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Zhuzhou Huarui Precision Cutting Tools Co., Ltd.

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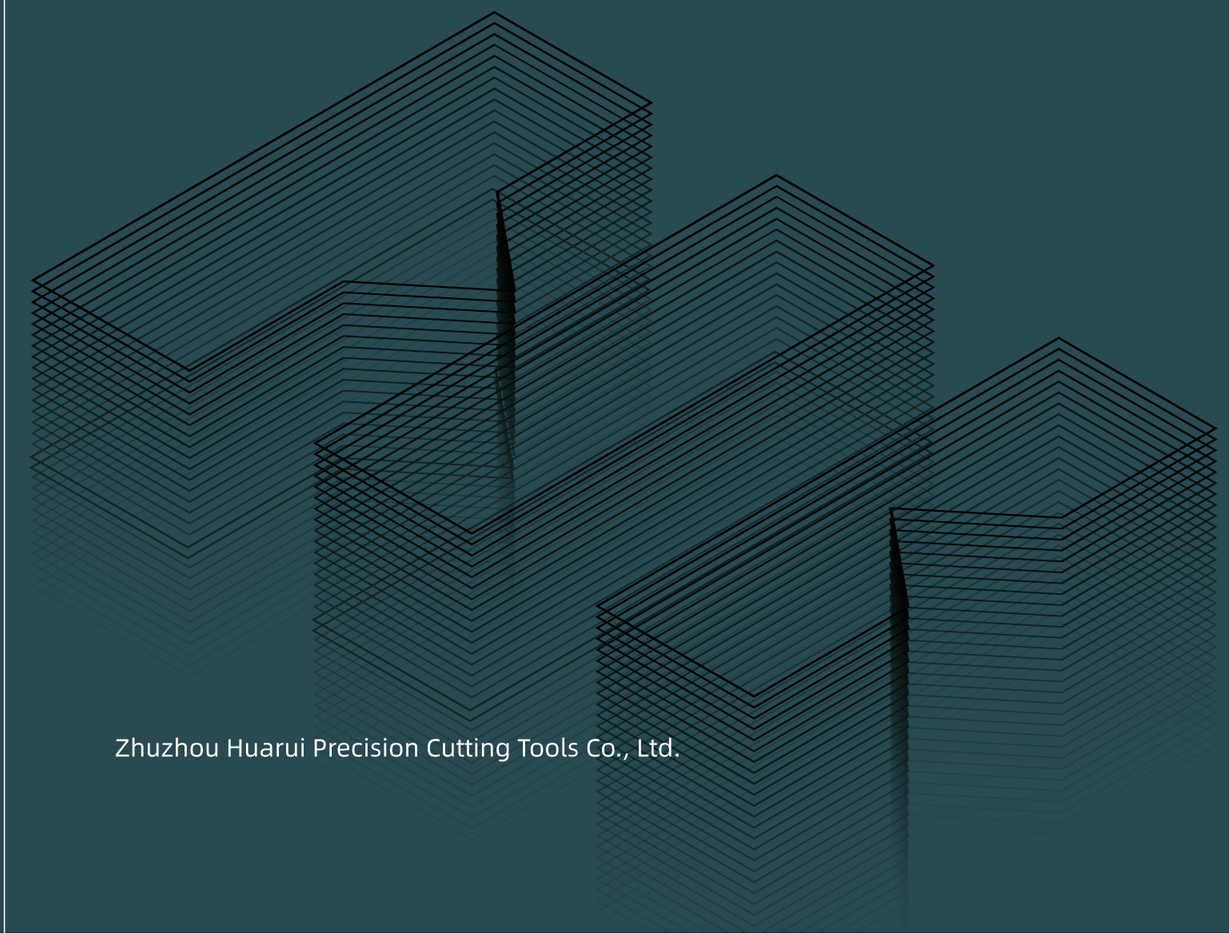
2026-2027 Comprehensive Cutting Tools Catalogue HUAREAL

HUAREAL 华锐

2026-2027

HUAREAL CUTTING TOOLS

CATALOGUE



Zhuzhou Huarui Precision Cutting Tools Co., Ltd.



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Huareal smart manufacturing software

- Empower machine with autonomous learning and continuous optimization
- Enhance manufacture automation with the power of AI

Huareal is committed to establishing a new driving force for future through intelligence, focusing on empowering the metal cutting industry. Through continuous investment and innovation, Huareal aims to significantly enhance the efficiency, precision, and reliability of machining through data-driven and intelligent collaboration, helping customers cope with complex challenges and unleash their manufacturing potential.

In the wave of intelligent manufacturing, Huareal is not only a technology provider, but also a strong partner. Huareal will join hands with customers to embark on a journey towards a more efficient, precise, and sustainable manufacturing.

Possible safety problems and protective measures in using cutting tools

Possible Safety Problems	Protective Measures
Casualty can be caused by clothes, gloves, long hair, etc. twisting into high-speed equipment during rotary cutting.	Please do not wear gloves during rotary cutting.
	Please hide your long hair in the working cap.
	Caution to prevent clothes and other items from contacting any rotating parts.
Injury can be caused by attachments flying out due to the cutting tool damage caused by improper use.	Read this catalogue and the Safety Standards before using.
	Please wear protective glasses and protective suits.
Human injury can be caused by direct contact with the sharp edge of the tools.	Please wear labor protection appliances such as gloves when handling cutting tools.
Scratches and scalds can be caused by chips produced during cutting.	Remove chips in time by cleaning tools.
	Please wear protective glasses, suits and gloves.
Scratches are likely to be caused by defects, such as burrs, on the machined workpieces.	Do not touch defects such as burrs on any machined workpieces.
	Please wear protective appliances such as protective suits and gloves
Tool damage and machined workpiece spatter can be caused by cutting without tight clamping.	The workpieces must be clamped tightly.
	Please wear protective glasses, suits and gloves.
Injury can be caused by tools falling off and flying out due to cutting without clamping the insert or its attachments tightly.	Make sure that the inserts and other attachments have been fastened properly with appropriate tools before machining.
Injury can be caused by high-speed chips when cutting at high speed.	Use safety hood, protective screen, outer cover, etc.
	Please wear protective glasses, suits and gloves.
Injury can be caused by the insert or its attachments falling off and flying out due to inertial centrifugal force at high speed.	Please use the tools according to the recommended purposes.
	Please wear protective glasses and protective suits.
Scratches to hand can be caused by direct touching on the sharp edge of milling tools.	Please wear labor protection appliances such as gloves when contacting cutting tools.
Injury to operators can be caused by tool damage and spatter due to any dramatical increase of cutting resistance caused by excessive wear and severe impact.	Replace any worn tools in time.
	Please wear protective glasses and protective suits.
Fire and explosion can be caused by sparks and high-temperature chips produced during cutting.	Remove inflammables and explosives from the processing workshop.
	Prepare fire extinguishers.
Tool damage can be caused by intense vibration of high-speed machine tools due to the poor balance of clamps and other attachments.	Check the equipment for looseness or abnormal sound before cutting.
	Please wear protective glasses and protective suits.
Damage and spatter of inserts or tools can be caused by excessive fastening using auxiliary tools such as screw pin or pressure plate.	Do not tighten excessively by auxiliary tools such as casing.
Damage and scattering can be caused by shaking or vibration of the tools with eccentric rotating or poor balance when rotary machining.	Please use the tools within the restricted rotating speed range.
	Check the balance performance of the machine regularly.
Drilling with very small tools can easily cause the tool to break, splash and fail to be taken out.	Reduce the tool vibration and process at a suitable running speed.
	Please wear protective glasses, suits and gloves.
Increased wear of machine and cutting tools as well as other harms can be caused beyond the specified purposes.	Please follow the instructions and regulations.
Note: Incidents caused by any modification or diversion of cutting tools without the permission of our company will be at your own risk.	

