	4.76	0.4	5.16				
WNGA080408TS1	3.5	12.7	4.76	0.8	5.16				
WNGA080412TS1	3.4	12.7	4.76	1.2	5.16				
WNGA080404TS3	3.6	12.7	4.76	0.4	5.16				
WNGA080408TS2	3.5	12.7	476	0.8	5.16				
WNGA080412TS2	3.4	12.7	4.76	1.2	5.16				

▶ Stock

CBN Insert

Solid Insert (HS)

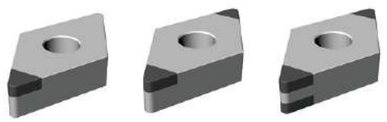
CNGA

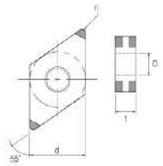


Product Code	Tip Size	d	t	r	D	CBN 73S	CBN 900S	CBN 10S	CBN 60S
CNGA120404HS1	3.6	12.7	4.76	0.4	5.16				
CNGA120408HS1	3.5	12.7	4.76	0.8	5.16				
CNGA120412HS1	3.4	12.7	4.76	1.2	5.16				
CNGA120404HS2	3.6	12.7	4.76	0.4	5.16				
CNGA120408HS2	3.5	12.7	4.76	0.8	5.16				
CNGA120412HS2	3.4	12.7	4.76	1.2	5.16				

▶ Stock

DNGA

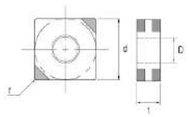




Product Code	Tip Size	d	t	r	D	CBN 73S	CBN 900S	CBN 10S	CBN 60S
DNGA150404HS1	4.0	12.7	4.76	0.4	5.16				
DNGA150408HS1	3.6	12.7	4.76	0.8	5.16				
DNGA150404HS2	4.0	12.7	4.76	0.4	5.16				
DNGA150408HS2	3.6	12.7	4.76	0.8	5.16				
DNGA150404HS4	4.0	12.7	4.76	0.4	5.16				
DNGA150408HS4	3.6	12.7	4.76	0.8	5.16				

▶ Stock

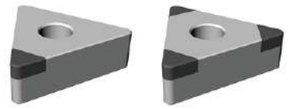
SNGA

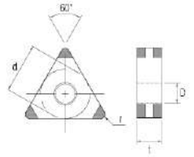


Product Code	Tip Size	d	t	r	D	CBN 73S	CBN 900S	CBN 10S	CBN 60S
SNGA120404HS1	3.7	12.7	4.76	0.4	5.16				
SNGA120408HS1	3.7	12.7	4.76	0.8	5.16				
SNGA120412HS1	3.7	12.7	4.76	1.2	5.16				
SNGA120404HS2	3.7	12.7	4.76	0.4	5.16				
SNGA120408HS2	3.7	12.7	4.76	0.8	5.16				
SNGA120412HS2	3.7	12.7	4.76	1.2	5.16				
SNGA120404HS4	3.7	12.7	4.76	0.4	5.16				
SNGA120408HS4	3.7	12.7	4.76	0.8	5.16				
SNGA120412HS4	3.7	12.7	4.76	1.2	5.16				

▶ Stock

TNGA

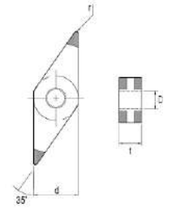




Product Code	Tip Size	d	t	r	D	CBN 73S	CBN 900S	CBN 10S	CBN 60S
TNGA160404HS1	3.6	9.525	4.76	0.4	3.81				
TNGA160408HS1	3.3	9.525	4.76	0.8	3.81				
TNGA160404HS3	3.6	9.525	4.76	0.4	3.81				
TNGA160408HS3	3.3	9.525	4.76	0.8	3.81				

▶ Stock

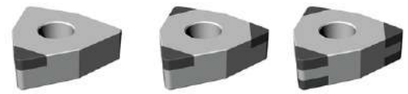
VNGA

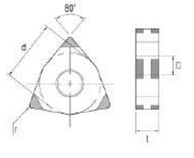


Product Code	Tip Size	d	t	r	D	CBN 73S	CBN 900S	CBN 10S	CBN 60S
VNGA160404HS1	4.3	9.525	4.76	0.4	3.81				
VNGA160408HS1	3.4	9.525	4.76	0.8	3.81				
VNGA160404HS2	4.3	9.525	4.76	0.4	3.81				
VNGA160408HS2	3.4	9.525	4.76	0.8	3.81				
VNGA160404HS4	4.3	9.525	4.76	0.4	3.81				
VNGA160408HS4	3.4	9.525	4.76	0.8	3.81				

▶ Stock

WNGA



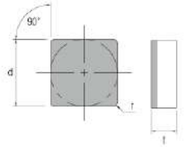


Product Code	Tip Size	d	t	r	D	CBN 73S	CBN 900S	CBN 10S	CBN 60S
WNGA080404HS1	3.6	12.7	4.76	0.4	5.16				
WNGA080408HS1	3.5	12.7	4.76	0.8	5.16				
WNGA080412HS1	3.4	12.7	4.76	1.2	5.16				
WNGA080404HS3	3.6	12.7	4.76	0.4	5.16				
WNGA080408HS3	3.5	12.7	4.76	0.8	5.16				
WNGA080412HS3	3.4	12.7	4.76	1.2	5.16				
WNGA080404HS6	3.6	12.7	4.76	0.4	5.16				
WNGA080408HS6	3.5	12.7	4.76	0.8	5.16				
WNGA080412HS6	3.4	12.7	4.76	1.2	5.16				

▶ Stock

Solid Insert (FT)

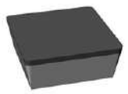
SNGN

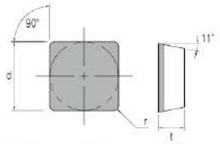


Product Code	Tip Size	d	t	r	D	CBN 450	CBN 500	CBN 501	CBN 600	CBN 650	CBN 900	CBN 950
SNGN090304FT	-	9.525	3.81	0.4	-							
SNGN090308FT	-	9.525	3.81	0.8	-							
SNGN090312FT	-	9.525	3.81	1.2	-							
SNGN120404FT	-	12.7	4.76	0.4	-							
SNGN120408FT	-	12.7	4.76	0.8	-							
SNGN120412FT	-	12.7	4.76	1.2	-							

▶ Stock

SPGN

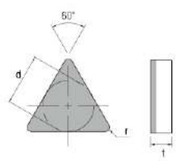




Product Code	Tip Size	d	t	r	D	CBN 450	CBN 500	CBN 501	CBN 600	CBN 650	CBN 900	CBN 950
SPGN090304FT	-	9.525	3.81	0.4	-							
SPGN090308FT	-	9.525	3.81	0.8	-							
SPGN090312FT	-	9.525	3.81	1.2	-							
SPGN120404FT	-	12.7	4.76	0.4	-							
SPGN120408FT	-	12.7	4.76	0.8	-							
SPGN120412FT	-	12.7	4.76	1.2	-							

▶ Stock

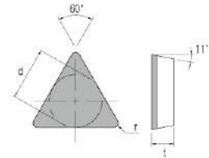
TNGN



Product Code	Tip Size	d	t	r	D	CBN 450	CBN 500	CBN 501	CBN 600	CBN 650	CBN 900	CBN 950
TNGN160404FT	-	9.525	4.76	0.4	-							
TNGN160408FT	-	9.525	4.76	0.8	-							

▶ Stock

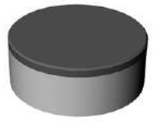
TPGN

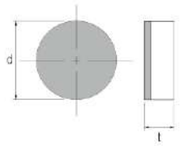


Product Code	Tip Size	d	t	r	D	CBN 450	CBN 500	CBN 501	CBN 600	CBN 650	CBN 900	CBN 950
TPGN090204FT	-	5.56	2.38	0.4	-							
TPGN090208FT	-	5.56	2.38	0.8	-							
TPGN110304FT	-	6.35	3.18	0.4	-							
TPGN110308FT	-	6.35	3.18	0.8	-							
TPGN160304FT	-	9.525	3.18	0.4	-							
TPGN160308FT	-	9.525	3.18	0.8	-							

▶ Stock

RNGN

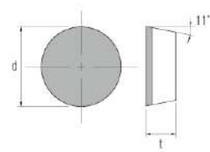




Product Code	Tip Size	d	t	r	D	CBN 450	CBN 500	CBN 501	CBN 600	CBN 650	CBN 900	CBN 950
RNGN090300FT	-	9.525	3.18	-	-							
RNGN100300FT	-	10.0	3.18	-	-							
RNGN120400FT	-	12.7	4.76	-	-							

▶ Stock

RPGN



Product Code	Tip Size	d	t	r	D	CBN 450	CBN 500	CBN 501	CBN 600	CBN 650	CBN 900	CBN 950
RPGN090300FT	-	9.525	3.18	-	-							
RPGN100300FT	-	10.0	3.18	-	-							
RPGN120400FT	-	12.7	4.76	-	-							

▶ Stock

Coating Insert

✓ The CBN-coated insert with excellent heat resistance incorporates special ceramic PVD coating technology, providing higher durability and processing efficiency compared to normal products.
As a result, the cutting application range of heat-treated steel has been expanded. Stocking disposable standard products for multiple corners makes it easier to use and helps cost down.

✓Features of CBN Coating

Specifications	AlCrN-based (A)	TiN-based (T)	AlTiN-based (AT)
Temperature	< 500	< 500	< 500
Max. service temperature	1100	600	1000
Color	Light grey	Gold	Grey
Features	Excellent anti-oxidation and high temperature, high hardness	Excellent wear resistance and chemical resistance	Multi-purpose coating with stability in hardness and stress. Excellent anti-oxidation and high temperature, high hardness
Application	Interrupted machining, Wet machining	High speed machining, Dry machining	Continuous (high speed) machining, Dry machining

✓CBN standard coating specificaitons

Specifications	AlCrN-based (A)	TiN-based (T)	AlTiN-based (AT)
CBN450	● CBN450A	● CBN450T	● CBN 450AT
CBN500			● CBN 500AT
CBN501			● CBN 501AT
CBN650	● CBN650A	● CBN650T	
CBN73S	● CBN 73SA		

AlCrN-based (A)

- **Stable tool life at interrupted cutting**
  Maintain stable tool life at interrupted machining through breakage resistance.
- **Excellent accuracy of dimension at machining**
  Excellent accuracy of dimension can be achieved even at interrupted machining through AlCrN-based wear resistance and breakage resistance coating with excellent adhesion.
- **Application for various shapes of workpiece**
  Compared with Non-coated insert, tool life can be extended at using for workpiece having mixed continuous and interrupted machining.

TiN-based(T)

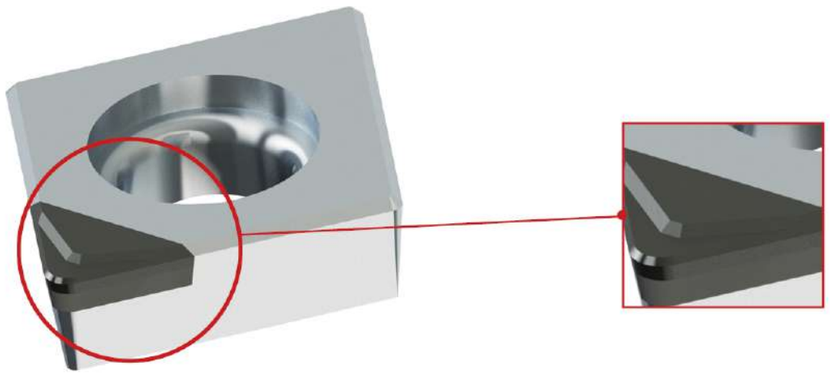
- **Excellent Multi-Purpose Coating**
  Effective prevention of adhesive wear and excellent anti-wear properties against mild and compressive stress
- **Stable long tool life at high speed machining**
  Improved surface quality and stable tool life of machined products due to low coefficient of friction

AlTiN-based (AT)

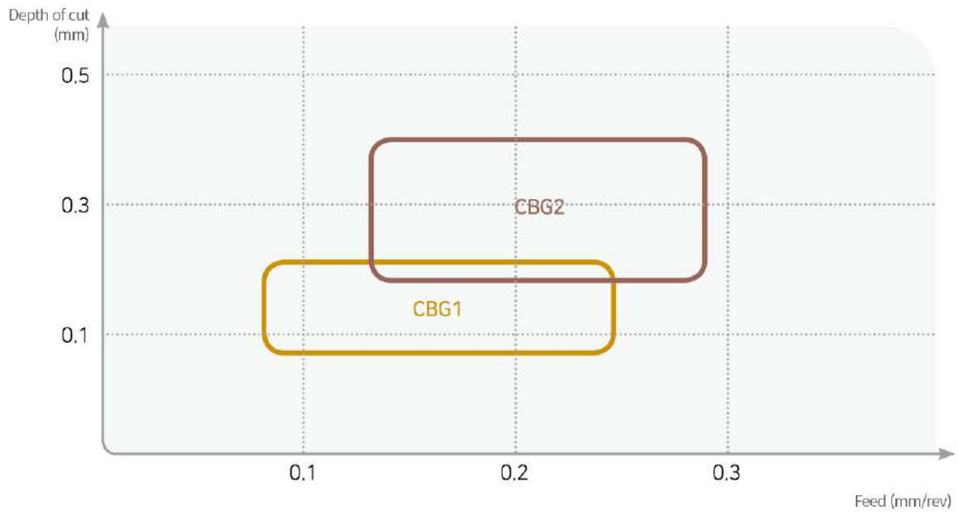
- **Excellent adhesive coating to coated surface**
  Excellent machining quality through smooth coated surface.
- **Excellent wear resistance maintaining at high temperature**
  Improve productivity by increase of tool life through excellent heat resistance.
  Prevent burning and built-up cutting edge at machining hard-to-machine material.

CBN Insert

Chip-Breaker Insert (CBG)



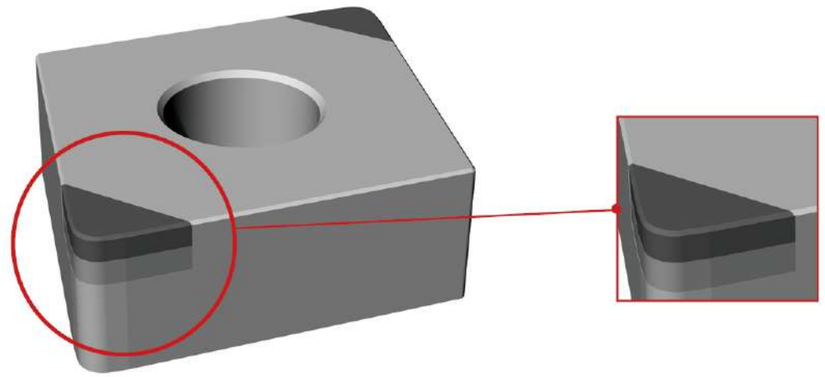
- ✓ Fitted with breaker shape developed independently to maximize chip processing. (There's no influence on tool life & cutting surface.)
- ✓ Applicable to one use standard type, CBN insert / Coated CBN insert.
- ✓ Reduce scratches on work surface by chip and prevent occurrence of holder chip tangling.



Range of application for steel

CBN Insert

Wiper Insert

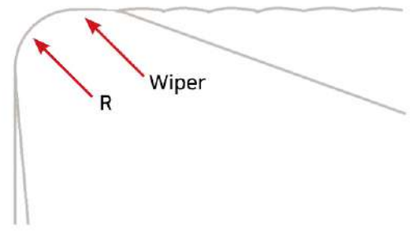


- ✓ It is a one use insert fitted with wiper edge at the normal cutting edge for machining heat-treated steel.
- ✓ Realizing excellent surface roughness equal to grinding work, it can improve machining efficiency greatly at high speed and high feed.

Finished surface roughness of Wiper insert

	Wiper Insert (R0.8)		Nose R Insert (R0.8)	
	Finishing machining (f=0.15mm/rev)	High feed machining (f=0.3mm/rev)	Finishing machining (f=0.15mm/rev)	High feed machining (f=0.3mm/rev)
Surface roughness(Rz)	0.6μm	1.0μm	3.5μm	9.5μm

Shape design



Wiper shape

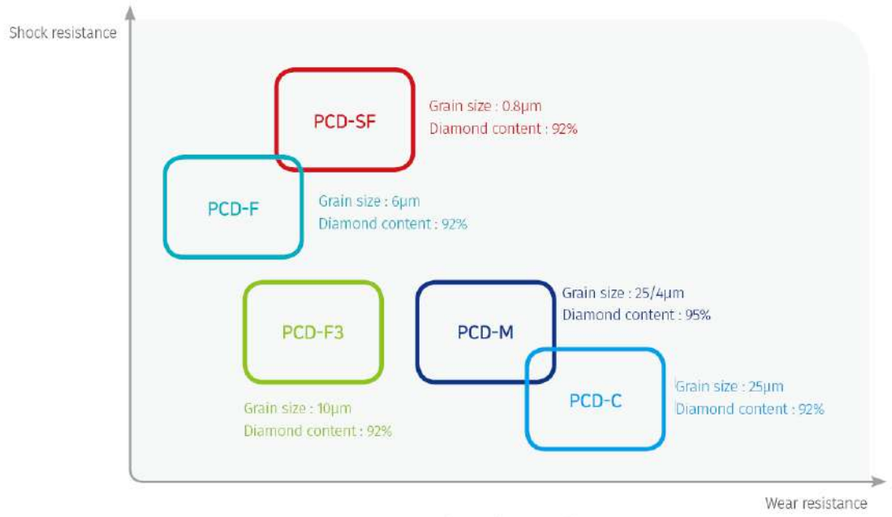
Normal

PCD Insert

PCD Grade

✓ PCD Tool use PCD materials available for optimal finish with excellent toughess and best wear resistance through precision grinding after vacuum brazing process.
In addition, it shows optimal performance for machining non-ferrous metals such as aluminum alloy, copper alloy, etc. and non-metals such as fiber glass, CFRP, etc.

Grade	Average particle size(㎛)	Features	Applications
PCD-SF	0.8	As it is made by sintering ultrafine diamond particles in high density, is has both wear resistance and breakage resistance.	Machining area requiring excellent surface roughness such as aluminum alloy, copper alloy, jewelry, wood composite, plastics, etc.
PCD-F	6	It is a grade made by sintering fine diamond particles which has particles strongly bonded with each other, so it has well-balance machinability and wear resistance	
PCD-F3	10	It has both excellent wear resistance and shock resistance	Aluminum alloy (Si less than 14%), Copper alloy, Graphite, Graphite composite, Synthetic wood, Semi-sintered ceramic cemented carbide, etc.
PCD-M	25/4	As fine diamond particles and large diamond particles are bonded in 2 phases, it has excellent shock resistant strength and wear resistance.	Metal composite (Duralcan, etc), Hi-silicon Aluminum alloy (Si more than 14%), Glass fiber, Glass fiber reinforced board, Reinforced wood, etc.
PCD-C	25	It is a grade made by sintering large diamond particles, so it has most diamond content and excellent wear resistance.	HiSilicon Aluminum alloy (Si more than 14%), Metal composite, Sintered ceramic, Dissimilar metals binder (Aluminum, Cast iron), Other wear resistant materials.

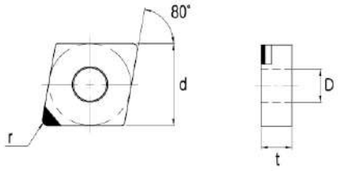


PCD grade application table

PCD Insert

Turning Insert

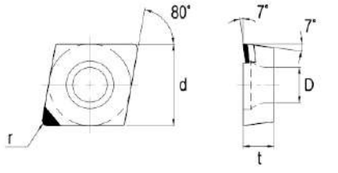
CNMA



Product Code	Tip Size	d	t	r	D	Rake angle	PCD -SF	PCD -F	PCD -F3	PCD -M	PCD -C
CNMA120404	3.6	12.7	4.76	0.4	5.16						
CNMA120408	3.5	12.7	4.76	0.8	5.16				▶		
CNMA120412	3.4	12.7	4.76	1.2	5.16						

▶ Stock

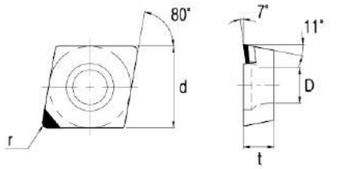
CCMT



Product Code	Tip Size	d	t	r	D	Rake angle	PCD -SF	PCD -F	PCD -F3	PCD -M	PCD -C
CCMT060204	2.6	6.35	2.38	0.4	2.8	7°					
CCMT060208	2.5	6.35	2.38	0.8	2.8	7°			▶		
CCMT09T304	3.6	9.525	3.97	0.4	4.4	7°					
CCMT09T308	3.5	9.525	3.97	0.8	4.4	7°			▶		
CCMT120404	3.6	12.7	4.76	0.4	5.5	7°					
CCMT120408	3.5	12.7	4.76	0.8	5.5	7°			▶		

▶ Stock

CPMT

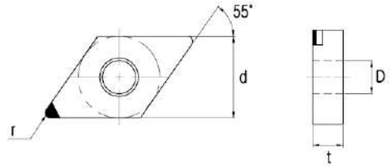


Product Code	Tip Size	d	t	r	D	Rake angle	PCD -SF	PCD -F	PCD -F3	PCD -M	PCD -C
CPMT060204	2.6	6.35	2.38	0.4	2.8	7°					
CPMT090304	3.6	9.525	3.18	0.4	4.4	7°					
CPMT090308	3.5	9.525	3.18	0.8	4.4	7°			▶		

▶ Stock

Turning Insert

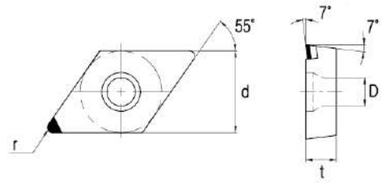
DNMA



Product Code	Tip Size	d	t	r	D	Rake angle	PCD -SF	PCD -F	PCD -F3	PCD -M	PCD -C
DNMA150404	4.0	12.7	4.76	0.4	5.16						
DNMA150408	3.6	12.7	4.76	0.8	5.16				▶		
DNMA150604	4.0	12.7	6.35	0.4	5.16						
DNMA150608	3.6	12.7	6.35	0.8	5.16				▶		

▶ Stock

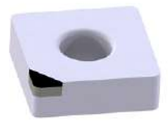
DCMT

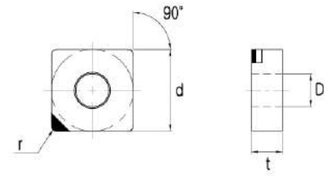


Product Code	Tip Size	d	t	r	D	Rake angle	PCD -SF	PCD -F	PCD -F3	PCD -M	PCD -C
DCMT070204	2.5	6.35	2.38	0.4	2.8	7°					
DCMT070208	2.2	6.35	2.38	0.8	2.8	7°			▶		
DCMT11T304	4.0	9.525	3.97	0.4	4.4	7°					
DCMT11T308	3.6	9.525	3.97	0.8	4.4	7°			▶		

▶ Stock

SNMA

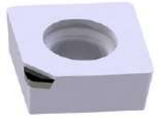


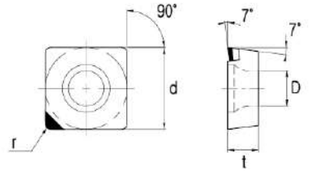


Product Code	Tip Size	d	t	r	D	Rake angle	PCD -SF	PCD -F	PCD -F3	PCD -M	PCD -C
SNMA120404	4.0	12.7	4.76	0.4	5.16						
SNMA120408	4.0	12.7	4.76	0.8	5.16				▶		

