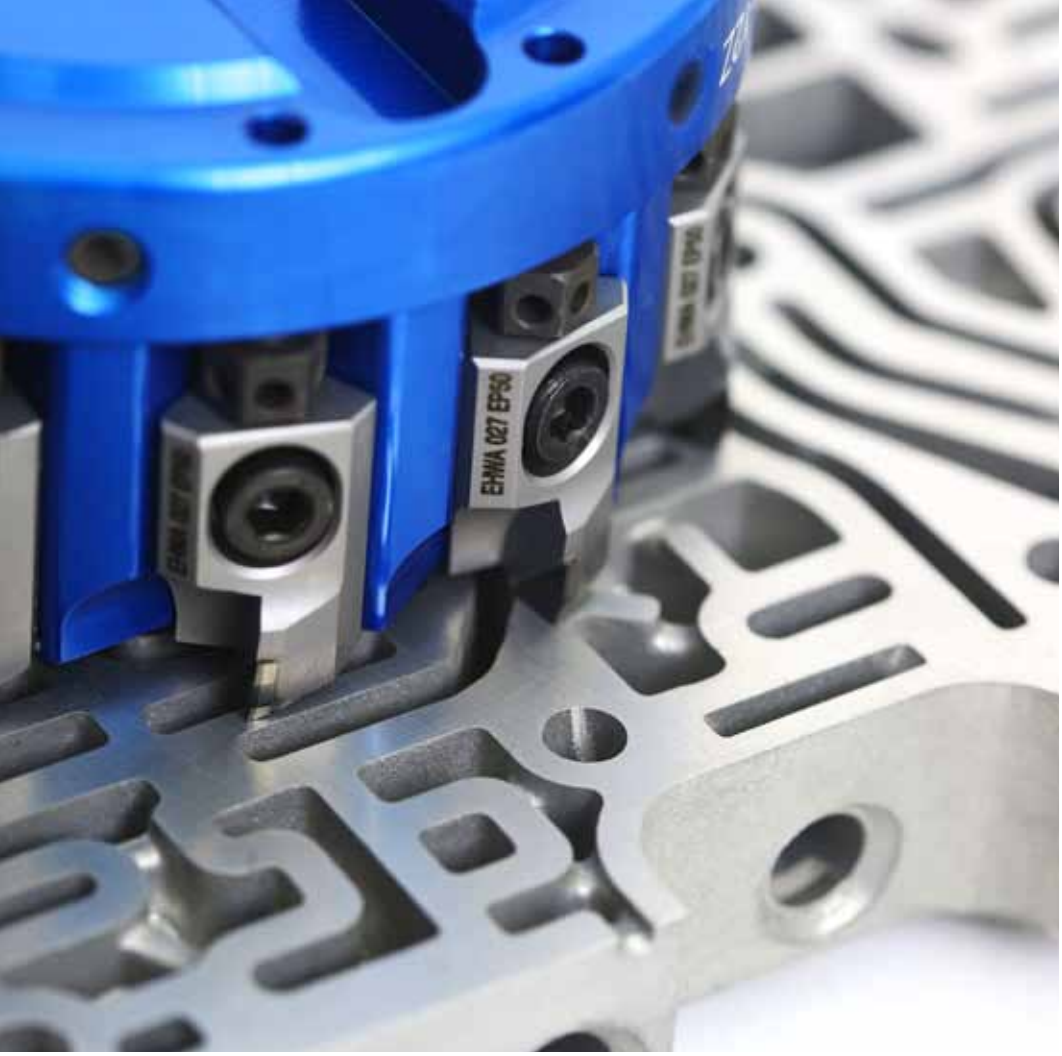
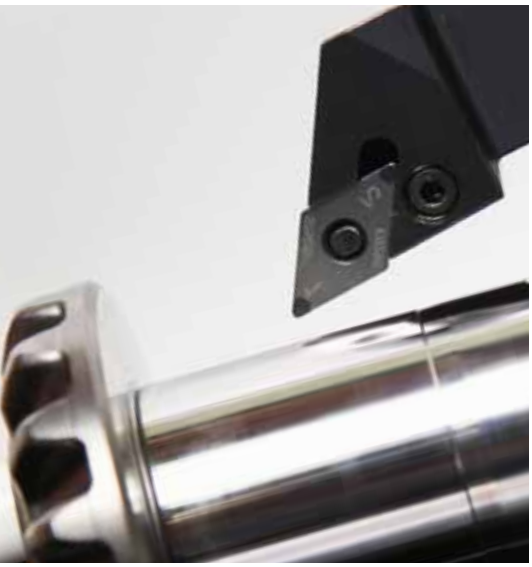


INNOVATOR IN
TECHNOLOGY



PCD | PCBN | CVD•MONO DIAMOND

CUTTING TOOLS

EHWA

EHWA

1975. Founded in Seoul, Korea
1981. Established subsidiary in California, USA
1985. Headquarters moved to Osan, Korea
1993. ISO9001 certified (TÜV)
Established plant in Fujian, China
1995. Opened sales office in Nagoya, Japan
1997. Established plant in Weihai, China
2002. Established plant in Shanghai, China
Acquired revised ISO 9001 and ISO 14001
2003. OSA (Organization for the Safety of Abrasives) certified
2004. Opened sales office in Frankfurt, Germany
2005. Selected as “Certified excellent company of quality competitiveness” by the Korean government
2008. Awarded $100M export Presidential award
2011. Selected as “World class 300 company” by the Korean government (First round)
2012. Established plant in Jakarta, Indonesia
2013. Opened new facility in Dongtan (R&D center and new business development)
Opened sales subsidiary in India
2015. Opened sales subsidiary in Mexico
2016. Certified KOSHA 18001
(Safety and Health Management System)
2017. Designated as a Compliance Program Trader
(Ministry of Trade, Industry and Energy)

TÜV

Worldwide competence -

The most advanced technology for diamond tools and quality

EHWA has become an international benchmark for success because of our ability to adapt quickly to the changing markets and diverse needs of customers, and by leading the way in applying the most advanced technology for manufacturing industrial diamond tools.

Since 1975, EHWA has been able to greatly expand its market share throughout the world because we have established a world renowned reputation of high quality products, service and expertise in the industry. EHWA is deeply committed to keeping customers up-to-date and equipped with the most competitive products and technical information. Our success can only be measured by the success of our customers.

The key to our flexibility and strength in the global marketplace is our many alliances with reliable overseas partners and customers throughout the world. EHWA purchases only the highest quality raw materials, industrial diamonds and CBN from reputable sources. In addition to having strong supply lines with major suppliers, EHWA has successfully teamed up with high-tech manufacturers in Europe, Japan, and U.S. under several joint-ventures for the research and development of high precision diamond tools, rotary dressers, and precision electroplated diamond tools.

The success of a company depends on its ability to adapt and compete in the global marketplace. EHWA is able to survive in the age of globalization because we are already globalized.

EHWA diamond tools are your partner for success.

EHWA = Cooperation

'E(二)' means Two Parties: EHWA and People such as customers, employees, partners and our society. 'HWA(和)' means Cooperation. Our philosophy is to nurture and grow long-term partnerships with our customers. Ever since 1975 when EHWA was established, EHWA has been striving to develop into the very best in our industry not only in size but more importantly in quality. We are convinced that we are the best partner for you.

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Tooling Improvement Service

Bottlenecks in production causes multiple problems. They not only reduce productivity, but also increases cycle time and decreases tool life. Customers can easily solve bottlenecks with EHWA tooling improvement service.

improvement

Current production

- Bottle neck
- Cycle time
- Shortened tool life
- Inefficient tool setting
- High C.P.U.
- High defect rate

Process Analysis / Propose solution

- Bottle neck
- Simulate the process with 3D program and check suitability
- Change the current process
- Change PCD/PCBN raw materials
- Propose cost saving solution

Evaluate the process suitability (OK/NG)

Sample test

- Internal test
- Field test

Apply the tool on mass production

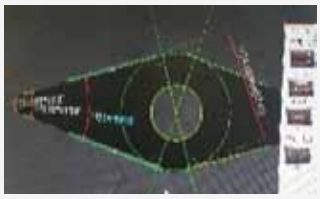
Technical Solution

Review the tool with its application and working conditions

Item	Check point
Workpiece	Workpiece material, hardness, roughness
Tool information	Specification, tool material
Operation	Application, tool layout
Working condition	Wet/dry , cutting speed(Vc) , feed rate , depth of cut

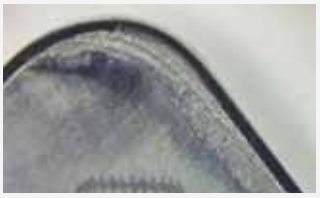
Current tool analysis

Tool shape and edge analysis



- Check the tool shape
- Measure the dimensions
- Analyze the edge preparation

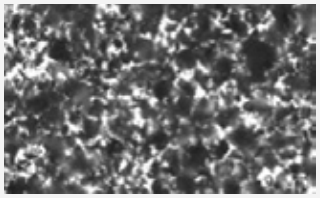
Wear analysis

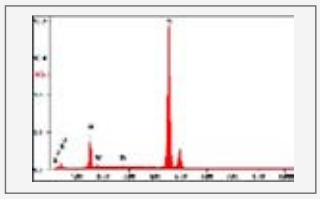


- Analyze the wear pattern
- Analyze the wear location
- Analyze the wear amount
- Analyze the chip size and crack

With optical microscope

Raw material analysis





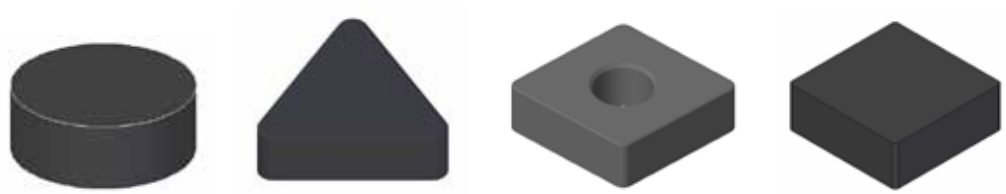
- SEM1 : Grit array analysis
- EDAX2 : Component analysis

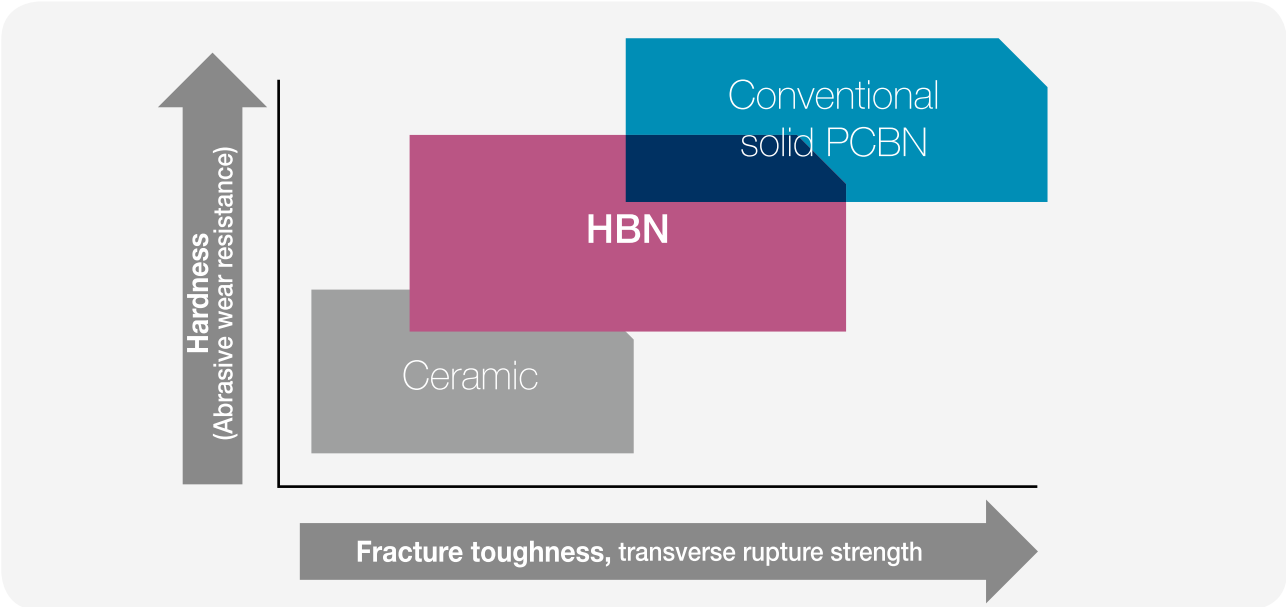
Propose technical solutions

EHWA new PCBN material

HBN | Hybrid solid PCBN

HBN is an EHWA hybrid PCBN manufactured by using a special sintering process with a ceramic binder and CBN powder. It's much more competitive than conventional PCBN and it has stronger outstanding wear-resistance & toughness compared to ceramics. Therefore, it's a good solution for both roughing and finishing of cast iron.





Nonferrous material	Conventional solid PCBN	HBN	Ceramic
Chemical resistance	□□	□□	□□□
Were resistance	□□□□□	□□□□	□
Impact resistance	□□□	□□□	□

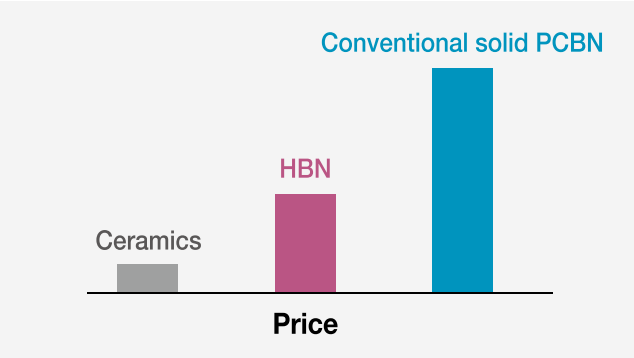
C type	D type	T type	Stype	R type
CNGN0903(32)	DNGN1104(33)	TNGN1103(22)	SNGN0903(32)	RNGN0603(22)
CNGN0904(33)	DNGN1504(43)	TNGN1104(23)	SNGN0904(33)	RNGN0904(33)
CNGN1204(43)		TNGN1604(33)	SNGN1204(43)	RNGN1204(43)
CNGN1207(45)		TNGN2204(43)	SNGN1207(45)	RNGN1207(45)

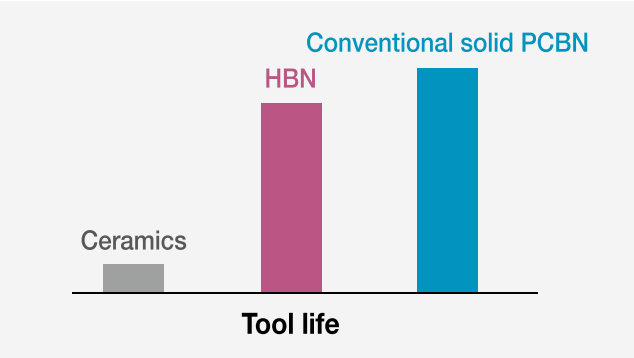
* Special inserts with various shapes are available for turning and milling applications.

Applications

Brake disk, brake drum, cast iron engine block, impeller, slurry pumps, rolling mill iron rolls

Performance comparision

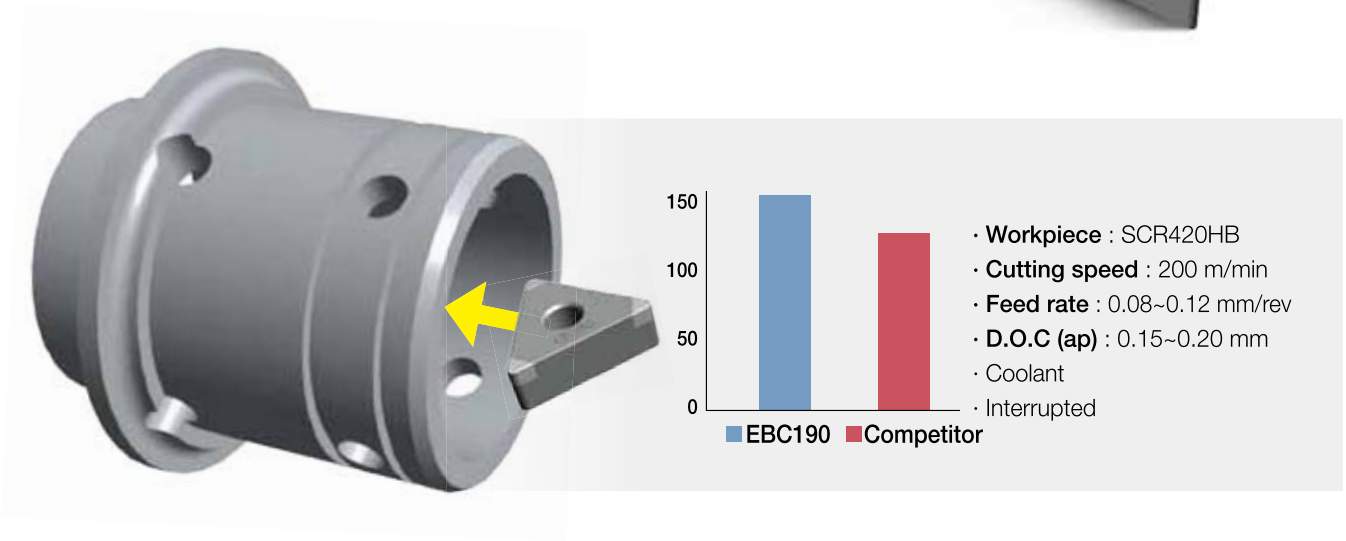


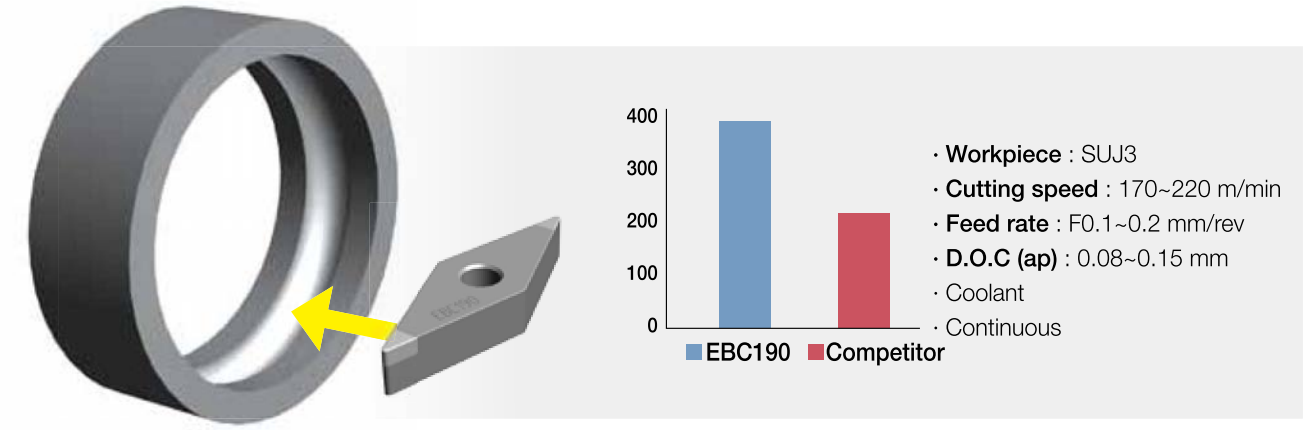


EHWA new PCBN material

EBC190 | new coated grade for hardened steel

EBC190 is a new PCBN grade which has high toughness and wear resistance. This coated grade performs well in bearing steel and hardened steel applications. EBC190 also performs well in both continuous and interrupted cutting applications.



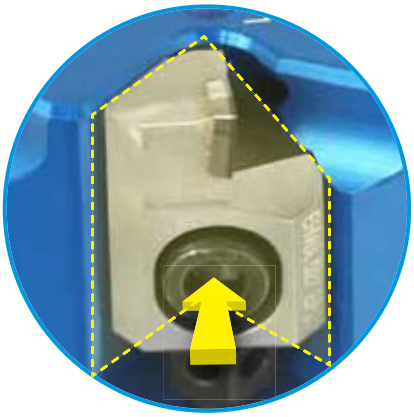


EHWA new milling cutter

CF milling cutter | chip flow cutter

EHWA original design for better chip flow

- Direct coolant spray to the tip edge
- Good chip flowing
- Longer tool life by strong mounting stability
- Good surface finish
- Easy to handle due to the light aluminum body
- Excellent durability and low cutting load
- High productivity and process stability
  (more cutting edge → high feed → cycle time reduction)



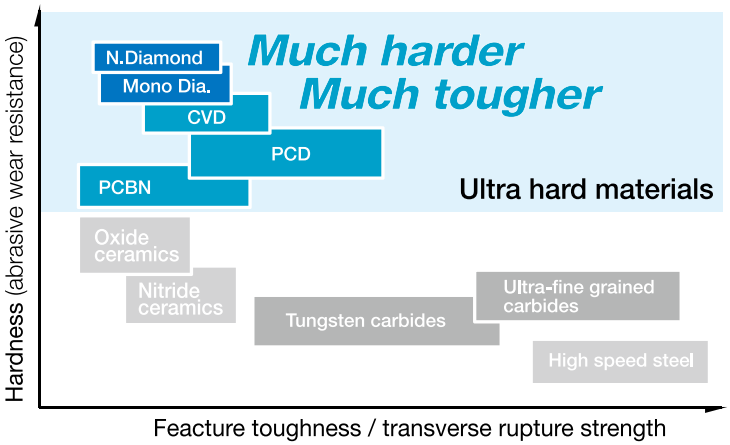
Strong mounting stability

Direct coolant spray

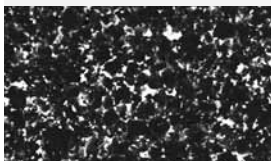
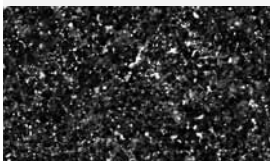
Advantages of diamond tools

Today's modern industrial society continues to push the development and uses of new and advanced materials, and high precision machining to new heights. Along with the improvements in producing processes and difficulties that arise from machining new and advanced materials, there is an increasing demand for new forms of cutting tools that go beyond the conventional cutting tools such as those made out of high speed steel, tungsten carbides, cermets, and ceramics.

Polycrystalline Diamond (PCD), is a synthetic diamond product that is produced by sintering selected diamond particles with a metal matrix using very sophisticated temperature and high pressure technology.



Characteristics of diamond types

	PCD	PCBN	CVD diamond	Mono diamond natural diamond
Definition	Polycrystalline diamond	Polycrystalline cubic boron nitride	Polycrystalline diamond (chemical vapor deposition method)	Single crystal diamond
Applicable work material	Non-ferrous such as Al, copper alloys, etc. & nonmetallic such as wood working, advanced composite, etc.	Ferrous material such as cast iron, hardened steel, super alloy meterial, etc.	Non-ferrous such as Al, copper alloys, etc. & nonmetallic such as wood working, advanced composite, etc.	Superior edge quality for nonmetallic material
Hardness (Hv, GPa)	50 ~ 70	30 ~ 40	70 ~ 80	80 ~ 100
Magnified structure				

PCD by its nature, is high in uniform hardness, and also more abrasive and shock resistant in all directions than natural diamonds because of its random-oriented structure of the diamond particles.

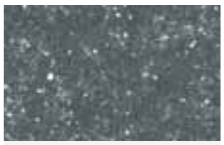
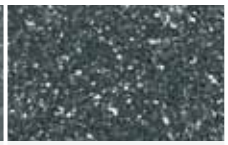
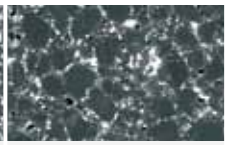
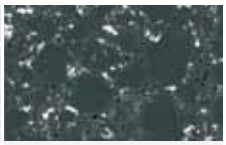
Polycrystalline cubic boron nitride (PCBN) is an artificially synthesized material. except for diamond, PCBN is the hardest material. however, unlike diamond, PCBN is stable under conditions of high temperature (up to 1000°c), normally seen when machining hardened ferrous or super alloy materials. PCBN tools permit metal cutting with feed and speed rates that are much higher than conventional cutting tools.

Diamond tools advantage

- Good surface finish
- High accuracy
- Longer tool life
- Lower stock management
- Fast material removal rate
- Lower energy cost
- Eco friendly

Poly Crystalline Diamond

PCD distinction & application

Grit size	Ultra Fine	Fine	Medium	Coarse	Multi modal
Micro structure (1000 x)					
Type	Carbide backed	Carbide backed	Carbide backed	Carbide backed	Carbide backed
Grain size	0.5 ㎛	3~4 ㎛	8~10 ㎛	20~25 ㎛	30+2 ㎛
Diamond (%)	85	90	90	94	94
Grade	EP20	EP51	EP55	EP58	EP29
Surface finish	Better	➔ ➔	➔ ➔ ➔	➔ ➔	Worse
Wear resistance	Worse	➔ ➔	➔ ➔ ➔	➔ ➔	Better
Application	Wood working				
	Copper alloy				
	Rubber / Acryl_glass				
			(Si <13%) Al-Si alloy (Si >13%)		
			Tungsten carbide		
				Ceramic (sintered/unsintered)	
				M.M.C / CFRP / glass fiber	
		General purpose			

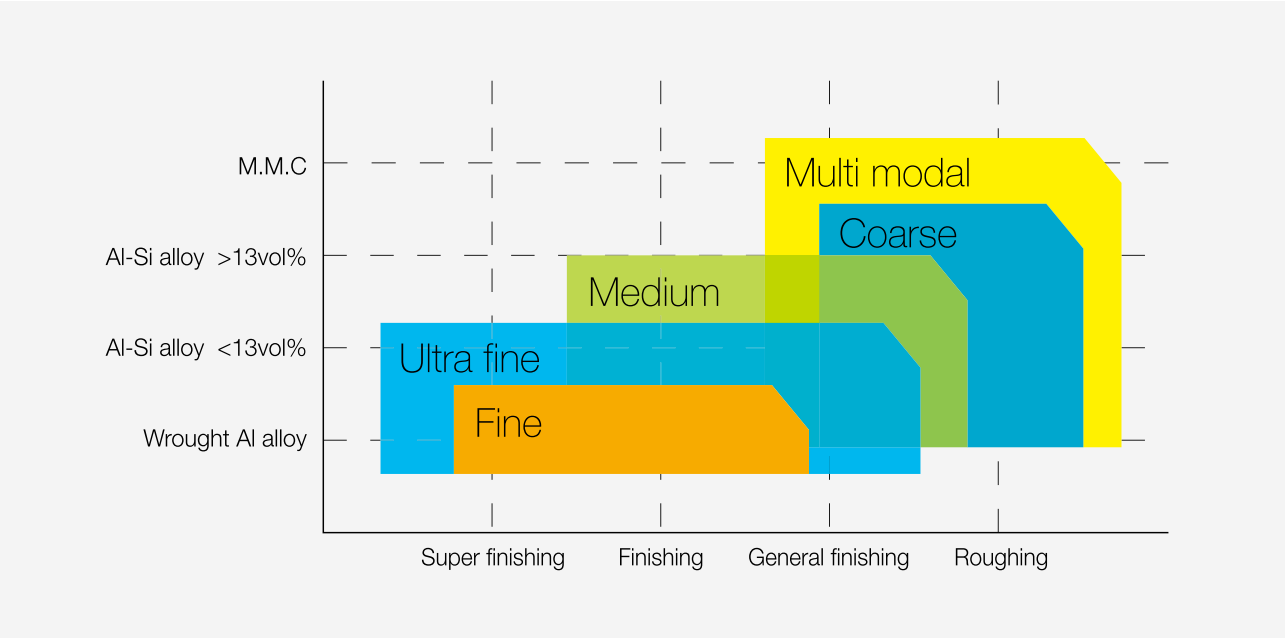
EHWA PCD grade

Grade	Binder	Diamond vol. (%)	Grit size (㎛)	Characteristic
EP10	W+Co	85	1.5	Excellent sharp edge, superb sharpness cutting edge
EP20	W+Co	85	0.5	Excellent surface finish, ultra fine grade and fine grade
EP51	W+Co	90	3~4	Excellent surface finish
EP13	W+Co	92	5~6	General purpose, excellent WEDM
EP55	W+Co	90	8~10	General purpose
EP75	W+Co	90	6~8	General purpose, excellent WEDM
EP750	W+Co	90	8+2	Multi-modal, good wear resistance
EP58	W+Co	94	20~25	Excellent wear resistance
EP59	W+Co	95	25+2	Multi-modal, good wear resistance
EP29	W+Co	94	30+2	Multi-modal, good wear resistance, adequate for difficult-to-cut-materials
EP69	W+Co	95	50+α	Multi-modal, good wear resistance, adequate for difficult-to-cut-materials

EHWA PCD working parameter

Materials	Ultra fine	Fine	Medium	Coarse	Multi modal	Vc (m/min)	f (mm/rev)	ap (㎛)
Al alloy (Si <13%)	EP10, EP20		EP13, EP55, EP75			~ 3,000	~ 0.2	~ 3
Al alloy (Si >13%)			EP750	EP58	EP29, EP59, EP69	~ 3,000	~ 0.2	~ 3
Copper alloy	EP10, EP20	EP51	EP13			~ 1,000	~ 0.2	~ 3
Carbide / ceramic			EP55, EP75, EP750	EP58	EP29, EP59, EP69	10~30	~ 0.2	~ 0.5
Engineering plastic	EP10, EP20		EP13, EP55, EP75		EP29, EP59, EP69	~ 1,000	~ 0.4	~ 2
Wood		EP51	EP55, EP75, EP750			~ 4,000	~ 0.4	-
Ti alloy	EP20					50~100	~ 0.3	~ 0.5

Application range by PCD grade



Applicable work material

Nonferrous material	
Al alloy	High Si >13% / low-medium Si <13% / metal matrix composites
Copper alloy	Brass / bronze / zinc
Tungsten carbide	Sintered / unsintered
Ti alloy	

Nonmetallic material	
Wood working	High density fiberboard /chipboard / hardboard / laminates
Advanced composite	Graphite-epoxy / carbon fiber / fiberglass plastic / engineering plastic
Ceramic & stone	Sintered / unsintered / granite / imitation marble
Quartz	

Polycrystalline Cubic Boron Nitride

Characteristic of PCBN

Contents	CBN vol. (%)	Grit size (㎛)	Binder phase	Strength & toughness	Thermal conductivity	Chemical stability	Wear resistance
Low contents	40~70	0.5~5	Ceramics (TIC, TIN..)	■■□□	■■□□	■■■■	■■■□
High contents	70~95	1~20	Metal (Co, WC...)	■■■■	■■■■	■■□□	■■■■

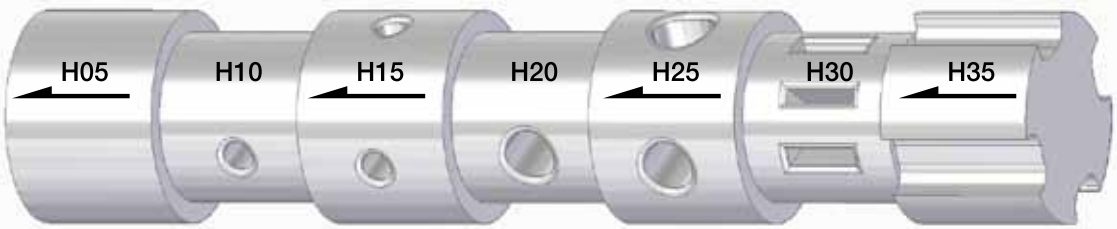
EHWA PCBN grade

■ Carbide backed ■ Solid tip

	Grade	CBN vol%	Type	Application
Low contents	EB19X	40%	Carbide Backed	H05 (high speed machining)
	EB29X(EB29S)		Carbide Backed, Solid	H05 (high speed machining)
	EB28X(EB28S)		Carbide Backed, Solid	H05 (standard)
	EB180		Carbide Backed	H05~H15
	EB570(EB57S)		Carbide Backed, Solid	H05~H15 , bearing steel
	EB160		Carbide Backed, Solid	H05~H15 , bearing steel
	EB560(EB56S)		Carbide Backed, Solid	H05~H20
	EB550(EB55S)		Carbide Backed, Solid	H15~H25
	EB150		Carbide Backed	H15~H25
	EB190		Carbide Backed	H05~H30
	EB73		Carbide Backed	H25~H35
	EB54X	70%	Solid	H25~H35
	EB170		Carbide Backed	P/M Valve seat
	EB14		Carbide Backed	P/M Valve seat
High contents	EB130	75%	Carbide Backed	Powder metal(low alloyed)
	EB710		Carbide Backed	Chilled iron, p/m(low alloyed)
	EB120		Carbide Backed	Ductile cast iron, chilled iron
	EB22		Carbide Backed	Chilled iron, p/m(low alloyed)
	EB11		Carbide Backed	Cast iron(Standard), heavy interrupt
	EB51		Carbide Backed	Cast iron(Standard)
	EB71		Carbide Backed & Double side	Cast iron(Standard)
	EB210		Carbide Backed	Cast iron(high interrupt)
	EB71X		Carbide Backed	Chilled iron, p/m(low alloyed)
	EB100X		Solid	White iron, cast iron heavy milling
	EB50		Solid	Grey Cast iron(rough)
	EB1000		Solid	Grey Cast iron (rough & finish)
	HBN		Solid	Grey Cast iron(Standard)
	HBN-T		Solid	Grey Cast iron(rough)
	HBN-W	95%	Solid	Grey Cast iron(rough)
	HBN-N		Solid	Grey Cast iron(rough)
	HBN-R		Solid	Grey cast iron(iron roll)

Interruption of hard steel turning

H05 : Continuous / **H15 :** Light Interruption / **H25 :** Medium Interruption / **H35 :** Heavy Interruption



EHWA PCBN working parameter

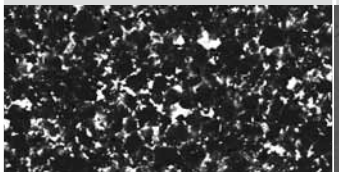
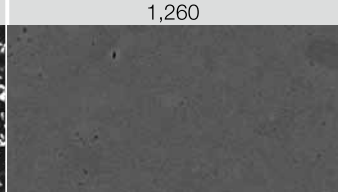
	Continuous cutting	Interrupt cutting			Working parameter		
		Light	Medium	Heavy	Vc (m/min)	f (mm/rev)	ap (mm)
H Hardened steel	EB19X, EB29X(S)				150~300	0.05~0.15	0.05~0.15
	EB28X(S)				120~280	0.05~0.2	0.05~0.2
	EB180, EB570(S)				100~230	0.05~0.15	0.05~0.2
		EB160, EB560(S)			80~200	0.05~0.2	0.05~0.2
		EB550(S), EB150			80~180	0.05~0.2	0.05~0.3
		EB190			70~170	0.05~0.2	0.05~0.3
			EB54X, EB73		70~120	0.05~0.15	0.05~0.2
				EB51, EB210	50~100	0.05~0.15	0.05~0.2
K Cast iron	EB51, EB71				300~1000	0.1~0.5	0.1~2
		EB210, EB71X			300~1500	0.05~0.3	0.1~2
	EB50, EB1000				150~1500	0.1~0.5	0.1~4
		EB100X			150~1000	0.1~0.3	0.1~4
		HBN-W, HBN-T			300~1000	0.1~0.5	0.1~4
	HBN, HBN-N				300~1000	0.1~0.5	0.1~4
P/M High alloyed	EB28X(S)				100~250	0.05~0.2	0.05~0.2
	EB170, EB14				100~200	0.05~0.2	0.05~0.2
		EB550(S)			50~150	0.05~0.25	0.05~0.2
P/M Low alloyed	EB51, EB71				50~150	0.05~0.3	0.05~0.2
	EB710, EB130, EB22				50~150	0.05~0.3	0.05~0.2
		EB120, EB71X			50~150	0.05~0.3	0.05~0.2

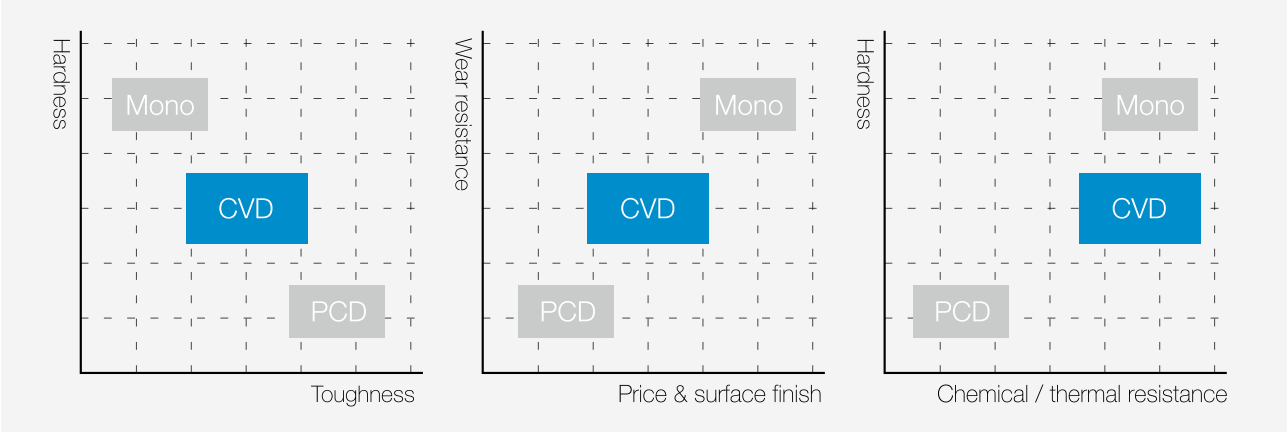
EHWA PCBN working parameter

Low CBN contents	High CBN contents
Hardened steel	**Cast iron**
Tool steel / die steel / hardened steel / Bearing steel / Hi-Cr, Mo steel	Gray cast iron / Ni-hard cast iron / Alloy cast iron / Chilled cast iron / Nodular cast iron
Work example Gear / transmission / shaft / bearing / die / punch	**Work example** Engine block / brake disc / brake drum / cluch plate / roll / pump / Impeller
Powder metal	**Super alloy**
Sintered metal	Inconel 718,901,600 / rene76,77,95 / stellite
Work example Valve seat / valve guide / con-rod / oil-pump / gear	**Work example** Turbine / turbine disc / turbine blade / turbine vane

Chemical Vapoured Deposition diamond

General properties of CVD diamond

Property	PCD	CVD (Poly crystalline diamond)	Mono (Single crystalline diamond)
Thermal conductivity	560	560	2,000
Hardness (Gpa)	50~70	70~80	80~100
Toughness (Mpa-m1/2)	8~9	8~9	3~4
Tensile strength (Gpa)	1,260	1,260	2,000
Micro structure (1000 x)			



EHWA CVD diamond grade

Grade	ED501	ED502
Wear resistance	■■■□	■■■■
Toughness	■■■□	■■□□

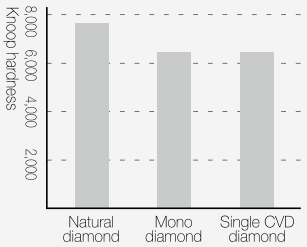
Applicable work material

Nonferrous material	Nonmetallic material
Al alloy High Si >13% / low-medium Si <13% / metal matrix composites	**Wood working** High density fiberboard / Chipboard / Hardboard / Laminates
Copper alloy Brass / bronze / zinc	**Advanced composite** Graphite-epoxy / Carbon-fiber / Fiberglass plastic / Engineering plastic
Tungsten carbide Sintered / unsintered	**Ceramic & Stone** Sintered / Unsintered / Granite / Imitation marble
	Quartz

Single Crystalline Diamond

Application

- Non-ferrous metal
- Acrylic
- Lens
- Microscopic pattern
- FPD (flat panel display)
- BLU (back light unit)



Natural diamond

- Excellent surface finish
- Colorless
- Longest tool life, excellent wear
- Highest thermal conductivityresistance

Mono diamond

- Available alternative to natural diamond
- Yellow color
- High pressure, High temperature synthesis
- Enhanced and more consistent performance

Single CVD diamond

- Similar to natural diamond
- Colorless
- Superior edge quality for ultra precision machining applications
- Highly consistent material properties

EHWA Coating Service

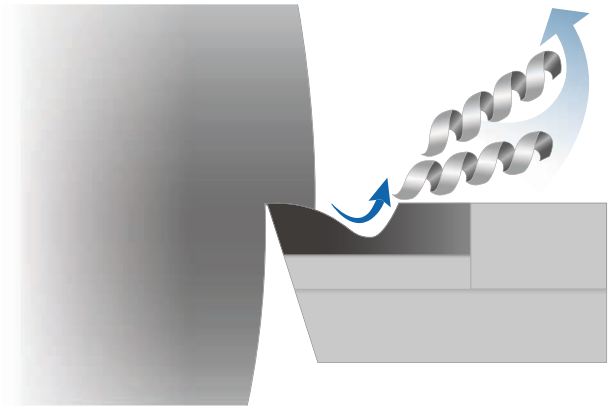
Coating Type

Coating grade (Ehwa code)	Color	Hardeness (Hv)	Temperature (℃)	Characteristic
TIN	Gold	2,300	600	Mono layer Traditionally used for wear part Easily identify used edge
TA	Purple grey	3,400	900	Good heat resistance Good wear resistance Traditionally used for cutting tool
AC	Silver grey	3,200	1,100	Better heat resistance Higher hot hardness Higher oxidation resistance
EL	Dark grey	3,500	1,000	Better wear resistance Better chemical resistance Good performer for hardened steel & bearing steel
NEW TNP	Light dark grey	3,500	1,000	Excellent wear resistance Excellent heat resistance Very good surface finish Best performer for hardened steel & bearing steel

Application Area

EHWA coating	Cast iron	Hardened steel (HRC45~)	Bearing steel	Powder metal (45HRC~)
TIN	TIN			
TA	TA	TA		
AC		AC		AC
EL			EL	
TNP		TNP	TNP	TNP

PCD/CVD
Chip breaker

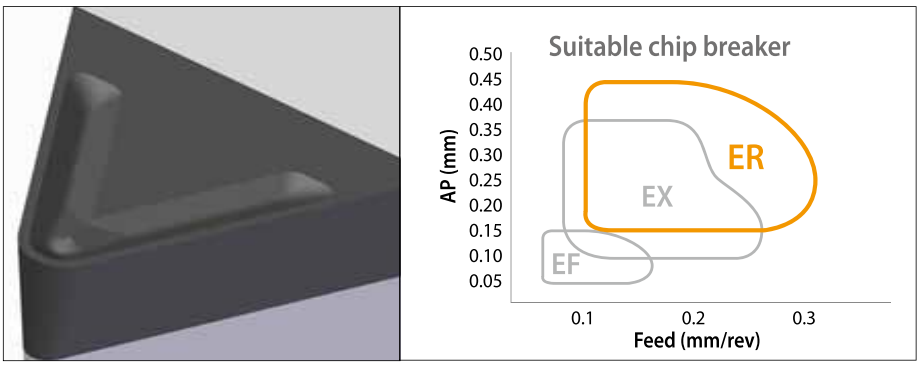


EHWA's 3D chip breaker

- Easy to control long chips
- Smooth and stable cutting at low & high feed rates
- Easy chip control for a variety of cutting conditions
- Various chip breaker design for CCGW, DCGW, VBGW, TCGW etc.

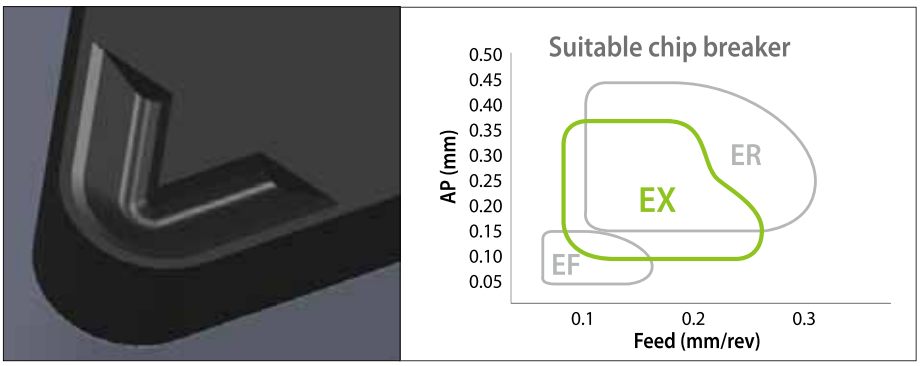
Various PCD chip breaker | ER, EX, EF, ES

ER type



- Excellent chip control for heavy depth of cut
- Perfect chip control by specially designed chip breaker

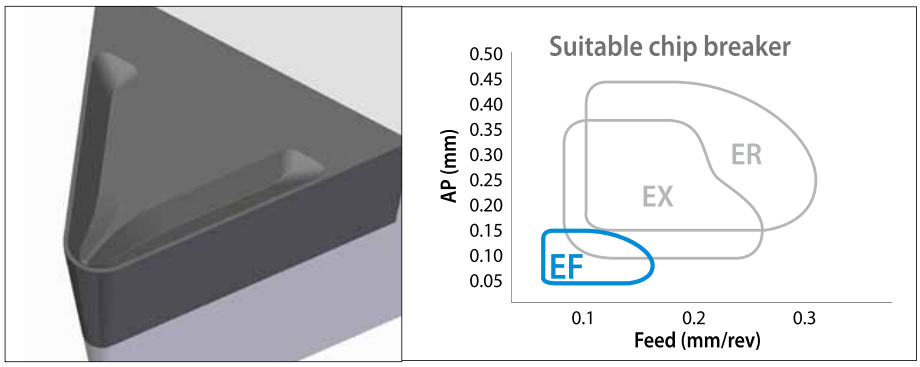
EX type



- Excellent chip control for medium depth of cut
- Special design enhancing cutting edge
- Outstanding chip-resistance at roughing & semi finishing

PCD/CVD
Chip breaker

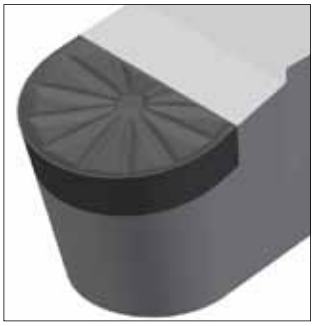
EF type

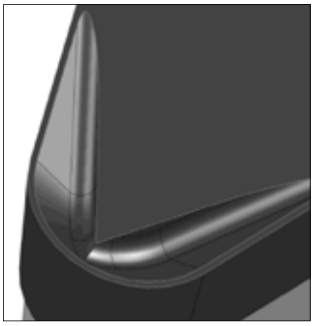
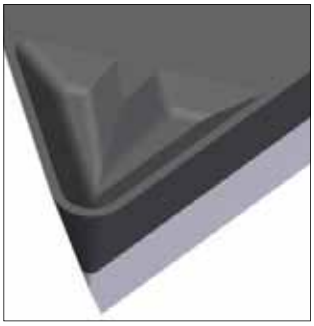


· Excellent chip control for smaller depths of cut
· Standard design for finishing

ES type

Customized design



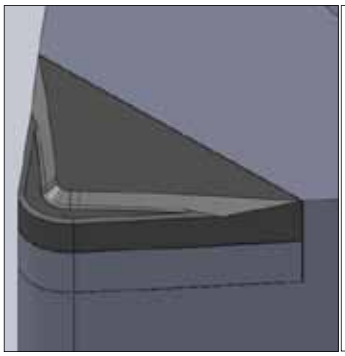
Needed information for ES design

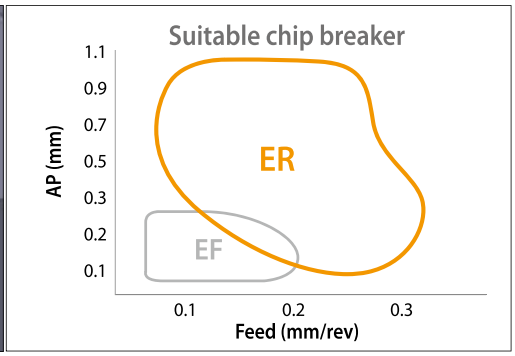
Tool/work piece information		Cutting condition	
Tool spec	VCGW160408	Cutting speed (m/min)	1,800
Holder spec	SVVCN2525-16	RPM (rev/min)	2,500
Part name	Aluminium wheel	Feed (mm/rev)	0.15
Workpiece material	ADC12	Depth of cut (mm)	0.3

PCBN
Chip breaker

Various PCBN chip breaker | ER, EF, ES

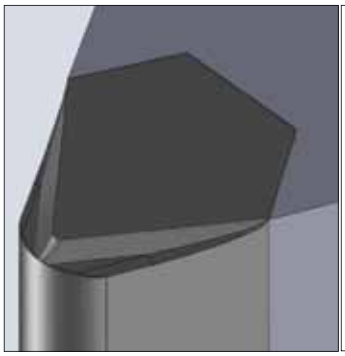
ER type

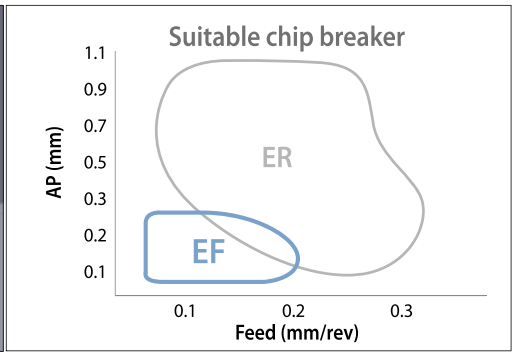




- Excellent chip control for heavy depth of cut
- Special design enhancing cutting edge
- Round coner easily curling chip

EF type

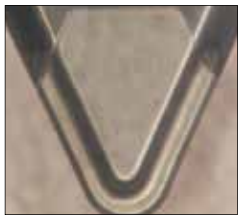




- Excellent chip control for small depth of cut
- Standard design for finishing

ES type

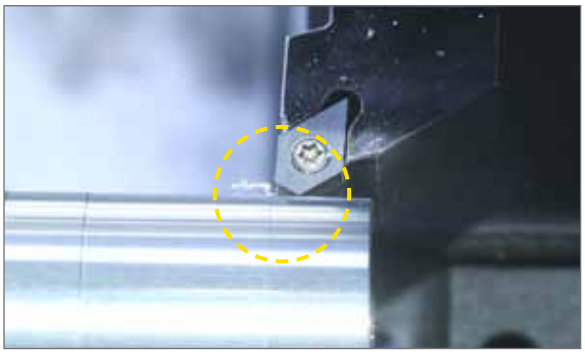
Customized design



Needed information for ES design

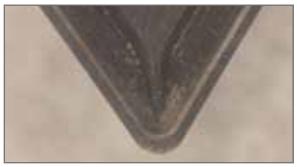
Tool/work piece information		Cutting condition	
Tool spec	CNGA120408	Cutting speed (m/min)	850
Holder spec	DCLN R/L3232	RPM (rev/min)	1,000
Part name	Brake disk	Feed (mm/rev)	0.3
Workpiece material	FC250	Depth of cut (mm)	0.4

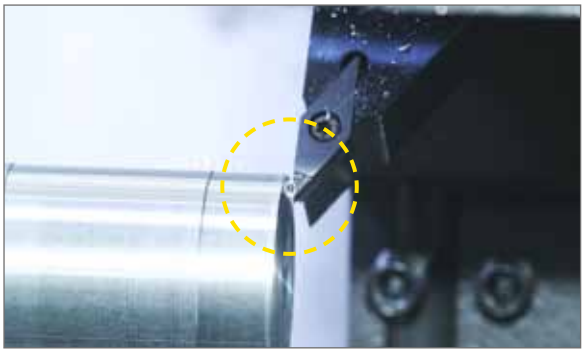
PCD/CVD
Case history



DCGW11T308 _ER

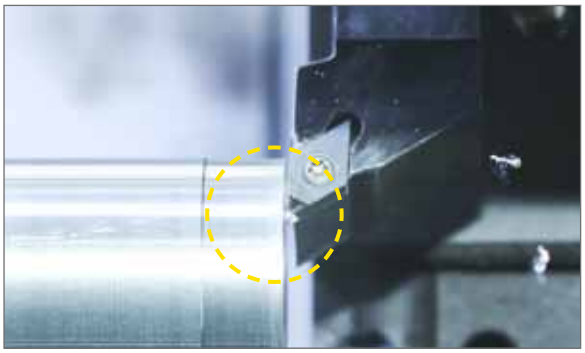
- **Work :** Al alloy
- **Vc** : ≒500 m/min
- **D.O.C** : 0.5 mm
- **Feed** : 0.15 mm/rev





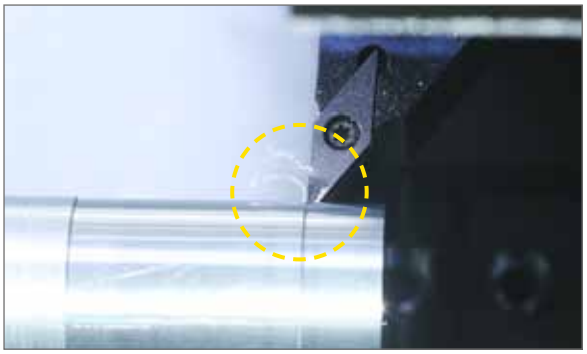
VCGW110302 _EF

- **Work** : Al alloy
- **Vc** : ≒500 m/min
- **D.O.C** : 0.1 mm
- **Feed** : 0.1 mm/rev



DCGW11T304 _EX

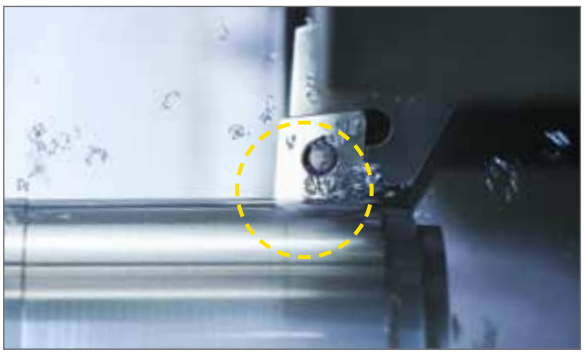
- **Work** : Al alloy
- **Vc** : ≒800 m/min
- **D.O.C** : 0.2 mm
- **Feed** : 0.15 mm/rev



VBGW160408 _ES

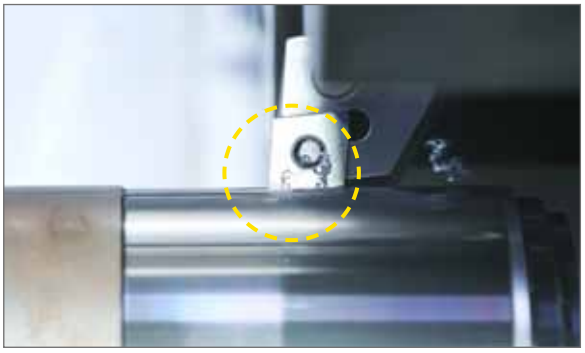
- **Work** : Al alloy
- **Vc** : ≒1500 m/min
- **D.O.C** : 0.2 mm
- **Feed** : 0.3 mm/rev

PCBN
Case history



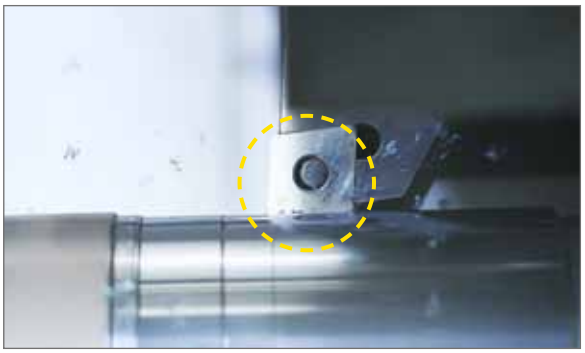
CNGA120408 _ER

- **Work** : SCM420 steel
- **Vc** : ≒150 m/min
- **D.O.C** : 0.25 mm
- **Feed** : 0.1 mm/rev



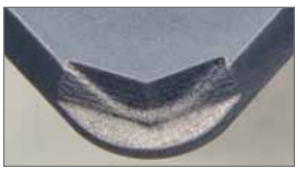
CNGA120408 _EF

- **Work** : SCM420 steel
- **Vc** : ≒150 m/min
- **D.O.C** : 0.1 mm
- **Feed** : 0.1 mm/rev



CNGA120408 _ES

- **Work** : Scm420 steel
- **Vc** : ≒150 m/min
- **D.O.C** : 0.2 mm
- **Feed** : 0.1 mm/rev



WNGA080408 _ES

- **Work** : Scm420 steel
- **Vc** : ≒100 m/min
- **D.O.C** : 0.15 mm
- **Feed** : 0.1 mm/rev

Turning

EHWA offers a wide range of PCD & PCBN inserts for turning.
Customers looking for high productivity can count on EHWA's turning tools.
Here is the right choice for an excellent and economical solution.