Kylin Series

Cutting solutions to supperalloy machining with high-efficiency and safety

HUAREAL



Solid Carbide End Mills







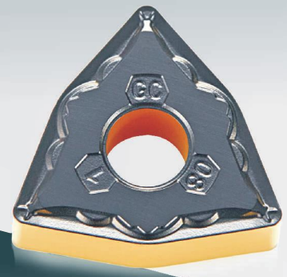


Turning of Small Components

HUAREAL



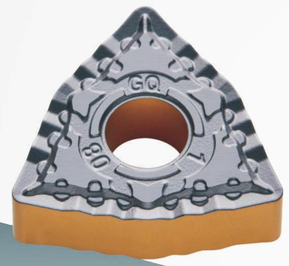
Steel Turning



GC



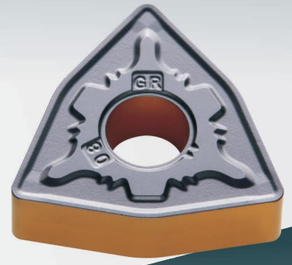
GF



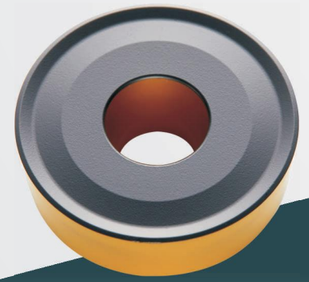
GQ



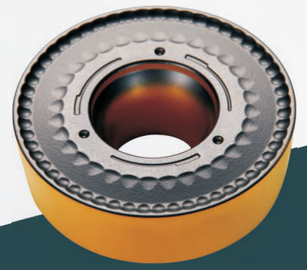
GM



GR



All-round



MR

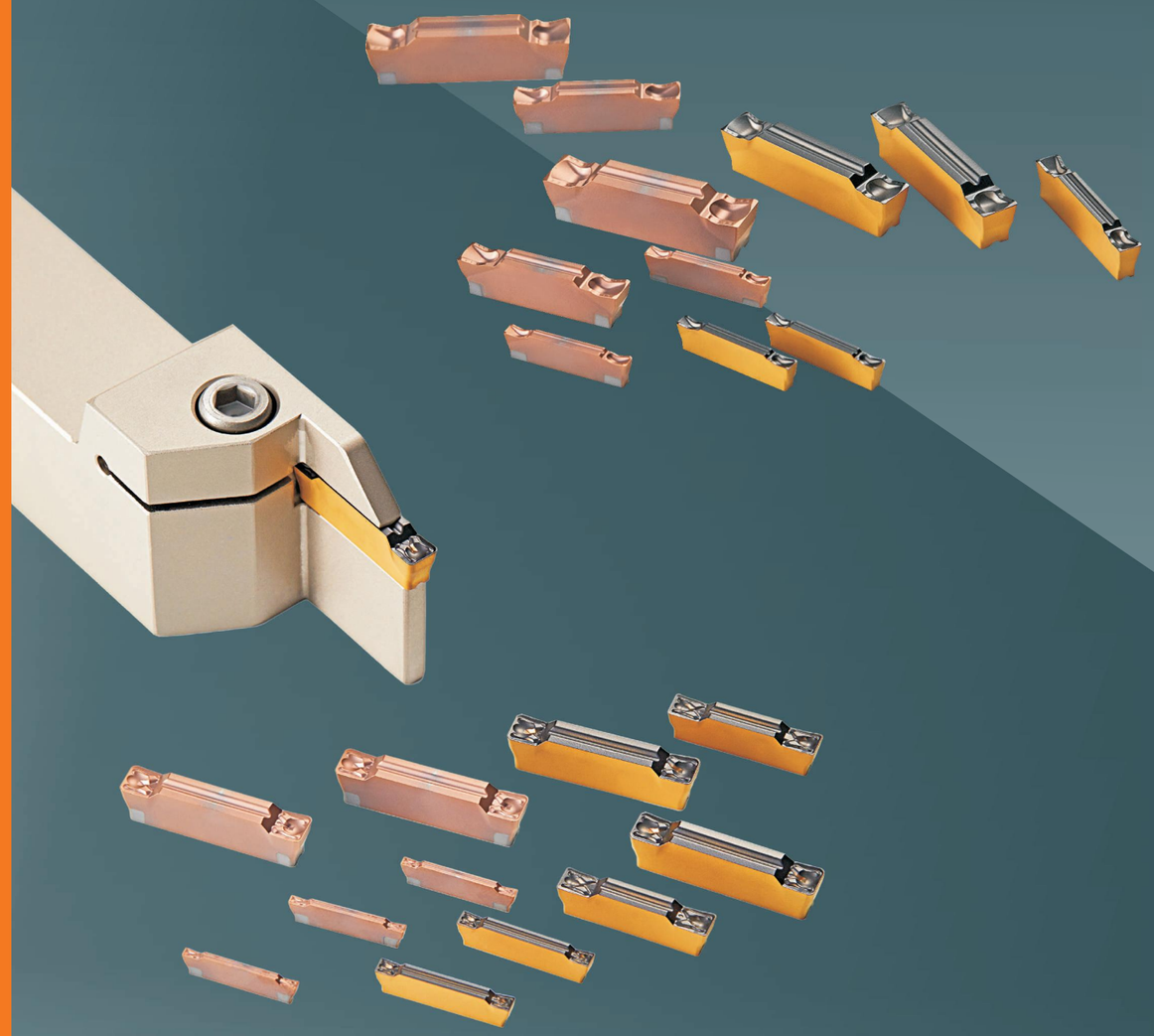


GX



GZ

Parting and Grooving



Thread Turning

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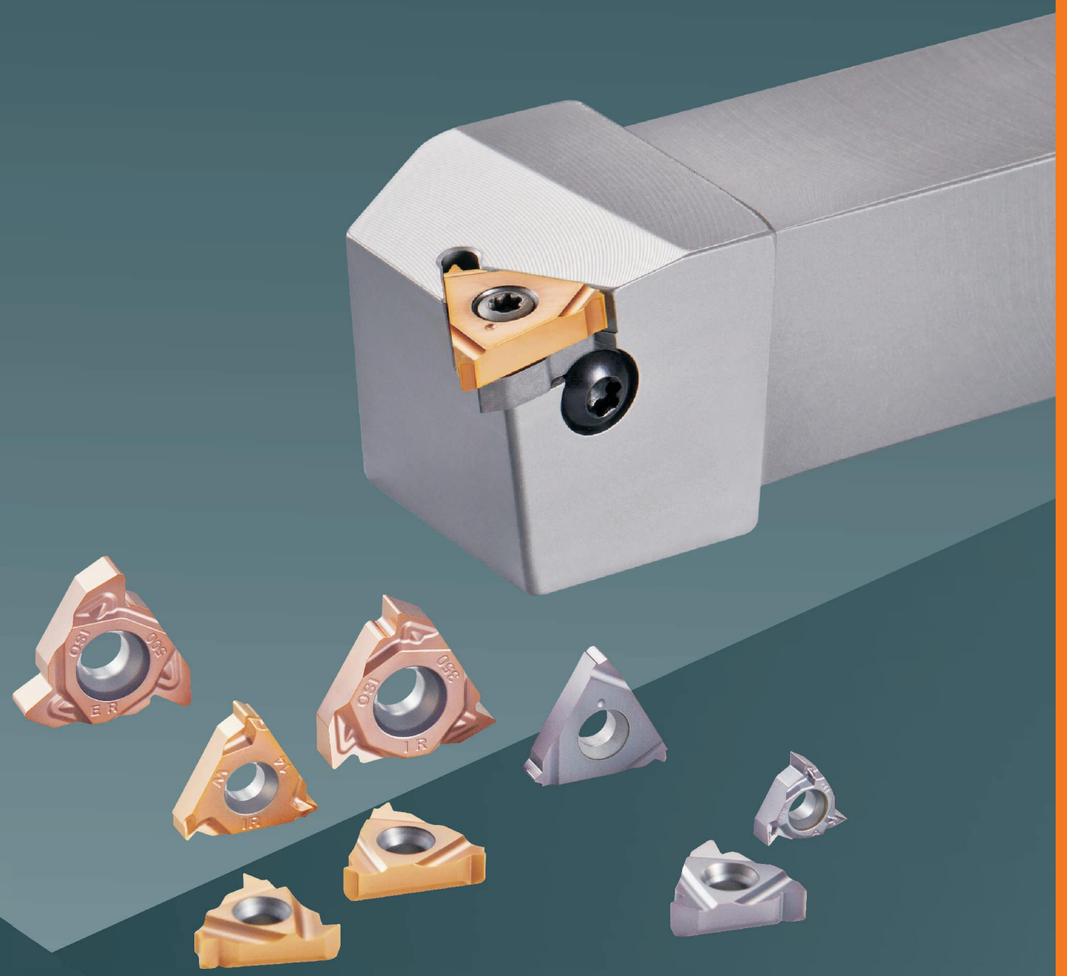


SPM400

Ultra-high Precision Ball Nose Profile Milling Tool



SPM500

Indexable Ball Nose Rough Milling Tool

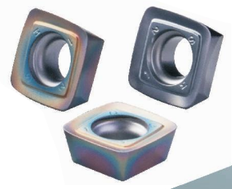


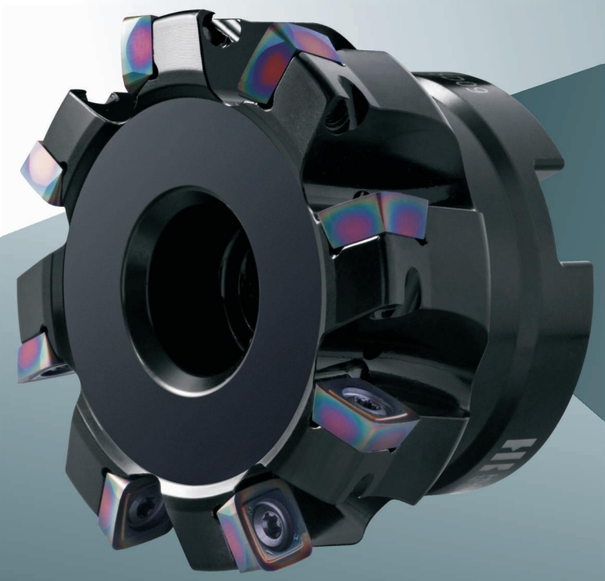
HUAREAL

C/SEM300 Series
High Feed Milling Tool





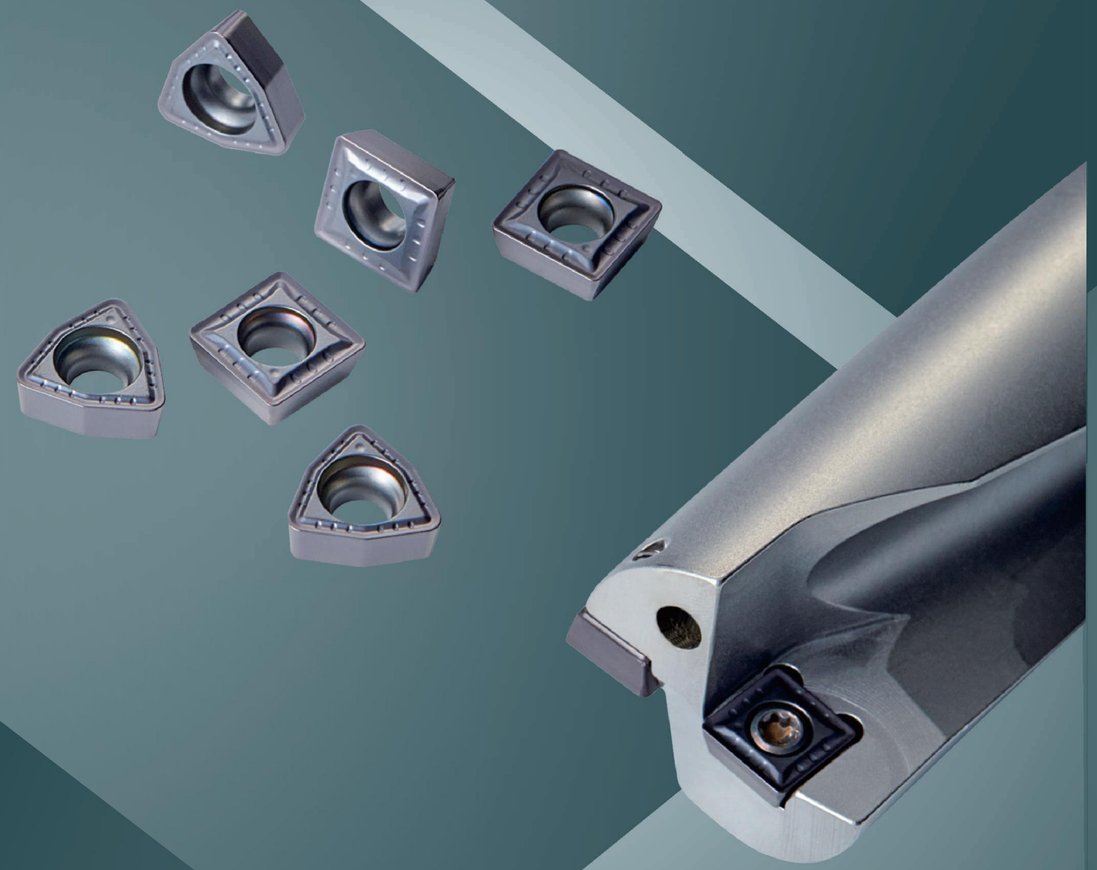




Solid Carbide Boring Tools



Indexable Short Hole Drilling Tools



HUAREAL

Solid Carbide Drills



Introduction

- This catalogue presents Huareal's major cutting products as of October 2025.
- This catalogue mainly introduces turning tools, milling tools and drilling tools. Wherein:

  Turning tools include general turning, Turning of small components, parting and grooving tool and threading tool

  Milling tools include indexable milling tool and solid carbide end mill

  Drilling tools include indexable short hole drills and solid carbide drill
- Products in this catalogue may be attached with the following symbols.

  Indexable inserts: Recommended grade；Available grade

  Indexable cutting tools: Standing inventory; Make-to-order

  Solid carbide cutting tool: Standing inventory; Make-to-order

  Application: Fit well；Applicable
- Product dimensions

  The basic dimensions of products in this catalogue are marked according to the ISO13399 Standard, and the specific symbols and corresponding definitions are following attached.
- According to the

  ISO13399 Standard, customers can input cutting tool information into PLM, CAD, CAM, CNC, etc. without replacing data from different companies. Huareal is actively engaged in providing "cutting tool data" based on the IS013399 Standard.

Overview of dimension codes according to ISO13399 Standard

Parameter	Definition		Code	Definition
ADJLN	Minimum adjustment limit		CICTE	Cutting item count - limit position
ADJLX	Maximum adjustment limit		CICTP	Cutting item count-peripheral position
ADJRG	Adjustment range		CICTS	Cutting item count- side position
ALP	Clearance angle axial		CICTSP	Cutting item count-cutter bar protection insert
AN	Clearance angle major		CICTT	Cutting item count- total
ANN	Clearance angle minor		CND	Coolant entry diameter
APMX	Depth of cut maximum		CNSC	Coolant entry style code
APMX_EFW	Depth of cut maximum in feed direction end		CNT	Coolant entry thread size
APMX_FFW	Depth of cut maximum in feed direction side		COATING	Coating
AZ	Maximum plunge depth		CP	Maximum coolant pressure
B	Shank width		CRKS	Connection retention knob thread size
BAWS	Body angle workpiece side		CRNT	Coolant radial entry thread size
BAMS	Body angle machine side		CTPT	Operation type
BBD	Balanced by design		CUTDIA	Workpiece parting diameter maximum
BBR	Balanced by rotational test		CW	Cutting width
BCH	Corner chamfer length		CWN	Minimum cutting width
BD	Body diameter		CWTOLL	Insert width lower tolerance
BHTA	Body half taper angle		CWTOLU	Insert width upper tolerance
BN	Face land width		CWX	Cutting width maximum
BS	Wiper edge length		CXSC	Coolant exit style code
BSG	Basic standard group		CZC	Connection size code
BSR	Wiper edge radius		CZCMS	Connection size code machine side
CDX	Cutting depth maximum		CZCWS	Connection size code workpiece side
CEMR	Cutting edge main radius		D1	Fixing hole diameter
CF	Spot chamfer		DAH	Diameter access hole
CHBA	Chamfer body angle		DAXIN	Axial groove inside diameter minimum
CHBL	Chamfer body length		DAXN	Face groove outside diameter minimum
CHW	Corner chamfer width		DAXX	Axial groove outside diameter maximum
CICT	Cutting item count		DBC	Diameter bolt circle
CICTBALL	Cutting item count-ball nose		DC	Cutting diameter
DCB	Connection bore diameter		KRINS	Major cutting edge angle
DCBN	Connection bore diameter minimum		KWW	Keyway width
DCBX	Connection bore diameter maximum		L	Cutting edge length
DCF	Cutting diameter face contact		LAMS	Inclination angle
DCIN	Cutting inside diameter		LB	Body length
DCN	Cutting diameter minimum		LCF	Length chip flute
DCON	Connection diameter		LCOX	Cut off length maximum
DCONMS	Connection diameter machine side		LE	Cutting edge effective length
DCONWS	Connection diameter workpiece side		LF	Functional length
DCONNWS	Interface diameter minimum workpiece side		LFN	Functional length minimum

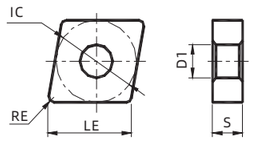
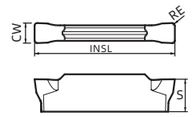
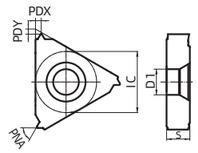
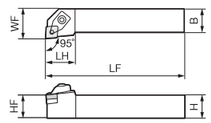
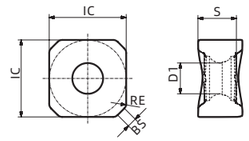
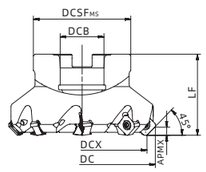
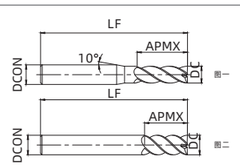
Overview of dimension codes according to ISO13399 Standard

Parameter	Definition		Parameter	Definition
DCONXWS	Connection diameter maximum workpiece side		LH	Cutting head length
DCPS	Data chip provision size		LPR	Protruding length
DCSFMS	Contact surface diameter machine side		LS	Shank length
DCSFWS	Contact surface diameter workpiece side		LSC	Clamping length
DCX	Cutting diameter maximum		LSCN	Clamping length minimum
DHUB	Hub diameter		LSCS	Distance to clamping starting point
DIX	Tool changer interference diameter maximum		LSCX	Clamping length maximum
DMIN	Minimum bore diameter		LSD	Dead shank length
DMM	Shank diameter		LU	Usable length (max. recommended)
DN	Neck diameter		LU_BFW	Usable length - back face milling
DRVCT	Number of drives		LUX	Usable length maximum
DSGN	Design		MHD	Mounting hole distance
EPSR	Insert inclined angle		MIID	Master insert identification
FHA	Flute helix angle		MIIDE	Master insert identification - limit position
FLGT	Flange thickness		MIIDS	Master insert identification - side position
FTDZ	Thread diameter size		MIIDC	Master insert identification - central position
GB	Face land angle		MIIDP	Master insert identification - peripheral position
H	Shank height		MIIDI	Master insert identification - in-between position
HA	Theoretical thread height		MMCC	Code for preset torque
HB	Thread height difference		MMCX	Max.cutting torque
HBH	Head bottom offset height		NOF	Flute count
HC	Thread height actual		NT	Tooth count
HF	Functional height		OAH	Overall height
HRY	Lowest point from reference plain		OAL	Overall length
HTB	Body height		OAW	Overall width
HTH	Height		OH	Overhang recommended
IC	Inscribed circle diameter		OHN	Overhang minimum
INSL	Insert length		OHX	Overhang maximum
INSUC	Insert usage code		ORDCODE	Ordercode
IZC	Insert size code		PCL	Peripheral cylindrical length
KAPR	Tool cutting edge angle		PDX	Profile distance ex
KAPR_EFW	Tool cutting edge angle - end feed		PDY	Profile distance ey
KCH	Corner chamfer		PHD	Premachined hole diameter
PHDX	Premachined hole diameter maximum		TCT	Tolerance class tool
PL	Point length		TCTR	Thread tolerance class
PNA	Profile included angle		TD	Thread diameter
PRFRAD	Profile radius		TDZ	Thread diameter size
PRSPC	Profile specification		TFLA	Tap floating length ahead
PSIR	Tool lead angle		TFLB	Tap floating length behind
PSIRL	Cutting edge angle major left hand		TG	Tap gradient