▶ Stock

SCMT

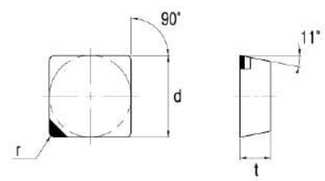




Product Code	Tip Size	d	t	r	D	Rake angle	PCD -SF	PCD -F	PCD -F3	PCD -M	PCD -C
SCMT09T304	4.0	9.525	3.97	0.4	4.4	7°					
SCMT09T308	4.0	9.525	3.97	0.8	4.4	7°			▶		
SCMT120404	4.0	12.7	4.76	0.4	5.5	7°					
SCMT120408	4.0	12.7	4.76	0.8	5.5	7°			▶		
SCMT120412	4.0	12.7	4.76	1.2	5.5	7°					

▶ Stock

SPMN

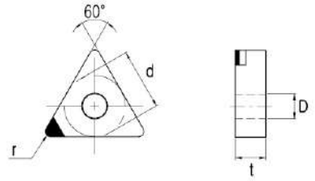


Product Code	Tip Size	d	t	r	Rake angle	PCD -SF	PCD -F	PCD -F3	PCD -M	PCD -C
SPMN090304	4.0	9.525	3.18	0.4						
SPMN090308	4.0	9.525	3.18	0.8				▶		
SPMN120304	4.0	12.7	3.18	0.4						
SPMN120308	4.0	12.7	3.18	0.8				▶		
SPMN120312	4.0	12.7	3.18	1.2						

▶ Stock

Turning Insert

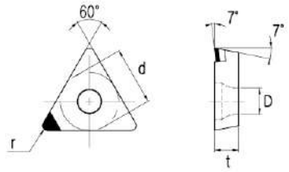
TNMA



Product Code	Tip Size	d	t	r	D	Rake angle	PCD -SF	PCD -F	PCD -F3	PCD -M	PCD -C
TNMA160404	3.6	9.525	4.76	0.4	3.81						
TNMA160408	3.3	9.525	4.76	0.8	3.81				▶		

▶ Stock

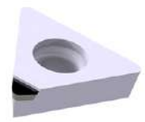
TCMT

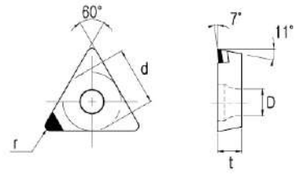


Product Code	Tip Size	d	t	r	D	Rake angle	PCD -SF	PCD -F	PCD -F3	PCD -M	PCD -C
TCMT110204	3.6	6.35	2.38	0.4	2.8	7°					
TCMT110208	3.3	6.35	2.38	0.8	2.8	7°			▶		
TCMT110304	3.6	6.35	3.18	0.4	3.3	7°					
TCMT110308	3.3	6.35	3.18	0.8	3.3	7°			▶		
TCMT16T304	3.6	9.525	3.97	0.8	4.4	7°					
TCMT16T308	3.3	9.525	3.97	0.4	4.4	7°			▶		
TCMT16T312	3.0	9.525	3.97	1.2	4.4	7°					

▶ Stock

TPMT

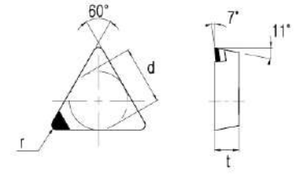




Product Code	Tip Size	d	t	r	D	Rake angle	PCD -SF	PCD -F	PCD -F3	PCD -M	PCD -C
TPMT080204	2.6	4.76	2.38	0.4	2.4	7°					
TPMT080208	2.3	4.76	2.38	0.8	2.4	7°			▶		
TPMT090204	2.6	5.56	2.38	0.4	2.8	7°					
TPMT090208	2.3	5.56	2.38	0.8	2.8	7°			▶		
TPMT110304	3.6	6.35	3.18	0.4	3.3	7°					
TPMT110308	3.3	6.35	3.18	0.8	3.3	7°			▶		
TPMT160304	3.6	9.525	3.18	0.4	4.4	7°					
TPMT160308	3.3	9.525	3.18	0.8	4.4	7°			▶		
TPMT160312	3.0	9.525	3.18	1.2	4.4	7°					

▶ Stock

TPMN

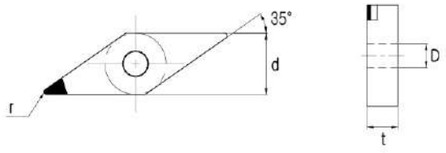


Product Code	Tip Size	d	t	r	Rake angle	PCD -SF	PCD -F	PCD -F3	PCD -M	PCD -C
TPMN090204	2.6	5.56	2.38	0.4	7°					
TPMN110304	3.6	6.35	3.18	0.4	7°					
TPMN110308	3.3	6.35	3.18	0.8	7°			▶		
TPMN160304	3.6	9.525	3.18	0.4	7°					
TPMN160308	3.3	9.525	3.18	0.8	7°			▶		

▶ Stock

Turning Insert

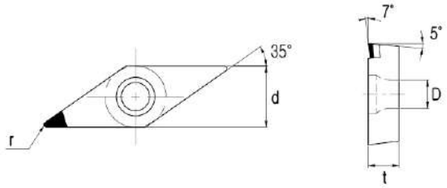
VNMA



Product Code	Tip Size	d	t	r	D	Rake angle	PCD -SF	PCD -F	PCD -F3	PCD -M	PCD -C
VNMA160404	4.3	9.525	4.76	0.4	3.81						
VNMA160408	3.4	9.525	4.76	0.8	3.81				▶		

▶ Stock

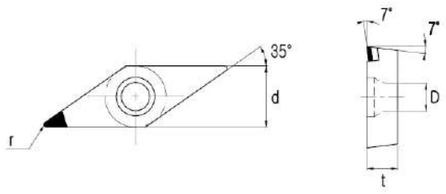
VBMT



Product Code	Tip Size	d	t	r	D	Rake angle	PCD -SF	PCD -F	PCD -F3	PCD -M	PCD -C
VBMT110304	2.8	6.35	3.18	0.4	2.8	7°					
VBMT110308	2.0	6.35	3.18	0.8	2.8	7°			▶		
VBMT160404	4.3	9.525	4.76	0.4	4.4	7°					
VBMT160408	3.4	9.525	4.76	0.8	4.4	7°			▶		

▶ Stock

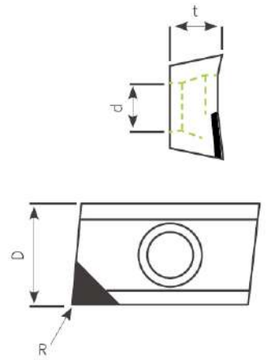
VCMT



Product Code	Tip Size	d	t	r	D	Rake angle	PCD -SF	PCD -F	PCD -F3	PCD -M	PCD -C
VCMT110304	2.8	6.35	3.18	0.4	2.8	7°					
VCMT110308	2.0	6.35	3.18	0.8	2.8	7°			▶		
VCMT160404	4.3	9.525	4.76	0.4	4.4	7°					
VCMT160408	3.4	9.525	4.76	0.8	4.4	7°			▶		

▶ Stock

Milling Insert

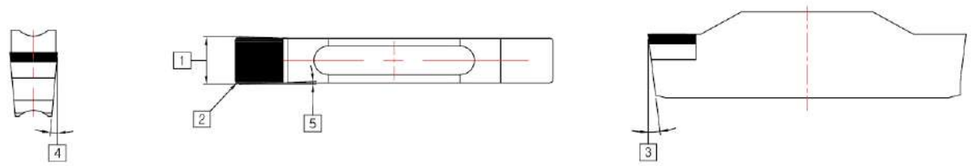


Product Code		D	t	R	d	PCD-SF	PCD-F	PCD-F3	PCD-M	PCD-C
SE□N	11T3□□□□	6.457	3.6	-	2.85					
	1604□□□□	9.525	4.76	-	4.40					
	1705□□□□	10.7	5.5	-	-					
CDEW	1204R□□□□	12.7	4.76	-	4.40					
OFC□	0704□□□□	7.4	4.86	-	-					
SE□N	1203□□□□	12.7	3.18	-	-					
SF□N	1203□□□□	12.7	3.18	-	-					
	1504□□□□	15.875	4.76	-	-					
SP□N	1203□□□□	12.7	3.18	-	-					
	1504□□□□	15.875	4.76	-	-					
SNEW (WIPER)	09T3□□□□	9.525	3.97	-	4.40		▶			
	1203□□□□	12.7	3.18	-	5.50					
	1204□□□□	12.7	4.76	-	6.00					
T□CN	1603□□□□	9.525	3.18	-	-					
	2203□□□□	12.7	3.18	-	-					
	2204□□□□	12.7	4.76	-	-					

▶ Stock

PCD Insert

Grooving Insert



G 1 - R 2 -3 / 4 -5 □□□□

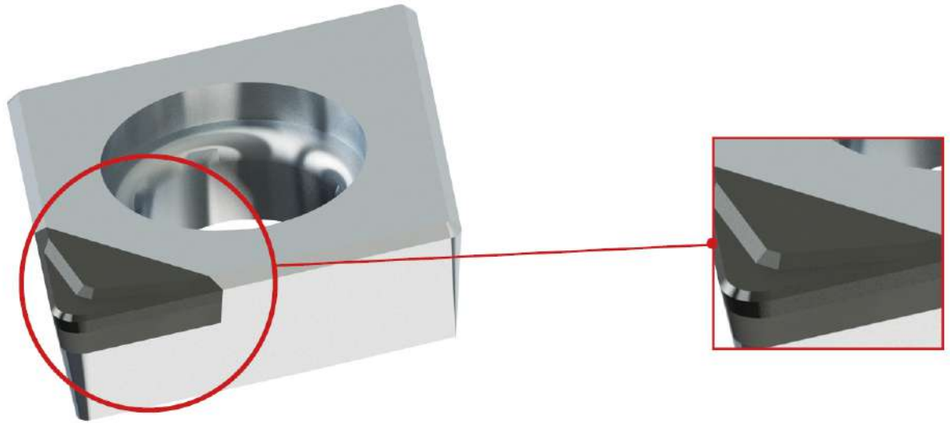
- 1 Width
- 2 Corner R
- 3 Front relief
- 4 Side relief
- 5 Back taper
- □□□□ Insert type

Product Code	Width	Corner R	Front relief (°)	Side relief (°)	Back taper(°)
G1.5-R04-06/05-01-□□□□	1.5	0.4	6	5	1
G1.5-R08-06/05-02-□□□□	1.5	0.8	6	5	2
G2.0-R04-06/05-01-□□□□	2.0	0.4	6	5	1
G2.0R08-06/05-02-□□□□	2.0	0.8	6	5	2
G2.5-R04-06/05-01-□□□□	2.5	0.4	6	5	1
G2.5-R08-06/05-02-□□□□	2.5	0.8	6	5	2
G3.0-R04-06/05-01-□□□□	3.0	0.4	6	5	1
G3.0-R08-06/05-02-□□□□	3.0	0.8	6	5	2
G3.5-R04-06/05-01-□□□□	3.5	0.4	6	5	1
G3.5-R08-06/05-02-□□□□	3.5	0.8	6	5	2
G4.0-R04-06/05-01-□□□□	4.0	0.4	6	5	1
G4.0-R08-06/05-02-□□□□	4.0	0.8	6	5	2
G4.5-R04-06/05-01-□□□□	4.5	0.4	6	5	1
G4.5-R08-06/05-02-□□□□	4.5	0.8	6	5	2
G5.0-R04-06/05-01-□□□□	5.0	0.4	6	5	1
G5.0-R08-06/05-02-□□□□	5.0	0.8	6	5	2

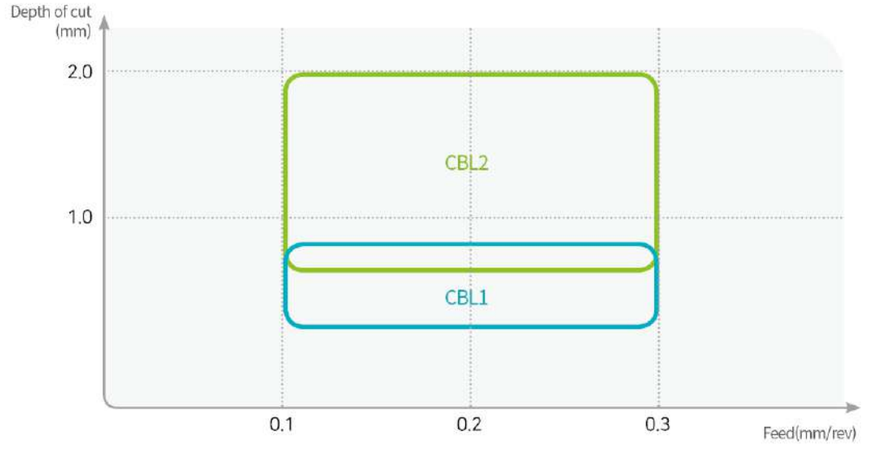
▶ Stock

PCD Insert

Chip-Breaker Insert (CBL)



- ✓ Improve work efficiency required surface roughness and excellent chip control.
- ✓ Reduce scratches by chip on machined surface and prevent occurrence of holder chip tangling.
- ✓ Described chip-breaker of our own, that makes maximizing performance of chip discharge.
- ✓ According to work-piece and cutting conditions, we design proper shape and describe by laser machine.



Recommended cutting conditions of Aluminum

DIAMOND TOOL

Technology and Innovation

- Electro Optic Tool
- Infrared Lens Tool
- Pattern Micro Groove Tool
- Nano Ball Endmill
- Special
- Single Diamond ISO Turning Insert
- Contact Lens Tool
- Contact Lens Insert Standard
- Standard Holder

Diamond

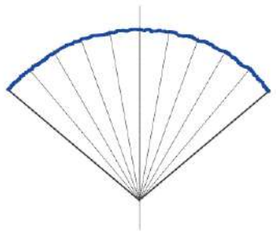
Ultra precision grinding technology to control tolerance within 0.000001mm

✓ In order to machine a workpiece requiring high precision, it is essential to select a tool with ultra precision more than the workpiece. We developed ultra precision diamond tools with nano-class shape accuracy through 20-years accumulated diamond tool development know-how and advanced diamond grinding technology. In addition, all the products produced through strict processes and quality control in a 10,000 class clean room with constant temperature and humidity.

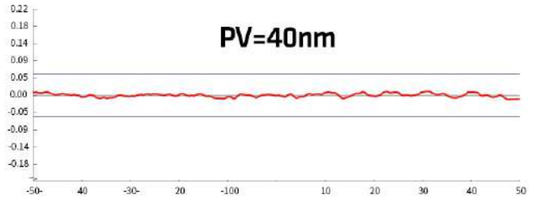
Specifications by shape of cutting

Classification	Specificaiton			
Shape of cutting				
	V-type	R-type	C-type	Specials
Included angle / Window angle	17° ~ 140° (±10') / 10° ~ 140° (±10')			
Cutting edge radius	0.001mm ~ 60mm			
Surface roughness(Ra)	Less than 3nm (Limited to window angle section)			
Waviness	Less than 30nm (Limited to window angle section)			
Remarks	All specifications can be changed according to conditions. Ex)) Relief angle, window angle, type of workpiece and customer specified condition etc. According to diamond type			

Shape measurement for ultra precision machining



Machining Pattern



Shape accuracy measurement

Diamond

Electro Optic Tool

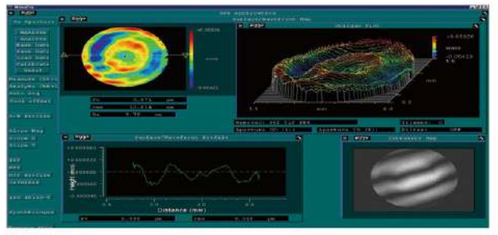
✓ Radius tools can make shape accuracy to less than 50nm and minimum radius size to less than 1um and shows excellent performance in machining optical lens core requiring nano-class precision.

Features

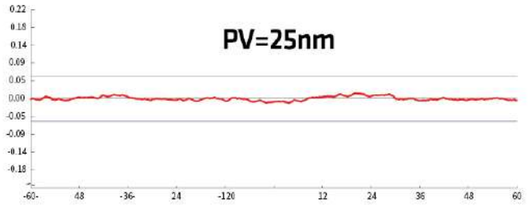
- Possess independently-developed diamond tool grinding machine.
- Waviness less than 50nm
- R size less than 1um
- Apply variable type of diamond to optimize tool performance

Application

- Mobile phone camera lens core machining
- Automotive optical lens core machining
- DOE(Diffractive Optical Element) core machining
- Fresnel lens core machining
- VR(Virtual Reality) element of optics



Interferometer measuring



Level of tool shape

Diamond

Infrared Lens Tool

✓ Applied separate optimization techniques such as wire shape and directional analysis to achieve high-precision machining implementation of infrared optical device.

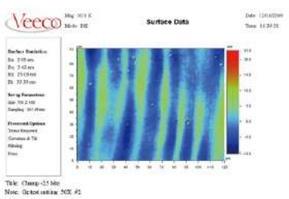
Features

- Maintain the same negative rake angle and center height at full radius region
- Easy to discharge chips by even negative rake angle
- 2-axis machining easier than the existing simple negative rake angle
  (The existing negative rake angle has center height varied by location at cutting available angle.)
- Possible to machining more than diameter 100

Application

- Mirror-like surface machining of Germanium(Ge), Silicon(Si), Zinc sulfide(ZnS), Zinc Selenide(ZnSe, etc.) for Infrared optics , which are hard-to-machine materials

Germanium machining



Interferometer measuring

Photograph of chamfered edge (x500)

Diamond

Pattern Micro Groove Tool

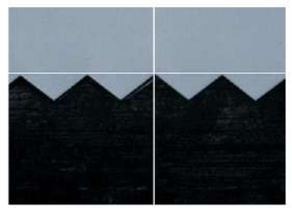
✓ Pattern micro groove tool is made by applying diamond grinding orientation analysis and efficient grinding method to minimize dimensional change due to tool wear at machining large parts.

Features

- Optimal decision direction selection
- Tool cutting edge clearance surfaces roughness less than Ra 3nm

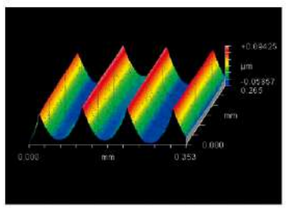
Application

- Roll pattern machining
- Micro grooving



Machining pattern

Roll pattern machining

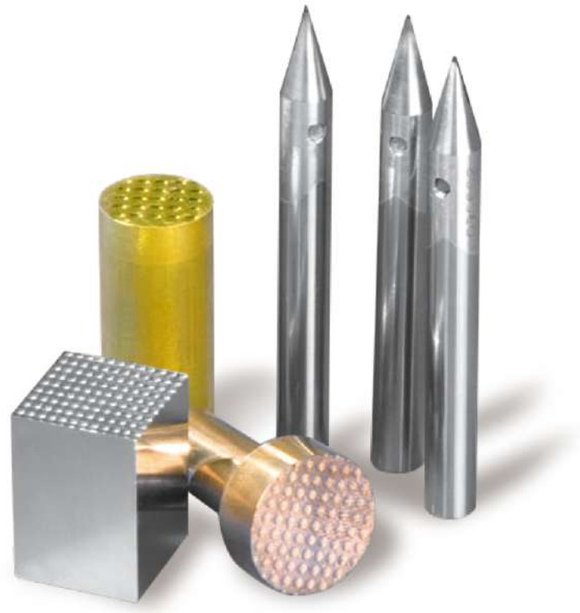


Machining pattern analysis

Diamond

Nano Ball Endmill

✓ Select single crystal diamond for direct machining of array lens and ultra precision machining of mold core and carry out a separate process to minimize centering error between center of cutting edge radius and rotation shank, an important factor of rotation tool.

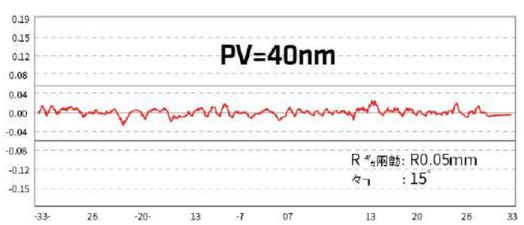


Features

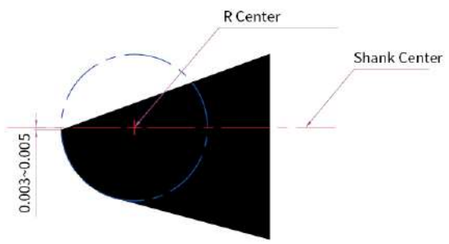
- Possible to produce R0.05mm of minimum ball endmill
- Shape accuracy less than 50nm available
- Shank of centering error with R center ±5μm

Application

- Microarray lens machining
- Dimple pattern machining



Level of tool shape



Difference in the center of radius and center of shank

Diamond

Special

✓ As the shape of part gets diversified and finer, various shapes of tools are required, so we make special tools available for making the shape of workpiece freely regardless of tool material.

- Alloy wheel mirror facing bite
- DC motor armature tool & V-block
- General-purpose turning bite & insert
- Boring bite
- Grooving bite
- LGP mirror surface machining cutter blade
- Cartridge type insert

Various aluminum alloy mirror machining

Diamond

Single Diamond ISO Turning Insert

✓ In order to meet change of various materials to be machined and customer needs. we have standardized single crystal diamond insert tool which has been limited to special specifications up to now and expanded the applied area.

Features

- Crystal orientation of single crystal diamond is set to optimal direction with our exclusive technology
- Increase easy-to-use-by applying standard holder
- Realize long life and excellent surface roughness at precision part machining, compared with Polycrystalline diamond (PCD)

Application

- Automobile part (Aluminum wheel, D.C motor, etc.)
- HDD parts
- Plastic lens (SOFT, HARD-RGP)
- Aluminum die casting alloy (Molds)
- Oxygen-free copper (Molds)

Comparison between PCD&SCD products after processing

Diamond

Contact Lens Tool

✓ Tools for machining contact lenses are designed to reflect the characteristics of the machining process, which requires achieving specifications with minimal cutting force, while taking into account the qualities of diverse materials.