- Maximum metal removal & higher productivity
- Stronger wear resistance & longer tool life
- Superior surface finish
- Precise tolerance control

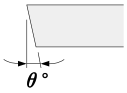
Designation system | unit: metric

C	N	M	G
Insert shape	Clearance angle	Tolerances	Clamp type

Insert shape

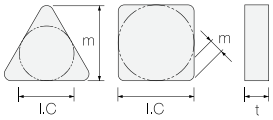
Symbol	Shape
C	80°
D	55°
E	75°
K	55°
R	
S	
T	
V	35°
W	80°

Clearance angle



Symbol	Angle
N	0°
A	3°
B	5°
C	7°
P	11°
D	15°
E	20°
F	25°

Tolerances



Class	I.C size (mm)	Tolerance m (mm)	t (mm)	I.C (mm)
A	6.35	±0.005	±0.025	±0.025
F	9.525	±0.005	±0.025	±0.013
C	12.7	±0.013	±0.025	±0.025
H	15.875	±0.013	±0.025	±0.013
E	19.05	±0.025	±0.025	±0.025
G	25.4	±0.025	±0.13	±0.025
	31.75			
M	6.35	±0.08	±0.13	±0.05
	9.525	±0.08	±0.13	±0.05
	12.7	±0.13	±0.13	±0.08
	15.875	±0.15	±0.13	±0.1
	19.05	±0.15	±0.13	±0.1
	25.4	±0.18	±0.13	±0.13
	31.75	±0.18	±0.13	±0.13
U	6.36	±0.13	±0.13	±0.08
	9.525	±0.13	±0.13	±0.08
	12.7	±0.2	±0.13	±0.13
	15.875	±0.27	±0.13	±0.13
	19.05	±0.27	±0.13	±0.18
	25.4	±0.38	±0.13	±0.25
	31.75	±0.38	±0.13	±0.25

Clamp type

Symbol	Shape
A	
G	
M	
R	
B, W	
T, H	
N	
Z, X	Special

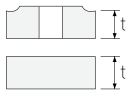
12 04 08 T2501 (R)

1 2

Cutting edge length

C	D	E	R	S	T	V	W	K	I.C size (mm)
03	04			03	06				3.97
05	06			05	09	09	03		5.56
06	07			06	11	11	04		6.35
08	09			07	13	13	05		7.94
			08						8
09	11		09	09	16	16	06	16	9.525
			10						10
			12						12
12	15	13	12.7	12	22	22	08		12.7
16	19		15	15	27	27	10		15.875
			16						16
19	23		19	19	33	33	13		19.05
			20						20
			25						25
25	31		25	25	44				25.4
			32						32

Thickness



Symbol	t (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

Corner radius

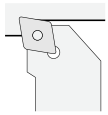
Symbol	R (mm)
01	0.1
02	0.2
04	0.4
05	0.5
08	0.8
12	1.2
16	1.6
20	2
24	2.4
32	3.2

1 Edge shape

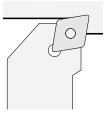
Symbol	Shape
F	
E	
T	
S	

2 Hand of insert

R Right hand



L Left hand



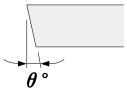
Designation system | unit: inch

C	N	M	G
Insert shape	Clearance angle	Tolerances	Clamp type

Insert shape

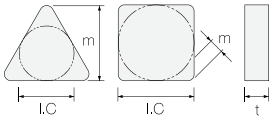
Symbol	Shape
C	
D	
E	
K	
R	
S	
T	
V	
W	

Clearance angle



Symbol	Angle
N	0°
A	3°
B	5°
C	7°
P	11°
D	15°
E	20°
F	25°

Tolerances



Class	I.C size	Tolerance m (inch)	t (inch)	I.C (inch)
A	2	±0.002	±0.001	±0.001
F	3	±0.002	±0.001	±0.0005
C	4	±0.0005	±0.001	±0.001
H	5	±0.0005	±0.001	±0.0005
E	6	±0.001	±0.001	±0.001
G	8	±0.001	±0.005	±0.001
	10			
M	2	±0.003	±0.005	±0.002
	3	±0.003	±0.005	±0.002
	4	±0.005	±0.005	±0.003
	5	±0.006	±0.005	±0.004
	6	±0.006	±0.005	±0.004
	8	±0.007	±0.005	±0.005
	10	±0.007	±0.005	±0.005
U	2	±0.007	±0.005	±0.003
	3	±0.007	±0.005	±0.003
	4	±0.008	±0.005	±0.005
	5	±0.01	±0.005	±0.005
	6	±0.01	±0.005	±0.007
	8	±0.015	±0.005	±0.01
	10	±0.015	±0.005	±0.01

Clamp type

Symbol	Shape
A	
G	
M	
R	
B, W	
T, H	
N	
Z, X	Special

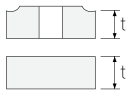
4 3 2 T2501 (R)

1 2

Cutting edge length

C	D	E	R	S	T	V	W	K	Symbol	I.C size (inch)
03	04			03	06				1.2	5/32
05	06			05	09	09	03		1.8	7/32
06	07			06	11	11	04		2	1/4
08	09			07	13	13	05		2.5	5/16
			08						-	-
09	11		09	09	16	16	06	16	3	3/8
			10						-	-
			12						-	-
12	15	13	12.7	12	22	22	08		4	½
16	19		15	15	27	27	10		5	5/8
			16						-	-
19	23		19	19	33	33	13		6	¾
			20						-	-
			25						-	-
25	31		25	25	44				8	1
			32						10	1-1/4

Thickness



Symbol	t (inch)
1	1/16
1.2	5/64
1.5	3/32
1.75	7/64
2	1/8
2.5	5/32
3	3/16
3.5	7/32
4	1/4
5	5/16
6	3/8

Corner radius

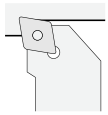
Symbol	R (inch)
0.2	0.004
0.5	0.008
1	1/64
2	1/32
3	3/64
4	1/16
5	5/64
6	3/32
7	7/64
8	1/8

1 Edge shape

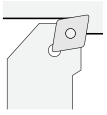
Symbol	Shape
F	
E	
T	
S	

2 Hand of insert

R Right hand

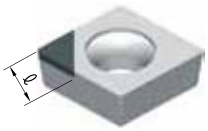


L Left hand

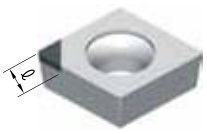


Turning_
PCD/CVD

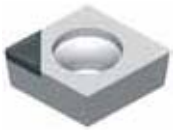
Insert tip types



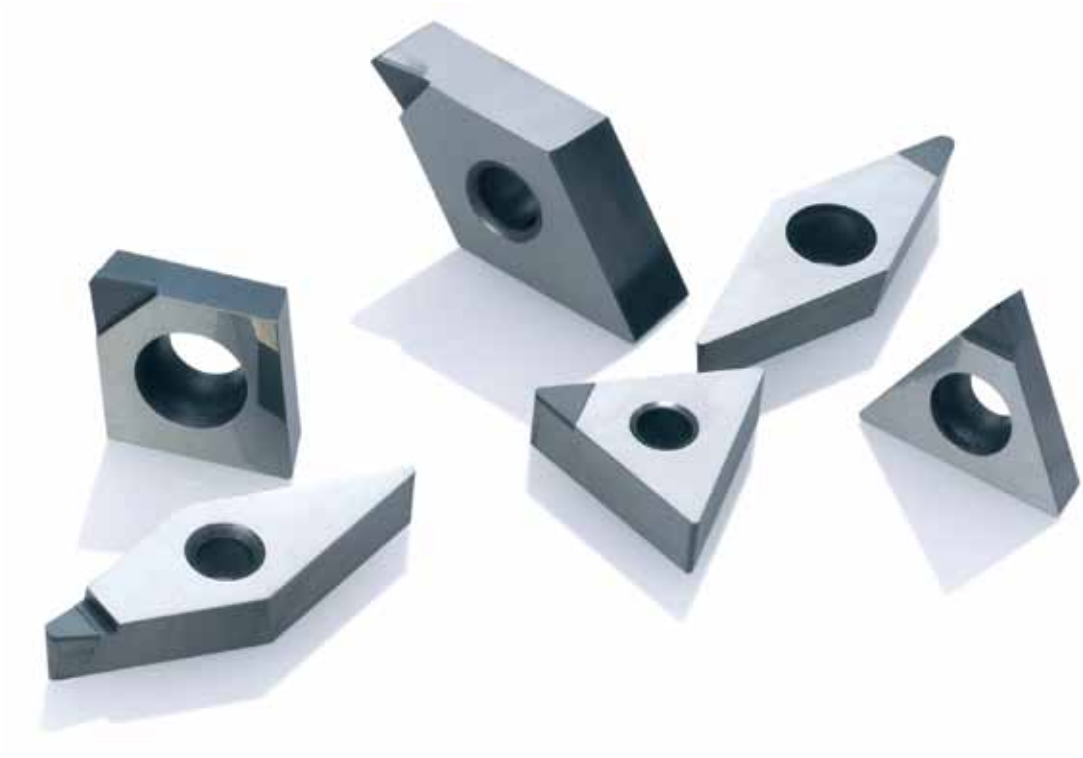
Standard



Mini tip (MT)

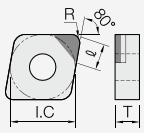


3D Chip breaker



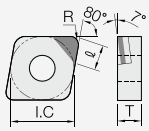
CN□□

NEGATIVE _ hole

CNGA		ISO code Metric	ISO code Inch	Dimensions (mm) I.C	T	R	Hole	ℓ	PCD EP10	EP20	EP13	EP51	EP55	EP750	EP58	EP59	EP29	EP69	CVD ED501	ED502
	Standard	CNGA 120402	CNGA 43(0.5)	12.7	4.76	0.2	5.16	4.3												
		120404	431	12.7	4.76	0.4	5.16	4.3												
		120408	432	12.7	4.76	0.8	5.16	4.2												
		120412	433	12.7	4.76	1.2	5.16	4.1												
	MT	CNGA 120402	CNGA 43(0.5)	12.7	4.76	0.2	5.16	2.8												
		120404	431	12.7	4.76	0.4	5.16	2.8												
		120408	432	12.7	4.76	0.8	5.16	2.7												
		120412	433	12.7	4.76	1.2	5.16	3.1												

■ **MT** : Mini Tip

Holder : 75p, 79p, 82p, 83p, 108p, 119p

CNGX		ISO code Metric	ISO code Inch	Dimensions (mm) I.C	T	R	Hole	ℓ	PCD EP10	EP20	EP13	EP51	EP55	EP750	EP58	EP59	EP29	EP69	CVD ED501	ED502
	Standard	CNGX 120402	CNGX 43(0.5)	12.7	4.76	0.2	5.16	4.3												
		120404	431	12.7	4.76	0.4	5.16	4.3												
		120408	432	12.7	4.76	0.8	5.16	4.2												
		120412	433	12.7	4.76	1.2	5.16	4.1												
	MT	CNGX 120402	CNGX 43(0.5)	12.7	4.76	0.2	5.16	2.8												
		120404	431	12.7	4.76	0.4	5.16	2.8												
		120408	432	12.7	4.76	0.8	5.16	2.7												
		120412	433	12.7	4.76	1.2	5.16	3.1												

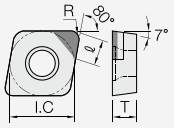
■ **MT** : Mini Tip

Holder : 75p, 79p, 82p, 83p, 108p, 119p

PCD / CVD

CC□□
POSITIVE 7 _ hole

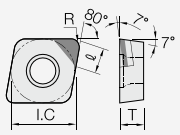
CCGW		ISO code Metric	ISO code Inch	Dimensions (mm) I.C	T	R	Hole	ℓ	PCD EP10	EP20	EP13	EP51	EP55	EP750	EP58	EP59	EP29	EP69	CVD ED501	ED502
	Standard	CCGW 09T302	CCGW 3(2.5)0.5	9.525	3.97	0.2	4.4	4.3												
		09T304	3(2.5)1	9.525	3.97	0.4	4.4	4.3												
		09T308	3(2.5)2	9.525	3.97	0.8	4.4	4.2												
		120402	430	12.7	4.76	0.2	5.5	4.3												
		120404	431	12.7	4.76	0.4	5.5	4.3												
		120408	432	12.7	4.76	0.8	5.5	4.2												
		120412	433	12.7	4.76	1.2	5.5	4.1												
	MT	CCGW 060202	CCGW 2(1.5)0.5	6.35	2.38	0.2	2.8	2.8												
		060204	2(1.5)1	6.35	2.38	0.4	2.8	2.8												
		060208	2(1.5)2	6.35	2.38	0.8	2.8	2.7												
		09T302	3(2.5)0.5	9.525	3.97	0.2	4.4	2.8												
		09T304	3(2.5)1	9.525	3.97	0.4	4.4	2.8												
		09T308	3(2.5)2	9.525	3.97	0.8	4.4	2.7												
		120402	430	12.7	4.76	0.2	5.5	2.8												
		120404	431	12.7	4.76	0.4	5.5	2.8												
		120408	432	12.7	4.76	0.8	5.5	2.7												
		120412	433	12.7	4.76	1.2	5.5	3.1												
	Chip breaker	CCGW 060202	CCGW 2(1.5)0.5	6.35	2.38	0.2	2.8	2.8												
		060204	2(1.5)1	6.35	2.38	0.4	2.8	2.8												
		060208	2(1.5)2	6.35	2.38	0.8	2.8	2.7												
		09T302	3(2.5)0.5	9.525	3.97	0.2	4.4	4.3												
		09T304	3(2.5)1	9.525	3.97	0.4	4.4	4.3												
		09T308	3(2.5)2	9.525	3.97	0.8	4.4	4.2												
		120402	430	12.7	4.76	0.2	5.5	4.3												
		120404	431	12.7	4.76	0.4	5.5	4.3												
		120408	432	12.7	4.76	0.8	5.5	4.2												
		120412	433	12.7	4.76	1.2	5.5	4.1												



■ **MT** : Mini Tip **Chip breaker type** : Rough / Finish / Semi Finish

Holder : 88p, 112p

CCGT		ISO code Metric	ISO code Inch	Dimensions (mm) I.C	T	R	Hole	ℓ	PCD EP10	EP20	EP13	EP51	EP55	EP750	EP58	EP59	EP29	EP69	CVD ED501	ED502
	Standard	CCGT 09T302	CCGT 3(2.5)0.5	9.525	3.97	0.2	4.4	4.3												
		09T304	3(2.5)1	9.525	3.97	0.4	4.4	4.3												
		09T308	3(2.5)2	9.525	3.97	0.8	4.4	4.2												
		120402	430	12.7	4.76	0.2	5.5	4.3												
		120404	431	12.7	4.76	0.4	5.5	4.3												
		120408	432	12.7	4.76	0.8	5.5	4.2												
		120412	433	12.7	4.76	1.2	5.5	4.1												
	MT	CCGT 060202	CCGT 2(1.5)0.5	6.35	2.38	0.2	2.8	2.8												
		060204	2(1.5)1	6.35	2.38	0.4	2.8	2.8												
		060208	2(1.5)2	6.35	2.38	0.8	2.8	2.7												
		09T302	3(2.5)0.5	9.525	3.97	0.2	4.4	2.8												
		09T304	3(2.5)1	9.525	3.97	0.4	4.4	2.8												
		09T308	3(2.5)2	9.525	3.97	0.8	4.4	2.7												
		120402	430	12.7	4.76	0.2	5.5	2.8												
		120404	431	12.7	4.76	0.4	5.5	2.8												
		120408	432	12.7	4.76	0.8	5.5	2.7												
		120412	433	12.7	4.76	1.2	5.5	3.1												



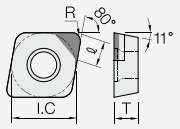
■ **MT** : Mini Tip

Holder : 88p, 112p

CP□□

POSITIVE 11 _ hole

CPGW

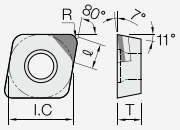


	ISO code Metric	ISO code Inch	Dimensions (mm) I.C	T	R	Hole	ℓ	PCD EP10	EP20	EP13	EP51	EP55	EP750	EP58	EP59	EP29	EP69	CVD ED501	ED502
Standard	CPGW 090302	CPGW 320.5	9.525	3.18	0.2	4.4	4.3												
	090304	321	9.525	3.18	0.4	4.4	4.3												
	090308	322	9.525	3.18	0.8	4.4	4.2												
MT	CPGW 080202	CPGW 2.5(1.5)0.5	7.94	2.38	0.2	3.4	2.8												
	080204	2.5(1.5)1	7.94	2.38	0.4	3.4	2.8												
	090302	320.5	9.525	3.18	0.2	4.4	2.8												
	090304	321	9.525	3.18	0.4	4.4	2.8												
	090308	322	9.525	3.18	0.8	4.4	2.7												
Chip breaker	CPGW 080202	CPGW 2.5(1.5)0.5	7.94	2.38	0.2	3.4	4.3												
	080204	2.5(1.5)1	7.94	2.38	0.4	3.4	4.3												
	090302	320.5	9.525	3.18	0.2	4.4	4.3												
	090304	321	9.525	3.18	0.4	4.4	4.3												
	090308	322	9.525	3.18	0.8	4.4	4.2												

■ **MT** : Mini Tip **Chip breaker type** : Rough / Finish / Semi Finish

Holder : 112p

CPGT



	ISO code Metric	ISO code Inch	Dimensions (mm) I.C	T	R	Hole	ℓ	PCD EP10	EP20	EP13	EP51	EP55	EP750	EP58	EP59	EP29	EP69	CVD ED501	ED502
Standard	CPGT 090302	CPGT 320.5	9.525	3.18	0.2	4.4	4.3												
	090304	321	9.525	3.18	0.4	4.4	4.3												
	090308	322	9.525	3.18	0.8	4.4	4.2												
MT	CPGT 080202	CPGT 2.5(1.5)0.5	7.94	2.38	0.2	3.4	2.8												
	080204	2.5(1.5)1	7.94	2.38	0.4	3.4	2.8												
	090302	320.5	9.525	3.18	0.2	4.4	2.8												
	090304	321	9.525	3.18	0.4	4.4	2.8												
	090308	322	9.525	3.18	0.8	4.4	2.7												

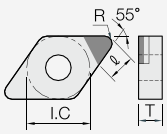
■ **MT** : Mini Tip

Holder : 112p

PCD / CVD

DN□□
NEGATIVE _ hole

DNGA

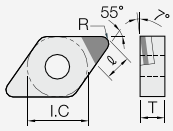


	ISO code Metric	ISO code Inch	Dimensions (mm) I.C	T	R	Hole	ℓ	PCD EP10	EP20	EP13	EP51	EP55	EP750	EP58	EP59	EP29	EP69	CVD ED501	ED502
Standard	DNGA 110404	DNGA 331	9.525	4.76	0.4	3.81	3.9												
	110408	332	9.525	4.76	0.8	3.81	3.5												
	150404	431	12.7	4.76	0.4	5.16	3.9												
	150408	432	12.7	4.76	0.8	5.16	3.5												
	150412	433	12.7	4.76	1.2	5.16	3.1												
MT	DNGA 110404	DNGA 331	9.525	4.76	0.4	3.81	2.4												
	110408	332	9.525	4.76	0.8	3.81	2												
	150404	431	12.7	4.76	0.4	5.16	2.4												
	150408	432	12.7	4.76	0.8	5.16	2												
	150412	433	12.7	4.76	1.2	5.16	2.1												

■ **MT** : Mini Tip

Holder : 75p, 79p, 80p, 83p, 84p, 108p, 109p

DNGX



	ISO code Metric	ISO code Inch	Dimensions (mm) I.C	T	R	Hole	ℓ	PCD EP10	EP20	EP13	EP51	EP55	EP750	EP58	EP59	EP29	EP69	CVD ED501	ED502
Standard	DNGX 110404	DNGX 331	9.525	4.76	0.4	3.81	3.9												
	110408	332	9.525	4.76	0.8	3.81	3.5												
	150404	431	12.7	4.76	0.4	5.16	3.9												
	150408	432	12.7	4.76	0.8	5.16	3.5												
	150412	433	12.7	4.76	1.2	5.16	3.1												
MT	DNGX 110404	DNGX 331	9.525	4.76	0.4	3.81	2.4												
	110408	332	9.525	4.76	0.8	3.81	2												
	150404	431	12.7	4.76	0.4	5.16	2.4												
	150408	432	12.7	4.76	0.8	5.16	2												
	150412	433	12.7	4.76	1.2	5.16	2.1												

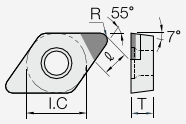
■ **MT** : Mini Tip

Holder : 75p, 79p, 80p, 83p, 84p, 108p, 109p

DC□□

POSITIVE 7 _ hole

DCGW

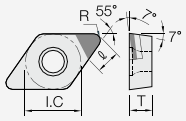


	ISO code Metric	ISO code Inch	Dimensions (mm) I.C	T	R	Hole	ℓ	PCD EP10	EP20	EP13	EP51	EP55	EP750	EP58	EP59	EP29	EP69	CVD ED501	ED502
Standard	DCGW 11T302	DCGW 3(2.5)0.5	9.525	3.97	0.4	4.4	4												
	11T304	3(2.5)1	9.525	3.97	0.4	4.4	3.9												
	11T308	3(2.5)2	9.525	3.97	0.8	4.4	3.5												
	150404	431	12.7	4.76	0.4	5.16	3.9												
	150408	432	12.7	4.76	0.8	5.16	3.5												
MT	DCGW 070202	DCGW 2(1.5)0.5	6.35	2.38	0.2	2.8	2.5												
	070204	2(1.5)1	6.35	2.38	0.4	2.8	2.4												
	11T302	3(2.5)0.5	9.525	3.97	0.4	4.4	2.5												
	11T304	3(2.5)1	9.525	3.97	0.4	4.4	2.4												
	11T308	3(2.5)2	9.525	3.97	0.8	4.4	2												
Chip breaker	DCGW 070202	DCGW 2(1.5)0.5	6.35	2.38	0.2	2.8	2.5												
	070204	2(1.5)1	6.35	2.38	0.4	2.8	2.4												
	11T302	3(2.5)0.5	9.525	3.97	0.4	4.4	4												
	11T304	3(2.5)1	9.525	3.97	0.4	4.4	3.9												
	11T308	3(2.5)2	9.525	3.97	0.8	4.4	3.5												

■ **MT** : Mini Tip **Chip breaker type** : Rough / Finish / Semi Finish

Holder : 89p, 113p, 114p

DCGT



	ISO code Metric	ISO code Inch	Dimensions (mm) I.C	T	R	Hole	ℓ	PCD EP10	EP20	EP13	EP51	EP55	EP750	EP58	EP59	EP29	EP69	CVD ED501	ED502
Standard	DCGT 11T302	DCGT 3(2.5)0.5	9.525	3.97	0.4	4.4	4												
	11T304	3(2.5)1	9.525	3.97	0.4	4.4	3.9												
	11T308	3(2.5)2	9.525	3.97	0.8	4.4	3.5												
	150404	431	12.7	4.76	0.4	5.16	3.9												
	150408	432	12.7	4.76	0.8	5.16	3.5												
MT	DCGT 070202	DCGT 2(1.5)0.5	6.35	2.38	0.2	2.8	2.5												
	070204	2(1.5)1	6.35	2.38	0.4	2.8	2.4												
	11T302	3(2.5)0.5	9.525	3.97	0.4	4.4	2.5												
	11T304	3(2.5)1	9.525	3.97	0.4	4.4	2.4												
	11T308	3(2.5)2	9.525	3.97	0.8	4.4	2												

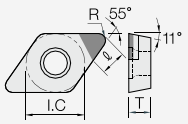
■ **MT** : Mini Tip

Holder : 89p, 113p, 114p

DP□□

POSITIVE 11 _ hole

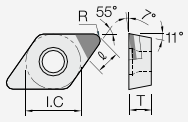
DPGW



	ISO code Metric	ISO code Inch	Dimensions (mm) I.C	T	R	Hole	ℓ	PCD EP10	EP20	EP13	EP51	EP55	EP750	EP58	EP59	EP29	EP69	CVD ED501	ED502
Standard	DPGW 11T302	DPGW 3(2.5)0.5	9.525	3.97	0.4	4.4	4												
	11T304	3(2.5)1	9.525	3.97	0.4	4.4	3.9												
	11T308	3(2.5)2	9.525	3.97	0.8	4.4	3.5												
MT	DPGW 070202	DPGW 2(1.5)0.5	6.35	2.38	0.2	2.8	2.5												
	070204	2(1.5)1	6.35	2.38	0.4	2.8	2.4												
	11T302	3(2.5)0.5	9.525	3.97	0.4	4.4	2.5												
	11T304	3(2.5)1	9.525	3.97	0.4	4.4	2.4												
	11T308	3(2.5)2	9.525	3.97	0.8	4.4	2												
Chip breaker	DPGW 070202	DPGW 2(1.5)0.5	6.35	2.38	0.2	2.8	2.5												
	070204	2(1.5)1	6.35	2.38	0.4	2.8	2.4												
	11T302	3(2.5)0.5	9.525	3.97	0.4	4.4	4												
	11T304	3(2.5)1	9.525	3.97	0.4	4.4	3.9												
	11T308	3(2.5)2	9.525	3.97	0.8	4.4	3.5												

■ **MT** : Mini Tip **Chip breaker type** : Rough / Finish / Semi Finish

DPGT

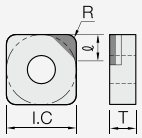


	ISO code Metric	ISO code Inch	Dimensions (mm) I.C	T	R	Hole	ℓ	PCD EP10	EP20	EP13	EP51	EP55	EP750	EP58	EP59	EP29	EP69	CVD ED501	ED502
Standard	DPGT 11T302	DPGT 3(2.5)0.5	9.525	3.97	0.4	4.4	4												
	11T304	3(2.5)1	9.525	3.97	0.4	4.4	3.9												
	11T308	3(2.5)2	9.525	3.97	0.8	4.4	3.5												
MT	DPGT 070202	DPGT 2(1.5)0.5	6.35	2.38	0.2	2.8	2.5												
	070204	2(1.5)1	6.35	2.38	0.4	2.8	2.4												
	11T302	3(2.5)0.5	9.525	3.97	0.4	4.4	2.5												
	11T304	3(2.5)1	9.525	3.97	0.4	4.4	2.4												
	11T308	3(2.5)2	9.525	3.97	0.8	4.4	2												

■ **MT** : Mini Tip

SN□□
NEGATIVE _ hole

SNGA

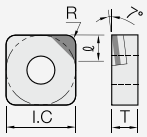


	ISO code Metric	ISO code Inch	Dimensions (mm) I.C	T	R	Hole	ℓ	PCD EP10	EP20	EP13	EP51	EP55	EP750	EP58	EP59	EP29	EP69	CVD ED501	ED502
Standard	SNGA 090304	SNGA 321	9.525	3.18	0.4	3.81	4.4												
	090308	322	9.525	3.18	0.8	3.81	4.4												
	120404	431	12.7	4.76	0.4	5.16	4.4												
	120408	432	12.7	4.76	0.8	5.16	4.4												
	120412	433	12.7	4.76	1.2	5.16	4.4												
MT	SNGA 090304	SNGA 321	9.525	3.18	0.4	3.81	2.9												
	090308	322	9.525	3.18	0.8	3.81	2.9												
	120404	431	12.7	4.76	0.4	5.16	2.9												
	120408	432	12.7	4.76	0.8	5.16	2.9												
	120412	433	12.7	4.76	1.2	5.16	3.4												

■ **MT** : Mini Tip

Holder : 76p, 77p, 80p, 81p, 84p, 85p, 109p, 119p

SNGX



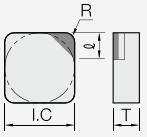
	ISO code Metric	ISO code Inch	Dimensions (mm) I.C	T	R	Hole	ℓ	PCD EP10	EP20	EP13	EP51	EP55	EP750	EP58	EP59	EP29	EP69	CVD ED501	ED502
Standard	SNGX 090304	SNGX 321	9.525	3.18	0.4	3.81	4.4												
	090308	322	9.525	3.18	0.8	3.81	4.4												
	120404	431	12.7	4.76	0.4	5.16	4.4												
	120408	432	12.7	4.76	0.8	5.16	4.4												
	120412	433	12.7	4.76	1.2	5.16	4.4												
MT	SNGX 090304	SNGX 321	9.525	3.18	0.4	3.81	2.9												
	090308	322	9.525	3.18	0.8	3.81	2.9												
	120404	431	12.7	4.76	0.4	5.16	2.9												
	120408	432	12.7	4.76	0.8	5.16	2.9												
	120412	433	12.7	4.76	1.2	5.16	3.4												

■ **MT** : Mini Tip

Holder : 76p, 77p, 80p, 81p, 84p, 85p, 109p, 119p

SNGN
NEGATIVE

SNGN

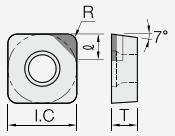


	ISO code Metric	ISO code Inch	Dimensions (mm) I.C	T	R	Hole	ℓ	PCD EP10	EP20	EP13	EP51	EP55	EP750	EP58	EP59	EP29	EP69	CVD ED501	ED502
Standard	SNGN 090304	SNGN 321	9.525	3.18	0.4	3.81	4.4												
	090308	322	9.525	3.18	0.8	3.81	4.4												
	120404	431	12.7	4.76	0.4	5.16	4.4												
	120408	432	12.7	4.76	0.8	5.16	4.4												
	120412	433	12.7	4.76	1.2	5.16	4.4												
MT	SNGN 090304	SNGN 321	9.525	3.18	0.4	3.81	2.9												
	090308	322	9.525	3.18	0.8	3.81	2.9												
	120404	431	12.7	4.76	0.4	5.16	2.9												
	120408	432	12.7	4.76	0.8	5.16	2.9												
	120412	433	12.7	4.76	1.2	5.16	3.4												

■ **MT** : Mini Tip

PCD / CVD

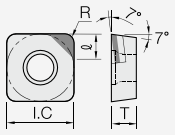
SC□□
POSITIVE 7 _ hole



SCGW	ISO code Metric	ISO code Inch	Dimensions (mm) I.C	T	R	Hole	ℓ	PCD EP10	EP20	EP13	EP51	EP55	EP750	EP58	EP59	EP29	EP69	CVD ED501	ED502
Standard	SCGW 120404	SCGW 431	12.7	4.76	0.4	5.5	4.4												
	120408	432	12.7	4.76	0.8	5.5	4.4												
	120412	433	12.7	4.76	1.2	5.5	4.4												
MT	SCGW 120404	SCGW 431	12.7	4.76	0.4	5.5	2.9												
	120408	432	12.7	4.76	0.8	5.5	2.9												
	120412	433	12.7	4.76	1.2	5.5	3.4												

■ **MT** : Mini Tip

Holder : 91p, 114p

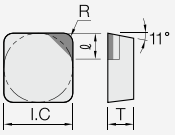


SCGT	ISO code Metric	ISO code Inch	Dimensions (mm) I.C	T	R	Hole	ℓ	PCD EP10	EP20	EP13	EP51	EP55	EP750	EP58	EP59	EP29	EP69	CVD ED501	ED502
Standard	SCGT 120404	SCGT 431	12.7	4.76	0.4	5.5	4.4												
	120408	432	12.7	4.76	0.8	5.5	4.4												
	120412	433	12.7	4.76	1.2	5.5	4.4												
MT	SCGT 120404	SCGT 431	12.7	4.76	0.4	5.5	2.9												
	120408	432	12.7	4.76	0.8	5.5	2.9												
	120412	433	12.7	4.76	1.2	5.5	3.4												

■ **MT** : Mini Tip

Holder : 91p, 114p

SPGN
POSITIVE 11



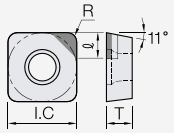
SPGN	ISO code Metric	ISO code Inch	Dimensions (mm) I.C	T	R	Hole	ℓ	PCD EP10	EP20	EP13	EP51	EP55	EP750	EP58	EP59	EP29	EP69	CVD ED501	ED502
Standard	SPGN 090304	SPGN 321	9.525	3.18	0.4		4.4												
	090308	322	9.525	3.18	0.8		4.4												
	120304	421	12.7	4.76	0.4		4.4												
	120308	422	12.7	4.76	0.8		4.4												
MT	SPGN 090304	SPGN 321	9.525	3.18	0.4		2.9												
	090308	322	9.525	3.18	0.8		2.9												
	120304	421	12.7	4.76	0.4		2.9												
	120308	422	12.7	4.76	0.8		2.9												

■ **MT** : Mini Tip

SP□□

POSITIVE 11 _ hole

SPGW

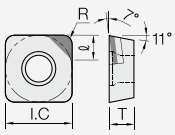


	ISO code Metric	ISO code Inch	Dimensions (mm) I.C	T	R	Hole	ℓ	PCD EP10	EP20	EP13	EP51	EP55	EP750	EP58	EP59	EP29	EP69	CVD ED501	ED502
Standard	SPGW 090304	SPGW 321	12.7	4.76	0.4	4.4	4.4												
	090308	322	12.7	4.76	0.8	4.4	4.4												
	120404	431	12.7	4.76	0.4	5.5	4.4												
	120408	432	12.7	4.76	0.8	5.5	4.4												
	120412	433	12.7	4.76	1.2	5.5	4.4												
MT	SPGW 090304	SPGW 321	12.7	4.76	0.4	4.4	2.9												
	090308	322	12.7	4.76	0.8	4.4	2.9												
	120404	431	12.7	4.76	0.4	5.5	2.9												
	120408	432	12.7	4.76	0.8	5.5	2.9												
	120412	433	12.7	4.76	1.2	5.5	3.4												

■ **MT** : Mini Tip

Holder : 115p

SPGT



	ISO code Metric	ISO code Inch	Dimensions (mm) I.C	T	R	Hole	ℓ	PCD EP10	EP20	EP13	EP51	EP55	EP750	EP58	EP59	EP29	EP69	CVD ED501	ED502
Standard	SPGT 090304	SPGT 321	12.7	4.76	0.4	4.4	4.4												
	090308	322	12.7	4.76	0.8	4.4	4.4												
	120404	431	12.7	4.76	0.4	5.5	4.4												
	120408	432	12.7	4.76	0.8	5.5	4.4												
	120412	433	12.7	4.76	1.2	5.5	4.4												
MT	SPGT 090304	SPGT 321	12.7	4.76	0.4	4.4	2.9												
	090308	322	12.7	4.76	0.8	4.4	2.9												
	120404	431	12.7	4.76	0.4	5.5	2.9												
	120408	432	12.7	4.76	0.8	5.5	2.9												
	120412	433	12.7	4.76	1.2	5.5	3.4												

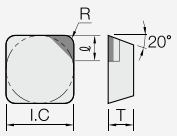
■ **MT** : Mini Tip

Holder : 115p

SEGN

POSITIVE 20

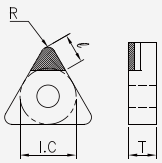
SEGN



	ISO code Metric	ISO code Inch	Dimensions (mm) I.C	T	R	Hole	ℓ	PCD EP10	EP20	EP13	EP51	EP55	EP750	EP58	EP59	EP29	EP69	CVD ED501	ED502
Standard	SEGN 120304	SEGN 431	12.7	3.18	0.4		4.4												
	120308	432	12.7	3.18	0.8		4.4												

PCD / CVD

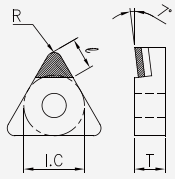
TN□□
NEGATIVE _ hole



TNGA	ISO code Metric	ISO code Inch	Dimensions (mm) I.C	T	R	Hole	ℓ	PCD EP10	EP20	EP13	EP51	EP55	EP750	EP58	EP59	EP29	EP69	CVD ED501	ED502
Standard	TNGA 110302	TNGA 22(0.5)	6.35	3.18	0.2	2.4	4.1												
	110304	221	6.35	3.18	0.4	2.4	4												
	160402	33(0.5)	9.525	4.76	0.2	3.81	4.1												
	160404	331	9.525	4.76	0.4	3.81	4												
	160408	332	9.525	4.76	0.8	3.81	3.7												
	220404	431	12.7	4.76	0.4	5.16	4												
	220408	432	12.7	4.76	0.8	5.16	3.7												
MT	TNGA 110302	TNGA 22(0.5)	6.35	3.18	0.2	2.4	2.6												
	110304	221	6.35	3.18	0.4	2.4	2.5												
	160402	33(0.5)	9.525	4.76	0.2	3.81	2.6												
	160404	331	9.525	4.76	0.4	3.81	2.5												
	160408	332	9.525	4.76	0.8	3.81	2.2												

■ **MT** : Mini Tip

Holder : 77p, 81p, 85p, 86p, 110p, 111p

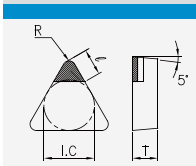


TNGX	ISO code Metric	ISO code Inch	Dimensions (mm) I.C	T	R	Hole	ℓ	PCD EP10	EP20	EP13	EP51	EP55	EP750	EP58	EP59	EP29	EP69	CVD ED501	ED502
Standard	TNGX 110302	TNGX 22(0.5)	6.35	3.18	0.2	2.4	4.1												
	110304	221	6.35	3.18	0.4	2.4	4												
	160402	33(0.5)	9.525	4.76	0.2	3.81	4.1												
	160404	331	9.525	4.76	0.4	3.81	4												
	160408	332	9.525	4.76	0.8	3.81	3.7												
	220404	431	12.7	4.76	0.4	5.16	4												
	220408	432	12.7	4.76	0.8	5.16	3.7												
MT	TNGX 110302	TNGX 22(0.5)	6.35	3.18	0.2	2.4	2.6												
	110304	221	6.35	3.18	0.4	2.4	2.5												
	160402	33(0.5)	9.525	4.76	0.2	3.81	2.6												
	160404	331	9.525	4.76	0.4	3.81	2.5												
	160408	332	9.525	4.76	0.8	3.81	2.2												

■ **MT** : Mini Tip

Holder : 77p, 81p, 85p, 86p, 110p, 111p

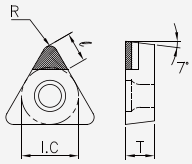
TBGN
POSITIVE 5



TBGN	ISO code Metric	ISO code Inch	Dimensions (mm) I.C	T	R	Hole	ℓ	PCD EP10	EP20	EP13	EP51	EP55	EP750	EP58	EP59	EP29	EP69	CVD ED501	ED502
Standard	TBGN 060102	TBGN (1.2)10.5	3.97	1.59	0.2		2.1												
	060104	(1.2)11	3.97	1.59	0.4		2												
	080202	1.5(1.5)0.5	4.76	2.38	0.2		2.6												
	080204	1.5(1.5)1	4.76	2.38	0.4		2.5												

TCGW

POSITIVE 7 _ hole



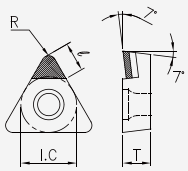
TCGW		ISO code Metric	ISO code Inch	Dimensions (mm) I.C	T	R	Hole	ℓ	PCD EP10	EP20	EP13	EP51	EP55	EP750	EP58	EP59	EP29	EP69	CVD ED501	ED502
	Standard	TCGW 090202	TCGW 2(1.5)0.5	5.56	2.38	0.2	2.5	3.6												
		090204	2(1.5)1	5.56	2.38	0.4	2.5	3.5												
		110202	2(1.5)0.5	6.35	2.38	0.2	2.8	4.1												
		110204	2(1.5)1	6.35	2.38	0.4	2.8	4												
		110208	2(1.5)2	6.35	2.38	0.8	2.8	3.7												
		16T302	3(2.5)0.5	9.525	3.97	0.2	4.4	4.1												
		16T304	3(2.5)1	9.525	3.97	0.4	4.4	4												
		16T308	3(2.5)2	9.525	3.97	0.8	4.4	3.7												
	MT	TCGW 090202	TCGW 2(1.5)0.5	5.56	2.38	0.2	2.5	2.6												
		090204	2(1.5)1	5.56	2.38	0.4	2.5	2.5												
		110202	2(1.5)0.5	6.35	2.38	0.2	2.8	2.6												
		110204	2(1.5)1	6.35	2.38	0.4	2.8	2.5												
		110208	2(1.5)2	6.35	2.38	0.8	2.8	2.2												
		16T302	3(2.5)0.5	9.525	3.97	0.2	4.4	2.6												
		16T304	3(2.5)1	9.525	3.97	0.4	4.4	2.5												
		16T308	3(2.5)2	9.525	3.97	0.8	4.4	2.2												
	Chip breaker	TCGW 090202	TCGW 2(1.5)0.5	5.56	2.38	0.2	2.5	3.6												
		090204	2(1.5)1	5.56	2.38	0.4	2.5	3.5												
		110202	2(1.5)0.5	6.35	2.38	0.2	2.8	4.1												
		110204	2(1.5)1	6.35	2.38	0.4	2.8	4												
		110208	2(1.5)2	6.35	2.38	0.8	2.8	3.7												
		16T302	3(2.5)0.5	9.525	3.97	0.2	4.4	4.1												
		16T304	3(2.5)1	9.525	3.97	0.4	4.4	4												
		16T308	3(2.5)2	9.525	3.97	0.8	4.4	3.7												

■ **MT** : Mini Tip **Chip breaker type** : Rough / Finish / Semi Finish

Holder : 92p, 93p, 115p

TCGT

POSITIVE 7 _ hole

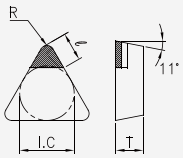


TCGT		ISO code Metric	ISO code Inch	Dimensions (mm) I.C	T	R	Hole	ℓ	PCD EP10	EP20	EP13	EP51	EP55	EP750	EP58	EP59	EP29	EP69	CVD ED501	ED502
	Standard	TCGT 090202	TCGT 2(1.5)0.5	5.56	2.38	0.2	2.5	3.6												
		090204	2(1.5)1	5.56	2.38	0.4	2.5	3.5												
		110202	2(1.5)0.5	6.35	2.38	0.2	2.8	4.1												
		110204	2(1.5)1	6.35	2.38	0.4	2.8	4												
		110208	2(1.5)2	6.35	2.38	0.8	2.8	3.7												
		16T302	3(2.5)0.5	9.525	3.97	0.2	4.4	4.1												
		16T304	3(2.5)1	9.525	3.97	0.4	4.4	4												
		16T308	3(2.5)2	9.525	3.97	0.8	4.4	3.7												
	MT	TCGT 090202	TCGT 2(1.5)0.5	5.56	2.38	0.2	2.5	2.6												
		090204	2(1.5)1	5.56	2.38	0.4	2.5	2.5												
		110202	2(1.5)0.5	6.35	2.38	0.2	2.8	2.6												
		110204	2(1.5)1	6.35	2.38	0.4	2.8	2.5												
		110208	2(1.5)2	6.35	2.38	0.8	2.8	2.2												
		16T302	3(2.5)0.5	9.525	3.97	0.2	4.4	2.6												
		16T304	3(2.5)1	9.525	3.97	0.4	4.4	2.5												
		16T308	3(2.5)2	9.525	3.97	0.8	4.4	2.2												

■ **MT** : Mini Tip

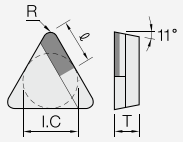
Holder : 92p, 93p, 115p

TPGN
POSITIVE 11

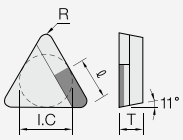


TPGN		ISO code Metric	ISO code Inch	Dimensions (mm) I.C	T	R	Hole	ℓ	PCD EP10	EP20	EP13	EP51	EP55	EP750	EP58	EP59	EP29	EP69	CVD ED501	ED502
	Standard	TPGN 110302	TPGN 22(0.5)	6.35	3.18	0.2		4.1												
		110304	221	6.35	3.18	0.4		4												
		110308	222	6.35	3.18	0.8		3.7												
		160302	32(0.5)	9.525	3.18	0.2		4.1												
		160304	321	9.525	3.18	0.4		4												
		160308	322	9.525	3.18	0.8		3.7												
	MT	TPGN 110302	TPGN 22(0.5)	6.35	3.18	0.2		2.6												
		110304	221	6.35	3.18	0.4		2.5												
		110308	222	6.35	3.18	0.8		2.2												
		160302	32(0.5)	9.525	3.18	0.2		2.6												
		160304	321	9.525	3.18	0.4		2.5												
		160308	322	9.525	3.18	0.8		2.2												
	Chip breaker	TPGN 110302	TPGN 22(0.5)	6.35	3.18	0.2		4.1												
		110304	221	6.35	3.18	0.4		4												
		110308	222	6.35	3.18	0.8		3.7												
		160302	32(0.5)	9.525	3.18	0.2		4.1												
		160304	321	9.525	3.18	0.4		4												
		160308	322	9.525	3.18	0.8		3.7												

■ **MT** : Mini Tip **Chip breaker type** : Rough / Finish / Semi Finish



TPGN (L)		ISO code Metric	ISO code Inch	Dimensions (mm) I.C	T	R	Hole	ℓ	PCD EP10	EP20	EP13	EP51	EP55	EP750	EP58	EP59	EP29	EP69	CVD ED501	ED502
	Standard	TPGN 160304 L	TPGN 331 L	9.525	3.18	0.4														
		160308 L	332 L	9.525	3.18	0.8														

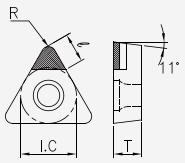


TPGN (R)		ISO code Metric	ISO code Inch	Dimensions (mm) I.C	T	R	Hole	ℓ	PCD EP10	EP20	EP13	EP51	EP55	EP750	EP58	EP59	EP29	EP69	CVD ED501	ED502
	Standard	TPGN 160304 R	TPGN 331 R	9.525	3.18	0.4														
		160308 R	332 R	9.525	3.18	0.8														

TPGW

POSITIVE 11 _ hole

TPGW		ISO code Metric	ISO code Inch	Dimensions (mm) I.C	T	R	Hole	ℓ	PCD EP10	EP20	EP13	EP51	EP55	EP750	EP58	EP59	EP29	EP69	CVD ED501	ED502
	Standard	TPGW 110202	TPGW 210.5	6.35	2.38	0.2	2.8	4.1												
		110204	211	6.35	2.38	0.4	2.8	4												
		110304	221	6.35	3.18	0.4	3.4	4												
		110308	222	6.35	3.18	0.8	3.4	3.7												
		160302	32(0.5)	9.525	3.18	0.2	4.4	4.1												
		160304	321	9.525	3.18	0.4	4.4	4												
		160308	322	9.525	3.18	0.8	4.4	3.7												
		160404	331	9.525	4.76	0.4	4.4	4												
		160408	332	9.525	4.76	0.8	4.4	3.7												
	MT	TPGW 080202	TPGW 1.5(1.5)0.5	4.76	2.38	0.2	2.3	2.6												
		080204	1.5(1.5)1	4.76	2.38	0.4	2.3	2.5												
		110202	210.5	6.35	2.38	0.2	2.8	2.6												
		110204	211	6.35	2.38	0.4	2.8	2.5												
		110304	221	6.35	3.18	0.4	3.4	2.5												
		110308	222	6.35	3.18	0.8	3.4	2.2												
		160302	32(0.5)	9.525	3.18	0.2	4.4	2.6												
		160304	321	9.525	3.18	0.4	4.4	2.5												
		160308	322	9.525	3.18	0.8	4.4	2.2												
		160404	331	9.525	4.76	0.4	4.4	2.5												
		160408	332	9.525	4.76	0.8	4.4	2.2												
	Chip breaker	TPGW 080202	TPGW 1.5(1.5)0.5	4.76	2.38	0.2	2.3	2.6												
		080204	1.5(1.5)1	4.76	2.38	0.4	2.3	2.5												
		110202	210.5	6.35	2.38	0.2	2.8	4.1												
		110204	211	6.35	2.38	0.4	2.8	4												
		110304	221	6.35	3.18	0.4	3.4	4												
		110308	222	6.35	3.18	0.8	3.4	3.7												
		160302	32(0.5)	9.525	3.18	0.2	4.4	4.1												
		160304	321	9.525	3.18	0.4	4.4	4												
		160308	322	9.525	3.18	0.8	4.4	3.7												
		160404	331	9.525	4.76	0.4	4.4	4												
		160408	332	9.525	4.76	0.8	4.4	3.7												

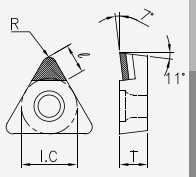


■ **MT** : Mini Tip **Chip breaker type** : Rough / Finish / Semi Finish

Holder : 116p

PCD / CVD

TPGT
POSITIVE 11 _ hole

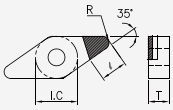


TPGT		ISO code Metric	ISO code Inch	Dimensions (mm) I.C	T	R	Hole	ℓ	PCD EP10	EP20	EP13	EP51	EP55	EP750	EP58	EP59	EP29	EP69	CVD ED501	ED502
Standard	TPGT	110202	TPGT 210.5	6.35	2.38	0.2	2.8	4.1												
		110204	211	6.35	2.38	0.4	2.8	4												
		110304	221	6.35	3.18	0.4	3.3	4												
		110308	222	6.35	3.18	0.8	3.3	3.7												
		160302	32(0.5)	9.525	3.18	0.2	4.4	4.1												
		160304	321	9.525	3.18	0.4	4.4	4												
		160308	322	9.525	3.18	0.8	4.4	3.7												
		160404	331	9.525	4.76	0.4	4.4	4												
		160408	332	9.525	4.76	0.8	4.4	3.7												
MT	TPGT	080202	TPGT 1.5(1.5)0.5	4.76	2.38	0.2	2.3	2.6												
		080204	1.5(1.5)1	4.76	2.38	0.4	2.3	2.5												
		110202	210.5	6.35	2.38	0.2	2.8	2.6												
		110204	211	6.35	2.38	0.4	2.8	2.5												
		110304	221	6.35	3.18	0.4	3.3	2.5												
		110308	222	6.35	3.18	0.8	3.3	2.2												
		160302	32(0.5)	9.525	3.18	0.2	4.4	2.6												
		160304	321	9.525	3.18	0.4	4.4	2.5												
		160308	322	9.525	3.18	0.8	4.4	2.2												
		160404	331	9.525	4.76	0.4	4.4	2.5												
		160408	332	9.525	4.76	0.8	4.4	2.2												

■ **MT** : Mini Tip

Holder : 116p

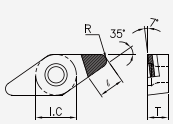
VN□□
NEGATIVE _ hole



VNGA		ISO code Metric	ISO code Inch	Dimensions (mm) I.C	T	R	Hole	ℓ	PCD EP10	EP20	EP13	EP51	EP55	EP750	EP58	EP59	EP29	EP69	CVD ED501	ED502
Standard	VNGA	160402	VNGA 33(0.5)	9.525	4.76	0.2	3.81	5												
		160404	331	9.525	4.76	0.4	3.81	4.5												
		160408	332	9.525	4.76	0.8	3.81	3.7												
MT	VNGA	160402	VNGA 33(0.5)	9.525	4.76	0.2	3.81	3												
		160404	331	9.525	4.76	0.4	3.81	2.5												
		160408	332	9.525	4.76	0.8	3.81	2.2												
Chip breaker	VNGA	160402	VNGA 33(0.5)	9.525	4.76	0.2	3.81	5												
		160404	331	9.525	4.76	0.4	3.81	4.5												
		160408	332	9.525	4.76	0.8	3.81	3.7												

■ **MT** : Mini Tip **Chip breaker type** : Rough / Finish / Semi Finish

Holder : 78p, 87p, 111p



VNGX		ISO code Metric	ISO code Inch	Dimensions (mm) I.C	T	R	Hole	ℓ	PCD EP10	EP20	EP13	EP51	EP55	EP750	EP58	EP59	EP29	EP69	CVD ED501	ED502
Standard	VNGX	160402	VNGX 33(0.5)	9.525	4.76	0.2	3.81	5												
		160404	331	9.525	4.76	0.4	3.81	4.5												
		160408	332	9.525	4.76	0.8	3.81	3.7												
MT	VNGX	160402	VNGX 33(0.5)	9.525	4.76	0.2	3.81	3												
		160404	331	9.525	4.76	0.4	3.81	2.5												
		160408	332	9.525	4.76	0.8	3.81	2.2												

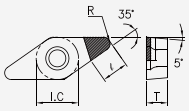
■ **MT** : Mini Tip

Holder : 78p, 87p, 111p

VB□□

POSITIVE 5 _ hole

VBGW

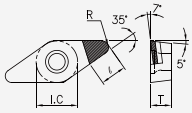


	ISO code Metric	ISO code Inch	Dimensions (mm) I.C	T	R	Hole	ℓ	PCD EP10	EP20	EP13	EP51	EP55	EP750	EP58	EP59	EP29	EP69	CVD ED501	ED502
Standard	VBGW 110302	VBGW 220.5	6.35	3.18	0.2	2.8	5												
	110304	221	6.35	3.18	0.4	2.8	4.5												
	110308	222	6.35	3.18	0.8	2.8	3.7												
	160402	32(0.5)	9.525	4.76	0.2	4.4	5												
	160404	331	9.525	4.76	0.4	4.4	4.5												
	160408	332	9.525	4.76	0.8	4.4	3.7												
	160412	333	9.525	4.76	1.2	4.4	3.3												
MT	VBGW 110302	VBGW 220.5	6.35	3.18	0.2	2.8	3												
	110304	221	6.35	3.18	0.4	2.8	2.5												
	110308	222	6.35	3.18	0.8	2.8	2.2												
	160402	32(0.5)	9.525	4.76	0.2	4.4	3												
	160404	331	9.525	4.76	0.4	4.4	2.5												
	160408	332	9.525	4.76	0.8	4.4	2.2												
	160412	333	9.525	4.76	1.2	4.4	1.8												
Chip breaker	VBGW 110302	VBGW 220.5	6.35	3.18	0.2	2.8	5												
	110304	221	6.35	3.18	0.4	2.8	4.5												
	110308	222	6.35	3.18	0.8	2.8	3.7												
	160402	32(0.5)	9.525	4.76	0.2	4.4	5												
	160404	331	9.525	4.76	0.4	4.4	4.5												
	160408	332	9.525	4.76	0.8	4.4	3.7												
	160412	333	9.525	4.76	1.2	4.4	3.3												

■ **MT** : Mini Tip **Chip breaker type** : Rough / Finish / Semi Finish

Holder : 93p, 94p, 117p

VBGT



	ISO code Metric	ISO code Inch	Dimensions (mm) I.C	T	R	Hole	ℓ	PCD EP10	EP20	EP13	EP51	EP55	EP750	EP58	EP59	EP29	EP69	CVD ED501	ED502
Standard	VBGT 110302	VBGT 220.5	6.35	3.18	0.2	2.8	5												
	110304	221	6.35	3.18	0.4	2.8	4.5												
	110308	222	6.35	3.18	0.8	2.8	3.7												
	160402	32(0.5)	9.525	4.76	0.2	4.4	5												
	160404	331	9.525	4.76	0.4	4.4	4.5												
	160408	332	9.525	4.76	0.8	4.4	3.7												
	160412	333	9.525	4.76	1.2	4.4	3.3												
MT	VBGT 110302	VBGT 220.5	6.35	3.18	0.2	2.8	3												
	110304	221	6.35	3.18	0.4	2.8	2.5												
	110308	222	6.35	3.18	0.8	2.8	2.2												
	160402	32(0.5)	9.525	4.76	0.2	4.4	3												
	160404	331	9.525	4.76	0.4	4.4	2.5												
	160408	332	9.525	4.76	0.8	4.4	2.2												
	160412	333	9.525	4.76	1.2	4.4	1.8												

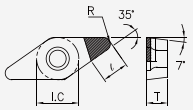
■ **MT** : Mini Tip

Holder : 93p, 94p, 117p

PCD / CVD

VC□□
POSITIVE 7 _ hole

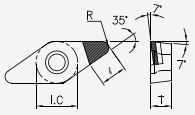
VCGW		ISO code Metric	ISO code Inch	Dimensions (mm) I.C	T	R	Hole	ℓ	PCD EP10	EP20	EP13	EP51	EP55	EP750	EP58	EP59	EP29	EP69	CVD ED501	ED502
	Standard	VCGW 110302	VCGW 220.5	6.35	3.18	0.2	2.8	5												
		110304	221	6.35	3.18	0.4	2.8	4.5												
		110308	222	6.35	3.18	0.8	2.8	3.7												
		160402	32(0.5)	9.525	4.76	0.2	4.4	5												
		160404	331	9.525	4.76	0.4	4.4	4.5												
		160408	332	9.525	4.76	0.8	4.4	3.7												
		160412	333	9.525	4.76	1.2	4.4	3.3												
		220512	4(3.5)3	12.7	5.56	1.2	5.5	3.3												
		220520	4(3.5)5	12.7	5.56	2	5.5	3.1												
	MT	VCGW 110302	VCGW 220.5	6.35	3.18	0.2	2.8	3												
		110304	221	6.35	3.18	0.4	2.8	2.5												
		110308	222	6.35	3.18	0.8	2.8	2.2												
		160402	32(0.5)	9.525	4.76	0.2	4.4	3												
		160404	331	9.525	4.76	0.4	4.4	2.5												
		160408	332	9.525	4.76	0.8	4.4	2.2												
		160412	333	9.525	4.76	1.2	4.4	1.8												
	Chip breaker	VCGW 110302	VCGW 220.5	6.35	3.18	0.2	2.8	5												
		110304	221	6.35	3.18	0.4	2.8	4.5												
		110308	222	6.35	3.18	0.8	2.8	3.7												
		160402	32(0.5)	9.525	4.76	0.2	4.4	5												
		160404	331	9.525	4.76	0.4	4.4	4.5												
		160408	332	9.525	4.76	0.8	4.4	3.7												
		160412	333	9.525	4.76	1.2	4.4	3.3												



■ **MT** : Mini Tip **Chip breaker type** : Rough / Finish / Semi Finish

Holder : 95p, 116p, 117p, 118p

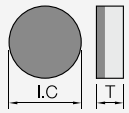
VCGT		ISO code Metric	ISO code Inch	Dimensions (mm) I.C	T	R	Hole	ℓ	PCD EP10	EP20	EP13	EP51	EP55	EP750	EP58	EP59	EP29	EP69	CVD ED501	ED502
	Standard	VCGT 110302	VCGT 220.5	6.35	3.18	0.2	2.8	5												
		110304	221	6.35	3.18	0.4	2.8	4.5												
		110308	222	6.35	3.18	0.8	2.8	3.7												
		160402	32(0.5)	9.525	4.76	0.2	4.4	5												
		160404	331	9.525	4.76	0.4	4.4	4.5												
		160408	332	9.525	4.76	0.8	4.4	3.7												
		160412	333	9.525	4.76	1.2	4.4	3.3												
		220512	4(3.5)3	12.7	5.56	1.2	5.5	3.3												
		220520	4(3.5)5	12.7	5.56	2	5.5	3.1												
	MT	VCGT 110302	VCGT 220.5	6.35	3.18	0.2	2.8	3												
		110304	221	6.35	3.18	0.4	2.8	2.5												
		110308	222	6.35	3.18	0.8	2.8	2.2												
		160402	32(0.5)	9.525	4.76	0.2	4.4	3												
		160404	331	9.525	4.76	0.4	4.4	2.5												
		160408	332	9.525	4.76	0.8	4.4	2.2												
		160412	333	9.525	4.76	1.2	4.4	1.8												



■ **MT** : Mini Tip

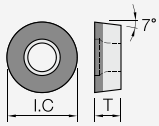
Holder : 95p, 116p, 117p, 118p

RNGN
NEGATIVE



RNGN	ISO code Metric	ISO code Inch	Dimensions (mm) I.C	T	R	Hole	PCD EP10	EP20	EP13	EP51	EP55	EP750	EP58	EP59	EP29	EP69
Standard	RNGN 090300	RNGN 320	9.525	3.18												
	090400	330	9.525	4.76												
	120300	420	12.7	3.18												
	120400	430	12.7	4.76												
	150400	530	15.875	4.76												

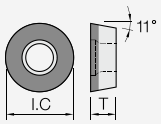
RCGW
POSITIVE 7 _ hole



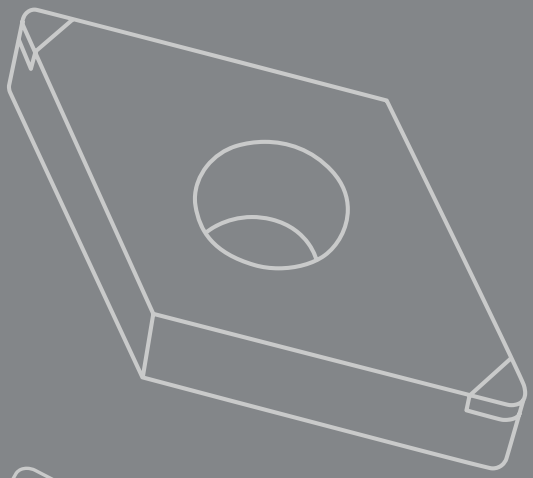
RCGW	ISO code Metric	ISO code Inch	Dimensions (mm) I.C	T	R	Hole	PCD EP10	EP20	EP13	EP51	EP55	EP750	EP58	EP59	EP29	EP69
Standard	RCGW 060200	RCGW 21.5	6.35	2.38		2.8										
	080300	-	8.0	3.18		3.4										
	10T300	-	10	3.18		4.4										
	12T300	42.5	12.7	3.97		4.4										

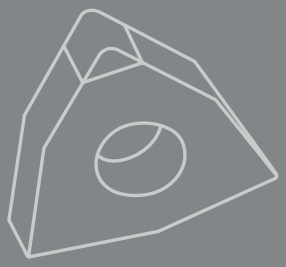
Holder : 90p

RPGW
POSITIVE 11 _ hole



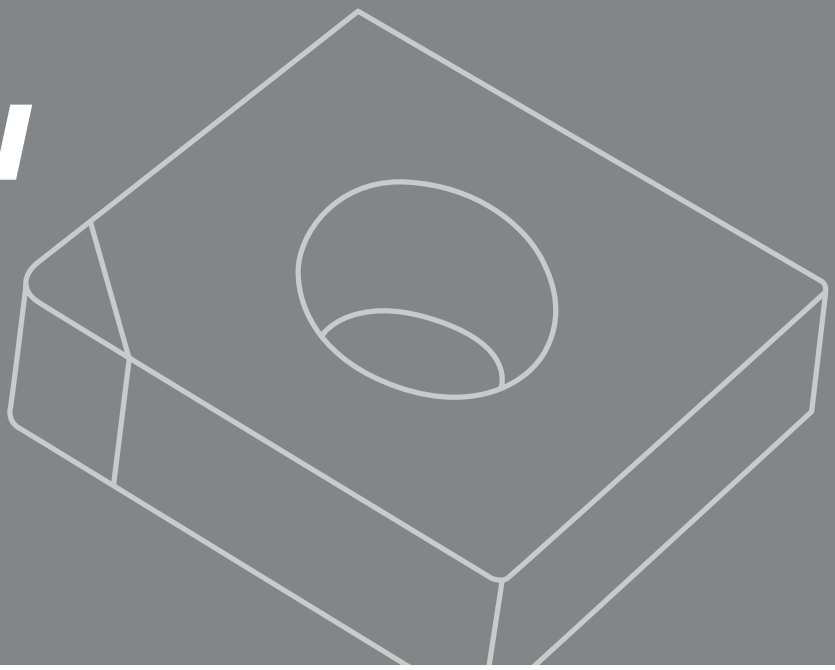
RPGW	ISO code Metric	ISO code Inch	Dimensions (mm) I.C	T	R	Hole	PCD EP10	EP20	EP13	EP51	EP55	EP750	EP58	EP59	EP29	EP69
Standard	RPGW 060200	RPGW 21.5	6.35	2.38		2.8										
	080300	-	8.0	3.18		3.4										
	10T300	-	10	3.18		4.4										
	12T300	42.5	12.7	3.97		4.4										





*Turning_*

PCBN

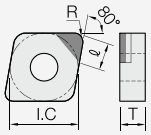


Insert tip types

Standard | Mini tip | Mini 2tips | Mini 4tips | Vertical tip | Solid

CNGA
NEGATIVE _ hole

■ Carbide backed ■ Solid tip



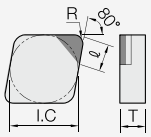
CNGA	ISO code Metric	ISO code Inch	Dimensions (mm) I.C	T	R	Hole	ℓ	PCBN EB28X (S)	EB570 (S)	EB160	EB560 (S)	EB150	EB550 (S)	EB190	EB170	EB73	EB54X	EB51	EB710	EB210	EB100X
Standard	CNGA 120402	CNGA 43(0.5)	12.7	4.76	0.2	5.16	4.3														
	120404	431	12.7	4.76	0.4	5.16	4.3														
	120408	432	12.7	4.76	0.8	5.16	4.2														
	120412	433	12.7	4.76	1.2	5.16	4.1														
MT	CNGA 120402	CNGA 43(0.5)	12.7	4.76	0.2	5.16	2.8														
	120404	431	12.7	4.76	0.4	5.16	2.8														
	120408	432	12.7	4.76	0.8	5.16	2.7														
	120412	433	12.7	4.76	1.2	5.16	3.1														
2MT	CNGA 120402	CNGA 43(0.5)	12.7	4.76	0.2	5.16	2.8														
	120404	431	12.7	4.76	0.4	5.16	2.8														
	120408	432	12.7	4.76	0.8	5.16	2.7														
	120412	433	12.7	4.76	1.2	5.16	3.1														
4MT	CNGA 120402	CNGA 43(0.5)	12.7	4.76	0.2	5.16	2.8														
	120404	431	12.7	4.76	0.4	5.16	2.8														
	120408	432	12.7	4.76	0.8	5.16	2.7														
	120412	433	12.7	4.76	1.2	5.16	3.1														
4VT solid	CNGA 120402	CNGA 43(0.5)	12.7	4.76	0.2	5.16	2.7														
	120404	431	12.7	4.76	0.4	5.16	2.6														
	120408	432	12.7	4.76	0.8	5.16	2.5														
	120412	433	12.7	4.76	1.2	5.16	2.5														

■ **MT** : Mini Tip **2MT** : Mini 2Tips **4MT** : Mini 4Tips **4VT** : Vertical 4Tips

Holder : 75p, 79p, 82p, 83p, 108p, 119p

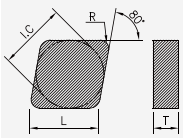
CNGN
NEGATIVE

■ Carbide backed ■ Solid tip



CNGN	ISO code Metric	ISO code Inch	Dimensions (mm) I.C	T	R	Hole	ℓ	PCBN EB28X (S)	EB570 (S)	EB160	EB560 (S)	EB150	EB550 (S)	EB190	EB170	EB73	EB54X	EB51	EB710	EB210	EB100X
Standard	CNGN 120408	CNGN 432	12.7	4.76	0.8		4.2														
	120412	433	12.7	4.76	1.2		4.1														

■ Solid

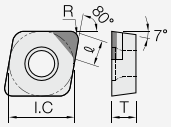


CNGN	ISO code Metric	ISO code Inch	Dimensions (mm) I.C	T	R	Hole		PCBN EB1000	EB50	EB100X	HBN	HBN-T	HBN-W	HBN-N
Solid	CNGN 120408	CNGN 432	12.7	4.76	0.8									
	120412	433	12.7	4.76	1.2									

CCGW

POSITIVE 7 _ hole

■ Carbide backed ■ Solid tip



CCGW	ISO code Metric	ISO code Inch	Dimensions (mm) I.C	T	R	Hole	ℓ	PCBN EB28X (S)	EB570 (S)	EB160	EB560 (S)	EB150	EB550 (S)	EB190	EB170	EB73	EB54X	EB51	EB710	EB210	EB100X
Standard	CCGW 060208	CCGW 2(1.5)2	6.35	2.38	0.8	2.8	3.2														
	09T302	3(2.5)0.5	9.525	3.97	0.2	4.4	4.3														
	09T304	3(2.5)1	9.525	3.97	0.4	4.4	4.3														
	09T308	3(2.5)2	9.525	3.97	0.8	4.4	4.2														
	120402	430	12.7	4.76	0.2	5.5	4.3														
	120404	431	12.7	4.76	0.4	5.5	4.3														
	120408	432	12.7	4.76	0.8	5.5	4.2														
	120412	433	12.7	4.76	1.2	5.5	4.1														
MT	CCGW 060202	CCGW 2(1.5)0.5	6.35	2.38	0.2	2.8	2.8														
	060204	2(1.5)1	6.35	2.38	0.4	2.8	2.8														
	060208	2(1.5)2	6.35	2.38	0.8	2.8	2.7														
	09T302	3(2.5)0.5	9.525	3.97	0.2	4.4	2.8														
	09T304	3(2.5)1	9.525	3.97	0.4	4.4	2.8														
	09T308	3(2.5)2	9.525	3.97	0.8	4.4	2.7														
	120402	430	12.7	4.76	0.2	5.5	2.8														
	120404	431	12.7	4.76	0.4	5.5	2.8														
	120408	432	12.7	4.76	0.8	5.5	2.7														
	120412	433	12.7	4.76	1.2	5.5	3.1														
2MT	CCGW 060202	CCGW 2(1.5)0.5	6.35	2.38	0.2	2.8	2.8														
	060204	2(1.5)1	6.35	2.38	0.4	2.8	2.8														
	060208	2(1.5)2	6.35	2.38	0.8	2.8	2.7														
	09T302	3(2.5)0.5	9.525	3.97	0.2	4.4	2.8														
	09T304	3(2.5)1	9.525	3.97	0.4	4.4	2.8														
	09T308	3(2.5)2	9.525	3.97	0.8	4.4	2.7														
	120402	430	12.7	4.76	0.2	5.5	2.8														
	120404	431	12.7	4.76	0.4	5.5	2.8														
	120408	432	12.7	4.76	0.8	5.5	2.7														
	120412	433	12.7	4.76	1.2	5.5	3.1														

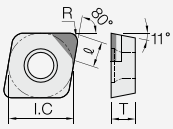
■ **MT** : Mini Tips **2MT** : Mini 2Tips

Holder : 88p, 112p

CPGW

POSITIVE 11 _ hole

■ Carbide backed ■ Solid tip



CPGW	ISO code Metric	ISO code Inch	Dimensions (mm) I.C	T	R	Hole	ℓ	PCBN EB28X (S)	EB570 (S)	EB160	EB560 (S)	EB150	EB550 (S)	EB190	EB170	EB73	EB54X	EB51	EB710	EB210	EB100X
Standard	CPGW 090302	CPGW 320.5	9.525	3.18	0.2	4.4	4.3														
	090304	321	9.525	3.18	0.4	4.4	4.3														
	090308	322	9.525	3.18	0.8	4.4	4.2														
MT	CPGW 080202	CPGW 2.5(1.5)0.5	7.94	2.38	0.2	3.4	2.8														
	080204	2.5(1.5)1	7.94	2.38	0.4	3.4	2.8														
	090302	320.5	9.525	3.18	0.2	4.4	2.8														
	090304	321	9.525	3.18	0.4	4.4	2.8														
	090308	322	9.525	3.18	0.8	4.4	2.7														
2MT	CPGW 080202	CPGW 2.5(1.5)0.5	7.94	2.38	0.2	3.4	2.8														
	080204	2.5(1.5)1	7.94	2.38	0.4	3.4	2.8														
	090302	320.5	9.525	3.18	0.2	4.4	2.8														
	090304	321	9.525	3.18	0.4	4.4	2.8														
	090308	322	9.525	3.18	0.8	4.4	2.7														