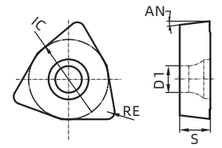
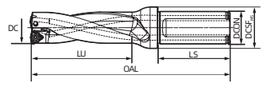
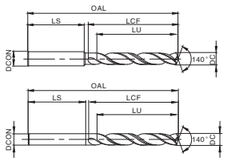
Overview of dimension codes according to ISO13399 Standard

Parameter	Definition		Parameter	Definition
PSIRR	Cutting edge angle major right hand		THBTP	Thread back taper characteristics
PSW	Premachined groove width		THCA	Thread spiral correction angle
RADH	Radial body height		THCHT	Threading chamfer type
RADW	Radial body width		THFT	Thread form
RAR	Clearance angle right hand		THFTS	Standard series thread profile
RE	Corner fillet radius		THL	Thread length
REEQ	Corner fillet radius equivalence		THUB	Hub thickness
REL	Corner fillet radius left hand		TP	Thread pitch
RER	Corner fillet radius right hand		TPI	Threads per inch
RETOLL	Corner radius lower tolerance		TPIN	Threads per inch minimum
RETOLU	Corner radius upper tolerance		TPIX	Threads per inch maximum
RGL	Regrind length		TPN	Thread pitch minimum
RMPX	Ramping angle maximum		TPT	Thread profile type
RPMX	Rotational speed maximum		TPX	Thread pitch maximum
S	Insert thickness		TRMAX	Tap range maximum
SDL	Step diameter length		TQ	Torque
SIG	Corner angle		TSYC	Tool style code
SPTL	Parting line		TTP	Thread type
SSC	Insert seat model		ULDR	Diameter ratio of machinable length
SSCE	Insert seat size code - limit position		VCX	Cutting speed maximum
SSCP	Insert seat size code - peripheral position		W1	Insert width
SSCS	Insert seat size code - side position		WB	Body width
STA	Step inclined angle		WF	Functional width
STDNO	Standard Number		WFCIRP	Width to reference point of cutting parts
SUBSTRATE	Tool substrate		WSC	Clamping width
TCDC	Tolerance class cutting diameter		WT	Weight
TCDCON	Interface diameter tolerance		ZADJ	Adjustable insert count
TCDMM	Shank diameter tolerance		ZEFF	Face effective cutting edge count
TCHA	Achievable hole tolerance		ZEFP	Peripheral effective cutting edge count (ZEFP)
TCHAL	Achievable hole lower tolerance		ZWX	Number of wiper edge inserts maximum
TCHAU	Achievable hole upper tolerance			

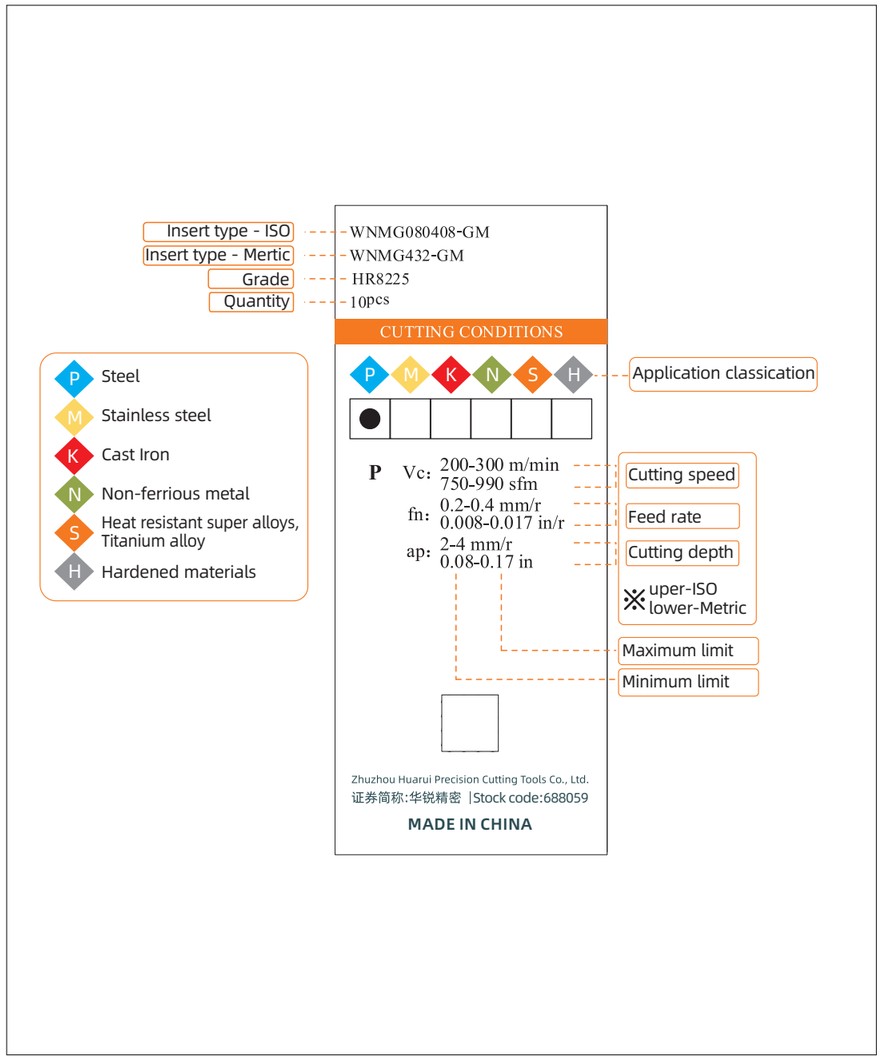
Examples of basic dimension according to ISO13399 Standard

Tool type	Basic size marking form	Code	Definition
Turning insert		IC	Inscribed circle diameter
		LE	Cutting edge length
		S	Insert thickness
		D1	Insert hole diameter
		RE	Corner radius
Parting and grooving insert		INSL	Insert length
		CW	Insert width
		S	Insert thickness
		RE	Corner radius
Thread insert		IC	Inscribed circle diameter
		PDX	Profile distance ex
		PDY	Profile distance ey
		S	Insert thickness
		DI	Insert hole diameter
		PNA	Angle profile
Turning tool		H	Shank height
		B	Shank width
		LF	Overall length
		LH	Cutting head length
		HF	Functional height
		WF	Functional width
		IC	Inscribed circle diameter
		S	Insert thickness
		D1	Insert hole diameter
		BS	Wiper edge length
		RE	Corner radius
Indexable milling tool		DC	Cutting diameter
		DCB	Bolt diameter
		DCX	Cutting diameter maximum
		DCSFMS	Contact surface diameter machine side
		LF	Overall length
		APMX	Cutting depth maximum
Solid carbide end mill		DC	Cutting diameter
		DCON	Shank connection diameter
		LF	Overall length
		APMX	Cutting depth maximum
		ZEFP	Peripheral effective cutting edge count

Examples of basic dimension according to ISO13399 Standard

Tool type	Basic size marking form	Code	Definition
Short hole drilling insert		IC	Inscribed circle diameter
		D1	Insert hole diameter
		S	Insert thickness
		RE	Corner radius
		AN	Clearance angle major
Short hole drilling tool		DC	Cutting diameter
		DCON	Shank connection diameter
		DCSFMS	Connection diameter machine side
		LS	Shank length
		LU	Usable length
		OAL	Overall length
Solid carbide drill		DC	Cutting diameter
		DCON	Shank connection diameter
		OAL	Overall length
		LCF	Length chip flute
		LS	Shank length
		LU	Usable length

Sticker Sample



Selection guidance of general turning insert

Description of turning insert overview

i According to the order of shape:

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

ii According to the order of clearance angle:

Negative insert

Positive insert

iii According to the processing method:

Finishing → Medium → Roughing → Heavy machining

Workpiece materials:

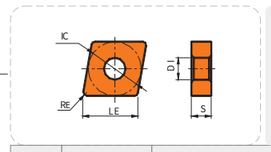
- Steel
- Stainless steel
- Cast iron
- Non-ferrous metal
- Heat resistant super alloys Titanium alloy

Instructions for insert specifications and models

Insert shape, angle

80° CN□□

Cutting condition:
Stable : continuously stable cutting
Average : for general cutting
Tough : Heavy interrupted or unstable condition



Working condition: ● Stable ◕ Average ⌗ Tough

Workpiece material

- P Steel
- M Stainless steel
- K Cast iron
- N Non-ferrous metal
- S Heat resistant super alloys Titanium alloy

Processing	Insert shape	Type	Dimension (mm)					CVD				PVD						Cemented carbide		Cermet	
			LE	IC	S	DI	RE	HR8115	HR8125	HR8225	HR6115	HR9105	HR7115	HR7125	HR7225	HR5125	HR5225	HRK10	HRK20	HRC10	HRC20
Finishing		CNMG120404-GF	12.9	12.7	4.76	5.16	0.4	★	☆	★											
		CNMG120408-GF	12.9	12.7	4.76	5.16	0.8	★	☆	★											
Finishing		CNMG120404-BF	12.9	12.7	4.76	5.16	0.4							☆	★						
		CNMG120408-BF	12.9	12.7	4.76	5.16	0.8							☆	★						
Semi-finishing		CNMG120404-GM	12.9	12.7	4.76	5.16	0.4	★	☆	★											
		CNMG120408-GM	12.9	12.7	4.76	5.16	0.8	★	☆	★											
		CNMG120412-GM	12.9	12.7	4.76	5.16	1.2	★	☆	★											
		CNMG160608-GM	16.1	15.875	6.35	6.35	0.8	★	☆	★											
		CNMG160612-GM	16.1	15.875	6.35	6.35	1.2	★	☆	★											
		CNMG160616-GM	16.1	15.875	6.35	6.35	1.6	★	☆	★											
Semi-finishing		CNMG120404-BM	12.9	12.7	4.76	5.16	0.4							☆	★						
		CNMG120408-BM	12.9	12.7	4.76	5.16	0.8							☆	★						
		CNMG120412-BM	12.9	12.7	4.76	5.16	1.2							☆	★						

★Recommended grade ☆Available grade

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

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

Grade

Insert shape | Description | Dimension | Inventory | Grade infomation

Turning

General Turning

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Steel turning

A full range of steel turning products will meet customers' requirements of quality, service life, universality and efficiency.

HR8105

The combination of a fine-grained cemented carbide matrix with a thick Al_2O_3 coating, coupled with a special post-coating treatment process, brings excellent resistance to crater wear and plastic deformation.

It is particularly suitable for high-speed machining of steel under stable working conditions. With finishing chipbreaker, it has excellent wear resistance and resistance to plastic deformation.

HR8115

The new cemented carbide matrix composition has high strength, excellent wear resistance, and reliable toughness. The strengthened bonding phase effectively resists high-temperature plastic deformation of the matrix. The combination of special coating post-treatment technology and a matrix with good resistance to thermoplastic deformation of the corner ensures excellent wear resistance.

HR8225

The functional gradient coating with high binding phase effectively restrain the cracks. The carbide matrix with uniformly refined hard phase distribution is paired with the new composite multi-layer CVD coating, which has high strength, excellent wear resistance and reliable toughness.
The improved precision pressing process has enhanced dimensional accuracy





GC chipbreaker

Special design of chipbreaker can achieve good chip control and surface quality, which is especially fit for automated turning process.



GF chipbreaker

The deisgn of large rake angle and cutting edge inclination has low cutting force and strong chip control. It is suitable for finishing with small cutting depth.

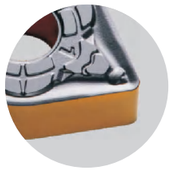


GQ chipbreaker

Finishing & semi-finishing
With excellent chip control, it's especially suitable for the automatic line with chip control requirements and ensure better surface quality.

GM chipbreaker

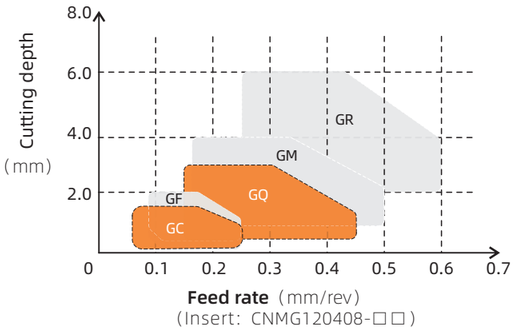
Advanced balance of sharpness and high-strength creates applicability for multiple purposes, and provides efficient cutting and long service life.





GR chipbreaker

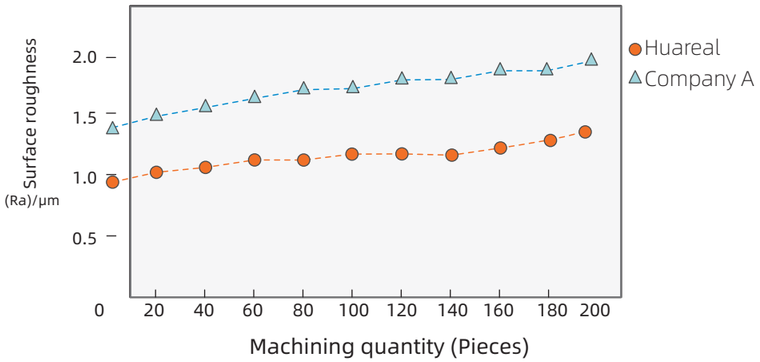
With a wide chamfer and high-strength insert, it can achieve good chip control ability, reduce rake face wear and extend the service life.