Features

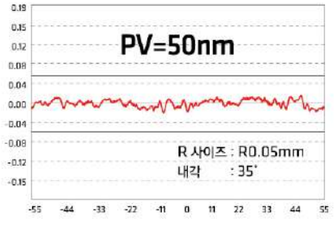
- Design optimal cutting edge according to material of workpiece.
- Maximize economic feasibility through increase of regrinding numbers
- Produce ISO insert tool for Intraocular lens (IOL)
- Produce micro end mill tool for Intraocular lens (IOL)

Application

- RGP lens machining
- Soft lens core machining
- Intraocular lens(IOL) machining
- Progressive multifocal lens machining

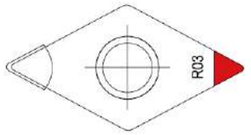
Contact lens machining

Intraocular lens (IOL)



Level of tool shape

Contact Lens Insert Standard

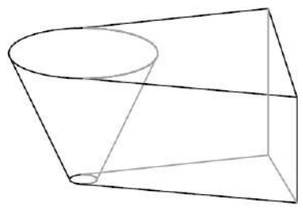


Type of Edge

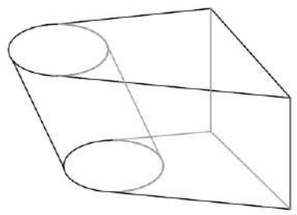
Red : Conical
Yellow : Cylindrical
Non-controlled : No mark

D	15	N	03	C	A	N
Insert type D : 55° Insert DCGW070202 V : 35° Insert VCGW110302	Side relief angle 10 : 10° 12 : 12° 15 : 15° or other degree	Diamond type N : Natural M : Synthetic (Mono)	Nose radius 03 : R0.3 05 : R0.5	Edge type C : Conical Red mark Y : Cylindrical Yellow mark	Waviness control A <0.3μm B <3.0μm C <0.05μm D <0.1μm E <0.2μm	Cutting direction R : Right hand N : Neutral L : Left hand

Comparison of conical type and cylindrical type



Conical type



Cylindrical type

All types available

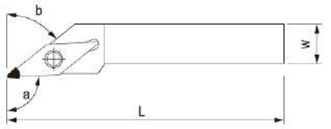
Included angle	Relief angle	Rake angle	Nose radius(mm)	Edge shape	Waviness	Diamond type	Cutting direction
35° 55°	12° 15° 18° etc	-2.5° 0° +2.5° etc	0.1 0.2 0.3 0.5 etc	Conical (Red) Cylindrical (Yellow)	≈100μm ≈250μm Non-controlled	Natural Synthetic (MONO)	Right hand Neutral Left hand

Standard Holder

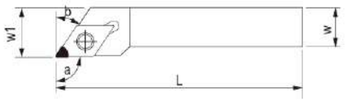
V	J	R	8	50
Insert type D : 55° Insert DCGW070202 V : 35° Insert VCGW110302	Approach angle J : 93° N : 62.5° V : 72.5° X : Special	Cutting direction R : Right hand N : Neutral L : Left hand	Holder height by width 08 : 8x8mm 06 : 6x6mm 063 : 6.35x6.35mm	Holder length 50mm

DNN0850

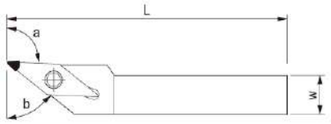
VJR0850



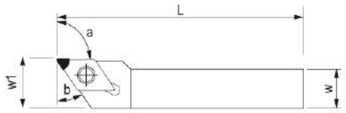
DJR0850



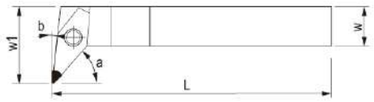
VJL0850



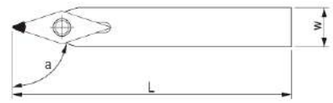
DJL0850



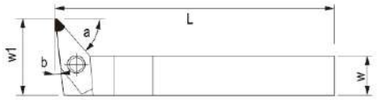
VXR0850



VNN0850



VXL0850



Holder	Insert	a	b	w	h	L
DNN0850	DCGW 55°	62.5°	62.5°	8	8	50
DJR0850	DCGW 55°	93.0°	32.0°	8	8	50
DJL0850	DCGW 55°	93.0°	32.0°	8	8	50
VNN0850	VCGW 35°	72.5°	72.5°	8	8	57
VJR0850	VCGW 35°	93.0°	52.0°	8	8	57
VJL0850	VCGW 35°	93.0°	52.0°	8	8	57
VXR0850	VCGW 35°	50.0°	6.0°	8	8	57
VXL0850	VCGW 35°	50.0°	6.0°	8	8	57

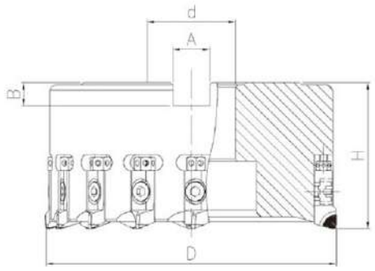
MILLING& TURNING

Technology and Innovation

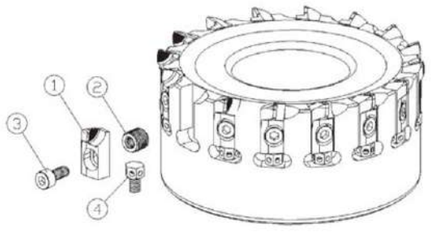
- Aluminum Cutter
- Shoulder Square Mill
- Super High Feed Mill
- Endmill Cutter
- High Feed Cutter
- Finish Ball Cutter
- Face Mill Cutter
- Chamfer Cutter
- Turning Holders
- Boring Bar

Aluminum Cutter

HPA-M

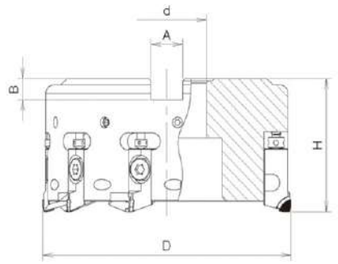


Product Code	ØD	Ød	A	B	H	z	Kg	Insert	Arbor
HPA 03R-M10	80	25.4	9.5	6	50	10	0.8		FMA 25.4
HPA 04R-M10	100	31.75	12.7	8	50	12	1.2	Regular HPA 08CA-R	FMA 31.75
HPA 05R-M10	125	38.1	15.9	10	63	14	2.2		FMA 38.1
HPA 06R-M10	160	50.8	19.05	11	63	18	2.8	Wiper HPA 08CA-W	FMA 50.8
HPA 08R-M10	200	47.625	25.4	14	63	24	4.5		FMA 47.625
HPA 10R-M10	250	47.625	25.4	14	63	30	7		FMA 47.625

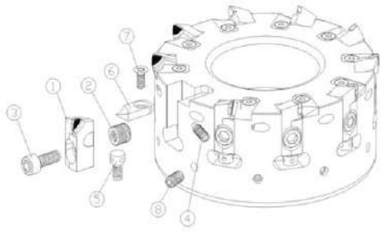


① Cartridge		② Double Screw	③ Clamp Screw	④ Adjust Screw
				
HPA 08CA-R	HPA 08CA-W	H107	M5×12	AJM 5F

HPA-H



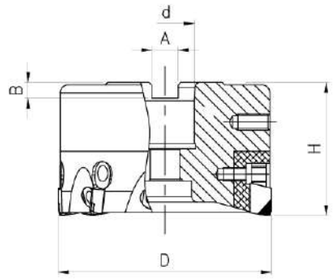
Product Code	ØD	Ød	A	B	H	z	Kg	Insert	Arbor
HPA 02R-H10	50	16	8	6.2	50	4	0.4		FMA 16
HPA 025R-H10	63	22	10	6	50	4	0.5		FMA 22
HPA 03R-H10	80	25.4	9.5	6	50	6	0.7		FMA 25.4
HPA 04R-H10	100	31.75	12.7	8	50	7	2.2	Regular HPA 10CA-R	FMA 31.75
HPA 05R-H10	125	38.1	15.9	10	63	10	1.4		FMA 38.1
HPA 06R-H10	160	50.8	19.05	11	63	12	2.5	Wiper HPA 10CA-W	FMA 50.8
HPA 08R-H10	200	47.625	25.4	14	63	14	3.5		FMA 47.625
HPA 10R-H10	250	47.625	25.4	14	63	18	4.9		FMA 47.625



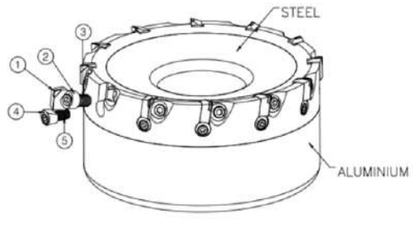
① Cartridge		② Double Screw	③ Clamp Screw	④ Adjust Wedge Screw
				
HPA 10CA-R	HPA 10CA-W	H108	M6×15	M6×16
⑤ Adjust Screw	⑥ Chip Cover	⑦ Chip Cover Screw	⑧ Balancing Screw	
				
AJM 5F	HC-R/L	M4×10	M6×10	

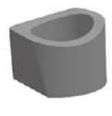
Aluminum Cutter

ASC

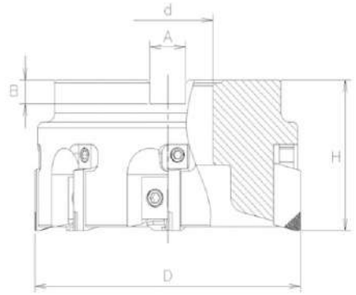


SPEC	ΦD	Φd	A	B	H	z	INSERT	BODY
ASC 02R	50	22	10	6	50	5	Regular HD-12R Wiper HD-12W	STEEL + ALUMINIUM
ASC 025R	63	22	10	6	50	6		
ASC 03R	80	22	10	6	50	8		
ASC 04R	100	25.4	9.5	6	63	10		
ASC 05R	125	31.75	12.7	8	63	12		
ASC 06R	160	38.1	15.9	10	63	16		
ASC 08R	200	50.8	19.05	11	63	20		
ASC 10R	250	47.625	25.4	14	63	24		

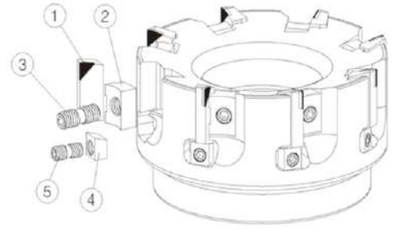


① Cartridge	② Wedge	③ Wedge Screw	④ Adjust Wedge	⑤ Wedge Screw
				
HD-12R	HD-12W	DT-ST16	DT-ST17	DWS6-15

HPA-I



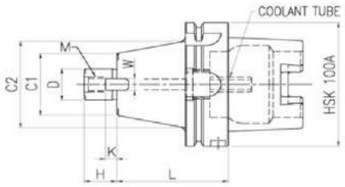
Product Code	ØD	Ød	A	B	H	z	Kg	Insert	Arbor
HPA 025R-I09	63	22	10	6	50	6	0.5	HPA-I09	FMA 22
HPA 03R-I09	80	25.4	9.5	6	50	8	0.7		FMA 25.4
HPA 04R-I09	100	31.75	12.7	8	63	10	1.4		FMA 31.75
HPA 05R-I09	125	38.1	15.9	10	63	12	0.18		FMA 38.1
HPA 06R-I09	160	50.8	19.05	11	63	14	2.4		FMA 50.8
HPA 08R-I09	200	47.625	25.4	14	63	16	3.5		FMA 47.625
HPA 10R-I09	250	47.625	25.4	14	63	18	4.8		FMA 47.625



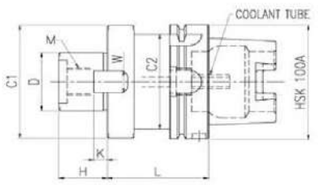
① Insert	② Wedge	③ Wedge Screw	④ Adjust Wedge	⑤ Adjust Wedge Screw
				
HPA-I09	DT-ST01	WS6-16	DT-ST02	WS5-11

Aluminum Cutter

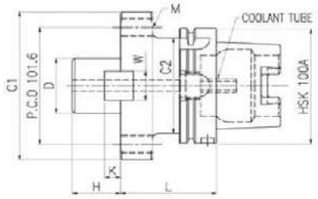
ARBOR



MODEL A



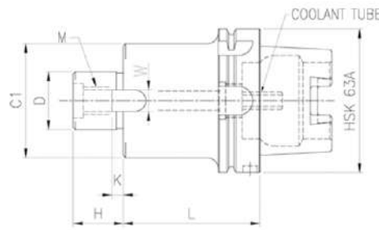
MODEL B

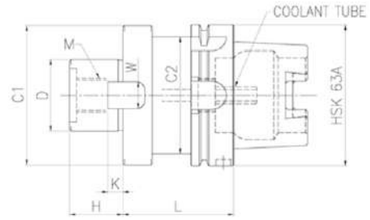


MODEL C

Product Code	D	L	H	C1	C2	W	K	M	Kg	Model	Cutter
HSK 100A-FMA25.4-75	25.4	75	22	50	70	9.5	5	M12	3.2	A	HPA 03R
HSK 100A-FMA25.4-105	25.4	105	22	50	70	9.5	5	M12	3.9	A	HPA 30R
HSK 100A-FMA25.4-135	25.4	135	22	50	70	9.5	5	M12	4.6	A	HPA 03R
HSK 100A-FMA31.75-75	31.75	75	30	60	70	12.7	7	M16	3.5	A	HPA 04R
HSK 100A-FMA31.75-105	31.75	105	30	60	70	12.7	7	M16	4.3	A	HPA 04R
HSK 100A-FMA31.75-135	31.75	135	30	60	70	12.7	7	M16	5.1	A	HPA 04R
HSK 100A-FMA38.1-75	38.1	75	27	80	80	15.9	9	M20	4.4	A	HPA 05R
HSK 100A-FMA38.1-105	38.1	105	27	80	80	15.9	9	M20	5.7	A	HPA 05R
HSK 100A-FMA38.1-135	38.1	135	27	80	80	15.9	9	M20	7	A	HPA 05R
HSK 100A-FMA50.8-75	50.8	75	36	99	83	19.05	10	M24	.7	B	HPA 06R
HSK 100A-FMA50.8-105	50.8	105	36	99	83	19.05	10	M24	7.7	B	HPA 06R
HSK 100A-FMA50.8-135	50.8	135	36	99	83	19.05	10	M24	9.7	B	HPA 06R
HSK 100A-FMA47.625-75	47.625	75	38	128.57	83	25.4	12.5	M16		C	HPA 08R

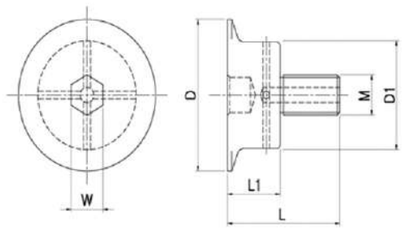
ARBOR



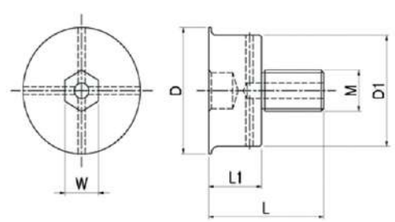


Product Code	D	L	H	C1	C2	W	K	M	Kg	Model	Cutter
HSK 63A-FMA22-50	22	50	19	50	50	9.5	5	M10	1.2	A	HPA 025R
HSK 63A-FMA25.4-60	25.4	60	22	50	50	9.5	5	M12	1.3	A	HPA 03R
HSK 63A-FMA25.4-90	25.4	90	22	50	50	9.5	5	M12	1.9	A	HPA 03R
HSK 63A-FMA25.4-120	25.4	120	22	50	50	9.5	5	M12	2.3	A	HPA 03R
HSK 63A-FMA31.75-60	31.75	60	30	60	53	12.7	7	M16	1.7	B	HPA 04R
HSK 63A-FMA31.75-90	31.75	90	30	60	53	12.7	7	M16	2.5	B	HPA 04R
HSK 63A-FMA31.75-120	31.75	120	30	60	53	12.7	7	M16	3.3	B	HPA 04R
HSK 63A-FMA38.1-60	38.1	60	27	80	53	15.9	9	M20	2.1	B	HPA 05R
HSK 63A-FMA38.1-90	38.1	90	27	80	53	15.9	9	M20	3	B	HPA 05R
HSK 63A-FMA38.1-120	38.1	120	27	80	53	15.9	9	M20	4.4	B	HPA 05R

MOUNT'G BOLT



MODEL A

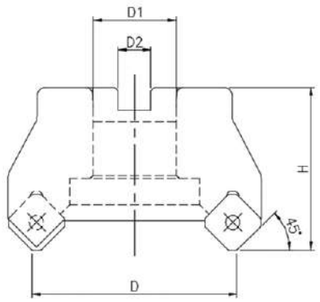


MODEL B

Product Code	D	D1	L	L1	W	M	Model	Cutter	Arbor
ICM-M10	28	16.5	41	11	8	M10	A	HPA 025R-I09	FMA 22
HCM-M10	25	18	43	10	8	M10	B	HPA 025R-H10	
ICM-M12	44	26	42	15.4	10	M12	A	HPA 03R-I09	FMA 25.4
HCM-M12	40	34	47.5	25.5	12	M12	B	HPA 03R-H10	
ICM-M16	60	43	49	23	14	M16	A	HPA 04R-I09	FMA 31.75
HCM-M16	49	43	48	22	14	M16	B	HPA 04R-H10	
ICM-M20	79	53.6	58.8	27.8	14	M20	A	HPA 05R-I09	FMA 38.1
HCM-M20	60	54	63	32	14	M20	B	HPA 05R-H10	
ICM-M24	110	65	60	22	17	M24	A	HPA 06R-I09	FMA 50.8
HCM-M24	71	65	60	22	17	M24	B	HPA 06R-H10	

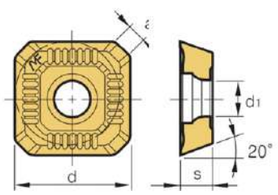
Aluminum Cutter

ALC45



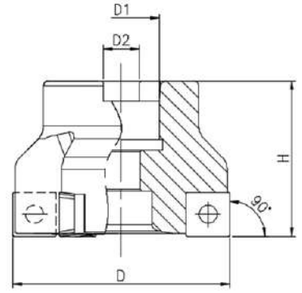
Product Code	D	D1	D2	H	z	Insert
ALC 063-45-3F	63	22	10.4	45	3	SEET14M4A GFN-MA-H01
ALC 080-45-3F	80	25.4	9.5	50	3	
ALC 100-45-3F	100	25.4	9.5	50	3	
ALC 125-45-3F	125	25.4	9.5	50	3	
ALC 160-45-3F	160	25.4	9.5	50	3	

Insert Screw	Shim	Shim Screw	Wrench	
				
FTGA03512	SS42SAF	SHXN0509F	T15	L-3.5



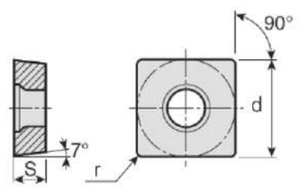
Insert	d	s	d1	a
SEET14M4A GFN-MA H01	14	4	4.4	2.64

ALC90



Product Code	D	D1	D2	H	z	Insert
ALC 050-90-3F	50	22	10.4	45	3	SCGT120404-AK
ALC 063-90-3F	63	22	10.4	45	3	
ALC 080-90-3F	80	25.4	9.5	50	3	
ALC 100-90-3F	100	25.4	9.5	50	3	
ALC 125-90-3F	125	25.4	9.5	50	3	
ALC 160-90-3F	160	25.4	9.5	50	3	

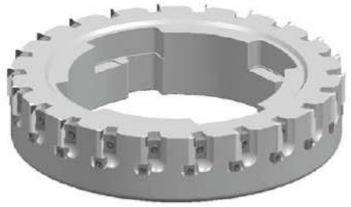
Insert Screw	Shim	Shim Screw	Wrench	
				
FTGA0411F	SS42S	SHXN0610F	T15	L-4

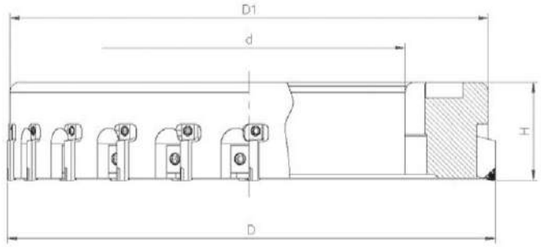


Insert	d	S	r
SCGT120404-AK	12.7	4.76	0.4

Aluminum Cutter

QCB-I

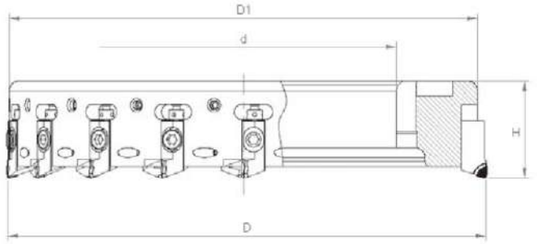




Product Code	D	D1	d	H	z	Insert
QCB D200-I09	200	195	120.02	50	18	HPA-I09
QCB D250-I09	250	245	160.02	50	22	
QCB D315-I09	315	310	215.02	50	28	

① Insert	② Wedge	③ Wedge Screw	④ Adjust Wedge	⑤ Adjust Wedge Screw
				
HPA-I09	DT-ST01	WS6-16	DT-ST02	WS5-11

QCB-H



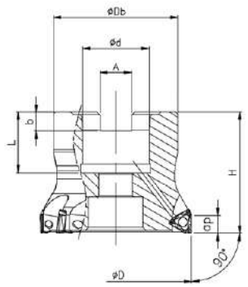
Product Code	D	D1	d	H	z	Insert
QCB D200-H10	200	195	120.02	50	14	HPA 10CA-R HPA 10CA-W
QCB D250-H10	250	245	160.02	50	18	
QCB D315-H10	315	310	215.02	50	22	

① Cartridge		② Double Screw	③ Clamp Screw	④ Adjust Wedge Screw
				
HPA 10CA-R	HPA 10CA-W	H108	M6×15	M6×16

⑤ Adjust Screw	⑥ Chip Cover	⑦ Chip Cover Screw	⑧ Balancing Screw
			
AJM 5F	HC-R/L	M4×10	M6×10

Shoulder Square Mill

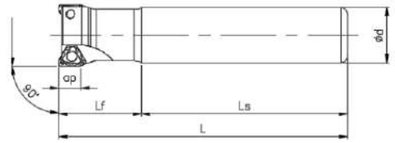
SSM



Product Code	Max. ap	D	z	Db	d	L	H	n	A	Insert
SSM 06.032F05	6	32	5	30	16	18	40	5.6	8.4	TOMT06
SSM 06.040F06	6	40	6	35	16	18	40	5.6	8.4	TOMT06
SSM 06.050F08	6	50	8	41	22	20	40	6.3	10.4	TOMT06
SSM 10.040F04	10	40	4	35	16	18	40	5.6	8.4	TOMT10
SSM 10.050F04	10	50	4	41	22	20	40	6.3	10.4	TOMT10
SSM 10.063F06	10	63	6	41	22	20	40	6.3	10.4	TOMT10
SSM 10.080F07A	10	80	7	58	25.4	26	50	6	9.5	TOMT10
SSM 10.080F07	10	80	7	50	27	22	50	7	12.4	TOMT10
SSM 10.100F08A	10	100	8	70	31.75	32	63	8	12.7	TOMT10
SSM10.100F08	10	100	8	60	32	28.5	50	8	14.4	TOMT10
SSM 15.050F04	15	50	4	41	22	20	40	6.3	10.4	TOMT15
SSM 15.063F05	15	63	5	41	22	20	40	6.3	10.4	TOMT15
SSM 15.080F06A	15	80	6	46	25.4	26	50	6	9.5	TOMT15
SSM 15.080F06	15	80	6	50	27	22	50	7	12.4	TOMT15
SSM 15.100F07A	15	100	7	60	31.75	32	50	8	12.7	TOMT15
SSM 15.100F07	15	100	7	60	32	28.5	50	8	14.4	TOMT15
SSM 15.125F08A	15	125	8	80	38.1	38	63	10	15.9	TOMT15
SSM 15.125F08	15	125	8	71	40	32	63	9	16.4	TOMT15
SSM 15.160F10	15	160	10	100	40	29	63	9	16.4	TOMT15
SSM 15.160F10A	15	160	10	100	50.8	46	63	11	19	TOMT15