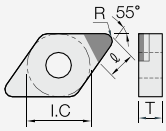
■ **MT** : Mini Tips **2MT** : Mini 2Tips

Holder : 112p

DNGA
NEGATIVE _ hole

■ Carbide backed ■ Solid tip

DNGA	ISO code Metric	ISO code Inch	Dimensions (mm) I.C	T	R	Hole	ℓ	PCBN EB28X (S)	EB570 (S)	EB160	EB560 (S)	EB150	EB550 (S)	EB190	EB170	EB73	EB54X	EB51	EB710	EB210	EB100X
Standard	DNGA 110404	DNGA 331	9.525	4.76	0.4	3.81	3.9														
	110408	332	9.525	4.76	0.8	3.81	3.5														
	150404	431	12.7	4.76	0.4	5.16	3.9														
	150408	432	12.7	4.76	0.8	5.16	3.5														
	150412	433	12.7	4.76	1.2	5.16	3.1														
	150604	441	12.7	6.35	0.4	5.16	3.9														
	150608	442	12.7	6.35	0.8	5.16	3.5														
	150612	443	12.7	6.35	1.2	5.16	3.1														
MT	DNGA 110404	DNGA 331	9.525	4.76	0.4	3.81	2.4														
	110408	332	9.525	4.76	0.8	3.81	2														
	150404	431	12.7	4.76	0.4	5.16	2.4														
	150408	432	12.7	4.76	0.8	5.16	2														
	150412	433	12.7	4.76	1.2	5.16	2.1														
	150604	441	12.7	6.35	0.4	5.16	2.4														
	150608	442	12.7	6.35	0.8	5.16	2														
	150612	443	12.7	6.35	1.2	5.16	2.1														
2MT	DNGA 110404	DNGA 331	9.525	4.76	0.4	3.81	2.4														
	110408	332	9.525	4.76	0.8	3.81	2														
	150404	431	12.7	4.76	0.4	5.16	2.4														
	150408	432	12.7	4.76	0.8	5.16	2														
	150412	433	12.7	4.76	1.2	5.16	2.1														
	150604	441	12.7	6.35	0.4	5.16	2.4														
	150608	442	12.7	6.35	0.8	5.16	2														
	150612	443	12.7	6.35	1.2	5.16	2.1														
4MT	DNGA 110404	DNGA 331	9.525	4.76	0.4	3.81	2.4														
	110408	332	9.525	4.76	0.8	3.81	2														
	150404	431	12.7	4.76	0.4	5.16	2.4														
	150408	432	12.7	4.76	0.8	5.16	2														
	150412	433	12.7	4.76	1.2	5.16	2.1														
	150604	441	12.7	6.35	0.4	5.16	2.4														
	150608	442	12.7	6.35	0.8	5.16	2														
	150612	443	12.7	6.35	1.2	5.16	2.1														
4VT solid	DNGA 110404	DNGA 331	9.525	4.76	0.4	3.81	2.7														
	110408	332	9.525	4.76	0.8	3.81	2.3														
	150404	431	12.7	4.76	0.4	5.16	2.7														
	150408	432	12.7	4.76	0.8	5.16	2.3														
	150412	433	12.7	4.76	1.2	5.16	2														

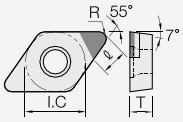


■ **MT** : Mini Tips **2MT** : Mini 2Tips **4MT** : Mini 4Tips **4VT** : Vertical 4Tips

Holder : 75p, 79p, 80p, 83p, 84p, 108p, 109p

DCGW
POSITIVE 7 _ hole

■ Carbide backed ■ Solid tip



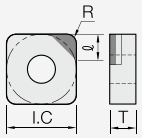
DCGW		ISO code Metric	ISO code Inch	Dimensions (mm) I.C	T	R	Hole	ℓ	PCBN EB28X (S)	EB570 (S)	EB160	EB560 (S)	EB150	EB550 (S)	EB190	EB170	EB73	EB54X	EB51	EB710	EB210	EB100X
	Standard	DCGW 11T302	DCGW 3(2.5)0.5	9.525	3.97	0.4	4.4	4														
		11T304	3(2.5)1	9.525	3.97	0.4	4.4	3.9														
		11T308	3(2.5)2	9.525	3.97	0.8	4.4	3.5														
		150404	431	12.7	4.76	0.4	5.16	3.9														
		150408	432	12.7	4.76	0.8	5.16	3.5														
	MT	DCGW 11T302	DCGW 3(2.5)0.5	9.525	3.97	0.4	4.4	2.5														
		11T304	3(2.5)1	9.525	3.97	0.4	4.4	2.4														
		11T308	3(2.5)2	9.525	3.97	0.8	4.4	2														
		150404	431	12.7	4.76	0.4	5.16	2.4														
		150408	432	12.7	4.76	0.8	5.16	2														
	2MT	DCGW 11T302	DCGW 3(2.5)0.5	9.525	3.97	0.4	4.4	2.5														
		11T304	3(2.5)1	9.525	3.97	0.4	4.4	2.4														
		11T308	3(2.5)2	9.525	3.97	0.8	4.4	2														
		150404	431	12.7	4.76	0.4	5.16	2.4														
		150408	432	12.7	4.76	0.8	5.16	2														

■ **MT** : Mini Tips **2MT** : Mini 2Tips

Holder : 89p, 113p, 114p

SNGA
NEGATIVE _ hole

■ Carbide backed ■ Solid tip



SNGA		ISO code Metric	ISO code Inch	Dimensions (mm) I.C	T	R	Hole	ℓ	PCBN EB28X (S)	EB570 (S)	EB160	EB560 (S)	EB150	EB550 (S)	EB190	EB170	EB73	EB54X	EB51	EB710	EB210	EB100X
	Standard	SNGA 090304	SNGA 321	9.525	3.18	0.4	3.81	4.4														
		090308	322	9.525	3.18	0.8	3.81	4.4														
		120404	431	12.7	4.76	0.4	5.16	4.4														
		120408	432	12.7	4.76	0.8	5.16	4.4														
		120412	433	12.7	4.76	1.2	5.16	4.4														
	MT	SNGA 090304	SNGA 321	9.525	3.18	0.4	3.81	2.9														
		090308	322	9.525	3.18	0.8	3.81	2.9														
		120404	431	12.7	4.76	0.4	5.16	2.9														
		120408	432	12.7	4.76	0.8	5.16	2.9														
		120412	433	12.7	4.76	1.2	5.16	3.4														
	2MT	SNGA 090304	SNGA 321	9.525	3.18	0.4	3.81	2.9														
		090308	322	9.525	3.18	0.8	3.81	2.9														
		120404	431	12.7	4.76	0.4	5.16	2.9														
		120408	432	12.7	4.76	0.8	5.16	2.9														
		120412	433	12.7	4.76	1.2	5.16	3.4														
	4MT	SNGA 120404	SNGA 431	12.7	4.76	0.4	5.16	2.9														
		120408	432	12.7	4.76	0.8	5.16	2.9														
		120412	433	12.7	4.76	1.2	5.16	3.4														
	8VT solid	SNGA 120404	SNGA 431	12.7	4.76	0.4	5.16	2.2														
		120408	432	12.7	4.76	0.8	5.16	2.2														
		120412	433	12.7	4.76	1.2	5.16	2.2														

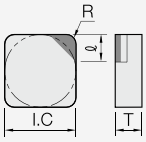
■ **MT** : Mini Tips **2MT** : Mini 2Tips **4MT** : Mini 4Tips **8VT** : Vertical 8Tips

Holder : 76p, 77p, 80p, 81p, 84p, 85p, 109p,119p

SNGN
NEGATIVE

■ Carbide backed ■ Solid tip

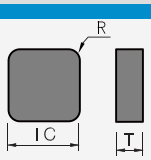
SNGN		ISO code Metric	ISO code Inch	Dimensions (mm) I.C	T	R	Hole	ℓ	PCBN EB28X (S)	EB570 (S)	EB160	EB560 (S)	EB150	EB550 (S)	EB190	EB170	EB73	EB54X	EB51	EB710	EB210	EB100X
Standard	SNGN	090304	SNGN 321	9.525	3.18	0.4		4.4														
		090308	322	9.525	3.18	0.8		4.4														
		120404	431	12.7	4.76	0.4		4.4														
		120408	432	12.7	4.76	0.8		4.4														
		120412	433	12.7	4.76	1.2		4.4														
MT	SNGN	090304	SNGN 321	9.525	3.18	0.4		2.9														
		090308	322	9.525	3.18	0.8		2.9														
		120404	431	12.7	4.76	0.4		2.9														
		120408	432	12.7	4.76	0.8		2.9														
		120412	433	12.7	4.76	1.2		3.4														
2MT	SNGN	090304	SNGN 321	9.525	3.18	0.4		2.9														
		090308	322	9.525	3.18	0.8		2.9														
		120404	431	12.7	4.76	0.4		2.9														
		120408	432	12.7	4.76	0.8		2.9														
		120412	433	12.7	4.76	1.2		3.4														
4MT	SNGN	120404	SNGN 431	12.7	4.76	0.4		2.9														
		120408	432	12.7	4.76	0.8		2.9														
		120412	433	12.7	4.76	1.2		3.4														
8VT solid	SNGN	120404	SNGN 431	12.7	4.76	0.4		2.2														
		120408	432	12.7	4.76	0.8		2.2														
		120412	433	12.7	4.76	1.2		2.2														



■ **MT** : Mini Tips **2MT** : Mini 2Tips **4MT** : Mini 4Tips **8VT** : Vertical 8Tips

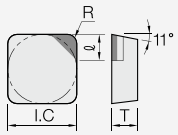
■ Solid

SNGN		ISO code Metric	ISO code Inch	Dimensions (mm) I.C	T	R	Hole	ℓ	PCBN EB1000	EB50	EB100X	HBN	HBN-T	HBN-W	HBN-N
Solid	SNGN	090304	SNGN 321	9.525	3.18	0.4									
		090308	322	9.525	3.18	0.8									
		120404	431	12.7	4.76	0.4									
		120408	432	12.7	4.76	0.8									
		120412	433	12.7	4.76	1.2									



SPGN
POSITIVE 11

■ Carbide backed ■ Solid tip

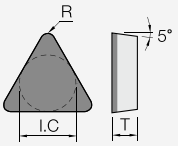


SPGN		ISO code Metric	ISO code Inch	Dimensions (mm) I.C	T	R	Hole	ℓ	PCBN EB28X (S)	EB570 (S)	EB160	EB560 (S)	EB150	EB550 (S)	EB190	EB170	EB73	EB54X	EB51	EB710	EB210	EB100X
Standard	SPGN	090304	SPGN 321	9.525	3.18	0.4		4.4														
		090308	322	9.525	3.18	0.8		4.4														
		120404	431	12.7	4.76	0.4		4.4														
		120408	432	12.7	4.76	0.8		4.4														
		120412	433	12.7	4.76	1.2		4.4														
MT	SPGN	090304	SPGN 321	9.525	3.18	0.4		2.9														
		090308	322	9.525	3.18	0.8		2.9														
		120404	431	12.7	4.76	0.4		2.9														
		120408	432	12.7	4.76	0.8		2.9														
		120412	433	12.7	4.76	1.2		3.4														
2MT	SPGN	090304	SPGN 321	9.525	3.18	0.4		2.9														
		090308	322	9.525	3.18	0.8		2.9														
		120404	431	12.7	4.76	0.4		2.9														
		120408	432	12.7	4.76	0.8		2.9														
		120412	433	12.7	4.76	1.2		3.4														
4MT	SPGN	120404	SPGN 431	12.7	4.76	0.4		2.9														
		120408	432	12.7	4.76	0.8		2.9														
		120412	433	12.7	4.76	1.2		3.4														
Full face	SPGN	090304	SPGN 321	9.525	3.18	0.4																
		090308	322	9.525	3.18	0.8																
		120404	431	12.7	4.76	0.4																
		120408	432	12.7	4.76	0.8																
		120412	433	12.7	4.76	1.2																

■ **MT** : Mini Tips **2MT** : Mini 2Tips **4MT** : Mini 4Tips

TBGN
POSITIVE 5

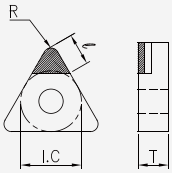
■ Carbide backed



TBGN		ISO code Metric	ISO code Inch	Dimensions (mm) I.C	T	R	Hole	ℓ	PCBN EB28X	EB570	EB160	EB560	EB150	EB550	EB190	EB170	EB73	EB51	EB710	EB210
Full face	TBGN	060102	TBGN (1.2)10.5	3.97	1.59	0.2														
		060104	(1.2)11	3.97	1.59	0.4														
		060108	(1.2)12	3.97	1.59	0.8														
		080202	1.5(1.5)0.5	4.76	2.38	0.2														
		080204	1.5(1.5)1	4.76	2.38	0.4														
		080208	1.5(1.5)2	4.76	2.38	0.8														
		080212	1.5(1.5)3	4.76	2.38	1.2														

TNGA
NEGATIVE _ hole

■ Carbide backed ■ Solid tip



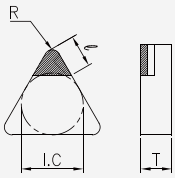
TNGA	ISO code Metric	ISO code Inch	Dimensions (mm) I.C	T	R	Hole	ℓ	PCBN EB28X (S)	EB570 (S)	EB160	EB560 (S)	EB150	EB550 (S)	EB190	EB170	EB73	EB54X	EB51	EB710	EB210	EB100X
Standard	TNGA 110304	TNGA 221	6.35	3.18	0.4	2.4	4														
	160404	331	9.525	4.76	0.4	3.81	4														
	160408	332	9.525	4.76	0.8	3.81	3.7														
	220404	431	12.7	4.76	0.4	5.16	4														
	220408	432	12.7	4.76	0.8	5.16	3.7														
MT	TNGA 110304	TNGA 221	6.35	3.18	0.4	2.4	2.5														
	160404	331	9.525	4.76	0.8	3.81	2.5														
	160408	332	9.525	4.76	0.4	3.81	2.2														
3MT	TNGA 110304	TNGA 221	6.35	3.18	0.4	2.4	2.5														
	160404	331	9.525	4.76	0.4	3.81	2.5														
	160408	332	9.525	4.76	0.8	3.81	2.2														
	220404	431	12.7	4.76	0.4	5.16	2.5														
	220408	432	12.7	4.76	0.8	5.16	2.2														
6VT Solid	TNGA 160404	TNGA 331	9.525	4.76	0.4	3.81	2.9														
	160408	332	9.525	4.76	0.8	3.81	2.6														

■ **MT** : Mini Tips **3MT** : Mini 3Tips **6VT** : Vertical 6Tips

Holder : 77p, 81p, 85p, 86p, 110p, 111p

TNGN
NEGATIVE

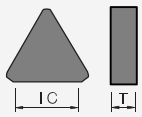
■ Carbide backed ■ Solid tip



TNGN	ISO code Metric	ISO code Inch	Dimensions (mm) I.C	T	R	Hole	ℓ	PCBN EB28X (S)	EB570 (S)	EB160	EB560 (S)	EB150	EB550 (S)	EB190	EB170	EB73	EB54X	EB51	EB710	EB210	EB100X
Standard	TNGN 160404	TNGN 331	9.525	4.76	0.4		4														
	160408	332	9.525	4.76	0.8		3.7														
	160412	333	9.525	4.76	1.2		3.4														
MT	TNGN 160404	TNGN 331	9.525	4.76	0.4		2.5														
	160408	332	9.525	4.76	0.8		2.2														
	160412	333	9.525	4.76	1.2		2.4														
3MT	TNGN 160404	TNGN 331	9.525	4.76	0.4		2.5														
	160408	332	9.525	4.76	0.8		2.2														
	160412	333	9.525	4.76	1.2		2.4														
6VT Solid	TNGN 160404	TNGN 331	9.525	4.76	0.4		2.9														
	160408	332	9.525	4.76	0.8		2.6														
	160412	333	9.525	4.76	1.2		2.3														

■ **MT** : Mini Tips **3MT** : Mini 3Tips **6VT** : Vertical 6Tips

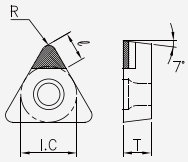
■ Solid



TNGN	ISO code Metric	ISO code Inch	Dimensions (mm) I.C	T	R	Hole	ℓ	PCBN EB1000	EB50	EB100X	HBN	HBN-T	HBN-W	HBN-N
Solid	TNGN 110304	TNGN 221	6.35	3.18	0.4									
	110308	222	6.35	3.18	0.8									
	160408	332	9.525	4.76	0.8									
	160412	333	9.525	4.76	1.2									

TCGW
POSITIVE 7 _ hole

■ Carbide backed ■ Solid tip



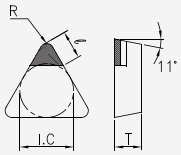
TCGW		ISO code Metric	ISO code Inch	Dimensions (mm) I.C	T	R	Hole	ℓ	PCBN EB28X (S)	EB570 (S)	EB160	EB560 (S)	EB150	EB550 (S)	EB190	EB170	EB73	EB54X	EB51	EB710	EB210	EB100X
	Standard	TCGW 16T302	TCGW 3(2.5)0.5	9.525	3.97	0.2	4.4	4.1														
		16T304	3(2.5)1	9.525	3.97	0.4	4.4	4														
		16T308	3(2.5)2	9.525	3.97	0.8	4.4	3.7														
	MT	TCGW 090202	TCGW 2(1.5)0.5	5.56	2.38	0.2	2.5	2.6														
		090204	2(1.5)1	5.56	2.38	0.4	2.5	2.5														
		110202	2(1.5)0.5	6.35	2.38	0.2	2.8	2.6														
		110204	2(1.5)1	6.35	2.38	0.4	2.8	2.5														
		110208	2(1.5)2	6.35	2.38	0.8	2.8	2.2														
		16T302	3(2.5)0.5	9.525	3.97	0.2	4.4	2.6														
		16T304	3(2.5)1	9.525	3.97	0.4	4.4	2.5														
		16T308	3(2.5)2	9.525	3.97	0.8	4.4	2.2														
	3MT	TCGW 090202	TCGW 2(1.5)0.5	5.56	2.38	0.2	2.5	2.6														
		090204	2(1.5)1	5.56	2.38	0.4	2.5	2.5														
		110202	2(1.5)0.5	6.35	2.38	0.2	2.8	2.6														
		110204	2(1.5)1	6.35	2.38	0.4	2.8	2.5														
		110208	2(1.5)2	6.35	2.38	0.8	2.8	2.2														
		16T302	3(2.5)0.5	9.525	3.97	0.2	4.4	2.6														
		16T304	3(2.5)1	9.525	3.97	0.4	4.4	2.5														
		16T308	3(2.5)2	9.525	3.97	0.8	4.4	2.2														

■ **MT** : Mini Tips **3MT** : Mini 3Tips

Holder : 92p, 93p, 115p

TPGN
POSITIVE 11

■ Carbide backed ■ Solid tip



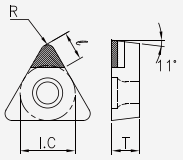
TPGN		ISO code Metric	ISO code Inch	Dimensions (mm) I.C	T	R	Hole	ℓ	PCBN EB28X (S)	EB570 (S)	EB160	EB560 (S)	EB150	EB550 (S)	EB190	EB170	EB73	EB54X	EB51	EB710	EB210	EB100X
	Standard	TPGN 160304	TPGN 321	9.525	3.18	0.4		4														
		160308	322	9.525	3.18	0.8		3.7														
		220404	431	12.7	4.76	0.4		4														
		220408	432	12.7	4.76	0.8		3.7														
		220412	433	12.7	4.76	1.2		3.4														
	MT	TPGN 160304	TPGN 321	9.525	3.18	0.4		2.5														
		160308	322	9.525	3.18	0.8		2.2														
	3MT	TPGN 160304	TPGN 321	9.525	3.18	0.4		2.5														
		160308	322	9.525	3.18	0.8		2.2														

■ **MT** : Mini Tips **3MT** : Mini 3Tips

TPGW

POSITIVE 11 _ hole

■ Carbide backed ■ Solid tip



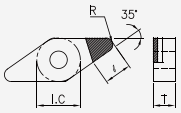
TPGW		ISO code Metric	ISO code Inch	Dimensions (mm) I.C	T	R	Hole	ℓ	PCBN EB28X (S)	EB570 (S)	EB160	EB560 (S)	EB150	EB550 (S)	EB190	EB170	EB73	EB54X	EB51	EB710	EB210	EB100X
Standard	TPGW	160302	TPGW 32(0.5)	9.525	3.18	0.2	4.4	4.1														
		160304	321	9.525	3.18	0.4	4.4	4														
		160308	322	9.525	3.18	0.8	4.4	3.7														
		160404	331	9.525	4.76	0.4	4.4	4														
		160408	332	9.525	4.76	0.8	4.4	3.7														
MT	TPGW	080202	TPGW 1.5(1.5)0.5	4.76	2.38	0.2	2.3	2.6														
		080204	1.5(1.5)1	4.76	2.38	0.4	2.3	2.5														
		090202	1.5)0.5	5.56	2.38	0.2	2.5	2.6														
		090204	1.5)1	5.56	2.38	0.4	2.5	2.5														
		110202	21(0.5)	6.35	2.38	0.2	2.8	2.6														
		110204	211	6.35	2.38	0.4	2.8	2.5														
		110302	22(0.5)	6.35	3.18	0.2	3.4	2.6														
		110304	221	6.35	3.18	0.4	3.4	2.5														
		110308	222	6.35	3.18	0.8	3.4	2.2														
		160302	32(0.5)	9.525	3.18	0.2	4.4	2.6														
		160304	321	9.525	3.18	0.4	4.4	2.5														
		160308	322	9.525	3.18	0.8	4.4	2.2														
		160404	331	9.525	4.76	0.4	4.4	2.5														
		160408	332	9.525	4.76	0.8	4.4	2.2														
3MT	TPGW	080202	TPGW 1.5(1.5)0.5	4.76	2.38	0.2	2.3	2.6														
		080204	1.5(1.5)1	4.76	2.38	0.4	2.3	2.5														
		090202	1.5)0.5	5.56	2.38	0.2	2.5	2.6														
		090204	1.5)1	5.56	2.38	0.4	2.5	2.5														
		110202	21(0.5)	6.35	2.38	0.2	2.8	2.6														
		110204	211	6.35	2.38	0.4	2.8	2.5														
		110302	22(0.5)	6.35	3.18	0.2	3.4	2.6														
		110304	221	6.35	3.18	0.4	3.4	2.5														
		110308	222	6.35	3.18	0.8	3.4	2.2														
		160302	32(0.5)	9.525	3.18	0.2	4.4	2.6														
		160304	321	9.525	3.18	0.4	4.4	2.5														
		160308	322	9.525	3.18	0.8	4.4	2.2														
		160404	331	9.525	4.76	0.4	4.4	2.5														
		160408	332	9.525	4.76	0.8	4.4	2.2														

■ **MT** : Mini Tips **3MT** : Mini 3Tips

Holder : 116p

VNGA
NEGATIVE _ hole

■ Carbide backed ■ Solid tip



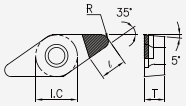
VNGA		ISO code Metric	ISO code Inch	Dimensions (mm) I.C	T	R	Hole	ℓ	PCBN EB28X (S)	EB570 (S)	EB160	EB560 (S)	EB150	EB550 (S)	EB190	EB170	EB73	EB54X	EB51	EB710	EB210	EB100X
	Standard	VNGA 160402	VNGA 33(0.5)	9.525	4.76	0.2	3.81	5														
		160404	331	9.525	4.76	0.4	3.81	4.5														
		160408	332	9.525	4.76	0.8	3.81	3.7														
	MT	VNGA 160402	VNGA 33(0.5)	9.525	4.76	0.2	3.81	3														
		160404	331	9.525	4.76	0.4	3.81	2.5														
		160408	332	9.525	4.76	0.8	3.81	2.2														
	2MT	VNGA 160402	VNGA 33(0.5)	9.525	4.76	0.2	3.81	3														
		160404	331	9.525	4.76	0.4	3.81	2.5														
		160408	332	9.525	4.76	0.8	3.81	2.2														
	4VT solid	VNGA 160402	VNGA 33(0.5)	9.525	4.76	0.2	3.81	2.6														
		160404	331	9.525	4.76	0.4	3.81	2.2														
		160408	332	9.525	4.76	0.8	3.81	2.3														

■ **MT** : Mini Tips **2MT** : Mini 2Tips **4VT** : Vertical 4Tips

Holder : 78p, 87p, 111p

VBGW
POSITIVE 5 _ hole

■ Carbide backed ■ Solid tip



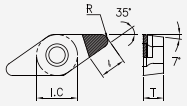
VBGW		ISO code Metric	ISO code Inch	Dimensions (mm) I.C	T	R	Hole	ℓ	PCBN EB28X (S)	EB570 (S)	EB160	EB560 (S)	EB150	EB550 (S)	EB190	EB170	EB73	EB54X	EB51	EB710	EB210	EB100X
	Standard	VBGW 110302	VBGW 22(0.5)	6.35	3.18	0.2	2.8	5														
		110304	221	6.35	3.18	0.4	2.8	4.5														
		160402	33(0.5)	9.525	4.76	0.2	2.8	5														
		160404	331	9.525	4.76	0.4	4.4	4.5														
		160408	332	9.525	4.76	0.8	4.4	3.7														
		160412	333	9.525	4.76	1.2	4.4	3.3														
	MT	VBGW 110302	VBGW 22(0.5)	6.35	3.18	0.2	2.8	3														
		110304	221	6.35	3.18	0.4	2.8	2.5														
		160402	33(0.5)	9.525	4.76	0.2	2.8	3														
		160404	331	9.525	4.76	0.4	4.4	2.5														
		160408	332	9.525	4.76	0.8	4.4	2.2														
		160412	333	9.525	4.76	1.2	4.4	1.8														
	2MT	VBGW 110302	VBGW 22(0.5)	6.35	3.18	0.2	2.8	3														
		110304	221	6.35	3.18	0.4	2.8	2.5														
		160402	33(0.5)	9.525	4.76	0.2	2.8	3														
		160404	331	9.525	4.76	0.4	4.4	2.5														
		160408	332	9.525	4.76	0.8	4.4	2.2														
		160412	333	9.525	4.76	1.2	4.4	1.8														

■ **MT** : Mini Tips **2MT** : Mini 2Tips

Holder : 93p, 94p, 117p

VCGW
POSITIVE 7 _ hole

■ Carbide backed ■ Solid tip



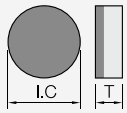
VCGW	ISO code Metric	ISO code Inch	Dimensions (mm) I.C	T	R	Hole	ℓ	PCBN EB28X (S)	EB570 (S)	EB160	EB560 (S)	EB150	EB550 (S)	EB190	EB170	EB73	EB54X	EB51	EB710	EB210	EB100X
Standard	VCGW 110302	VCGW 22(0.5)	6.35	3.18	0.2	2.8	5														
	110304	221	6.35	3.18	0.4	2.8	4.5														
	160402	33(0.5)	9.525	4.76	0.2	4.4	5														
	160404	331	9.525	4.76	0.4	4.4	4.5														
	160408	332	9.525	4.76	0.8	4.4	3.7														
	160412	333	9.525	4.76	1.2	4.4	3.3														
MT	VCGW 110302	VCGW 22(0.5)	6.35	3.18	0.2	2.8	3														
	110304	221	6.35	3.18	0.4	2.8	2.5														
	160402	33(0.5)	9.525	4.76	0.2	4.4	3														
	160404	331	9.525	4.76	0.4	4.4	2.5														
	160408	332	9.525	4.76	0.8	4.4	2.2														
	160412	333	9.525	4.76	1.2	4.4	1.8														
2MT	VCGW 110302	VCGW 22(0.5)	6.35	3.18	0.2	2.8	3														
	110304	221	6.35	3.18	0.4	2.8	2.5														
	160402	33(0.5)	9.525	4.76	0.2	4.4	3														
	160404	331	9.525	4.76	0.4	4.4	2.5														
	160408	332	9.525	4.76	0.8	4.4	2.2														
	160412	333	9.525	4.76	1.2	4.4	1.8														

■ **MT** : Mini Tips **2MT** : Mini 2Tips

Holder : 95p, 116p, 117p, 118p

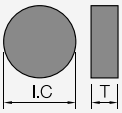
RNGN
NEGATIVE

■ Carbide backed



RNGN	ISO code Metric	ISO code Inch	Dimensions (mm) I.C	T	R			PCBN EB28X	EB570	EB550	EB190	EB73	EB51	EB710	EB120	EB210
	RNGN 060300	RNGN 220	6.35	3.18												
	090300	320	9.525	3.18												
	090400	330	9.525	4.76												
	120300	420	12.7	3.18												
	120400	430	12.7	4.76												

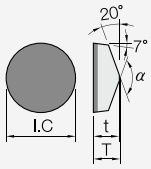
■ Solid



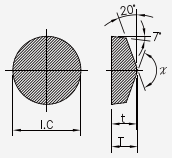
Shape	ISO code Metric	ISO code Inch	Dimensions (mm) I.C	T	R			PCBN EB28S	EB57S	EB55S	EB54X	EB50	EB1000	EB100X	HBN	HBN-T	HBN-R	HBN-N	HBN-W
	RNGN 060300	RNGN 220	6.35	3.18															
	090300	320	9.525	3.18															
	090400	330	9.525	4.76															
	120300	420	12.7	3.18															
	120400	430	12.7	4.76															

RCGX
POSITIVE 7

■ Carbide backed

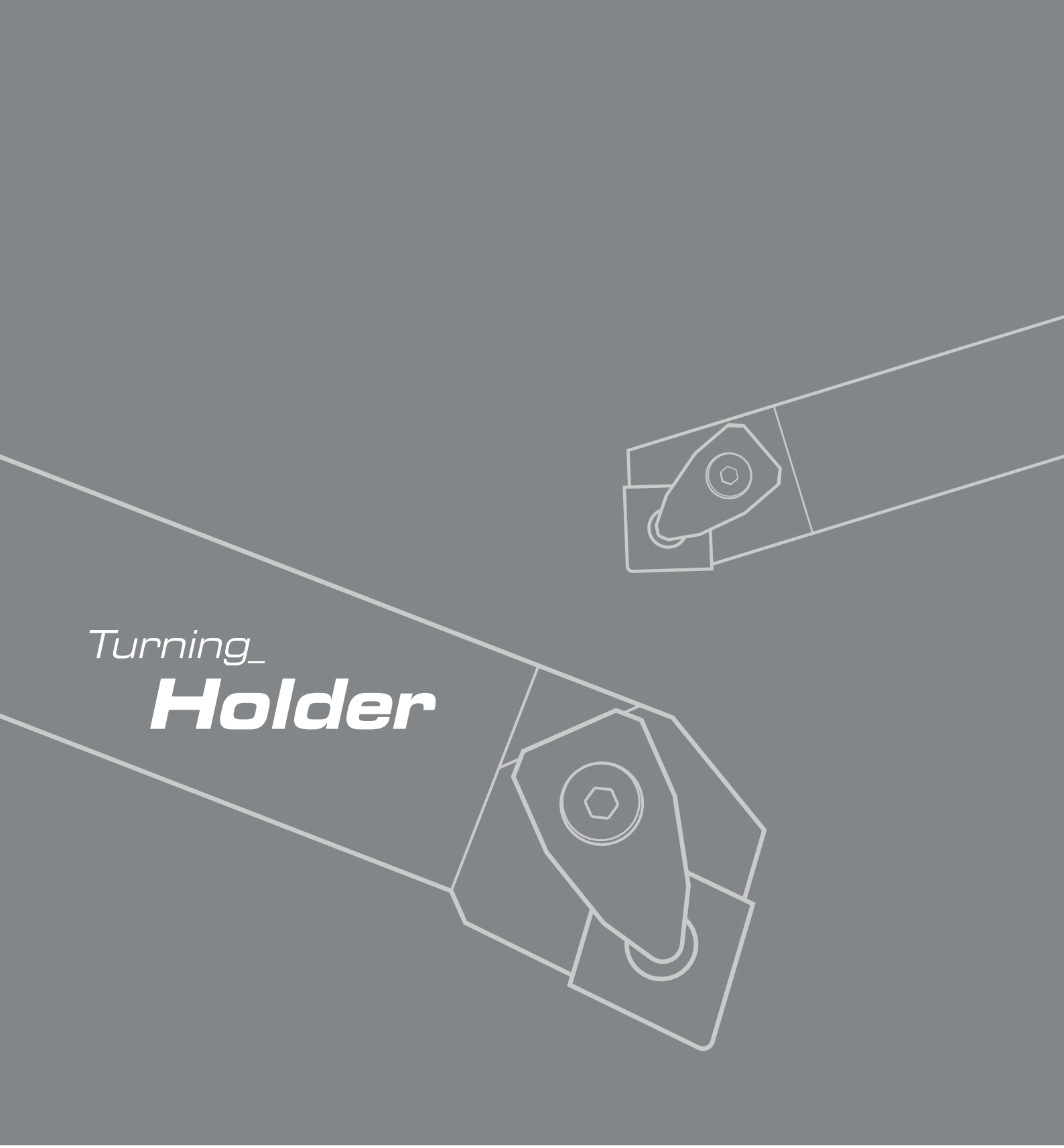
RCGX	ISO code Metric	ISO code Inch	Dimensions (mm) I.C	t	T	α	PCBN EB51	EB71	EB71X
	RCGX 060300	RCGX 220	6.35	3.18	3.32	140°			
	090300	320	9.525	3.18	3.32	140°			
	090700	3(-)	9.525	7.7	7.94	120°			
	120400	430	12.7	4.76	4.94	140°			
	120700	4(-)	12.7	7.7	7.94	140°			
	191000	(-)	19.05	9.77	10	120°			

■ Solid

RCGX	ISO code Metric	ISO code Inch	Dimensions (mm) I.C	t	T	α	PCBN HBN-R	HBN-N
	RCGX 060300	RCGX 220	6.35	3.18	3.32	140°		
	090300	320	9.525	3.18	3.32	140°		
	090700	3(-)	9.525	7.7	7.94	120°		
	120400	430	12.7	4.76	4.94	140°		
	120700	4(-)	12.7	7.7	7.94	140°		
	191000	(-)	19.05	9.77	10	120°		

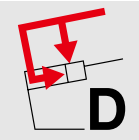
MEMO

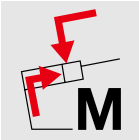
EHWA

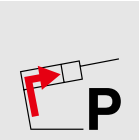


Turning_ Holder

How to combine the holder



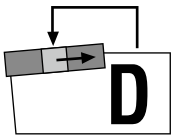




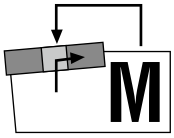
D Double clamping
M Multi locking
P Lever locking
S Screw clamping

Designation system

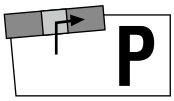
D	S	K	D
Clamp type	Insert shape	Tool style	Clearance angle



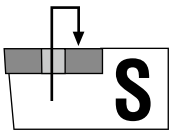
Double clamping



Multi locking

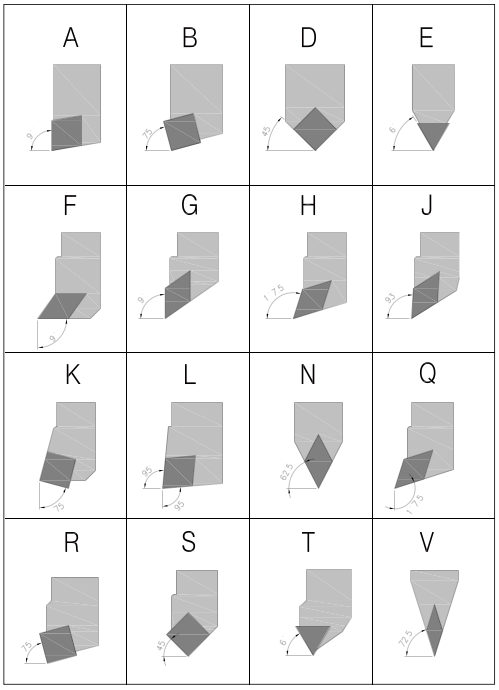


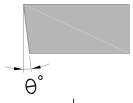
Lever locking



Screw clamping

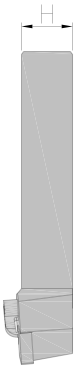
Symbol	Shape
C	80°
D	55°
E	75°
L	
R	
S	
T	
V	35°
W	80°



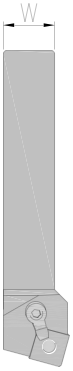


Symbol	Angle
N	0°
A	3°
B	5°
C	7°
P	11°
D	15°
E	20°
F	25°

R	25	25	12
			1
Cutting direction	Tool height		Tool width



	H size (mm)
12	12
16	16
20	20
25	25
32	32
40	40
50	50



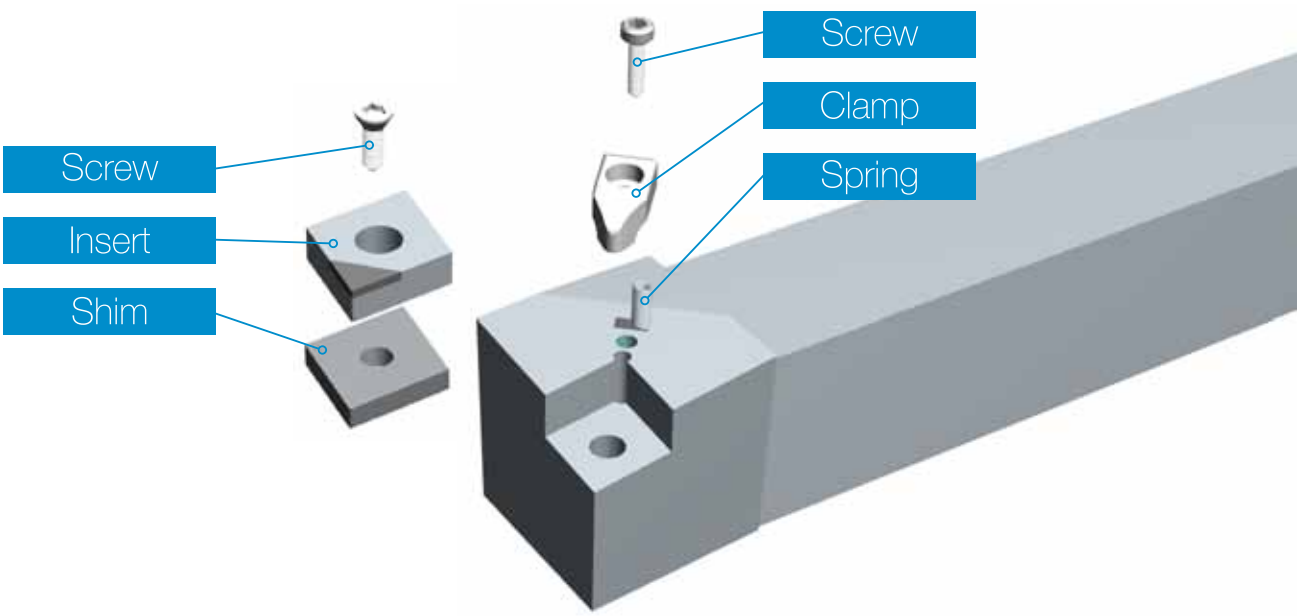
	W (mm)
12	12
16	16
20	20
25	25
32	32
40	40
50	50

1 Cutting edge length

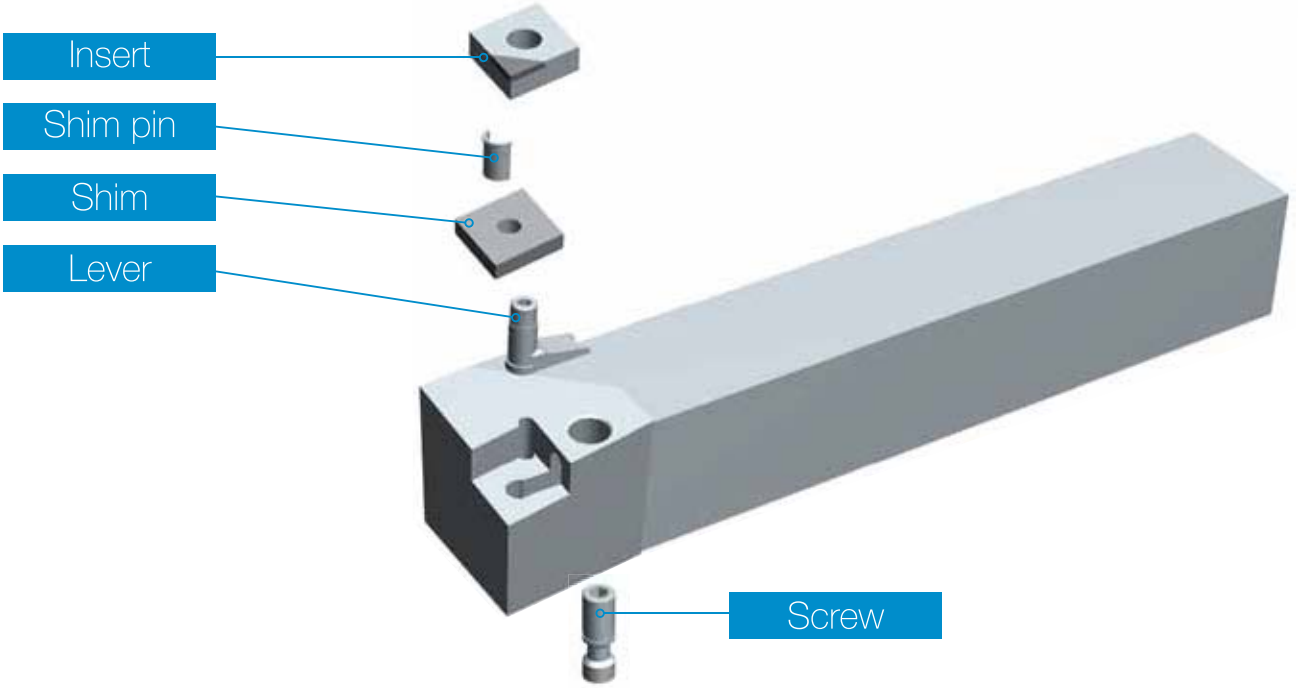
C	D	E	R	S	T	V	W	K	I.C size (mm)
03	04			03	06				3.97
05	06			05	09	09	03		5.56
06	07			06	11	11	04		6.35
08	09			07	13	13	05		7.94
			08						8
09	11		09	09	16	16	06	16	9.525
			10						10
			12						12
12	15	13	12.7	12	22	22	08		12.7
16	19		15	15	27	27	10		15.875
			16						16
19	23		19	19	33	33	13		19.05
			20						20
			25						25
25	31		25	25	44				25.4
			32						32

Tool Holder Clamping Type

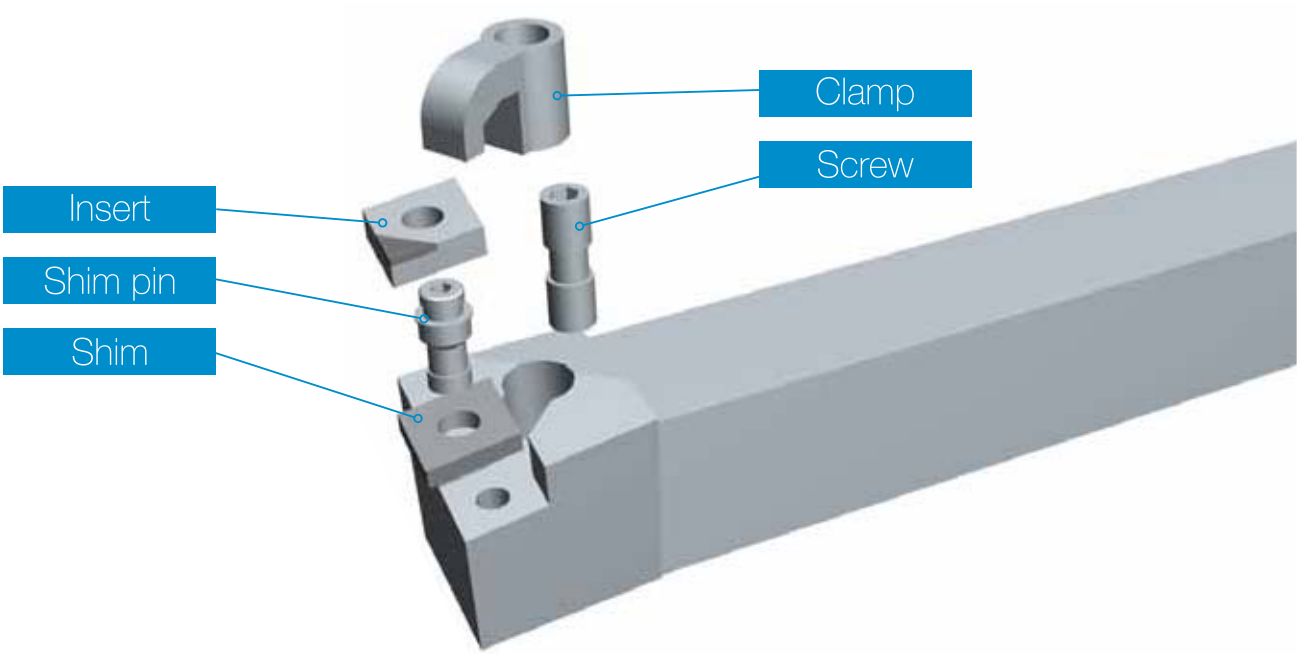
Double clamping



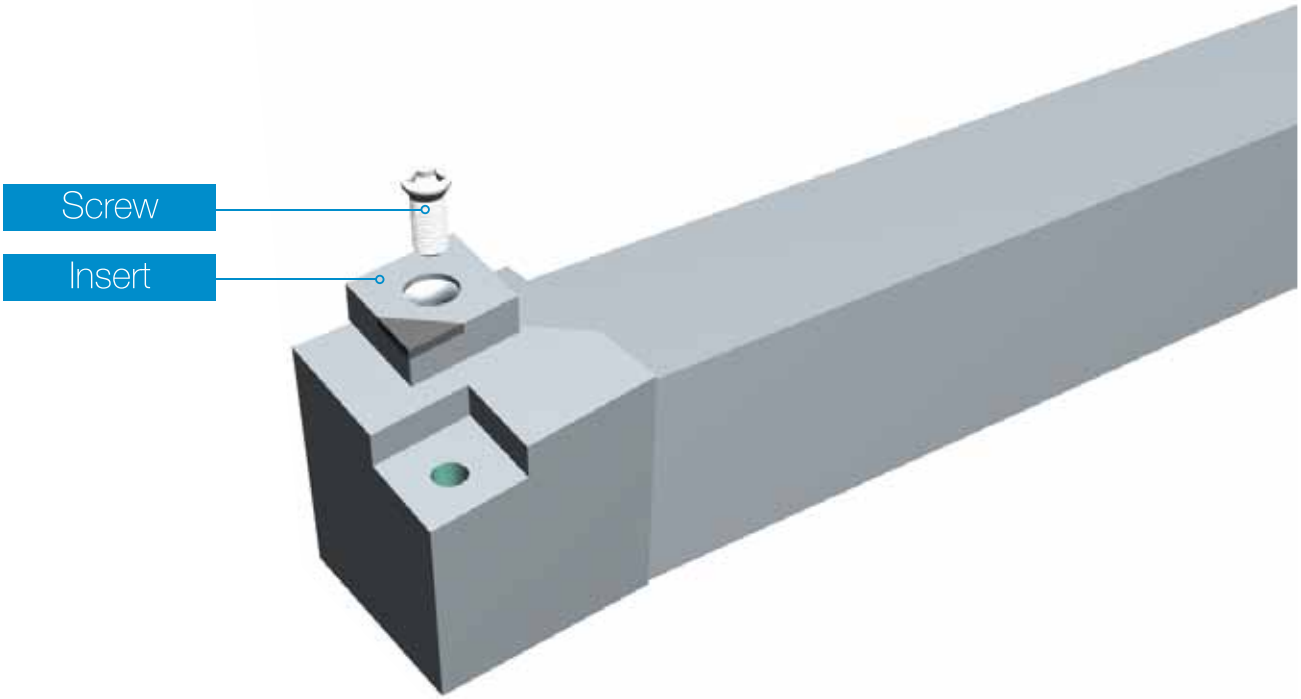
Lever locking



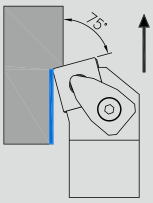
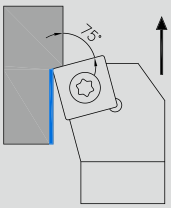
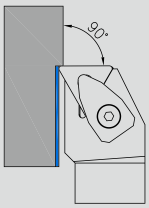
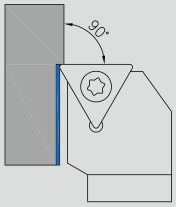
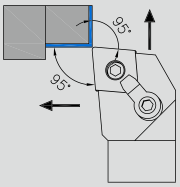
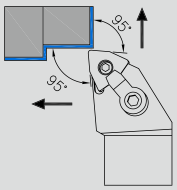
Multi locking

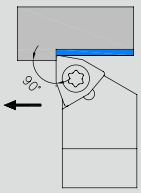
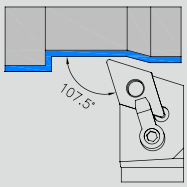
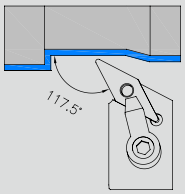
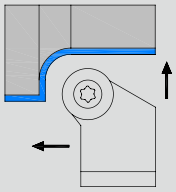
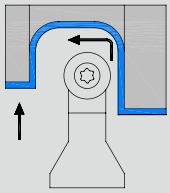
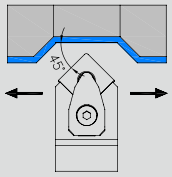


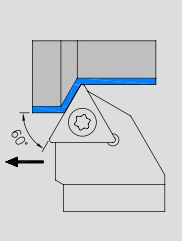
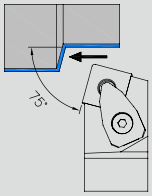
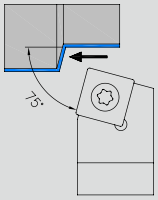
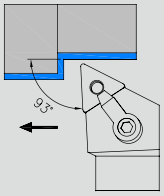
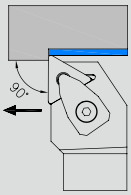
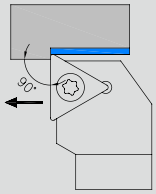
Screw clamping

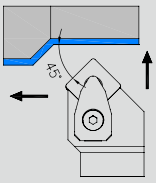
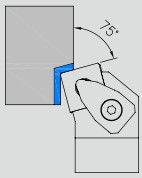
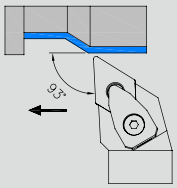
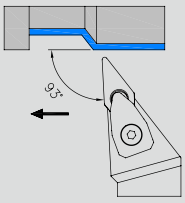
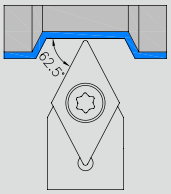
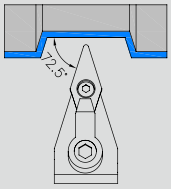


Application Of Holders

Edge/ angle	75° SN□□ type	75° SC□□ type	90° TN□□ type	90° TC□□ type	95° CN□□ type	95° WN□□ type
Touring						
D type			DTFN : 77p		DCLN : 75p	DWLN : 78p
P type			PTFN : 81p		PCLN : 79p	PWLN : 82p
M type	MSKN : 119p		MTFN : 86p		MCCN : 83p	MWLN : 88p
S type		SSKC : 91p		STFC : 92p		

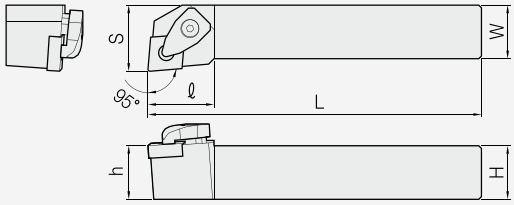
Edge/ angle	90° WC□□ type	107.5° SC□□type	117.5° VN□□type	RC□□ type	RC□□ type	45° SN□□type
Touring						
D type						DSDNN : 76p
P type						PSDNN : 80p
M type		MDQN : 83p	MVQN : 87p			
S type				SRCG : 90p	SRDCN : 90p	

Edge/ angle	60˚ TC□□ type	75˚ SN□□ type	75˚ SC□□ type	93˚ TN□□ type	90˚ TN□□ type	90˚ TC □□type
Touring						
D type		DSBN : 76p			DTGN : 77p	
P type		PSBN : 80p			PTGN : 82p	
M type		MSRN : 85p		MTJN : 86p		
S type	STTC : 93p		SSBC : 91p			STGC : 93p

Edge/ angle	45˚ SN□□type	75˚ SN□□ type	93˚ DN□□ type	93˚ VN□□ type	62.5˚ DN□□ type	72.5˚ VN□□ type
Touring						
D type	DSSN : 77p	DSKN : 76p	DDJN : 75p	DVJN : 78p		DVVNN : 78p
P type	PSSN : 81p		PDJN : 79p		PDMN : 80p	
M type	MSSN : 85p	MSKN : 84p	MDJN : 84p	MVJN : 87p	MDNNN : 61p	MVVNN : 87p
S type						

DCLN R/L
Double Clamping

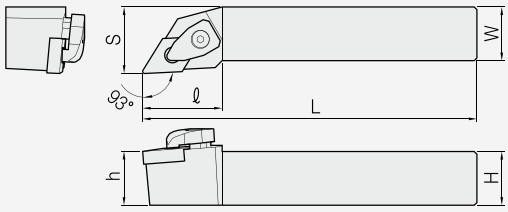
+ CN□□



Insert	Item No.	Dimensions (mm) H	W	L	S	h	ℓ	Clamp	Clamp Screw	Shim	Shim Screw	Spring	Wrench
CN□□1204□□	EH-DCLN R/L 2020-12	20	20	125	25	20	30	DCL4	DCS0518	DSC44	DSCR0410	DSPR0714	W30P
	2525-12	25	25	150	32	25	30						
	3225-12	32	25	170	32	32	30						
	3232-12	32	32	170	40	32	30						

DDJN R/L
Double Clamping

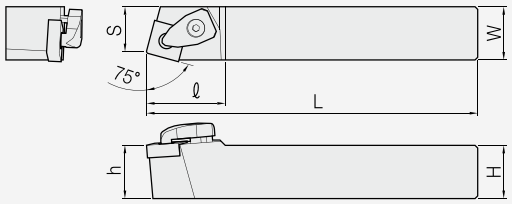
+ DN□□



Insert	Item No.	Dimensions (mm) H	W	L	S	h	ℓ	Clamp	Clamp Screw	Shim	Shim Screw	Spring	Wrench
DN□□1104□□	EH-DDJN R/L 2020-11	20	20	125	25	20	30	DCL3	DCS0415	DSD32	DSCR0307	DSPR0510	W25P
	2525-11	25	25	150	32	25	30						
	3225-11	32	25	170	32	32	30						
	3232-11	32	32	170	40	32	30						
DN□□1506□□	EH-DDJN R/L 2020-15	20	20	125	25	20	35	DCL4	DCS0518	DSD43	DSCR0410	DSPR0714	W30P
	2525-15	25	25	150	32	25	35						
	3225-15	32	25	170	32	32	35						
	3232-15	32	32	170	40	32	35						
DN□□1504□□	EH-DDJN R/L 2020-15-3	20	20	125	25	20	35	DCL4	DCS0518	DSD44	DSCR0410	DSPR0714	W30P
	2525-15-3	25	25	150	32	25	35						
	3232-15-3	32	32	170	40	32	35						

DSBN R/L
Double Clamping

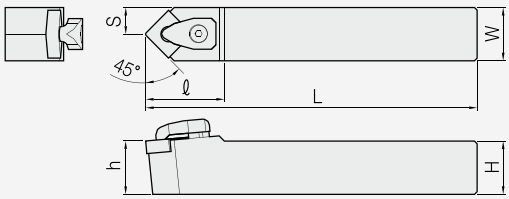
+ SN□□



Insert	Item No.		Dimensions (mm) H	W	L	S	h	ℓ	Clamp	Clamp Screw	Shim	Shim Screw	Spring	Wrench
SN□□0903□□	EH-DSBN R/L	2020-09	20	20	125	17	20	25	DCL3	DCS0415	DSS32	DSCR0307	DSPR0510	W25P
		2525-09	25	25	150	22	25	25						
SN□□1204□□	EH-DSBN R/L	2020-12	20	20	125	17	20	32	DCL4	DCS0518	DSS44	DSCR0410	DSPR0714	W30P
		2525-12	25	25	150	22	25	32						
		3225-12	32	25	170	22	32	32						
		3232-12	32	32	170	27	32	32						

DSDNN
Double Clamping

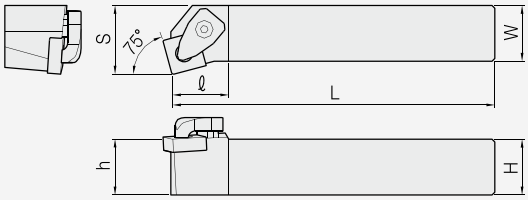
+ SN□□



Insert	Item No.		Dimensions (mm) H	W	L	S	h	ℓ	Clamp	Clamp Screw	Shim	Shim Screw	Spring	Wrench
SN□□0903□□	EH-DSDNN	2020-09	20	20	125	10	20	26.5	DCL3	DCS0415	DSS32	DSCR0307	DSPR0510	W25P
SN□□1204□□	EH-DSDNN	2020-12	20	20	125	10	20	33	DCL4	DCS0518	DSS44	DSCR0410	DSPR0714	W30P
		2525-12	25	25	150	12.5	25	33						
		3225-12	32	25	170	12.5	32	33						
		3232-12	32	32	170	16	32	33						

DSKN R/L
Double Clamping

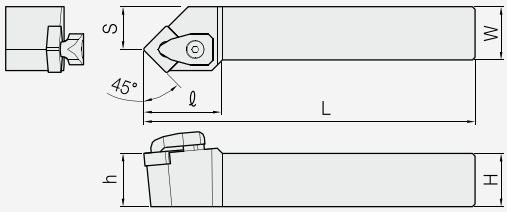
+ SN□□



Insert	Item No.		Dimensions (mm) H	W	L	S	h	ℓ	Clamp	Clamp Screw	Shim	Shim Screw	Spring	Wrench
SN□□0903□□	EH-DSKN R/L	2020-09	20	20	125	25	20	20	DCL3	DCS0415	DSS32	DSCR0307	DSPR0510	W25P
SN□□1204□□	EH-DSKN R/L	2020-12	20	20	125	25	20	23	DCL4	DCS0518	DSS44	DSCR0410	DSPR0714	W30P
		2525-12	25	25	150	32	25	23						
		3232-12	32	32	170	40	32	23						

DSSN R/L
Double Clamping

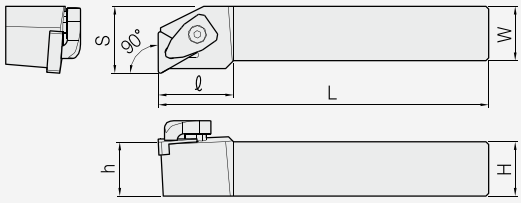
+ **SN□□**



Insert	Item No.	Dimensions (mm) H	W	L	S	h	ℓ	Clamp	Clamp Screw	Shim	Shim Screw	Spring	Wrench
SN□□0903□□	EH-DSSN R/L 2020-09	20	20	125	25	20	28.5	DCL3	DCS0415	DSS32	DSCR0307	DSPR0510	W25P
SN□□1204□□	EH-DSSN R/L 2020-12	20	20	125	25	20	35	DCL4	DCS0518	DSS44	DSCR0410	DSPR0714	W30P
	2525-12	25	25	150	32	25	35						
	3225-12	32	25	170	32	32	35						
	3232-12	32	32	170	40	32	35						

DTFN R/L
Double Clamping

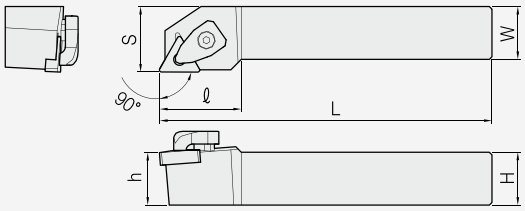
+ **TN□□**



Insert	Item No.	Dimensions (mm) H	W	L	S	h	ℓ	Clamp	Clamp Screw	Shim	Shim Screw	Spring	Wrench
TN□□1604□□	EH-DTFN R/L 2020-16	20	20	125	25	20	24.5	DCL3	DCS0415	DST32	DSCR0307	DSPR0510	W25P
	2525-16	25	25	150	32	25	24.5						
	3232-16	32	32	170	40	32	23.5						
TN□□2204□□	EH-DTFN R/L 2525-22	25	25	150	32	25	33	DCL4	DCS0518	DST44	DSCR0410	DSPR0714	W30P
	3225-22	32	25	170	32	32	33						
	3232-22	32	32	170	40	32	33						

DTGN R/L
Double Clamping

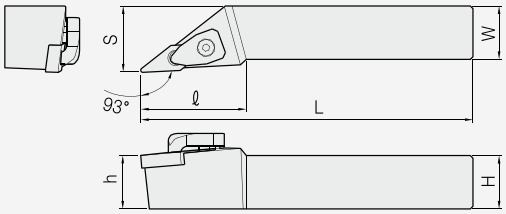
+ **TN□□**



Insert	Item No.	Dimensions (mm) H	W	L	S	h	ℓ	Clamp	Clamp Screw	Shim	Shim Screw	Spring	Wrench
TN□□1604□□	EH-DTGN R/L 2020-16	20	20	125	25	20	24.5	DCL3	DCS0415	DST32	DSCR0307	DSPR0510	W25P
	2525-16	25	25	150	32	25	24.5						
	3232-16	32	32	170	40	32	23.5						
TN□□2204□□	EH-DTGN R/L 2525-22	25	25	150	32	25	32.6	DCL4	DCS0518	DST44	DSCR0410	DSPR0714	W30P
	3225-22	32	25	170	32	32	32.6						
	3232-22	32	32	170	40	32	32.6						

DVJN R/L
Double Clamping

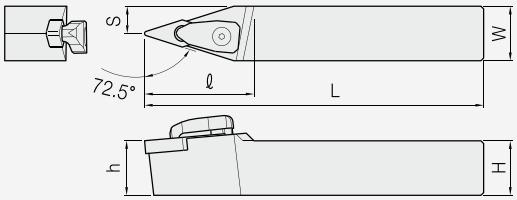
+ VN□□



Insert	Item No.		Dimensions (mm) H	W	L	S	h	ℓ	Clamp	Clamp Screw	Shim	Shim Screw	Spring	Wrench
VN□□1604□□	EH-DVJN R/L	2020-16	20	20	125	25	20	41.5	DCL3	DCS0518	DSV32	DSCR-03508	DSPR0714	W30P
		2525-16	25	25	150	32	25	41.5						
		3232-16	32	32	170	40	32	41.5						

DVVNN
Double Clamping

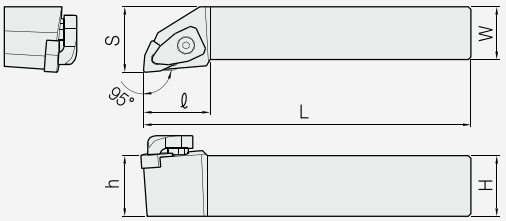
+ VN□□



Insert	Item No.		Dimensions (mm) H	W	L	S	h	ℓ	Clamp	Clamp Screw	Shim	Shim Screw	Spring	Wrench
VN□□1604□□	EH-DVVNN	2020-16	20	20	125	10	20	40	DCL3	DCS0518	DSV32	DSCR-03508	DSPR0714	W30P
		2525-16	25	25	150	12.5	25	40						
		3232-16	32	32	170	16	32	40						