Cutting data

Chipbreaker	Grade	Cutting speed v_c (m/min)	Feed rate f_n (mm/r)	Cutting depth ap (mm)
GC	HR8105 HR8225	240-420 220-380	0.05-0.25	0.30-1.50
GF	HR8105 HR8225	240-420 220-380	0.08-0.25	0.30-2.00
GQ	HR8115 HR8225	200-400 200-360	0.15-0.45	0.50-3.00
GM	HR8115 HR8225	200-400 200-360	0.18-0.50	1.00-4.00
GR	HR8225	180-300	0.25-0.60	2.00-6.00

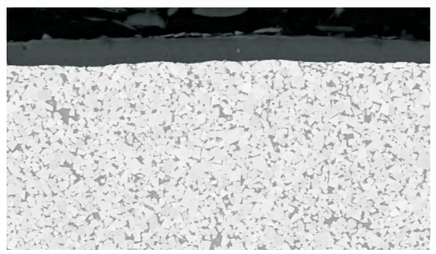
Workpiece name: Shaft parts
Workpiece material: 45# steel
Machining method: Wet external turning
Insert: DNMG150408-GQ
Cutting data: HR8115
v_c=338m/min,
f_n=0.2mm/r,
ap=0.4mm



Stainless steel turning

In response to the characteristics of stainless steel turning, BF, BM, BR chipbreaker series has been developed. Combined with special grade HR7225, it can effectively restrain the build-up edge and notch wear during turning of stainless steel. It can meet the requirements of working conditions from finishing to roughing.





Structure of Hr7225

HR7225

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



BF

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



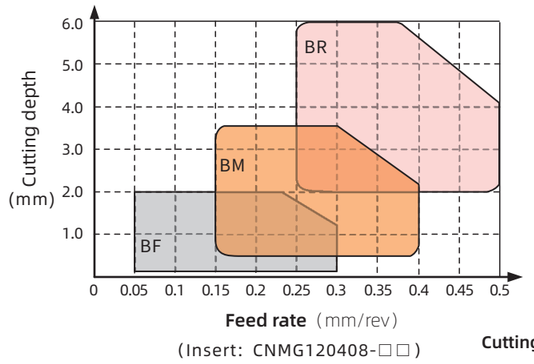
BM

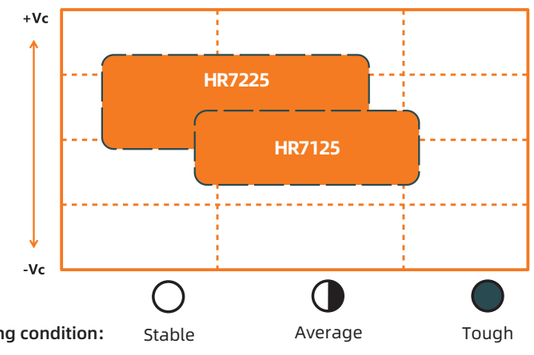
The edge micro-processing technique guarantees both sharpness and high strength, and thus meet the machining requirements of high efficiency and long service life of stainless steel

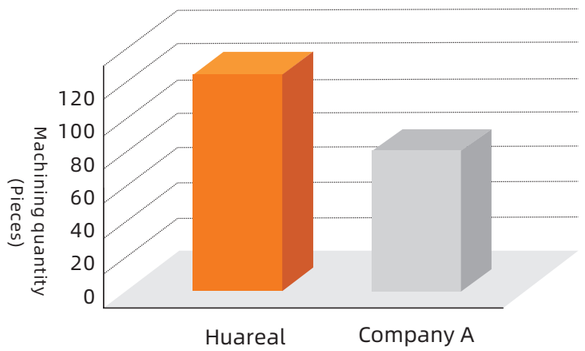


BR

The optimized design of chip breaker with high strength, it is suitable for interrupt machining of stainless steel and light-load roughing.







Cutting data (HR7225)

Chipbreaker	Cutting speed v_c (m/min)	Feed rate f_n (mm/r)	Cutting depth ap (mm)
BF	120 ı 260	0.05 ı 0.30	0.20 ı 2.00
BM	100 ı 220	0.15 ı 0.40	0.50 ı 3.50
BR	80 ı 200	0.25 ı 0.50	2.00 ı 6.00

High-temp alloy turning

Grade HR9205 and HR9215 combined with SF and SM series chipbreaker can meet the technical demand from roughing to finishing and improve service life and safety.

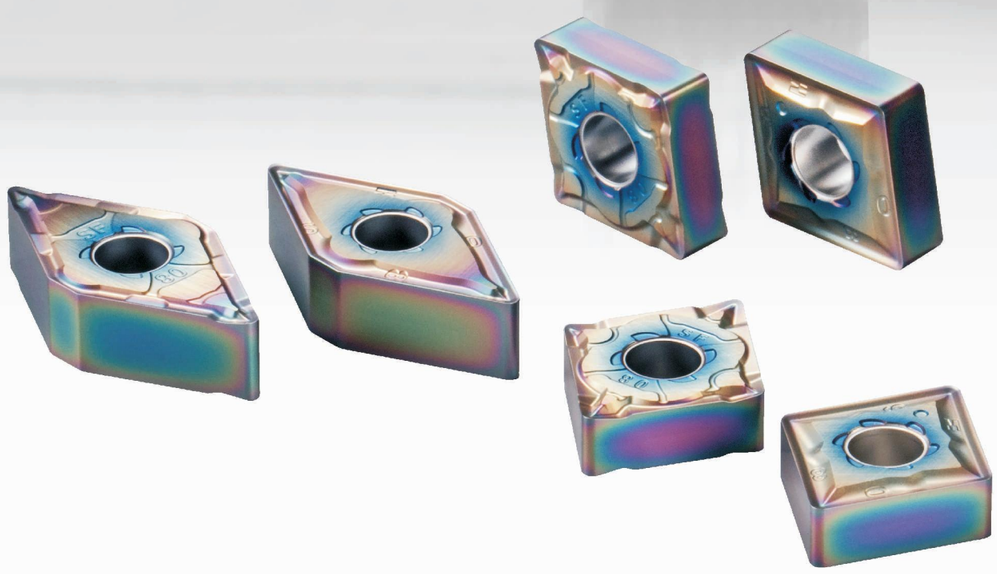
HR9205

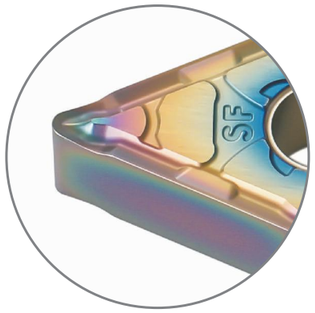
- The well-distributed refined submicron hard phase guarantees high hardness and wear resistance.
- The addition of alloy elements achieve solution strengthening and grain boundary strengthening, further enhancing safety
- With a special coating composition design, it exhibits excellent thermal stability and oxidation resistance.

HR9215

- The well-distributed refined submicron hard phase and optimized bonding phase composition together improve the toughness and safety
- The reasonable composite structure of AlCr*N, AlTi*N, and TiSi*N, effectively restrains the extension of longitudinal cracks and improves ability of anti-peeling and anti-chipping of the coating.

Kylin series



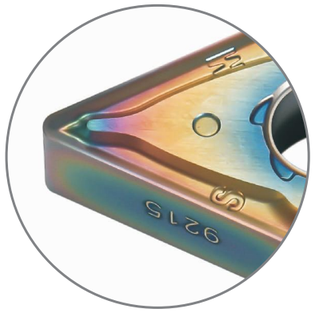


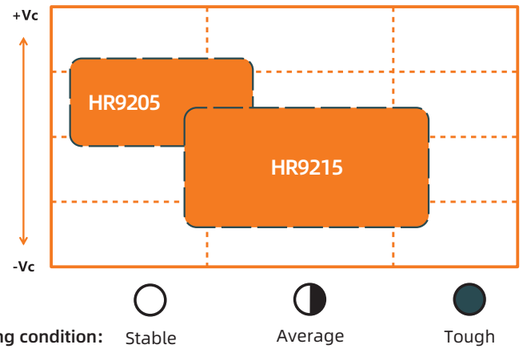
SF Finishing

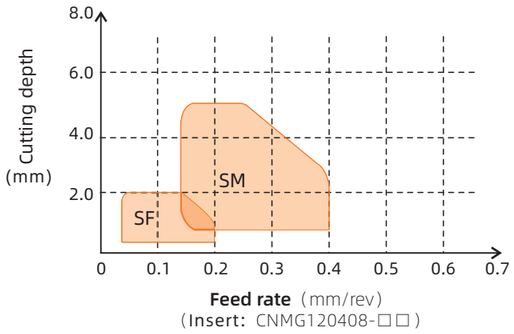
- Special corner design and sharp edge can reduce cutting force and tool vibration
- Smooth surface and chip removal

SM Semi-finishing to roughing

- The perfect combination of edge strength and chip control implement safe and reliable machining
- Light cutting can decelerate hardening, inhibit notch wear, and extend tool life





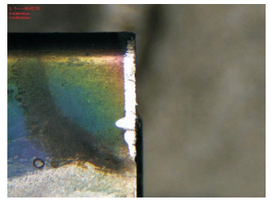


Case

Workpiece name:	Main steam valve
Workpiece material:	Gh901
Machining method:	External machining
Cutting data:	v_c=41.7m/min, f_n=0.2mm/r, ap=2.5mm
Cooling method:	Water-based emulsion
Test tool:	HR9215/CNMG120408-SM
Tool change standard:	Surface quality or chip breaking

Improvement of 30%

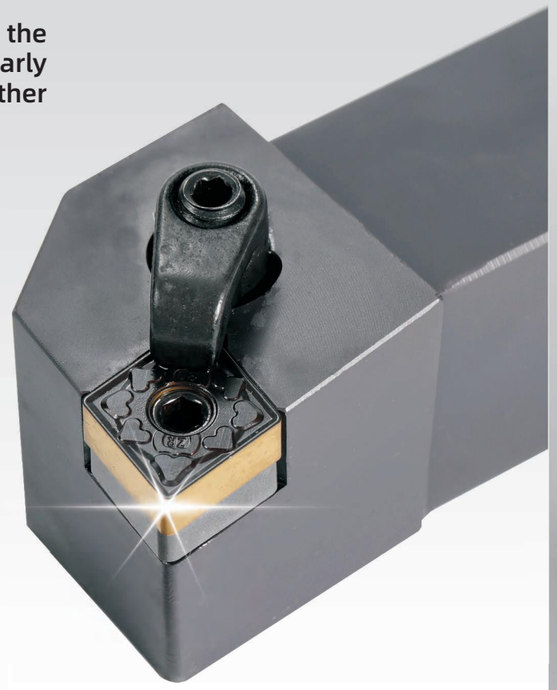
Test result: Huareal insert wear is uniform and the average life is stable with a significant improvement of over 30% compared to the original insert.

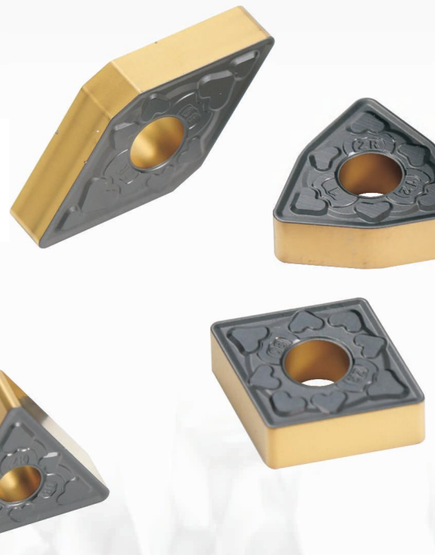


T=30min
HR9215/CNMG120408-SM Wear photograph

Cast iron turning

Aiming at the features of cast iron, we launched the 2nd generation grade--HR6215. It is particularly suitable for ductile iron, and also applicable to other cast iron under general cutting conditions.





- The highly consistent fiber-structured TiCN coating enhances the hardness and wear resistance of the coating, making it particularly suitable for ductile iron turning.
- The 2nd generation CVD coating technology which combines the fiber-structured TiCN and fine-grained alumina perfectly, significantly enhances the cohesion between coating layers and prevents peeling.
- The unique post-coating treatment process effectively eliminates the internal stress of inserts and enhancing impact resistance. The appearance, featuring a black front and yellow back, improves the wear identification of the cutting edge.

ZR chipbreaker-- for ductile iron

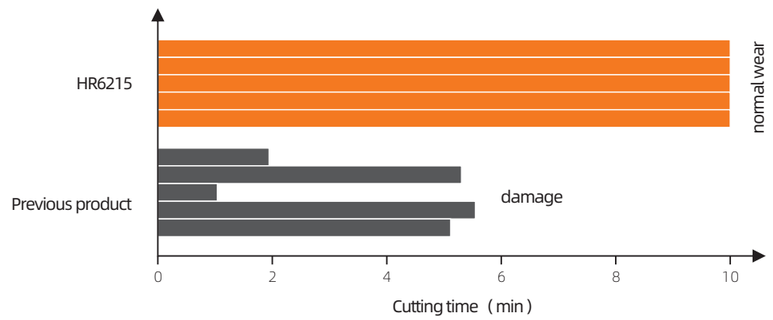
It's specially developed for ductile iron which balances the corner sharpness and strength well and achieves low cutting force and high quality. It is also applicable to gray iron.