Product Code	Insert Screw	Wrench
		
SSM06	CSTB-2.5	T8
SSM10	SR14-562	T10
SSM15	TS451120I	T10

SSE



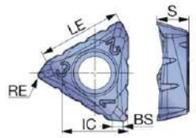
Product Code	Max. ap	D	z	d	Ls	Lf	L	Insert
SSE 06.012F01	6	12	1	16	50	18	68	TOMT06
SSE 06.016F02	6	16	2	16	60	24	84	TOMT06
SSE 06.018F02	6	18	2	16	60	24	84	TOMT06
SSE 06.020F02	6	20	2	16	60	30	90	TOMT06
SSE 06.020F02S	6	20	2	20	70	30	100	TOMT06
SSE 06.020F03	6	20	3	20	70	30	100	TOMT06
SSE 06.022F02	6	22	2	20	70	30	100	TOMT06
SSE 06.022F03	6	22	3	20	70	30	100	TOMT06
SSE 06.025F03	6	25	3	25	80	35	115	TOMT06
SSE 06.025F04	6	25	4	25	80	35	115	TOMT06
SSE 06.028F03	6	28	3	25	80	35	115	TOMT06
SSE 06.028F04	6	28	4	25	80	35	115	TOMT06
SSE 10.025F02	10	25	2	25	80	35	115	TOMT10
SSE 10.028F02	10	28	2	25	80	35	115	TOMT10
SSE 10.032F02	10	32	2	32	80	40	120	TOMT10
SSE 10.032F03	10	32	3	32	80	40	120	TOMT10
SSE 10.035F02	10	35	2	32	80	40	120	TOMT10
SSE 10.035F03	10	35	3	32	80	40	120	TOMT10
SSE 10.040F03	10	40	3	32	80	40	120	TOMT10
SSE 10.040F04	10	40	4	32	80	40	120	TOMT10
SSE 15.040F03	15	40	3	32	80	40	120	TOMT15
SSE 15.050F04	15	50	4	32	80	40	120	TOMT15

Product Code	Insert Screw	Wrench
		
SSE06 D≤18mm	CSTB-2.5S	T8
SSE06 D≥20mm	CSTB-2.5S	T8
SSE10	SP14-562/S	T10
SSE15	TS451120I	T20

TOMT Insert

TOMT-MJ

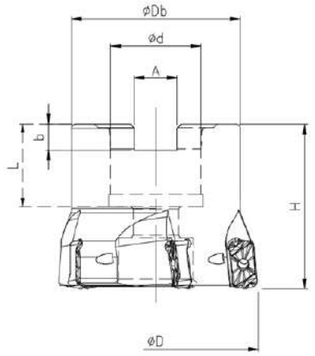
TOMT-NMJ



Product Code	Max. ap	LE	IC	S	RE	BS	AH3135				AH120			
TOMT060302PDER-MJ	6	6.2	5.6	3.2	0.2	1.4	●	●			●		●	●
TOMT060304PDER-MJ	6	6.2	5.6	3.2	0.4	1.2	●	●			●		●	●
TOMT060308PDER-MJ	6	6.2	5.6	3.2	0.8	0.8	●	●			●		●	●
TOMT100404PDER-MJ	10	10.5	8.6	4.7	0.4	1.5	●	●			●		●	●
TOMT100408PDER-MJ	10	10.5	8.6	4.7	0.8	1.1	●	●			●		●	●
TOMT100416PDER-MJ	10	10.5	8.6	4.7	1.6	0.2	●	●			●		●	●
TOMT150604PDER-MJ	15	15.7	12.7	6.0	0.4	2.2	●	●			●		●	●
TOMT150608PDER-MJ	15	15.7	12.7	6.0	0.8	1.9	●	●			●		●	●
TOMT150616PDER-MJ	15	15.7	12.7	6.0	1.6	1.1	●	●			●		●	●
TOMT150620PDER-MJ	15	15.7	12.7	6.0	2.0	0.7	●	●			●		●	●
TOMT150608PDER-NMJ	15	15.7	12.7	6.0	0.8	1.9	●	●			●		●	●
							P	M	K	S	P	M	K	S

Super High Feed Mill

SHFM

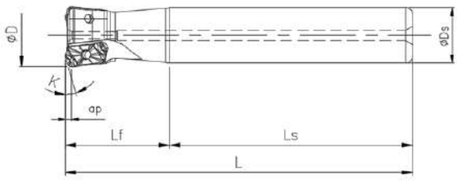


Product Code	Max. ap	D	z	Db	d	L	H	b	A	Insert
SHFM 03R040M16.0E05	1	40	5	35	16	18	40	5.6	8.4	LNMU03
SHFM 03R040M16.0E06	1	40	6	35	16	18	40	5.6	8.4	LNMU03
SHFM 03R050M22.0E05	1	50	5	47	22	20	50	6.3	10.4	LNMU03
SHFM 03R050M22.0E08	1	50	8	47	22	20	50	6.3	10.4	LNMU03
SHFM 03R050M22.2E08	1	50	8	47	22.225	20	50	5.0	8.0	LNMU03

Insert Screw	Wrench
	
CSPB-2.5	T8

Super High Feed Mill

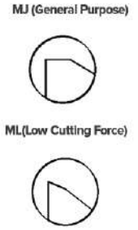
SHFE

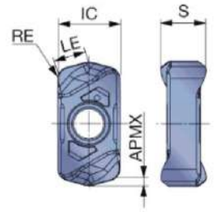


Product Code	Max. ap	D	z	Ds	Ls	Lf	L	K	Insert
SHFE 03.017F02	1	17	2	16	70	30	100	15	LNMU03
SHFE 03.017F02S	1	17	2	16	100	50	150	15	LNMU03
SHFE 03.019F02	1	19	2	16	70	30	100	17	LNMU03
SHFE 03.019F02S	1	19	2	16	125	25	150	17	LNMU03
SHFE 03.021F03	1	21	3	20	80	50	130	17	LNMU03
SHFE 03.021F03S	1	21	3	20	80	80	160	17	LNMU03
SHFE 03.021F04	1	21	4	20	80	50	130	17	LNMU03
SHFE 03.023F03	1	23	3	20	80	50	130	17	LNMU03
SHFE 03.023F03S	1	23	3	20	130	30	160	17	LNMU03
SHFE 03.023F04	1	23	4	20	80	50	130	17	LNMU03
SHFE 03.026F04	1	26	4	25	80	60	140	17	LNMU03
SHFE 03.026F04S	1	26	4	25	80	100	180	17	LNMU03
SHFE 03.026F05	1	26	5	25	80	60	140	17	LNMU03
SHFE 03.029F04	1	29	4	25	80	60	140	17	LNMU03
SHFE 03.029F04S	1	29	4	25	145	35	180	17	LNMU03
SHFE 03.029F05	1	29	5	25	80	60	140	17	LNMU03
SHFE 03.031F04	1	31	4	32	80	70	150	17	LNMU03
SHFE 03.031F04S	1	31	4	32	80	120	200	17	LNMU03
SHFE 03.031F05	1	31	5	32	80	70	150	17	LNMU03
SHFE 03.033F05	1	33	5	32	80	70	150	17	LNMU03
SHFE 03.033F05S	1	33	5	32	80	120	200	17	LNMU03
SHFE 03.033F06	1	33	6	32	80	70	150	17	LNMU03
SHFE 03.036F05	1	36	5	32	115	35	150	17	LNMU03
SHFE 03.036F05S	1	36	5	32	165	35	200	17	LNMU03
SHFE 03.036F06	1	36	6	32	115	35	150	17	LNMU03

Insert Screw	Wrench
	
CSPB-2.5	T8

LNMU Insert

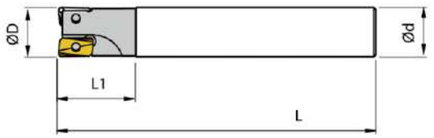




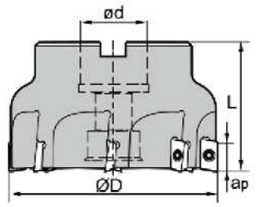
Product Code	Max. ap	LE	IC	S	RE	AH725					AH130				AH3035				
LNMU0303ZER-MJ	1	3.2	6	4.3	1.2	●		●	●	●		●				●				●
LNMU0304ZER-ML	1	3.2	6	4.3	1.2				●			●				●				
						P	M	K	S	H	P	M	K	S	H	P	M	K	S	H

Endmill Cutter

ARE01



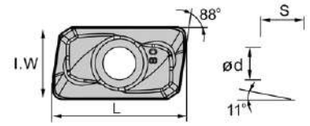
ARE02



Product Code		ØD	Ød	L1	L	z
ARE01	ARE01-016-120-AP11-2F	16	16	25	120	2
	ARE01-016-180AP11-2F	16	16	30	180	2
	ARE01-020-120-AP11-2F	20	20	30	120	2
	ARE01-020-180-AP11-2F	20	20	30	180	2
	ARE01-025-150-AP11-3F	25	25	35	150	3
	ARE01-025-200-AP11-3F	25	25	35	200	3
	ARE01-025-150-AP16-2F	25	25	35	150	2
	ARE01-025-200-AP16-2F	25	25	35	200	2
	ARE01-032-160-AP16-3F	32	32	40	160	3
	ARE01-032-200-AP16-3F	32	32	40	200	3
ARE02	ARE02-050-A22-AP16-5F	50	22	-	40	5
	ARE02-063-A22-AP16-6F	63	22	-	50	6

Diameter ØD	Insert	Screw	Wrench
			
Ø16~Ø25	APMT1135PDR	DTKA 02555	T-7
Ø25~Ø63	APMT1604PDR	DTKA 04100	T-15

APMT Insert



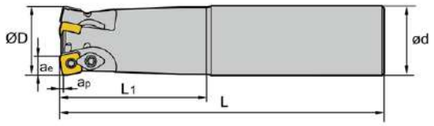
UTP200

- ✓ PVD Coating
- ✓ P20, M20

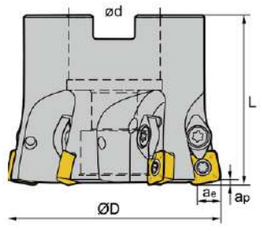
Product Code	L	I.W	S	d	r
APMT1135PDR	11.25	6.2	3.5	2.8	0.8
APMT1604PDR	17.25	9.25	4.76	4.4	0.8

High Feed Cutter

HFC01

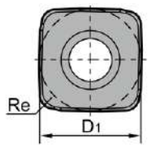


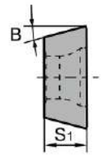
Product Code	ØD	Ød	L1	L	z
HFC01-33-200-SD12-2F	33	32	50	200	2
HFC01-33-250-SD12-2F	33	32	50	250	2



Product Code	ØD	Ød	L1	L	z
HFC01-50-A22-SD12-3F	50	22	-	50	3
HFC01-63-A22-SD12-4F	63	22	-	50	4

SDMW Insert





UTP200

- ✓ PVD Coating
- ✓ P20, M20

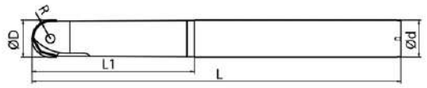
	B	Re	S1	D1
SDMW1204	15°	2	4.76	12.7

Insert Screw	Clamp Screw	Clamp	Wrench	
				
DTKA 04100	DS 5003-1	DYR 08	T-15	T-20

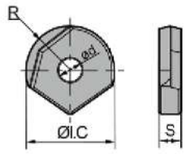
Milling&Turning

Finish Ball Cutter

FBC



Product Code	R	ØD	Ød	L1	L
FBC 012-130	6	12	12	50	130
FBC 012-150	6	12	12	60	150
FBC 016-150	8	16	16	60	150
FBC 016-180	8	16	16	80	180
FBC 020-180	10	20	20	15	180
FBC 020-220	10	20	20	90	220
FBC 025-200	12.5	25	25	90	200
FBC 025-250	12.5	25	25	110	250
FBC 030-200	15	30	30	90	200
FBC 030-250	15	30	30	110	250
FBC 030-300	15	30	30	125	300



UTP200

- ✓ PVD Coating
- ✓ P20, M20

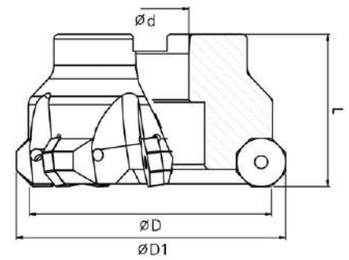
Product Code	R	ØI.C	S	Ød	ØD
DFBI1203-M/F	6	12	3	4	Ø12
DFBI1604-M/F	8	16	4	5	Ø16
DFBI2005-M/F	10	20	5	5	Ø20
DFBI2506-M/F	13	25	6	6	Ø25
DFBI3007-M/F	15	30	7	8.25	Ø30

Diameter	Screw	Wrench
		
Ø12	DBF 1210	T-15
Ø16	DBF 1611	T-15
Ø20	DBF 20165	T-20
Ø25	DBF 2520	T-25
Ø30	DBF 3025	L-5

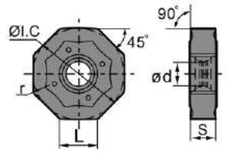
Milling&Turning

Face Mill Cutter

OMR07



Product Code	ØD	Ød	L	z
OMR07-080-B27-ON08-06	80	92	50.0	6
OMR07-100-B32-ON08-07	100	111	63.0	7
OMR07-125-B40-ON08-08	125	138	63.0	8



UTP150

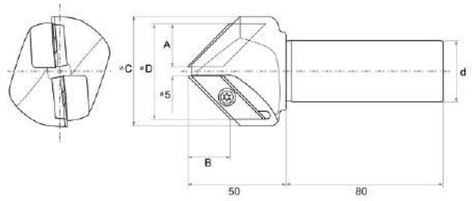
- ✓ CVD Coating
- ✓ K15

Product Code	R	ØI.C	S	Ød	ØD
ONHU08T508-PM	8.37	20.2	5.79	5.3	0.83

Screw	Wrench
	
DTKA512-60	T-20

Chamfer Cutter

CSC

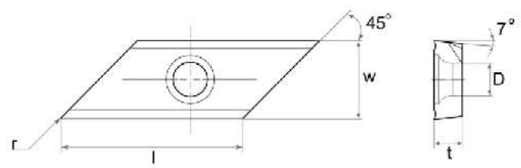


Product Code	θ	A	B	ΦC	ΦD	d	z	Insert	Screw	Wrench
CSC 0503 1R-30	30°	15.5	25.5	40	36.0	32.0	1	XCET 310404ER	SDT050	T-20
CSC 0503 1R-30-A	30°	15.5	25.5	40	36.0	25.4	1			
CSC 0503 1R-30-A-2F	30°	15.5	26.0	47	43.0	25.4	2			
CSC 0503 1R-41-A	41°	20.5	20.5	56	46.0	25.4	2			
CSC 0503 1R-45	45°	22.0	20.5	56	46.0	32.0	2			
CSC 0503 1R-45-A	45°	22.0	20.5	56	46.0	25.4	2			
CSC 0503 1R-60	60°	26.5	15.0	72	55.0	32.0	2			
CSC 0503 1R-60-A	60°	26.5	15.0	72	55.0	25.4	2			

Recommended Cutting Condition

Work Piece	Carbon Steel (S55C) Stainless Steel 250HB ≥ Cast Iron (FC250)	Alloy Steel (SCM440) 300HB ≥ High Alloy Steel (SKD61) 300HB ≥
Feed (mm/tooth)	0.1~0.25	0.1~0.2
rpm	3000(1000~7000)	

XCET



Product Code	Dimensions					Grade		
ISO	l	w	t	D	r	TX515	TX520	TX920
XCET 310404 ER	22	12.7	4.5	5.6	0.4		●	●

Technical Data

30° Chamfer

Hole Dia Ød	0.5	1	1.5	2	2.5	3	3.5	4
5	0.8	1.3	1.8	2.3	2.8			
6	1.7	2.2	2.7	3.2	3.7			
6.8	2.4	2.9	3.4	3.9	4.4			
8	3.4	3.9	4.4	4.9	5.4			
8.5	3.8	4.3	4.8	5.3	5.8			
10	5.1	5.6	6.1	6.6	7.1	7.6	8.1	8.6
10.2	5.3	5.8	6.3	6.8	7.3	7.8	8.3	8.8
12	6.9	7.4	7.9	8.4	8.9	9.4	9.9	10.4
16	10.3	10.8	11.3	11.8	12.3	12.8	13.3	13.8
17.5	11.6	12.1	12.6	13.1	13.6	14.1	14.6	15.1
20	13.7	14.2	14.7	15.2	15.7	16.2	16.7	17.2
21	14.6	15.1	15.6	16.1	16.6	17.1	17.6	18.1
24	17.2	17.7	18.2	18.7	19.2	19.7	20.2	20.7
30	22.4	22.9	23.4	23.9	24.4	24.9	25.4	
33	24.9	25.4						

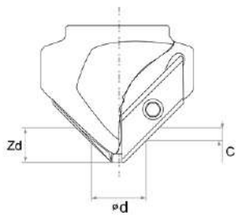
CSC 05031R-30

Technical Data

45° Chamfer

Hole Dia Ød	0.5	1	1.5	2	3	4	5
5	0.7	1.2	1.7	2.2	3.2		
6	1.2	1.7	2.2	2.7	3.7		
6.8	1.6	2.1	2.6	3.1	4.1		
8	2.2	2.7	3.2	3.7	4.7		
8.5	2.4	2.9	3.4	3.9	4.9		
10	3.2	3.7	4.2	4.7	5.7	6.7	7.7
10.2	3.3	3.8	4.3	4.8	5.8	6.8	7.8
12	4.2	4.7	5.2	5.7	6.7	7.7	8.7
14	5.2	5.7	6.2	6.7	7.7	8.7	9.7
16	6.2	6.7	7.2	7.7	8.7	9.7	10.7
17.5	6.9	7.4	7.9	8.4	9.4	10.4	11.4
20	8.2	8.7	9.2	9.7	10.7	11.7	12.7
21	8.7	9.2	9.7	10.2	11.2	12.2	13.2
24	10.2	10.7	11.2	11.7	12.7	13.7	14.7
30	13.2	13.7	14.2	14.7	15.7	16.7	17.7
33	14.7	15.2	15.7	16.2	17.2	18.2	19.2
36	16.2	16.7	17.2	17.2	17.7	18.7	19.7
42	19.2	19.7	20.2				

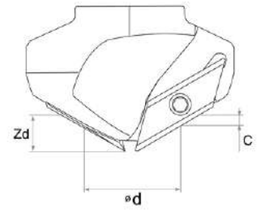
CSC 05031R-45



60° Chamfer

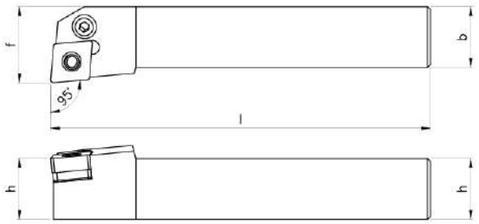
Hole Dia Ød	0.5	0.5	1	2	2.5	3	3.5
5	0.6	1.1	1.6	2.1			
6	0.9	1.4	1.7	2.4			
6.8	1.1	1.6	2.1	2.6			
8	1.4	1.9	2.4	2.9			
8.5	1.6	2.1	2.6	3.1			
10	2	2.5	3	3.5	4	4.5	5
10.2	2.1	2.6	3.1	3.6	4.1	4.6	5.1
12	2.6	3.1	3.6	4.1	4.6	5.1	5.6
16	3.7	4.2	4.7	5.2	5.7	6.2	6.7
17.5	4.2	4.7	5.2	5.7	6.2	6.7	7.2
20	4.9	5.4	5.9	6.4	6.9	7.4	7.9
21	5.2	5.7	6.2	6.7	7.2	7.7	8.2
24	6.1	6.6	7.1	7.6	8.1	8.6	9.1
30	7.8	8.3	8.8	9.3	9.8	10.3	10.8
33	8.7	9.2	9.7	10.2	10.7	11.2	11.7
36	9.5	10	10.5	11	11.5	12	12.5
38	10.1	10.6	11.1	11.6	12.1	12.6	13.1
42	11.2	11.7	12.2	12.7	13.2	13.7	14.2
46	12.4	12.9	13.4	13.9	14.4		
48	13	13.5	14	14.5			
52	14.1						

CSC 05031R-60



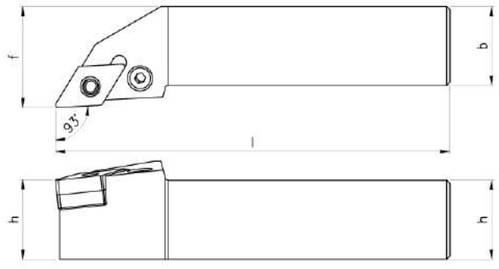
Turning Holders-Lever Lock

PCLNR/L



Product Code	b	h	l	f	Insert	Lever	Screw	Shim	Shimpin	Wrench
PCLNR/L2020-K12	20	20	125	25	CN□□1204□□	KLCL4	KLCS4	KLSC42	KLSP4	L-3
PCLNR/L2525-M12	25	25	150	32						
PCLNR/L3232-P12	32	32	170	40						

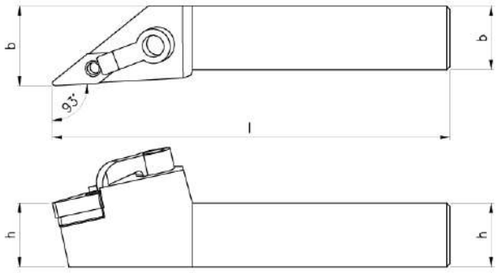
PDJNR/L



Product Code	b	h	l	f	Insert	Lever	Screw	Shim	Shimpin	Wrench
PDJNR/L2020-K15	20	20	125	25	DN□□1506□□	KLCL4A	KLCS4	KLSC42	KLSP4	L-3
PDJNR/L2525-M15	25	25	150	32						
PDJNR/L3232-P15	32	32	170	40						

Turning Holders-Multi Lock

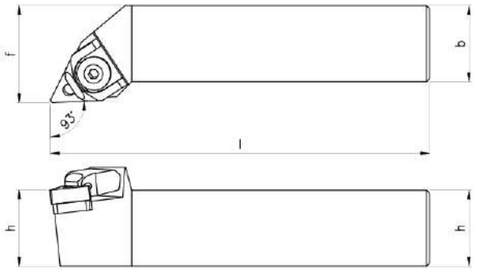
MVJNR/L



Product Code	b	h	l	f	Insert	Lever	Screw	Shim	Shimpin	Wrench
MVJNR/L2020-K16	20	20	125	25	VN□□1604□□	KCLM30	KXNSM0825	KIVSN324	KMLP3	L-2 L-4
MVJNR/L2525-M16	25	25	150	32						

Turning Holders-Wedge Clamp

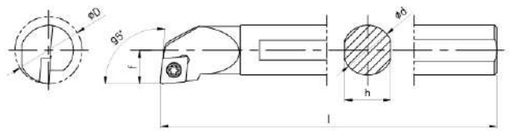
WTJNR/L



Product Code	b	h	l	f	Insert	Wedge Clamp	Clamp Screw	Shim	Shimpin	Snapring	Wrench
WTJNR/L2020-K16	20	20	125	25	TN□□1604□□	KWC33	KWCS4	KWST33	KWSS33	KWSR4	L-3
WTJNR/L2525-M16	25	25	150	32							