DWLN R/L
Double Clamping

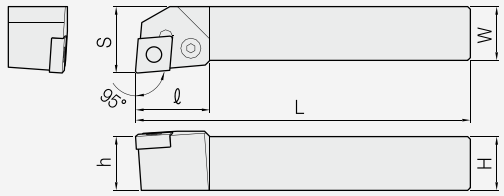
+ WN□□



Insert	Item No.		Dimensions (mm) H	W	L	S	h	ℓ	Clamp	Clamp Screw	Shim	Shim Screw	Spring	Wrench
WN□□0604□□	EH-DWLN R/L	2020-06	20	20	125	25	20	26	DCL3	DCS0415	DSW32	DSCR0307	DSPR0510	W25P
		2525-06	25	25	150	32	25	26						
WN□□0804□□	EH-DWLN R/L	2020-08	20	20	125	25	20	32	DCL4	DCS0518	DSW44	DSCR0410	DSPR0714	W30P
		2525-08	25	25	150	32	25	32						

PCLN R/L
Lever Locking

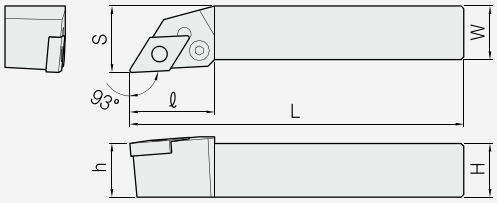
+ CN□□



Insert	Item No.	Dimensions (mm) H	W	L	S	h	ℓ	Lever	Screw	Shim	Shim Pin	Wrench	Shim pin punch
CN□□0903□□	EH-PCLN R/L 1616-09	16	16	100	20	16	20	LV3	LVSCR-0617	LVSC32	LVSP3	W25L	LVSPS3
	2020-09	20	20	125	25	20	22						
	2525-09	25	25	150	32	25	22						
CN□□1204□□	EH-PCLN R/L 1616-12	16	16	100	20	16	28	LV4	LVSCR-0821	LVSC42	LVSP4	W30L	LVSPS4
	2020-12	20	20	125	25	20	28						
	2525-12	25	25	150	32	25	28						
	3225-12	32	25	170	32	32	28						
	3232-12	32	32	170	40	32	28						

PDJN R/L
Lever Locking

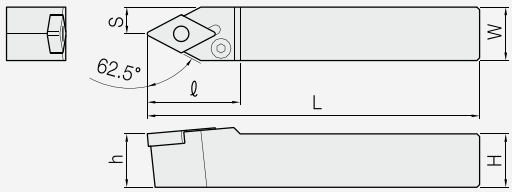
+ DN□□



Insert	Item No.	Dimensions (mm) H	W	L	S	h	ℓ	Lever	Screw	Shim	Shim Pin	Wrench	Shim pin punch
DN□□1104□□	EH-PDJN R/L 1616-11	16	16	100	20	16	25	LV3	LVSCR-0617	LVSD317	LVSP3	W25L	LVSPS3
	2020-11	20	20	125	25	20	25						
	2525-11	25	25	150	32	25	30						
DN□□1506□□	EH-PDJN R/L 2020-15	20	20	125	25	20	35	LV4B	LVSCR-0821	LVSD42	LVSP4	W30L	LVSPS4
	2525-15	25	25	150	32	25	35						
	3225-15	32	25	170	32	32	35						
	3232-15	32	32	170	40	32	35						
DN□□1504□□	EH-PDJN R/L 2020-15-3	20	20	125	25	20	35	LV4	LVSCR-0821	LVSD42	LVSP4	W30L	LVSPS4
	2525-15-3	25	25	150	32	25	35						
	3232-15-3	32	32	170	40	32	35						

PDNN R/L
Lever Locking

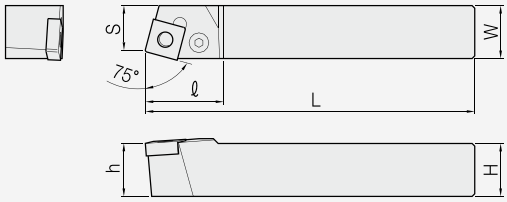
+ DN□□



Insert	Item No.	Dimensions (mm) H	W	L	S	h	ℓ	Lever	Screw	Shim	Shim Pin	Wrench	Shim pin punch
DN□□1506□□	EH-PDNN R/L 2020-15	20	20	125	8	20	37	LV4B	LVSCR-0821	LVSD42	LVSP4	W30L	LVSPS4
	2525-15	25	25	150	12.5	25	37						
	3232-15	32	32	150	16	32	37						
	4025-15	40	25	170	12.5	32	37						
DN□□1504□□	EH-PDNN R/L 2525-15-3	25	25	150	12.5	25	37	LV4	LVSCR-0821	LVSD42	LVSP4	W30L	LVSPS4
	4025-15-3	40	25	150	12.5	25	37						

PSBN R/L
Lever Locking

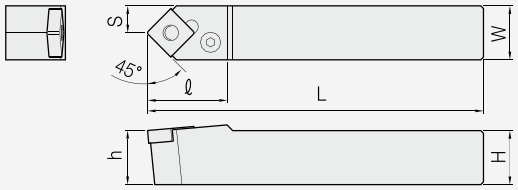
+ SN□□



Insert	Item No.	Dimensions (mm) H	W	L	S	h	ℓ	Lever	Screw	Shim	Shim Pin	Wrench	Shim pin punch
SN□□0903□□	EH-PSBN R/L 1616-09	16	16	100	13	16	21	LV3	LVSCR-0617	LVSS32	LVSP3	W25L	LVSPS3
	2020-09	20	20	125	17	20	23						
SN□□1204□□	EH-PSBN R/L 2020-12	20	20	125	17	20	28	LV4	LVSCR-0821	LVSS42	LVSP4	W30L	LVSPS4
	2525-12	25	25	150	22	25	28						
	3225-12	32	32	170	22	32	28						
	3232-12	32	32	170	27	32	28						

PSDNN
Lever Locking

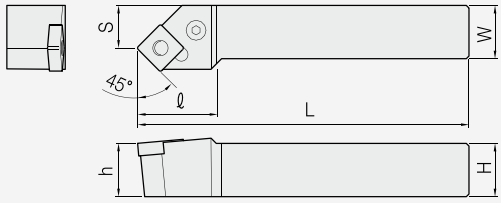
+ SN□□



Insert	Item No.	Dimensions (mm) H	W	L	S	h	ℓ	Lever	Screw	Shim	Shim Pin	Wrench	Shim pin punch
SN□□0903□□	EH-PSDNN 1616-09	16	16	100	13	16	21	LV3	LVSCR0617	LVSS32	LVSP3	W25L	LVSPS3
SN□□1204□□	EH-PSDNN 2020-12	20	20	125	10	20	30	LV4	LVSCR-0821	LVSS42	LVSP4	W30L	LVSPS4
	2525-12	25	25	150	12.5	25	30						
	3232-12	32	32	170	16	32	40						

PSSN R/L
Lever Locking

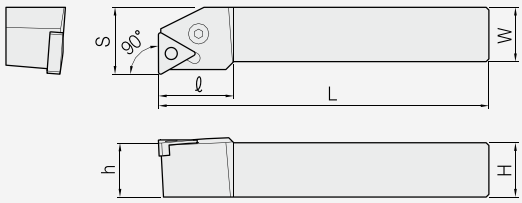
+ SN□□



Insert	Item No.	Dimensions (mm) H	W	L	S	h	ℓ	Lever	Screw	Shim	Shim Pin	Wrench	Shim pin punch
SN□□0903□□	EH-PSSN R/L 1616-09	16	18	100	20	16	25	LV3	LVSCR0617	LVSS32	LVSP10	W25L	LVSPS3
SN□□1204□□	EH-PSSN R/L 2020-12	20	20	125	25	20	30	LV4	LVSCR-0821	LVSS42	LVSP4	W30L	LVSPS4
	2525-12	25	25	150	32	25	36						
	3232-12	32	32	170	40	32	40						

PTFN R/L
Lever Locking

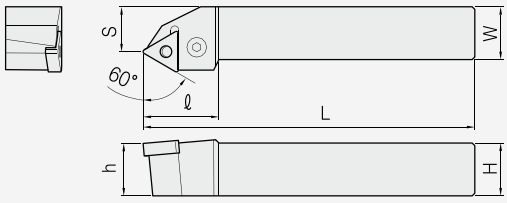
+ TN□□



Insert	Item No.	Dimensions (mm) H	W	L	S	h	ℓ	Lever	Screw	Shim	Shim Pin	Wrench	Shim pin punch
TN□□1604□□	EH-PTFN R/L 1616-16	16	16	100	20	16	20	LV3	LVSCR-0617	LVST317	LVSP3	W25L	LVSPS3
	2020-16	20	20	125	25	20	20						
	2525-16	25	25	150	32	25	20						
TN□□2204□□	EH-PTFN R/L 2525-22	25	25	150	32	25	25	LV4	LVSCR-0821	LVST42	LVSP4	W30L	LVSPS4
	3232-22	32	32	170	40	32	25						

PTTN R/L
Lever Locking

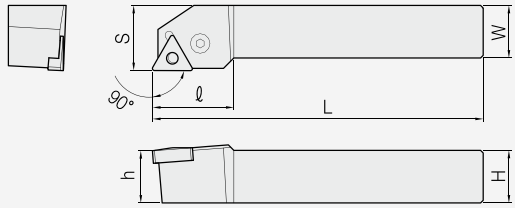
+ TN□□



Insert	Item No.	Dimensions (mm) H	W	L	S	h	ℓ	Lever	Screw	Shim	Shim Pin	Wrench	Shim pin punch
TN□□1604□□	EH-PTTN R/L 1616-16	16	16	100	13	16	25	LV3	LVSCR-0617	LVST317	LVSP3	W25L	LVSPS3
	2020-16	20	20	125	17	20	25						
	2525-16	25	25	150	22	25	32						
TN□□2204□□	EH-PTTN R/L 2525-22	25	25	150	22	25	32	LV4	LVSCR-0821	LVST42	LVSP4	W30L	LVSPS4

PTGN R/L
Lever Locking

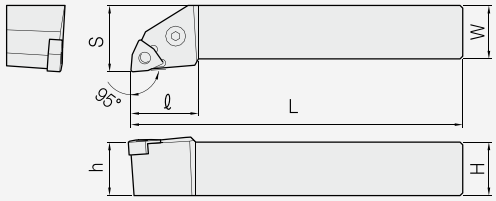
+ **TN□□**



Insert	Item No.	Dimensions (mm) H	W	L	S	h	ℓ	Lever	Screw	Shim	Shim Pin	Wrench	Shim pin punch
TN□□1103□□	EH-PTGN R/L 1212-11	12	12	80	16	12	16	LV2	LVSCR-0509B	-	-	W20L	-
	1616-11	16	16	100	20	16	18						
	2020-11	20	20	125	25	20	19						
	2525-11	25	25	150	32	25	20						
TN□□1604□□	EH-PTGN R/L 1616-16	16	16	100	20	16	20	LV3	LVSCR-0617	LVST317	LVSP3	W25L	LVSPS3
	2020-16	20	20	125	25	20	20						
	2525-16	25	25	150	32	25	20						
	3232-16	32	32	170	40	32	20						
TN□□2204□□	EH-PTGN R/L 2525-22	25	25	150	32	25	28	LV4	LVSCR-0821	LVST42	LVSP4	W30L	LVSPS4
	3232-22	32	32	170	40	32	28						

PWLN R/L
Lever Locking

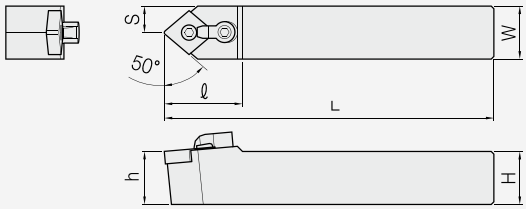
+ **WN□□**



Insert	Item No.	Dimensions (mm) H	W	L	S	h	ℓ	Lever	Screw	Shim	Shim Pin	Wrench	Shim pin punch
WN□□0604□□	EH-PWLN R/L 1616-06	16	16	100	20	16	20	LV3	LVSCR-0617	LVSW-317	LVSP3	W25L	LVSPS3
	2020-06	20	20	125	25	20	20						
	2525-06	25	25	150	32	25	20						
WN□□0804□□	EH-PWLN R/L 2020-08	20	20	125	25	20	26	LV4	LVSCR-0821	LVSW42	LVSP4	W30L	LVSPS4
	2525-08	25	25	150	32	25	26						

MCMNN
Multi Locking

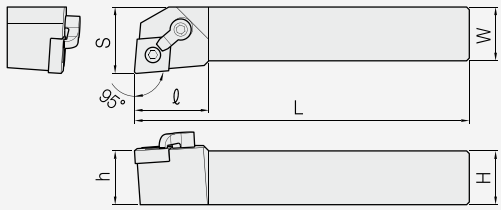
+ **CN□□**



Insert	Item No.	Dimensions (mm) H	W	L	S	h	ℓ	Clamp	Clamp Screw	Shim	Shim Pin	Wrench
CN□□1204□□	EH-MCMNN 2020-12	20	20	125	10	20	32	MCL6N	MCSCR-1/4-25	MSC43	MSP4D	W31.8L W23.8L
	2525-12	25	25	150	12.5	25	32					
	3232-12	32	32	170	16	32	32					

MCLN R/L
Multi Locking

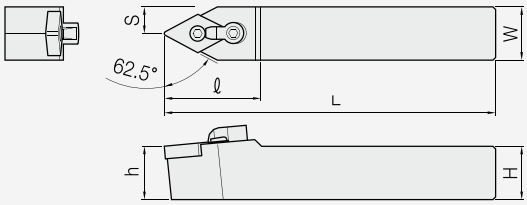
+ **CN**□□



Insert	Item No.	Dimensions (mm) H	W	L	S	h	ℓ	Clamp	Clamp Screw	Shim	Shim Pin	Wrench
CN□□0903□□	EH-MCLN R/L 1616-09	16	16	100	20	16	25	MCL7N	MCSCR-10-32-19	MSC32	MSP3DS	W23.8L W19.8L
	2020-09	20	20	125	25	20	25					
	2525-09	25	25	150	32	25	25					
CN□□1204□□	EH-MCLN R/L 2020-12	20	20	125	25	20	32	MCL6N	MCSCR-1/4-25	MSC43	MSP4D	W31.8L W23.8L
	2525-12	25	25	150	32	25	32					
	3225-12	32	25	170	32	32	32					
	3232-12	32	32	170	40	32	32					

MDNNN
Multi Locking

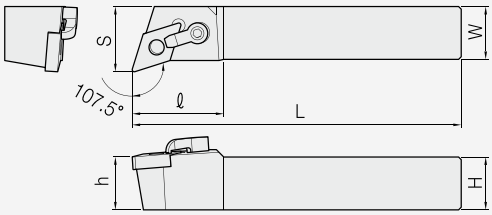
+ **DN**□□



Insert	Item No.	Dimensions (mm) H	W	L	S	h	ℓ	Clamp	Clamp Screw	Shim	Shim Pin	Wrench
DN□□1504□□	EH-MDNNN 2525-15-3	25	25	150	12.5	25	41	MCL8N	MCSCR-5/16-32	MSD43	MSP4D	W39.7L W23.8L
DN□□1506□□	EH-MDNNN 2525-15	25	25	150	12.5	25	41	MCL8N	MCSCR-5/16-32	MSD43	MSP4DL	W39.7L W23.8L

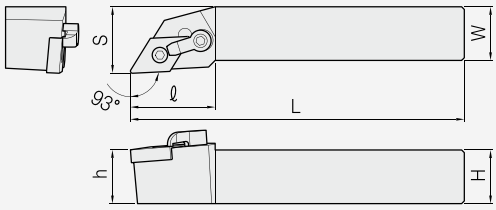
MDQN R/L
Multi Locking

+ **DN**□□



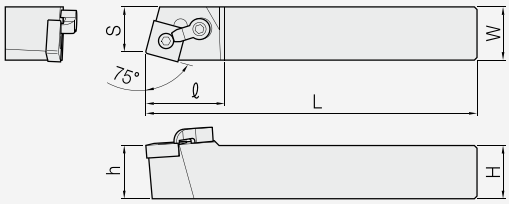
Insert	Item No.	Dimensions (mm) H	W	L	S	h	ℓ	Clamp	Clamp Screw	Shim	Shim Pin	Wrench
DN□□1504□□	EH-MDQN R/L 2525-15-3	25	25	150	32	25	36	MCL6N	MCSCR-1/4-25	MSD43	MSP4D	W31.8L W23.8L
	3232-15-3	32	32	170	40	32	36					
DN□□1506□□	EH-MDQN R/L 2525-15	25	25	150	32	25	36	MCL6N	MCSCR-1/4-25	MSD43	MSP4DL	W31.8L W23.8L
	3232-15	32	32	170	40	32	36					

MDJN R/L
Multi Locking
+ DN□□



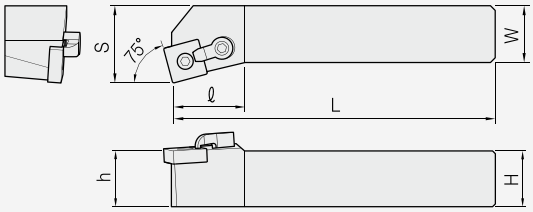
Insert	Item No.	Dimensions (mm) H	W	L	S	h	ℓ	Clamp	Clamp Screw	Shim	Shim Pin	Wrench
DN□□1104□□	EH-MDJN R/L 2020-11	20	20	125	25	20	32	MCL6N	MCSCR-1/4-19	MSD32	MSP3D	W31.8L W19.8L
	2525-11	25	25	150	32	25	32					
DN□□1504□□	EH-MDJN R/L 2020-15-3	20	20	125	25	20	36	MCL6N	MCSCR-1/4-25	MSD43	MSP4D	W31.8L W23.8L
	2525-15-3	25	25	150	32	25	36					
	3232-15-3	32	32	170	40	32	36					
DN□□1506□□	EH-MDJN R/L 2020-15	20	20	125	25	20	36	MCL6N	MCSCR-1/4-25	MSD43	MSP4DL	W31.8L W23.8L
	2525-15	25	25	150	32	25	36					
	3232-15	32	32	170	40	32	36					

MSBN R/L
Multi Locking
+ SN□□



Insert	Item No.	Dimensions (mm) H	W	L	S	h	ℓ	Clamp	Clamp Screw	Shim	Shim Pin	Wrench
SN□□1204□□	EH-MSBN R/L 2020-12	20	20	125	17	20	32	MCL8N1	MCSCR-5/16-32	MSS43	MSP4D	W39.7L W23.8L
	2525-12	25	25	150	22	25	32					

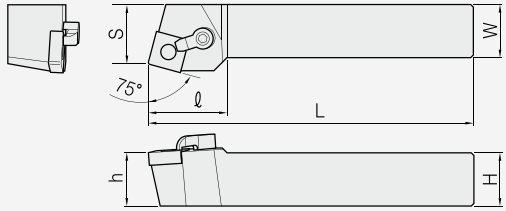
MSKN R/L
Multi Locking
+ SN□□



Insert	Item No.	Dimensions (mm) H	W	L	S	h	ℓ	Clamp	Clamp Screw	Shim	Shim Pin	Wrench
SN□□0903□□	EH-MSKN R/L 1616-09	16	16	100	20	16	28	MCL7N	MCSCR-10-32-19	MSS32	MSP3DS	W19.8L W23.8L
	2020-09	20	20	125	22	20	28					
SN□□1204□□	EH-MSKN R/L 2020-12	20	20	125	25	20	32	MCL8N1	MCSCR-5/16-32	MSS43	MSP4D	W39.7L W23.8L
	2525-12	25	25	150	32	25	32					
	3225-12	32	32	170	32	32	32					

MSRN R/L
Multi Locking

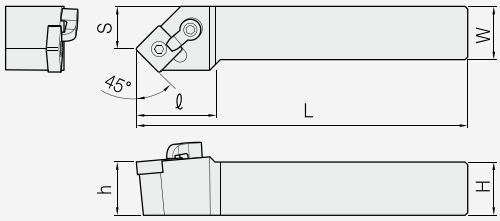
+ SN□□



Insert	Item No.		Dimensions (mm) H	W	L	S	h	ℓ	Clamp	Clamp Screw	Shim	Shim Pin	Wrench
SN□□0903□□	EH-MSRN R/L	1616-09	16	16	100	17	16	28	MCL7N	MCSCR-10-32-19	MSS32	MSP3DS	W19.8L W23.8L
		2020-09	20	20	125	22	20	28					
SN□□1204□□	EH-MSRN R/L	2020-12	20	20	125	22	20	32	MCL8N1	MCSCR-5/16-32	MSS43	MSP4D	W39.7L W23.8L
		2525-12	25	25	150	27	25	32					

MSSN R/L
Multi Locking

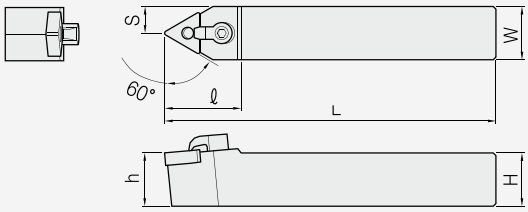
+ SN□□



Insert	Item No.		Dimensions (mm) H	W	L	S	h	ℓ	Clamp	Clamp Screw	Shim	Shim Pin	Wrench
SN□□0903□□	EH-MSSN R/L	1616-09	16	16	100	20	16	28	MCL7N	MCSCR-10-32-19	MSS32	MSP3DS	W19.8L W23.8L
		2020-09	20	20	125	25	20	28					
SN□□1204□□	EH-MSSN R/L	2020-12	20	20	125	25	20	32	MCL8N1	MCSCR-5/16-32	MSS43	MSP4D	W39.7L W23.8L
		2525-12	25	25	150	32	25	32					

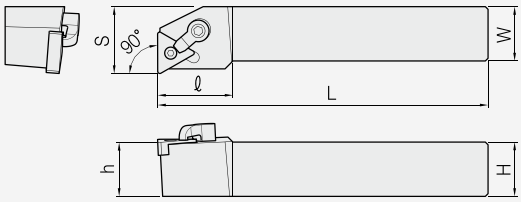
MTENN
Multi Locking

+ TN□□



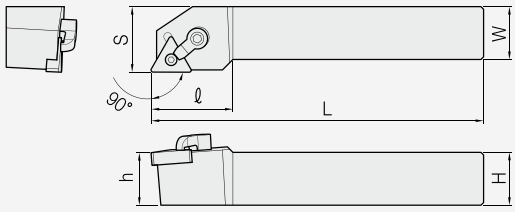
Insert	Item No.		Dimensions (mm) H	W	L	S	h	ℓ	Clamp	Clamp Screw	Shim	Shim Pin	Wrench
TN□□1604□□	EH-MTENN	2020-16	20	20	125	10	20	32	MCL7N	MCSCR-10-32-19	MST32	MSP3D	W23.8L W19.8L
		2525-16	25	25	150	12.5	25	32					
TN□□2204□□	EH-MTENN	2525-22	25	25	150	12.5	25	35	MCL8N1	MCSCR-5/16-32	MST43	MSP4D	W39.7L W23.8L

MTFN R/L
Multi Locking
+ TN□□



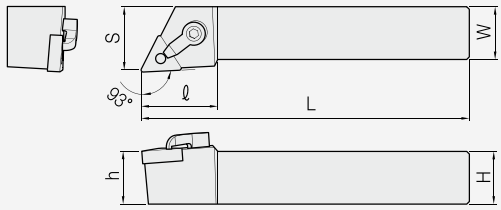
Insert	Item No.	Dimensions (mm) H	W	L	S	h	ℓ	Clamp	Clamp Screw	Shim	Shim Pin	Wrench
TN□□1604□□	EH-MTFN R/L 1616-16	16	16	100	20	16	32	MCL7N	MCSCR-10-32-19	MST32	MSP3D	W23.8L W19.8L
	2020-16	20	20	125	25	20	32					
	2525-16	25	25	150	32	25	32					
TN□□2204□□	EH-MTFN R/L 2525-22	25	25	150	32	25	32	MCL8N1	MCSCR-5/16-32	MST43	MSP4D	W39.7L W23.8L
	3232-22	32	32	170	40	32	32					
	4040-22	40	40	250	50	40	32					

MTGN R/L
Multi Locking
+ TN□□



Insert	Item No.	Dimensions (mm) H	W	L	S	h	ℓ	Clamp	Clamp Screw	Shim	Shim Pin	Wrench
TN□□1604□□	EH-MTGN R/L 1616-16	16	16	100	20	16	32	MCL7N	MCSCR-10-32-19	MST32	MSP3D	W23.8L W19.8L
	2020-16	20	20	125	25	20	32					
	2525-16	25	25	150	32	25	32					
TN□□2204□□	EH-MTGN R/L 2525-22	25	25	150	32	25	32	MCL8N1	MCSCR-5/16-32	MST43	MSP4D	W39.7L W23.8L
	3232-22	32	32	170	40	32	32					

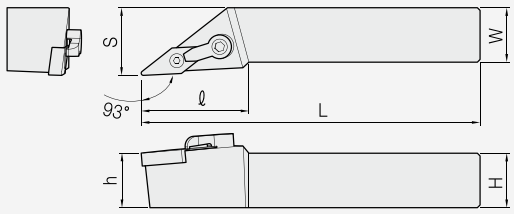
MTJN R/L
Multi Locking
+ TN□□



Insert	Item No.	Dimensions (mm) H	W	L	S	h	ℓ	Clamp	Clamp Screw	Shim	Shim Pin	Wrench
TN□□1604□□	EH-MTJN R/L 2020-16	20	20	125	25	20	32	MCL7N	MCSCR-10-32-19	MST32	MSP3D	W23.8L W19.8L
	2525-16	25	25	150	32	25	32					
TN□□2204□□	EH-MTJN R/L 2525-22	25	25	150	32	25	32	MCL8N1	MCSCR-5/16-32	MST43	MSP4D	W39.7L W23.8L
	3232-22	32	32	170	40	32	32					

MVJN R/L
Multi Locking

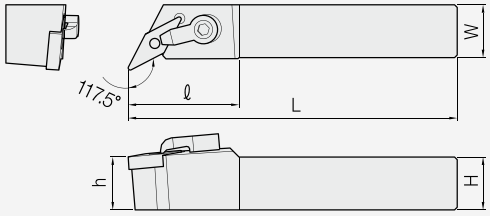
+ VN□□



Insert	Item No.	Dimensions (mm) H	W	L	S	h	ℓ	Clamp	Clamp Screw	Shim	Shim Pin	Wrench
VN□□1604□□	EH-MVJN R/L 2020-16	20	20	125	25	20	37	MCL8N1	MCSCR-5/16-32	MSV32	MSP3D	W39.7L W23.8L
	2525-16	25	25	150	32	25	37					
	3232-16	32	32	170	40	32	37					

MVQN R/L
Multi Locking

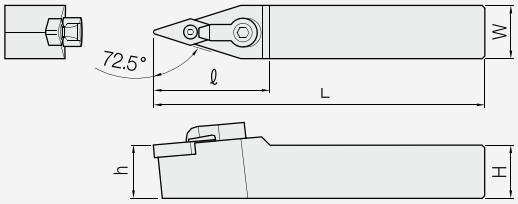
+ VN□□



Insert	Item No.	Dimensions (mm) H	W	L	S	h	ℓ	Clamp	Clamp Screw	Shim	Shim Pin	Wrench
VN□□1604□□	EH-MVQN R/L 2020-16	20	20	125	25	20	42	MCL8N2		MSV32	MSP3D	W39.7L W19.8L
	2525-16	25	25	150	32	25	42					
	3232-16	32	32	170	40	32	37					

MVVNN
Multi Locking

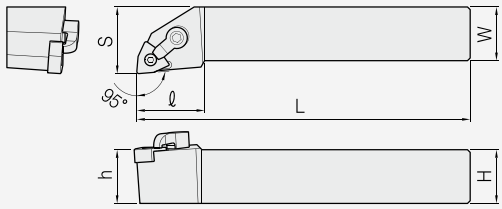
+ VN□□



Insert	Item No.	Dimensions (mm) H	W	L	S	h	ℓ	Clamp	Clamp Screw	Shim	Shim Pin	Wrench
VN□□1604□□	EH-MVVNN 2020-16	20	20	125	25	20	42	MCL8N2		MSV32	MSP3D	W39.7L W19.8L
	2525-16	25	25	150	32	25	42					

MWLN R/L
Multi Locking

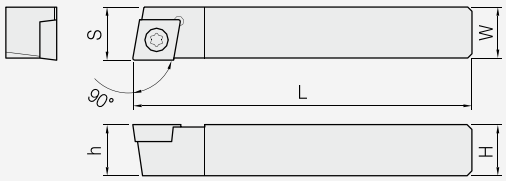
+ **WN**□□



Insert	Item No.	Dimensions (mm) H	W	L	S	h	ℓ	Clamp	Clamp Screw	Shim	Shim Pin	Wrench
WN□□0604□□	EH-MWLN R/L 2020-06	20	20	125	25	20	32	MCL7N	MCSCR-10-32-19	MSW32	MSP3D	W23.8L W19.8L
	2525-06	25	25	150	32	25	32					
	3232-06	32	32	170	40	32	32					
WN□□0804□□	EH-MWLN R/L 2020-08	20	20	125	25	20	32	MCL8N	MCSCR-1/4-21	MSW43	MSP4D	HW31.8L HW23.8L
	2525-08	25	25	150	32	25	32					
	3232-08	32	32	170	40	32	32					

SCAC R/L
Screw On

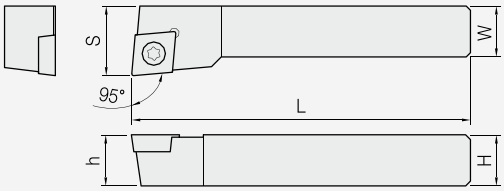
+ **CC**□□



Insert	Item No.	Dimensions (mm) H	W	L	S	h	Screw	Shim	Shim Screw	Wrench
CC□□0602□□	EH-SCAC R/L 1010-06	10	10	70	10.5	10	SCR02565	-	-	TW07P
CC□□09T3□□	1212-09	12	12	80	12.5	12	SCR03508	-	-	TW15P

SCLC R/L
Screw On

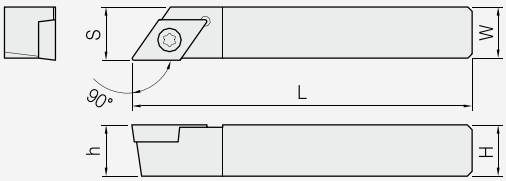
+ **CC**□□



Insert	Item No.	Dimensions (mm) H	W	L	S	h	ℓ	Screw	Shim	Shim Screw	Wrench
CC□□0602□□	EH-SCLC R/L 0808-06	08	08	60	10	08	10	SCR02565	-	-	TW07P
	1010-06	10	10	70	16	10	10				
CC□□09T3□□	EH-SCLC R/L 1212-09	12	12	80	20	12	16	SCR03508	-	-	TW15P
	1616-09	16	16	100	20	16	16				
	2020-09	20	20	125	25	20	16				
CC□□1204□□	EH-SCLC R/L 2020-12	20	20	125	25	20	25	SCR0411F	SSC42	SSCR0610	TW15P W40L
	2525-12	25	25	150	32	25	26				

SDAC R/L
Screw On

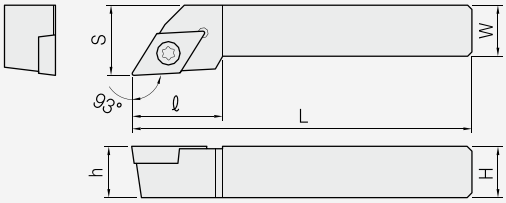
+ DC□□



Insert	Item No.	Dimensions (mm) H	W	L	S	h	Screw	Shim	Shim Screw	Wrench
DC□□0702□□	EH-SDAC R/L 1010-07	10	10	70	10.5	10	SCR02565	-	-	TW07P
DC□□11T3□□	EH-SDAC R/L 1212-11	12	12	80	12.5	12	SCR03508	-	-	TW15P
	1616-11	16	16	100	16.5	16	SCR03512	SSD32	SSCR0509	TW15P,W35L

SDJC R/L
Screw On

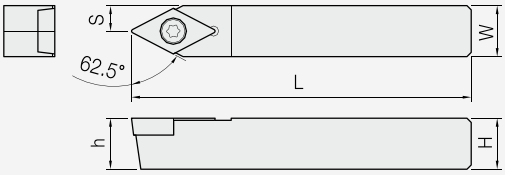
+ DC□□



Insert	Item No.	Dimensions (mm) H	W	L	S	h	ℓ	Screw	Shim	Shim Screw	Wrench
DC□□0702□□	EH-SDJC R/L 1010-07	10	10	70	12	10	15	SCR02565	-	-	TW07P
	1212-07	12	12	80	16	12	15				
	1616-07	16	16	100	20	16	18				
	2020-07	20	20	125	25	20	15				
DC□□11T3□□	EH-SDJC R/L 1212-11	12	12	80	16	12	15	SCR03512	SSD32	SSCR0509	TW15P,W35L
	1616-11	16	16	100	20	16	24				
	2020-11	20	20	125	25	20	24				
	2525-11	25	25	150	32	25	29				

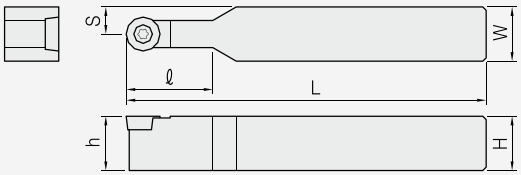
SDNCN
Screw On

+ DC□□



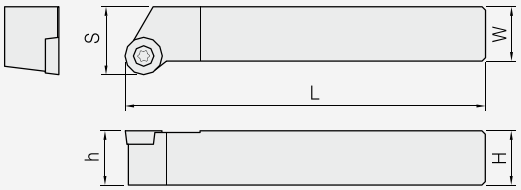
Insert	Item No.	Dimensions (mm) H	W	L	S	h	Screw	Shim	Shim Screw	Wrench
DC□□0702□□	EH-SDNCN 1010-07	10	10	70	5	10	SCR02565	-	-	TW07P
	1212-07	12	12	80	6	12				
DC□□11T3□□	EH-SDNCN 1212-11	12	12	100	6	12	SCR03508	-	-	TW15P
DC□□11T3□□	EH-SDNCN 1616-11	16	16	100	8	16	SCR03512	SSD32	SSCR0509	TW15P W35L
	2020-11	20	20	125	10	20				

SRDCN
Screw On
+ RCGT



Insert	Item No.		Dimensions (mm) H	W	L	S	h	ℓ	Screw	Shim	Shim Screw	Wrench
RCGT 0602M0	EH-SRDCN	1010-06	10	10	70	5	10	10	SCR02565	-	-	TW07P
		1212-06	12	12	80	6	12	12				
		1616-06	16	16	100	8	16	12				
		2525-06	25	25	150	12.5	25	20				
RCGT 0803M0	EH-SRDCN	1616-08	16	16	100	8	16	16	SCR0307	-	-	TW09P
		2020-08	20	20	125	10	20	20				
		2525-08	25	25	150	12.5	25	20				
RCGT 1003M0	EH-SRDCN	1616-10	16	16	100	8	16	25	SCR03511A	SSR10	SSCR0509	TW15P,W35L
		2020-10	20	20	125	10	20	25				
		2525-10	25	25	150	12.5	25	25				
RCGT 1204M0	EH-SRDCN	2020-12	20	20	125	10	20	28	SCR03512	SSR12	SSCR0509	TW15P,W35L
		2525-12	25	25	150	12.5	25	28				

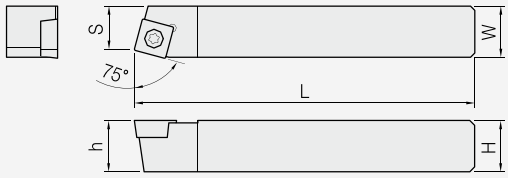
SRGC R/L
Screw On
+ RCGT



Insert	Item No.		Dimensions (mm) H	W	L	S	h	ℓ	Screw	Shim	Shim Screw	Wrench
RCGT 0602M0	EH-SRGC R/L	1010-06	10	10	70	12	10	-	SCR02565	-	-	TW07P
		1212-06	12	12	80	16	12	-				
		1616-06	16	16	100	20	16	-				
RCGT 0803M0	EH-SRGC R/L	1616-08	16	16	100	20	16	-	SCR0307	-	-	TW09P
		2020-08	20	20	125	25	20	-				
		2525-08	25	25	150	32	25	-				
RCGT 1003M0	EH-SRGC R/L	1616-10	16	16	100	20	16	-	SCR03511A	SSR10	SSCR0509	TW15P,W35L
		2020-10	20	20	125	25	20	-				
		2525-10	25	25	150	32	25	-				
RCGT 1204M0	EH-SRGC R/L	2020-12	20	20	125	25	20	-	SCR03512	SSR12	SSCR0509	TW15P,W35L
		2525-12	25	25	150	32	25	-				

SSBC R/L
Screw On

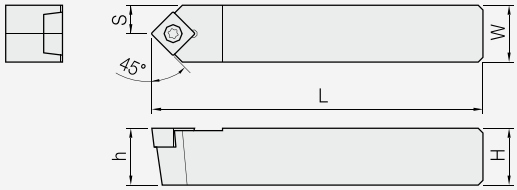
+ SC□□



Insert	Item No.		Dimensions (mm) H	W	L	S	h		Screw	Shim	Shim Screw	Wrench
SC□□09T3□□	EH-SSBC R/L	1212-09	12	12	80	11	12		SCR03508	-	-	TW15P
		1616-09	16	16	100	13	16		SCR03512	SSS32	SSCR0509	TW15P,W35L
SC□□1204□□	EH-SSBC R/L	2020-12	20	20	125	17	20		SCR0411F	SSS42	SSCR0610	TW15P,W35L

SSDCN
Screw On

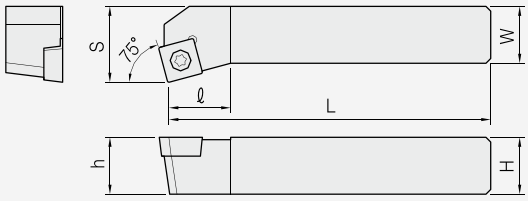
+ SC□□



Insert	Item No.		Dimensions (mm) H	W	L	S	h		Screw	Shim	Shim Screw	Wrench
SC□□09T3□□	EH-SSDCN	1212-09	12	12	80	6	12		SCR03508	-	-	TW15P
		1616-09	16	16	100	8	16		SCR03512	SSS32	SSCR0509	TW15P,W35L

SSKC R/L
Screw On

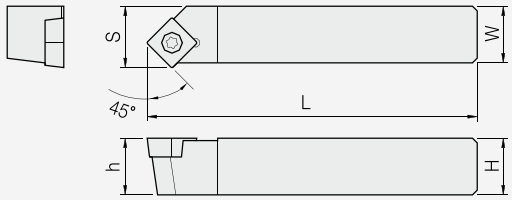
+ SC□□



Insert	Item No.		Dimensions (mm) H	W	L	S	h	ℓ	Screw	Shim	Shim Screw	Wrench
SC□□09T3□□	EH-SSKC R/L	1616-09	16	16	100	20	16	13	SCR03512	SSS32	SSCR0509	TW15P,W35L

SSSC R/L
Screw On

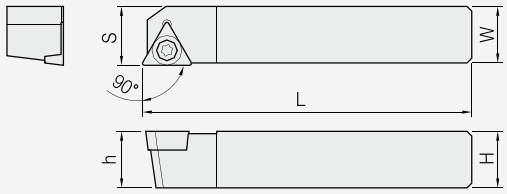
+ SC□□



Insert	Item No.		Dimensions (mm) H	W	L	S	h		Screw	Shim	Shim Screw	Wrench
SC□□09T3□□	EH-SSSC R/L	1616-09	16	16	100	17	16		SCR03512	SSS32	SSCR0509	TW15P,W35L
SC□□1204□□		2020-12	20	20	125	21	20		SCR0411F	SSS42	SSCR0610	TW15P,W40L

STAC R/L
Screw On

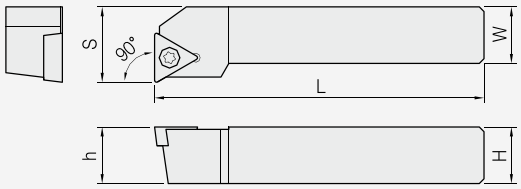
+ TC□□



Insert	Item No.		Dimensions (mm) H	W	L	S	h		Screw	Shim	Shim Screw	Wrench
TC□□0902□□	EH-STAC R/L	1010-09	10	10	70	10.5	10		SCR02206	-	-	TW06P
TC□□1102□□		1212-11	12	12	80	12.5	12		SCR02565	-	-	TW07P

STFC R/L
Screw On

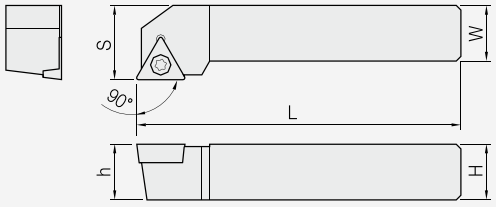
+ TC□□



Insert	Item No.		Dimensions (mm) H	W	L	S	h	ℓ	Screw	Shim	Shim Screw	Wrench
TC□□0902□□	EH-STFC R/L	1010-09	10	10	70	12	10	10	SCR02206	-	-	TW06P
TC□□1102□□	EH-STFC R/L	1212-11	12	12	80	16	12	14	SCR02565	-	-	W07P
		1616-11	16	16	100	20	16	14				
TC□□16T3□□	EH-STFC R/L	1616-16	16	16	100	20	16	19	SCR03512	SST32	SSCR0509	TW15P,W35L
		2020-16	20	20	125	25	20	19				

STGC R/L
Screw On

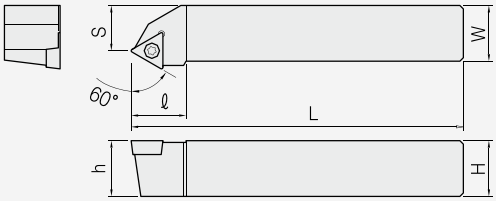
+ TC□□



Insert	Item No.		Dimensions (mm) H	W	L	S	h	ℓ	Screw	Shim	Shim Screw	Wrench
TC□□0902□□	EH-STGC R/L	0808-09	8	8	60	10	8	11	SCR02206	-	-	TW06P
		1010-09	10	10	70	12	10	11				
TC□□1102□□	EH-STGC R/L	1212-11	12	12	80	16	12	14	SCR02565	-	-	TW07P
		1616-11	16	16	100	20	16	16				
TC□□16T3□□	EH-STGC R/L	2020-16	20	20	125	25	20	21	SCR03512	SST32	SSCR0509	TW15P,W35L
		2525-16	25	25	150	32	25	21				

STTC R/L
Screw On

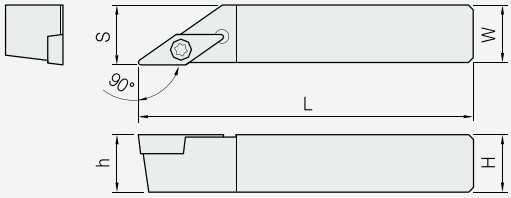
+ TC□□



Insert	Item No.		Dimensions (mm) H	W	L	S	h	ℓ	Screw	Shim	Shim Screw	Wrench
TC□□1102□□	EH-STTC R/L	1010-09	16	16	100	13	16	14	SCR02565	-	-	TW07P
TC□□16T3□□	EH-STTC R/L	1212-11	16	16	100	13	16	19	SCR03512	SST32	SSCR0509	TW15P,W35L
		1616-11	20	20	125	17	20	19				

SVAB R/L
Screw On

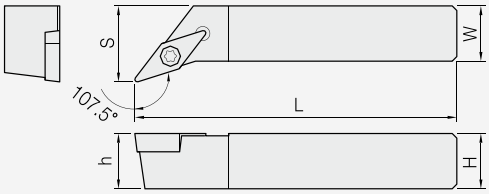
+ VB□□



Insert	Item No.		Dimensions (mm) H	W	L	S	h	Screw	Shim	Shim Screw	Wrench
VB□□1604□□	EH-SVAB R/L	1616-16	16	16	100	16.5	16	SCR03512	SSV32	SSCR0509	TW15P,W35L
		2020-16	20	20	125	20.5	20				

SVHB R/L
Screw On

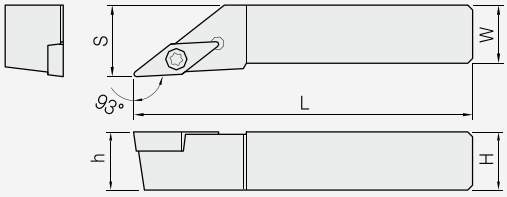
+ VB□□



Insert	Item No.		Dimensions (mm) H	W	L	S	h		Screw	Shim	Shim Screw	Wrench
VB□□1604□□	EH-SVHB R/L	2525-16	25	25	150	32	25		SCR03512	SSV32	SSCR0509	TW15P,W35L
		3225-16	32	32	170	32	32					

SVJB R/L
Screw On

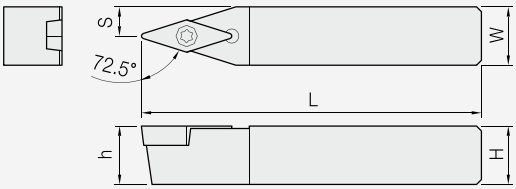
+ VB□□



Insert	Item No.		Dimensions (mm) H	W	L	S	h	ℓ	Screw	Shim	Shim Screw	Wrench
VB□□1102□□	EH-SVJB R/L	1212-11	12	12	80	16	12	27	SCR02565	-	-	TW07P
		1616-11	16	16	100	20	16	27				
		2020-11	20	20	125	25	20	27				
VB□□1604□□	EH-SVJB R/L	1616-16	16	16	100	20	16	36	SCR03512	SSV32	SSCR0509	TW15P W35L
		2020-16	20	20	125	25	20	41				
		2525-16	25	25	150	32	25	41				
		3225-16	32	25	170	32	32	55				

SVVBN
Screw On

+ VB□□

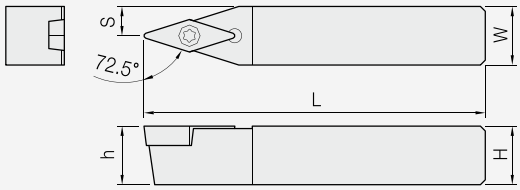


Insert	Item No.		Dimensions (mm) H	W	L	S	h	ℓ	Screw	Shim	Shim Screw	Wrench
VB□□1102□□	EH-SVVBN	1212-11	12	12	80	6	12		SCR02565	-	-	TW07P
		1616-11	16	16	100	8	16					
		2020-11	20	20	125	10	20					
VB□□1604□□	EH-SVVBN	1616-16	16	16	100	8	16		SCR03512	SSV32	SSCR0509	TW15P W35L
		2020-16	20	20	125	10	20					
		2525-16	25	25	150	12.5	25					
		3225-16	32	25	170	12.5	32					

SVVCN

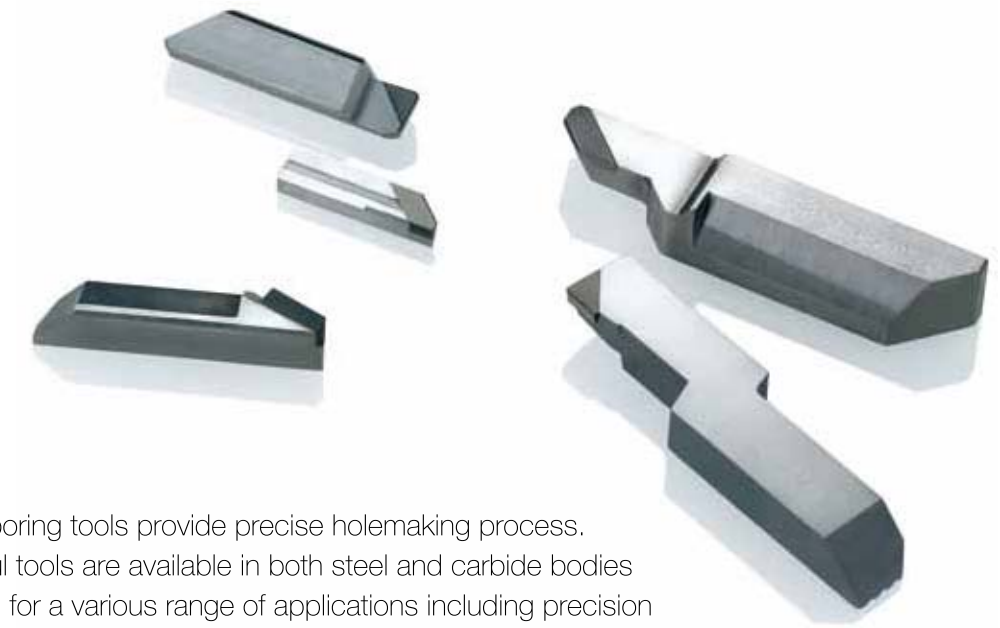
Screw On

+ **VC□□**



Insert	Item No.		Dimensions (mm) H	W	L	S	h		Screw	Shim	Shim Screw	Wrench
VC□□1103□□	EH-SVVCN	1212-11	12	12	80	6	12	-	SCR02565	-	-	TW07P
		1616-11	16	16	100	8	16	-				
		2020-11	20	20	125	10	20	-				
VC□□1303□□	EH-SVVCN	1212-13	12	12	80	6	12	-	SCR0307	-	-	TW09P
		1616-13	16	16	100	8	16	-				
		2020-13	20	20	125	10	20	-				
VC□□1604□□	EH-SVVCN	1616-16	16	16	100	6	16	-	SCR03512	SSV32	SSCR0509	TW15P,W35L
		2020-16	20	20	125	8	20	-				
		2525-16	25	25	150	12.5	25	-				

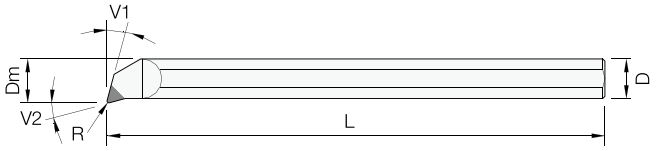
Boring



The EHWA boring tools provide precise holemaking process. These trustful tools are available in both steel and carbide bodies and are ideal for a various range of applications including precision micro boring.

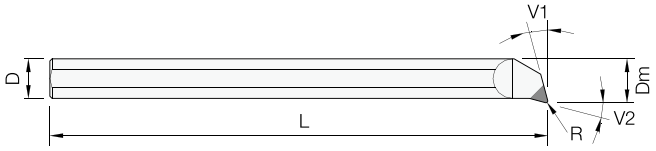
Boring

BS type | PCD/PCBN

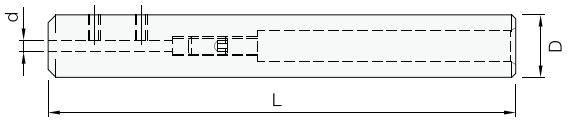


Item No.		Dimensions (mm)						PCD		PCBN	
		R	V1	V2	L	D	Dm	EP20	EP55	EB190	EB51
BSR	25 60 005	0.05	15	15	60	2.5	3				
	25 60 01	0.1	15	15	60	2.5	3				
	30 60 005	0.05	15	15	60	3	3.5				
	30 60 01	0.1	15	15	60	3	3.5				
	40 60 01	0.1	15	15	60	4	4.5				
	40 60 02	0.2	15	15	60	4	4.5				
	50 60 01	0.1	15	15	60	5	5.5				
	50 60 02	0.2	15	15	60	5	5.5				
	60 80 01	0.1	15	15	80	6	7				
	60 80 02	0.2	15	15	80	6	7				

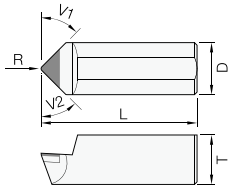
BS type | PCD/PCBN



Item No.		Dimensions (mm)						PCD		PCBN	
		R	V1	V2	L	D	Dm	EP20	EP55	EB190	EB51
BSL	25 60 005	0.05	15	15	60	2.5	3				
	25 60 01	0.1	15	15	60	2.5	3				
	30 60 005	0.05	15	15	60	3	3.5				
	30 60 01	0.1	15	15	60	3	3.5				
	40 60 01	0.1	15	15	60	4	4.5				
	40 60 02	0.2	15	15	60	4	4.5				
	50 60 01	0.1	15	15	60	5	5.5				
	50 60 02	0.2	15	15	60	5	5.5				
	60 80 01	0.1	15	15	80	6	7				
	60 80 02	0.2	15	15	80	6	7				

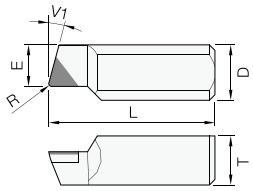


Item No.		Dimensions (mm)			
		d	L	H	D
SLV	16 025	2.5	100	14	16
	16 03	3	100	14	16
	16 04	4	100	14	16
	16 05	5	100	14	16
	16 06	6	100	14	16



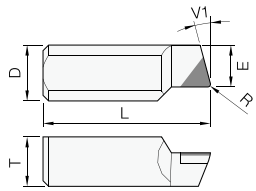
BR type | PCD/PCBN

Item No.	Dimensions (mm)					PCD		PCBN	
	R	V1	V2	L	D	EP20	EP55	EB190	EB51
BRC 40 15 02	0.2	45	45	15	4				
40 15 04	0.4	45	45	15	4				
50 15 02	0.2	45	45	15	5				
50 15 04	0.4	45	45	15	5				
60 20 02	0.2	45	45	20	6				
60 20 04	0.4	45	45	20	6				
80 30 04	0.4	45	45	30	8				
80 30 08	0.8	45	45	30	8				



BR type | PCD/PCBN

Item No.	Dimensions (mm)						PCD		PCBN	
	R	V1	E	L	D	T	EP20	EP55	EB190	EB51
BRR 40 15 02	0.2	15	15	15	4	3.5				
40 15 04	0.4	15	15	15	4	3.5				
50 15 02	0.2	15	15	15	5	4.5				
50 15 04	0.4	15	15	15	5	4.5				
60 20 02	0.2	20	20	20	6	5.5				
60 20 04	0.4	20	20	20	6	5.5				
80 30 04	0.4	30	30	30	8	7				
80 30 08	0.8	30	30	30	8	7				

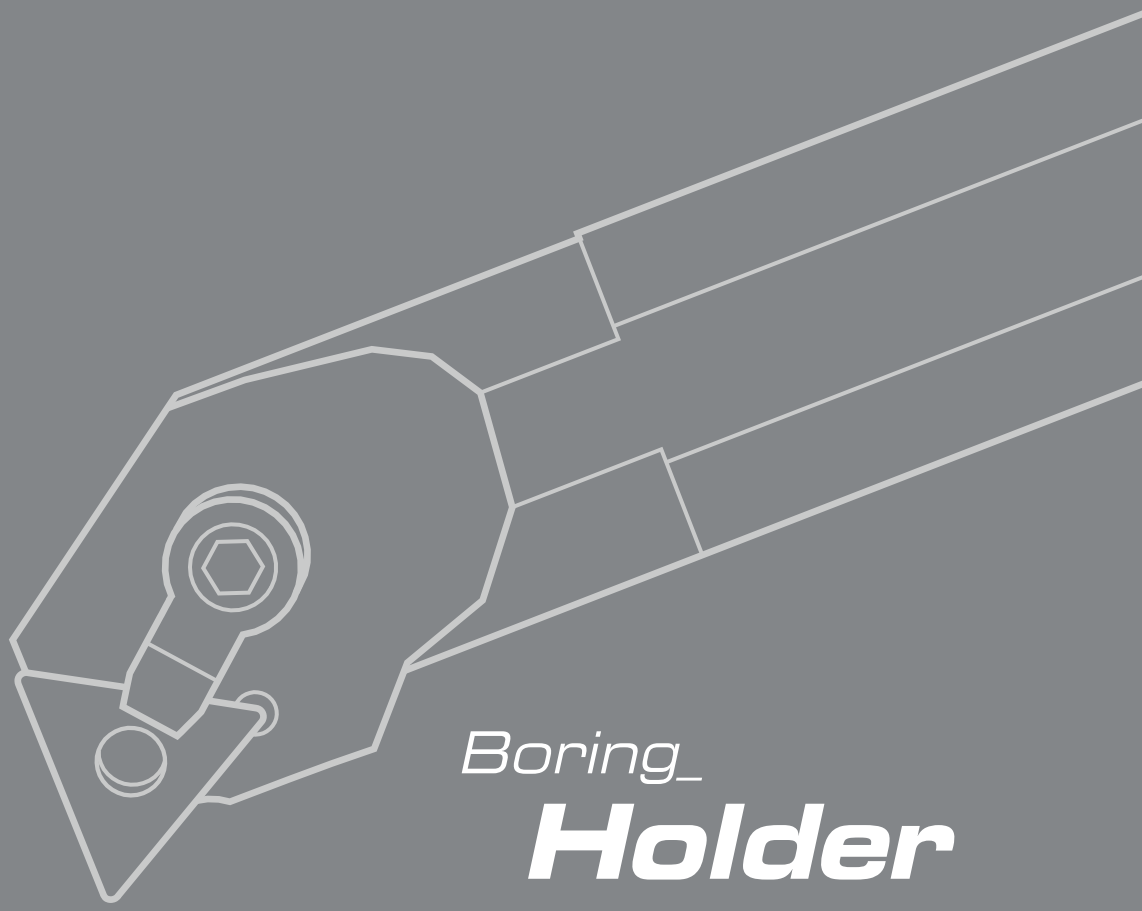


BR type | PCD/PCBN

Item No.	Dimensions (mm)						PCD		PCBN	
	R	V1	E	L	D	T	EP20	EP55	EB190	EB51
BRL 40 15 02	0.2	15	15	15	4	3.5				
40 15 04	0.4	15	15	15	4	3.5				
50 15 02	0.2	15	15	15	5	4.5				
50 15 04	0.4	15	15	15	5	4.5				
60 20 02	0.2	20	20	20	6	5.5				
60 20 04	0.4	20	20	20	6	5.5				
80 30 04	0.4	30	30	30	8	7				
80 30 08	0.8	30	30	30	8	7				

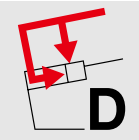
MEMO

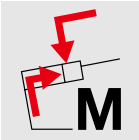
EHWA

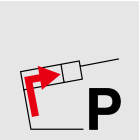


Boring_ Holder

How to combine the holder





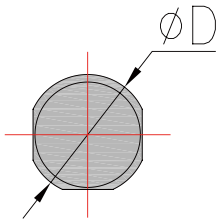


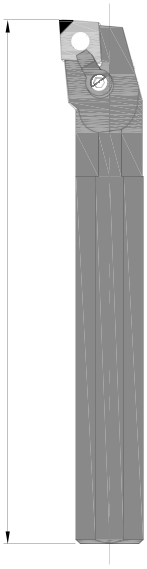
D Double clamping
M Multi locking
P Lever locking
S Screw clamping

E 25 R - M

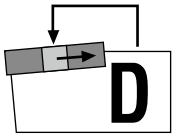
Shank material	Insert diameter	Tool length	Clamp type

A	STEEL SHANK+OIL HOLE
E	TC SHANK+OIL HOLE
C	TC SHANK
S	STEEL SHANK
X	SPECIAL

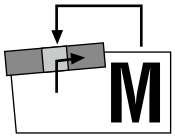




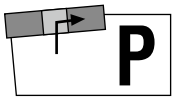
Symbol (L)	Length (mm)
H	100
J	110
K	125
M	150
N	160
Q	180
R	200
S	250
T	300
U	350
V	400
W	450
Y	500



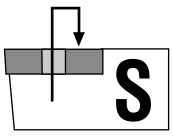
Double clamping



Multi locking



Lever locking



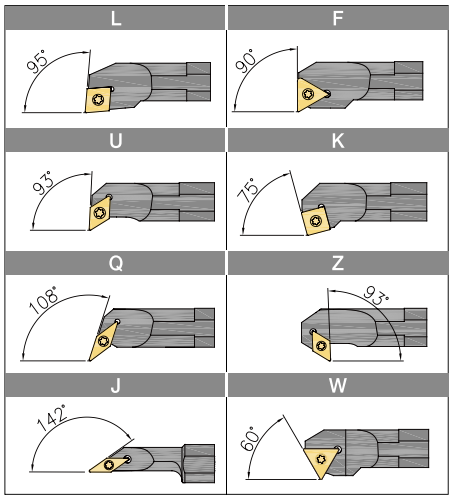
Screw clamping

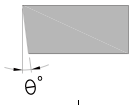
S K D R - 12

1

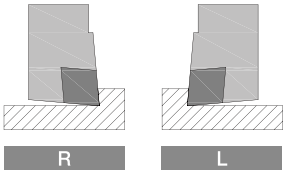
Insert shape	Tool style	Clearance angle	Cutting direction