Cutting data（QT600）

Cutting condition	Usage	Chipbreaker	Grade	Parameter recommendation		
				v_c(m/min)	f_n(mm/r)	ap(mm)
Stable	Finishing	ZR	HR6215	230-365	0.10-0.30	0.2-0.1
	Semi-finishing			210-335	0.20-0.35	0.5-1.5
	Roughing			195-315	0.25-0.40	1.0-3.0
Average	Finishing	ZR	HR6215	205-335	0.10-0.30	0.2-1.0
	Semi-finishing			190-305	0.20-0.35	0.5-1.5
	Roughing			180-285	0.25-0.40	1.0-3.0
Tough	Finishing	ZR	HR6215	205-335	0.10-0.30	0.2-1.0
	Semi-finishing			190-305	0.20-0.35	0.5-1.5
	Roughing			180-285	0.25-0.40	1.0-3.0

Impact toughness comparison in interrupted cutting of Qt600



Processing Conditions

Workpiece material: QT600
Insert: WNMG080412-ZR
Cutting speed v_c=220m/min
Feed per revolution: f_n=0.3mm/r
Depth of cut: ap=2mm
Cooling method: Water-based emulsion

Grade code key

HR ① 8 ② 2 ③ 25 ④

①Grade code

②Classification codes

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

③Number of grades in the same group

—— 1-1st generation

—— 2-2nd generation

—— 3-3rd generation

④ISO material classification number

05	10
15	20
25	30
35	40

General turning application overview

Type	Material	ISO	CVD coating							PVD coating							Cemented carbide	Cermet		ISO
			HR8105 New	HR8115	HR8125	HR8225	HR8135	HR6115	HR6215 New	HR7115	HR7125	HR7225	HR9205 New	HR9215 New	HR5125	HR5225	HRK10	HRC10	HR115C	
P	Non-alloyed steel/Alloy steel	P01	HR8105																	P01
		P05																HRC10	HR115C	P05
		P10		HR8115								HR7225				HR5225				P10
		P15				HR8225					HR7125				HR5125					P15
		P20			HR8125															P20
		P25					HR8135													P25
		P30																		P30
		P35																		P35
		P40																		P40
		P45																		P45
		P50																		P50
M	Stainless steel	M05								HR7115										M05
		M10										HR7225				HR5225				M10
		M15									HR7125				HR5125					M15
		M20																		M20
		M25																		M25
		M30																		M30
		M35																		M35
		M40																		M40
		M45																		M45
K	Cast iron	K01																		K01
		K05																	HR115C	K05
		K10						HR6115												K10
		K15							HR6215											K15
		K20																		K20
		K25																		K25
		K30																		K30
		K35																		K35
		K40																		K40
		K45																		K45
		K50																		K50
N	Aluminum/Aluminum alloy	N01															HRK10			N01
		N05																		N05
		N10																		N10
		N15																		N15
		N20																		N20
		N25																		N25
		N30																		N30
		N40																		N40
S	High-temp alloy	S01																		S01
		S05								HR7115			HR9205							S05
		S10												HR9215						S10
		S15																		S15
		S20																		S20
		S25																		S25
		S30																		S30

Turning grade overview

Grade type	Grade	ISO	Color	Coating type	composition	Characteristics
Coated Carbide	HR8105	ISO P	Black & Yellow	CVD	TiN+MT-TiCN+Al_2O_3	• Suitable for steel turning under stable working condition • Brand new coating with high red hardness carbide substrate shows outstanding wear resistance and plastic deformation resistance
	HR8115	ISO P	Black & Yellow	CVD	TiN+MT-TiCN+Al_2O_3	• Suitable for light interrupted and continuous machining of steel • The gradient alloy structure together with thick Al2O3, and sophisticated post-coating treatment, greatly improves the wear resistance. It is suitable for finishing and semi-finishing of carbon steel and alloy steel
	HR8125	ISO P	Black & Yellow	CVD	TiN+MT-TiCN+Al_2O_3	• Suitable for interrupted and continuous cutting of steel • The strengthened binding phase which can effectively inhibit the high temperature plastic deformation of the substrate; The functional gradient coating with high binding phase can control the crack effectively
	HR8225	ISO P	Black & Yellow	CVD	TiN+MT-TiCN+Al_2O_3	• Preferred grade for steel turning; suitable for interrupted and continuous cutting; high universality • Brand new well-distributed refined hard phase substrate combines with multi-layer CVD coating. It possesses outstanding wear resistance and toughness.
	HR8135	ISO P	Black & Yellow	CVD	TiN+MT-TiCN+Al_2O_3	• Grade for steel turning of strong impact • High toughness matrix composition and reinforced bonding phase provide excellent impact strength. It's fit for high-impact turning conditions.
Coated Carbide	HR1135	ISO P、M	Bronze	PVD	AlTiSiN+TiSiN	• Small components turning grade with high wear resistance • The fine-grain cemented carbide matrix with the new nano-gradient composite coating has excellent wear resistance and build-up edge resistance, ensuring the stability of the insert life and the high quality of the machined surface.
	HR7115	ISO M、S	Bronze	PVD	AlTiSiN+TiSiN	• Preferred grade for S-type material • The subgrain carbide matrix combined with a new nano-gradient composite coating and special surface treatment, has excellent wear resistance, oxidation resistance and possessing stability. It's suitable for turning of titanium alloys and super alloys.
	HR7125	ISO M	Ash black	PVD	AlTiN	• Universal grade for continuous and interrupted turning of stainless steel • Unique coating materials combined with new coating technology, the surface is smooth, with low friction coefficient, high nano-hardness, and excellent antioxidant performance.
	HR7225	ISO M	Bronze	PVD	AlTiSiN+TiSiN	• Preferred grade for stainless steel turning • The brand-new nano-gradient composite "H2-Flex" coating, strengthened by non-metal modified components, with uniformly refined sub-micron hard phase and optimized bonding phase, has excellent wear resistance and toughness.
	HR6115	ISO K	Black	CVD	TiN+MT-TiCN+Al_2O_3	• Preferred grade for cast iron turning • The thickened CVD black coating and special post-coating treatment have excellent wear resistance and toughness, suitable for cast iron turning can also be used for roughing of high-strength steel.

Turning grade overview

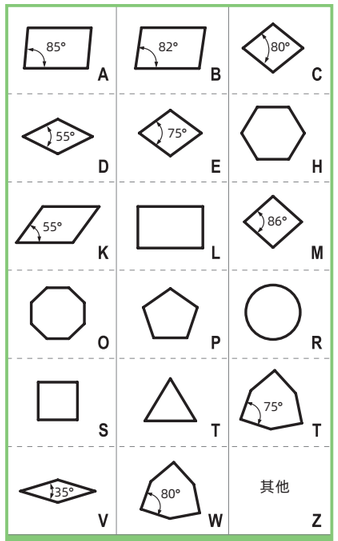
Grade type	Grade	I S O	Color	Coating type	composition	Characteristics
Coated Carbide	HR6215	ISO K	Black & Yellow	CVD	TiN+MT-TiCN+Al_2O_3	• Preferred grade for ductile iron • The 2nd generation CVD coating technology significantly enhances the cohesion between coating layers and prevents peeling. The unique post-coating treatment process effectively improves impact resistance. It's particularly suitable for interrupted turning.
	HR9205	ISO S	Rainbow color	PVD	AlTiN+TiSiN+AlCrN	• High wear resistance grade for S-type material • The well-distributed refined submicron hard phase guarantees high hardness and wear resistance. • The addition of alloy elements achieve solution strengthening and grain boundary strengthening, further enhancing safety. • With a special coating composition design, it exhibits excellent thermal stability and oxidation resistance.
	HR9215	ISO S	Rainbow color	PVD	AlTiN+TiSiN+AlCrN	• General turning grade for S-type material • The well-distributed refined submicron hard phase and optimized bonding phase composition together improve the toughness and safety • The reasonable composite structure of AlCr*N, AlTi*N, and TiSi*N, effectively restrains the extension of longitudinal cracks and improves ability of anti-peeling and anti-chipping of the coating. • Good wear resistance and suitable for general turning of high-temp alloy
	HR5125	ISO P、M	Ash black	PVD	AlTiN	• General grade for threading • The strong toughness alloy matrix paired with high hardness nano-coating, has excellent cohesion and extremely high toughness and edge strength.
	HR5225	ISO P、M	Bronze	PVD	AlTiSiN+TiSiN	• High wear resistance grade for threading • The subgrain matrix combined with the new nano-gradient composite coating, has excellent build-up edge resistance and chipping resistance. It's suitable for threading of general material, e.g. steel and stainless steel.

Grade type	Grade	I S O	Color	Coating type	composition	Characteristics
Cemented carbide	HRK10	ISO N	Silver gray	Uncoated	/	• Preferred grade for aluminum alloy turning • Uncoated cemented carbide material and fine-grained and well-distributed matrix have higher bending resistance and good wear resistance.
	HRK20	ISO N	Silver gray	Uncoated	/	• General grade for aluminum alloy turning • Uncoated cemented carbide material provides excellent wear resistance, better chipping resistance, higher versatility and greater safety.
Cermet	HRC10	ISO P	Silver gray	Uncoated	/	• Good stability, especially suitable for low carbon steel finishing, and the working condition with higher requirements of surface quality. • Newly upgraded cermet grade with hard and compact surface provides good chemical stability and adhesion resistance. It also has great wear resistance, outstanding chipping resistance, consistent performance and excellent surface quality.
Coated Cermet	HR115C	ISO P	Bronze	PVD	AlTiSiN+TiSiN	• Better high-temp resistance and higher cutting speed compared with cermet grade • The coated cermet grade, with a new nano-gradient composite coating, further improves the wear resistance and high-temp resistance. The unique transition layer treatment technology effectively improves the adhesion between the coating and the substrate and reduces the friction coefficient between the insert and workpiece. Insert service life and stability are outstanding

HUAREAL

General turning inserts code key

Shape code



Chipbreaker and clamping form

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

Cutting edge length

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

Insert shape

Insert thickness

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



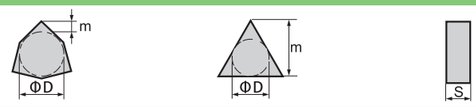
C N M G 12 04 08 - GM (ISO)

4 3 2 (inch)

Major clearance angle

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

Tolerance (mm)



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

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

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

◆ Inscribed circle (ΦD) tolerance

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

Inscribed circle

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

Thickness

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

Corner radius

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

Corner radius code

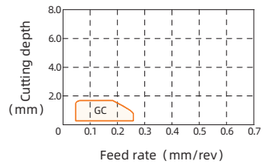
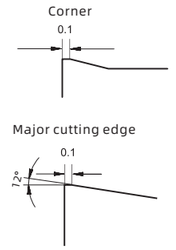
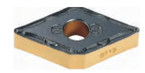
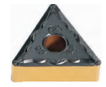
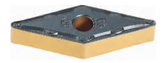
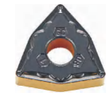
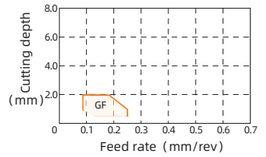
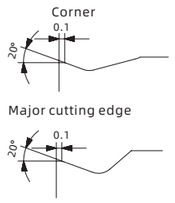
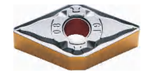
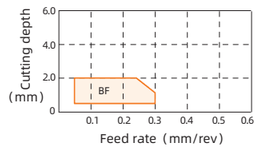
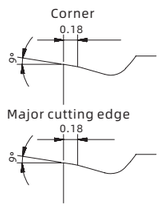
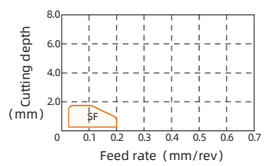
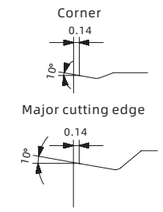
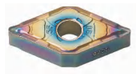
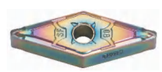
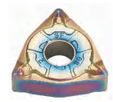
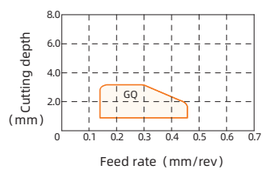
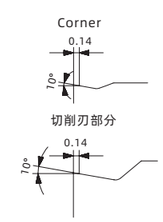
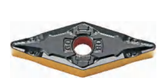
Code	Corner radius (mm)
00	No fillet
02	0.2
04	0.4
08	0.8
12	1.2
16	1.6
20	2.0
24	2.4
32	3.2
X	Others
Insert diameter Mo (Metric)	Round insert

Chipbreaker code

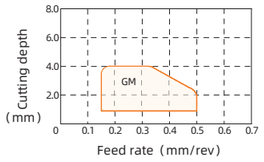
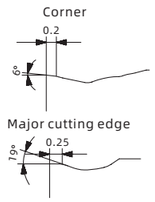
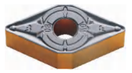
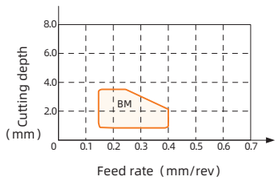
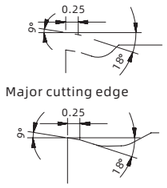
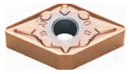
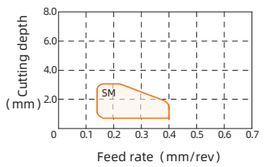
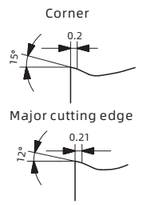
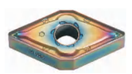
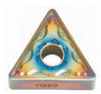
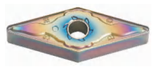
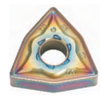
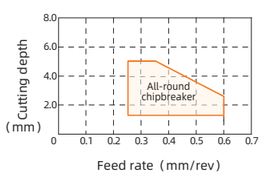
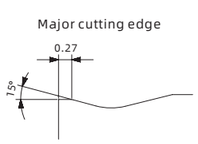
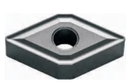
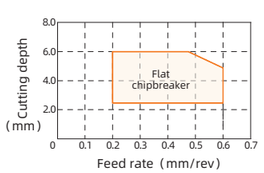
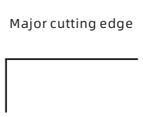
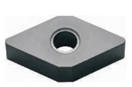
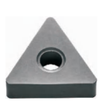
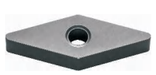
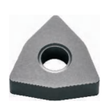
GF	GM	GR
		