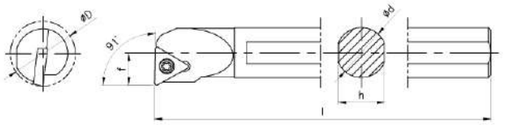
Boring Bar-Screw On

SCLCR-Steel



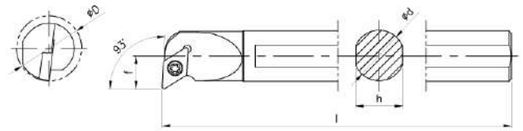
Product Code	ΦD	Φd	h	l	f	Insert	Screw	Shim	Shimscrew	Wrench
S(A)08K-SCLCR06	10	8	7	125	5	CCMT0602□□	KS-2506	-	-	T-8
S(A)10K-SCLCR06	12	10	9	125	6					
S(A)12M-SCLCR06	14	12	11	150	7					
S(A)16R-SCLCR06	20	16	15	200	10					
S(A)12M-SCLCR-09	16	12	11	150	8	CCMT09T3□□	KS-3508	-	-	T-15
S(A)16M-SCLCR09	20	16	15	150	10					
S(A)16R-SCLCR/09	20	16	15	200	10					
S(A)20S-SCLCR09	26	20	18	250	13					
S(A)25T-SCLCR09	32	25	23	300	17					

STFCR-Steel



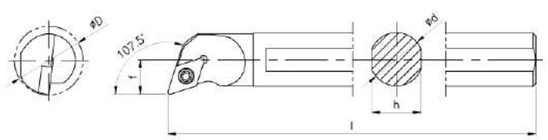
Product Code	ΦD	Φd	h	l	f	Insert	Screw	Shim	Shimscrew	Wrench
S(A)08K-STFCR09	10	8	7	125	6	TCMT0902□□	KS-2245	-	-	T-6
S(A)10K-STFCR09	12	10	9	125	6					
S(A)10K-STFCR11	12	10	9	125	6	TCMT1102□□	KS-2506	-	-	T-8
S(A)12M-STFCR11	15	12	11	150	8					
S(A)16R-STFCR11	19	16	15	200	10					
S(A)20S-STFCR11	25	20	18	250	13					
S(A)20S-STFCR16	25	20	18	250	13	TCMT16T3□□	KS-3508	-	-	T-15

SDUCR-Steel



Product Code	ΦD	Φd	h	l	f	Insert	Screw	Wrench
S(A)10K-SDUCR07	10	10	9	125	7	DCMT0702□□	KS-2506	T-8
S(A)12M-SDUCR07	16	12	11	150	9			
S(A)16M-SDUCR07	20	16	15	150	11			
S(A)16R-SDUCR07	20	16	15	200	11			
S(A)16R-SDUCR11	20	16	15	200	11	DCMT11T3□□	KS-3508	T-15
S(A)20S-SDUCR11	25	20	18	250	13			

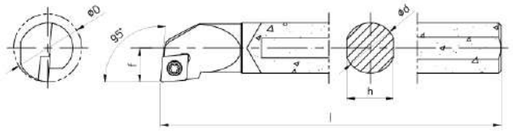
SDQCR-Steel



Product Code	ΦD	Φd	h	l	f	Insert	Screw	Wrench
S(A)10K-SDQCR07	13	10	9	125	7	DCMT0702□□	KS-2506	T-8
S(A)10M-SDQCR07	13	10	9	150	13			
S(A)12M-SDQCR07	16	12	11	150	9			
S(A)16R-SDQCR07	20	16	15	200	11			
S(A)16R-SDQCR11	20	16	15	200	11	DCMT11T3□□	KS-3508	T-15
S(A)20S-SDQCR11	25	20	18	250	13			

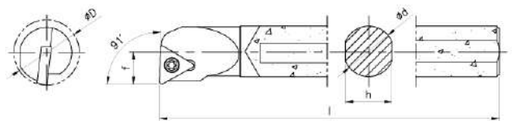
Carbide Boring Bar

SCLCR-Carbide



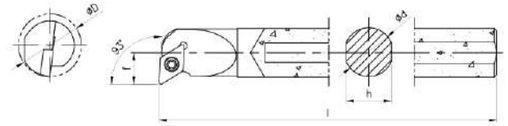
Product Code	ΦD	Φd	h	l	f	Insert	Screw	Wrench
C04G-SCLCR03	5	4	3.7	90	2.5	CCGT0301□□	KS-1630	T-6
C05H-SCLCR03	6	5	4.7	100	3			
C(E)06H-SCLCR04	7	6	5.5	100	3.5	CCGT0401□□	KS-2033	T-6
C(E)08K-SCLCR06	10	8	7.5	125	5	CCMT0602□□	KS-2506	T-8
C(E)10K-SCLCR06	12	10	9.5	125	6			
C(E)12M-SCLCR06	14	12	11.5	150	7			
C(E)12M-SCLCR09	16	12	11.5	150	8	CCMT09T3□□	KS-3508	T-15
C(E)16R-SCLCR09	20	16	15	200	10			
C(E)20S-SCLCR09	26	20	18	250	13			

STFCR-Carbide



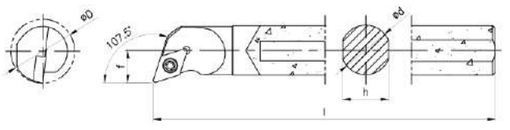
Product Code	ΦD	Φd	h	l	f	Insert	Screw	Wrench
C(E)08K-STFCR09	10	8	7.5	125	5	TCMT0902□□	KS-2245	T-6
C(E)10K-STFCR11	12	10	9.5	125	6	TCMT1102□□	KS-2506	T-8
C(E)12M-STFCR11	16	12	11.5	150	8			
C(E)16R-STFCR11	20	16	15	200	10			

SDQCR-Carbide



Product Code	ΦD	Φd	h	l	f	Insert	Screw	Wrench
C(E)08K-SDQCR07	11	8	7.5	125	6	DCMT0702□□	KS-2506	T-8
C(E)10K-SDQCR07	13	10	9.5	125	7			
C(E)12M-SDQCR07	16	12	11.5	150	9			
C(E)16R-SDQCR07	20	16	15	200	11			
C(E)16R-SDQCR11	20	16	15	200	11	DCMT11T3□□	KS-3508	T-15
C(E)20S-SDUCR11	25	20	18	250	13			

SDUCR-Carbide



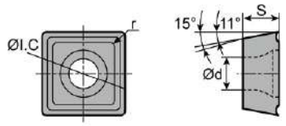
Product Code	ΦD	Φd	h	l	f	Insert	Screw	Wrench
C(E)10K-SDUCR07	13	10	9.5	125	7	DCMT0702□□	KS-2506	T-8
C(E)12M-SDUCR07	16	12	11.5	125	9			
C(E)16R-SDUCR07	20	16	15	200	11			
C(E)16R-SDUCR11	20	16	15	200	11	DCMT11T3□□	KS-3508	T-15
C(E)20S-SDUCR11	25	20	18	250	13			

Drilling

Technology and Innovation

- Insert
- Insert Drill
- X-Drill
- X-Drill Holder
- Cartridge
- Drive Ring
- Pilot Drill

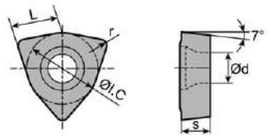
Insert



UTP200

- ✓ PVD Coating
- ✓ P20, M20

Product Code	ØI.C	s	d	r
SPMX050204	5.56	2.38	2.2	0.4
SPMX060204	6.35	2.38	2.6	0.4
SPMX07T308	7.94	3.97	2.8	0.8
SPMX090408	9.525	4.76	4.2	0.8
SPMX110408	11.11	4.76	4.4	0.8
SPMX140512	14.29	5.56	5.75	1.2



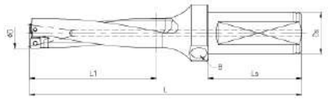
UTP200

- ✓ PVD Coating
- ✓ P20, M20

Product Code	L	ØI.C	s	d	r
WCMX030204	3.8	5.56	2.38	2.8	0.4
WCMX040204	4.3	6.35	2.38	3.1	0.4
WCMX050308	5.4	7.94	3.18	3.2	0.8
WCMX06T308	6.5	9.525	3.97	3.7	0.8
WCMX080408	8.7	12.7	4.76	4.3	0.8

Insert Drill

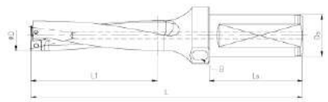
UDT 2xD



Product Code	D	L1	L	Ds	Ls	B	Insert	Screw	Wrench
UDT-12520D	12.5	28	105	20	50	PT-1/8	SPMX050204	FTNA0204	T6
UDT-13020D	13.0	29	106	20	50	PT-1/8			
UDT-13520D	13.5	30	107	20	50	PT-1/8			
UDT-14020D	14.0	31	108	20	50	PT-1/8			
UDT-14520D	14.5	32	109	20	50	PT-1/8			
UDT-15020D	15.0	33	110	20	50	PT-1/8			
UDT-15520D	15.5	34	120	25	56	PT-1/8	SPMX060204	ST2255-60	
UDT-16020D	16.0	35	121	25	56	PT-1/8			
UDT-16520D	16.5	36	122	25	56	PT-1/8			
UDT-17020D	17.0	37	123	25	56	PT-1/8			
UDT-17520D	17.5	38	124	25	56	PT-1/8			
UDT-18020D	18.0	39	125	25	56	PT-1/8			
UDT-18520D	18.5	40	126	25	56	PT-1/8			
UDT-19020D	19.0	41	127	25	56	PT-1/8			
UDT-19520D	19.5	42	128	25	56	PT-1/8			
UDT-20020D	20.0	43	129	25	56	PT-1/8			
UDT-20520D	20.5	44	130	25	56	PT-1/8			
UDT-21020D	21.0	45	131	25	56	PT-1/8			
UDT-21520D	21.5	46	132	25	60	PT-1/8			
UDT-22020D	22.0	47	142	32	60	PT-1/4	SPMX07T308	ST25065-60S	T8
UDT-22520D	22.5	48	143	32	60	PT-1/4			
UDT-23020D	23.0	49	144	32	60	PT-1/4			
UDT-23520D	23.5	50	145	32	60	PT-1/4			
UDT-24020D	24.0	51	146	32	60	PT-1/4			
UDT-24520D	24.5	52	147	32	60	PT-1/4			
UDT-25020D	25.0	53	148	32	60	PT-1/4			
UDT-25520D	25.5	54	149	32	60	PT-1/4			
UDT-26020D	26.0	55	150	32	60	PT-1/4			
UDT-26520D	26.5	56	151	32	60	PT-1/4			
UDT-27020D	27.0	57	152	32	60	PT-1/4			
UDT-27520D	27.5	58	153	32	60	PT-1/4			
UDT-28020D	28.0	59	154	32	60	PT-1/4	SPMX090408	TSB-35090	T15
UDT-28520D	28.5	60	155	32	60	PT-1/4			
UDT-29020D	29.0	61	156	32	60	PT-1/4			
UDT-29520D	29.5	64	159	32	60	PT-1/4			
UDT-30020D	30.0	65	160	32	60	PT-1/4			
UDT-31020D	31.0	67	162	32	60	PT-1/4			
UDT-32020D	32.0	69	164	32	60	PT-1/4			
UDT-33020D	33.0	71	166	32	60	PT-1/4			
UDT-34020D	34.0	73	168	32	60	PT-1/4	SPMX110408	ST401-60H	
UDT-35020D	35.0	75	170	32	60	PT-1/4			
UDT-36020D	36.0	77	172	32	60	PT-1/4			
UDT-37020D	37.0	79	189	40	70	PT-1/4			
UDT-38020D	38.0	81	191	40	70	PT-1/4			
UDT-39020D	39.0	83	193	40	70	PT-1/4			
UDT-40020D	40.0	85	195	40	70	PT-1/4			
UDT-41020D	41.0	87	197	40	70	PT-1/4			
UDT-42020D	42.0	89	199	40	70	PT-1/4	SPMX140512	ST512-60	T20
UDT-43020D	43.0	91	201	40	70	PT-1/4			
UDT-44020D	44.0	93	203	40	70	PT-1/4			
UDT-45020D	45.0	95	205	40	70	PT-1/4			
UDT-46020D	46.0	97	207	40	70	PT-1/4			
UDT-47020D	47.0	99	209	40	70	PT-1/4			
UDT-48020D	48.0	101	211	40	70	PT-1/4			
UDT-49020D	49.0	103	213	40	70	PT-1/4			
UDT-50020D	50.0	105	215	40	70	PT-1/4			

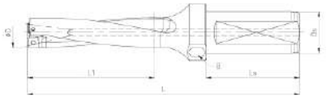
Insert Drill

UDT 3xD



Product Code	D	L1	L	Ds	Ls	B	Insert	Screw	Wrench
UDT-12530D	12.5	41	118	20	50	PT-1/8	SPMX050204	FTNA0204	T6
UDT-13030D	13.0	42	119	20	50	PT-1/8			
UDT-13530D	13.5	44	121	20	50	PT-1/8			
UDT-14030D	14.0	45	122	20	50	PT-1/8			
UDT-14530D	14.5	47	124	20	50	PT-1/8			
UDT-15030D	15.0	48	125	20	50	PT-1/8			
UDT-15530D	15.5	50	136	25	56	PT-1/8	SPMX060204	ST2255-60	
UDT-16030D	16.0	51	137	25	56	PT-1/8			
UDT-16530D	16.5	53	139	25	56	PT-1/8			
UDT-17030D	17.0	54	140	25	56	PT-1/8			
UDT-17530D	17.5	56	142	25	56	PT-1/8			
UDT-18030D	18.0	57	143	25	56	PT-1/8			
UDT-18530D	18.5	59	145	25	56	PT-1/8			
UDT-19030D	19.0	60	146	25	56	PT-1/8			
UDT-19530D	19.5	62	148	25	56	PT-1/8			
UDT-20030D	20.0	63	149	25	56	PT-1/8			
UDT-20530D	20.5	65	151	25	56	PT-1/8			
UDT-21030D	21.0	66	152	25	56	PT-1/8			
UDT-21530D	21.5	68	154	25	56	PT-1/8			
UDT-22030D	22.0	69	155	32	60	PT-1/4	SPMX07T308	ST25065-60S	T8
UDT-22530D	22.5	71	166	32	60	PT-1/4			
UDT-23030D	23.0	72	167	32	60	PT-1/4			
UDT-23530D	23.5	74	169	32	60	PT-1/4			
UDT-24030D	24.0	75	170	32	60	PT-1/4			
UDT-24530D	24.5	77	172	32	60	PT-1/4			
UDT-25030D	25.0	78	173	32	60	PT-1/4			
UDT-25530D	25.5	80	175	32	60	PT-1/4			
UDT-26030D	26.0	81	176	32	60	PT-1/4			
UDT-26530D	26.5	83	178	32	60	PT-1/4			
UDT-27030D	27.0	84	179	32	60	PT-1/4			
UDT-27530D	27.5	86	181	32	60	PT-1/4			
UDT-28030D	28.0	87	182	32	60	PT-1/4	SPMX090408	TSB-35090	T15
UDT-28530D	28.5	89	184	32	60	PT-1/4			
UDT-29030D	29.0	90	185	32	60	PT-1/4			
UDT-29530D	29.5	94	189	32	60	PT-1/4			
UDT-30030D	30.0	95	190	32	60	PT-1/4			
UDT-31030D	31.0	98	193	32	60	PT-1/4			
UDT-32030D	32.0	101	196	32	60	PT-1/4			
UDT-33030D	33.0	104	199	32	60	PT-1/4			
UDT-34030D	34.0	107	202	32	60	PT-1/4	SPMX110408	ST410-60H	
UDT-35030D	35.0	110	205	32	60	PT-1/4			
UDT-36030D	36.0	113	208	32	60	PT-1/4			
UDT-37030D	37.0	116	226	40	70	PT-1/4			
UDT-38030D	38.0	119	229	40	70	PT-1/4			
UDT-39030D	39.0	122	232	40	70	PT-1/4			
UDT-40030D	40.0	125	235	40	70	PT-1/4			
UDT-41030D	41.0	128	238	40	70	PT-1/4			
UDT-42030D	42.0	131	241	40	70	PT-1/4	SPMX140512	ST512-60	T20
UDT-43030D	43.0	134	244	40	70	PT-1/4			
UDT-44030D	44.0	137	247	40	70	PT-1/4			
UDT-45030D	45.0	140	250	40	70	PT-1/4			
UDT-46030D	46.0	143	253	40	70	PT-1/4			
UDT-47030D	47.0	146	256	40	70	PT-1/4			
UDT-48030D	48.0	149	259	40	70	PT-1/4			
UDT-49030D	49.0	152	262	40	70	PT-1/4			
UDT-50030D	50.0	155	265	40	70	PT-1/4			

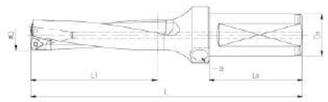
UDT 4xD



Product Code	D	L1	L	Ds	Ls	B	Insert	Screw	Wrench
UDT-12540D	12.5	53	130	20	50	PT-1/8	SPMX050204	FTNA0204	T6
UDT-13040D	13	55	132	20	50	PT-1/8			
UDT-13540D	13.5	57	134	20	50	PT-1/8			
UDT-14040D	14	59	136	20	50	PT-1/8			
UDT-14540D	14.5	61	138	20	50	PT-1/8			
UDT-15040D	15	63	140	20	50	PT-1/8			
UDT-15540D	15.5	65	151	25	56	PT-1/8	SPMX060204	ST2255-60	
UDT-16040D	16	67	153	25	56	PT-1/8			
UDT-16540D	16.5	69	155	25	56	PT-1/8			
UDT-17040D	17	71	157	25	56	PT-1/8			
UDT-17540D	17.5	73	159	25	56	PT-1/8			
UDT-18040D	18	75	161	25	56	PT-1/8			
UDT-18540D	18.5	77	163	25	56	PT-1/8			
UDT-19040D	19	79	165	25	56	PT-1/8			
UDT-19540D	19.5	81	167	25	56	PT-1/8			
UDT-20040D	20	83	169	25	56	PT-1/8			
UDT-20540D	20.5	85	171	25	56	PT-1/8			
UDT-21040D	21	87	173	25	56	PT-1/8			
UDT-21540D	21.5	89	175	25	60	PT-1/8			
UDT-22040D	22	91	186	32	60	PT-1/4	SPMX07T308	ST25065-60S	T8
UDT-22540D	22.5	93	188	32	60	PT-1/4			
UDT-23040D	23	95	190	32	60	PT-1/4			
UDT-23540D	23.5	97	192	32	60	PT-1/4			
UDT-24040D	24	99	194	32	60	PT-1/4			
UDT-24540D	24.5	101	196	32	60	PT-1/4			
UDT-25040D	25	103	198	32	60	PT-1/4			
UDT-25540D	25.5	105	200	32	60	PT-1/4			
UDT-26040D	26	107	202	32	60	PT-1/4			
UDT-26540D	26.5	109	204	32	60	PT-1/4			
UDT-27040D	27	111	206	32	60	PT-1/4			
UDT-27540D	27.5	113	208	32	60	PT-1/4			
UDT-28040D	28	115	210	32	60	PT-1/4	SPMX090408	TSB-35090	T15
UDT-28540D	28.5	117	212	32	60	PT-1/4			
UDT-29040D	29	119	214	32	60	PT-1/4			
UDT-29540D	29.5	123	218	32	60	PT-1/4			
UDT-30040D	30	125	220	32	60	PT-1/4			
UDT-31040D	31	129	224	32	60	PT-1/4			
UDT-32040D	32	133	228	32	60	PT-1/4			
UDT-33040D	33	137	232	32	60	PT-1/4			
UDT-34040D	34	141	236	32	60	PT-1/4	SPMX110408	ST401-60H	
UDT-35040D	35	145	240	32	60	PT-1/4			
UDT-36040D	36	149	244	32	60	PT-1/4			
UDT-37040D	37	153	263	40	70	PT-1/4			
UDT-38040D	38	157	267	40	70	PT-1/4			
UDT-39040D	39	161	271	40	70	PT-1/4			
UDT-40040D	40	165	275	40	70	PT-1/4			
UDT-41040D	41	169	279	40	70	PT-1/4			
UDT-42040D	42	173	283	40	70	PT-1/4	SPMX140512	ST512-60	T20
UDT-43040D	43	177	287	40	70	PT-1/4			
UDT-44040D	44	181	291	40	70	PT-1/4			
UDT-45040D	45	185	295	40	70	PT-1/4			
UDT-46040D	46	189	299	40	70	PT-1/4			
UDT-47040D	47	193	303	40	70	PT-1/4			
UDT-48040D	48	197	307	40	70	PT-1/4			
UDT-49040D	49	201	311	40	70	PT-1/4			
UDT-50040D	50	205	315	40	70	PT-1/4			

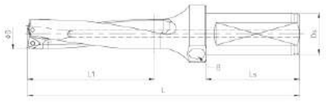
Insert Drill

UDU 2xD



Product Code	D	L1	L	Ds	Ls	B	Insert	Screw	Wrench
UDU-13020D	13.0	31	108	20	50	PT-1/8			
UDU-13520D	13.5	32	109	20	50	PT-1/8			
UDU-14020D	14.0	33	110	20	50	PT-1/8	WC..03T104	ZSB-18045	T6
UDU-14520D	14.5	34	111	20	50	PT-1/8			
UDU-15020D	15.0	35	112	20	50	PT-1/8			
UDU-15520D	15.5	36	113	20	50	PT-1/8			
UDU-16020D	16.0	37	114	20	50	PT-1/8			
UDU-16520D	16.5	38	115	20	50	PT-1/8			
UDU-17020D	17.0	39	116	20	50	PT-1/8			
UDU-17520D	17.5	40	117	20	50	PT-1/8			
UDU-18020D	18.0	41	118	20	50	PT-1/8	WC..030204	ST22045-55	T6
UDU-18520D	18.5	42	119	20	50	PT-1/8			
UDU-19020D	19.0	43	120	20	50	PT-1/8			
UDU-19520D	19.5	44	121	20	50	PT-1/8			
UDU-20020D	20.0	45	122	20	50	PT-1/8			
UDU-20520D	20.5	46	133	25	56	PT-1/8			
UDU-21020D	21.0	47	134	25	56	PT-1/8			
UDU-21520D	21.5	48	135	25	56	PT-1/8			
UDU-22020D	22.0	49	136	25	56	PT-1/8			
UDU-22520D	22.5	50	137	25	56	PT-1/8	WC..040204	FTKA02555	T8
UDU-23020D	23.0	51	138	25	56	PT-1/8			
UDU-23520D	23.5	52	139	25	56	PT-1/8			
UDU-24020D	24.0	53	140	25	56	PT-1/8			
UDU-24520D	24.5	54	141	25	56	PT-1/8			
UDU-25020D	25.0	55	142	25	56	PT-1/8			
UDU-26020D	26.0	57	157	32	60	PT-1/4			
UDU-27020D	27.0	59	159	32	60	PT-1/4			
UDU-28020D	28.0	61	161	32	60	PT-1/4	WC..050308	ST307-55	T8
UDU-29020D	29.0	63	163	32	60	PT-1/4			
UDU-30020D	30.0	65	165	32	60	PT-1/4			
UDU-31020D	31.0	67	167	32	60	PT-1/4			
UDU-32020D	32.0	69	169	32	60	PT-1/4			
UDU-33020D	33.0	71	171	32	60	PT-1/4			
UDU-34020D	34.0	73	173	32	60	PT-1/4			
UDU-35020D	35.0	75	175	32	60	PT-1/4			
UDU-36020D	36.0	77	177	32	60	PT-1/4	WC..06T308	ST3509-55	T15
UDU-37020D	37.0	79	179	32	60	PT-1/4			
UDU-38020D	38.0	81	181	32	60	PT-1/4			
UDU-39020D	39.0	83	183	32	60	PT-1/4			
UDU-40020D	40.0	85	185	32	60	PT-1/4			
UDU-41020D	41.0	87	187	32	60	PT-1/4			
UDU-42020D	42.0	89	199	40	70	PT-1/4			
UDU-43020D	43.0	91	201	40	70	PT-1/4			
UDU-44020D	44.0	93	203	40	70	PT-1/4			
UDU-45020D	45.0	95	205	40	70	PT-1/4			
UDU-46020D	46.0	97	207	40	70	PT-1/4			
UDU-47020D	47.0	99	209	40	70	PT-1/4			
UDU-48020D	48.0	101	211	40	70	PT-1/4			
UDU-49020D	49.0	103	213	40	70	PT-1/4			
UDU-50020D	50.0	105	215	40	70	PT-1/4	WC..080408	ST411-60W	T15
UDU-51020D	51.0	107	217	40	70	PT-1/4			
UDU-52020D	52.0	109	219	40	70	PT-1/4			
UDU-53020D	53.0	111	221	40	70	PT-1/4			
UDU-54020D	54.0	113	223	40	70	PT-1/4			
UDU-55020D	55.0	115	225	40	70	PT-1/4			
UDU-56020D	56.0	117	227	40	70	PT-1/4			
UDU-57020D	57.0	119	229	40	70	PT-1/4			
UDU-58020D	58.0	121	231	40	70	PT-1/4			