Symbol	Shape
C	
D	
K	
S	
T	
V	
W	





Symbol	Angle
N	0°
B	5°
C	7°
P	11°

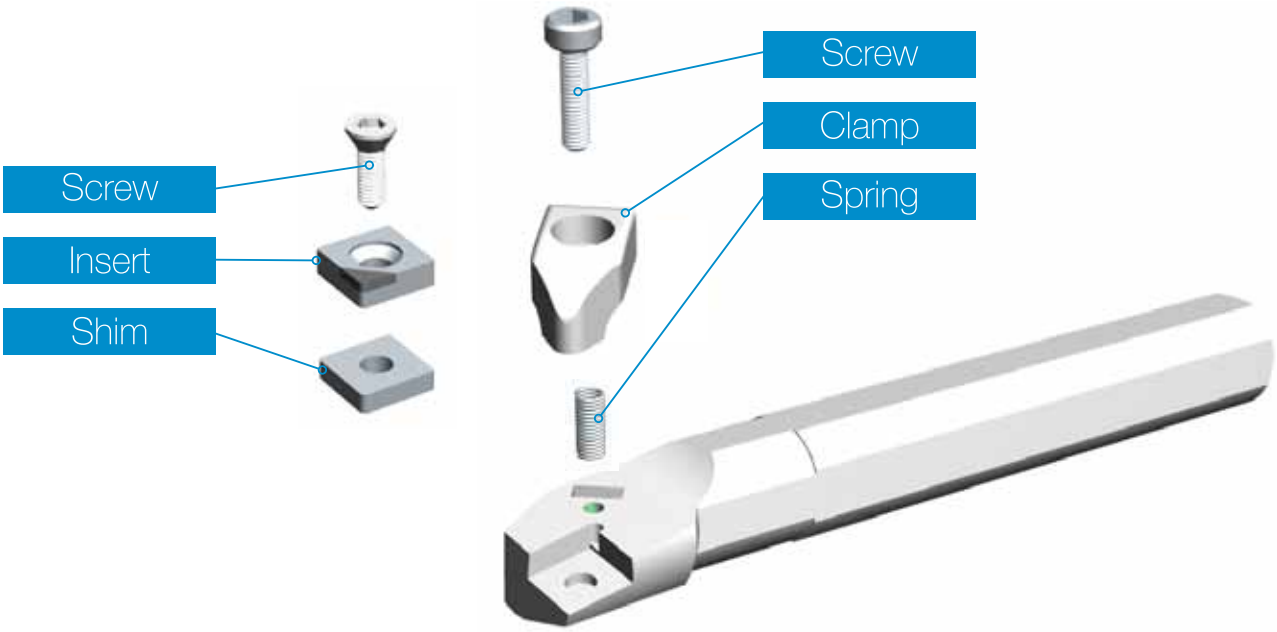


1 Cutting edge length

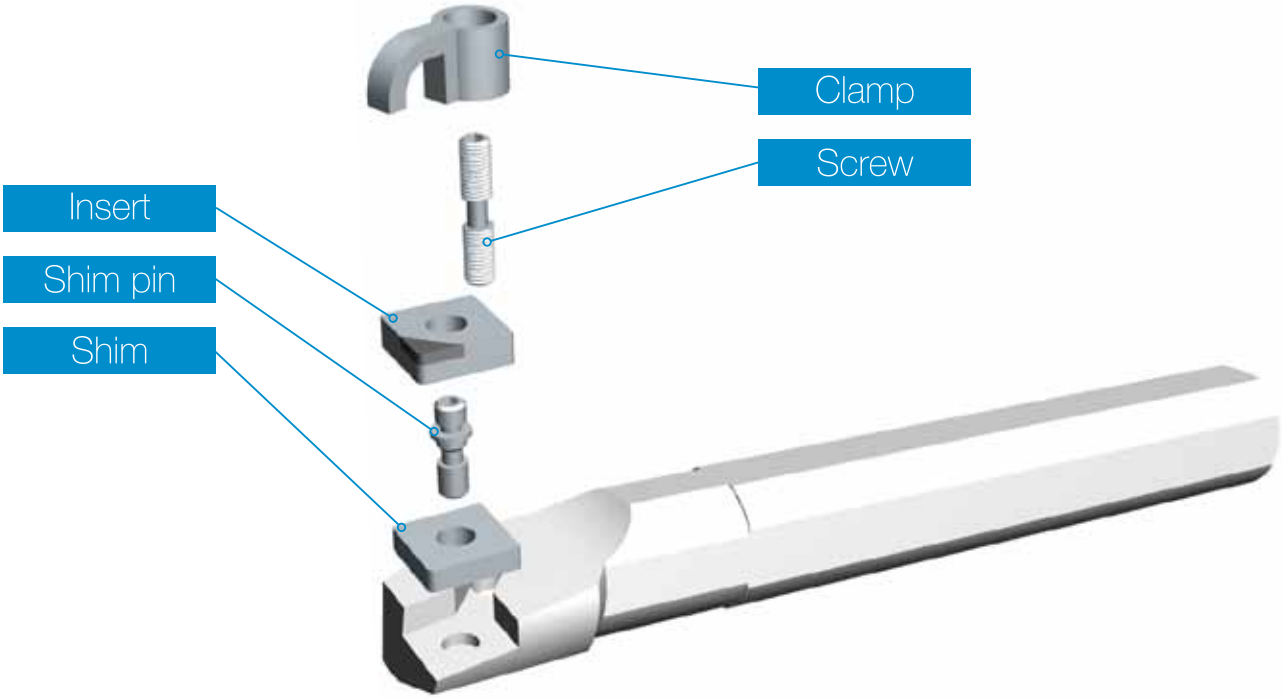
C	D	E	R	S	T	V	W	K	I.C size (mm)
03	04			03	06				3.97
05	06			05	09	09	03		5.56
06	07			06	11	11	04		6.35
08	09			07	13	13	05		7.94
			08						8
09	11		09	09	16	16	06	16	9.525
			10						10
			12						12
12	15	13	12.7	12	22	22	08		12.7
16	19		15	15	27	27	10		15.875
			16						16
19	23		19	19	33	33	13		19.05
			20						20
			25						25
25	31		25	25	44				25.4
			32						32

Tool Holder Clamping Type

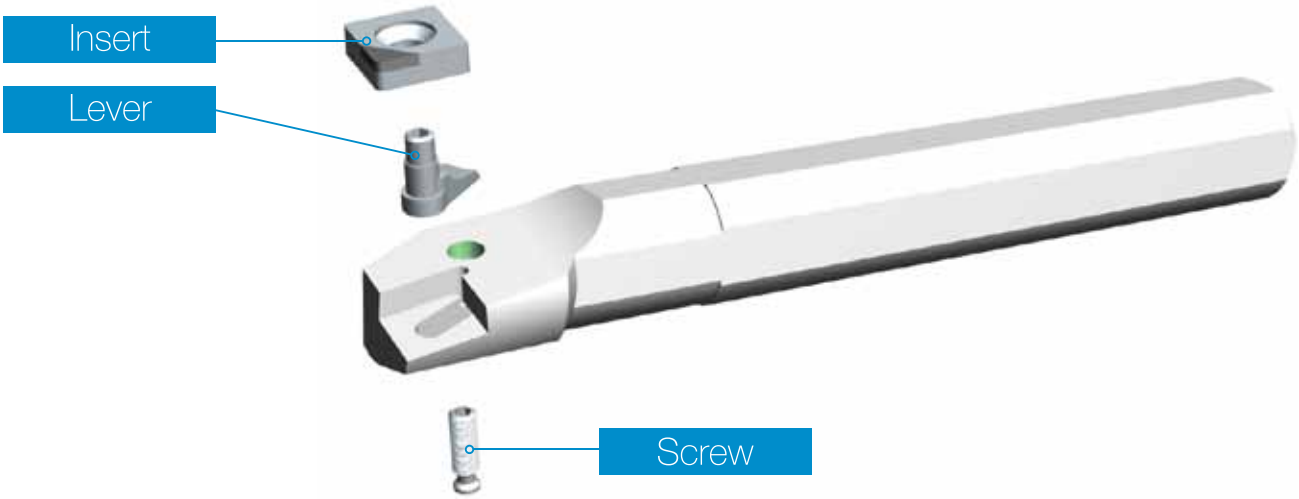
Double clamping



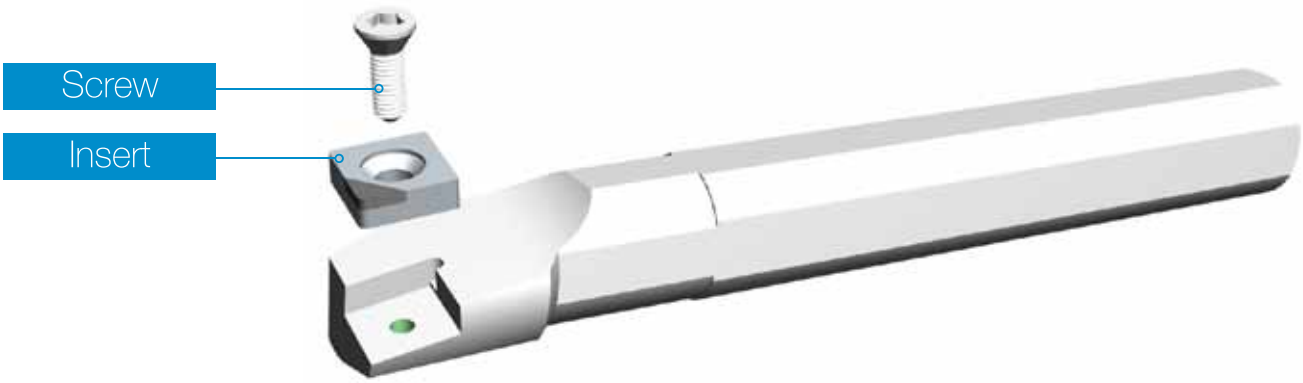
Multi locking



Lever locking

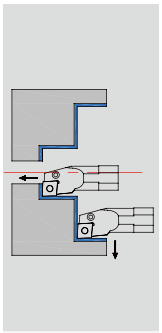
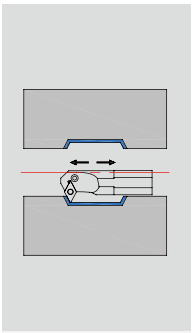
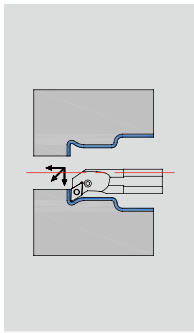
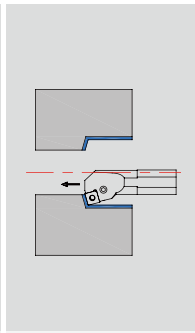
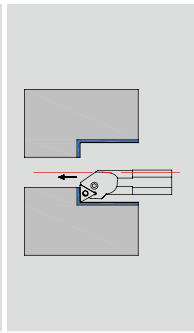
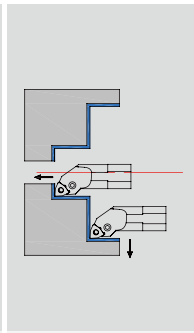


Screw clamping

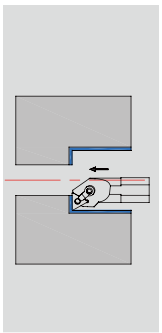
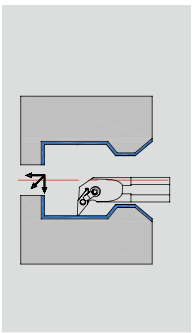
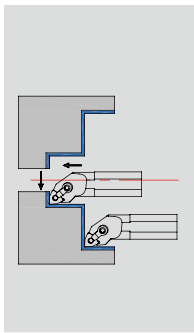
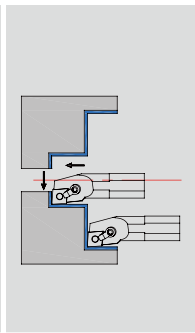
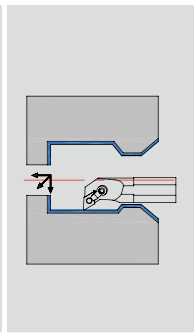
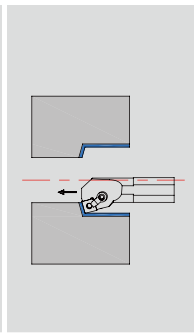


Application Of Holder

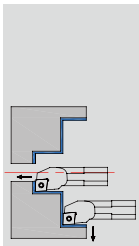
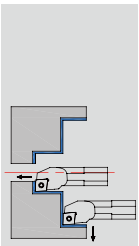
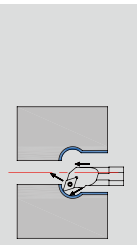
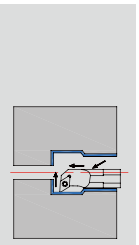
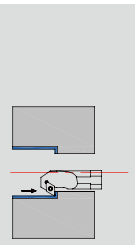
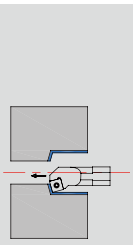
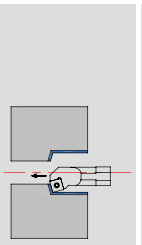
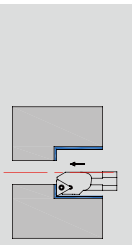
Lever lock system

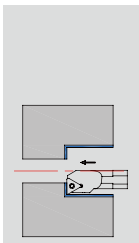
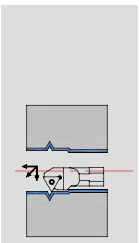
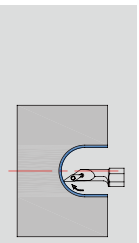
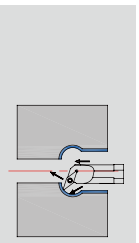
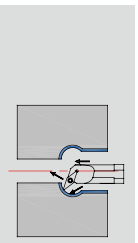
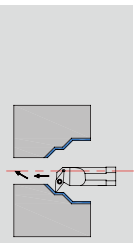
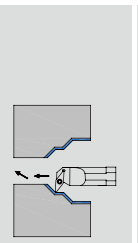
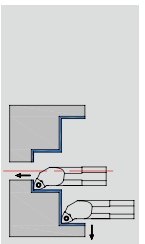
Cutting shape						
Designation	PCLNR/L	PDSNR/L	PDUNR/L	PSKNR/L	PTFNR/L	PWLNR/L
Approach angle	95°	62.5°	93°	75°	90°	95°
Page	108	108	109	109	110	110
Copying		●	●			
Facing	●					●
Back truning		●	●			●
Turning	●	●	●	●	●	●

Multi lock system

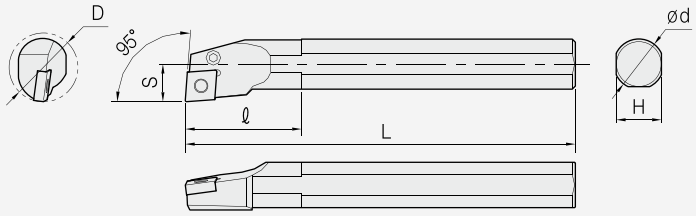
Cutting shape						
Designation	MTFNR/L	MVUNR/L	MWLNR/L	MCLNR/L	MDUNR/L	MSKNR/L
Approach angle	90°	93°	95°	95°	93°	75°
Page	111	111	111	119	119	119
Copying		●			●	
Facing			●	●		
Back truning		●			●	
Turning	●	●	●	●	●	●

Screw on system

Cutting shape								
Designation	SCLCR/L	SCLPR/L	SDQCR/L	SDUCR/L	SDZCR/L	SSKCR/L	SSKPR/L	STFCR/L
Approach angle	95°	95°	107.5°	93°	3°	75°	75°	90°
Page	112	112	113	113	114	114	115	115
Copying			●	●				
Facing	●	●						
Back truning			●	●	●			
Turning	●	●	●	●	●	●	●	●

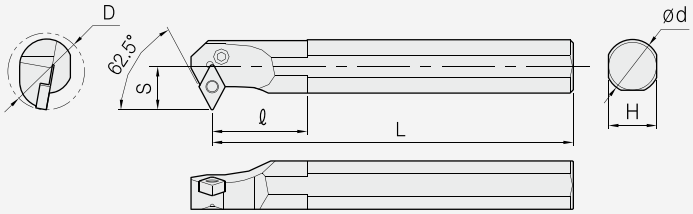
Cutting shape								
Designation	STFPR/L	STWPR/L	SVJCR/L	SVQBR/L	SVQCR/L	SVUBR/L	SVUCR/L	SWLCR/L
Approach angle	90°	60°	142°	108°	108°	93°	93°	95°
Page	116	114	116	117	117	117	118	118
Copying			●	●	●	●	●	●
Facing								
Back truning				●	●	●	●	●
Turning	●	●	●	●	●	●	●	●

PCLN R/L
Lever Locking
+ CN□□



Insert	Item No.	Dimensions (mm) ØD	Ød	H	L	S	ℓ	Lever	Screw	Shim	Shim Pin	Shim pin punch	Wrench
CN□□0903□□	EH-S16R-PCLN R/L-09	20	16	15	200	11	28	LV3C	LVSCR0509B	-	-	-	W20L
	EH-S20S-PCLN R/L-09	25	20	18	250	19	32						
	EH-S25R-PCLN R/L-09	32	25	23	200	17	36						
CN□□1204□□	EH-S25R-PCLN R/L-12	32	25	23	200	17	40	LV4A	LVSCR0613A	-	-	-	W25L
CN□□1204□□	EH-S32S-PCLN R/L-12	40	32	30	250	22	50	LV4	LVSCR0821	LVSC42B	LVSP4	LVSP4	W30L
	EH-S40T-PCLN R/L-12	50	40	37	300	27	55						
	EH-S50U-PCLN R/L-12	63	50	47	350	35	55						

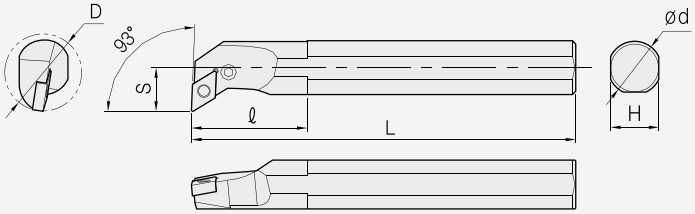
PDSN R/L
Lever Locking
+ DN□□



Insert	Item No.	Dimensions (mm) ØD	Ød	H	L	S	ℓ	Lever	Screw	Shim	Shim Pin	Shim pin punch	Wrench
DN□□1506□□	EH-S32S-PDSN R/L-15	40	32	30	250	22	45	LV4B	LVSCR0821	LVSD42	LVSP4	LVSP4	W30L
	EH-S40T-PDSN R/L-15	50	40	37	300	27	43						
DN□□1504□□	EH-S32S-PDSN R/L-15-3	40	32	30	450	22	45	LV4	LVSCR0821	LVSD42	LVSP4	LVSP4	W30L
	EH-S40T-PDSN R/L-15-3	50	40	37	300	27	43						
DN□□1506□□	EH-A32S-PDSN R/L-15	40	32	31	250	22	45	LV4B	LVSCR0821	LVSD42	LVSP4	LVSP4	W30L
DN□□1504□□	EH-A32S-PDSN R/L-15-3	40	32	31	250	22	45	LV4	LVSCR0821	LVSD42	LVSP4	LVSP4	W30L

PDUN R/L
Lever Locking

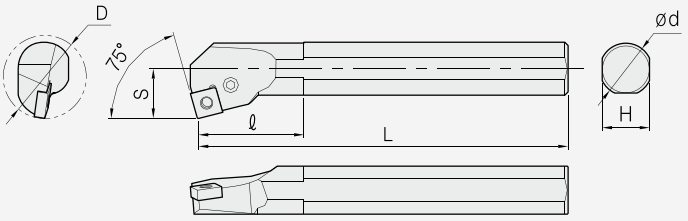
+ DN□□



Insert	Item No.	Dimensions (mm) ØD	Ød	H	L	S	ℓ	Lever	Screw	Shim	Shim Pin	Shim pin punch	Wrench
DN□□1104□□	EH-S20S-PDUN R/L-11	25	20	18	250	13	30	LV3D	LVSCR0512B	-	-	-	W20L
	EH-S25R-PDUN R/L-11	32	25	23	200	17	35	LV3	LVSCR0617	LVSD317	LVSP3	LVSP3	W25L
	EH-S32S-PDUN R/L-11	40	32	30	250	22	40						
DN□□1506□□	EH-S32S-PDUN R/L-15	40	32	30	250	22	50	LV4B	LVSCR0821	LVSD42	LVSP4	LVSP4	W30L
	EH-S40T-PDUN R/L-15	50	40	37	300	27	50						
	EH-S50U-PDUN R/L-15	63	50	47	350	35	63						
DN□□1504□□	EH-S32S-PDUN R/L-15-3	40	32	30	250	22	50	LV4	LVSCR0821	LVSD42	LVSP4	LVSP4	W30L
	EH-S40T-PDUN R/L-15-3	50	40	37	300	27	50						
DN□□1506□□	EH-A32S-PDUN R/L-15	40	32	31	250	22	50	LV4B	LVSCR0821	LVSD42	LVSP4	LVSP4	W30L
DN□□1504□□	EH-A32S-PDUN R/L-15-3	40	32	31	250	22	50	LV4	LVSCR0821	LVSD42	LVSP4	LVSP4	W30L

PSKN R/L
Lever Locking

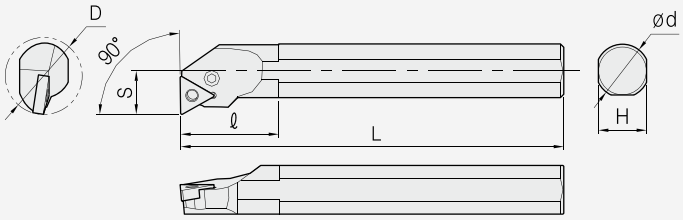
+ SN□□



Insert	Item No.	Dimensions (mm) ØD	Ød	H	L	S	ℓ	Lever	Screw	Shim	Shim Pin	Shim pin punch	Wrench
SN□□1204□□	EH-S25R-PSKN R/L-12	32	25	23	200	17	42	LV4A	LVSCR0613A	-	-	-	W25L
	EH-S32S-PSKN R/L-12	40	32	30	250	22	45	LV4	LVSCR0821	LVSS42B	LVSP4	LVSP4	W30L
	EH-S40T-PSKN R/L-12	50	40	37	300	27	50						
SN□□1204□□	EH-A25R-PSKN R/L-12	32	25	23	200	17	42	LV4A	LVSCR0613A	-	LVSP4	-	W25L
SN□□1204□□	EH-A32S-PSKN R/L-12	40	32	30	250	22	50	LV4	LVSCR0821	LVSS42B	LVSP4	LVSP4	W30L

PTFN R/L
Lever Locking

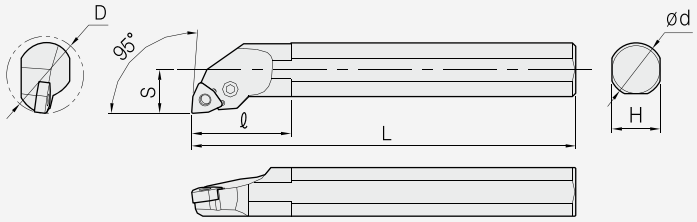
+ TN□□



Insert	Item No.	Dimensions (mm) ØD	Ød	H	L	S	ℓ	Lever	Screw	Shim	Shim Pin	Shim pin punch	Wrench
TN□□1103□□	EH-S16R-PTFN R/L-11	20	16	15	200	11	28	LV2	LVSCR0509B	-	-	-	W25L
	EH-S20S-PTFN R/L-11	25	20	18	250	13	33						
	EH-S25R-PTFN R/L-11	32	25	23	200	17	36						
TN□□1604□□	EH-S25R-PTFN R/L-16	32	25	23	200	17	42	LV3B	LVSCR0512B	-	-	-	W20L
	EH-S32S-PTFN R/L-16	44	32	30	250	22	50	LV3	LVSCR0617	LVST317B	LVSP3	LVSP3	W25L
	EH-S40T-PTFN R/L-16	54	40	37	300	27	55						
	EH-A25R-PTFN R/L-16	32	25	24	200	17	40						
	EH-A32S-PTFN R/L-16	40	32	31	250	22	50						

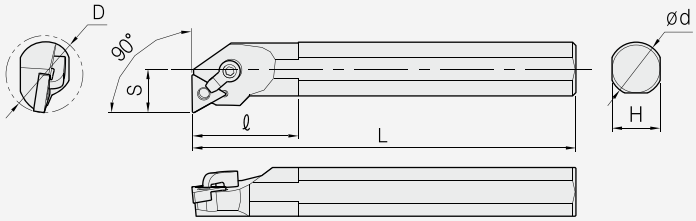
PWLN R/L
Lever Locking

+ WN□□



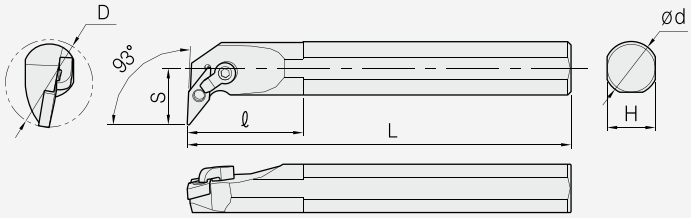
Insert	Item No.	Dimensions (mm) ØD	Ød	H	L	S	ℓ	Lever	Screw	Shim	Shim Pin	Shim pin punch	Wrench
WN□□0604□□	EH-S20S-PWLN R/L-06	25	20	18	250	13	40	LV3B	LVSCR0512B	-	-	-	W20L
	EH-S25R-PWLN R/L-06	32	25	23	200	17	40						
	EH-S32S-PWLN R/L-06	44	32	30	250	22	45	LV3B	LVSCR0613B	LVSW317	LVSP3	LVSP3	W25L
WN□□0804□□	EH-S25R-PWLN R/L-08	32	25	23	200	17	45	LV4A	LVSCR0613A	-	-	-	W25L
	EH-S32S-PWLN R/L-08	44	32	30	250	22	50	LV4	LVSCR0821	LVSW42	LVSP4	LVSP3	W30L

MTFN R/L
Multi Locking
+ TN□□



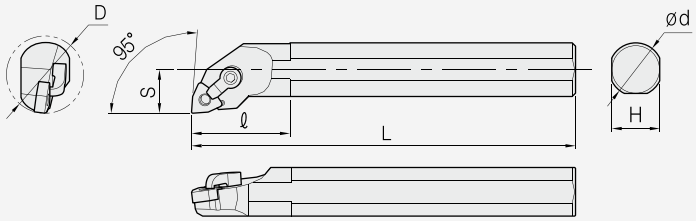
Insert	Item No.	Dimensions (mm) ØD	Ød	H	L	S	ℓ	Clamp	Clamp Screw	Shim	Shim Pin	Wrench
TN□□1604□□	EH-S25R-MTFN R/L-16	32	25	23	200	17	36	MCL7N1	MCSCR10-32-19	-	MSP3D3	W23.8L
	EH-S32S-MTFN R/L-16	40	32	30	250	22	50			MST32D	MSP3D	W19.8L
	EH-S40T-MTFN R/L-16	50	40	37	300	27	60					
	EH-A25R-MTFN R/L-16	32	25	23	200	17	40			-	MSP3D3	W23.8L
	EH-A32S-MTFN R/L-16	40	32	30	250	22	50			MST32D	MSP3D	W19.8L

MVUN R/L
Multi Locking
+ VN□□



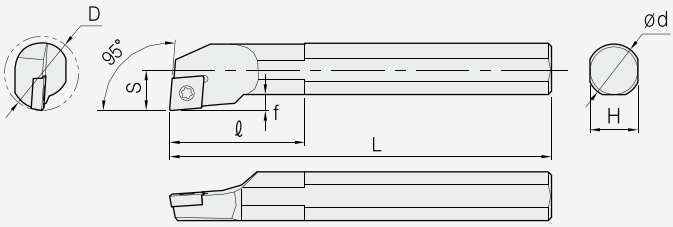
Insert	Item No.	Dimensions (mm) ØD	Ød	H	L	S	ℓ	Clamp	Clamp Screw	Shim	Shim Pin	Wrench
VN□□1604□□	EH-S32S-MVUN R/L-16	40	32	30	250	22	50	MCL8N2	MCSCR5/16-28	MSV32	MSP3D	W39.7L
	EH-S40T-MVUN R/L-16	50	40	37	300	27	60					W19.8L
	EH-A32S-MVUN R/L-16	40	32	30	250	22	50					
	EH-A40T-MVUN R/L-16	50	40	37	300	27	60					

MWLN R/L
Multi Locking
+ WN□□



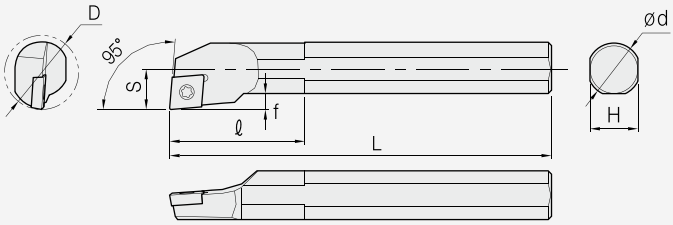
Insert	Item No.	Dimensions (mm) ØD	Ød	H	L	S	ℓ	Clamp	Clamp Screw	Shim	Shim Pin	Wrench
WN□□0604□□	EH-S25R-MWLN R/L-06	32	25	23	200	17	36	MCL7N	MCSCR10/32-19	-	MSP3D3	W23.8L
	EH-S32S-MWLN R/L-06	40	32	30	250	22	50			MSW32	MSP3D	W19.8L
	EH-S40T-MWLN R/L-06	50	40	37	300	27	60					
WN□□0804□□	EH-S25R-MWLN R/L-08	32	25	23	200	17	36	MCL6N	MCSCR1/4-21	-	MSP4DS	W31.8L
	EH-S32S-MWLN R/L-08	40	32	30	250	22	50			MSW43	MSP4D	W23.8L
	EH-S40T-MWLN R/L-08	50	40	37	300	27	60					

SCLC R/L
Screw On
+ CC□□



Insert	Item No.	Dimensions (mm) ØD	Ød	H	L	S	ℓ	Screw	Shim	Shim Screw	Wrench
CC□□0602□□	EH-S08K SCLC R/L 06	10	8	7	125	5	14	SCR02555	-	-	TW07P
	EH-S10K SCLC R/L 06	12	10	9	125	6	14	SCR02565			
	EH-S10M SCLC R/L 06	12	10	9	150	6	14				
	EH-S12M SCLC R/L 06	16	12	11	150	9	25				
	EH-S16R SCLC R/L 06	20	16	15	200	11	32				
CC□□09T3□□	EH-S12M SCLC R/L 09	16	12	11	150	9	25	SCR03508	-	-	TW15P
	EH-S16R SCLC R/L 09	20	16	15	200	11	32.5				
	EH-S20S SCLC R/L 09	25	20	18	250	13	38				
	EH-S25R SCLC R/L 09	32	25	23	200	17	45	SCR03510			
CC□□1204□□	EH-S25R SCLC R/L 12	32	25	23	200	17	45	SCR0411F	-	-	TW15P
	EH-S32S SCLC R/L 12	40	32	30	250	22	50		SSC42	SSCR0610	W40L
	EH-S40T SCLC R/L 12	50	40	37	300	27	60				TW15P
CC□□0602□□	EH-A08F SCLC R/L 06	10	8	7.5	80	5	14	SCR02555	-	-	TW07P
	EH-A10H SCLC R/L 06	12	10	9.5	100	6	14	SCR02565			
	EH-A12K SCLC R/L 06	16	12	11	125	9	25				
CC□□09T3□□	EH-A12K SCLC R/L 09	16	12	11	125	9	25	SCR03508	-	-	TW15P
	EH-A16M SCLC R/L 09	20	16	15	150	11	32.5				
	EH-A20Q SCLC R/L 09	25	20	19	180	13	-				
	EH-A25R SCLC R/L 09	32	25	24	200	17	45	SCR03510			
CC□□1204□□	EH-A25R SCLC R/L 12	32	25	24	200	17	45	SCR0411F	-	-	TW15P
	EH-A32S SCLC R/L 12	40	32	31	250	32	50		SSC42	SSCR0610	W40L,TW15P

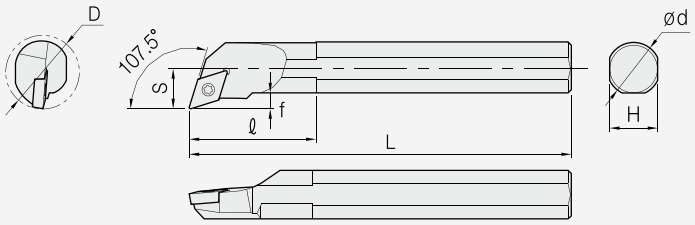
SCLP R/L
Screw On
+ CP□□



Insert	Item No.	Dimensions (mm) ØD	Ød	H	L	S	ℓ	Screw	Wrench
CP□□0802□□	EH-S10M SCLP R/L 08	12	10	9	150	6	-	SCR0305	TW09P
	EH-S12M SCLP R/L 08	16	12	11	150	8	15	SCR0307	
CP□□0903□□	EH-S16N SCLP R/L 09	20	16	15	160	10	15	SCR0408	TW15P
	EH-S16R SCLP R/L 09	20	16	15	200	11	35		
	EH-S20N SCLP R/L 09	25	20	18	160	12.5	20		
	EH-S20S SCLP R/L 09	25	20	15	250	12.5	20		
CP□□0802□□	EH-A10H SCLP R/L 08	12	10	9.5	100	9	-	SCR0305	TW09P
	EH-A12K SCLP R/L 08	16	12	11	125	8	20	SCR0307	
CP□□0903□□	EH-A16M SCLP R/L 09	20	16	15	150	10	25	SCR0408	TW15P
	EH-A20Q SCLP R/L 09	25	20	19	180	12.5	28		

SDQC R/L
Screw On

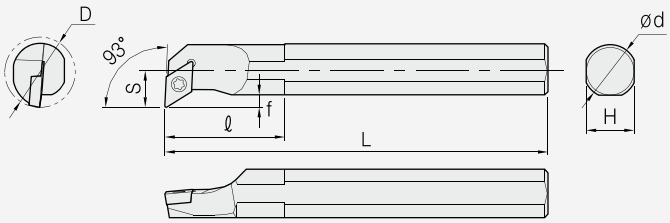
+ DC□□



Insert	Item No.	Dimensions (mm) ØD	Ød	H	L	S	ℓ	f	Screw	Wrench
DC□□0702□□	EH-S10M-SDQCR R/L-07	13	10	9	150	7	20	2.5	SCR02555	TW07P
	EH-S12M-SDQCR R/L-07	16	12	11	150	9	22	3.5	SCR02565	
	EH-S16R-SDQCR R/L-07	20	16	15	200	11	27	4		
DC□□11T3□□	EH-S16R-SDQCR R/L-11	20	16	15	200	11	32	4	SCR03508	TW15P
	EH-S20S-SDQCR R/L-11	25	20	18	250	13	32	4.5		
	EH-S25R-SDQCR R/L-11	32	25	23	200	17	32	7	SCR03510	
DC□□0702□□	EH-A10H-SDQCR R/L-07	13	10	9.5	100	7	20	2	SCR02555	TW07P
	EH-A12K-SDQCR R/L-07	16	12	11	125	9	22	3	SCR02565	
DC□□11T3□□	EH-A16M-SDQCR R/L-11	20	16	15	150	11	27	3	SCR03508	TW15P
	EH-A20Q-SDQCR R/L-11	25	20	19	180	13	32	3		
	EH-A25R-SDQCR R/L-11	32	25	24	200	17	32	4	SCR03510	

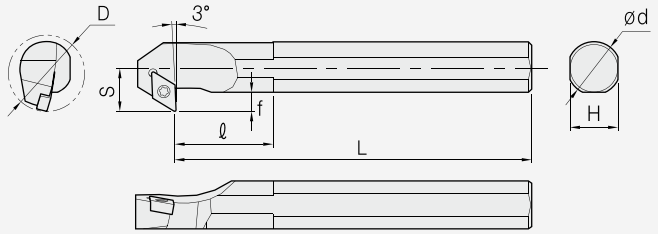
SDUC R/L
Screw On

+ DC□□



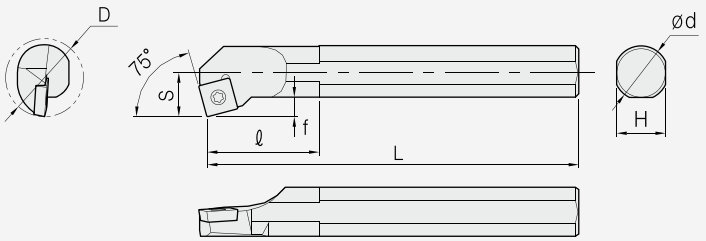
Insert	Item No.	Dimensions (mm) ØD	Ød	H	L	S	ℓ	f	Screw	Wrench
DC□□0702□□	EH-S10M-SDUCR R/L-07	13	10	9	150	7	0	2.5	SCR02555	TW07P
	EH-S12M-SDUCR R/L-07	16	12	11	150	9	22	3.5	SCR02565	
	EH-S16R-SDUCR R/L-07	20	16	15	200	11	27	4		
DC□□11T3□□	EH-S16R-SDUCR R/L-11	20	16	15	200	11	27	4	SCR03508	TW15P
	EH-S20S-SDUCR R/L-11	25	20	18	250	13	35	4.3		
	EH-S25R-SDUCR R/L-11	32	25	23	200	17	46	6.8	SCR03510	
	EH-S32S-SDUCR R/L-11	40	32	30	250	22	50	8.4		
DC□□0702□□	EH-A10H-SDUCR R/L-07	13	10	9.5	100	7	0	2	SCR02555	TW07P
	EH-A12K-SDUCR R/L-07	16	12	11	125	9	22	3	SCR02565	
	EH-A16M-SDUCR R/L-07	20	16	15	150	11	27	3		
DC□□11T3□□	EH-A20Q-SDUCR R/L-11	25	20	19	180	13	35	3	SCR03508	TW15P
	EH-A25R-SDUCR R/L-11	32	25	24	200	17	46	4.5	SCR03510	

SDZC R/L
Screw On
+ DC□□



Insert	Item No.	Dimensions (mm) ØD	Ød	H	L	S	ℓ	f	Screw	Shim	Shim Screw	Wrench
DC□□0702□□	EH-S16R SDZC R/L 07	20	16	15	200	11	29	4	SCR02565	-	-	TW07P
	EH-S20S SDZC R/L 07	25	20	18	250	13	36.5	4.5				
DC□□11T3□□	EH-S25R SDZC R/L 11	32	25	23	200	17	30	6.9	SCR03510	-	-	TW15P
	EH-S32S SDZC R/L 11	40	32	30	250	22	39	8.4	SCR03512	SSD32	SSCR0509	TW15P,W35L
	EH-S40T SDZC R/L 11	50	40	37	300	27	47	9.4				
	EH-A25R SDZC R/L 11	32	25	24	200	17	30	4.5	SCR03510	-	-	TW15P
	EH-A32S SDZC R/L 11	40	32	31	250	22	39	6	SCR03512	SSD32	SSCR0509	TW15P,W35L

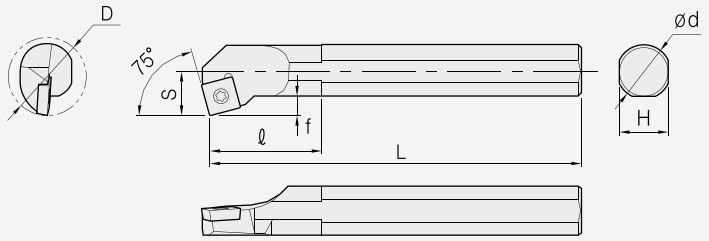
SSKC R/L
Screw On
+ SC□□



Insert	Item No.	Dimensions (mm) ØD	Ød	H	L	S	ℓ	Screw	Shim	Shim Screw	Wrench
SC□□09T3□□	EH-S12M SSKC R/L 09	16	20	11	150	9	26	SCR03507	-	-	TW15P
	EH-S16R SSKC R/L 09	20	16	15	200	11	40	SCR03508			
	EH-S20S SSKC R/L 09	25	20	18	250	13	46				
SC□□1204□□	EH-S25R SSKC R/L 12	32	25	23	200	17	36	SCR0411F			TW15P
	EH-S32S SSKC R/L 12	40	32	30	250	22	43		SSC42	SSCR0610	TW15P,W40L
SC□□09T3□□	EH-A12K SSKC R/L 09	16	12	11	125	9	26	SCR03507	-	-	TW15P
	EH-A16M SSKC R/L 09	20	16	15	150	11	32	SCR03508			
	EH-A20Q SSKC R/L 09	25	20	19	180	13	34				
SC□□1204□□	EH-A25R SSKC R/L 12	32	25	24	200	17	36	SCR0411F	SSC42	SSCR0610	TW15P
	EH-A32S SSKC R/L 12	40	32	31	250	22	43				TW15P,W40L

SSKP R/L
Screw On

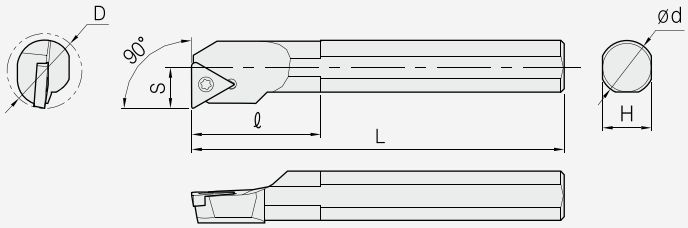
+ SP□□



Insert	Item No.	Dimensions (mm) ØD	Ød	H	L	S	ℓ	Screw	Wrench
SP□□0903□□	EH-S12M SSKP R/L 09	16	12	11	150	8	18	SCR0307	TW09P
	EH-S16N SSKP R/L 09	20	16	15	160	10	30		
	EH-S16R SSKP R/L 09	20	16	15	200	10	32		
	EH-S20N SSKP R/L 09	25	20	18	160	12.5	32		
	EH-S20S SSKP R/L 09	25	20	18	250	12.5	35		
SP□□0903□□	EH-A12K SSKP R/L 09	16	12	11	125	8	21	SCR03508	TW09P
	EH-A16M SSKP R/L 09	20	16	15	150	10	30	SCR0307	
	EH-A20Q SSKP R/L 09	25	20	19	180	12.5	32		

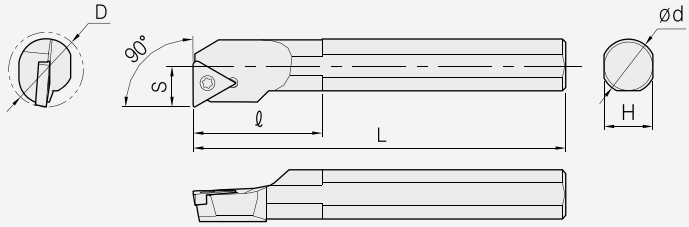
STFC R/L
Screw On

+ TC□□



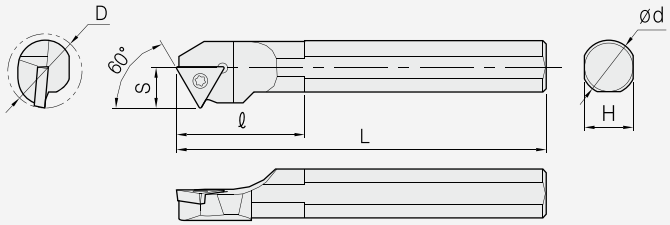
Insert	Item No.	Dimensions (mm) ØD	Ød	H	L	S	ℓ	Screw	Shim	Shim Screw	Wrench
TC□□0902□□	EH-S10M STFC R/L 09	13	10	9	150	7	23	SCR02206	-	-	TW06P
	EH-S12M STFC R/L 09	16	12	11	150	9	28				
TC□□1102□□	EH-S12M STFC R/L 11	16	12	11	150	9	30	SCR02565	-	-	TW07P
	EH-S16R STFC R/L 11	20	16	15	200	11	35				
	EH-S20S STFC R/L 11	25	20	18	250	13	36				
TC□□16T3□□	EH-S20S STFC R/L 16	25	20	18	250	13	36	SCR03510	-	-	TW15P
	EH-S25R STFC R/L 16	32	25	23	200	17	49				
TC□□16T3□□	EH-S32S STFC R/L 16	40	32	30	250	22	50	SCR03512	SST32	SSCR0509	TW15P,W35L
	EH-S40T STFC R/L 16	50	40	37	300	27	60				
TC□□0902□□	EH-A10M STFC R/L 09	13	10	9.5	100	7	23	SCR02206	-	-	TW06P
	EH-A12K STFC R/L 09	16	12	11	125	9	23				
	EH-A12K STFC R/L 11	16	12	11	125	9	30				
TC□□1102□□	EH-A16M STFC R/L 11	20	16	15	150	11	30	SCR02565	-	-	TW07P
	EH-A20Q STFC R/L 11	25	20	19	180	13	36				
TC□□16T3□□	EH-A25R STFC R/L 16	32	25	24	200	17	49	SCR03510	-	-	TW15P
	EH-A32S STFC R/L 16	40	32	31	250	22	50	SCR03512	SST32	SSCR0509	TW15P,W35L

STFP R/L
Screw On
+ TP□□



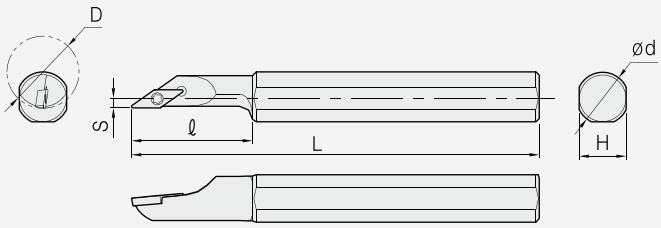
Insert	Item No.	Dimensions (mm) ØD	Ød	H	L	S	ℓ	Screw	Wrench
TP□□1103□□	EH-S10M STFP R/L 11	12	10	9	150	6	-	SCR030508	TW09P
	EH-S12M STFP R/L 11	16	12	11	150	8	10	SCR0307	TW09P
	EH-S16N STFP R/L 11	20	16	15	160	10	12		
	EH-S16R STFP R/L 11	20	16	15	200	10	12		
TP□□1604□□	EH-S20N STFP R/L 16	25	20	18	160	12.5	32	SCR0408	TW15P
	EH-S20S STFP R/L 16	25	20	18	250	12.5	14		
TP□□1103□□	EH-A10H STFP R/L 11	12	10	9.5	100	6	-	SCR030508	TW09P
	EH-A12K STFP R/L 11	16	12	11	125	8	10	SCR0307	TW09P
	EH-A16M STFP R/L 11	20	16	15	150	10	23		
TP□□1604□□	EH-A20Q STFP R/L 16	25	20	19	180	12.5	41	SCR0408	TW15P

STWP R/L
Screw On
+ TP□□



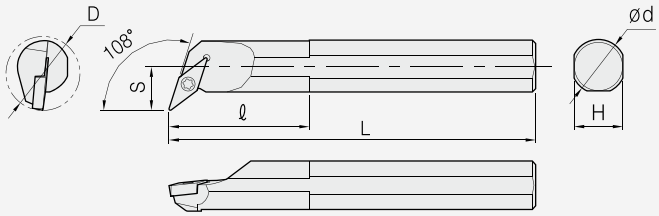
Insert	Item No.	Dimensions (mm) ØD	Ød	H	L	S	ℓ	Screw	Wrench
TPGH1102□□	EH-S10M STWP R/L 11	12	10	9	150	6	23	SCR030508	TW09P
TPGH1103□□	EH-S12M STWP R/L 11	16	12	11	150	8	30	SCR0306	TW09P
TPGH1103□□	EH-S16R STWP R/L 11	20	16	15	180	10	35		
	EH-S20R STWP R/L 11	25	20	19	200	12.5	40		

SVJC R/L
Screw On
+ VC□□



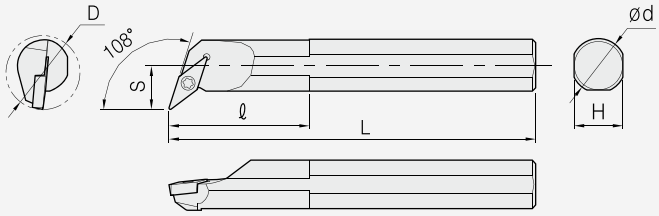
Insert	Item No.	Dimensions (mm) ØD	Ød	H	L	S	ℓ	Screw	Wrench
VCMT0802□□	EH-S12M SVJC R/L 08	16	12	11	150	2	26	SCR0204	TW06P
	EH-S16Q SVJC R/L 08	20	16	15	180	2	36		

SVQB R/L
Screw On
+ VB□□



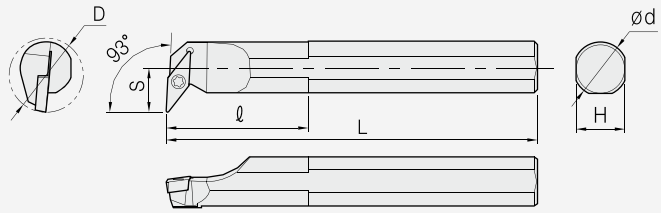
Insert	Item No.	Dimensions (mm) ØD	Ød	H	L	S	ℓ	Screw	Shim	Shim Screw	Wrench
VB□□1604□□	EH-S32S SVQB R/L 16	40	32	30	250	22	56	SCR03512	SSV32	SSCR0509	TW15P,W35L
	EH-S40T SVQB R/L 16	50	40	37	300	27	64				
	EH-A32S SVQB R/L 16	40	32	31	250	22	56				

SVQC R/L
Screw On
+ VC□□



Insert	Item No.	Dimensions (mm) ØD	Ød	H	L	S	ℓ	Screw	Shim	Shim Screw	Wrench
VC□□1103□□	EH-S16R SVQC R/L 11	20	16	15	200	11	35	SCR02565	-	-	TW07P
	EH-S20S SVQC R/L 11	25	20	18	250	13	38				
	EH-S25R SVQC R/L 11	32	25	23	200	17	42				
VC□□1303□□	EH-S20S SVQC R/L 13	25	20	18	250	13	42	SCR0307	-	-	TW07P
	EH-S25R SVQC R/L 13	32	25	23	200	17	45				
VC□□1604□□	EH-S25R SVQC R/L 16	32	25	23	200	17	50	SCR03510	-	-	TW15P
	EH-S32S SVQC R/L 16	40	32	30	250	22	56	SCR03512	SSV32	SSCR0509	TW15P W35L
	EH-S40T SVQC R/L 16	50	40	37	300	27	64				

SVUB R/L
Screw On
+ VB□□

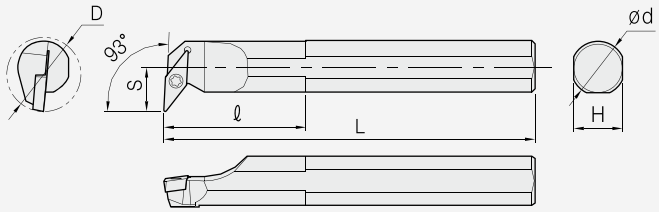


Insert	Item No.	Dimensions (mm) ØD	Ød	H	L	S	ℓ	Screw	Shim	Shim Screw	Wrench
VB□□1604□□	EH-S32S SVUB R/L 16	40	32	30	250	22	56	SCR03510	SSV32	SSCR0509	TW15P,W35L
	EH-S40T SVUB R/L 16	50	40	37	300	27	64				
	EH-A32S SVUB R/L 16	40	32	31	250	22	56				

SVUC R/L

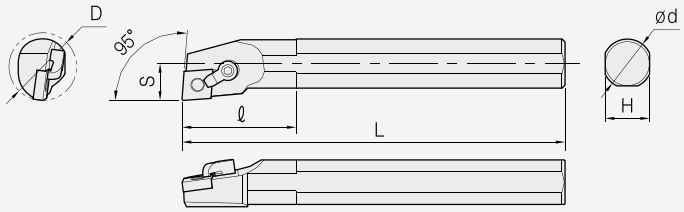
Screw On

+ VC□□



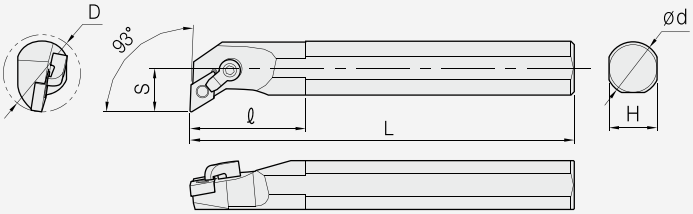
Insert	Item No.	Dimensions (mm) ØD	Ød	H	L	S	ℓ	Screw	Shim	Shim Screw	Wrench
VC□□1103□□	EH-S16R SVUC R/L 11	22	16	15	200	13	30	SCR02565	-	-	TW07P
	EH-S20S SVUC R/L 11	25	20	18	250	14	33				
	EH-S25T SVUC R/L 11	32	25	23	300	17	38				
VC□□1303□□	EH-S20S SVUC R/L 13	28	20	18	250	16	35	SCR0307	-	-	TW09P
	EH-S25R SVUC R/L 13	32	25	23	200	17	40				
VC□□1604□□	EH-S25R SVUC R/L 16	32	25	23	200	19	50	SCR03510	-	-	TW15P
	EH-S32S SVUC R/L 16	40	32	30	250	22	56	SCR03512	SSV32	SSCR0509	TW15P
	EH-S40T SVUC R/L 16	50	40	37	300	27	64				W35L

MCLN R/L
Multi Locking
+ CN□□



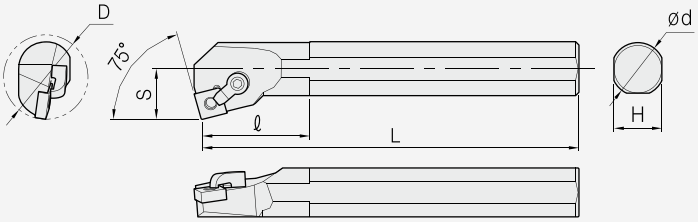
Insert	Item No.	Dimensions (mm) ØD	Ød	H	L	S	ℓ	Clamp	Clamp Screw	Shim	Shim Pin	Wrench
CN□□0903□□	EH-S20S-MCLN R/L-09	25	20	18	250	13	30	MCL7N	MCSCR10-32-19	-	MSP3D3	W19.8L
	EH-S25R-MCLN R/L-09	32	25	23	200	17	36					W23.8L
CN□□1204□□	EH-S25R-MCLN R/L-12	32	25	23	200	17	36	MCL6N	MCSCR1/4-21	-	MSP4DS	W31.8L
	EH-S32S-MCLN R/L-12	40	32	30	250	22	50			MSC43	MSP4D	W23.8L
	EH-S40T-MCLN R/L-12	50	40	37	300	27	60					
CN□□1204□□	EH-A25R-MCLN R/L-12	32	25	23	200	17	40	MCL6N	MCSCR1/4-21	-	MSP4DS	W31.8L
	EH-A32S-MCLN R/L-12	40	32	30	250	22	50			MSC43	MSP4D	W23.8L

MDUN R/L
Multi Locking
+ DN□□



Insert	Item No.	Dimensions (mm) ØD	Ød	H	L	S	ℓ	Clamp	Clamp Screw	Shim	Shim Pin	Wrench
DN□□1504□□	EH-S32S-MDUN R/L-15-3	40	32	30	250	22	50	MCL6N	MCSCR1/4-21	MSD43	MSP4D	W31.8L
	EH-S40T-MDUN R/L-15-3	50	40	37	300	27	60					W23.8L
	EH-A32S-MDUN R/L-15-3	40	32	30	250	22	50					

MSKN R/L
Multi Locking
+ SN□□



Insert	Item No.	Dimensions (mm) ØD	Ød	H	L	S	ℓ	Clamp	Clamp Screw	Shim	Shim Pin	Wrench
SN□□1204□□	EH-S25R-MSKN R/L-12	32	25	23	200	17	36	MCL8N1	MCSCR5/16-28	-	MSP4DS	W39.7L
	EH-S32S-MSKN R/L-12	40	32	30	250	22	50			MSS43	MSP4D	W23.8L
	EH-S40T-MSKN R/L-12	50	40	37	300	27	60					
SN□□1204□□	EH-A25R-MSKN R/L-12	32	25	23	200	17	40	MCL8N1	MCSCR5/16-28	-	MSP4DS	W39.7L
	EH-A32S-MSKN R/L-12	40	32	30	250	22	50			MSS43	MSP4D	W23.8L
	EH-A40T-MSKN R/L-12	50	40	37	300	27	60					

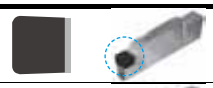
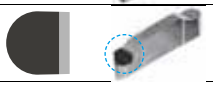
Grooving Parting

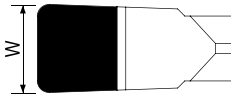
Grooving Parting

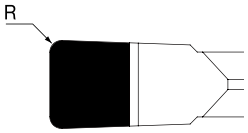
EHWA grooving tools are suitable for precise grooving and cutting of the workpieces. the tools are designed with optimal PCD, PCBN or carbide grades by the applications, providing longer tool life and effective cutting.

ES type | PCD/PCBN

ESG	30	04	R/L
Insert shape	Width	Corner radius	Hand of insert

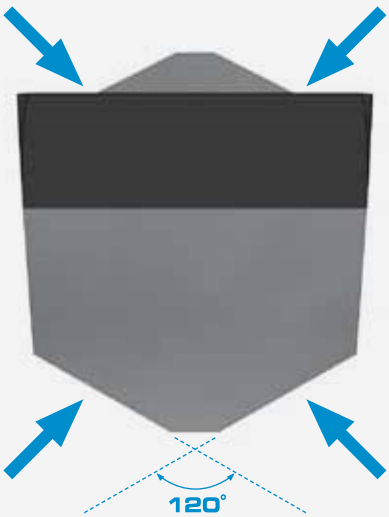
Symbol	Shape
ESG	
ESR	
ESX	Special





Symbol	Shape
R	
L	

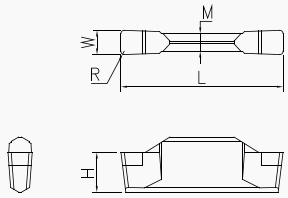
ES type

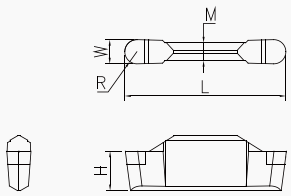


Characteristic

- Ehwa standard type
- You can choose various processing type, groove, width and groove depth for holder
- Higher clamping strength achieved by 120° taper

ES type | PCD/PCBN

Shape	Item No.	Dimensions (mm)					PCD			PCBN			
		W	R	M	L	H	EP20	EP55	EP750	EB29X	EB190	EB570	EB51
	ESG2002-R/L	2	0.2	1.7	20	7							
	ESG3002-R/L	3	0.2	2.2	20	7							
	ESG4002-R/L	4	0.2	3.0	20	7							
	ESG4004-R/L	4	0.4	3.0	20	7							
	ESG6002-R/L	6	0.2	5.0	25	7.5							
	ESG6004-R/L	6	0.4	5.0	25	7.5							
	ESG8002-R/L	8	0.2	6.0	30	8.7							
	ESG8004-R/L	8	0.4	6.0	30	8.7							

Shape	Item No.	Dimensions (mm)					PCD			PCBN			
		W	R	M	L	H	EP20	EP55	EP750	EB29X	EB190	EB570	EB51
	ESR2010	2	1	1.7	20	7							
	ESR3015	3	1.5	2.2	20	7							
	ESR4020	4	2	3.0	20	7							
	ESR6030	6	3	5.0	25	7.5							
	ESR8040	8	4	6.0	30	8.7							

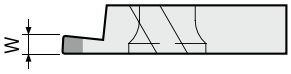
Special order (possible to choose W1, R, PCD, PCBN material)

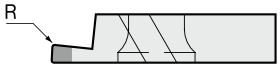
Holder : 136~145p

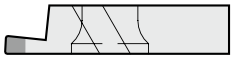
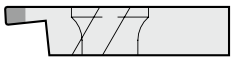
ED type | PCD/PCBN

EDG	30	04	R/L
Insert shape	Width	Corner radius	Hand of insert

Symbol	Shape
EDG	
EDR	
EDX	Special





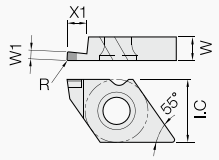
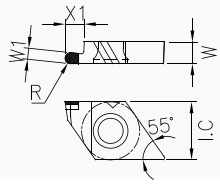
Symbol	Shape
R	
L	

ED type

Characteristic

- Suitable for grooving requiring a narrow groove and high rigidity
- Excellent clamping rigidity by double clamping of screw and clamp

ED type | PCD/PCBN

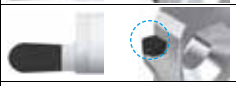
Shape	Item No.		Dimensions (mm)					PCD			PCBN			
			W1	X1	R	W	I.C	EP20	EP55	EP750	EB28X	EB190	EB570	EB51
	EDG	1502-R/L	1.5	2.6	0.2	4.76	12.7							
		2002-R/L	2	3	0.2	4.76	12.7							
		3002-R/L	3	4.5	0.2	4.76	12.7							
		4002-R/L	4	4.5	0.2	4.76	12.7							
	EDR	1502-R/L	1.5	2.6	0.75	4.76	12.7							
		2002-R/L	2	3	1.0	4.76	12.7							
		3002-R/L	3	4.5	1.5	4.76	12.7							
		4002-R/L	4	4.5	2.0	4.76	12.7							

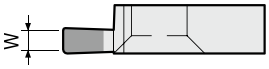
Special order (possible to choose W1, X1, R, PCD, PCBN material)

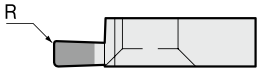
Holder : 143p

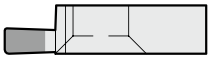
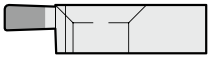
ET type | PCD/PCBN

ETG	30	04	R/L
Insert shape	Width	Corner radius	Hand of insert

Symbol	Shape
ETG	
ETR	
ETX	Special





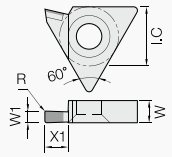
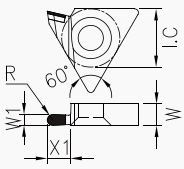
Symbol	Shape
R	
L	

ET type

Characteristic

- Suitable for narrow grooving
- Easy tool setting

ET type | PCD/PCBN

Shape	Item No.		Dimensions (mm)					PCD			PCBN			
			W1	X1	R	W	I.C	EP20	EP55	EP750	EB28X	EB190	EB570	EB51
	ETG	1502-R/L	1.5	3	0.2	4.76	12.7							
		2002-R/L	2	3.5	0.2	4.76	12.7							
		3002-R/L	3	4.5	0.2	4.76	12.7							
		4002-R/L	4	4.5	0.2	4.76	12.7							
	ETR	1502-R/L	1.5	3	0.75	4.76	12.7							
		2002-R/L	2	3.5	1.0	4.76	12.7							
		3002-R/L	3	4.5	1.5	4.76	12.7							
		4002-R/L	4	4.5	2.0	4.76	12.7							

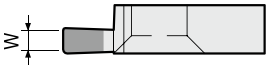
Special order (possible to choose W1, X1, R, PCD, PCBN material)

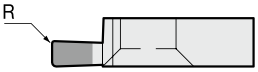
Holder : 144p

EM type | PCD/PCBN

EMG	30	04	R/L
Insert shape	Width	Corner radius	Hand of insert

Symbol	Shape
EMG	
EMX	Special





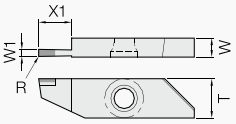
Symbol	Shape
R	
L	

EM type

Characteristic

- Micro-grooving tool for automatic lathes
- Suitable for small and precise grooving

EMG type | PCD/PCBN

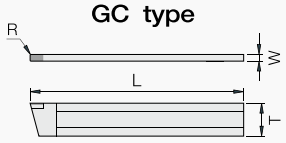
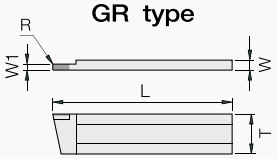
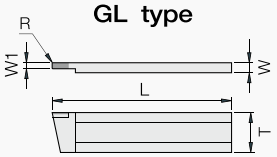
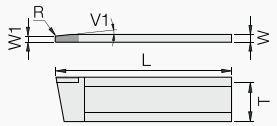
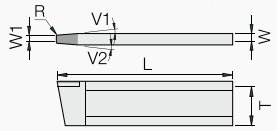
Shape	Item No.	Dimensions (mm)						PCD			PCBN		
		W1	X1	R	W	L	T	EP20	EP55	EP750	EB570	EB22	EB51
	EMG 05000-L/R	0.5	3.0	0.00	2.7	22.2	5.6						
	10005-L/R	1.0	3.5	0.00	2.7	22.2	5.6						
	15005-L/R	1.5	3.5	0.05	2.7	22.2	5.6						
	2001-L/R	2.0	4.0	0.10	2.7	22.2	5.6						
	2501-L/R	2.5	4.0	0.10	2.7	22.2	5.6						

Special order (possible to choose W1, X1, R, PCD, PCBN material)

Holder : 145p

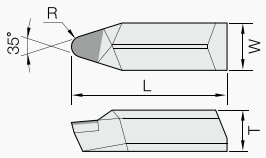
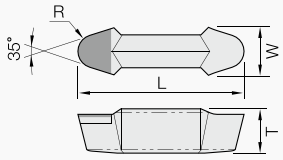
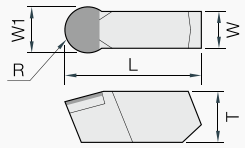
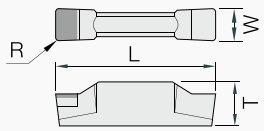
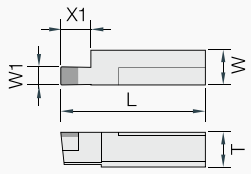
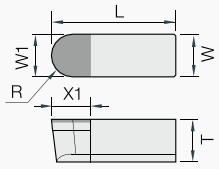
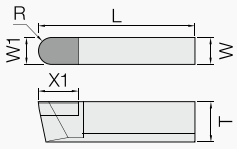
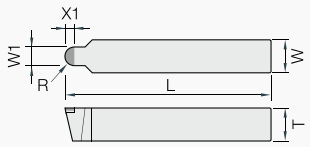
Grooving/ Parting

Customized design | Piston ring - PCD/ PCBN

Shape	Item No.	Dimensions (mm)						PCD			PCBN	
		W	T	L	R	V1	V2	EP13	EP750	EP59	EB51	EB710
GC type 												
GR type 												
GL type 												
1Side Taper type 												
2Side Taper type 												

Please specify the workpiece, W, W1, R, L, T and V.