BF	BM	BR
		
All-round chipbreaker	Flat chipbreaker	ZR

HUAREAL

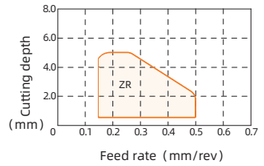
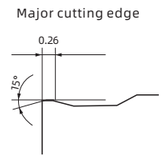
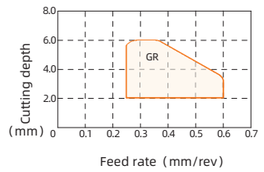
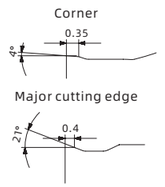
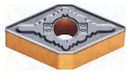
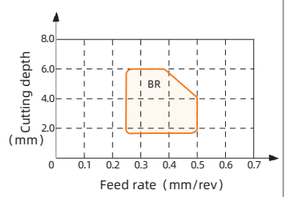
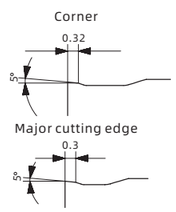
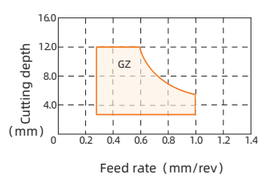
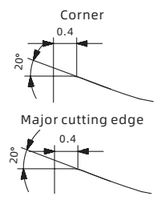
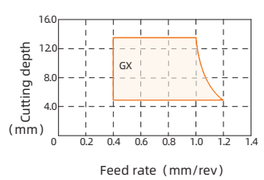
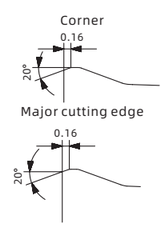
Overview of general turning inserts chipbreaker (Negative)

Usage	Tolerance	Chipbreaker	Features	Chipbreaker diagram	Sectional view of chipbreaker		80° C-type	55° D-type	90° S-type	60° T-type	35° V-type	80° W-type
For finishing	M	GC	**Recommended chipbreaker for finishing of P-type material** ◆ Better chip control performance, great surface quality ◆ Cutting edge with sharpness and strength. ◆ Especially suitable for wall lifting processing.				 A27	 A32		 A40	 A43	 A45
		GF	**First recommendation for finishing of P-type material** ◆ Extra-large positive rake angle, less cutting resistance ◆ Positive cutting inclination angle can well control chip flow direction. ◆ The two-stage chip breaking table ensures good chip breaking even at small cutting depth				 A27	 A32	 A35	 A40	 A43	 A45
		BF	**First recommendation for finishing of M-type material** ◆ Sharp cutting edge, less cutting resistance ◆ Good chip disposal performance even at small cutting depth.				 A27	 A32	 A35	 A40	 A43	 A45
		SF	**First recommendation for S-type finishing** ◆ The unique corner design ensures a sharp edge and low cutting resistance, effectively reducing tool vibration during turning process ◆ With a smooth surface and good chip evacuation, it ensures good curling, breaking, and discharge of chips				 A27	 A32	 A35	 A40	 A43	 A45
For semi-finishing	M	GQ	**Semi-finishing of P-type material** ◆ It is suitable for finishing to semi-finishing of P-type material ◆ Good chip removal performance with high versatility				 A27	 A32	 A35	 A40	 A43	 A45

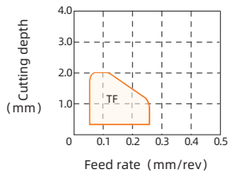
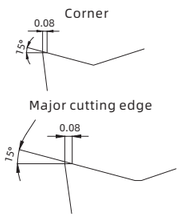
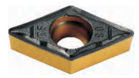
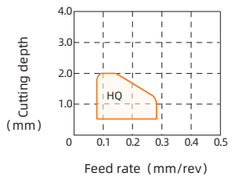
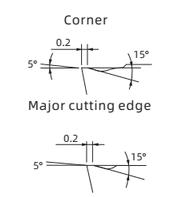
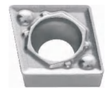
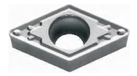
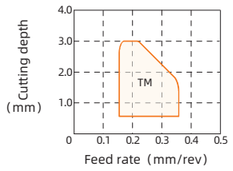
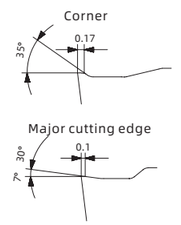
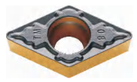
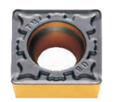
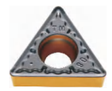
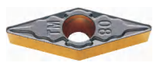
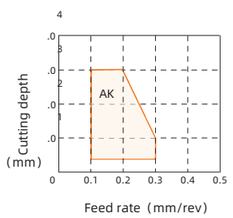
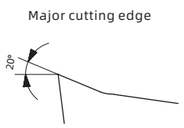
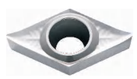
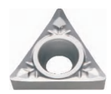
Overview of general turning inserts chipbreaker (Negative)

Usage	Tolerance	Chipbreaker	Features	Chipbreaker diagram	Sectional view of chipbreaker		80° C-type	55° D-type	90° S-type	60° T-type	35° V-type	80° W-type
For semi-finishing	M	**GM**	**First recommendation for P-type semi-finishing** ◆ Special edge design, ensuring both sharpness and strength ◆ The curved front face with variable cutting edge width and rake angle ensures the smooth flow and good control of chips ◆ With high versatility and wide cutting range, efficient and				 A28	 A33	 A36	 A41	 A44	 A46
		BM	**First recommendation for semi-finishing of stainless steel** ◆ Sharp cutting edge, less cutting resistance, good chip disposal performance even at small cutting depth ◆ The micro-passivated cutting edge reduces the formation of build-up edgeconsistent machining is achieved				 A28	 A33	 A36	 A41	 A44	 A46
		SM	**Semi-finishing chipbreaker for S-type material** ◆ Light and fast in cutting, the influence of hardening and build-up edge on insert is effectively reduced.				 A28	 A33	 A36	 A41	 A44	 A46
		All-round chipbreaker	**All-round chipbreaker** ◆ General machining chipbreaker for K-type material ◆ Double-sided chipbreaker, especially suitable for K-type material machining				 A29	 A34	 A37	 A41	 A44	 A47
		Flat chipbreaker	**Flat chipbreaker** ◆ Chipbreaker for K-type material ◆ With high structural strength and good fit to the cutter bar, it is more suitable for unstable cutting of cast iron				 A29	 A34	 A37	 A42	 A44	 A47

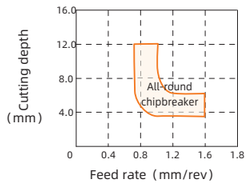
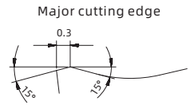
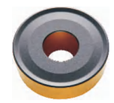
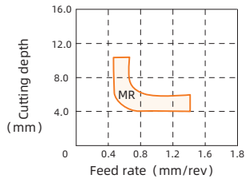
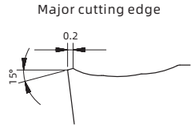
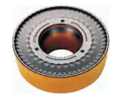
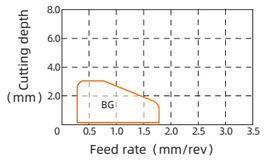
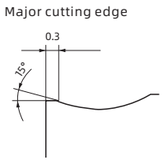
Overview of general turning inserts chipbreaker (Negative)

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

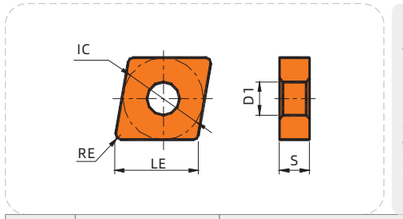
Overview of general turning inserts chipbreaker (Positive)

Usage	Tolerance	Chipbreaker	Features	Chipbreaker diagram	Sectional view of chipbreaker		80° C-type	55° D-type	90° S-type	60° T-type	35° V-type	80° W-type
For finishing	M	TF	**Eneral chipbreaker for finshing** ◆ Inclined cutting edge design ensures low cutting force, effectively reduce vibration, and ensure the surface quality ◆ Strong versatility and wide processing range. Inclination and chip control convex plate design can achieve excellent chip control performance.				 A49	 A50	 A51	 A52	 A53、A54	
For semi-finishing	M	HQ	**Finishing to semi-finishing chipbreaker** ◆ Universal for cermet ◆ The design of three-dimensional rake angles and double convex points aims to achieve excellent cutting performance				 A49	 A50		 A52	 A53	
		TM	**General chipbreaker for semi-finshing** ◆ It's suitable for internal or external semi-finishing of steel, stainless steel and cast iron				 A49	 A50	 A51	 A52	 A53、A54	
For aluminum alloy machining	G	AK	**Aluminum alloy machining chipbreaker** ◆ With a large rake angle and clearance angle, the cutting edge of the insert becomes sharper and therefore, cutting can be done in a faster and lighter way with effective chip breaking.				 A49	 A50		 A52	 A53、A54	

Overview of general turning inserts chipbreaker (Special type)

Usage	Tolerance	Chipbreaker	Features	Chipbreaker diagram	Sectional view of chipbreaker		R-type
For profile turning	M	All-round chipbreaker	**Profile turning chipbreaker** ◆ With high strength, the cutting edge secures high safety and is the first choice for rough profiling. ◆ It is suitable for train wheel turning.				 A55
		MR	**Profile turning chipbreaker** ◆ Large chip-breaking space prevents chip blockage during large cutting depth machining. ◆ The small pit group improves the chip machining performance during small cutting depth machining. It is suitable for train wheel turning.				 A55
For planer machining	G	BG	**Planer machining chipbreaker** ◆ The sharp positive rake design effectively enhances cutting efficiency, ◆ The precise structure of the wiper ensures the quality of surface ◆ Suitable for peeling processing of hard steel and stainless steel materials				 A48

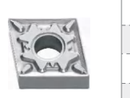
80° CN□□



Working condition: ● Stable ◕ Average ⌗ Tough

Workpiece material

P	Steel
M	Stainless steel
K	Cast iron
N	Non-ferrous metal
S	Heat resistant super alloys Titanium alloy

Operation type	Insert shape	Type	Dimension (mm)					CVD							PVD						Cemented carbide		Cermet	
			LE	IC	S	D1	RE	HR8105	HR8115	HR8125	HR8225	HR8135	HR6115	HR6215	HR7115	HR7125	HR7225	HR9205	HR9215	HRK10	HRK20	HRC10	HR115C
Finishing		CNMG120404-GC	12.9	12.7	4.76	5.16	0.4	★	☆	☆	★													
		CNMG120408-GC	12.9	12.7	4.76	5.16	0.8	★	☆	☆	★													
Finishing		CNMG120404-GF	12.9	12.7	4.76	5.16	0.4	★	☆	☆	★													
		CNMG120408-GF	12.9	12.7	4.76	5.16	0.8	★	☆	☆	★													
Finishing		CNMG120404-BF	12.9	12.7	4.76	5.16	0.4									☆	★							
		CNMG120408-BF	12.9	12.7	4.76	5.16	0.8									☆	★							
Finishing		CNMG120404-SF	12.9	12.7	4.76	5.16	0.4								☆			★	★					
		CNMG120408-SF	12.9	12.7	4.76	5.16	0.8								☆			★	★					
		CNMG120412-SF	12.9	12.7	4.76	5.16	1.2								☆			★	★					
Finishing to semi-finishing		CNMG120408-GQ	12.9	12.7	4.76	5.16	0.8	☆	★	☆	★													
		CNMG120412-GQ	12.9	12.7	4.76	5.16	1.2	☆	★	☆	★													
Finishing to semi-finishing		CNMG120404HQ	12.9	12.7	4.76	5.16	0.4																★	★
		CNMG120408HQ	12.9	12.7	4.76	5.16	0.8																★	★

★ Recommended grade ☆ Available grade

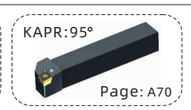
Applicable tools



DCLNR/L



PCBNR/L



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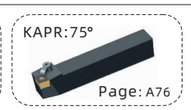
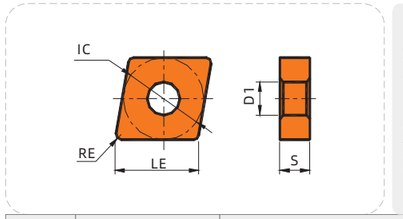


MCBNR/L



MCLNR/L

80° CN□□



Working condition: ● Stable ◕ Average ⌗ Tough

Workpiece material

P	Steel
M	Stainless steel
K	Cast iron
N	Non-ferrous metal
S	Heat resistant super alloys Titanium alloy

Operation type	Insert shape	Type	Dimension (mm)					CVD							PVD						Cemented carbide		Cermet	
			LE	IC	S	D1	RE	HR8105	HR8115	HR8125	HR8225	HR8135	HR6115	HR6215	HR7115	HR7125	HR7225	HR9205	HR9215	HRK10	HRK20	HRC10	HR115C
Semi-finishing		CNMG120404-GM	12.9	12.7	4.76	5.16	0.4	☆	★	☆	★													
		CNMG120408-GM	12.9	12.7	4.76	5.16	0.8	☆	★	☆	★													
		CNMG120412-GM	12.9	12.7	4.76	5.16	1.2	☆	★	☆	★													
		CNMG160608-GM	16.1	15.875	6.35	6.35	0.8	☆	★	☆	★													
		CNMG160612-GM	16.1	15.875	6.35	6.35	1.2	☆	★	☆	★													
		CNMG160616-GM	16.1	15.875	6.35	6.35	1.6	☆	★	☆	★													
		CNMG190608-GM	19.3	19.05	6.35	7.94	0.8	☆	★	☆	★													
		CNMG190612-GM	19.3	19.05	6.35	7.94	1.2	☆	★	☆	★													
		CNMG190616-GM	19.3	19.05	6.35	7.94	1.6	☆	★	☆	★													
Semi-finishing		CNMG120404-BM	12.9	12.7	4.76	5.16	0.4									☆	★							
		CNMG120408-BM	12.9	12.7	4.76	5.16	0.8									☆	★							
		CNMG120412-BM	12.9	12.7	4.76	5.16	1.2									☆	★							
Semi-finishing		CNMG120404-SM	12.9	12.7	4.76	5.16	0.4								☆			★	★					
		CNMG120408-SM	12.9	12.7	4.76	5.16	0.8								☆			★	★					
		CNMG120412-SM	12.9	12.7	4.76	5.16	1.2								☆			★	★					