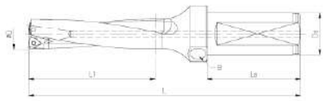
UDU 3xD



Product Code	D	L1	L	Ds	Ls	B	Insert	Screw	Wrench
UDU-13030D	13.0	44	121	20	50	PT-1/8			
UDU-13530D	13.5	45	122	20	50	PT-1/8			
UDU-14030D	14.0	47	124	20	50	PT-1/8	WC..03T104	ZSB-18045	T6
UDU-14530D	14.5	48	125	20	50	PT-1/8			
UDU-15030D	15.0	50	127	20	50	PT-1/8			
UDU-15530D	15.5	51	128	20	50	PT-1/8			
UDU-16030D	16.0	53	130	20	50	PT-1/8			
UDU-16530D	16.5	54	131	20	50	PT-1/8			
UDU-17030D	17.0	56	133	20	50	PT-1/8			
UDU-17530D	17.5	57	134	20	50	PT-1/8			
UDU-18030D	18.0	59	136	20	50	PT-1/8	WC..030204	ST22045-55	T6
UDU-18530D	18.5	60	137	20	50	PT-1/8			
UDU-19030D	19.0	62	139	20	50	PT-1/8			
UDU-19530D	19.5	63	140	20	50	PT-1/8			
UDU-20030D	20.0	65	142	20	50	PT-1/8			
UDU-20530D	20.5	66	143	25	56	PT-1/8			
UDU-21030D	21.0	68	155	25	56	PT-1/8			
UDU-21530D	21.5	69	156	25	56	PT-1/8			
UDU-22030D	22.0	71	158	25	56	PT-1/8			
UDU-22530D	22.5	72	159	25	56	PT-1/8	WC..040204	FTKA02555	T8
UDU-23030D	23.0	74	161	25	56	PT-1/8			
UDU-23530D	23.5	75	162	25	56	PT-1/8			
UDU-24030D	24.0	77	164	25	56	PT-1/8			
UDU-24530D	24.5	78	165	25	56	PT-1/8			
UDU-25030D	25.0	80	167	25	56	PT-1/8			
UDU-25530D	25.5	81	168	32	60	PT-1/4			
UDU-26030D	26.0	83	183	32	60	PT-1/4			
UDU-26530D	26.5	84	184	32	60	PT-1/4			
UDU-27030D	27.0	86	186	32	60	PT-1/4			
UDU-27530D	27.5	87	187	32	60	PT-1/4	WC..050308	ST307-55	T8
UDU-28030D	28.0	89	189	32	60	PT-1/4			
UDU-28530D	28.5	90	190	32	60	PT-1/4			
UDU-29030D	29.0	92	192	32	60	PT-1/4			
UDU-29530D	29.5	93	193	32	60	PT-1/4			
UDU-30030D	30.0	95	195	32	60	PT-1/4			
UDU-31030D	31.0	98	198	32	60	PT-1/4			
UDU-32030D	32.0	101	201	32	60	PT-1/4			
UDU-33030D	33.0	104	204	32	60	PT-1/4			
UDU-34030D	34.0	107	207	32	60	PT-1/4			
UDU-35030D	35.0	110	210	32	60	PT-1/4			
UDU-36030D	36.0	113	213	32	60	PT-1/4	WC..06T308	ST3509-55	T15
UDU-37030D	37.0	116	216	32	60	PT-1/4			
UDU-38030D	38.0	119	219	32	60	PT-1/4			
UDU-39030D	39.0	122	222	32	60	PT-1/4			
UDU-40030D	40.0	125	225	32	60	PT-1/4			
UDU-41030D	41.0	128	228	32	60	PT-1/4			
UDU-42030D	42.0	131	241	40	70	PT-1/4			
UDU-43030D	43.0	134	244	40	70	PT-1/4			
UDU-44030D	44.0	137	247	40	70	PT-1/4			
UDU-45030D	45.0	140	250	40	70	PT-1/4			
UDU-46030D	46.0	143	253	40	70	PT-1/4			
UDU-47030D	47.0	146	256	40	70	PT-1/4			
UDU-48030D	48.0	149	259	40	70	PT-1/4			
UDU-49030D	49.0	152	262	40	70	PT-1/4			
UDU-50030D	50.0	155	265	40	70	PT-1/4	WC..080408	ST411-60W	T15
UDU-51030D	51.0	158	268	40	70	PT-1/4			
UDU-52030D	52.0	161	271	40	70	PT-1/4			
UDU-53030D	53.0	164	274	40	70	PT-1/4			
UDU-54030D	54.0	167	277	40	70	PT-1/4			
UDU-55030D	55.0	170	280	40	70	PT-1/4			
UDU-56030D	56.0	173	283	40	70	PT-1/4			
UDU-57030D	57.0	176	286	40	70	PT-1/4			
UDU-58030D	58.0	179	289	40	70	PT-1/4			

Insert Drill

UDU 4xD



Product Code	D	L1	L	Ds	Ls	B	Insert	Screw	Wrench
UDU-13040D	13.0	57	134	20	50	PT-1/8	WC..03T104	ZSB-18045	T6
UDU-13540D	13.5	59	136	20	50	PT-1/8			
UDU-14040D	14.0	61	138	20	50	PT-1/8			
UDU-14540D	14.5	63	140	20	50	PT-1/8			
UDU-15040D	15.0	65	142	20	50	PT-1/8			
UDU-15540D	15.5	67	144	20	50	PT-1/8			
UDU-16040D	16.0	69	146	20	50	PT-1/8	WC..030204	ST22045-55	T6
UDU-16540D	16.5	71	148	20	50	PT-1/8			
UDU-17040D	17.0	73	150	20	50	PT-1/8			
UDU-17540D	17.5	75	152	20	50	PT-1/8			
UDU-18040D	18.0	77	154	20	50	PT-1/8			
UDU-18540D	18.5	79	156	20	50	PT-1/8			
UDU-19040D	19.0	81	158	20	50	PT-1/8			
UDU-19540D	19.5	83	160	20	50	PT-1/8			
UDU-20040D	20.0	85	162	20	50	PT-1/8			
UDU-20540D	20.5	87	174	25	56	PT-1/8	WC..040204	FTKA02555	T8
UDU-21040D	21.0	89	176	25	56	PT-1/8			
UDU-21540D	21.5	91	178	25	56	PT-1/8			
UDU-22040D	22.0	93	180	25	56	PT-1/8			
UDU-22540D	22.5	95	182	25	56	PT-1/8			
UDU-23040D	23.0	97	184	25	56	PT-1/8			
UDU-23540D	23.5	99	186	25	56	PT-1/8			
UDU-24040D	24.0	101	188	25	56	PT-1/8			
UDU-24540D	24.5	102	190	25	56	PT-1/8			
UDU-25040D	25.0	105	192	25	56	PT-1/8			
UDU-26040D	26.0	109	209	32	60	PT-1/8	WC..050308	ST307-55	T8
UDU-27040D	27.0	113	213	32	60	PT-1/8			
UDU-28040D	28.0	117	217	32	60	PT-1/8			
UDU-29040D	29.0	121	221	32	60	PT-1/8			
UDU-30040D	30.0	125	225	32	60	PT-1/8			
UDU-31040D	31.0	129	229	32	60	PT-1/4	WC..06T308	ST3509-55	T15
UDU-32040D	32.0	133	233	32	60	PT-1/4			
UDU-33040D	33.0	137	237	32	60	PT-1/4			
UDU-34040D	34.0	141	241	32	60	PT-1/4			
UDU-35040D	35.0	145	245	32	60	PT-1/4			
UDU-36040D	36.0	149	249	32	60	PT-1/4			
UDU-37040D	37.0	153	253	32	60	PT-1/4			
UDU-38040D	38.0	157	257	32	60	PT-1/4			
UDU-39040D	39.0	161	261	32	60	PT-1/4			
UDU-40040D	40.0	165	265	32	60	PT-1/4			
UDU-41040D	41.0	169	269	32	60	PT-1/4			
UDU-42040D	42.0	173	283	40	70	PT-1/4	WC..080408	ST411-60W	T15
UDU-43040D	43.0	177	287	40	70	PT-1/4			
UDU-44040D	44.0	181	291	40	70	PT-1/4			
UDU-45040D	45.0	185	295	40	70	PT-1/4			
UDU-46040D	46.0	189	299	40	70	PT-1/4			
UDU-47040D	47.0	193	303	40	70	PT-1/4			
UDU-48040D	48.0	197	307	40	70	PT-1/4			
UDU-49040D	49.0	201	311	40	70	PT-1/4			
UDU-50040D	50.0	205	315	40	70	PT-1/4			
UDU-51040D	51.0	209	319	40	70	PT-1/4			
UDU-52040D	52.0	213	323	40	70	PT-1/4			
UDU-53040D	53.0	217	327	40	70	PT-1/4			
UDU-54040D	54.0	221	331	40	70	PT-1/4			
UDU-55040D	55.0	225	335	40	70	PT-1/4			
UDU-56040D	56.0	229	339	40	70	PT-1/4			
UDU-57040D	57.0	233	343	40	70	PT-1/4			
UDU-58040D	58.0	237	347	40	70	PT-1/4			

Recommened cutting condition

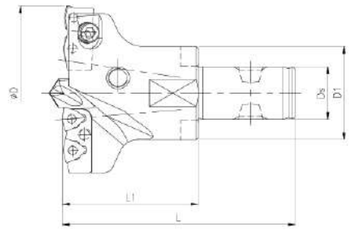
UDT

		Vc (m/min)	Φ12.5~Φ15	Φ15.5~Φ21.5	Φ22~Φ27.5	Φ28~Φ33	Φ34~Φ41	Φ42~Φ50
P	Unalloyed steel	180-240	0.05-0.08	0.06-0.10	0.06-0.12	0.07-0.13	0.08-0.15	0.08-0.16
	Low-alloy steel	150-220	0.06-0.12	0.08-0.15	0.10-0.17	0.12-0.20	0.12-0.22	0.13-0.24
	Low-alloy steel	130-200	0.06-0.12	0.08-0.14	0.10-0.18	0.12-0.20	0.12-0.20	0.12-0.22
	High-alloy steel	120-180	0.06-0.10	0.08-0.15	0.10-0.18	0.12-0.20	0.12-0.22	0.13-0.24
M	Stainless steel	150,220	0.05-0.10	0.06-0.12	0.08-0.15	0.09-0.16	0.10-0.17	0.11-0.18
K	Grey cast iron	150-250	0.06-0.12	0.08-0.16	0.12-0.20	0.14-0.25	0.15-0.28	0.17-0.30
	Cst iron with nodular cast	120-200	0.06-0.10	0.08-0.15	0.10-0.18	0.12-0.20	0.14-0.22	0.16-0.24
N	Aluminium	300-380	0.060.14	0.08-0.15	0.10-0.20	0.12-0.22	0.14-0.23	0.15-0.24
S	Super-alloys and titanium	30-60	0.05-0.10	0.06-0.14	0.080.18	0.10-0.20	0.11-0.20	0.12-0.22

UDU

		Vc (m/min)	Φ13~Φ15.5	Φ16~Φ20	Φ20.5~Φ25	Φ25.5~Φ30	Φ31~Φ41	Φ42~Φ58
P	Unalloyed steel	180-250	0.04-0.08	0.05-0.10	0.06-0.12	0.08-0.14	0.08-0.14	0.08-0.18
	Low-alloy steel	150-220	0.05-0.08	0.06-0.12	0.07-0.14	0.08-0.18	0.12-0.22	0.12-0.25
	Low-alloy steel	120-220	0.05-0.08	0.06-0.10	0.07-0.14	0.08-0.18	0.10-0.20	0.12-0.24
	High-alloy steel	130-200	0.05-0.08	0.06-0.10	0.07-0.15	0.08-0.18	0.10-0.20	0.12-0.24
M	Stainless steel	150-220	0.04-0.08	0.05-0.09	0.06-0.12	0.07-0.13	0.08-0.16	0.10-0.20
K	Grey cast iron	150-250	0.05-0.11	0.08-0.13	0.10-0.15	0.12-0.20	0.15-0.26	0.18-0.30
	Cst iron with nodular cast	120-200	0.05-0.10	0.06-0.12	0.08-0.14	0.10-0.18	0.14-0.24	0.15-0.25
N	Aluminium forging alloys	300-380	0.04-0.06	0.05-0.07	0.06-0.08	0.07-0.10	0.10-0.13	0.12-0.20
	Aluminium cast alloys	260-330	0.04-0.06	0.05-0.07	0.06-0.08	0.07-0.10	0.10-0.15	0.12-0.20
S	Super-alloys and titanium	40-80	0.03-0.05	0.04-0.06	0.04-0.07	0.05-0.08	0.06-0.10	0.07-0.13

X-Drill



Product Code	D	Ds	D1	L1	L	Pilot Drill	Cartridge	Insert	Screw	Wrench
UXD-045050	45~50	13	28	50	85	PLD 1035 TiN-H	UDC-045050N/T	WC..030204	ST22045-55	T6
UXD-050055	50~55	13	28	50	85	PLD 1035 TiN-H	UDC-050055N/T			
UXD-055060	55~60	16	32	60	100	PLD 1238 TiN-H	UDC-055060N/T	WC..040204	FTKA02555	T8
UXD-060065	60~65	16	32	60	100	PLD 1238 TiN-H	UDC-060065N/T	WC..050308	ST307-55	T8
UXD-065070	65~70	16	32	60	100	PLD 1238 TiN-H	UDC-065070N/T			
UXD-070075	70~75	22	40	70	115	PLD 1238 TiN-H	UDC-070075N/T			
UXD-075080	75~80	22	40	70	115	PLD 1645 TiN-H	UDC-075080N/T	WC..06T308	ST3509-55	T15
UXD-080085	80~85	22	40	70	115	PLD 1645 TiN-H	UDC-080085N/T			
UXD-085090	85~90	27	48	70	120	PLD 1645 TiN-H	UDC-085090N/T			
UXD-090095	90~95	27	48	70	120	PLD 1645 TiN-H	UDC-090095N/T			
UXD-095100	95~100	27	48	70	120	PLD 1645 TiN-H	UDC-095100N/T			
UXD-100105	100~105	32	58	80	130	PLD 2045 TiN-H	UDC-100105N/T	WC..050308	ST307-55	T8
UXD-105110	105~110	32	58	80	130	PLD 2045 TiN-H	UDC-105110N/T	WC..06T308	ST3509-55	T15
UXD-110115	110~115	32	58	80	130	PLD 2045 TiN-H	UDC-110115N/T			
UXD-115120	115~120	40	70	90	145	PLD 2045 TiN-H	UDC-115120N/T			
UXD-120125	120~125	40	70	90	145	PLD 2556 TiN-H	UDC-120125N/T			
UXD-125130	125~130	40	70	90	145	PLD 2556 TiN-H	UDC-125130N/T			
UXD-130135	130~135	40	70	90	145	PLD 2556 TiN-H	UDC-130135N/T			
UXD-135140	135~140	40	70	90	145	PLD 2556 TiN-H	UDC-135140N/T			
UXD-140150	140~150	50	80	100	160	PLD 2556 TiN-H	UDC-140150N/T	WC..080408	ST411-60W	T15
UXD-150160	150~160	50	80	100	160	PLD 2556 TiN-H	UDC-150160N/T			
UXD-160170	160~170	50	80	100	160	PLD 3068 TiN-H	UDC-160170N/T			
UXD-170180	170~180	50	80	100	160	PLD 3068 TiN-H	UDC-170180N/T			

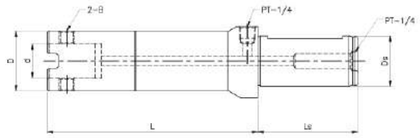
Recommended cutting conditions

X-Drill

		Vc (m/min)	Φ45~Φ55	Φ55~Φ60	Φ60~Φ75	Φ75~Φ100	Φ100~Φ105	Φ105~Φ150	Φ150~Φ180
P	Unalloyed steel	120-180	0.06-0.10	0.07-0.11	0.08-0.12	0.08-0.14	0.08-0.18	0.08-0.12	0.10-0.14
	Low-alloy steel	110-170	0.060.10	0.07-0.11	0.08-0.12	0.10-0.14	0.10-0.18	0.08-0.12	0.10-0.14
	Low-alloy steel	90-130	0.06-0.10	0.07-0.11	0.08-0.12	0.10-0.14	0.12-0.18	0.08-0.12	0.10-0.14
	High-alloy steel	60-100	0.05-0.07	0.05-0.07	0.06-0.08	0.06-0.10	0.09-0.13	0.06-0.08	0.06-0.10
M	Stainless steel	60-110	0.04-0.07	0.04-0.11	0.06-0.12	0.08-0.14	0.10-0.18	0.06-0.12	0.08-0.14
K	Grey cast iron	120-180	0.07-0.13	0.07-0.15	0.08-0.16	0.10-0.18	0.12-0.22	0.08-0.16	0.10-0.18
	Cst iron with nodular cast	100-180	0.04-0.13	0.07-0.15	0.08-0.16	0.10-0.25	0.12-0.26	0.08-0.16	0.10-0.25
N	Aluminium forging alloys	180-280	0.04-0.06	0.07-0.12	0.08-0.13	0.09-0.15	0.12-0.20	0.08-0.13	0.09-0.15
	Aluminium cast alloys	120-270	0.04-0.06	0.06-0.12	0.08-0.13	0.09-0.15	0.120.20	0.08-0.13	0.09-0.15

X-Drill Holder

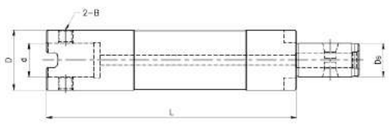
XDHD (CYLINDRICAL SHANK Type)



Product Code	Ds	d	L	D	Ls	B	Drive Ring
XDHD-3213115	32	13	115	28	70	MTB-08115	XDDR-281310
XDHD-3213200	32	13	200	28	70	MTB-08115	
XDHD-3213300	32	13	300	28	70	MTB-08115	
XDHD-4016125	40	16	125	32	80	MTB-08115	XDDR0321610
XDHD-4016200	40	16	200	32	80	MTB-08115	
XDHD-4016300	40	16	300	32	80	MTB-08115	
XDHD-4022148	40	22	148	40	80	MTB-10145	XDDR-402212
XDHD-4022200	40	22	200	40	80	MTB-10145	
XDHD-4022300	40	22	300	40	80	MTB-10145	
XDHD-4027168	40	27	168	48	80	MTB-12175	XDDR-482712
XDHD-4027300	40	27	300	48	80	MTB-12175	
XDHD-4032186	40	32	186	58	80	MTB-12195	XDDR-583214
XDHD-4032300	40	32	300	58	80	MTB-12195	
XDHD-5040186	50	40	186	70	80	MTB-16260	XDDR-704014
XDHD-5040300	50	40	300	70	80	MTB-16260	
XDHD-5050184	50	50	184	80	80	MTB-16260	XDDR-805016
XDHD-5050300	50	50	300	80	80	MTB-16260	

X-Drill Holder Extension

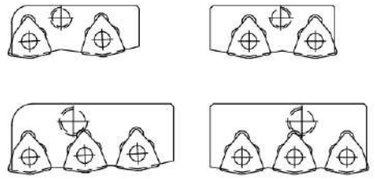
XDHDE



Product Code	Ds	d	L	D	B	Drive Ring
XDHDE-2813115	13	13	115	28	MTB-08115	XDDR-281310
XDHDE-2813150	13	13	150	28	MTB-08115	
XDHDE-2813200	13	13	200	28	MTB-08115	
XDHDE-2813300	13	13	300	28	MTB-08115	
XDHDE-3216115	16	16	115	32	MTB-08115	XDDR-321610
XDHDE-3216200	16	16	200	32	MTB-08115	
XDHDE-3216300	16	16	300	32	MTB-08115	
XDHDE-4022113	22	22	113	40	MTB-10145	XDDR-402212
XDHDE-4022200	22	22	200	40	MTB-10145	
XDHDE-4022300	22	22	300	40	MTB-10145	
XDHDE-4827113	27	27	113	48	MTB-12175	XDDR-482712
XDHDE-4827200	27	27	200	48	MTB-12175	
XDHDE-4827300	27	27	300	48	MTB-12175	
XDHDE-5832186	32	32	186	58	MTB-12195	XDDR-583214
XDHDE-5832300	32	32	300	58	MTB-12195	
XDHDE-7040186	40	40	186	70	MTB-16260	XDDR-704014
XDHDE-7040300	40	40	300	70	MTB-16260	
XDHDE-7040500	40	40	500	70	MTB-16260	
XDHDE-8050204	50	50	204	80	MTB-16260	XDDR-805016
XDHDE-8050300	50	50	300	80	MTB-16260	
XDHDE-8050500	50	50	500	80	MTB-16260	

Cartridge

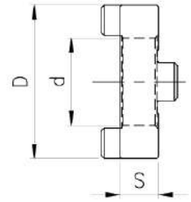
UDC



Inner	Outer	Insert	No. of Insert	Screw	Wrench	X Drill
UDC-045050N	UDC-045050T	WC..030204	2	ST22045-55	T8	UXD-045050
UDC-050055N	UDC-050055T					UXD-050055
UDC-055060N	UDC-055060T	WC..040204	2	FTKA02555	T8	UXD-055060
UDC-060065N	UDC-060065T	WC..050308	2	ST307-55	T8	UXD-060065
UDC-065070N	UDC-065070T					UXD-065070
UDC-070075N	UDC-070075T					UXD-070075
UDC-075080N	UDC-075080T	WC..06T308	2	ST3509-55	T15	UXD-075080
UDC-080085N	UDC-080085T					UXD-080085
UDC-085090N	UDC-085090T					UXD-085090
UDC-090095N	UDC-090095T					UXD-090095
UDC-095100N	UDC-095100T					UXD-095100
UDC-100105N	UDC-100105T	WC..050308	3	ST307-55	T8	UXD-100105
UDC-105110N	UDC-105110T	WC..06T308	3	ST3509-55	T15	UXD-105110
UDC-110115N	UDC-110115T					UXD-110115
UDC-115120N	UDC-115120T					UXD-115120
UDC-120125N	UDC-120125T					UXD-120125
UDC-125130N	UDC-125130T					UXD-125130
UDC-130135N	UDC-130135T					UXD-130135
UDC-135140N	UDC-135140T					UXD-135140
UDC-140150N	UDC-140150T	WC..080408	3	ST411-60W		UXD-140150
UDC-150160N	UDC-150160T					UXD-150160
UDC-160170N	UDC-160170T					UXD-160170
UDC-170180N	UDC-170180T					UXD-170180