Customized design | Others - PCD/ PCBN

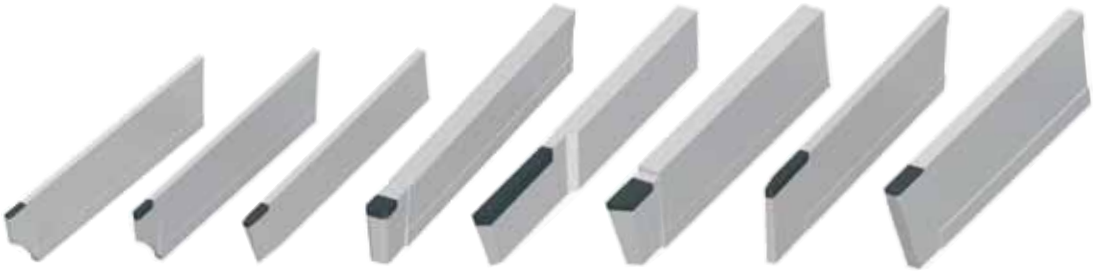
Shape	Dimensions (mm)						PCD			PCBN			
	W	W1	R	X1	L	T	EP20	EP55	EP750	EB28X	EB570	EB190	EB51
													
													
													
													
													
													
													
													

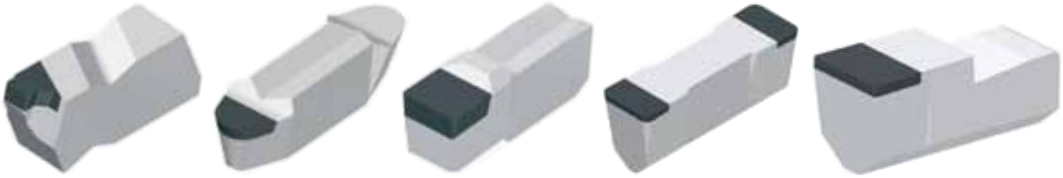
Please specify the workpiece, W, W1, R, X1, L and T.

Grooving/ Parting

Customized design | PCD/ PCBN

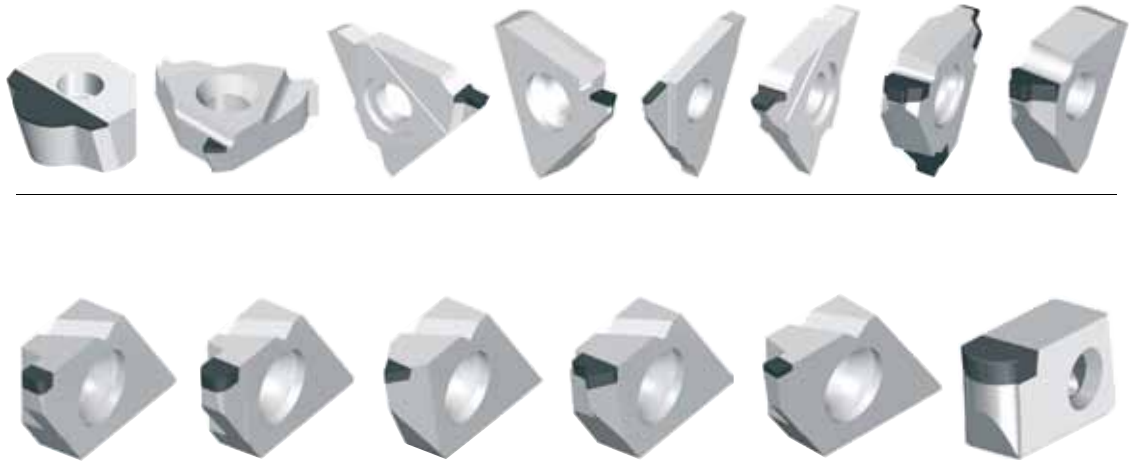
- Face, slot, chamfer, profile, etc.
- Optimized tooling service depending on the customer's demand.





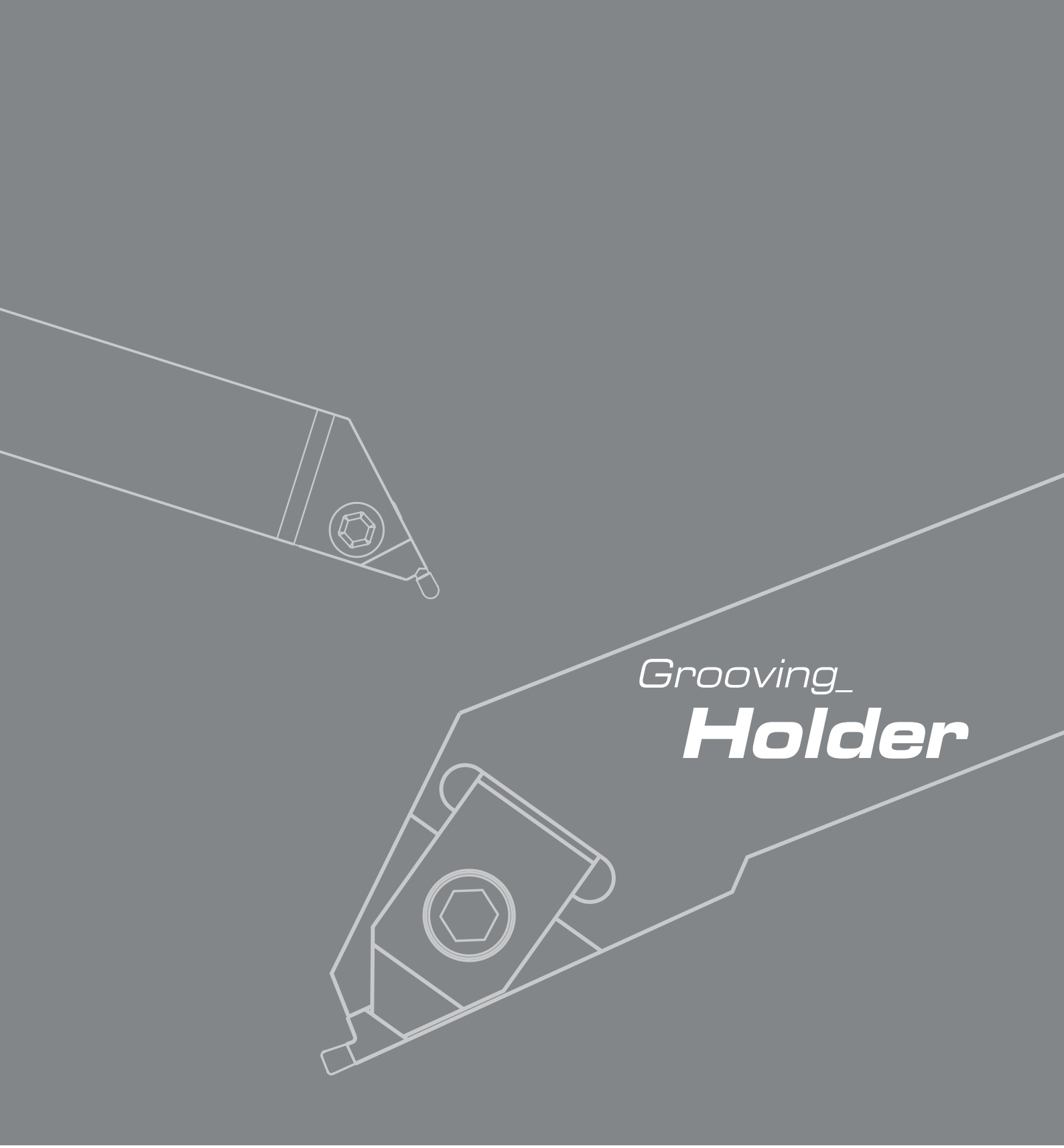
Customized design | PCD/ PCBN

- Face, slot, chamfer, profile, etc.
- Optimized tooling service depending on the customer's demand.

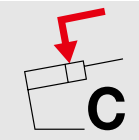


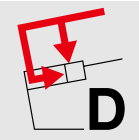
MEMO

EHWA



How to combine the holder

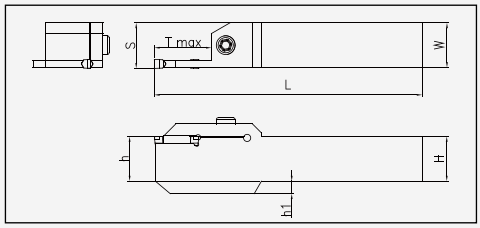




C Clamp on clamping (ESG Type)
D Double clamping (EDG Type)
S Screw clamping (ETG, EMG Type)

ESEH R/L

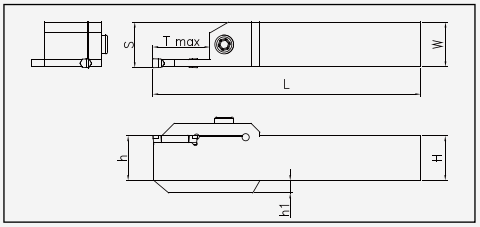
+ ESG(R,X)□□



Insert	Item No.	Dimensions (mm)						Clamp Screw	Wrench
		H	W	L	S	H1	Tmax		
ES□20□□	ESEH-R/L 1212-2-T08	12	12	100	12.2		8	HCR0512	W40L
	ESEH-R/L 1616-2-T08	16	16	100	16.2		8		
	ESEH-R/L 2020-2-T08	20	20	125	20.2		8		
	ESEH-R/L 2525-2-T08	25	25	150	25.2		8		
	ESEH-R/L 1616-2-T12	16	16	100	16.2		12		
	ESEH-R/L 2020-2-T12	20	20	125	20.2		12		
	ESEH-R/L 2525-2-T12	25	25	150	25.2		12		
	ESEH-R/L 1616-2-T17	16	16	100	16.2		17		
	ESEH-R/L 2020-2-T17	20	20	125	20.2		17		
	ESEH-R/L 2525-2-T17	25	25	150	25.2		17		
ES□30□□	ESEH-R/L 1616-3-T10	16	16	100	16.4		10	HCR0512	W40L
	ESEH-R/L 2020-3-T10	20	20	125	20.4		10		
	ESEH-R/L 2525-3-T10	25	25	150	25.4		10		
	ESEH-R/L 3232-3-T10	32	32	170	32.4		10		
	ESEH-R/L 1616-3-T13	16	16	100	16.4		13		
	ESEH-R/L 2020-3-T13	20	20	125	20.4		13		
	ESEH-R/L 2525-3-T13	25	25	150	25.4		13		
	ESEH-R/L 1616-3-T20	16	16	100	16.4		20		
	ESEH-R/L 2020-3-T20	20	20	125	20.4		20		
	ESEH-R/L 2525-3-T20	25	25	150	25.4		20		
	ESEH-R/L 3232-3-T20	32	32	170	32.4		20		
	ESEH-R/L 2525-3-T25	25	25	150	25.4		25		
ES□40□□	ESEH-R/L 1616-4-T10	16	16	100	16.4		10	HCR0616	W50L
	ESEH-R/L 2020-4-T10	20	20	125	20.4		10		
	ESEH-R/L 2525-4-T10	25	25	150	25.4		10		
	ESEH-R/L 3232-4-T10	32	32	150	32.4		10		
	ESEH-R/L 1616-4-T15	16	16	100	16.4		15		
	ESEH-R/L 2020-4-T15	20	20	125	20.4		15		
	ESEH-R/L 2525-4-T15	25	25	150	25.4		15		
	ESEH-R/L 1616-4-T20	16	16	100	16.4		20		
	ESEH-R/L 2020-4-T20	20	20	125	20.4		20		
	ESEH-R/L 2525-4-T20	25	25	150	25.4		20		
	ESEH-R/L 3232-4-T20	32	32	170	32.4		20		
	ESEH-R/L 1616-4-T25	16	16	100	16.4		25		
	ESEH-R/L 2020-4-T25	20	20	125	20.4		25		
	ESEH-R/L 2525-4-T25	25	25	150	25.4		25		

ESEH R/L

+ ESG(R,X)□□

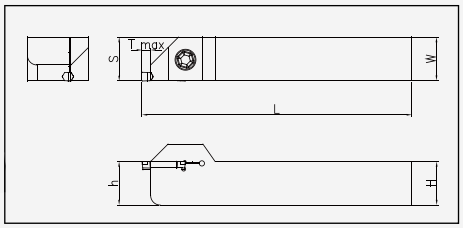


Insert	Item No.	Dimensions (mm)						Clamp Screw	Wrench
		H	W	L	S	H1	Tmax		
ES □50□□	ESEH-R/L 2020-5-T12	20	20	125	20.5		12	HCR0616	W50L
	ESEH-R/L 2525-5-T12	25	25	150	25.5		12		
	ESEH-R/L 2020-5-T15	20	20	125	20.55		15		
	ESEH-R/L 2525-5-T15	25	25	150	25.55		15		
	ESEH-R/L 3232-5-T15	32	32	170	32.55		15		
	ESEH-R/L 2020-5-T20	20	20	125	20.5		20		
	ESEH-R/L 2525-5-T20	25	25	150	25.5		20		
	ESEH-R/L 3232-5-T20	32	32	170	32.5		20	HCR0620	W50L
	ESEH-R/L 2525-5-T32	25	25	150	25.5	7	32		
ES □60□□	ESEH-R/L 2020-6-T12	20	20	125	20.5		12	HCR0616	W50L
	ESEH-R/L 2525-6-T12	25	25	150	25.5		12		
	ESEH-R/L 2525-6-T15	25	25	150	25.55		15		
	ESEH-R/L 3232-6-T15	32	32	170	32.55		15		
	ESEH-R/L 2020-6-T20	20	20	125	20.5		20		
	ESEH-R/L 2525-6-T20	25	25	150	25.5		20		
	ESEH-R/L 3232-6-T20	32	32	170	32.5		20	HCR0620	W50L
	ESEH-R/L 2525-6-T32	25	25	150	25.5	7	32		
ES □80□□	ESEH-R/L 2525-8-T16	25	25	150	26		16	HCR0616	W50L
	ESEH-R/L 3232-8-T16	32	32	170	33.05		16		
	ESEH-R/L 2525-8-T25	25	25	150	26		25		
	ESEH-R/L 3232-8-T25	32	32	170	33		25	HCR0620	W50L
	ESEH-R/L 2525-8-T36	25	25	150	26	7	36		
	ESEH-R/L 3232-8-T36	32	32	170	33		36		

Grooving/ Parting **Holder**

ESEH R/L-T00

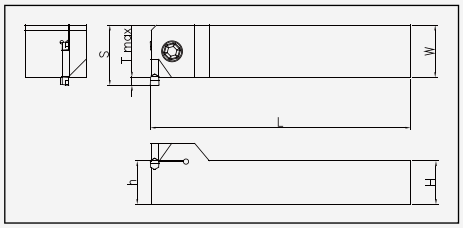
+ ESG(R,X)□□



Insert	Item No.	Dimensions (mm)						Clamp Screw	Wrench
		H	W	L	S	ΦD MIN	Tmax		
ES□30□□	ESEH-R/L 1616-3-T00	16	16	100	16.4	80	4.8	HCR0512	W40L
	ESEH-R/L 2020-3-T00	20	20	125	20.4	80	4.8		
	ESEH-R/L 2525-3-T00	25	25	150	25.4	80	4.8		
ES□40□□	ESEH-R/L 1616-4-T00	16	16	100	16.4	80	4.8	HCR0616	W50L
	ESEH-R/L 2020-4-T00	20	20	125	20.4	80	4.8		
	ESEH-R/L 2525-4-T00	25	25	150	25.4	80	4.8		
ES□60□□	ESEH-R/L 2020-6-T00	20	20	125	20.5	80	6.0	HCR0616	W50L
	ESEH-R/L 2525-6-T00	25	25	150	25.5	80	6.0		

ESEV R/L

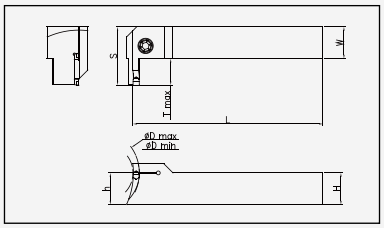
+ ESG(R,X)□□



Insert	Item No.	Dimensions (mm)						Clamp Screw	Wrench
		H	W	L	S	ΦD MIN	Tmax		
ES□20□□	ESEV-R/L 2020-2-T00	20	20	125	23.5	120	3	HCR0512	W40L
	ESEV-R/L 2525-2-T00	25	25	150	28.5	120	3		
	ESEV-R/L 3232-2-T00	32	32	170	35.5	120	3		
ES□30□□	ESEV-R/L 2020-3-T00	20	20	125	25	80	4.8		
	ESEV-R/L 2525-3-T00	25	25	150	30	80	4.8		
	ESEV-R/L 3232-3-T00	32	32	170	37	80	4.8		
ES□40□□	ESEV-R/L 2020-4-T00	20	20	125	25	80	4.8	HCR0616	W50L
	ESEV-R/L 2525-4-T00	25	25	150	30	80	4.8		
	ESEV-R/L 3232-4-T00	32	32	170	37	80	4.8		
ES□50□□	ESEV-R/L 2020-5-T00	20	20	125	29.5	60	5		
	ESEV-R/L 2525-5-T00	25	25	150	31.5	60	5		
	ESEV-R/L 3232-5-T00	32	32	170	38.5	60	5		
ES□60□□	ESEV-R/L 2020-6-T00	20	20	125	26.5	60	6		
	ESEV-R/L 2525-6-T00	25	25	150	31.5	80	6		
	ESEV-R/L 3232-6-T00	32	32	170	38.5	60	6		
ES□80□□	ESEV-R/L 2525-8-T00	25	25	150	33.5	50	8		
	ESEV-R/L 3232-8-T00	32	32	170	38.5	50	8		

ESFV R/L

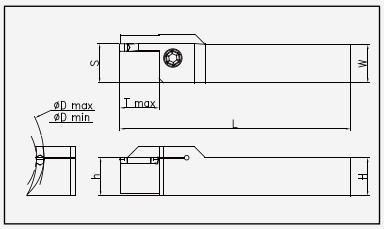
+ ESG(R,X)□□



Insert	Item No.	Dimensions (mm) H	W	L	S	Tmax	ΦD MIN	ΦD MAX	Clamp Screw	Wrench
ES□40□□	ESFV-R/L 425-44/70-T20	25	25	150	45.5	20	44	70	HCR0616	W50L
	ESFV-R/L 425-60/120-T20	25	25	150	45.5	20	60	120		
	ESFV-R/L 425-112/200-T20	25	25	150	45.5	20	112	200		

ESFH R/L

+ ESG(R,X)□□

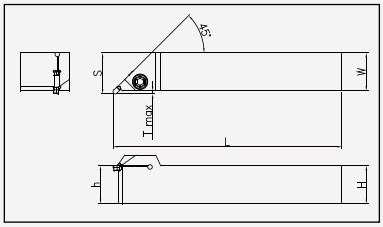


Insert	Item No.	Dimensions (mm) H	W	L	S	Tmax	ΦD MIN	ΦD MAX	Clamp Screw	Wrench
ES□30□□	ESFH-325-34/50-T10	25	25	150	25.5	10	34	50	HCRL0512	W40L
	ESFH-325-44/70-T15	25	25	150	25.5	15	44	70		
	ESFH-325-64/100-T15	25	25	150	25.5	15	64	100		
ES□40□□	ESFH-425-40/60-T10	25	25	150	25.5	10	40	60	HCR0616	W50L
	ESFH-425-44/70-T20	25	25	150	25.5	20	44	70		
	ESFH-425-84/92-T20	25	25	150	25.5	20	84	92		
	ESFH-425-60/120-T20	25	25	150	25.5	20	60	120		
	ESFH-425-112/200-T20	25	25	150	25.5	20	112	200		
ES□50□□	ESFH-525-190/220-T10	25	25	150	25.5	10	190	200	HCR0616	W50L
ES□60□□	ESFH-625-170/190-T10	25	25	150	25.5	10	170	190	HCR0616	W50L
	ESFH-625-190/220-T10	25	25	150	25.5	10	190	200		

Grooving/ Parting **Holder**

ESEU R/L

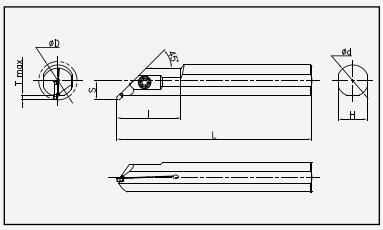
+ ESG(R,X)□□



Insert	Item No.	Dimensions (mm)					Clamp Screw	Wrench
		H	W	L	S	Tmax		
ES□30□□	ESEU-R/L 2020-3	20	20	125	23	3	HCR0616	W50L
	ESEU-R/L 2525-3	25	25	150	28	3		
	ESEU-R/L 3232-3	32	32	170	35	3		
ES□40□□	ESEU-R/L 2020-4	20	20	125	23	3		
	ESEU-R/L 2525-4	25	25	150	28	3		
	ESEU-R/L 3232-4	32	32	170	35	3		
ES□50□□	ESEU-R/L 2020-5	20	20	125	24	4		
	ESEU-R/L 2525-5	25	25	150	29	4		
	ESEU-R/L 3232-5	32	32	170	36	4		
ES□60□□	ESEU-R/L 2020-6	20	20	125	24	4		
	ESEU-R/L 2525-6	25	25	150	29	4		
	ESEU-R/L 3232-6	32	32	170	36	4		
ES□80□□	ESEU-R/L 2525-8	25	25	150	30	5		
	ESEU-R/L 3232-8	32	32	170	37	5		

ESIU R/L

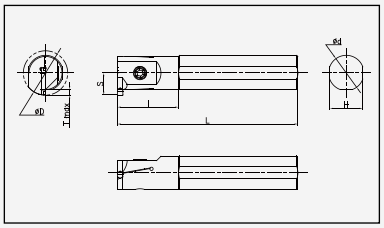
+ ESG(R,X)□□



Insert	Item No.	Dimensions (mm)							Clamp Screw	Wrench
		ΦD	Φd	L	l	Tmax	H	S		
ES□30□□	ESIU-R/L 3520-3	35	20	150	45	3.5	18	13	HCR0512	W40L
	ESIU-R/L 4025-3	40	25	200	45	3.5	23	15.5		
	ESIU-R/L 5032-3	50	32	250	65	3.5	30	19		
ES□40□□	ESIU-R/L 3520-4	35	20	150	45	3.5	18	13		
	ESIU-R/L 4025-4	40	25	200	45	3.5	23	15.5		
	ESIU-R/L 5032-4	50	32	250	65	3.5	30	19		
ES□50□□	ESIU-R/L 4025-5	40	25	200	45	3.5	23	15.5	HCR0616	W50L
	ESIU-R/L 5032-5	50	32	250	65	3.5	30	19	HCR0620	
ES□60□□	ESIU-R/L 4025-6	40	25	200	45	3.5	23	19	HCR0616	
	ESIU-R/L 5032-6	50	32	250	65	3.5	30	19	HCR0620	
ES□80□□	ESIU-R/L 4025-8	40	25	200	45	6.5	23	15.5	HCR0616	
	ESIU-R/L 5032-8	50	32	250	65	6.5	30	19	HCR0620	

ESIV R/L

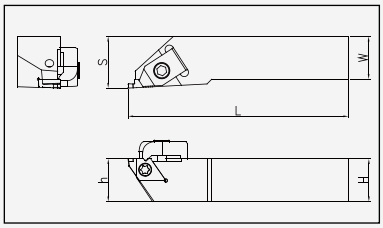
+ ESG(R,X)□□



Insert	Item No.	Dimensions (mm)							Clamp Screw	Wrench
		ΦD	Φd	L	l	Tmax	H	S		
ES□20□□	ESIV-R/L 2516-2	25	16	125	35	6.5	15	14	HCR0410	W20L
	ESIV-R/L 2520-2	25	20	150	45	6.5	18	15.5	HCR0512	W30L
	ESIV-R/L 3225-2	32	25	200	45	7	23	19	HCR0410	W40L
ES□30□□	ESIV-R/L 2520-3	25	20	150	45	6.5	18	15.5	HCR0410	W30L
	ESIV-R/L 3225-3	32	25	200	45	7	23	19	HCR0512	W40L
	ESIV-R/L 4032-3	40	32	250	55	7.5	30	22.5	HCR0616	W50L
ES□40□□	ESIV-R/L 2520-4	25	20	150	45	6.5	18	15.5	HCRL0410	W30L
	ESIV-R/L 3225-4	32	25	200	45	7	23	19	HCRL0512	W40L
	ESIV-R/L 4032-4	40	32	250	55	7.5	30	22.5	HCR0616	W50L
ES□50□□	ESIV-R/L 3225-5	32	25	200	45	7.5	23	19.5	HCRL0512	W40L
	ESIV-R/L 4032-5	40	32	250	55	8.5	30	23.5	HCR0616	W50L
ES□60□□	ESIV-R/L 3225-6	32	25	200	45	7.5	23	19.5	HCRL0512	W40L
	ESIV-R/L 4032-6	40	32	250	55	8.5	30	23.5	HCR0616	W50L
ES□80□□	ESIV-R/L 4032-8	40	32	250	55	8.5	30	23.5	HCR0616	W50L
	ESIV-R/L 4540-8	45	40	300	70	8.5	37	26.5	HCR0616	W50L

EDEH R/L

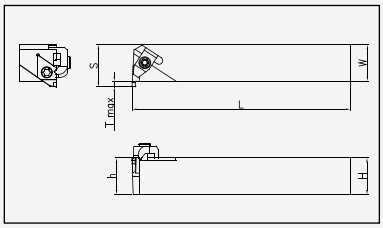
+ EDG(R,X)□□



Insert	Item No.	Dimensions (mm)					Clamp	Clamp Screw	Screw	Wrench
		T	W	L	S	H				
EDG□□□□	EDEH-R/L 2525-T00	25	25	130	30	25	DCG4	HCRL0512	SCRL0512	W30L, T20L

EDEV R/L

+ EDG(R,X)□□

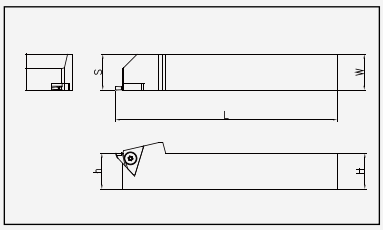


Insert	Item No.	Dimensions (mm)						Clamp	Clamp Screw	Screw	Wrench
		T	W	L	S	ΦD MIN	Tmax				
ED□15□□	EDEV-R/L 2525-1.5-T00	25	25	150	28	120	2.6	DCG4	HCRL0512	SCRL0512	W30L, T20L
	EDEV-R/L 3232-1.5-T00	32	32	170	35	120	2.6				
ED□20□□	EDEV-R/L 2020-2-T00	20	20	125	23.5	120	3				
	EDEV-R/L 2525-2-T00	25	25	150	28.5	120	3				
	EDEV-R/L 3232-2-T00	32	32	170	35.5	120	3				
ED□30□□	EDEV-R/L 2020-3-T00	20	20	125	25	80	4.5				
	EDEV-R/L 2525-3-T00	25	25	150	30	80	4.5				
	EDEV-R/L 3232-3-T00	32	32	170	37	80	4.5				
ED□40□□	EDEV-R/L 2020-4-T00	20	20	125	25	80	4.5				
	EDEV-R/L 2525-4-T00	25	25	150	30	80	4.5				
	EDEV-R/L 3232-4-T00	32	32	170	37	80	4.5				

Grooving/ Parting **Holder**

ETEH R/L

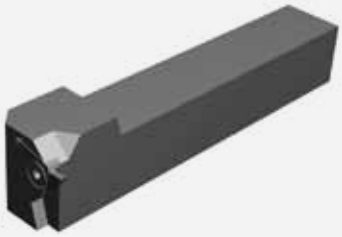
+ ETG(R,X) □□

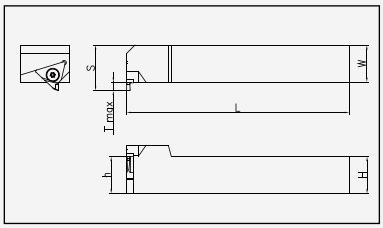


Insert	Item No.	Dimensions (mm)					Screw	Wrench
		T	W	L	S	H		
ETG □□□□	ETEH R/L 2525-T00	25	25	130	30	25	SCR0511	T20L

ETEV R/L

+ ETG(R,X) □□



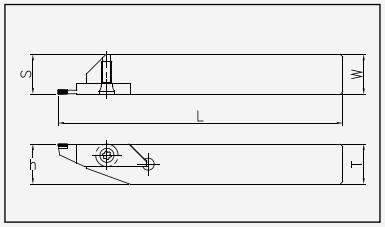


Insert	Item No.	Dimensions (mm)						Clamp Screw	Wrench
		T	W	L	S	ΦD MIN	Tmax		
ED□15□□	EDEV-R/L 2525-1.5-T00	25	25	150	28.5	120	3	SCRL0511	T20L
	EDEV-R/L 3232-1.5-T00	32	32	170	35.5	120	3		
ED□20□□	EDEV-R/L 2020-2-T00	20	20	125	24	120	3.5		
	EDEV-R/L 2525-2-T00	25	25	150	29	120	3.5		
	EDEV-R/L 3232-2-T00	32	32	170	36	120	3.5		
ED□30□□	EDEV-R/L 2020-3-T00	20	20	125	25	80	4.5		
	EDEV-R/L 2525-3-T00	25	25	150	30	80	4.5		
	EDEV-R/L 3232-3-T00	32	32	170	37	80	4.5		
ED□40□□	EDEV-R/L 2020-4-T00	20	20	125	25	80	4.5		
	EDEV-R/L 2525-4-T00	25	25	150	30	80	4.5		
	EDEV-R/L 3232-4-T00	32	32	170	37	80	4.5		

EMG Type (PCD/PCBN)

EMEH R/L

+ EMG(X) □□



Insert	Item No.	Dimensions (mm)					Screw	Wrench
		T	W	L	S	H		
EMG□□□□	**EMEH-R/L 1010-T00**	10	10	100	10	10	SCR02565	T07P

Milling

We are dedicated to designing and developing special milling cutters and indexable inserts for machining work-pieces that range from easy-to-machine to difficult-to-machine

- Design of insert and cutter for maximized productivity
- Available in various grades such as ultra-fine, fine, medium, coarse and multi-modal to machine all material types
- Guaranteed increased tool life and enhanced wear resistance
- Economical, consistent, and reliable performance
- Re-sharpening & re-tipping help the tools extend their total tool life and reduce the tool cost

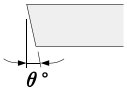
Designation system | unit : metric

S	P	K	N
Insert shape	Clearance angle	Tolerances	Clamp type

Insert shape

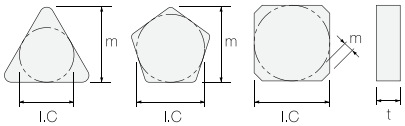
Symbol	Shape
A	85°
B	82°
C	80°
H	120°
L	
O	135°
P	108°
R	
S	
T	
W	80°
X	Special

Clearance angle



Symbol	Angle
N	0°
A	3°
B	5°
C	7°
P	11°
D	15°
E	20°
F	25°
G	30°

Tolerances



Class	I.C size (mm)	Tolerance m (mm)	t (mm)	I.C (mm)
A	6.35 9.525 12.7 15.875 19.05	±0.025	±0.025	±0.025
C		±0.025	±0.025	±0.025
G		±0.13	±0.13	±0.025
H		±0.025	±0.025	±0.013
K		±0.025	±0.025	±0.05~±0.15
M		±0.13	±0.13	±0.05~±0.15
U		±0.13	±0.13	±0.08~±0.25

Clamp type

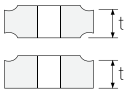
Symbol	Shape
A	
F	
G	
M	
N	
R	
T	
W	
X	Special

12 03 08 ED T (R)

1 2

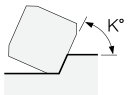
Cutting edge length	Thickness	Corner radius	Parallel land

C	R,S	T	H	O	I.C size (mm)
		09			5.56
06	06	11			6.35
08		13			7.94
09	09	16			9.525
12	12	22		05	12.7
16	15	27	09		15.875
				07	17.94
19	19	33	10		19.05
25	25				25.4

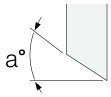


Symbol	t (mm)
01	1.59
02	2.38
03	3.18
T3	3.97
04	4.76
05	5.56
06	6.35
07	7.94
09	9.52

Symbol	R (mm)
00	Sharp
02	0.2
04	0.4
05	0.5
08	0.8
10	1.0
12	1.2
15	1.5
16	1.6
24	2.4
32	3.2
40	4.0



Entering angle	
A	45°
D	60°
E	75°
F	85°
P	90°
Z	Special

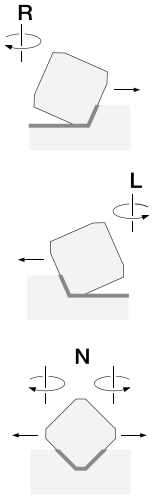


Clearance angle of land	
B	5°
C	7°
D	15°
E	20°
F	25°
G	30°
N	0°
P	11°
Z	Special

1 Edge shape

Symbol	Shape
F	
E	
T	
S	

2 Cutting direction



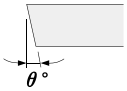
Designation system | unit : inch

S	P	K	N
Insert shape	Clearance angle	Tolerances	Clamp type

Insert shape

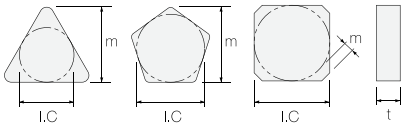
Symbol	Shape
A	85°
B	82°
C	80°
H	120°
L	
O	135°
P	108°
R	
S	
T	
W	80°
X	Special

Clearance angle



Symbol	Angle
N	0°
A	3°
B	5°
C	7°
P	11°
D	15°
E	20°
F	25°
G	30°

Tolerances



Class	I.C size (inch)	Tolerance m (inch)	t (inch)	I.C (inch)
A	6.35 9.525 12.7 15.875 19.05	±0.0002	±0.001	±0.001
C		±0.0005	±0.001	±0.001
G		±0.001	±0.005	±0.001
H		±0.0005	±0.001	±0.0005
K		±0.0005	±0.001	±0.002~±0.006
M		±0.003~±0.008	±0.005	±0.002~±0.006
U		±0.005~±0.015	±0.005	±0.003~±0.001

Clamp type

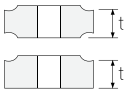
Symbol	Shape
A	
F	
G	
M	
N	
R	
T	
W	
X	Special

Milling

4 2 2 ED T (R)

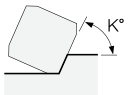
4	2	2 ED	T (1)	(R) (2)
Cutting edge length		Thickness	Corner radius	Parallel land

C	R,S	T	H	O	Symbol	I.C size (inch)
		9			1.8	7/23
06	06	11			2	1/4
09	09	16			3	3/8
12	12	22		05	4	½
16	15	27	09		5	5/8
19	19	33	10		6	¾
25	25				8	1
					10	1-1/4

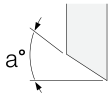


Symbol	t (inch)
1	1/16
1.5	3/32
2	1/8
2.5	5/32
3	3/16
3.5	7/32
4	1/4
5	5/16
6	3/8

Symbol	R (inch)
0	Sharp
1	1/64
2	1/32
3	3/64
4	1/16
6	3/32
8	1/8



Entering angle	
A	45°
D	60°
E	75°
F	85°
P	90°
Z	Special

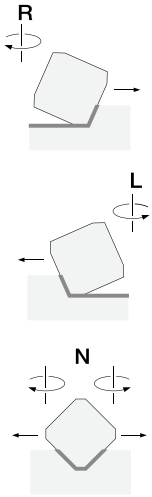


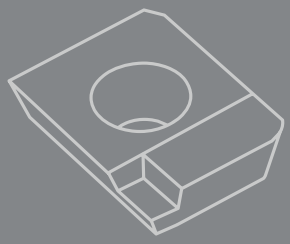
Clearance angle of land	
B	5°
C	7°
D	15°
E	20°
F	25°
G	30°
N	0°
P	11°
Z	Special

1 Edge shape

Symbol	Shape
F	
E	
T	
S	

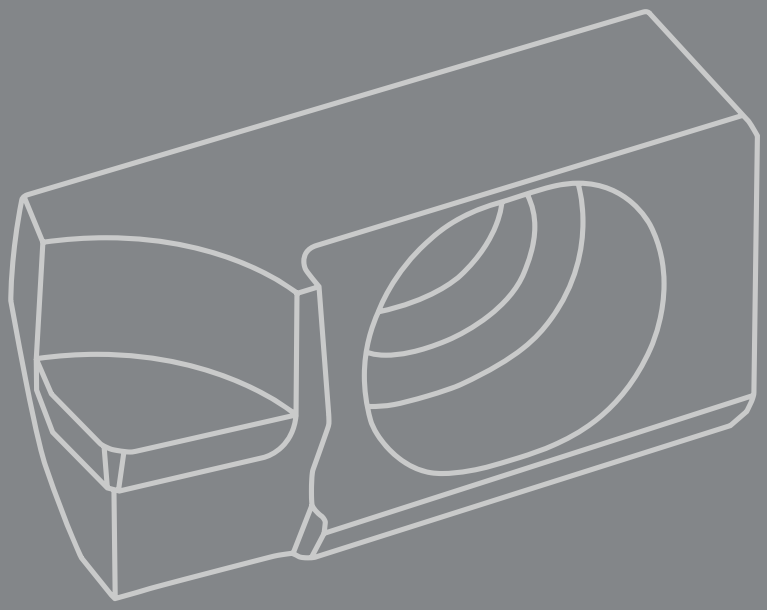
2 Cutting direction



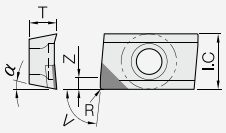


*Milling_*

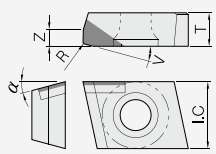
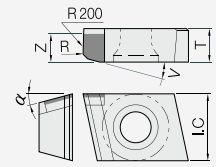
PCD



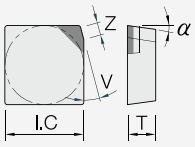
APKT

Shape	ISO code		Dimensions (mm)						PCD							
	Metric	Inch	I.C	Z	α	V	R	T	EP20	EP55	EP750	EP58	EP29			
	**APKT** 1604PDFR		9.525	2	11			4.76								

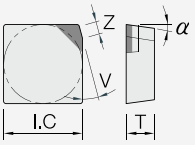
CDEW

Shape	ISO code		Dimensions (mm)						PCD							
	Metric	Inch	I.C	Z	α	V	R	T	EP20	EP55	EP750	EP58	EP29			
	**CDEW** 1204R-R		12.7	2.4	15	15	-	4.76								
	**CDEW** 1204R-F		12.7	4.5	15	15	200	4.76								

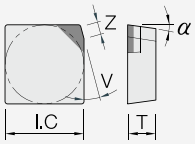
SPGN

Shape	ISO code		Dimensions (mm)						PCD							
	Metric	Inch	I.C	Z	α	V	R	T	EP20	EP55	EP750	EP58	EP29			
	**SPGN** 1203EDR	**SPGN** 42EDR	12.7	1.4	11	15		3.18								
	1203EDL	42EDL	12.7	1.4	11	15		3.18								
	1504EDR	53EDR	15.875	1.4	11	15		3.18								

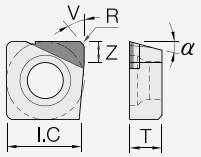
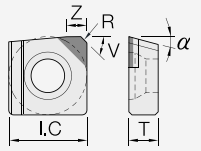
SEGN

Shape	ISO code		Dimensions (mm)						PCD							
	Metric	Inch	I.C	Z	α	V	R	T	EP20	EP55	EP750	EP58	EP29			
	**SEGN** 1203AFN	**SEGN** 42AFN	12.7	2	20	45		3.18								
	1203EFR	42EFR	12.7	2	20	15		3.18								
	1504AFN	53AFN	15.875	2	20	45		4.76								
	1504EFR	53EFR	15.875	2	20	15		4.76								

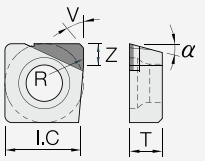
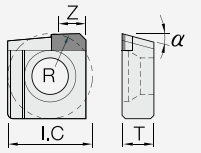
SFGN

Shape	ISO code		Dimensions (mm)						PCD							
	Metric	Inch	I.C	Z	α	V	R	T	EP20	EP55	EP750	EP58	EP29			
	**SFGN** 1203EFR	**SFGN** 42EFR	12.7	2	25	15		3.18								

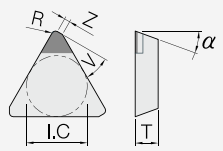
SNEW

Shape	ISO code		Dimensions (mm)						PCD							
	Metric	Inch	I.C	Z	α	V	R	T	EP20	EP55	EP750	EP58	EP29			
	**NF-SNEW** 09T3ADTR		9.525	2.35	15	45		3.97								
	09T3ADTR-R		9.525	2.35	15		0.5	3.97								
	**NF-SNEW** 1204AFTR		12.7	3.3	15	45		4.76								
	1204AFTR-R		12.7	3.3	15		1	4.76								

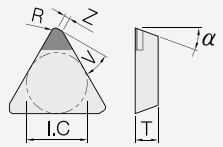
SNEW(W)

Shape	ISO code		Dimensions (mm)						PCD							
	Metric	Inch	I.C	Z	α	V	R	T	EP20	EP55	EP750	EP58	EP29			
	**NF-SNEW** 09T3ADTR-W		9.525	2.6	15	45	100	3.97								
	**NF-SNEW** 1204ADFR-W		12.7	5	15	45	300	4.76								

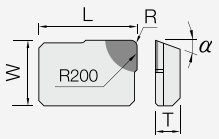
TPGN

Shape	ISO code		Dimensions (mm)						PCD							
	Metric	Inch	I.C	Z	α	V	R	T	EP20	EP55	EP750	EP58	EP29			
	TPGN 1603PDR	TPGN 32PDR	12.7	1.2	11	30		3.18								
	1603PDL	32PDL	12.7	1.2	11	30		3.18								
	2204PDR	43PDR	15.88	1.4	11	30		4.76								

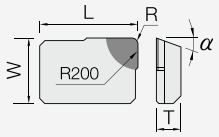
TEGN

Shape	ISO code		Dimensions (mm)						PCD							
	Metric	Inch	I.C	Z	α	V	R	T	EP20	EP55	EP750	EP58	EP29			
	TEGN 1603PER	TEGN 32PER	12.7	1.2	20	30	0.8	3.18								
	2204PER	43PER	15.88	1.4	20	30	0.8	4.76								

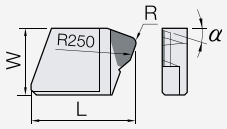
LDCN

Shape	ISO code		Dimensions (mm)						PCD							
	Metric	Inch	I.C	Z	α	L	R	T	EP20	EP55	EP750	EP58	EP29			
	LDCN 190412R	LDCN	12.7		15	19.05	1.2	4.76								
	190412L		12.7		15	19.05	1.2	4.76								

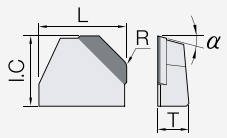
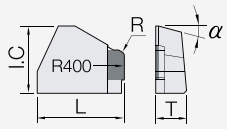
LFCN

Shape	ISO code		Dimensions (mm)						PCD							
	Metric	Inch	W	Z	α	L	R	T	EP20	EP55	EP750	EP58	EP29			
	**LFCN** 190412R	**LFCN**	12.7		25	19.05	1.2	4.76								
	190412L		12.7		25	19.05	1.2	4.76								

GDCN

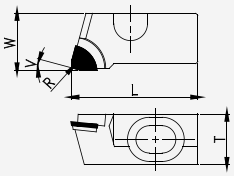
Shape	ISO code		Dimensions (mm)						PCD							
	Metric	Inch	W	Z	α	L	R	T	EP20	EP55	EP750	EP58	EP29			
	**GDCN** 2004PDFR	**GDCN**	12.7		15	20	1.2	4.76								
	2004PDFL		12.7		15	20	1.2	4.76								

YDEN

Shape	ISO code		Dimensions (mm)						PCD							
	Metric	Inch	I.C	Z	α	V	R	T	EP20	EP55	EP750	EP58	EP29			
	**YDEN** 1505ADFR		12.7		15	15.875	1.6	5.675								
	**YDEN** 1505ADFR-WD		12.28		15	15.925	0.8	5.675								

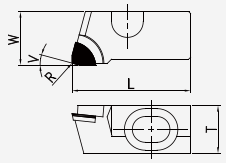
Cartridge_ SD type

SDR



Item No.	Dimensions (mm)					PCD							
	W	V	L	R	T	EP20	EP55	EP750	EP58	EP29			
SDR	13.5	15	30		12								
SDR-A	13.5	0	30		12								
SDR-R	13.5	15	30	0.4	12								
SDR-ES	13.5	15	30		12								

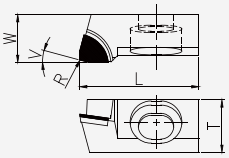
SDW



Item No.	Dimensions (mm)				PCD							
	W	L	R	T	EP20	EP55	EP750	EP58	EP29			
SDW	13	30	400	12								
SDW-ES	13	30	400	12								

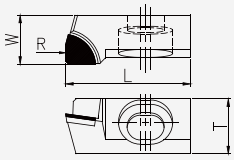
Cartridge_ High feed type

HFR



Item No.	Dimensions (mm)					PCD							
	W	V	L	R	T	EP20	EP55	EP750	EP58	EP29			
HFR	10	15	25		11								
HFR-A	10	0	25		11								
HFR-R	10	15	25	0.4	11								
HFR-ES	10	15	25		11								

HFW

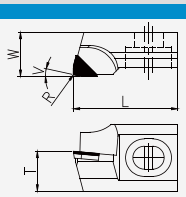


Item No.	Dimensions (mm)				PCD							
	W	L	R	T	EP20	EP55	EP750	EP58	EP29			
HFW	9.8	25	400	11								
HFW-ES	9.8	25	400	11								

SDR : standard face milling rough
SDR-A : corner milling rough
SDR-R : standard face milling rough with nose radius
SDR-ES : rough with edge hone
SDW : standard face milling wiper
SDW-ES : wiper with edge hone
CFR : CF milling rough
CFW : CF milling wiper

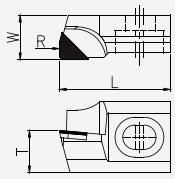
Cartridge_ CF type

CFR



Item No.	Dimensions (mm)					PCD							
	W	V	L	R	T	EP20	EP55	EP750	EP58	EP29			
CFR	10.5	15	25		10								
CFR-A	10.5	0	25		10								
CFR-R	10.5	15	25	0.4	10								
CFR-ES	10.5	15	25		10								

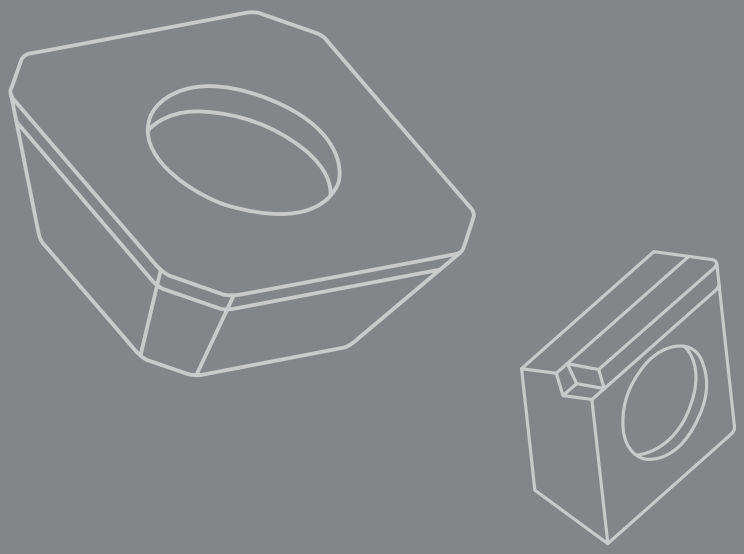
CFW



Item No.	Dimensions (mm)				PCD							
	W	L	R	T	EP20	EP55	EP750	EP58	EP29			
CFW	10	25	400	10								
CFW-ES	10	25	400	10								

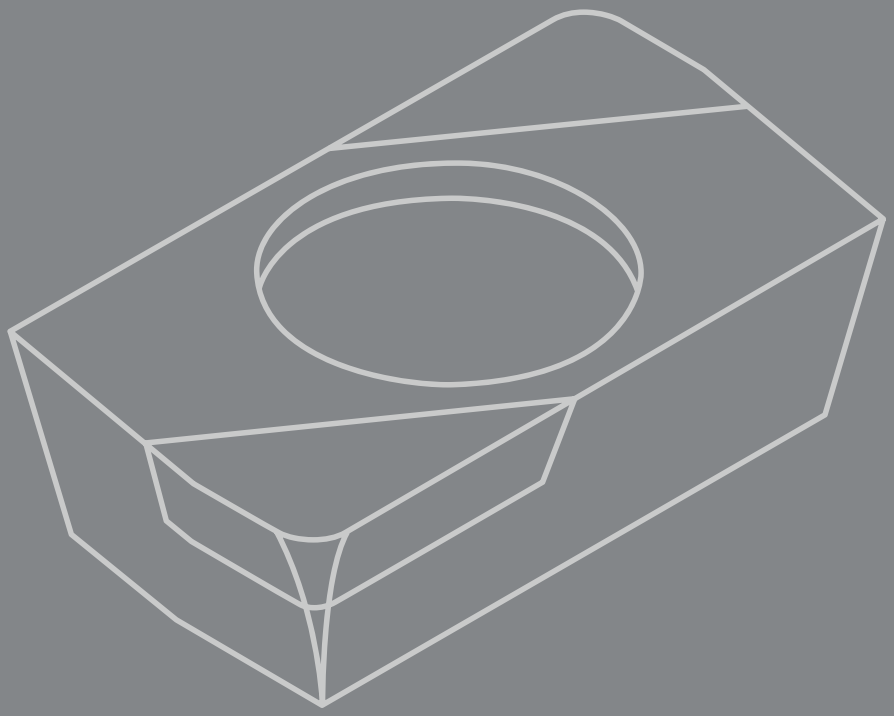
Customized design

- Face, slot, chamfer, profile, etc.
- Optimized tooling service depending on the customer's demand.

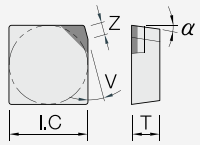


Milling_

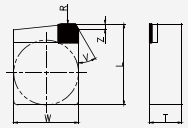
PCBN



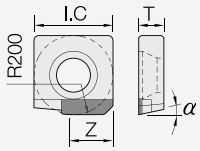
SPGN

Shape	ISO code		Dimensions (mm)						PCBN					
	Metric	Inch	I.C	Z	α	V	R	T	EB11	EB210	EB51	EB71	EB710	
	SPGN 1203EDR	SPGN 42EDR	12.7	1.4	11	15		3.18						
	1203EDL	42EDL	12.7	1.4	11	15		3.18						
	1504EDR	53EDR	15.9	1.4	11	15		3.18						

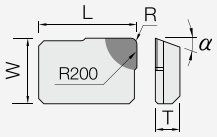
SNGN

Shape	ISO code		Dimensions (mm)						PCBN					
	Metric	Inch	W	Z	V	R	T	L	EB11	EB210	EB51	EB71	EB710	
	SNGN 1506APTR	SNGN 54APTR	12.7	2.5	30	250	6.35	15.875						
	1506APTL	54APTL	12.7	2.5	30	250	6.35	15.875						

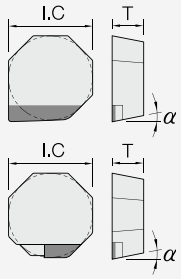
SNEW

Shape	ISO code		Dimensions (mm)						PCBN					
	Metric	Inch	I.C	Z	α	V	R	T	EB11	EB210	EB51	EB71	EB710	
	SNEW 09T3ADFR	SNEW 3(2.5)ADFR	9.525	2.6	15	45		3.97						
	1203ADTR	42ADTR	12.7	7	15	45	300	3.18						

LDCN

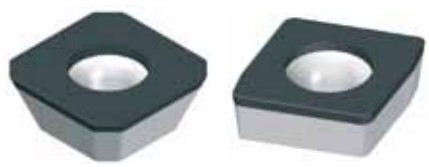
Shape	ISO code		Dimensions (mm)						PCBN					
	Metric	Inch	W	Z	α	L	R	T	EB11	EB210	EB51	EB71	EB710	
	**LDCN** 190412R		12.7		15	19.1	1.2	4.76						
	190412L		12.7		15	19.1	1.2	4.76						

OPHX

Shape	ISO code		Dimensions (mm)						PCBN					
	Metric	Inch	I.C	Z	α	V	R	T	EB11	EB210	EB51	EB71	EB710	
	**OPHX** 0504ZZN-R		12.7		11		-	4.76						
	0504ZZR		12.7		11		300	4.76						
	0504ZZL		12.7		11		300	4.76						

Customized design

- Face, slot, chamfer, profile, etc.
- Optimized tooling service depending on the customer's demand.



*Milling_*

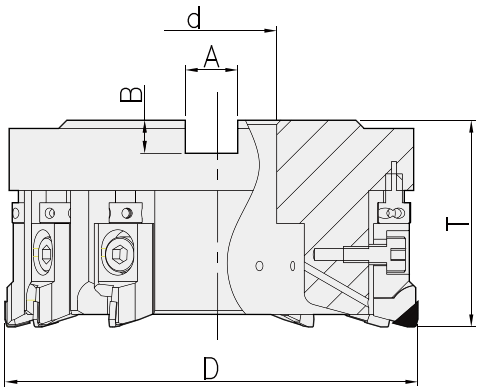
Cutter body_Aluminum

Aluminum body and special inserts designed for high- speed / high precision cutting.
The light weight body makes tool setting easy.

_ Easy setting with light aluminum body
(50% lighter than steel body)
_ Excellent milling performance and quality
Excellent durability and low cutting resistance
High productivity and process stability

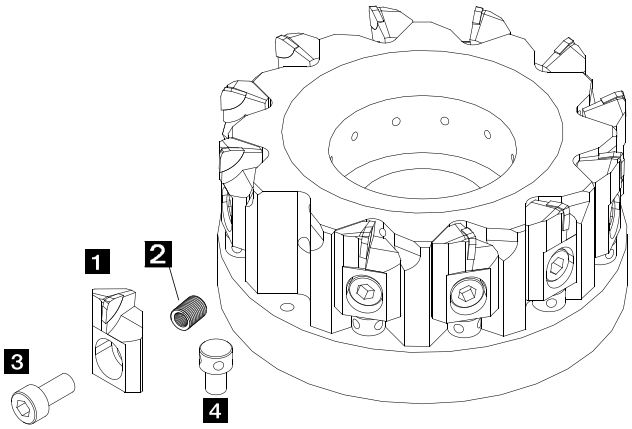
Cutter body_Aluminum & Steel

CF type



Item No.		Dimensions (mm)					Tooth		Weight	Cartridge	Arbor
Standard	High feed	ØD	Ød	A	B	T	standard	High feed	(kg)		
CF 08050-6R(L)	CF 08050-10R(L)	80	25.4	9.5	6	50	6	10	0.7	ROUGH CFR(R) CFR (L) WIPER CFW (R) CFW (L)	FMA 25.4
CF 10063-10R(L)	CF 10063-12R(L)	100	31.75	12.7	8	63	10	12	1.0		FMA 31.75
CF 12563-12R(L)	CF 12563-16R(L)	125	38.1	15.9	10	63	12	16	1.8		FMA 38.1
CF 16063-16R(L)	CF 16063-18R(L)	160	50.8	19.0	11	63	16	18	2.9		FMA 50.8
CF 20063-20R(L)	CF 20063-24R(L)	200	47.625	25.4	14	63	20	24	4.5		FMA 47.625
CF 25063-24R(L)	CF 25063-30R(L)	250	47.625	25.4	14	63	24	30	7.0		FMA 47.625

- Shoulder type cartridge can be offered by customer's demand.



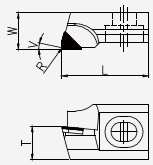
Spare parts

1 Cartridge (Rough)	1 Cartridge (Wiper)	2 Double Bolt	3 Clamp Bolt	4 Adjust Bolt	Coolant Bolt
CFR	CFW	M8M5-7	M5x12	M5x8	

- Every spare parts be offered by extra charge.

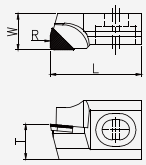
Cartridge_ CF type

CFR

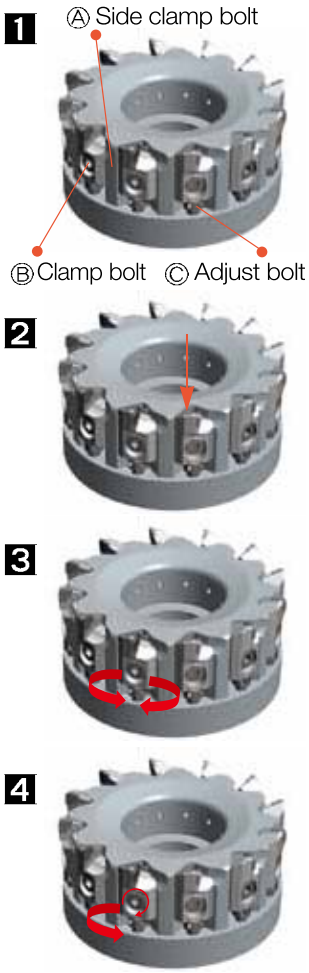


Item No.	Dimensions (mm) W	V	L	R	T	PCD EP20	EP55	EP750	EP58	EP29
CFR	10.5	15	25		10					
CFR-A	10.5	0	25		10					
CFR-R	10.5	15	25	0.4	10					
CFR-ES	10.5	15	25		10					

CFW



Item No.	Dimensions (mm) W	L	R	T	PCD EP20	EP55	EP750	EP58	EP29
CFW	10	25	400	10					



Setting manual

1. Installaion of cartridge

Install the Ⓒ Adjust bolt on the cutter body, and insert the cartridge. Then, gently tightening the Ⓑ Clamp bolt and Ⓐ Side clamp bolt.

2. Installaion of bolt

When tightening, secure the cartridge by pressing it downward. Then using a torque wrench. Temporarily tighten the clamp bolt and side clamp bolt to 3N.m using a torque wrench.

3. Cutting edge height adjustment

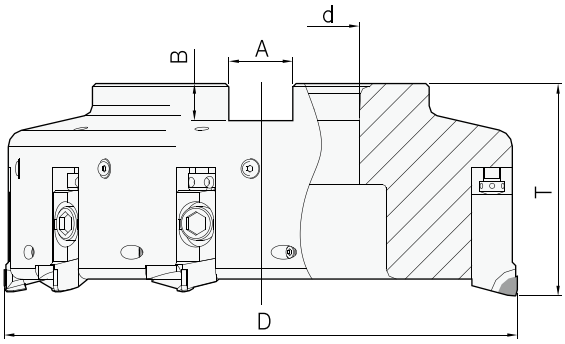
Turn the adjustment bolt and adjust so that the height of the front cutter is -10㎛ from the target value.

4. Final adjustment

Using a torque wrench, tighten the clamp bolt and side clamp bolt to 10N·m. After then turn the adjustment bolt, And adjust to the target height.

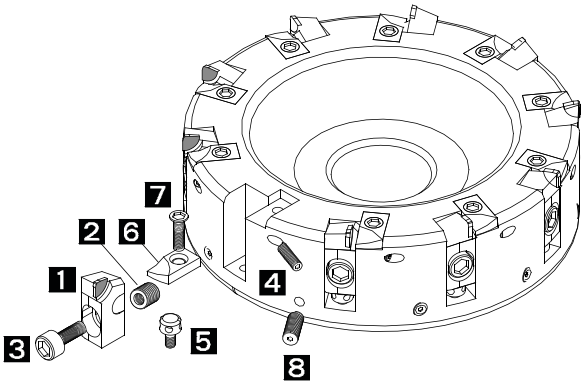
Cutter body_Aluminum & Steel

SD type



Item No. Inch type	Dimensions (mm) ØD	Ød	A	B	T	Tooth	Weight (kg)	Cartridge	Arbor
SD 08050-6R(L)	80	25.4	9.5	6	50	6	0.7	ROUGH SDR (R) SDR (L) WIPER SDW (R) SDW (L)	FMA 25.4
SD 10063-8R(L)	100	31.75	12.7	8	63	8	1.0		FMA 31.75
SD 12563-10R(L)	125	38.1	15.9	10	63	10	1.8		FMA 38.1
SD 16063-12R(L)	160	50.8	19.0	11	63	12	2.9		FMA 50.8
SD 20063-16R(L)	200	47.625	25.4	14	63	16	4.5		FMA 47.625
SD 25063-18R(L)	250	47.625	25.4	14	63	18	7.0		FMA 47.625

- Shoulder type cartridge can be offered by customer's demand.



Spare parts

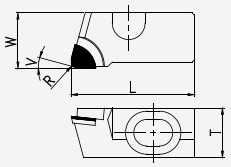
1 Cartridge (Rough) SDR	1 Cartridge (Wiper) SDW	2 Double Bolt M6xM10-8	3 Clamp Bolt M6x15	4 Side Clamp Bolt M6x10

5 Adjust Bolt M5x0.8	6 Chip Cover 4x9.5x18	7 Chip Cover Bolt M4x10	8 Balancing Bolt M6x10	Coolant Bolt

- Every spare parts be offered by extra charge.

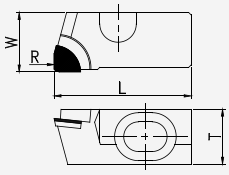
Cartridge_ SD type

SDR

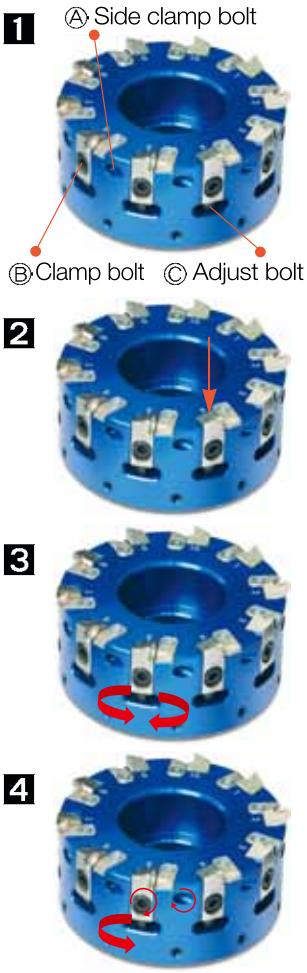


Item No.	Dimensions (mm)						PCD							
	W	V	α	L	R	T	EP20	EP55	EP750	EP58	EP29			
SDR	13.5	15	11	30		12								
SDR-A	13.5	0	11	30		12								
SDR-R	13.5	15	11	30	0.4	12								
SDR-ES (EDGE HONE)	13.5	15	11	30		12								

SDW



Item No.	Dimensions (mm)						PCD							
	W	Z	α	L	R	T	EP20	EP55	EP750	EP58	EP29			
SDW	13		11	30	400	12								
SDW-ES (EDGE HONE)	13		11	30	400	12								



Setting manual

1. Installaion of cartridge
Install the Ⓒ Adjust bolt on the cutter body, and insert the cartridge. After then, gently tightening the Ⓑ Clamp bolt and Ⓐ Side clamp bolt.