★ Recommended grade ☆ Available grade

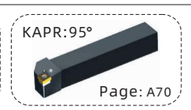
Applicable tools



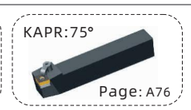
DCLNR/L



PCBNR/L



PCLNR/L



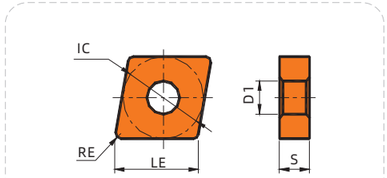
MCBNR/L



MCLNR/L

HUAREAL

80° CN□□



Working condition: ● Stable ◕ Average ⌗ Tough

Workpiece material

P	Steel
M	Stainless steel
K	Cast iron
N	Non-ferrous metal
S	Heat resistant super alloys Titanium alloy

Operation type	Insert shape	Type	Dimension (mm)					CVD						PVD				Cemented carbide		Cermet	
			LE	IC	S	D1	RE	HR8105	HR8115	HR8125	HR8225	HR8135	HR6115	HR7115	HR7125	HR7225	HR9205	HR9215	HRK10	HRK20	HRC10	HR115C
Cast iron machining		CNMG120404	12.9	12.7	4.76	5.16	0.4						★									
		CNMG120408	12.9	12.7	4.76	5.16	0.8						★									
		CNMG120412	12.9	12.7	4.76	5.16	1.2						★									
		CNMG120416	12.9	12.7	4.76	5.16	1.6						★									
		CNMG160608	16.1	15.875	6.35	6.35	0.8						★									
		CNMG160612	16.1	15.875	6.35	6.35	1.2						★									
		CNMG160616	16.1	15.875	6.35	6.35	1.6						★									
		CNMG190612	19.3	19.05	6.35	7.94	1.2						★									
		CNMG190616	19.3	19.05	6.35	7.94	1.6						★									
Cast iron machining		CNMA120404	12.9	12.7	4.76	5.16	0.4						★									
		CNMA120408	12.9	12.7	4.76	5.16	0.8						★									
		CNMA120412	12.9	12.7	4.76	5.16	1.2						★									
		CNMA120416	12.9	12.7	4.76	5.16	1.6						★									
		CNMA160608	16.1	15.875	6.35	6.35	0.8						★									
		CNMA160612	16.1	15.875	6.35	6.35	1.2						★									
		CNMA160616	16.1	15.875	6.35	6.35	1.6						★									
		CNMA190612	19.3	19.05	6.35	7.94	1.2						★									
		CNMA190616	19.3	19.05	6.35	7.94	1.6						★									
Cast iron machining		CNMG120404-ZR	12.9	12.7	4.76	5.16	0.4						★									
		CNMG120408-ZR	12.9	12.7	4.76	5.16	0.8						★									
		CNMG120412-ZR	12.9	12.7	4.76	5.16	1.2						★									

★ Recommended grade ☆ Available grade

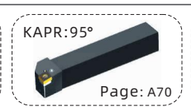
Applicable tools



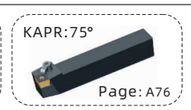
DCLNR/L



PCBNR/L



PCLNR/L

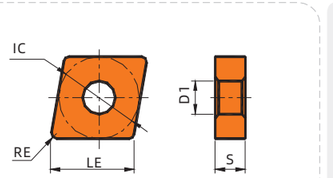


MCBNR/L



MCLNR/L

80° CN□□



Working condition: ● Stable ◕ Average ⌗ Tough

Workpiece material

P	Steel
M	Stainless steel
K	Cast iron
N	Non-ferrous metal
S	Heat resistant super alloys Titanium alloy

Operation type	Insert shape	Type	Dimension (mm)					CVD						PVD				Cemented carbide		Cermet	
			LE	IC	S	D1	RE	HR8105	HR8115	HR8125	HR8225	HR8135	HR6115	HR7115	HR7125	HR7225	HR9205	HR9215	HRK10	HRK20	HRC10	HR115C
Roughing		CNMG120408-GR	12.9	12.7	4.76	5.16	0.8	☆	★	☆	★											
		CNMG120412-GR	12.9	12.7	4.76	5.16	1.2	☆	★	☆	★											
		CNMG160608-GR	16.1	15.875	6.35	6.35	0.8	☆	★	☆	★											
		CNMG160612-GR	16.1	15.875	6.35	6.35	1.2	☆	★	☆	★											
		CNMG160616-GR	16.1	15.875	6.35	6.35	1.6	☆	★	☆	★											
		CNMG190608-GR	19.3	19.05	6.35	7.94	0.8	☆	★	☆	★											
		CNMG190612-GR	19.3	19.05	6.35	7.94	1.2	☆	★	☆	★											
		CNMG190616-GR	19.3	19.05	6.35	7.94	1.6	☆	★	☆	★											
Roughing		CNMG120408-BR	16.1	12.7	4.76	5.16	0.8							☆	★							
		CNMG120412-BR	12.9	12.7	4.76	5.16	1.2							☆	★							
		CNMG160608-BR	12.9	15.875	6.35	6.35	0.8							☆	★							
		CNMG160612-BR	16.1	15.875	6.35	6.35	1.2							☆	★							
		CNMG160616-BR	16.1	15.875	6.35	6.35	1.6							☆	★							
		CNMG190612-BR	16.1	19.05	6.35	7.94	1.2							☆	★							
		CNMG190616-BR	19.3	19.05	6.35	7.94	1.6							☆	★							
Heavy machining		CNMM160616-GZ	19.3	15.875	6.35	6.35	1.6	★	☆	★	☆											
		CNMM190608-GZ	19.3	19.05	6.35	7.94	0.8	★	☆	★	☆											
		CNMM190612-GZ	19.3	19.05	6.35	7.94	1.2	★	☆	★	☆											
		CNMM190616-GZ	19.3	19.05	6.35	7.94	1.6	★	☆	★	☆											
		CNMM190624-GZ	19.3	19.05	6.35	7.94	2.4	★	☆	★	☆											
		CNMM250924-GZ	25.792	25.4	9.525	9.12	2.4	★	☆	★	☆											
		CNMM250932-GZ	25.792	25.4	9.525	9.12	3.2	★	☆	★	☆											

★ Recommended grade ☆ Available grade

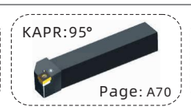
Applicable tools



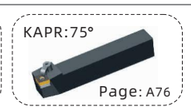
DCLNR/L



PCBNR/L



PCLNR/L

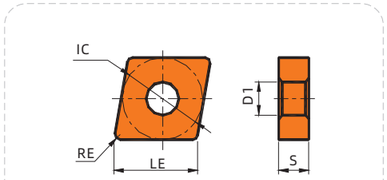


MCBNR/L



MCLNR/L

80° CN□□



Working condition: ● Stable ◕ Average ⌗ Tough

Workpiece material

P	Steel
M	Stainless steel
K	Cast iron
N	Non-ferrous metal
S	Heat resistant super alloys Titanium alloy

Operation type	Insert shape	Type	Dimension (mm)					CVD						PVD				Cemented carbide		Cermet	
			LE	IC	S	D1	RE	HR8105	HR8115	HR8125	HR8225	HR8135	HR6115	HR6215	HR7115	HR7125	HR7225	HR9205	HR9215	HRK10	HRK20	HRC10	HR115C
Heavy machining		CNMM190608-GX	19.3	19.05	6.35	7.94	0.8	★	☆	★	☆												
		CNMM190612-GX	19.3	19.05	6.35	7.94	1.2	★	☆	★	☆												
		CNMM190616-GX	19.3	19.05	6.35	7.94	1.6	★	☆	★	☆												
		CNMM190624-GX	19.3	19.05	6.35	7.94	2.4	★	☆	★	☆												
		CNMM250716-GX	25.792	25.4	7.94	9.12	1.6	★	☆	★	☆												
		CNMM250724-GX	25.792	25.4	7.94	9.12	2.4	★	☆	★	☆												
		CNMM250732-GX	25.792	25.4	7.94	9.12	3.2	★	☆	★	☆												
		CNMM250916-GX	25.792	25.4	9.525	9.12	1.6	★	☆	★	☆												
		CNMM250924-GX	25.792	25.4	9.525	9.12	2.4	★	☆	★	☆												
		CNMM250932-GX	25.792	25.4	9.525	9.12	3.2	★	☆	★	☆												

★ Recommended grade ☆ Available grade

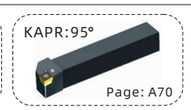
Applicable tools



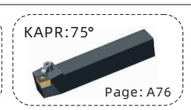
DCLNR/L



PCBNR/L



PCLNR/L

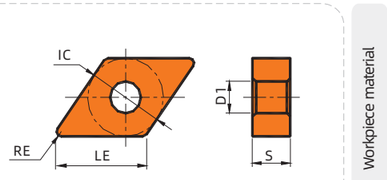


MCBNR/L



MCLNR/L

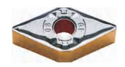
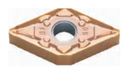
55°DN□□



Working condition: ● Stable ◕ Average ⌗ Tough

Workpiece material

P	Steel
M	Stainless steel
K	Cast iron
N	Non-ferrous metal
S	Heat resistant super alloys Titanium alloy

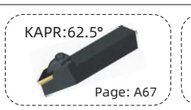
Operation type	Insert shape	Type	Dimension (mm)					CVD						PVD				Cemented carbide		Cermet	
			LE	IC	S	D1	RE	HR8105	HR8115	HR8125	HR8225	HR8135	HR6115	HR6215	HR7115	HR7125	HR7225	HR9205	HR9215	HRK10	HRK20	HRC10	HR115C
Finishing		DNMG150404-GC	15.5	12.7	4.76	5.16	0.4	★	☆	★	★												
		DNMG150408-GC	15.5	12.7	4.76	5.16	0.8	★	☆	★	★												
		DNMG150604-GC	15.5	12.7	4.76	5.16	0.4	★	☆	★	★												
		DNMG150608-GC	15.5	12.7	4.76	5.16	0.8	★	☆	★	★												
Finishing		DNMG150404-GF	15.5	12.7	4.76	5.16	0.4	★	☆	★	★												
		DNMG150408-GF	15.5	12.7	4.76	5.16	0.8	★	☆	★	★												
		DNMG150604-GF	15.5	12.7	6.35	5.16	0.4	★	☆	★	★												
		DNMG150608-GF	15.5	12.7	6.35	5.16	0.8	★	☆	★	★												
Finishing		DNMG150404-BF	15.5	12.7	4.76	5.16	0.4									☆	★						
		DNMG150408-BF	15.5	12.7	4.76	5.16	0.8									☆	★						
		DNMG150604-BF	15.5	12.7	6.35	5.16	0.4									☆	★						
		DNMG150608-BF	15.5	12.7	6.35	5.16	0.8									☆	★						
Finishing		DNMG150404-SF	15.5	12.7	4.76	5.16	0.4								☆		★	★					
		DNMG150408-SF	15.5	12.7	4.76	5.16	0.8								☆		★	★					
		DNMG150604-SF	15.5	12.7	6.35	5.16	0.4								☆		★	★					
		DNMG150608-SF	15.5	12.7	6.35	5.16	0.8								☆		★	★					
Semi-finishing		DNMG150408-GQ	15.5	12.7	4.76	5.16	0.8	☆	★	☆	★												
		DNMG150412-GQ	15.5	12.7	4.76	5.16	1.2	☆	★	☆	★												
		DNMG150608-GQ	15.5	12.7	6.35	5.16	0.8	☆	★	☆	★												
		DNMG150612-GQ	15.5	12.7	6.35	5.16	1.2	☆	★	☆	★												
Semi-finishing		DNMG150404HQ	15.5	12.7	4.76	5.16	0.4															★	★
		DNMG150408HQ	15.5	12.7	4.76	5.16	0.8															★	★

★ Recommended grade ☆ Available grade

Applicable tools



DDJNR/L



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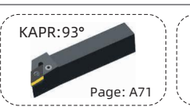
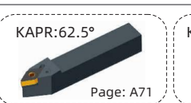
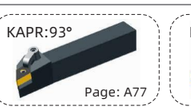


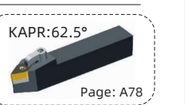
PDJNR/L



PDPNN

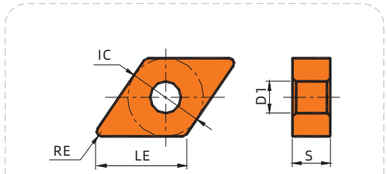


MDJNR/L



MDPNN

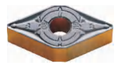
55°DN□□



Working condition: ● Stable ◔ Average ⌗ Tough

Workpiece material

P	Steel
M	Stainless steel
K	Cast iron
N	Non-ferrous metal
S	Heat resistant super alloys Titanium alloy