Drive Ring

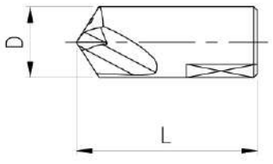
XDDR



Product Code	D	d	S
XDDR-281310	28	13	10
XDDR-321610	32	16	10
XDDR-402212	40	22	12
XDDR-482712	48	27	12
XDDR-583214	58	32	14
XDDR-704014	70	40	14
XDDR-805016	80	50	16

Pilot Drill

PLD



Product Code	D	L
PLD-1035 TiN-H	10	35
PLD-1238 TiN-H	12	38
PLD-1645 TiN-H	16	45
PLD-2045 TiN-H	20	45
PLD-2556 TiN-H	25	56
PLD-3068 TiN-H	30	68

Technical Data

Technology and Innovation

- CBN Grade comparison
- Comparison table of workpieces
- Steel and Non-Ferrous Metal symbol signboards
- Hardness conversion table
- SI unit conversion table
- Element Characteristics
- CBN/PCD Machining Examples
- Trouble Shooting

CBN Grade comparison

Workpiece	Grade	CHAMPDIA	SUMITOMO	KYOCERA	NTK
H High-hardness steel	H01	CBN400	BN1000	KBN510	B24
		CBN40A	BNC100	KBN05M	B52
		CBN450	BNX10	KBN10M	B5K
		CBN45A			
	H10	CBN500	BN2000	KBN510	B24
		CBN501	BNC2010	KBN525	B36
		CBN502	BNX20	KBN05M	B54
		CBN520		KBN10M	B52
		CBN560		KBN25M	B5K
		CBN570			
		CBN580			
	H20	CBN650	BNC200	KBN25M	B22
		CBN651	BNC2125	KBN30M	B36
		CBN652		KBN35M	B6K
		CBN653		KBN900	
		CBN654			
	H30	CBN600	BNC160	KBN30M	B40
		CBN6000I	BNC2115	KBN35M	B6K
		CBN60M	BNC300	KBN900	
		CBN6300	BN350		
K Sintering alloy and cast iron	K01	CBN90E	BN7000	KBN475	B30
		CBN901			B16
	K10	CBN90E	BN7000	KBN60M	B23
		CBN910		KBN900	B16
		CBN950			
	K20	CBN951	BN7000	KBN900	
		CBN952	BNC8115		
			BNS8125		
	K30	CBN8000	BNC8115		
		CBN900	BNS8125		

Workpiece	Grade	SANDVIK	TAEGUTEC	SECO	KENNAMETAL	MITUBISHI
H High-hardness steel	H01	CB20	TB610	CBN050C	KB1610	BC8105
			KB50	CBN010		BC8110
			KB90	CBN10		MBC010
				CBN100		MB810
	H10	CB7015	KB90A	CBN150	KB1615	BC8120
		CB7050	TB2015	CBN060K	KB1625	MBC020
		CB50	TB650	CBN200	KB5610	BC8020
		CB7105		CBN160C	KB9610	MB8025
						MB825
	H20	CB7025	TB670	CBN350	KB1340	BC8120
		CB7525		CBN300P	KB5625	MBC020
		CB7115		CBN400C	KB9640	BC8020
				CBN500		MB8025
				CH2540		
	H30	CB7125		CH3515	KB5630	MB835
		CB7525			KB9640	BC8130
		CB7135				
K Sintering alloy and cast iron	K01	CB7525	TB730	CBN050C		MB710
		CB50	KB90	CBN300P		
		CB7050				
	K10	CB50	KB90A	CBN20	KB1630	MB710
		CB7050		CBN200	KB1345	MB5015
				CBN300P	KB9610	MB4020
	K20		KB90A	CBN350	KB9640	MB4120
				CBN500		MBS140
				CBN600		BC5030
	K30					

Comparison table of workpieces

Carbon steel and alloy steel

Type	Korea	ISO	Japan	U.S.A	Great Britain	Germany	France	Russia
	KS	ISO	JIS	AISI SAE	BS BS/EN	DIN DIN/EN	FNF NF/EN	GOCT
Carbon steel	SM10C	C10	S10C	1010	040A10 045A10 045M10	C10E C10R	XC10	-
	SM15C	C15E4 C15M2	S15C	1015	055M15	C15E C15R	-	-
	SM20C	-	S20C	1020	070M20 C22, C22E C22R	C22 C22E C22R	C22 C22E C22R	-
	SMC25C	C25 C25E4 C25M2	S25C	1025	C25 C25E C25R	C25 C25E C25R	C25 C25E C25R	-
	SM30C	C30 C30E4 C30M2	S30C	1030	080A30 080M30 CC30 C30E C30R	CC30 C30E C30R	CC30 C30E C30R	30 Г
	SMC35C	C35 C35E4 C35M2	S35C	1035	C35 C35E C35R	C35 C35E C35R	C35 C35E C35R	35 Г
	SMC40C	C40 C40E4 C40M2	S40C	1039 1040	080M40 C40 C40E C40R	C40 C40E C40R	C40 C40E C40R	40 Г
	SMC43C	-	S43C	1042 1043	080A42	-	-	40 Г
	SM45C	C45 C45E4 C45M2	S45C	1045 1046	C45 C45E C45R	C45 C45E C45R	C45 C45E C45R	45 Г
	SMC48C	-	S48C	-	080A47	-	-	45 Г
	SM50C	C50 C50E4 C50M2	S50C	1049	080M50 C50 C50E C50R	C50 C50E C50R	C50 C50E C50R	50 Г
	SM53C	-	SM53C	1050 1053	-	-	-	50 Г
	SM55C	C55 C55E4 C55M2	S55C	1055	070M55 C55 C55E C55R	C55 C55E C55R	C55 C55E C55R	-
	SM58C	C60 C60E4 C60M2	S58C	1059 1060	C60 C60E C60R	C60 C60E C60R	C60 C60E C60R	60 Г

Type		Korea	ISO	Japan	U.S.A	Great Britain	Germany	France	Russia
		KS	ISO	JIS	AISI SAE	BS BS/EN	DIN DIN/EN	FNF NF/EN	GOCT
Alloy steel	Nickel chromium steel	SNC236	-	SNC236	-	-	-	-	40XH
		SNC415(H)	-	SNC415(H)	-	-	-	-	-
		SNC631(H)	-	SNC631(H)	-	-	-	-	30XH3A
		SNC815(H)	15NiCr13	SNC815(H)	-	655M13(655H13)	15NiCr13	-	-
		SNC836	-	SNC836	-	-	-	-	-
	Nickel chromium molybdenum steel	SNCM220	20NiCrMo2 20NiCrMoS2	SNCM220	8615 8617(H) 8620(H) 8622(H)	805A20 805M20 805A22 805M22	20NiCrMo2 20NiCrMoS2	20NCD2	-
		SNCM240	41CrNiMo2 41CrNiMoS2	SNCM240	8637 8640	-	-	-	-
		SNCM415	-	SNCM415	-	-	-	-	-
		SNCM420(H)	-	SNCM420(H)	4320(H)	-	-	-	20XH2M(20XHM)
		SNCM431	-	SNCM431	-	-	-	-	-
		SNCM439	-	SNCM439	4340	-	-	-	-
		SNCM447	-	SNCM447	-	-	-	-	-
		SNCM616	-	SNCM616	-	-	-	-	-
		SNCM625	-	SNCM625	-	-	-	-	-
		SNCM630	-	SNCM630	-	-	-	-	-
		SNCM815	-	SNCM815	-	-	-	-	-
	Chromium steel	SCr415(H)	-	SCr415(H)	-	-	17Cr3 17CrS3	-	15X 15XA
		SCr420(H)	20Cr4(H) 20CrS4	SCr420(H)	5120(H)	-	-	-	20X
		SCr430(H)	34Cr4 34CrS4	SCr430(H)	5130(H) 5132(H)	34Cr4 34CrS4	34Cr4 34CrS4	34Cr4 34CrS4	20X
		SCr435(H)	34Cr4 34CrS4 37Cr4 37CrS4	SCr435(H)	5135(H)	37Cr4 37CrS4	37Cr4 37CrS4	37Cr4 37CrS4	35X
		SCr440(H)	37Cr4 37CrS4 41Cr4 41CrS4	SCr440(H)	5140(H)	530M40 41Cr4 41CrS4	41Cr4 41CrS4	41Cr4 41CrS4	40X
		SCr445(H)	-	SCr445(H)	-	-	-	-	45X

Comparison table of workpieces

Carbon steel and alloy steel

Type		Korea	ISO	Japan	U.S.A	Great Britain	Germany	France	Russia
		KS	ISO	JIS	AISI SAE	BS BS/EN	DIN DIN/EN	FNF NF/EN	GOCT
Alloy steel	Chromium molybdenum steel	SCM415(H)	-	SCM415(H)	-	-	-	-	-
		SCM418(H)	18CrMo4 18CrMoS4	SCM418(H)	-	-	18CrMo4 18CrMoS4	-	20XM
		SCM420(H)	-	SCM420(H)	-	708M20(708H20)	-	-	20XM
		SCM430	-	SCM430	4130	-			
		SCM432	-	SCM432	-	-			
		SCM438(H)	34CrMo4 34CrMoS4	SCM435(H)	4135(H) 4137(H)	34CrMo4 34CrMoS4			
		SCM440(H)	42CrMo4 42CrMoS4	SCM440(H)	4140(H) 4142(H)	708M70 709M40 42CrMo4 42CrMoS4	42CrMo4 42CrMoS4	42CrMo4 42CrMoS4	-
		SCM445(H)	-	SCM445(H)	4145(H) 4147(H)	-	-	-	-
	Manganese steel and Manganese chromium steel	SMn420(H)	22Mn6(H)	SMn420(H)	1522(H)	150M19	-	-	-
		SMn433(H)	-	SMn433(H)	1534	150M36			30 2
									35 2
		SMn438(H)	36Mn6(H)	SMn438(H)	1541(H)	150M36			35 2
									40 2
		SMn443(H)	42Mn6(H)	SMn443(H)	1541(H)	-			40 2
									45 2
		SMnC420(H)	-	SMnC420(H)	-	-			-
		SMnC443(H)	-	SMnC443(H)	-	-			-
	Aluminum chromium molybdenum steel	SACM645	41CrAlMo74	SACM645	-	-	-	-	-

Tool steel

Type	Korea	ISO	Japan	U.S.A	Great Britain	Germany	France	Russia
	KS	ISO	JIS	AISI SAE	BS BS/EN	DIN DIN/EN	FNF NF/EN	GOCT
High speed steel	SKH2	HS18-0-1	SKH2	T1				
	SKH3	-	SKH3	T4				
	SKH4	-	SKH4	T5	BM 2	S6/5/2/5	Z 85 WDCV	
	SKH10	-	SKH10	T15				
	SKH51	HS6-5-2	SKH51	M2				
	SKH52	HS-6-6-2	SKH52	M3-1				
	SKH53	HS-6-5-3	SKH53	M3-2				
	SKH54	HS-6-5-4	SKH54	M4	BM 35	S6/5/2/5	6-5-2-5	
	SKH55	HS6-5-2-5	SKH55	M 35				
	SKH56	-	SKH56	M36				
	SKH57	HS10-4-3-10	SKH57	-		S2/9/2		
	SKH58	HS2-9-2	SKH58	M7				
	SKH59	HS2-9-1-8	SKH59	M42				
Alooy tool steel	STS11	-	SKS11	F2				
	STS2	-	SKS2	-				
	STS21	-	SKS21	-				
	STS5	-	SKS5	-				
	STS51	-	SKS51	L6				
	STS7	-	SKS7	-				
	STS8	-	SKS8	-				
	STS4	-	SKS4	-				
	STS41	-	SKS41	-				
	STS43	105V	SKS43	W2-9 1/				
	STS44	-	SKS44	W2-8 1-2		105WCr6	105WC13	
	STS3	-	SKS3	-				
	STS31	105WCr1	SKS31	-				
	STS93	-	SKS93	-		X210Cr12	Z200C12	
	STS94	-	SKS94	-				
	STS95	-	SKS95	-	BD3	X100CrMoV5 1	Z100CDV5	
	STD1	210Cr12	SKD1	D3				
	STD11	-	SKD11	D2	BA2	X30WCrV9 3	Z30WCV9	
	STD12	100CrMoV5	SKD12	A2				
	STD4	-	SKD4	-	BH21	X40CrMoV5 1	Z40CDV5	
	STD5	X30WCrV9-3	SKD5	H21				
	STD6	X37CrMoV5-1	SKD6	H11	BH12			
	STD61	X40CrMoV5-1	SKD61	H13				
	STD62	X35CWrMoV5	SKD62	H12				
	STD7	32CrMoV12-28	SKD7	H10				
	STD8	-	SKD8	H19				
	STF3	-	SKT3	-				
	STF4	55NiCrMoV7	SKT4	L6		55NiCrMoV6	55NCDV7	

Comparison table of workpieces

Tool steel

Type	Korea	ISO	Japan	U.S.A	Great Britain	Germany	France	Russia
	KS	ISO	JIS	AISI SAE	BS BS/EN	DIN DIN/EN	FNF NF/EN	GOCT
Free cutting carbon steel	SUM11	-	SUM11	1110				
	UM12	-	UM12	1109				
	SUM21	9S20	SUM21	1212				
	SUM22	11SMn28	SUM22	1213	230M07	9SMn28	S250	
	SUM22L	11SMnPb28	SUM22L	12L13		9SMnPb28	S250Pb	
	SUM23	-	SUM23	1215	240M07	9SMn36	S 300	
	SUM23L	-	SUM23L	-				
	SUM24L	11SMnPb28	SUM24L	12L14		9SMnPb36	S300Pb	
	SUM25	12SMn35	SUM25	-				
	SUM31	-	SUM31	1117				
	SUM31L	-	SUM31L	-				
	SUM32	-	SUM32	-				
	SUM41	-	SUM41	1137				
	SUM42	-	SUM42	1141				
	SUM43	44SMn28	SUM43	1144				
High carbon chromium	STB1		STB1	-				
	STB2	-	STB2	52100	534A99	100Cr6	100Cr6	
	STB3	B1	STB3	ASTM A				
		B2		485				
		-		Grade 1				
	STB4	-	STB4	-				
	STB5		STB5	-				

Stainless steel

Type		Korea	ISO	Japan	U.S.A		Great Britain	Germany	France	Russia
		KS	ISO	JIS	UNS	AISI SAE	BS BS/EN	DIN DIN/EN	FNF NF/EN	GOCT
Stainless steel	Austenitic	STS201	X12CrMnNiN17-7-5	SUS201	S20100	201	284S16	X12CrNi17-7	Z12CMN17-07Az	12X17 9AH4
		STS202	X12CrMnNiN18-9-5	SUS202	S20200	202	301S21	X2CrNiN18-7		07X16H6
		STS301	X10CrNi18-8	SUS301	S30100	301		X12CrNi17-7	Z11CN17-08	
		STS301L	X2CrNiN18-7	SUS301L						
		STS301J1		SUS301J1			302S25			12X18H9
		STS302		SUS302	S30200	302		X10CrNiS18-9	Z12CN18-09	
		STS302B	X12CrNiSi18-9-3	SUS302B	S30125	302B	303S21			
		STS303	X10CrNiS18-9	SUS303	S30300	303	303S41		Z8CNF18-09	12X18H10E
		STS303Se		SUS303Se	S30323	303Se		X5CrNi18-10		
		STS303Cu		SUS303Cu			304S31			08X18H10
		STS304	X5CrNi18-9 X2CrNi18-9	SUS403	S30400	304	304S11	X2CrNi19-11	Z7CN18-09	03X18H11
		STS304L	X2CrNi19-11	SUS304L	S30403	304L		X2CrNiN18-10	Z3CN19-11	
		STS304N1	X5CrNiN18-8	SUS304N1	S30451	304N			Z6CN19-09Az	
		STS304LN	X2CrNiN18-8	SUSLN	S30453	304LN		X5CrNi18-12	Z3CN18-10Az	
		STS304J1		SUS304J1			305S19			06X18H11
		STS305	X6CrNi18-12	SUS305	S30500	305			Z8CN18-12	
		STS309S		SUS309S	S30908	309S	310S31	X5CrNiMo27-12-2	Z10CN24-13	10X23H18
		STS310S	X6CrNi25-20	SUS310S	S31008	310S	316S31	X5CrNiMo27-13-3	Z8CN25-20	
		STS316	X5CrNiMo17-12-2 X3CrNiMo17-12-3	SUS316	S31600	316	316S11	X2CrNiMo17-13-2 X2CrNiMo17-14-3	Z7CND17-12-02 Z6CND18-12-03	03X17H14M3
		STS316L	X2CrNiMo17-12-2 X2CrNiMo17-12-3 X2CrNiMo18-14-3	SUS316L	S31603	316L			Z3CND17-12-02 Z3CND17-12-03	
		STS316N		SUS316N	S31651	316N	317S16	X6CrNiTi18-10		
		STS317		SUS317	S31700	317	321S31	X6CrNiNb18-10		08X18H10T
		STS321	X6CrNiTi18-10	SUS321	S32100	321	347S31		Z6CNT18-10	08X18H12
		STS347	X6CrNiNb18-10	SUS347	S34700	347		X6CrAl13	Z6CNNb18-10	
		STS384	X3NiCr18-16	SUS384	S38400	384	405S17		Z6CN18-16	

Comparison table of workpieces

Stainless steel

Type		Korea	ISO	Japan	U.S.A		Great Britain	Germany	France	Russia
		KS	ISO	JIS	UNS	AISI SAE	BS BS/EN	DIN DIN/EN	FNF NF/EN	GOCT
Stainless steel	Ferritic	STS405	X6CrAl13	STS405	S40500	405			Z8CA12	
		STS410L		STS410L				X6Cr17	Z3C14	
		STS429		STS429	S42900	429	430S17	X7CrS18		12X17
		STS430	X6Cr17	STS430	S43000	430		X6CrMo17-1	Z8C17	
		STS430F	X7CrS17	STS430F	S43020	430F	434S17		Z8CF17	
		STS434	X6CrMo17-1	STS434	S43400	434			Z8CD17-01	
		STS444	X2CrMoTi18-2	STS444	S44400	444			Z3CDT18-02	
		STSXM27		STSXM27	S44627			X10Cr13	Z1CD26-01	
	Martensitic	STS403		STS403	S40300	403	410S21			
		STS410	X12Cr13	STS410	S41000	410	416S21	X20Cr13	Z13C13	
		STS416	X12CrS13	STS416	S41600	416	420S29	X20CrNi17-2	Z11CF13	20X13
		STS420J1	X20Cr13	STS420J1	S42000	420	431S29		Z20C13	20X17H2
		STS431	X19CrNi16-2	STS431	S43100	431			Z15CN16-02	
		STS440A	X70CrMo15	STS440A	S44002	440A		X7CrNiAl17-7	Z70C15	
	Preciptation hardening type	STS630	X5CrNiCuNb16-4	STS630	S17400	S17400			Z6CNU17-04	09X17H7IO
		STS631	X7CrNiAl17-7	STS631	S17700	S17700			Z9CNA17-07	
		STS631J1		STS631J1						

Casting Iron

Type		Korea	ISO	Japan	U.S.A	Great Britain	Germany	France	Russia
		KS	ISO	JIS	AISI SAE	BS BS/EN	DIN DIN/EN	FNF NF/EN	GOCT
Casting Iron	Grey iron casting	GC100	100, 150, 200,	FC100	No 20 B		GG 10	Ft 10 D	-
		GC150	250, 300, 350	FC150	No 25 B	Grade 150	GG 15	Ft 15 D	
		GC200		FC200	No 30 B	Grade 220	GG 20	Ft 20 D	
		GC250		FC250	No 35 B	Grade 260	GG 25	Ft 25 D	
		GC300		FC300	No 45 B	Grade 300	GG 30	Ft 30 D	
		GC350		FC350	No 50 B	Grade 350	GG 35	Ft 35 D	
					No 55 B	Grade 400	GG 40	Ft 40 D	
	Spheroidal graphite iron casting	GCD400	700-2, 600-3.	FCD400	60-40-18	SNG 420/12	GGG 40	FCS 400-12	B
			500-7,			SNG 370/17	GGG 40.3	FGS 370-17	
		GCD500	450-10, 400-15,	FCD500	80-55-06	SNG 500/7	GGG 50	FGS 500-7	
		GCD600	400-18, 350-22	FCD600		SNG 600/3	GGG 60	FGS 600-3	
		GCD700		FCD700	100-70-03	SNG 700/2	GGG 70	FGS 700-2	
	Austempered Sheroidal graphite iron casting	FCAD	-	FCAD	-	EN-GJS	EN-GJS	EN-GJS	-
	Austenitic iron casting	FCA-	L-, S	FCA-	Type 1, 2,	F1, F2,	GGL-, GGG	L-, S-	-
		FCDA-		FCDA-	Type D-2, D-3A	S2W, S5S			
					Class 1, 2				

Comparison table of workpieces

Non-ferrous alloy

Type		Korea	ISO	Japan	U.S.A	Great Britain	Germany	France	Russia
		KS	ISO	JIS	AISI SAE	BS BS/EN	DIN DIN/EN	FNF NF/EN	GOCT
Aluminum alloy	Aluminum alloy ingots for casting	AC1B	Al-Cu4MgTi	AC1B	204	-	-	A-U5GT	
		AC2A	-	AC2A	-	-	-	-	
		AC2B	-	AC2B	319	-	-	-	
		AC3A	-	AC3A	-	LM-6	-	-	
		AC4A	-	AC4A	-	-	G(GK)-AlSi9Cu3	-	
		AC4B	-	AC4B	-	-	-	-	
		AC4C	Al-Si7Mg(Fe)	AC4C	356	LM-25	G(GK)-AlSi7MG	A-S7G	
		AC4CH	Al-Si7Mg	AC4CH	A356.0	-	-	-	
		AC4D	Al-Si5Cu1Mg	AC4D	355	LM-16	-	-	
		AC5A	Al-Cu4Ni2Mg2	AC5A	242	-	G(GK)-AlMg5	A-U4NT	
		AC7A	-	AC7A	514	LM-5	-	-	
		AC8A	-	AC8A	-	LM-13	-	A-S12UNG	
		AC8B	-	AC8B	-	LM-26	-	A-S10UG	
		AC8C	-	AC8C	-	-	-	A-S10UG	
		AC9A	-	AC9A	-	LM-29	-	-	
		AC9B	-	AC9B	-		GD-AlSi12 (Cu)	A-S18UNG	
	Ferritic	ALDC1	Al-Si12CuFe	ADC1	A413.0	LM20	GD-AlSi10Mg	A-S13	
		ALDC2	-	ADC3	A360.0	-	GD-AlMg9	A-S9G	
		ALDC3	-	ADC5	518	-	-	A-G6	
		ALDC4	-	ADC6	-	-	GD-AlSi9Cu3	A-G3T	
		ALDC7	Al-Si8Cu3Fe	ADC10	A380.0	-	GD-AlSi9Cu3	-	
		ALDC7Z	Al-Si8Cu3Fe	ADC10Z	A380.0	LM24	-	-	
		ALDC8	-	ADC12	383	LM2	-	-	
		ALDC8Z	-	ADC12Z	383	LM2	-	-	
		ALDC9	-	ADC14	B390.0	LM30	EN AW-5052	-	
	Martensitic	A5052S	-	A5052S	5052	EN AW-5052	EN AW-5052	EN AW-5052	
		A5454S	-	A5454S	5454	EN AW-5454	EN AW-5454	EN AW-5454	
		A5083S	AlMg4.5Mn0.7	A5083S	5083	EN AW-5083	EN AW-5083	EN AW-5083	
		A5086S	-	A5086S	5086	EN AW-5086	EN AW-5086	EN AW-5086	
		A6061S	AlMg1SiCu	A6061S	6061	EN AW-6061	EN AW-6061	EN AW-6061	
		A6063S	AlMg0.7Si	A6063S	6063	EN AW-6063	EN AW-6063	EN AW-6063	
		A7003S	-	A7003S	-	EN AW-7003	EN AW-7003	EN AW-7003	
		A7N01S	-	A7N01S	-	-	-	-	
		A7075S	AlZn5.5MgCu	A7075S	7075	EN AW-7075	EN AW-7075	EN AW-7075	