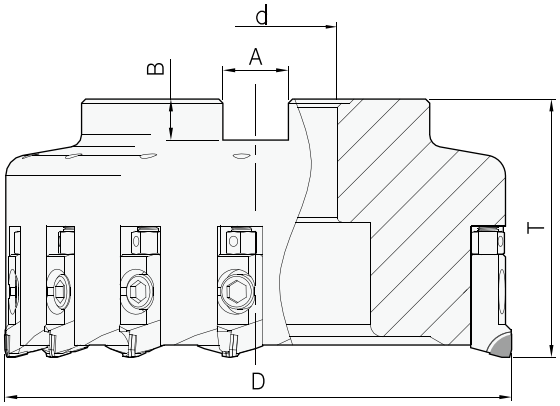
2. Installaion of bolt
When tightening, secure the cartridge by pressing it downward. And using a torque wrench, temporarily tighten the clamp bolt and side clamp bolt to 3N·m.

3. Cutting edge height adjustment
Turn the adjustment bolt and adjust so that the height of the front cutter is -10㎛ from the target value.

4. Final adjustment
Using a torque wrench, tighten the clamp bolt and Side clamp bolt to 10N·m. And turn the adjustment bolt, then adjust to the target height.

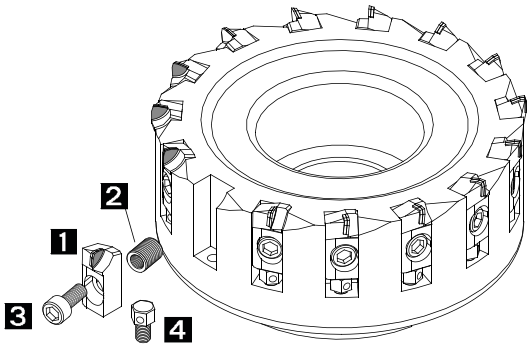
Cutter body_Aluminum & Steel

HF type



Item No. Inch type	Dimensions (mm) ØD	Ød	A	B	T	Tooth	Weight (kg)	Cartridge	Arbor
HF 08050-10R(L)	80	25.4	9.5	6	50	10	0.7	ROUGH HFR(R) HFR(L) WIPER HFW(R) HFW(L)	FMA 25.4
HF 10063-12R(L)	100	31.75	12.7	8	63	12	1.0		FMA 31.75
HF 12563-15R(L)	125	38.1	15.9	10	63	15	1.8		FMA 38.1
HF 16063-18R(L)	160	50.8	19.0	11	63	18	2.9		FMA 50.8
HF 25063-24R(L)	200	47.625	25.4	14	63	24	4.5		FMA 47.625
HF 25063-30R(L)	250	47.625	25.4	14	63	30	7.0		FMA 47.625

- Shoulder type cartridge can be offered by customer's demand.



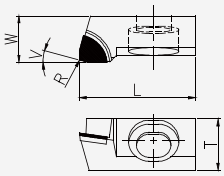
Spare parts

1 Cartridge (Rough) HFR	1 Cartridge (Wiper) HFW	2 Double Bolt M8M5-7	3 Clamp Bolt M5x12	4 Adjust Bolt M5x8	Coolant Bolt

- Every spare parts be offered by extra charge.

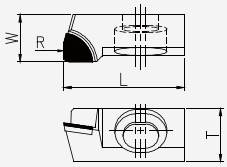
Cartridge_ High feed type

HFR



Item No.	Dimensions (mm)						PCD							
	W	Z	α	L	R	T	EP20	EP55	EP750	EP58	EP29			
HFR	10	15	11	25		11								
HFR-A	10	0	11	25		11								
HFR-R	10	15	11	25	0.4	11								
HFR-ES	10	15	11	25		11								

HFW



Item No.	Dimensions (mm)						PCD							
	W	Z	α	L	R	T	EP20	EP55	EP750	EP58	EP29			
HFW	9.8			25	400	11								
HFW-ES	9.8			25	400	11								

1

Ⓐ Clamp bolt Ⓑ Adjust bolt

2

3

4

Setting manual

1. Installaion of cartridge

Install the Ⓑ adjust bolt on the cutter body, and insert the cartridge.
After then, gently tightening the Ⓐ Clamp bolt.

2. Installaion of bolt

When tightening, secure the cartridge by pressing it downward.
And using a torque wrench, temporarily tighten the clamp bolt 3N·m.

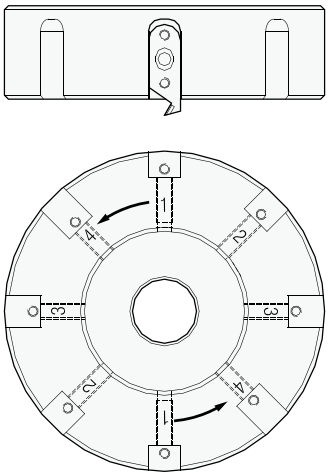
3. Cutting edge height adjustment

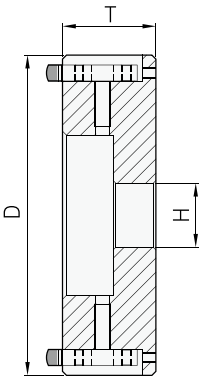
Turn the adjustment bolt and adjust so that the height of the front cutter is -10㎛ from the target value.

4. Final adjustment

Using a torque wrench, tighten the clamp Bolt to 10N·m.
And turn the adjustment bolt, then adjust to the target height.

Cutter body_Aluminum

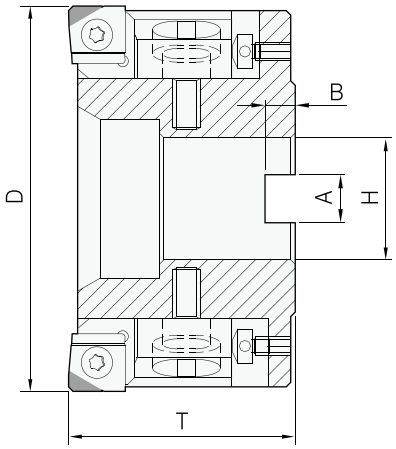




Item No. Inch type	Dimensions (mm) D	Z	H	T
120D-35T-24H-10Z-RH	120	10	24	35
120D-35T-24H-10Z-LH	120	10	24	35
158D-40T-70H-6Z-RH	158	6	70	40
158D-40T-70H-6Z-LH	158	6	70	40
198D-45T-40H-6Z-RH	198	6	40	45
198D-45T-40H-6Z-LH	198	6	40	45
220D-40T-65H-6Z-RH	220	6	65	40
220D-40T-65H-6Z-LH	220	6	65	40
248D-45T-40H-12Z-RH	248	12	40	45
248D-45T-40H-12Z-LH	248	12	40	45

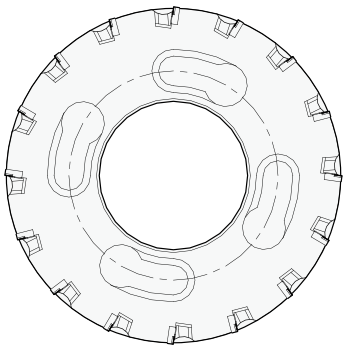
Order made

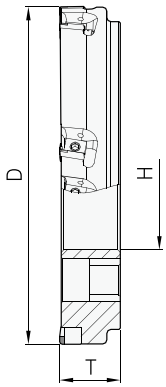
- PCD inserts and Cartridges can be customized.
- Samples are requested for Cartridge production.



*Milling_*

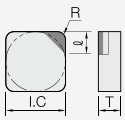
Cutter body_Steel





Item No. Inch type	Dimensions (mm) D	Z	H	T
125D-63T-40H-16Z	125	16	40	63
160D-63T-40H-18Z	160	18	40	63
200D-63T-60H-12Z	200	12	60	63
250D-63T-50H-24Z	250	24	50	63
250D-45T-109.88H-16Z	250	16	109.88	45

SNGN

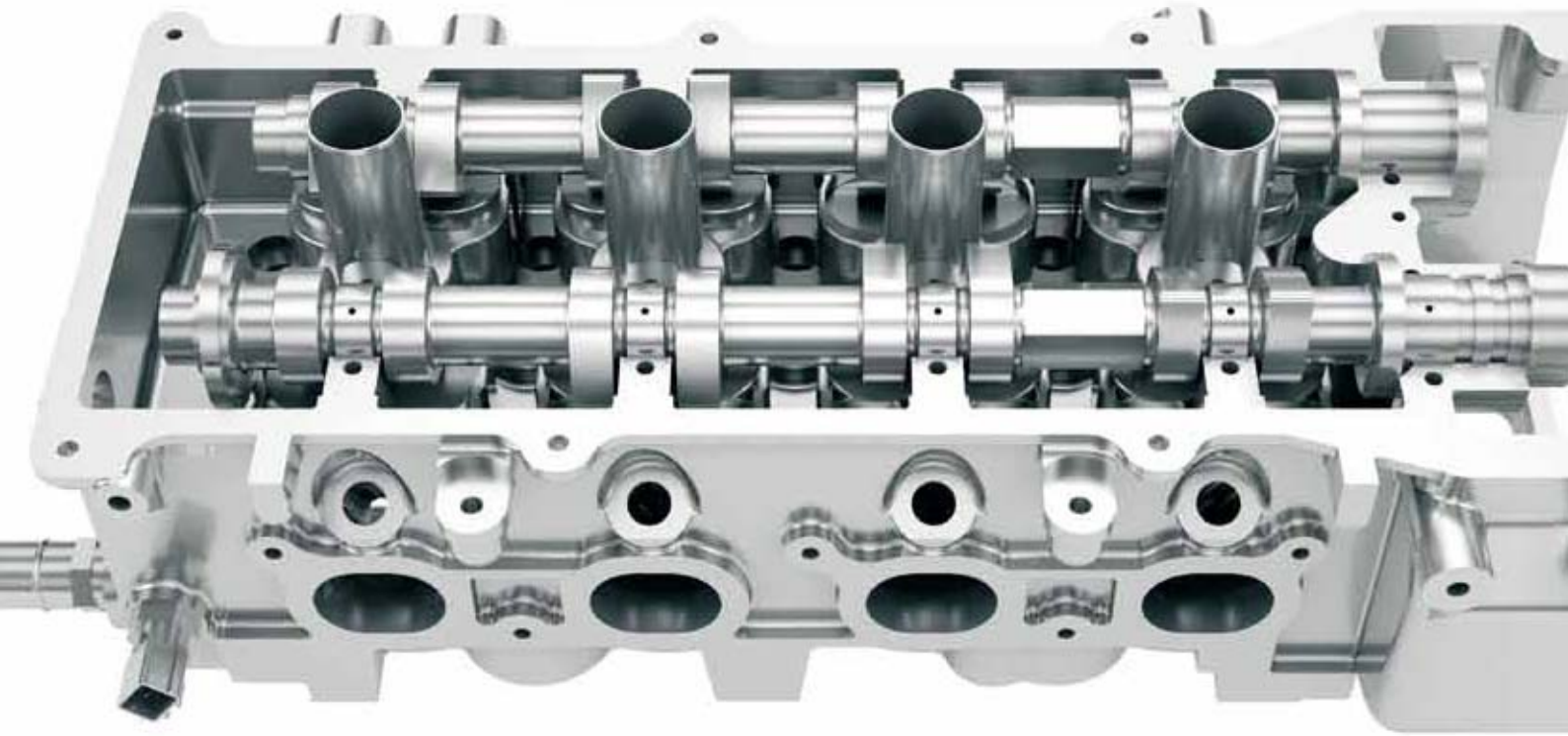
Shape	ISO code Metric	Inch	Dimensions (mm) W	Z	α	V	R	T	L	PCBN EB11	EB210	EB51	EB71	EB710
	SNGN 1506APTR	SNGN 54APTR	12.7	5	11	45	250	6.35	15.9					
	1506APTL	54APTL	12.7	5	11	45	250	6.35	15.9					

Customized design

- Customized PCBN inserts and Cartridges
- Must have either samples or drawings of current tool in use

Rotating

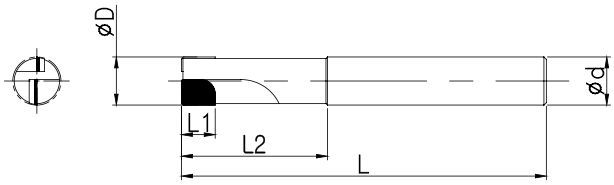
Applicable to all general cutting tools
such as high-speed steel, solid carbide, carbide-tipped,
cermet, PCD, and PCBN with or without internal coolant.



Rotating_ Endmill

Square endmill

The range from D3 to D20 with various edge length is common in use.

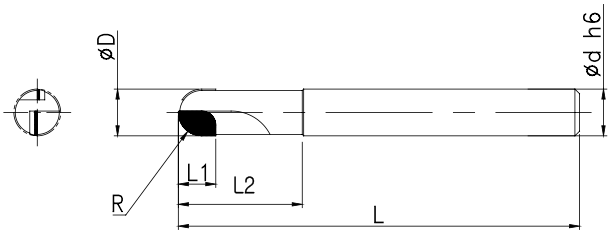


Item No.		Dimensions (mm)					
		D	d	L1	L2	L	Z
EDES	10303-0515-60	3	3	5	15	60	1
	10404-0715-60	4	4	7	15	60	1
	10505-1020-60	5	5	10	20	60	1
	10606-1020-60	6	6	10	20	60	1
	20808-1020-60	8	8	10	20	60	2
	21010-1030-75	10	10	10	30	75	2
	21212-1035-85	12	12	10	35	85	2
	21616-1035-85	16	16	10	35	85	2
	22020-1040-100	20	20	10	40	100	2

- Over center, Oil hole: Please contact separately for further discussion.
- EDES: Ehwa pcD/cvD Endmill Square

Ball nose endmill

Teeth, 1Z or 2Z can be determined by diameter.

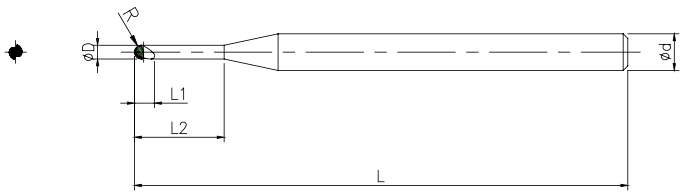


Item No.		Dimensions (mm)					
		D	d	L1	L2	L	Z
EDEB	10303-0515-60	3	3	5	15	60	1
	10404-0715-60	4	4	7	15	60	1
	10505-1020-60	5	5	10	20	60	1
	10606-1020-60	6	6	10	20	60	1
	20606-1020-60	6	6	10	20	60	2
	20808-1020-60	8	8	10	20	60	2
	21010-1020-80	10	10	10	20	80	2
	21212-1020-80	12	12	10	20	80	2

- Oil hole : Please contact separately for further discussion.
- EDEB : Ehwa pcD/cvD Endmill Ballnose

Ball nose endmill

The range from D3 to D20 with various edge length is common in use.

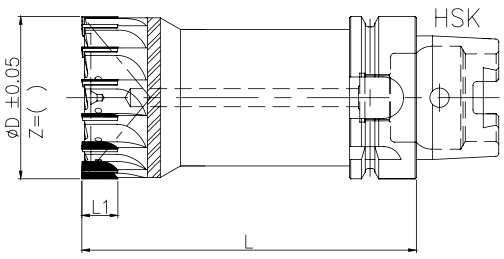


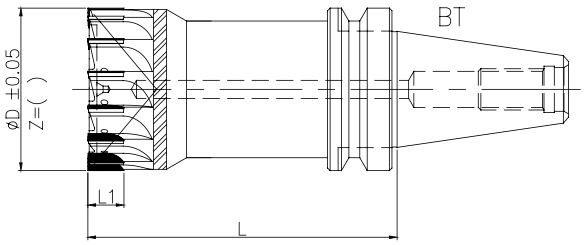
- Design:
- Diameter: 2,0~3,0mm
- N of blades: 2
- Helix angle: 35

Item No.		Dimensions (mm)					
		D	R	L1	L2	L	d
EBEB	20204-0104-50	2	1	1.2	4	50	4
	20204-0106-50	2	1	1.2	6	50	4
	20204-0108-50	2	1	1.2	8	50	4
	20204-0110-50	2	1	1.2	10	50	4
	20204-0112-50	2	1	1.2	12	50	4
	20204-0114-50	2	1	1.2	14	50	4
	20204-0116-50	2	1	1.2	16	50	4
	20204-0118-50	2	1	1.2	18	50	4
	20204-0120-50	2	1	1.2	20	50	4
	20306-1.508-66	3	1.5	1.8	8	66	6
	20306-1.510-66	3	1.5	1.8	10	66	6
	20306-1.512-66	3	1.5	1.8	12	66	6
	20306-1.516-66	3	1.5	1.8	16	66	6
	20306-1.520-66	3	1.5	1.8	20	66	6
	20306-1.525-66	3	1.5	1.8	25	66	6
	20306-1.530-66	3	1.5	1.8	30	66	6

- EBEB : Ehwa pcBn Endmill Ballnose

Monoblock type



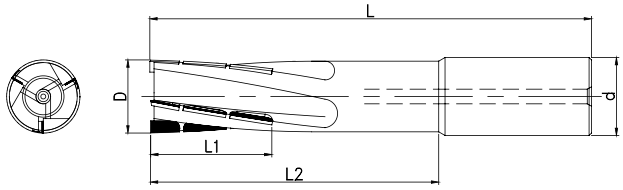


Item No.	Dimensions (mm)				
	ØD	d	L1	L	type
EDEM 0832-HSKA63	30	8	14	150	HSKA63
0840-HSKA63	40	8	14	150	HSKA63
0850-HSKA63	50	8	14	150	HSKA63
1463-HSKA63	63	14	14	150	HSKA63
1463-HSKA100	63	14	14	150	HSKA100
1463-BT40	63	14	14	150	BT40

- EDEM : Ehwa pcD/cvD Endmill Monoblock
- Available type : HSK type - HSK 32, 40, 50, 63, 100
  Taper type - BT 30, 40, 50 / SK 30, 40, 50 / CAT 30, 40, 50

Special Helical endmill

This special helical endmill can achieve high performance with long tool life. The cutting force of the helical design is outstanding. Therefore, it is suitable for high removal rate.

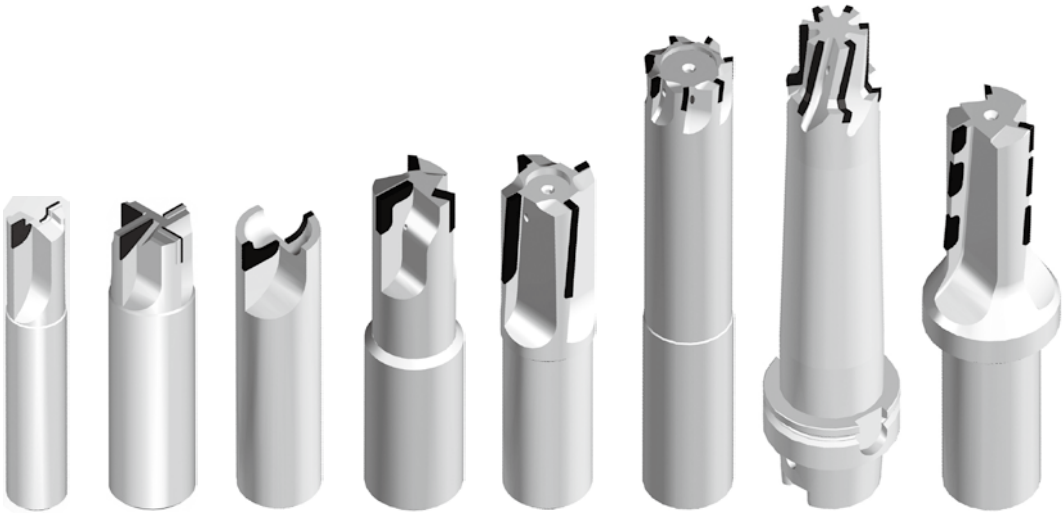


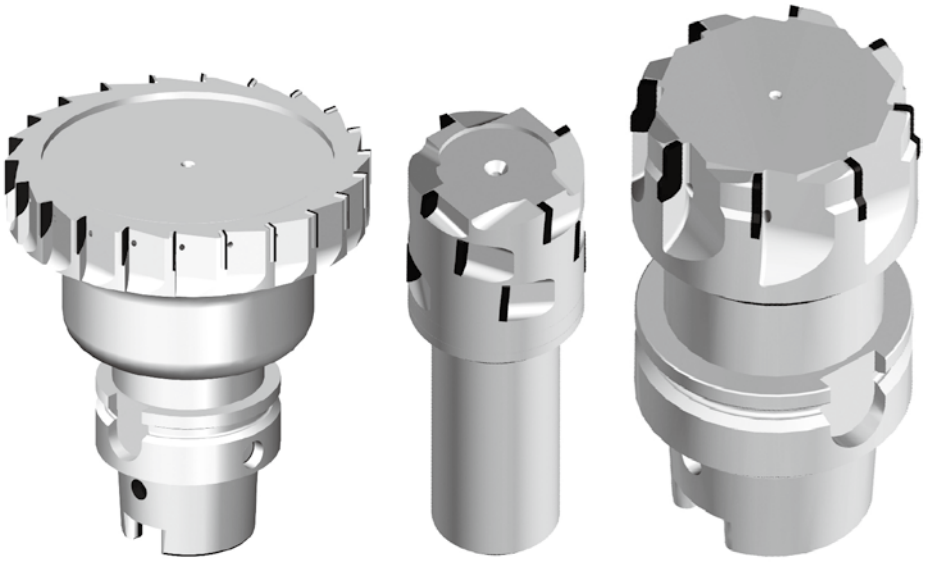
Item No.	Dimensions (mm)					
	D	d	L1	L2	L	F
EDEH 31616-30-120	16	16	30	50	120	3
32020-30-120	20	20	30	50	120	3
32525-30-120	25	25	30	50	120	3
33032-30-120	30	32	30	50	120	4

■ EDEH : Ehwa pcD Endmill Helix

Customized design

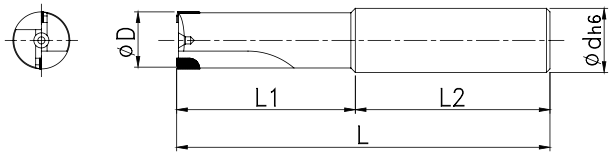
- Face, slot, chamfer, profile, etc.
- Optimized tooling service depending on the customer's demand.





Rotating_ Reamer

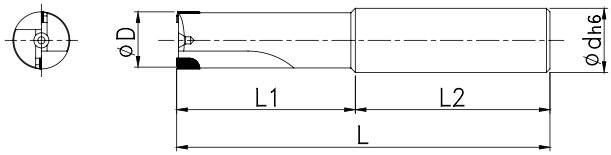
Normal type



Item No.		Dimensions (mm)					
		ØD	Ød	L1	L2	L	Z
EDRS	20406-15-60	4	6	15	45	60	2
	20506-15-60	5	6	15	45	60	2
	20606-25-80	6	6	25	55	80	2
	20808-25-80	8	8	25	55	80	2
	21010-40-100	10	10	40	60	100	2
	21212-40-100	12	12	40	60	100	2

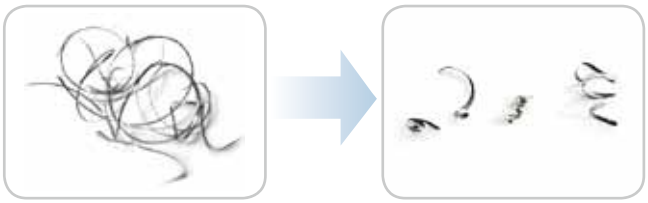
- EDRS : Ehwa pcD Reamer Straight flute

Chip breaker type



Item No.		Dimensions (mm)					
		ØD	Ød	L1	L2	L	Z
EDRS CB	20406-15-60	4	6	15	45	60	2
	20506-15-60	5	6	15	45	60	2
	20606-25-80	6	6	25	55	80	2
	20808-25-80	8	8	25	55	80	2
	21010-40-100	10	10	40	60	100	2
	21212-40-100	12	12	40	60	100	2

- EDRS CB : Ehwa pcD Reamer Straight flute Chip Breaker
- Chip breaker design : varies with cutting conditions



Normal type

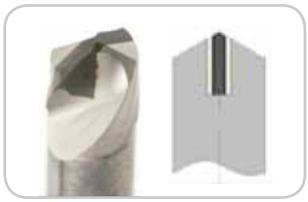
Customized design

- Face, slot, chamfer, profile, etc.
- Optimized tooling service depending on the customer's demand.

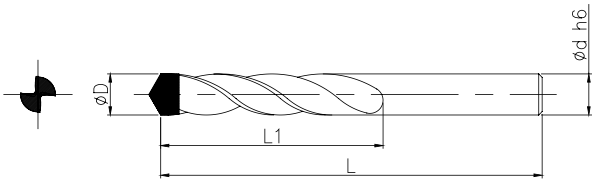
Rotating_ Drill

PCD helical drill

HELIX E



HELIX S

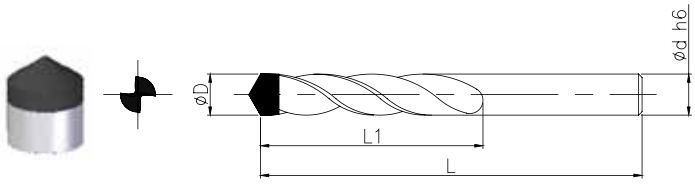


Item No.		Dimensions (mm)			
		ØD	L1	L	Ød
EDDHE(or S)	20303-30-80	3	30	80	3
	20404-30-80	4	30	80	4
	20505-30-80	5	30	80	5
	20606-30-80	6	30	80	6
	20707-35-90	7	35	90	7
	20808-35-90	8	35	90	8
	20909-40-100	9	40	100	9
	21010-40-100	10	40	100	10
	21111-50-110	11	50	110	11
	21212-50-110	12	50	110	12

■ EDDHE : Ehwa pcD Drill Helix Economic PCD / EDDHS : Ehwa pcD Drill Helix Sandwich PCD

PCD helical drill

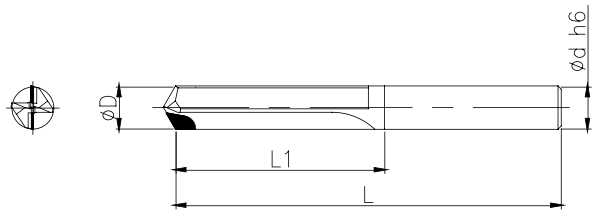
HELIX D



Item No.		Dimensions (mm)			
		ØD	L1	L	Ød
EDHDD	20303-30-80	3	30	80	3
	20404-30-80	4	30	80	4
	20505-30-80	5	30	80	5
	20606-30-80	6	30	80	6
	20707-35-90	7	35	90	7
	20808-35-90	8	35	90	8
	20909-40-100	9	40	100	9
	21010-40-100	10	40	100	10
	21111-50-110	11	50	110	11
	21212-50-110	12	50	110	12

■ EDDHD : Ehwa pcD Drill Helix Dom PCD

PCD burnishing drill



Item No.		Dimensions (mm)			
		ØD	L1	L	Ød
EDDS	20505-30-80	5	30	80	5
	20606-30-80	6	30	80	6
	20707-35-90	7	35	90	7
	20808-35-90	8	35	90	8
	20909-40-100	9	40	100	9
	21010-40-100	10	40	100	10
	21111-50-110	11	50	110	11
	21212-50-110	12	50	110	12

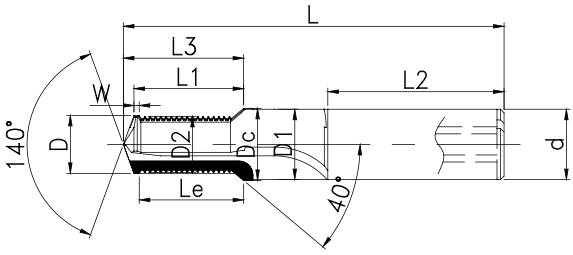
■ EDDS : Ehwa pcD Drill Straight flute

Customized design

- Face, slot, chamfer, profile, etc.
- Optimized tooling service depending on the customer's demand.

Drill - PCD

Drill thread milling tool

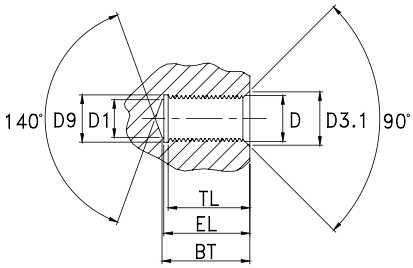


Item No.		Dimensions (mm)										
		L	L3	L1	L2	W	D	d	D1	Dc	D2	Z
EDTMS	1.5D M8-1.25	70.3	14.4	13.4	40	1.3	6.8	10	9	8.3	6.45	2
	1.5D M10-1.5	74.5	18.9	17.6	45	1.5	7.5	12	11	10.3	8.08	2
	1.5D M12-1.75	83.8	21.8	20.2	45	1.5	10.3	14	13.5	12.3	9.74	2
	2.0D M8-1.25	74	18.2	17.1	40	1.3	6.8	10	9	8.3	6.45	2
	2.0D M10-1.5	79	23.4	22.1	45	1.5	8.5	12	11	10.3	8.08	2
	2.0D M12-1.75	89	27.1	25.5	45	1.5	10.3	14	13.5	12.3	9.74	2
	2.0D M14-2.00	102	32.8	30.9	48	1.5	12	16	15.5	14.3	11.35	2
	2.0D M16-2.00	102	37.1	35	48	1.5	14	18	17.5	16.3	13.28	2
	2.5D M8-1.25	74	23.2	22.1	40	1.3	6.8	10	9	8.3	6.45	2
	2.5D M10-1.50	79	27.9	26.6	45	1.5	8.5	12	11	10.3	8.08	2
	2.5D M12-1.75	89	34.1	32.5	45	1.5	10.3	14	13.5	12.3	9.74	2
	2.5D M14-2.00	102	38.8	36.9	48	1.5	12	16	15.5	14.3	11.35	2
	2.5D M16-2.00	102	45.1	43	48	1.5	14	18	17.5	16.3	13.28	2

■ EDTMS : Ehwa Dia Thread Mill Straight flute

Thread engaments for BGF

(for metric ISO thread DIN13, DIN 8140)



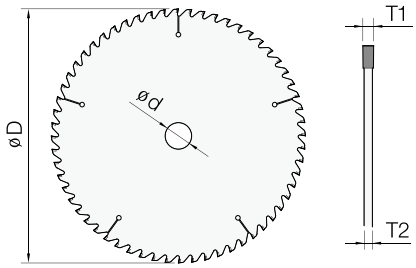
BT = Drill depth
EL = Thread engagement
TL = Full thread length

M	1.5 x D						2.0 x D						2.5 x D					
	D1	BT	D3.1	D9	EL	TL	D1	BT	D3.1	D9	EL	TL	D1	BT	D3.1	D9	EL	TL
M8	6,75	13,35	8,30	8,41	12,15	10,45	6,75	17,10	8,30	8,41	15,90	14,20	6,75	22,10	8,30	8,41	20,90	19,20
M10	8,50	17,60	10,30	10,54	16,06	14,00	8,50	22.10	10,30	10,54	20,60	18,50	8,50	26,60	10,30	10,54	25,10	23,00
M12	10,30	20,25	12,30	12,65	18,45	16,35	10,30	25,50	12,30	12,65	23,70	21,60	10,30	32,50	12,30	12,65	30,70	28,60
M14	12,00	22,90	14,30	14,81	20,90	18,60	12,00	30,90	14,30	14,81	28,90	26,60	12,00	36,90	14,30	14,81	34,90	32,60
M16	14,00	27,00	16,30	16,88	25,00	22,60	14,00	35,00	16,30	16,88	33,00	30,60	14,00	43,00	16,30	16,88	41,00	38,60

Rotating_ Cutter

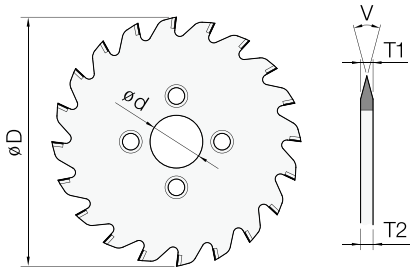
Cutter - PCD

PCD saw



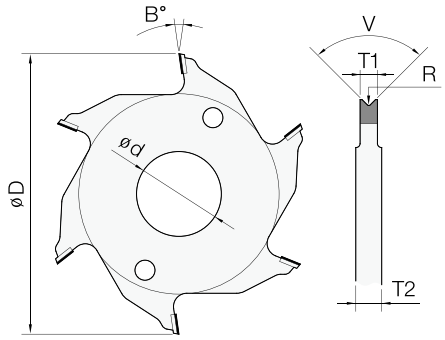
Item No.	Dimensions (mm)				
	øD	ød	T1	T2	Z
EDSC-255	255	25.4 / 31.75	2.2 / 2.5 / 3 / 3.2	2.2	40 / 60 / 80
EDSC-305	305	25.4 / 31.75	2.2 / 2.5 / 3 / 3.2	2.2	40 / 60 / 80
EDSC-355	355	25.4 / 31.75	2.2 / 2.5 / 3 / 3.2	2.2	40 / 60 / 80

PCD V-cutter



Item No.	Dimensions (mm)					
	øD	ød	T1	T2	V	Z
EDVC 100-V	100	20 / 25.4	2	2	35° / 40° / 45°	20 / 30
EDVC 105-V	105	20 / 25.4	2	2	35° / 40° / 45°	20 / 30
EDVC 110-V	110	20 / 25.4	2	2	35° / 40° / 45°	20 / 30
EDVC 120-V	120	20 / 25.4	2	2	35° / 40° / 45°	20 / 30

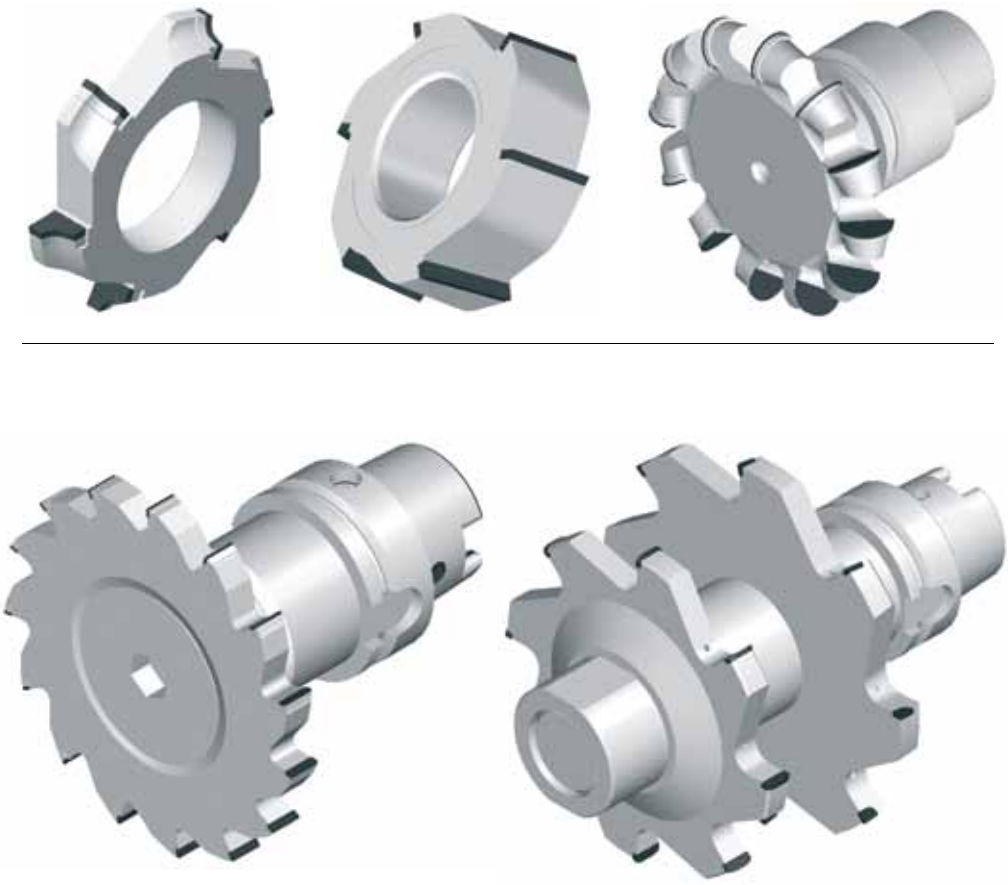
PCD bevel cutter

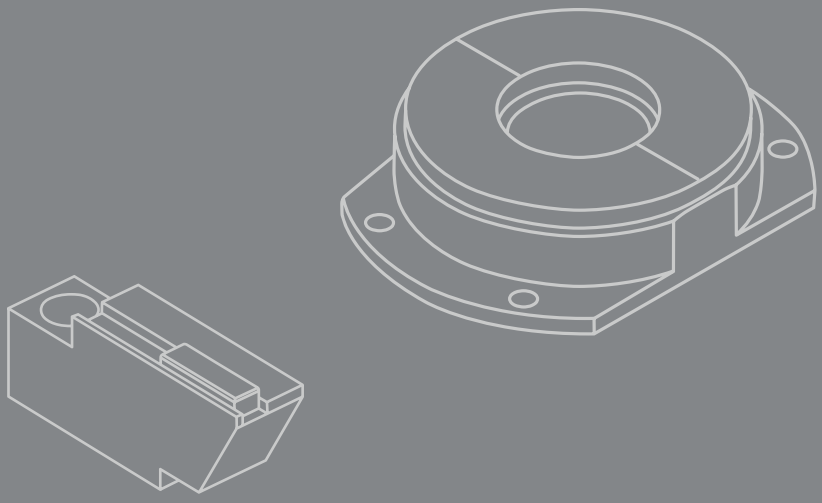


Item No.	Dimensions (mm)						
	øD	ød	T1	T2	V	R	B
EDBC 80-B	80	25.4	5	6.5 / 7 / 7.5	40°/60°/90°	0.2 / 0.5 / 1	3°/4°/6°/8°
EDBC 83-B	83	25.4	5	6.5 / 7 / 7.5	40°/60°/90°	0.2 / 0.5 / 1	3°/4°/6°/8°
EDBC 90-B	90	25.4	5	6.5 / 7 / 7.5	40°/60°/90°	0.2 / 0.5 / 1	3°/4°/6°/8°

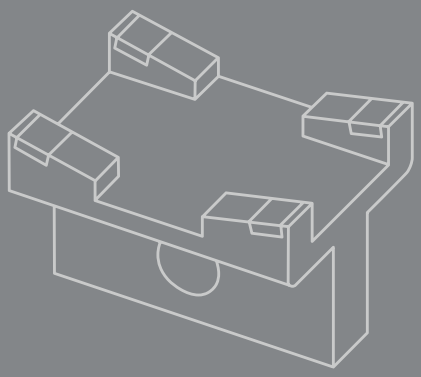
Customized design

- Face, slot, chamfer, profile, etc.
- Optimized tooling service depending on the customer's demand.



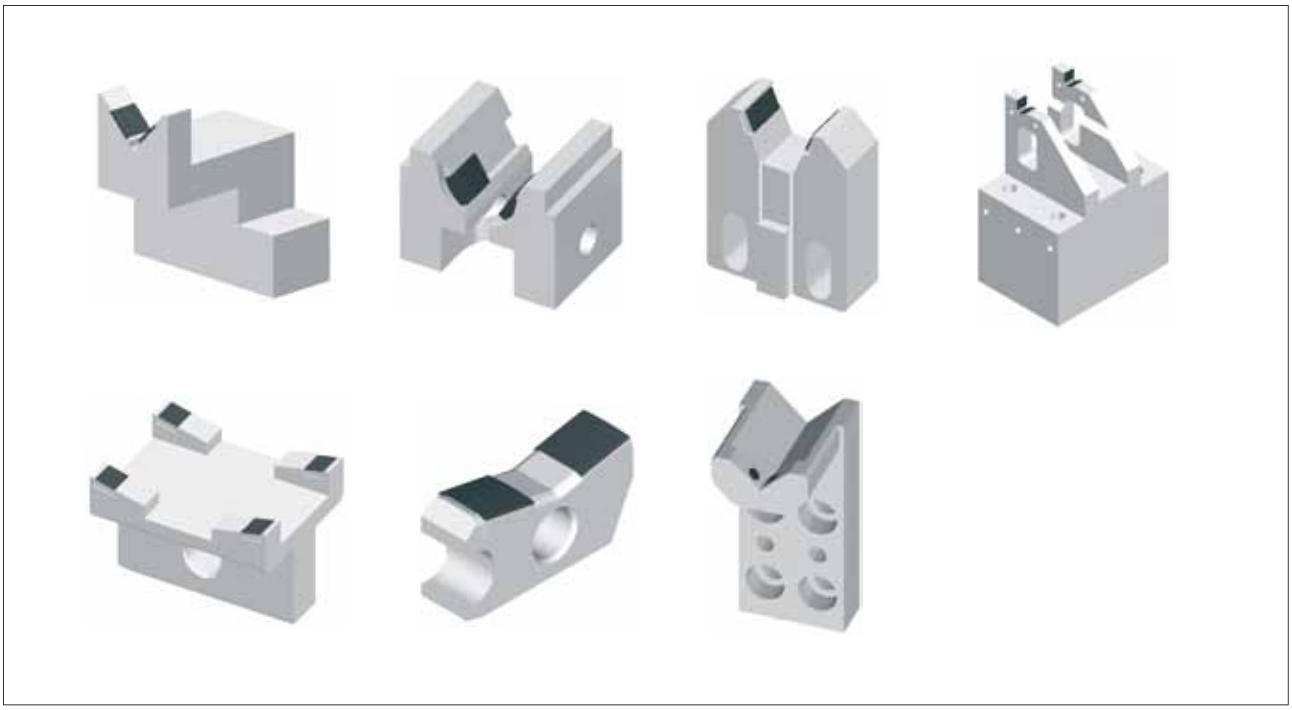


Wearless



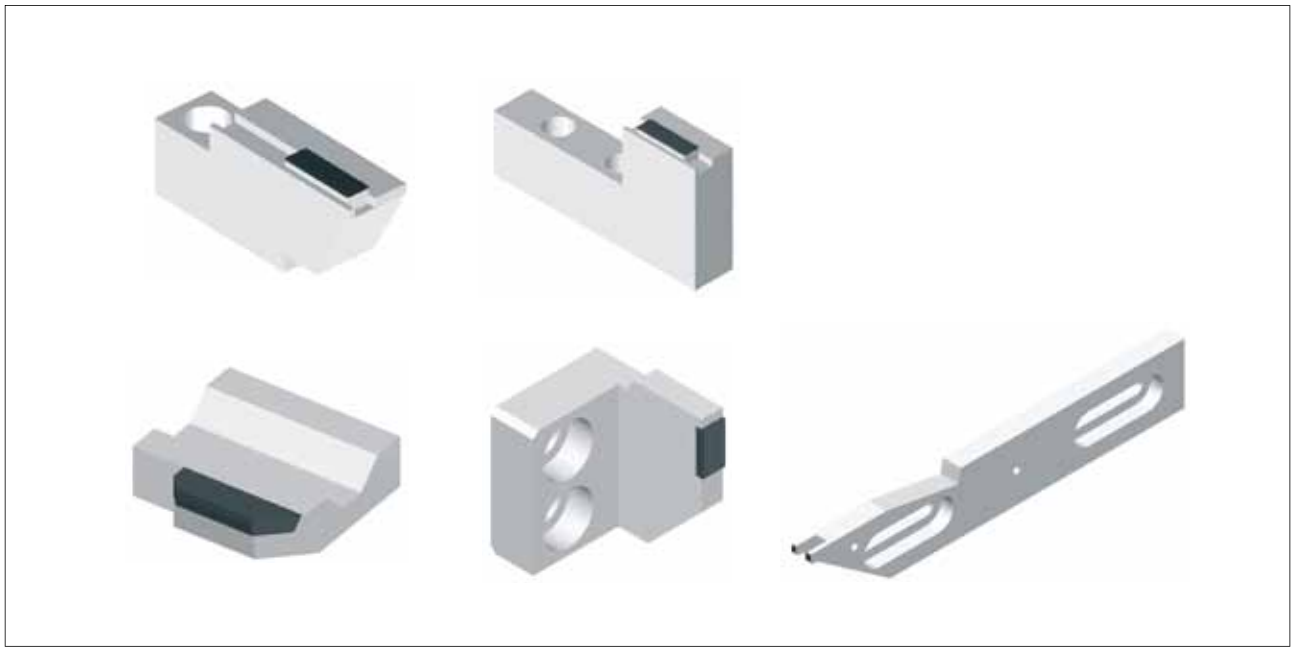
Bearing backing plate

V-block



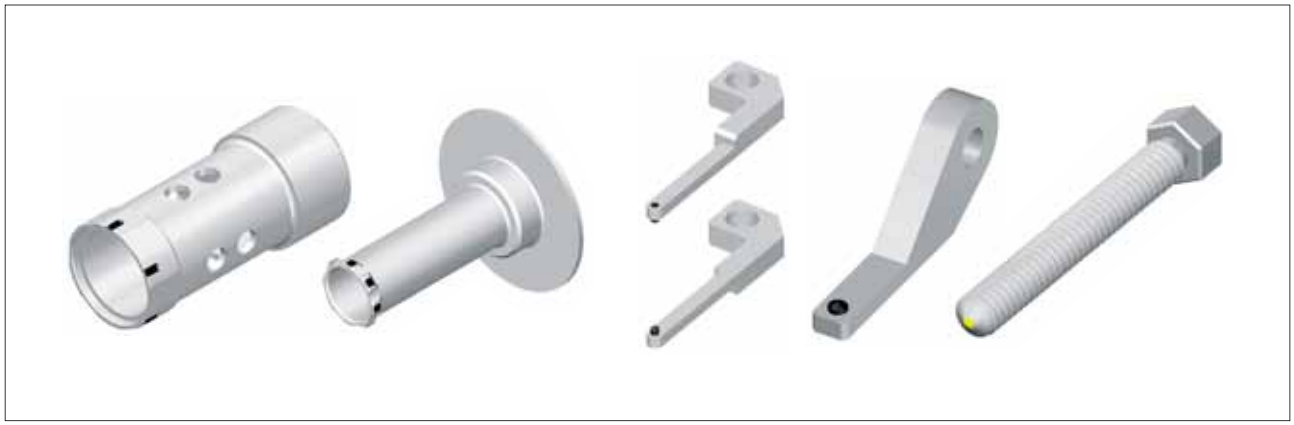
Wearless

Shoe

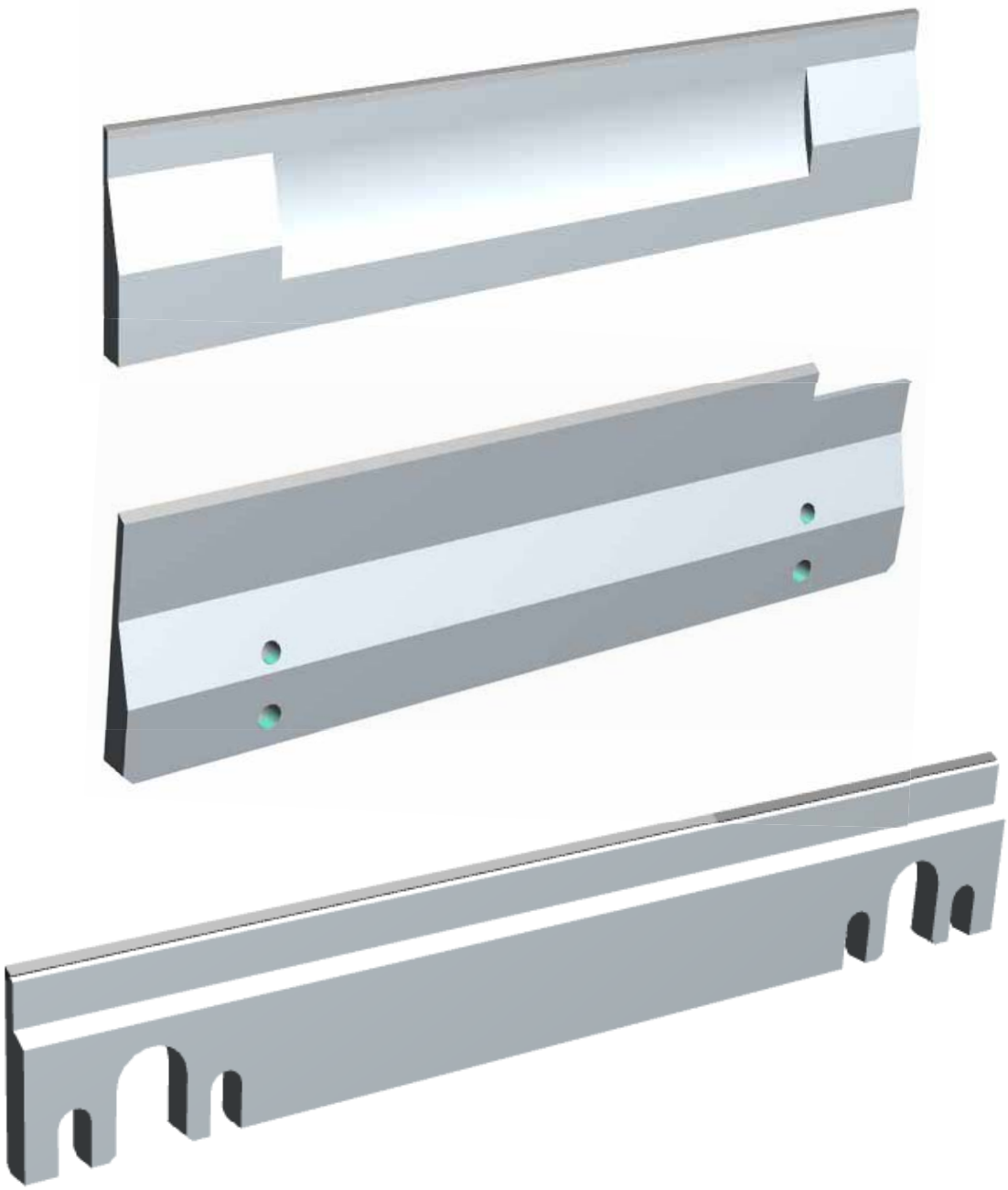


Dead center

Special gauges



Guide blade



MEMO

Applications

Automotive

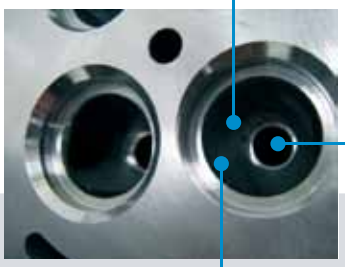
Cylinder head (Al alloy)

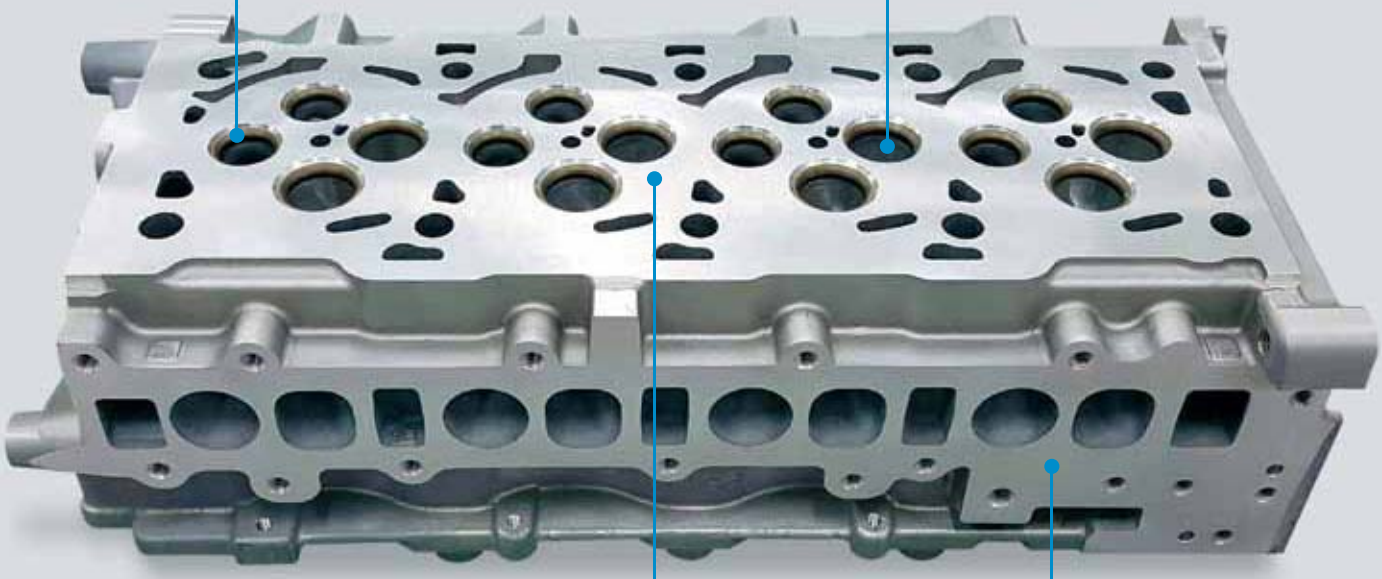
PCBN tool
Valve seat chamfering

PCD reamer
Valve guide reaming

PCD endmill
Valve seat port hole cutting (rough)

PCD step reamer
Valve guide parent bore & valve seat spot machining





PCD cutter
Mold excess cutting

PCD milling cutter
Top face milling (rough & finish)

PCD milling cutter
Manifold face milling (rough & finish)

Cylinder head (Al alloy)

PCD boring tool
Oil seal bore spot boring
(rough & finish)

PCD milling cutter
Bottom face milling
(rough & finish)

PCD step reamer
Inject hole reaming
(finish)

PCD tool & insert
Cam bore journal (finish)

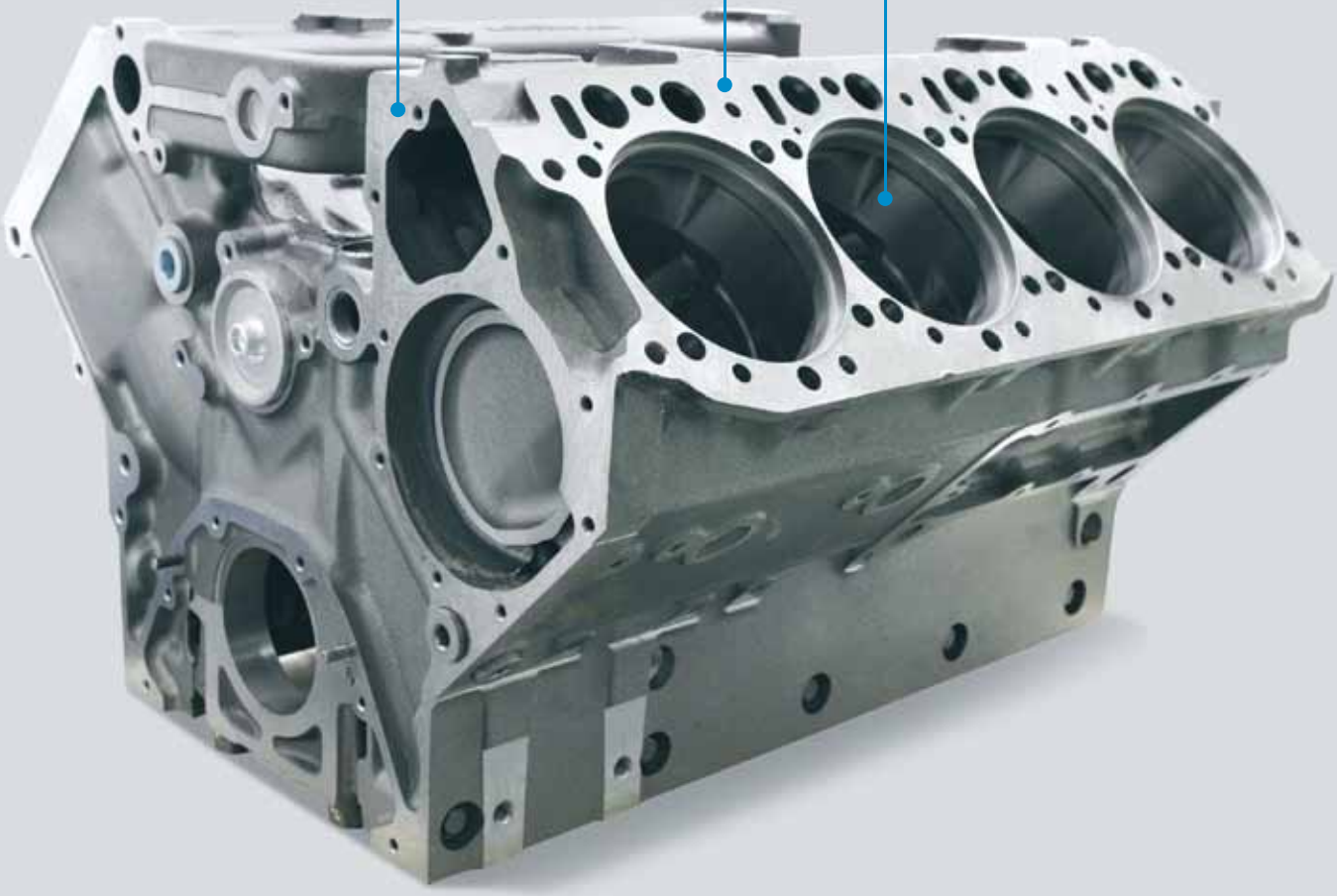
PCD ball endmill
Cam bore journal (rough)

Automotive

Cylinder block (cast iron)

PCBN milling cutter
Top, front & rear face milling (finish)

PCBN insert
Cylinder boring (rough & finish)



Applications

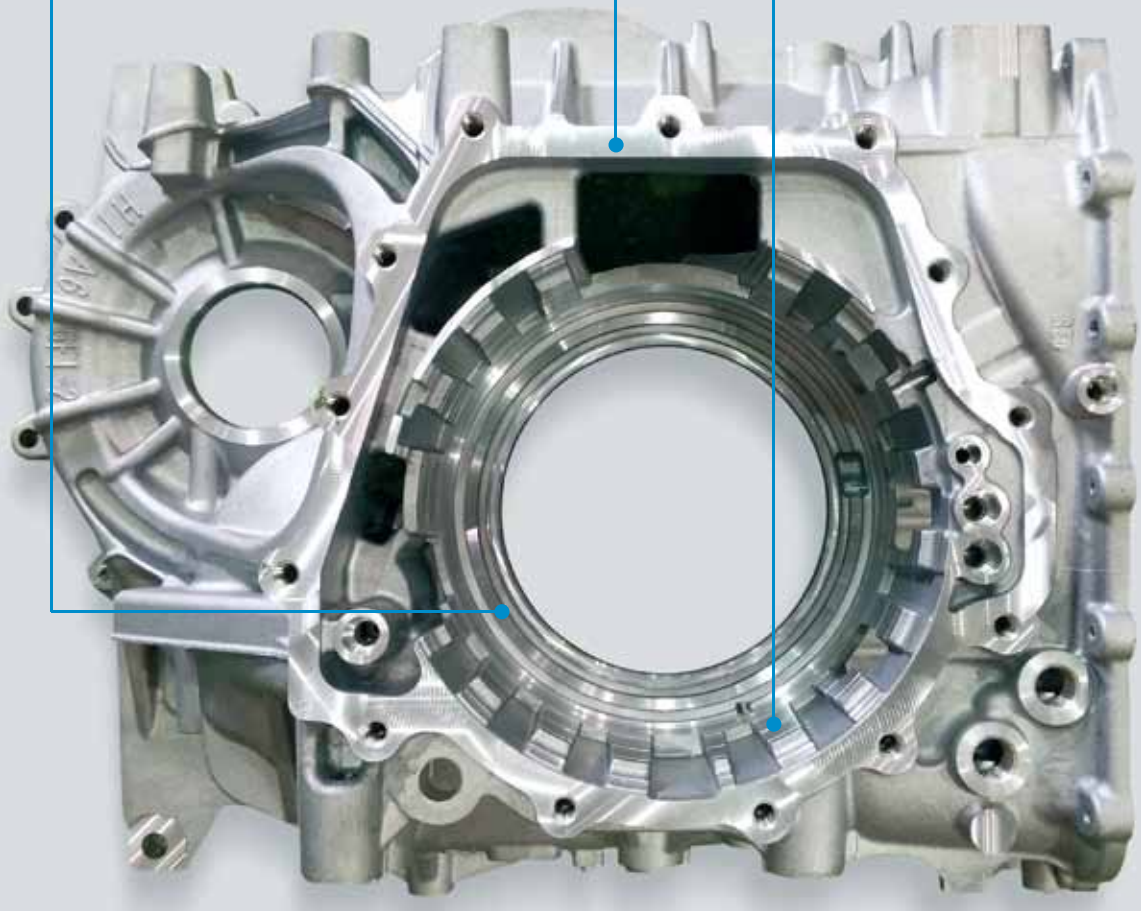
Transmissionhousing (Al alloy)

PCD reamer
Reaming

PCD milling cutter
Face milling (rough & finish)

PCD monoblock endmill
Face milling (rough & finish)

PCD monoblock cutter
Grooving

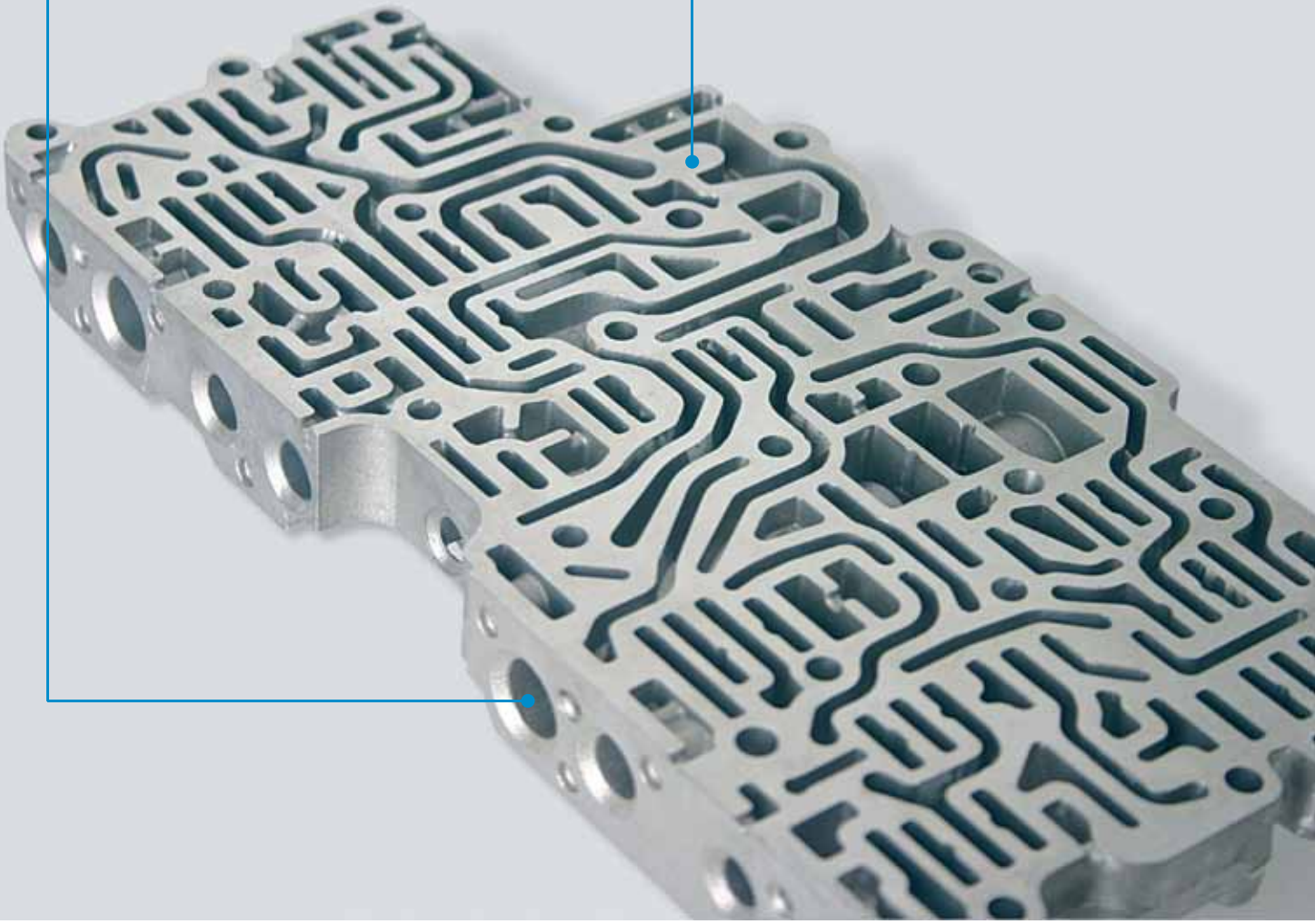


Automotive

Valve bodies (Al alloy)

PCD insert & reamer
Reaming (rough & finish)

PCD milling cutter
Top face milling (rough & finish)



Gear & Clutch

D-burnishing tool
Auto clutch burnishing (finish)

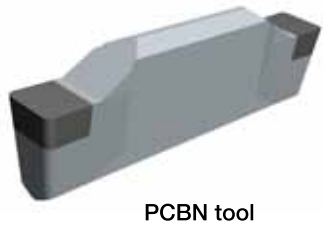
Cermet reamer
Carrier reaming (finish)

PCBN insert
Turning (rough & finish)

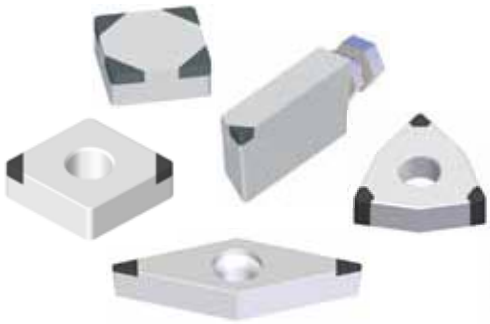
PCBN insert
Interrupted turning/facing & inner diameter boring (finish)

Automotive

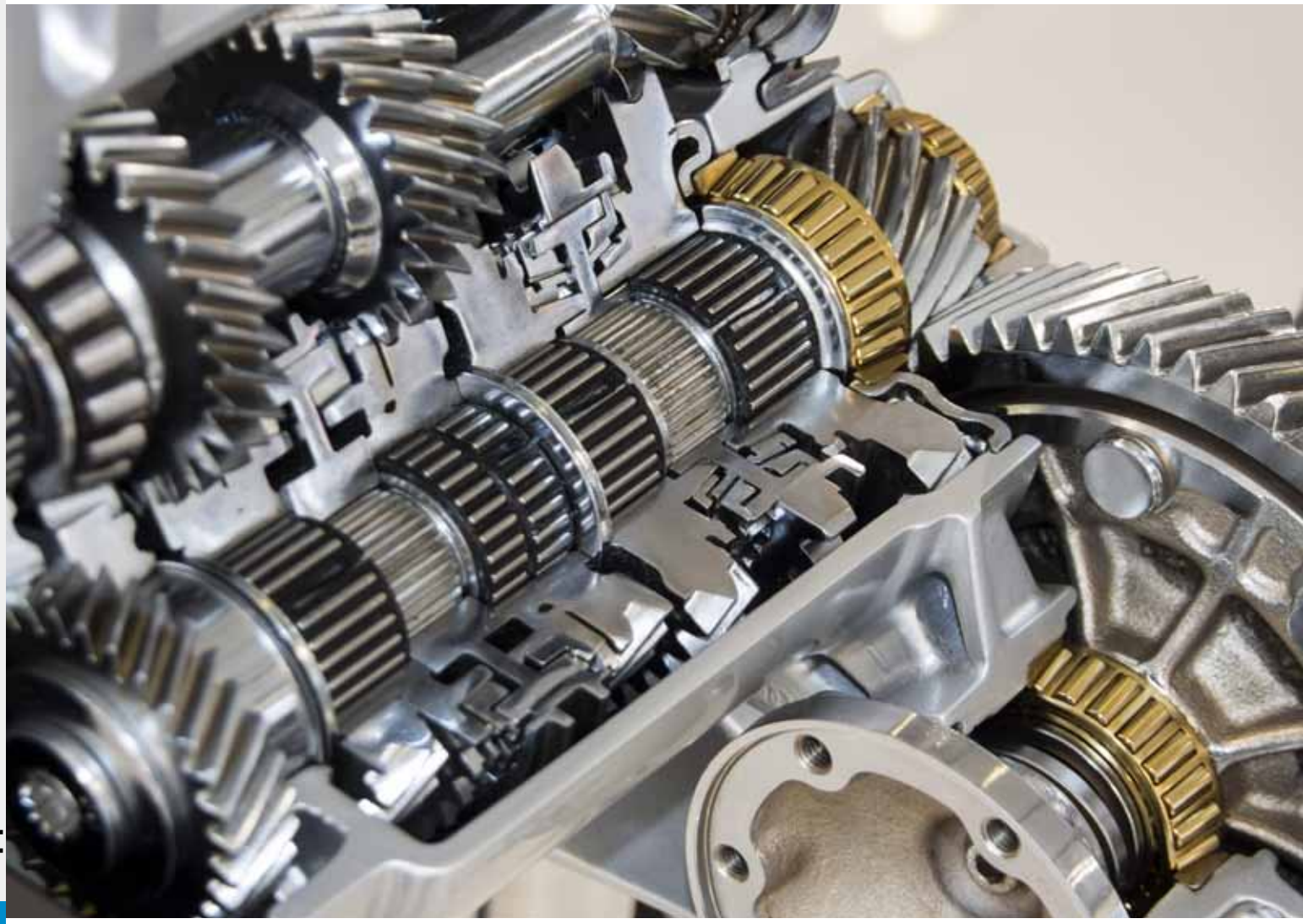
Transmission shaft

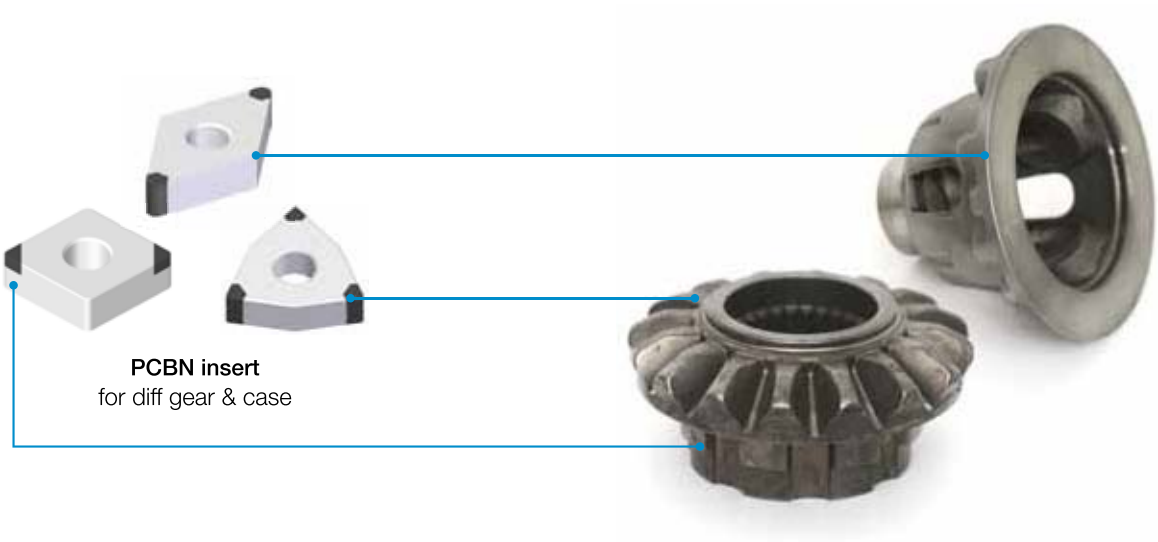


PCBN tool
Grooving (finish)

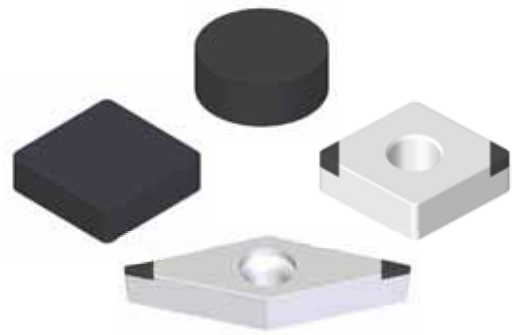


PCBN insert & tool
Main shaft turning (finish)



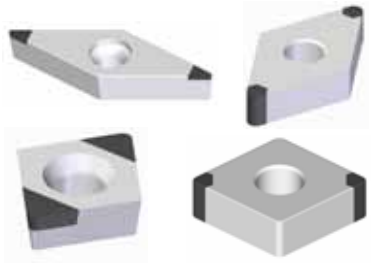

PCBN insert
for diff gear & case

Transmission | planetary gear



PCBN insert
for planetary gear, ring gear and sun gear

Bearing | ball & taper



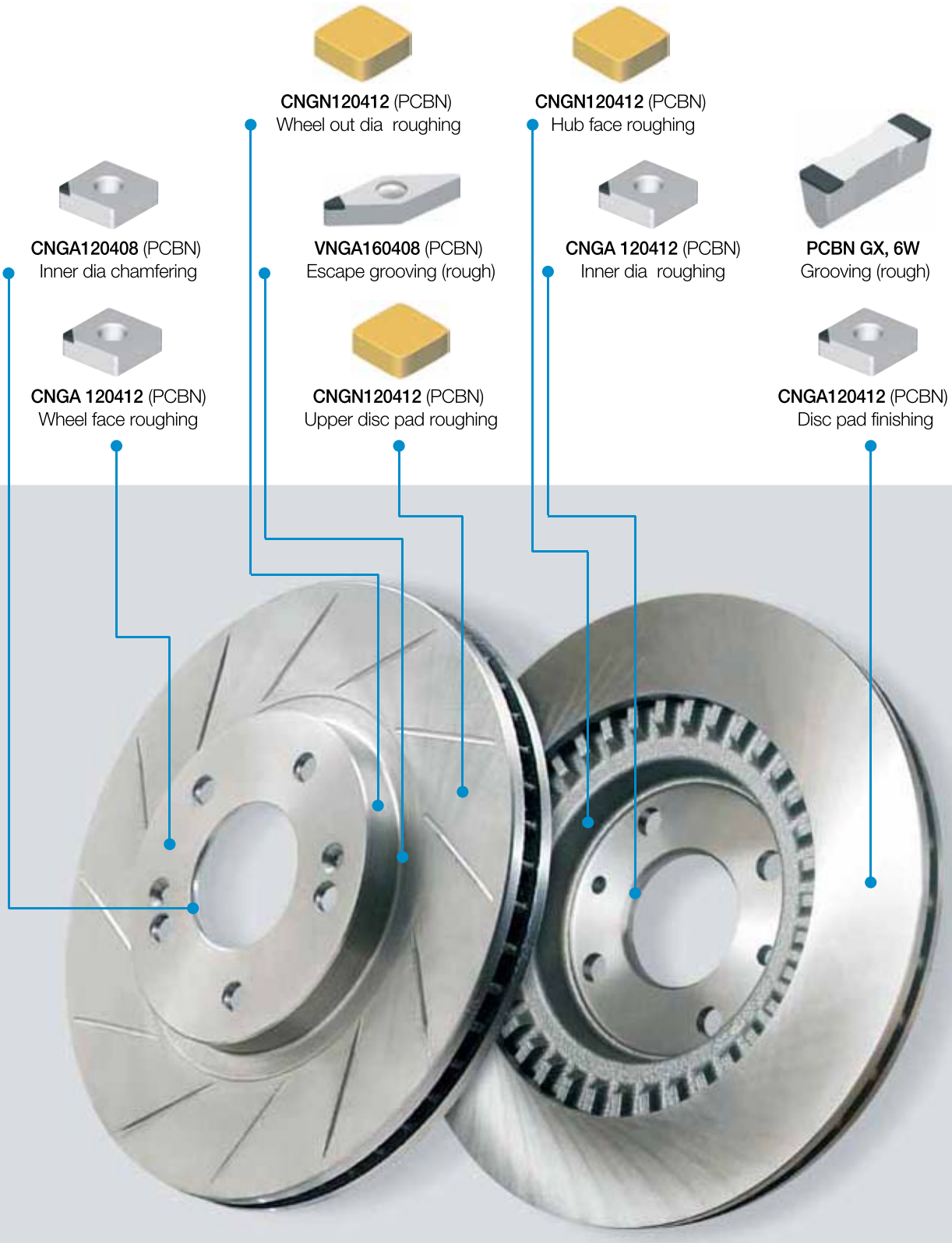
PCBN insert
for hub bearing

D-guage

PCD backing plate

Automotive

Brake disc



Piston

PCD, MONO insert & tool
Turning

PCD grooving tool
Ring grooving

PCD special tool
Combustion chamber cutting

PCD reamer
Pin boring & chamfering

PCD cutter
Circlip & R boss cutting

Automotive

Compressor piston & housing

PCD boring tool (chip breaker)
Piston OD turning

PCD endmill
Piston ball seat chamfer cutting

PCD ball endmill
Piston ball seat cutting

PCD reamer & blade
Pistion bore & shaft bore reaming

PCD double cutter
Piston side cutting

PCD milling cutter
Pistion housing face milling

Applications

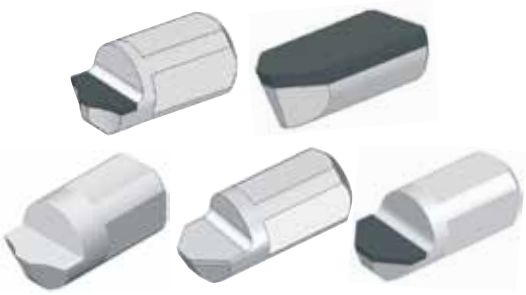
Steering box

PCD step reamer
Steering housing reaming

Automotive

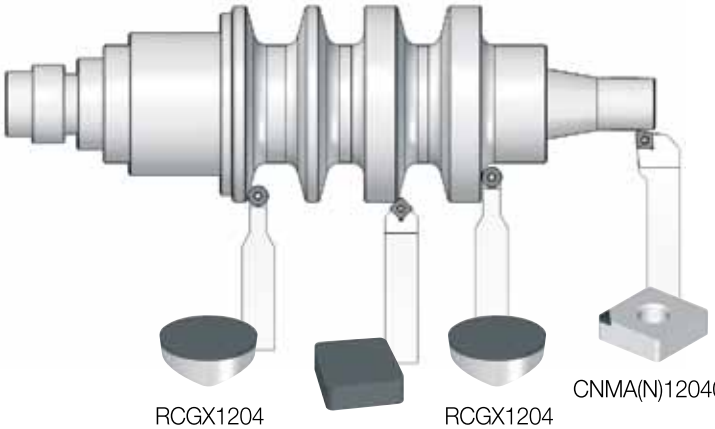
Pump housing

PCD step reamer, endmill
Pump housing cutting



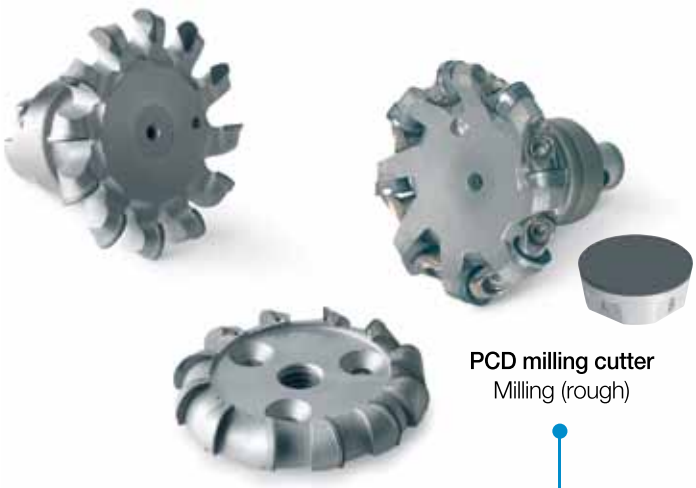
Notch tool
(PCD, PCBN, carbide)

Grooving & turning
(PCD, PCBN, carbide, ceramic)



Engraving
(PCD, TC)

Ophthalmic lens

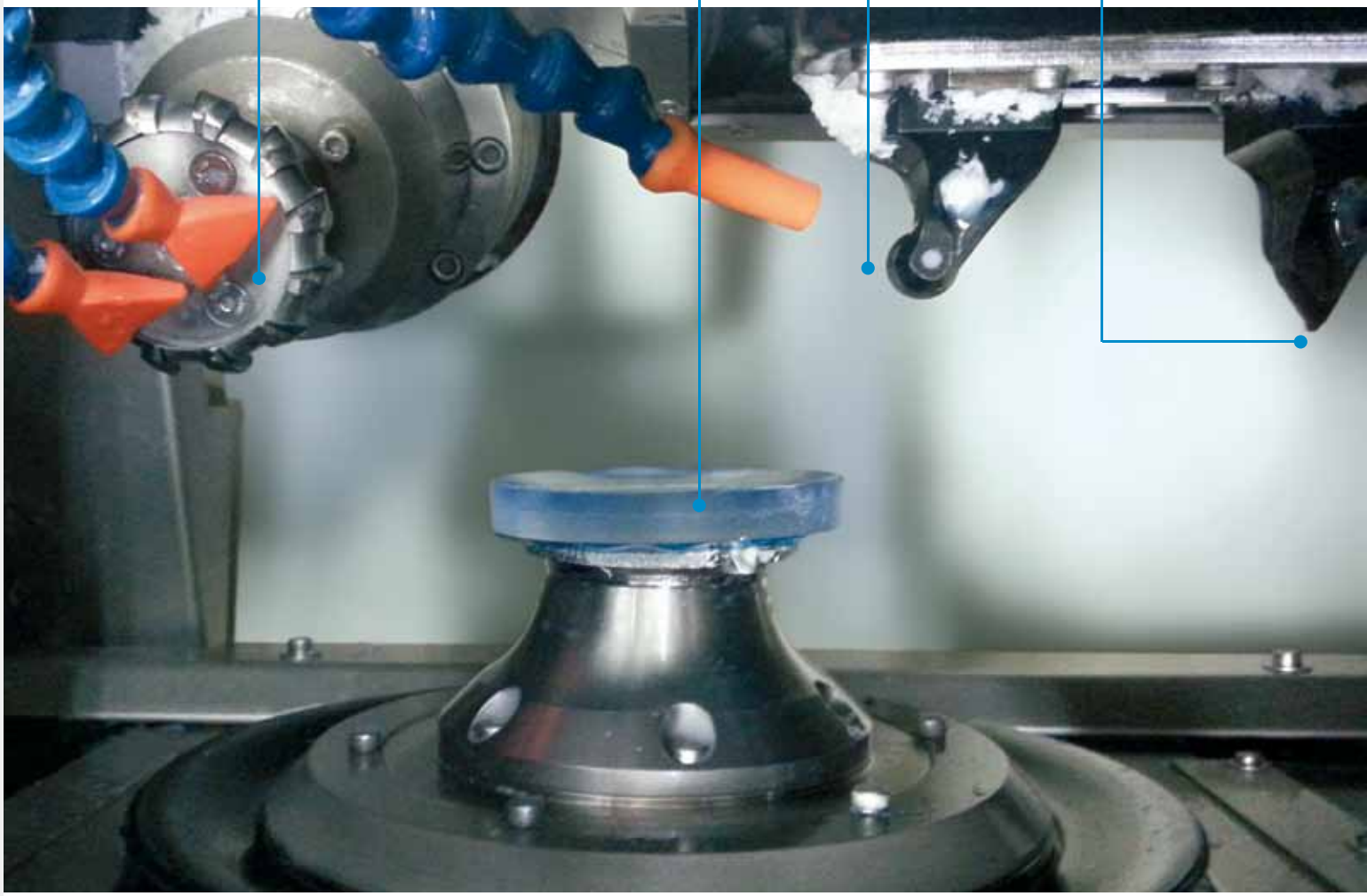


PCD milling cutter
Milling (rough)

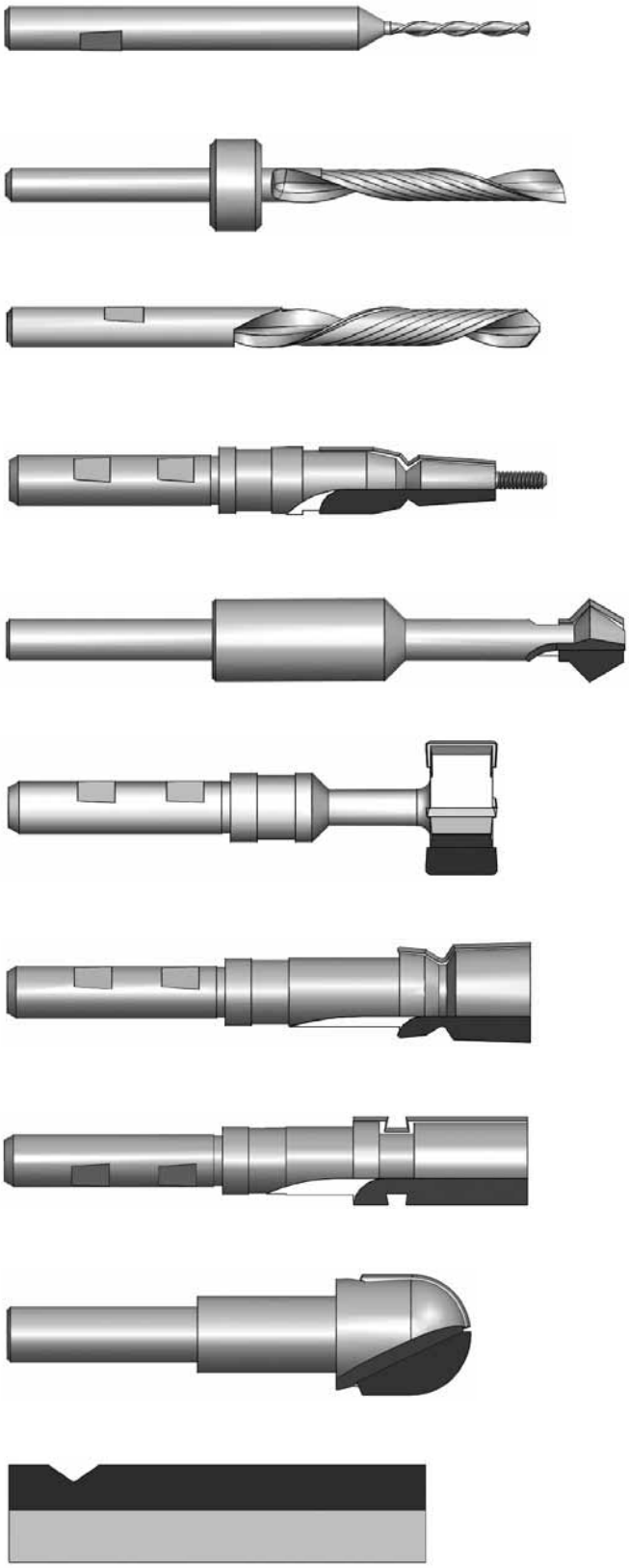
PCD insert
Out diameter Turning

PCD insert
Turning (finish)

MONO insert
Turning (finish)



Edge machining

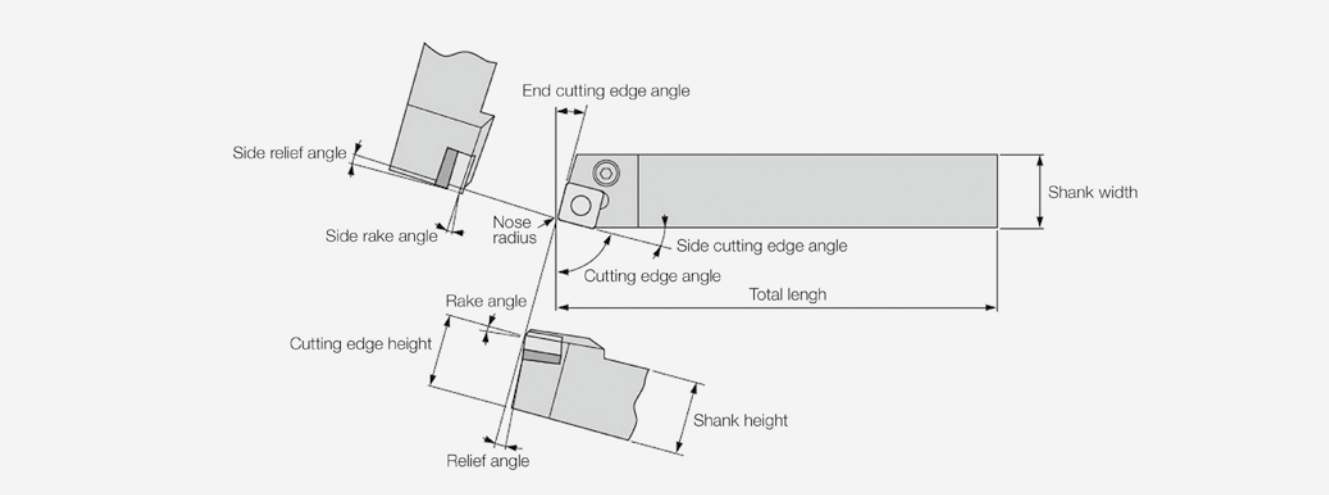


MEMO

Technical information

Turning

Insert shape and terms



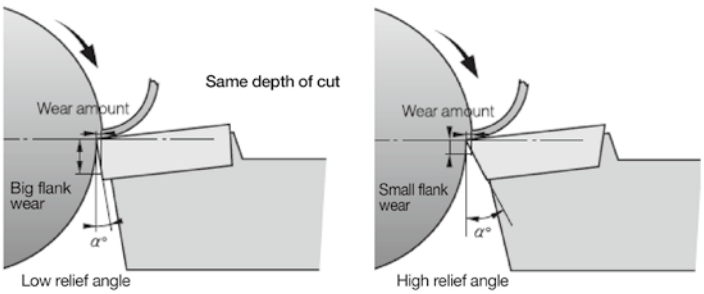
Role of edge angle

Angle	Defination	Function	Features
Rake angle	Side rake angle Rake angle	Cutting force, cutting heat, chip flow and tool life	* Positive angle : excellent machine-ability (reduce the cutting load, whereas weaken edge strength) * Positive angle : proper for "easy to cut" and thin workpieces * Negative angle : proper for mill scale or interrupted cutting demanding strong edge strength.
Relief angle	Relief angle Side relief angle	Eliminate unnecessary interference	* Must be designed considering the tool life and edge
Cutting edge angle	Cutting edge angle	Control chip size and cutting direction	* As the angle becomes bigger, chip thickness becomes thicker, resulting easy chip flow.
	Side cutting edge angle	Control chip size and cutting direction	* As the angle becomes bigger, cutting edge becomes wider, resulting strong edge strength. * As the angle becomes smaller, chip thickness becomes thinner, resulting easy chip flow.
	End cutting edge angle	Prevent friction between cutting edge and cutting face	* Small angle strengthens edge strength, whereas shortens tool life by flank wear.

Relief angle

Relief angle makes move of the cutting edge easily by avoiding the friction between workpiece and relief face.

Relationship between various relief angle and flank wear



Features

- Big relief angle causes less flank wear.
- Big relief angle weakens cutting edge strength.
- Small relief angle causes chattering.

Recommendation

- For hard workpiece or strong edge strength => low relief angle
- For soft workpiece or "easy to work hardening" workpiece => high relief angle

End cutting edge angle

It influences the surface finish by preventing friction between the machined face and the tool.

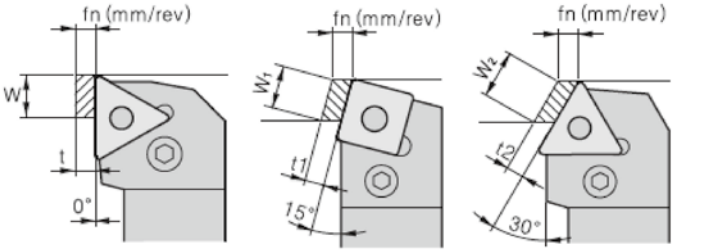
Effects

- If end cutting edge angle reduces cutting edge get stronger but cutting heat generated by machining increases.
- Small end cutting edge angle can cause chattering due to the increases cutting force.

Side cutting edge angle

Side cutting edge angle influences chip flow and cutting load. Therefore, it is necessary to design proper angle considering the tool strength.

Side cutting edge angle and chip thickness

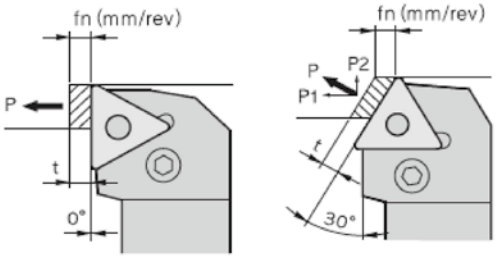


Approach angle 0° Approach angle 15° Approach angle 30°

As approach angle becomes bigger, chip thickness becomes thinner and tip width becomes wider.
When the feed and depth of cut are the same, and approach angle is 0˚, chip thickness is the same as the feed rate and chip width is the same as depth of cut. (t=fn) and chip width is equal to depth of cut (W=ap).

t1 = 0.97t, W1 = 1.04W
t2 = 0.87t, W2 = 1.15W

Side cutting edge angle and cutting load



Force P is loaded Force P is scattered to P1, P2

As approach angle becomes bigger, radial cutting force becomes bigger, whereas feed component force becomes smaller.

Side cutting edge angle and cutting performance

Low	←	←	←	**Lead angle**	→	→	→	High
High	←	←	←	**Wear rate**	→	→	→	Low
Easy to cut material	←	←	←	**Workpiece**	→	→	→	Difficult to cut material
Small	←	←	←	**Machining power**	→	→	→	Big
Hard to occur	←	←	←	**Chatter**	→	→	→	Easy to occur
Finishing	←	←	←	**How to machine**	→	→	→	Roughing
Long thin workpiece	←	←	←	**Workpiece rigidity**	→	→	→	Thick workpiece
In case of low rigidity	←	←	←	**Machine rigidity**	→	→	→	In case of high rigidity

Turning

Nose-R

Nose radius influences not only the surface finish but also the edge strength.
generally, it is designed with 2~3 times bigger than the feed.

Features
- Big nose radius makes a good surface finish.
- Big nose radius strengthens the edge strength.
- Big nose radius reduces flank and crater wears.
- But if the radius is too big, it would cause chattering by big cutting load.

Recommendation
- For small depth of cut or thin and long workpiece => small nose R
- For interrupted cutting, big size workpiece or roughing => big nose R

Cutting edge shape and the affects

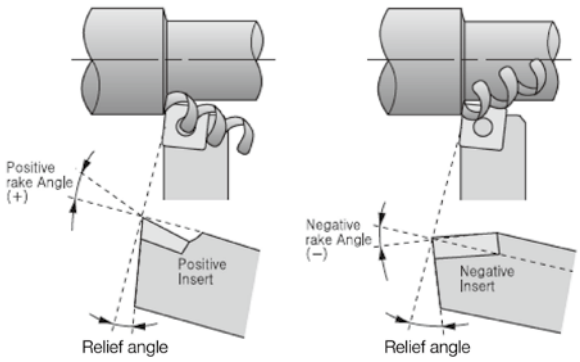
Rake angle

Rake angle influences cutting force, chip flow and tool life.

Features
- High rake angle makes a good surface finish.
- As the rake angle becomes bigger by 1°, spindle power becomes decrease by 1%.
- High rake angle weakens cutting edge.

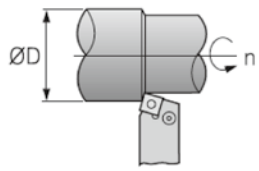
Recommendation
- For hard workpiece or interrupted cutting => small rake angle
- For soft workpiece or "easy to cut" material => big rake angle

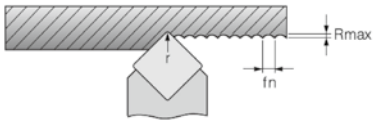
Rake angle and the direction of chip flow



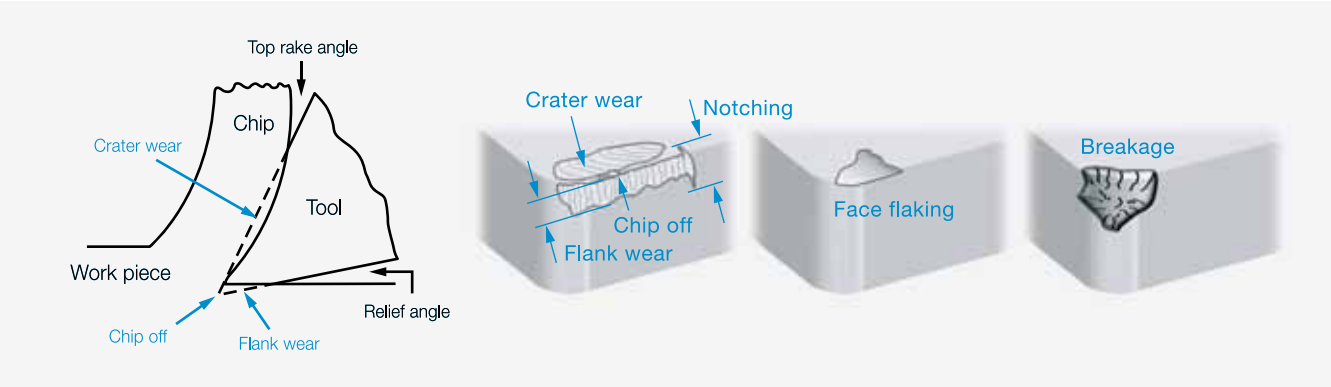
Major cutting formulas

Cutting speed	Feed	Theoretical surface roughness
$Vc = \frac{\pi \times D \times N}{1{,}000}$ (m/min)	$fn = \frac{Vf}{N}$ (mm/rev)	$Rmax = \frac{fn2}{8r} \times 1{,}000$
• Vc : Cutting speed (m/min) • D : Diameter (mm) • N : Revolution per minute (min^{-1}) • π : Circular constant (3.14)	• fn : Feed per revolution(mm/rev) • vf : Table feed (mm/min) • N : Revolution per minute (min^{-1})	Practical surface roughness • Steel : Rmax × (1.5~3) • Cast iron : Rmax × (3~5) • Rmax : Profile depth (μm) (Maximum height roughness) • fn : feed (mm/rev) • r : nose radius





Wear behavior

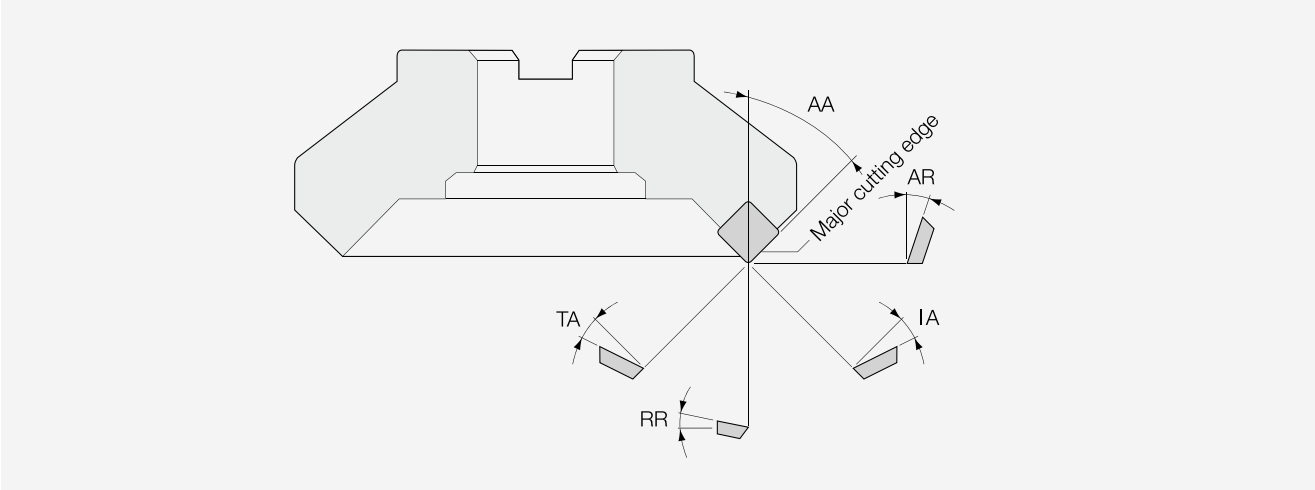


Trouble shooting by wear behavior

Wear type	Trouble shooting
Crater wear	• Reduce cutting speed • Reduce feed rate • Add coating on the insert • Coolant
Flank wear	• Increase cutting speed (for grey cast iron) • Reduce cutting speed (for hardened steel) • Increase feed rate • Increase depth of cut • Check tool center height
Notching	• Increase cutting speed • Reduce feed rate • Increase approach angle • Increase chamfer angle • Change D.O.C
Chipping	• Use chamfered or horned edge preparation • Change cutting speed to eliminate vibration
Flaking (continuous cut)	• Increase cutting speed reduce feed rate • Use chamfered and horned edge preparation • Reduce insert approach angle • Check tool center height
Flaking (interrupted cut)	• Dry cutting • Reduce feed rate • Use chamfered and horned edge preparation • Reduce insert approach angle • Check cutting tool center height
Breakage	• Increase cutting speed • Reduce feed rate • Increase approach angle • Use chamfered edge preparation

Milling

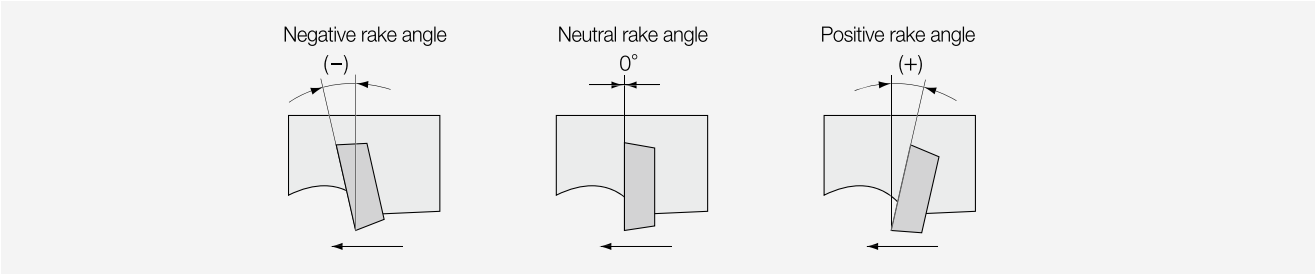
Milling cutter shape and designation



Role of cutting edge angle

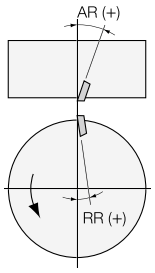
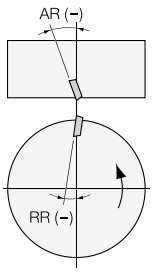
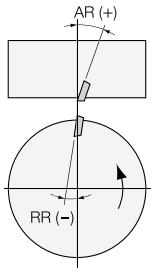
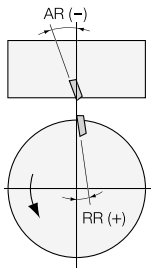
Tool failure	Symbol	Function	Features
Axial rake angle	A.R	Direction of chip flow, machinability	–
Radial rake angle	R.R	Direction of chip flow, machinability	–
Approach angle	A.A	Chip thickness, direction of chip flow	As A.A becomes bigger, chip thickness becomes thinner and cutting load becomes lower.
True rake angle	T.A	Effective rake angle	As T.A becomes bigger, machinability becomes better, whereas weaken edge strength. As T.A becomes smaller, it strengthens the edge strength, whereas machinability becomes worse.
Cutting edge inclination angle	I.A	Direction of chip flow, Machinability	As I.A becomes bigger, machinability becomes better and it helps easy chip flow, whereas weakens edge strength.
Face angle	F.A	Surface finish	As it approaches to 0deg, surface becomes better.
Relief angle	R.A	Edge strength, tool life, chattering	–

Positive and negative rake angle

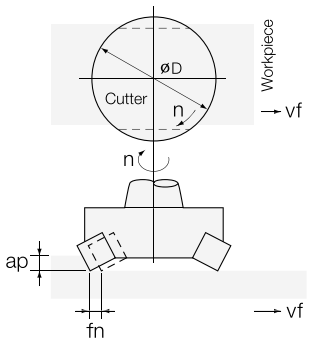


- Insert shape whose cutting edge precedes is a positive rake angle (+)
- Insert shape whose cutting edge follows is a negative rake angle (–)

Features by combination of rake angle

	Double positive angle	Double negative angle	Posi - negative angle	Nega - positive angle
				
Application	• For steel, cast iron, stainless steel • For soft steel to prevent built-up edge • For better surface finish	• For interrupted cutting • Roughing of cast iron and steel	• For " difficult to cut" material • For roughing of steel and cast iron (big D.O.C)	–
Advantages	• Excellent surface finish by preventing built-up edge for soft material • Proper design for low cutting load and good machinability	• Strong cutting edge • Proper for roughing of mill scale or bad surface condition • Cost saving by double side • Easy chip flow	• Easy chip flow and good machinability. • Suitable for "hard-to-cut" material • Proper design to prevent the chattering by special design	–
Disadvantages	• Weak cutting edge • Only available with single side	• Not recommended for low machine power and rigidity	• Only available with single side	• Bad chip flow

Major cutting formulas



Cutting speed

$$Vc = \frac{\pi \times D \times N}{1{,}000} \quad (m/min)$$

- Vc : Cutting speed (m/min)
- D : Diameter of tool (mm)
- N : Revolution per minute (min^{-1})
- π : Circular constant (3.14)

Feed

$$fz = \frac{Vf}{N \times z} \quad (mm/tooth)$$

- fz : Feed per tooth (mm/tooth)
- vf : Feed per minute (mm/min)
- N : Revolution per minute (min^{-1})
- z : Number of tooth

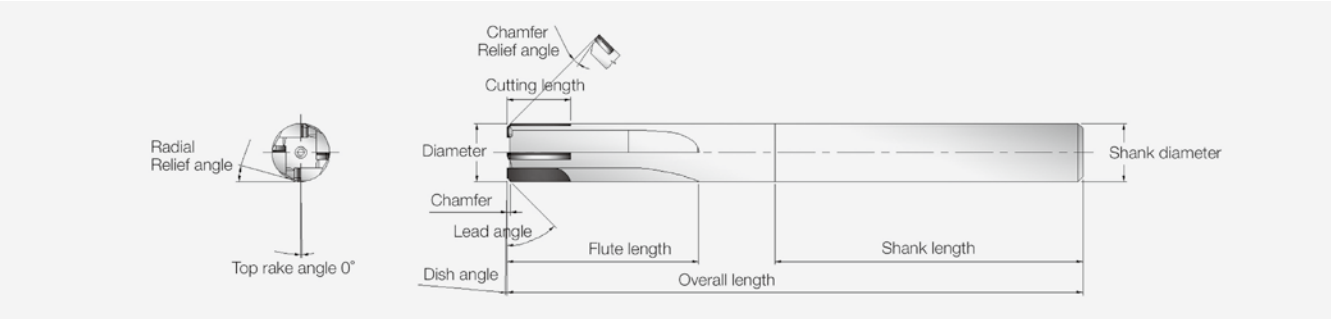
Machining time

$$T = \frac{60 \times Lt}{Vf} \quad (sec)$$

- T : Machining time (sec)
- Lt : Total length of table feed (mm) (=Lw+D+2R)
- Lw : The length of workpiece (mm)
- D : Diameter of cutter body (mm)
- vf : Table feed (mm/min)
- R : Relief length (mm)

Endmill

Endmill shape and terms



The comparison by number of flute

Flute	2 flutes	3 flutes	4 flutes
Shape			
Chip flow	Good ←	←	← Bad
Tool rigidity	Weak →	→	→ High
Purpose	hole, side, General purpose	Side, Finishing	Hard meterial, Side, finishing

Specification	Major features	2 flutes	4 flutes
Tool rigidity	Torsional rigidity	○	◎
	Bending rigidity	○	◎
Surface finish	Surface roughness	○	◎
	Machining precision	○	◎
Chip control	Chip clogging	◎	○
	Chip evacuation	◎	○
Grooving	Chip evacuation	◎	○
	Grooving	◎	○
Side facing	Surface finish	○	◎
	Vibration	◎	○

○ Good ◎ Excellent

Formula of cutting condition

Calculations of cutting speed

$$Vc = \frac{\pi \times D \times N}{1{,}000} \text{ (m/min)}$$

- Vc : Cutting speed (m/min)
- π : Circular constant (3.14)
- D : Endmill diameter (mm)
- N : Revolution per minute (min^{-1})

Calculations of feed speed

$$fz = \frac{Vf}{N \times Z} = \frac{fn}{Z} \text{ (mm/tooth)}$$

$$Vf = N \times fz \times Z = N \times fn \text{ (m/min)}$$

$$fn = \frac{Vf}{N} = fz \times Z \text{ (mm/rev)}$$

- Vf : Feed speed (m/min)
- fn : Feed per revolution (mm/rev)
- fz : Feed per tooth (mm/tooth)
- Z : Number of flute

The effect of flute length

Expression of aspect ratio

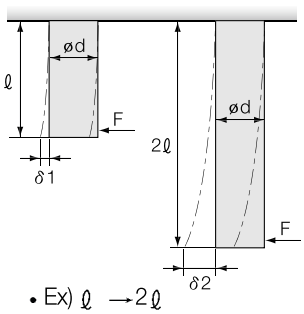
- Aspect ratio
- ℓ/d
- Ex) 3d, 5d, 10d

Deformation rate by length

- Deformation rate is "reaction force" against external force
- The more flute, the better rigidity

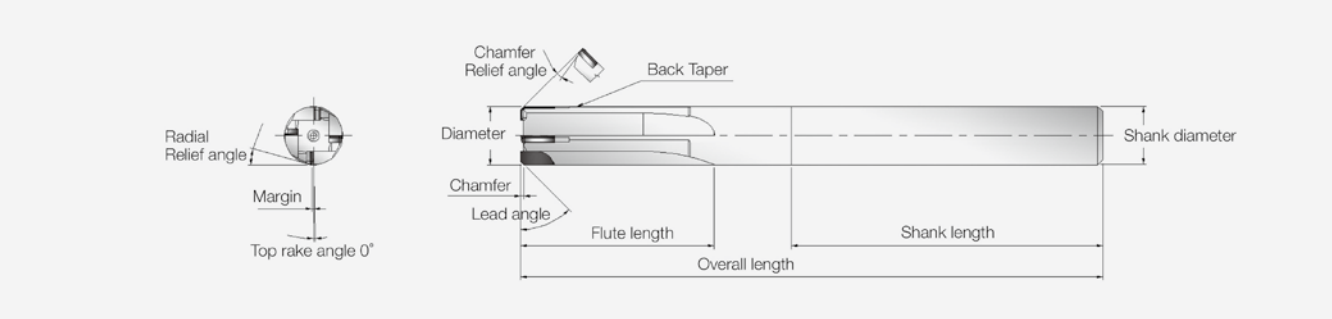
$$\delta = \frac{P\ell^3}{3EI} \qquad I = \frac{\pi d^4}{64}$$

- δ : Deformation volume
- P : Cutting force
- ℓ : Length of cut
- E : Elasticity coefficient
- I : Inertia moment



- Ex) $\ell \rightarrow 2\ell$
  $\delta 1 \rightarrow 8\delta 1$ (=$\delta 2$)

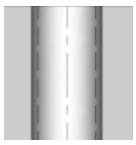
Reamer shape and terms



Margin	A tiny cylindrical area of the outer diameter for better dimensional accuracy and surface finish				
	· Decrease the cutting load · Generate less heat · Bad roughness & guide	Low ←	**Margin**	→ High	· Increase the cutting load · Generate more heat · Good roughness & guide
Lead angle	Major cutting edge				
	· Good straightness · Bad roughness & Guide · Thicker chip	Low ←	**Lead angle**	→ High	· Bad straightness · Good roughness & Guide · Thinner chip
Back taper	Slight angle to the shank to prevent unnecessary friction between the work piece and the tool O.D.				
	· Bad machinability · Good roughness · Refurbish multiple times	Low ←	**Back taper**	→ High	· Good machinability · Bad roughness · Refurbish few times
Relief angle	Angle for preventing the interference between the edge and workpiece and for effective cutting				
	· Decrease edge sharpnes · Better edge strength · Proper for hard material	Low ←	**Relief angle**	→ High	· Increase edge sharpness · Better cutting ability · Proper for soft material

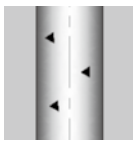
Trouble shooting

Too large diameter



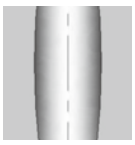
- Tool diameter may be too large
- Cutting speed too high
- Feed too high
- Run-out error too high
- Cuttig lead uneven
- Coolant unsuitable

Bad surface



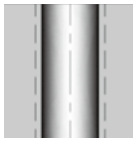
- Coolant unsuitable
- Build-up on cutting edge
- Tool blunt-possible fracturing on blade
- Chip removal bad
- Residual imbalance too large

Deformed hole



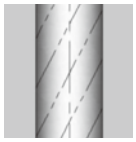
- Workpiece not correctly clamped

Too small diameter



- Tool worn
- Cutting speed too low
- Feed too low
- Ductile material - contracts after machining
- Allowance insufficient

Chatter marks



- Build-up on cutting edge
- Tool blunt
- Coolant unsuitable
- Run-out error too high
- Residual imbalance too great
- Clamping set-up not correct

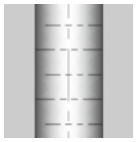
Curved hole

- Wrong lead geometry
- Wrong axial position of blade

Tapered hole

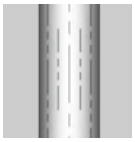
- Run-out error too high
- Cutting lead not correct
- Pre-machining not correct

Feed grooves



- Tool blunt, possible fracturing on blade
- Build-up on cutting edge
- Coolant unsuitable

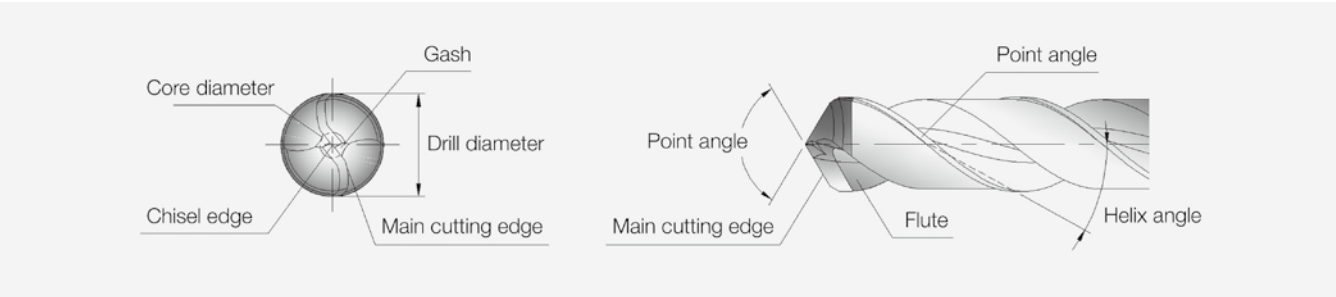
Facets



- Centering error
- Too small back taper

Drill

Drill's shape and terms



Point angle	Point angle has big influence on cutting performance. It mainly depends on workpiece. In case of standard drills Point angle is generally 118°. • Thrust resistance decrease • Torque increase, Burr on exit increase • Soft material (aluminum etc) Low ← **Point angle** → High • Thrust resistance increase • Torque decrease, Burr on exit decrease • Hard workpiece (hardened steel)
Helix angle	Plays rake angle of cutting edge's role. If helix angle increases Cutting force decreases. on the other hand If helix angle is too big drill rigidity decreases. • Poor machinability • Hard workpiece (hardened steel) Low ← **Helix angle** → High • Smooth chip evacuation • Soft material (aluminum etc)
Flute	The path of both chip evacuation and cooling lubricant. too big length of flute weakens drill rigidity and too small length of flute worsens chip evacuation to breakage.
Relief angle	Angle for preventing the interference between the edge and workpiece and for effective drilling • Decrease edge sharpness • Better edge strength • Proper for hard material Low ← **Relief angle** → High • Increase edge sharpness • Better drilling ability • Proper for soft material
Gash (thinning)	The chisel edge is determined by web thickness and chisel angle. Thinner web weakens the drill strength. Therefore, we recommend to add thinning instead of reducing the web thickness to modify the chisel edge for less trust.

Helical and burnishing type comparison

	Helical drill	Burnishing drill
Cutting load	Good (small)	Bad (big)
Roughness	Bad	Good
Chip flow	Good	Bad
Heat generation	Good (small)	Bad (big)
Purpose	Deep hole, ferrous materials, etc.	Al, non-ferrous materials, shallow hole

Major cutting formulas

Cutting speed

$$Vc = \frac{\pi \times D \times N}{1{,}000} \text{ (m/min)}$$

- Vc : Cutting speed (m/min)
- D : Diameter (mm)
- N : Revolution per minute (min^{-1})
- π : Circular constant (3.14)

Feed

$$fn = \frac{Vf}{N} \text{ (mm/rev)}$$

- fn : Feed per revolution(mm/rev)
- vf : Table feed (mm/min)
- N : Revolution per minute (min^{-1})

Machining time

$$T = \frac{L}{N \times fn} \text{ (min)}$$

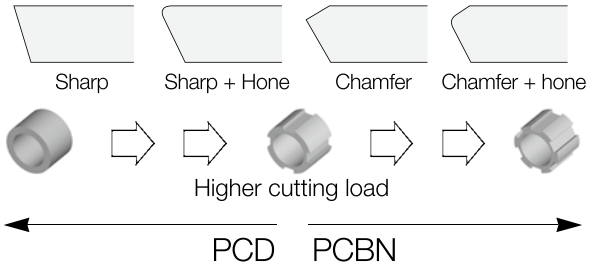
- T : Machining time (min)
- n : Revolution per minute (min^{-1})
- L : Length of drilling (mm)
- fn : Feed (mm/rev)

Tool shapes

- Cutting load & vibration ⇨ ⇨ ⇨ ⇨ ⇨ Higher
- Rigidity
- Toughness
- Tool life

⇨ ⇨ ⇨ ⇨ ⇨ Better

Edge preparations

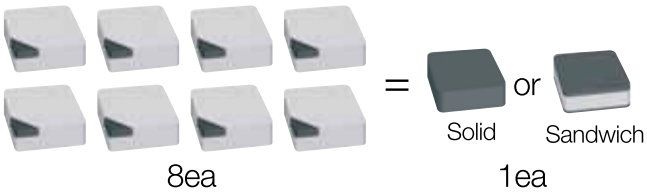


- Rigidity
- Toughness
- Tool life

⇨ ⇨ ⇨ ⇨ ⇨ Better

Advantages of solid PCBN & sandwich PCBN

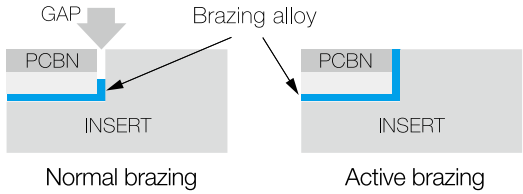
For cast iron machining



Advantages

- Better tool strength due to solid design
- Full cutting edge available
- Cost saving
- Eco friendly

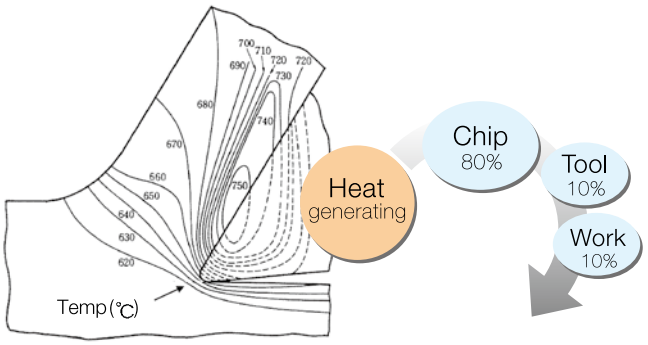
Benefits of active brazing



Advantages

- No oxidation due to vacuum condition
- Less GAP between PCD/PCBN blank and carbide insert
- Higher blazing strength

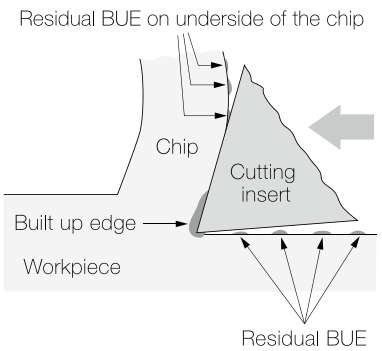
Effect of Heat generation



- Weaken tool rigidity
- Accelerate tool wear
- Cause tool deformation

⇨ ⇨ ⇨ Poor tool life & precision

Built-up edge (BUE)



Cause

- low cutting speed
- Too soft workpiece

Trouble shooting

- Increase cutting speed
- Increase feed rate
- Make the edge sharper

Effect on cutting process

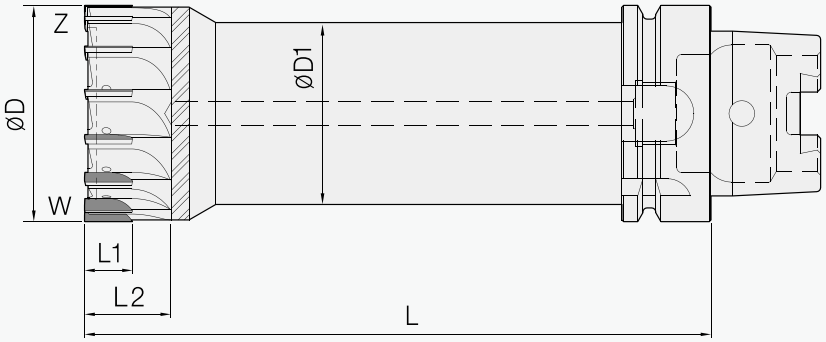
- Good - Protect the tool head against wear
- Bad - Poor surface finish
  - Hard to control the dimensions
  - Cause more chipping or flaking on the edge

Endmill order sheet

Date.

Custormer		End_user	
Workpiece	Part name	Hardness	HRc / HRB
	Material	Roughness	Ra / Rz / Rmax

Tool information



Tool size

D	Diameter, tolerance	mm
D1	Diameter of shank body	mm
L1	Length of tip	mm
L2	Width of tip	mm
W	Length of tool	mm
L	No. of teeth	mm
Z	No. of flute	ea
F	Length of flute	ea

Shank

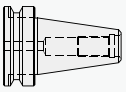
Solid carbide	☐
Solid carbide + steel	☐
Steel	☐

Coolant hole

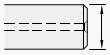
Yes	☐
No	☐

Holder & adaptor

HSKA	☐
Size	32, 40, 50, 63, 80, 100



BT	☐
SK	☐
Size	30, 40, 50



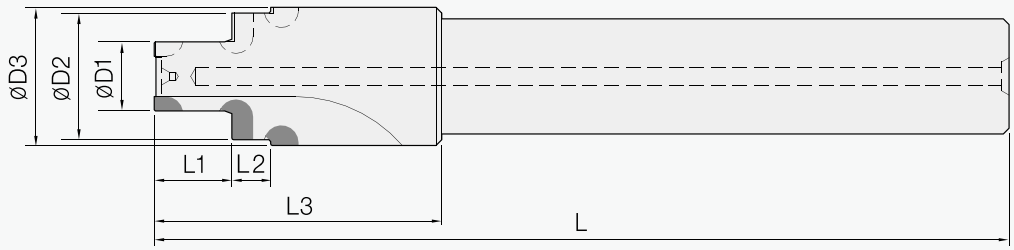
Ø	mm

Reamer order sheet

Date.

Custormer		End_user	
Workpiece	Part name	Hardness	HRc / HRB
	Material	Roughness	Ra / Rz / Rmax

Tool information

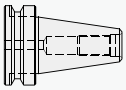


Tool size

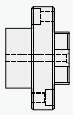
D1	Diameter, tolerance	mm
D2	Diameter, tolerance	mm
D3	Diameter, tolerance	mm
L1	Length of step	mm
L2	Length of step	mm
L3	Length of clearlance	mm
L	Length of tool	mm
F	No. of flute	ea

Holder & adaptor

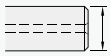
HSKA	☐
Size	32, 40, 50, 63, 80, 100



BT	☐
SK	☐
Size	30, 40, 50



Module	☐
Size	60, 70



Ø	mm

Shank

Solid carbide	☐
Solid carbide + steel	☐
Steel	☐

Coolant hole

Yes (Y-hole)	☐
Yes (through)	☐
No	☐

Hole type

Through hole	☐
Blind hole	☐

Guide

Yes	☐
No	☐

Interrupted cut

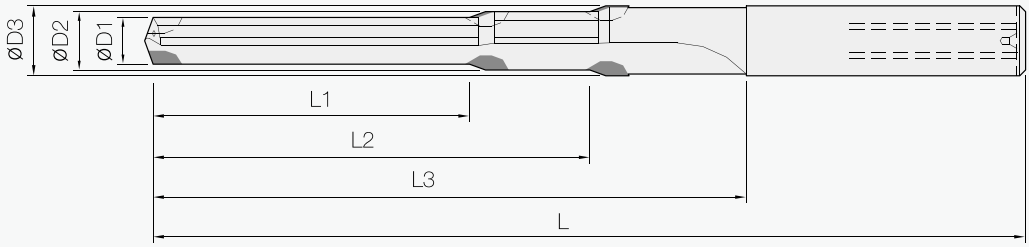
Yes	☐
No	☐

Drill order sheet

Date.

Custormer		End_user	
Workpiece	Part name	Hardness	HRc / HRB
	Material	Roughness	Ra / Rz / Rmax

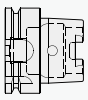
Tool information



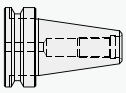
Tool size

D1	Diameter, tolerance	mm
D2	Diameter, tolerance	mm
D3	Diameter, tolerance	mm
L1	Length of step	mm
L2	Length of step	mm
L3	Length of clearlance	mm
L	Length of tool	mm
F	No. of flute	ea

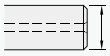
Holder & adaptor



HSKA	☐
Size	32, 40, 50, 63, 80, 100



BT	☐
SK	☐
Size	30, 40, 50



Ø	mm

Shank

Solid carbide	☐
Solid carbide + steel	☐
Steel	☐

Coolant hole

Yes (Y-hole)	☐
Yes (through)	☐
No	☐

Hole type

Through hole	☐
Blind hole	☐

Guide

Yes	☐
No	☐

Interrupted cut

Yes	☐
No	☐

Test information

Date.

Custormer		End_user	
Workpiece	Part name	Hardness	HRc / HRB
	Material *	Roughness	Ra / Rz / Rmax
Work figure Drawing			
Machine	M.C.T ☐	C.N.C turnig / milling ☐	
	Manual ☐	Machine maker	

Cutting data

Speed (V)		(m/min)
RPM (N)		(rev/min)
Feed (F)		(mm/rev)
		(mm/min)
D.O.C *		(pass)
		(mm)

Cutting condition

Continuous *	Continuous		☐
Interrupt *	Light		☐
	Medium		☐
	Heavy		☐
Coolant*	Dry		☐
	Inner ☐	Out (Wet)	☐

Tool information

Tool material *	PCD		☐
	PCBN		☐
	CVD		☐
	SCD	natural	☐
		mono	☐
	TC		☐
	Cermet		☐
	Ceramic		☐
	Others		☐
Shank *	T.C		☐
	STEEL		☐
	T.C+STEEL		☐
Mono block			☐

SPEC *		
Competitor *		
Tool life		(time)
		(EA)
Operation *	turning	☐
	milling	☐
	boring	☐
	grooving / cutting	☐
	reaming	☐
	endmill	☐
	drilling	☐
Wearless		☐
Need to be determined *		☐

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