Heat resisting steel

Type		Korea	ISO	Japan	U.S.A		Great Britain	Germany	France	Russia
		KS	ISO	JIS	UNS	AISI SAE	BS BS/EN	DIN DIN/EN	FNF NF/EN	GOCT
Heat resistant steel	Austenitic	STR31		SUH31			331S42		Z35CNWS14-14	
		STR35		SUH35			349S52	X53CrMnNi21-9	Z52CMN21-09-Az	
		STR36		SUH36			349S54		Z55CMN21-09-Az	
		STR37		SUH37	S63008		381S34			
		STR38		SUH38	S63017					
		STR309		SUH309			309S24	CrNi2520	Z15CN24-13	
		STR310		SUH310	S30900		310S24		Z15CN25-20	
		STR330		SUH330	S31000	309			Z12NCS35-16	
		STR660		SUH660	N08330	310			Z6NCTV25-20	
		STR661		SUH661	S66286	N08330		CrAl1205		
	Ferritic	STR21		SUH21	R30155			X6CrTi12		
		STR409	X6CrTi12	SUH409			409S19		Z6CT12	
		STR409L	X2CrTi12	SUH409L	S40900				Z3CT12	
		STR446		SUH446		409		X45CrSi9-3	Z12C25	
	Martensitic	STR1		SUH1	S44600		401S45		Z45CS9	
		STR3		SUH3	S65007	446			Z40CSD10	
		STR4		SUH4			443S65		Z80CSN20-02	
		STR11		SUH11						
		STR600		SUH600						
		STR616		SUH616	S42200					

Steel, Non-ferrous metal symbol list

Comparison of workpiece material standards

Group		Standard term	Code
Structural Steel		Rolled Steel for Welded Structure	SWS
		Rerolled Steel	SBR
		Rolled Steel for General Structure	SBR
		Light Gauge Steel for General Sturcture	SBC
		Hot-rolled Steel Plate, Sheet/ Strip for Automobile Structural Use	SAPH
Steel Plate		Cold-rolled Steel Shet/Strip	SBC
		Hot-rolled Steel Shet/Strip	SHP
Steel Pipe		Carbon Steel Pipe for Ordinary Piping	SPP
		Carbon Steel Pipe for Boiler and Heat Exchanger	STH
		Seamless Steel Pipe for High Pressure Gas Cylinder	STHG
		Carbon Steel Pipe for General Structural Use	SPS
		Carbon Steel Pipe for Machine Structural Use	STST
		Alloy Steel Pipe for Structural Use	STA
		Stainless Steel Pipe for Machine and Structural Use	STS-TK
		Carbon Steel Square Pipe for General Structural Use	SPSR
		Alloy Steel Pipe	SPA
		Carbon Steel Pipe for Pressure Service	SPPS
		Carbon Steel Pipe for High Temperature Service	SPSR
		Carbon Steel Pipe for High Pressure Service	SPPH
		Stainless Steel Pipe	STSxT
Iron and Steel		Carbon Steel for Machine Structural Use	SMxxC, SMxxCK
		Aluminum Chromium Molybdenum Steel	SACM
		Chromium Molybdenum Steel	SCM
		Chromium Steel	SCr
		Nickel Chromium Steel	SNC
		Nickel Chromium Molybdenum Steel	SNCM
		Manganese Steel and manganese Chromium Steel for Machine Structural Use	SMn, SMnC
Speical steel	Tool Steel	Carbon Tool Steel	STC
		Hollow Drill Steel	SKC
		Alloy Tool Steel	STS, STD, STF
		High Speed Tool Steel	SKH
	Stainless Steel	Stainless Steel Bar	STS
	Heat resisting steel	Heat Resisting Steel	STR
		Heat Resisting Steel Bar	STR
		Heat Resisting Steel Sheet	STR
	Free cutting carbon steel		SUM
	High carbon chromium special steel		STB
	Spring Steel		

Group	Standard term	Code
Forged Steel	Carbon Steel Forging	SF
	Chromium Molybdenum Steel Forging	SFCM
	Nickel Chromium Molybdenum Steel Forging	SFNCM
Cast Iron	Gray Cast Iron	GC
	Spheroidal Graphite Cast iron	GCD
	Blackheart Malleable Cast iron	BMC
	Blackheart Malleable Cast iron	WMC
	Pearlitic Malleable Cast iron	PMC
Cast Steel	Carbon Cast Steel	SC
	High Tensile Strength Carbon Cast Steel & Low Alloy Cast Steel	HSC
	Stainless Cast Steel	SSC
	Heat Resisting Cast Steel	HPSC
	High Manganese Cast Steel	HMnSC
	Cast Steel for High Temperature and High Pressure Service	SCPH
Casting	Brass Casting	BsC
	High Strength Brass Casting	HBsC
	Bronze Casting	BrC
	Phosphoric Bronze Castin	PCB
	Aluminum Bronze Casting	AlBC
	Aluminum Alloy Casting	ACxA
	Magnesium Alloy Casting	MgC
	Zinc Alloy Die Casting	ZnDC
	Aluminum Alloy Die Casting	AℓDC
	Magnesium Alloy Die Casting	MgDC
	White Metal	WM
	Aluminum Alloy Casting for Bearing	AM
	Brass Alloy Casting for Bearing	KM

Hardness calculating table

VICKERS HARDNESS NUMBER (HV)	KNOOP HARDNESS NUMBER (HK)	BRINELL HARDNESS NUMBER (HB)		ROCKWELL HARDNESS NUMBER (HR)			ROCKWELL SUPERFICIAL HARDNESS NUMBER (HR)				SHORE HARDNESS HUMBER (HS)	TENSILE STRENGTH (APPROX.)
	500gf LOAD and OVER	HBS 3000kgf LOAD 10mm STEEL BALL	HBW 3000kgf LOAD 10mm CARBIDE BALL	SCALE A 60kgf LOAD DIAMOND INDENTER	SCALE B 100kgf LOAD 1/16" STEEL BALL	SCALE C 150kgf LOAD DIAMOND INDENTER	SCALE D 100kgf LOAD DIAMOND INDENTER	SCALE 15N 15kgf LOAD DIAMOND INDENTER	SCALE 30N 30kgf LOAD DIAMOND INDENTER	SCALE 45N 45kgf LOAD DIAMOND INDENTER		
1865				92.1		80	86.5	96.5	92	87		
1787				91.6		79	85.7	96.3	91.5	86.2		
1710				91.1		78	84.9	96.1	90.9	85.4		
1633				90.6		77	84.2	95.8	90.3	84.5		
1556				90.1		76	83.4	95.5	89.7	83.6		
1478				89.6		75	82.6	95.2	89.1	82.5		
1400				89		74	81.8	94.9	88.5	81.6		
1323				88.5		73	81	94.6	87.9	80.7		
1245				88		72	80.1	94.3	87.2	79.7		
1160				87.1		71	79.4	94	86.5	78.7		
1076	972			86.8		70	78.6	93.7	85.8	77.6		
1004	946			86.2		69	77.8	93.4	85.1	76.4		
940	920			85.6		68	76.9	93.2	84.3	75.4		
900	895			85		67	76.1	92.9	83.6	74.2		
865	870			84.5		66	75.4	92.5	82.8	73.3		
832	846		739	83.9		65	74.5	92.2	81.9	72		
800	822		722	53.4		64	73.8	91.8	81.1	71		
772	799		705	82.8		63	73	91.4	80.1	69.9		
746	776		688	82.3		62	72.2	91.1	79.3	66.6		
720	754		670	81.8		61	71.5	90.7	78.4	67.7		
697	732		654	81.2		60	70.7	90.2	77.5	66.6		
674	710		634	80.7		59	69.9	89.8	76.6	65.5		
653	690		615	80.1		58	69.2	89.3	75.7	64.3		
633	670		595	79.6		57	68.5	88.9	74.8	63.2	95.2	
613	650		577	79		56	67.7	88.3	73.9	62	93.1	
595	630		560	78.5		55	66.9	87.9	73	60.9	91	212
577	612		543	78		54	66.1	87.4	72	59.8	88.9	205
560	594		525	77.4		53	65.4	86.9	71.2	58.6	87	199
544	576	500	512	76.8		52	64.6	86.4	70.2	87.4	85.2	192
528	558	487	496	76.3		51	63.8	85.9	69.4	86.1	83.3	186
513	542	475	481	75.9		50	63.1	85.5	68.5	55	81.6	179
498	526	464	469	75.2		49	62.1	85	67.6	53.8	79.9	172
484	510	451	455	74.7		48	61.4	84.5	66.7	52.5	78.2	167
471	495	442	443	74.1		47	60.8	83.9	65.8	51.4	75.6	161
458	480	432	432	73.6		46	60	83.5	64.8	50.3	75	156

VICKERS HARDNESS NUMBER (HV)	KNOOP HARDNESS NUMBER (HK)	BRINELL HARDNESS NUMBER (HB)		ROCKWELL HARDNESS NUMBER (HR)				ROCKWELL SUPERFICIAL HARDNESS NUMBER (HR)				SHORE HARDNESS HUMBER (HS)	TENSILE STRENGTH (APPROX.)
	500gf LOAD and OVER	HBS 3000kgf LOAD 10mm STEEL BALL	HBW 3000kgf LOAD 10mm CARBIDE BALL	SCALE A 60kgf LOAD DIAMOND INDENTER	SCALE B 100kgf LOAD 1/16" STEEL BALL	SCALE C 150kgf LOAD DIAMOND INDENTER	SCALE D 100kgf LOAD DIAMOND INDENTER	SCALE 15N 15kgf LOAD DIAMOND INDENTER	SCALE 30N 30kgf LOAD DIAMOND INDENTER	SCALE 45N 45kgf LOAD DIAMOND INDENTER			
446	466	421	421	73.1		45	59.2	83	64	49	73.5	151	
434	452	409	409	72.5		44	58.5	82.5	53.1	47.8	71.9	146	
423	438	400	400	70		43	57.7	82	52.2	46.7	70.4	141	
412	426	390	390	71.5		42	56.9	81.5	61.3	45.5	69	136	
402	414	381	381	70.9		41	56.2	80.9	60.4	44.3	67.6	132	
392	402	371	371	70.4		40	55.4	80.4	59.5	43.1	66.2	127	
382	391	362	362	69.9		39	54.6	79.9	58.6	41.9	64.7	124	
372	380	353	353	69.4		38	53.8	79.4	57.7	40.8	63.4	120	
363	370	344	344	68.9		37	53.1	78.8	56.8	39.6	62.1	118	
354	360	336	336	68.4	109	36	52.3	78.3	55.9	38.4	60.8	114	
345	351	327	327	67.9	108.5	35	51.5	77.7	55	37.2	59.6	110	
336	342	319	319	67.4	108	34	50.8	77.2	54.2	36.1	47.7	108	
327	334	311	311	66.8	107.5	33	50	76.6	53.3	34.9	46.6	105	
318	326	301	301	66.3	107	32	49.2	76.1	52.1	33.7	45.6	102	
310	318	294	294	65.8	106	31	48.4	75.6	51.3	32.5	44.6	100	
302	311	286	286	65.3	105.5	30	47.7	75	50.4	31.3	43.6	97	
294	304	279	279	64.7	104.5	29	47	74.5	49.5	30.1	42.7	95	
286	297	271	271	64.3	104	28	46.1	73.9	48.6	28.9	41.7	93	
279	290	264	264	63.8	103	27	45.2	73.3	47.7	27.8	40.8	90	
272	284	258	258	63.3	102.5	26	44.6	72.8	46.8	26.7	39.9	88	
266	278	253	253	62.8	101.5	25	43.8	72.2	45.9	25.5	39.2	86	
260	272	247	247	62.4	101	24	43.1	71.6	45	24.3	38.4	84	
254	266	243	243	62	100	23	42.1	71	44	23.1	37.7	82	
248	261	237	237	61.5	99	22	41.6	70.5	43.2	22	36.9	80	
243	256	231	231	61	98.5	21	40.9	69.9	42.3	20.7	36.3	79	
238	251	226	226	60.5	97.8	20	40.1	69.4	41.5	19.6	35.6	77	
230	243	219	219		96.7	18					34.6	75	
222	236	212	212		95.5	16					33.5	72	
213	229	203	203		93.9	14					32.3	69	
204	200	194	194		92.3	12					31.1	66	
196	212	187	187		90.7	10					30	63	
188	204	179	179		89.5	8						61	
180	196	171	171		87.1	6						59	
173	189	165	165		85.5	4						56	
166	181	158	158		83.5	2						54	

SI unit conversion table

Major SI unit conversion table

Force

N	kgf	dyn
1	1.01972×10^{-1}	1×10^{5}
9.80665	1	9.80665×10^{5}
1×10^{-5}	1.01972×10^{-6}	1

Stress

Pa or N/㎡	MPa or N/㎟	kgf/㎟	kgf/㎠	kgf/㎡
1	1×10^{-6}	1.01972×10^{-7}	1.01972×10^{-5}	1.01972×10^{-1}
1×10^{6}	1	1.01972×10^{-1}	1.01972×10	1.01972×10^{5}
9.80665×10^{6}	9.80665	1	1×10^{2}	1×10^{5}
9.80665×10^{4}	9.80665×10^{-2}	1×10^{-2}	1	1×10^{4}
9.80665	9.80665×10^{-6}	1×10^{-6}	1×10^{-4}	1

Pressure

Pa	kPa	Mpa	bar	kgf/㎠
1	1×10^{-3}	1×10^{-6}	1×10^{-5}	1.01972×10^{-5}
1×10^{3}	1	1×10^{3}	1×10^{-2}	1.01972×10^{-2}
1×10^{6}	1×10^{3}	1	1×10	1.01972×10
1×10^{5}	1×10^{2}	1×10^{-1}	1	1.01972
9.80665×10^{4}	9.80665×10	9.80665×10^{-2}	9.80665×10^{-1}	1

Work·Energy·Calorie

J	kW·h	kgf·m	kcal
1	2.77778×10^{-7}	1.01972×10^{-1}	2.38889×10^{-4}
3.60000×10^{6}	1	3.67098×10^{5}	8.60000×10^{2}
9.80665	2.72407×10^{-6}	1	2.34270×10^{-3}
4.18605×10^{3}	1.16279×10^{-3}	4.26858×10^{-2}	1

Power

W	kW	kgf·m/s	PS	kcal/h
1	1×10^{-3}	1.01972×10^{-1}	1.35962×10^{-3}	0.86
1×10^{3}	1	1.01972×10^{2}	1.35962	8.60000×10^{2}
9.8165	9.80665×10^{-3}	1	1.33333×10^{-2}	8.43371
7.355×10^{2}	7.355×10^{-1}	7.5×10	1	6.32529×10^{2}
1.16279	1.16279×10^{-3}	1×10^{-1}	1.58095×10^{-3}	1

Specific heat

J/(kg·K)	kcal/(kg·℃) cal/(g·℃)
1	2.38889×10^{-4}
4.18605×10^{3}	1

Thermal conductivity

W/(m·k)	kcal/(h·m·℃)
1	8.6000×10^{-1}
1.16279	1

Revolution per minute

min^{-1}	s^{-1}	r.p.m.
1	0.0167	1
60	1	60

The physical properties of element

Element	Density (g/㎤)	Hardness (kg/㎟)	Young's Modulus ($X10^{3}$kg/㎟)	Thermal Expansion Coefficient (10^{-6}/℃)	Melting Point (℃)
WC	15.6	2150	70	5.1	2900
TiC	4.94	3200	46	7.6	3200
TaC	14.5	1800	29	6.6	3800
NbC	8.2	2050	35	6.8	3500
TiN	5.43	2000	26	9.2	2950
$Al^{2}0^{3}$	3.98	3000	42	8.5	2050
CBN	3.48	4500	71	4.7	
Diamond	3.52 >	9000	99	3.1	
Co	8.9		$10^{\sim}18$	12.3	1495
Ni	8.9		20	13.3	1455

CBN Machnining Example

Disk Drum	
Workpiece	FC170 (HRC > 45)
Grade / Tool	CBN950 / VBGW160408
Spped	300 m/min
Feed	0.2 mm/rev
Depth	0.3 mm
Tool life	220EA / Cutting edge

Transmission bearing housing	
Workpiece	STB
Grade / Tool	CBN650 / DNGA150612
Spped	200 m/min
Feed	0.25 mm/rev
Depth	0.2 mm
Tool life	200EA / Cutting edge

Mechanical axis	
Workpiece	18Cr-3Mo-3.5C (HRC > 67)
Grade / Tool	CBN73S / VNGA160408
Spped	80 m/min
Feed	0.4 mm/rev
Depth	1.5 mm
Tool life	225EA / Cutting edge

Gear clutch	
Workpiece	Gear Clutch
Grade / Tool	CBN500 / DNGA150408N2
Spped	160 m/min
Feed	0.11 mm/rev
Depth	1.0 mm
Tool life	330EA / Cutting edge

Ring gear	
Workpiece	SCR 420H (HRC60~63)
Grade / Tool	CBN650/CNGA120408N
Spped	500 m/min
Feed	0.11 mm/rev
Depth	0.3 mm
Tool life	80EA / Cutting edge

6-speed intermediate gear	
Workpiece	SCR420H1 (HRC60~63)
Grade / Tool	CBN650 / CNGA120408
Spped	180 m/min
Feed	0.12 mm/rev
Depth	0.3 mm
Tool life	250EA / Cutting edge

Caterpillar Seal	
Workpiece	SNCM 220H (156~207 HB)
Grade / Tool	CBN650/CNGA120408 / CBN650/DCGW11T308
Spped	160 m/min
Feed	0.11 mm/rev
Depth	0.5 mm
Tool life	80EA / Cutting edge

Damper pulley	
Workpiece	SM45C (HRC 55~60)
Grade / Tool	CBN650 / VBGW160403
Spped	250 m/min
Feed	0.2 mm/rev
Depth	0.2 mm
Tool life	80EA / Cutting edge

Gear-Diff. Side	
Workpiece	SCM420HB
Grade / Tool	CBN501 / DNGA150408-CBG
Spped	220 m/min
Feed	0.11 mm/rev
Depth	0.1 mm
Tool life	200EA / Cutting edge

HSK63 Chuck	
Workpiece	SCM415
Grade / Tool	CBN651S / VNGA160408HS2
Spped	220 m/min
Feed	0.15 mm/rev
Depth	mm0.2
Tool life	100EA / Cutting edge

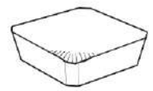
PCD Machining Example

Outer diameter turning of aluminum piston	
Workpiece	390Al (GD-Al Si 17)
Grade / Tool	PCD-M / CCGW120316
Speed	730 m/min
Result	8,000 pistons / Cutting edge

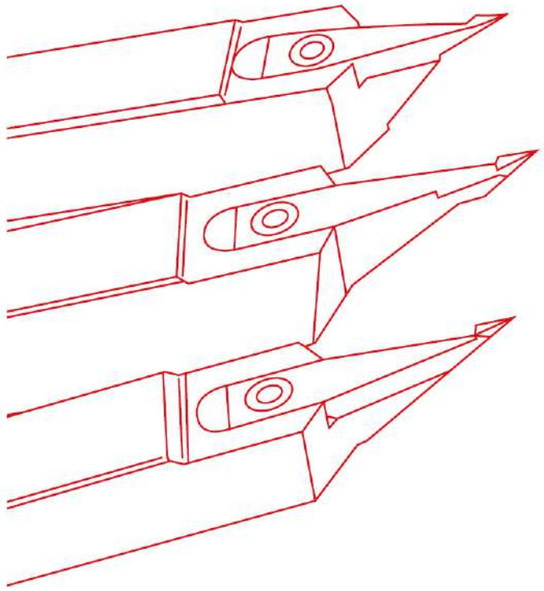
Grooving of aluminum piston	
Workpiece	390Al (GD-Al Si 17)
Grade / Tool	PCD-F/Three grooving inserts / set
Speed	370 m/min
Result	10,000 pistons / Tool setup

Milling of aluminum cylnder head surface	
Workpiece	GK-Al Si9Cu3
Grade / Tool	PCD-M/Milling head Ø250, 18F insert tip
Speed	3,500 m/min
Feed	4,4460 rev/min
Result	40,000 heads / Tool setup

Trouble Shooting

Type		Status	Cause	Countermeasures
FlankWear		• Variation of dimension • Deteriorated finishing surface • Increasing machining load	• Wear by grinded surface • Excessive feed rate and cutting speed	• Reduce cutting Speed • Use larger corner radius • Use high wear-resistant grade
Crater Wear		• Deterioration of chip disposal • Deteriorated finishing surface	• Wear by chips (remarkable with ductile cast iron) • Excessive cutting speed	• Reduce cutting Speed • Use smaller lead angle • Check edge geometry • Use high wear-resistant grade
Thermal Cracking		• Deteriorated finishing surface • Occurrence of chipping	• Severe cycle of heating & cooling during cutting • Excessive feed rate and cutting speed	• Reduce cutting speed • Reduce feed rate • Change to dry machining • Use tougher grade
Notch Wear		• Deteriorated finishing surface • Increasing machining load	• Excessive feed rate and cutting depth	• Reduce cutting depth • Reduce feed rate • Use tougher grade • Increase coolant supply
Edge Splintering		• Occurrence of fire flower • Occurrence of noise • Increasing Machining load	• Excessive feed rate • Falling-off of BUE • Weak cutting edge	• Use tougher grade • Check edge geometry • Increase stability of the system • Use larger lead angle
Plastic Deformation		• Variation of dimension • Chipping of cutting edge	• High machining load • Use of improper grade	• Reduce cutting speed • Reduce feed rate • Reduce cutting depth • Use harder grade
Built-up-Edge		• Deteriorated finishing surface • Variation of dimension • Occurrence of chipping	• High affinity with work piece • Low cutting speed	• Increase cutting speed • Increase feed rate • Use tougher grade • Use larger rake angle
Breakage		• Occurrence of fire flower • Cutting impossible	• Using low toughness Insert • Using improper clamping holder	• Use tougher grade • Reduce feed rate • Reduce cutting depth • Increase stability of the system

memo



DAEHYUP

for the world best
CHAMPDIA CO.,LTD.

union
Tool-Tech