Operation type	Insert shape	Type	Dimension (mm)					CVD						PVD				Cemented carbide		Cermet	
			LE	IC	S	D1	RE	HR8105	HR8115	HR8125	HR8225	HR8135	HR6115	HR6215	HR7115	HR7125	HR7225	HR9205	HR9215	HRK10	HRK20	HRC10	HR115C
Semi-finishing		DNMG110412-GM	11.6	9.525	4.76	3.81	1.2	☆	★	☆	★												
		DNMG150404-GM	15.5	12.7	4.76	5.16	0.4	☆	★	☆	★												
		DNMG150408-GM	15.5	12.7	4.76	5.16	0.8	☆	★	☆	★												
		DNMG150412-GM	15.5	12.7	4.76	5.16	1.2	☆	★	☆	★												
		DNMG150604-GM	15.5	12.7	6.35	5.16	0.4	☆	★	☆	★												
		DNMG150608-GM	15.5	12.7	6.35	5.16	0.8	☆	★	☆	★												
		DNMG150612-GM	15.5	12.7	6.35	5.16	1.2	☆	★	☆	★												
Semi-finishing		DNMG150404-BM	15.5	12.7	4.76	5.16	0.4								☆	★							
		DNMG150408-BM	15.5	12.7	4.76	5.16	0.8								☆	★							
		DNMG150412-BM	15.5	12.7	4.76	5.16	1.2								☆	★							
		DNMG150604-BM	15.5	12.7	6.35	5.16	0.4								☆	★							
		DNMG150608-BM	15.5	12.7	6.35	5.16	0.8								☆	★							
		DNMG150612-BM	15.5	12.7	6.35	5.16	1.2								☆	★							
Semi-finishing		DNMG150404-SM	15.5	12.7	4.76	5.16	0.4								☆			★	★				
		DNMG150408-SM	15.5	12.7	4.76	5.16	0.8								☆			★	★				
		DNMG150412-SM	15.5	12.7	4.76	5.16	1.2								☆			★	★				
		DNMG150604-SM	15.5	12.7	6.35	5.16	0.4								☆			★	★				
		DNMG150608-SM	15.5	12.7	6.35	5.16	0.8								☆			★	★				
		DNMG150612-SM	15.5	12.7	6.35	5.16	1.2								☆			★	★				

★ Recommended grade ☆ Available grade

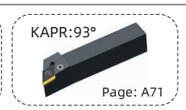
Applicable tools



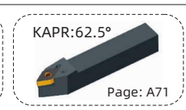
DDJNR/L



DDNNN



PDJNR/L



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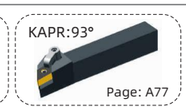
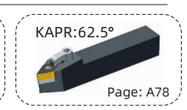
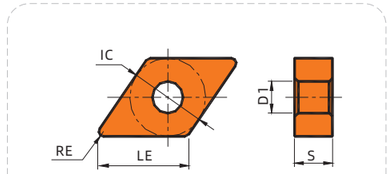


MDJNR/L



MDPNN

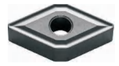
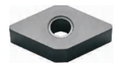
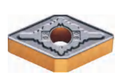
55°DN□□



Working condition: ● Stable ◔ Average ⌗ Tough

Workpiece material

P	Steel
M	Stainless steel
K	Cast iron
N	Non-ferrous metal
S	Heat resistant super alloys Titanium alloy

Operation type	Insert shape	Type	Dimension (mm)					CVD						PVD				Cemented carbide		Cermet	
			LE	IC	S	D1	RE	HR8105	HR8115	HR8125	HR8225	HR8135	HR6115	HR6215	HR7115	HR7125	HR7225	HR9205	HR9215	HRK10	HRK20	HRC10	HR115C
Cast iron machining		DNMG150404	15.5	12.7	4.76	5.16	0.4						★										
		DNMG150408	15.5	12.7	4.76	5.16	0.8						★										
		DNMG150412	15.5	12.7	4.76	5.16	1.2						★										
		DNMG150604	15.5	12.7	6.35	5.16	0.4						★										
		DNMG150608	15.5	12.7	6.35	5.16	0.8						★										
		DNMG150612	15.5	12.7	6.35	5.16	1.2						★										
Cast iron machining		DNMA150404	15.5	12.7	4.76	5.16	0.4						★										
		DNMA150408	15.5	12.7	4.76	5.16	0.8						★										
		DNMA150412	15.5	12.7	4.76	5.16	1.2						★										
		DNMA150604	15.5	12.7	6.35	5.16	0.4						★										
		DNMA150608	15.5	12.7	6.35	5.16	0.8						★										
		DNMA150612	15.5	12.7	6.35	5.16	1.2						★										
Cast iron machining		DNMG150404-ZR	15.5	12.7	4.76	5.16	0.4							★									
		DNMG150408-ZR	15.5	12.7	4.76	5.16	0.8							★									
		DNMG150412-ZR	15.5	12.7	4.76	5.16	1.2							★									
		DNMG150604-ZR	15.5	12.7	6.35	5.16	0.4							★									
		DNMG150608-ZR	15.5	12.7	6.35	5.16	0.8							★									
		DNMG150612-ZR	15.5	12.7	6.35	5.16	1.2							★									
Roughing																							
		DNMG150608-GR	15.5	12.7	6.35	5.16	0.8	☆	★	☆	★												
		DNMG150612-GR	15.5	12.7	6.35	5.16	1.2	☆	★	☆	★												

★ Recommended grade ☆ Available grade

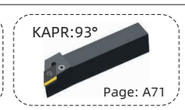
Applicable tools



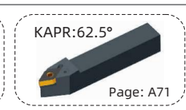
DDJNR/L



DDNNN



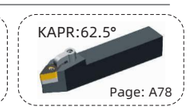
PDJNR/L



PDPNN

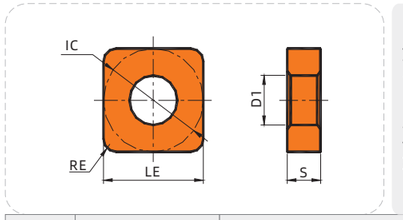


MDJNR/L



MDPNN

90°SN□□



Working condition: ● Stable ◔ Average ⌗ Tough

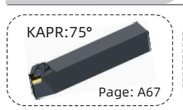
Workpiece material

P	Steel
M	Stainless steel
K	Cast iron
N	Non-ferrous metal
S	Heat resistant super alloys Titanium alloy

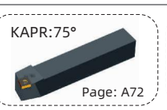
Operation type	Insert shape	Type	Dimension (mm)					CVD							PVD					Cemented carbide		Cermet	
			LE	IC	S	D1	RE	HR8105	HR8115	HR8125	HR8225	HR8135	HR6115	HR6215	HR7115	HR7125	HR7225	HR9205	HR9215	HRK10	HRK20	HRC10	HR115C
Finishing		SNMG120404-GF	12.7	12.7	4.76	5.16	0.4	★	☆	☆	★												
		SNMG120408-GF	12.7	12.7	4.76	5.16	0.8	★	☆	☆	★												
Finishing		SNMG120404-BF	12.7	12.7	4.76	5.16	0.4									☆	★						
		SNMG120408-BF	12.7	12.7	4.76	5.16	0.8									☆	★						
Finishing		SNMG120404-SF	12.7	12.7	4.76	5.16	0.4								☆			★	★				
		SNMG120408-SF	12.7	12.7	4.76	5.16	0.8								☆			★	★				
		SNMG120412-SF	12.7	12.7	4.76	5.16	1.2								☆			★	★				
Semi-finishing		SNMG120412-GQ	12.7	12.7	4.76	5.16	1.2	☆	★	☆	★												
Semi-finishing		SNMG120404HQ	12.7	12.7	4.76	5.16	0.4															★	★

★ Recommended grade ☆ Available grade

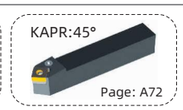
Applicable tools



DSBNR/L



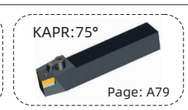
PSBNR/L



PSDNN



PSKNR/L

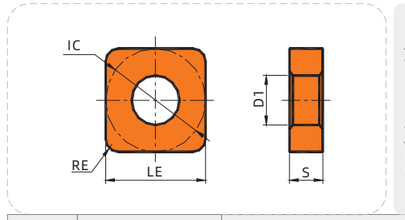


MSBNR/L



MSKNR/L

90°SN□□



Working condition: ● Stable ◔ Average ⌗ Tough

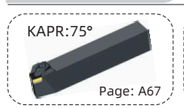
Workpiece material

P	Steel
M	Stainless steel
K	Cast iron
N	Non-ferrous metal
S	Heat resistant super alloys Titanium alloy

Operation type	Insert shape	Type	Dimension (mm)					CVD							PVD					Cemented carbide		Cermet	
			LE	IC	S	D1	RE	HR8105	HR8115	HR8125	HR8225	HR8135	HR6115	HR6215	HR7115	HR7125	HR7225	HR9205	HR9215	HRK10	HRK20	HRC10	HR115C
Semi-finishing		SNMG120404-GM	12.7	12.7	4.76	5.16	0.4	☆	★	☆	★												
		SNMG120408-GM	12.7	12.7	4.76	5.16	0.8	☆	★	☆	★												
		SNMG120412-GM	12.7	12.7	4.76	5.16	1.2	☆	★	☆	★												
		SNMG190612-GM	19.05	19.05	6.35	7.94	1.2	☆	★	☆	★												
		SNMG190616-GM	19.05	19.05	6.35	7.94	1.6	☆	★	☆	★												
Semi-finishing		SNMG120404-BM	12.7	12.7	4.76	5.16	0.4									☆	★						
		SNMG120408-BM	12.7	12.7	4.76	5.16	0.8									☆	★						
		SNMG120412-BM	12.7	12.7	4.76	5.16	1.2									☆	★						
Semi-finishing		SNMG120404-SM	12.7	12.7	4.76	5.16	0.4								☆			★	★				
		SNMG120408-SM	12.7	12.7	4.76	5.16	0.8								☆			★	★				
		SNMG120412-SM	12.7	12.7	4.76	5.16	1.2								☆			★	★				

★ Recommended grade ☆ Available grade

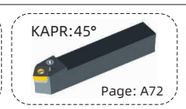
Applicable tools



DSBNR/L



PSBNR/L



PSDNN



PSKNR/L

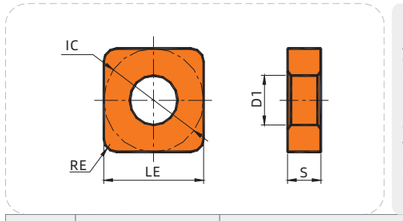


MSBNR/L



MSKNR/L

90°SN□□



Working condition: ● Stable ◕ Average ⌗ Tough

Workpiece material

P	Steel
M	Stainless steel
K	Cast iron
N	Non-ferrous metal
S	Heat resistant super alloys Titanium alloy

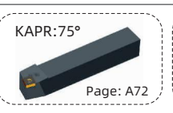
Operation type	Insert shape	Type	Dimension (mm)					CVD						PVD				Cemented carbide		Cermet	
			LE	IC	S	D1	RE	HR8105	HR8115	HR8125	HR8225	HR8135	HR6115	HR6215	HR7115	HR7125	HR7225	HR9205	HR9215	HRK10	HRK20	HRC10	HR115C
Cast iron machining		SNMG120404	12.7	12.7	4.76	5.16	0.4						★										
		SNMG120408	12.7	12.7	4.76	5.16	0.8						★										
		SNMG120412	12.7	12.7	4.76	5.16	1.2						★										
		SNMG150608	15.875	15.875	6.35	6.35	0.8						★										
		SNMG150612	15.875	15.875	6.35	6.35	1.2						★										
		SNMG150616	15.875	15.875	6.35	6.35	1.6						★										
		SNMG190612	19.05	19.05	6.35	7.94	1.2						★										
		SNMG190616	19.05	19.05	6.35	7.94	1.6						★										
Cast iron machining		SNMA120404	12.7	12.7	4.76	5.16	0.4						★										
		SNMA120408	12.7	12.7	4.76	5.16	0.8						★										
		SNMA120412	12.7	12.7	4.76	5.16	1.2						★										
		SNMA150608	15.875	15.875	6.35	6.35	0.8						★										
		SNMA150612	15.875	15.875	6.35	6.35	1.2						★										
		SNMA150616	15.875	15.875	6.35	6.35	1.6						★										
		SNMA190612	19.05	19.05	6.35	7.94	1.2						★										
		SNMA190616	19.05	19.05	6.35	7.94	1.6						★										
Cast iron machining		SNMG120404-ZR	12.7	12.7	4.76	5.16	0.4							★									
		SNMG120408-ZR	12.7	12.7	4.76	5.16	0.8							★									
		SNMG120412-ZR	12.7	12.7	4.76	5.16	1.2							★									

★ Recommended grade ☆ Available grade

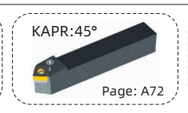
Applicable tools



DSBNR/L



PSBNR/L



PSDNN



PSKNR/L

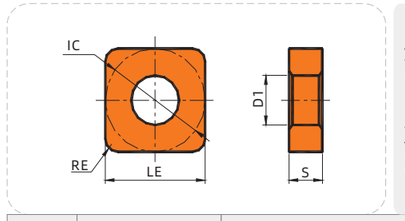


MSBNR/L



MSKNR/L

90°SN□□



Working condition: ● Stable ◕ Average ⌗ Tough

Workpiece material

P	Steel
M	Stainless steel
K	Cast iron
N	Non-ferrous metal
S	Heat resistant super alloys Titanium alloy

Operation type	Insert shape	Type	Dimension (mm)					CVD							PVD					Cemented carbide		Cermet	
			LE	IC	S	D1	RE	HR8105	HR8115	HR8125	HR8225	HR8135	HR6115	HR6215	HR7115	HR7125	HR7225	HR9205	HR9215	HRK10	HRK20	HRC10	HR115C
Roughing		SNMG120408-GR	12.7	12.7	4.76	5.16	0.8	☆	★	☆	★												
		SNMG120412-GR	12.7	12.7	4.76	5.16	1.2	☆	★	☆	★												
		SNMG150608-GR	15.875	15.875	6.35	6.35	0.8	☆	★	☆	★												
		SNMG150612-GR	15.875	15.875	6.35	6.35	1.2	☆	★	☆	★												
		SNMG150616-GR	15.875	15.875	6.35	6.35	1.6	☆	★	☆	★												
		SNMG190608-GR	19.05	19.05	6.35	7.94	0.8	☆	★	☆	★												
		SNMG190612-GR	19.05	19.05	6.35	7.94	1.2	☆	★	☆	★												
		SNMG190616-GR	19.05	19.05	6.35	7.94	1.6	☆	★	☆	★												
Roughing		SNMG120408-BR	12.7	12.7	4.76	5.16	0.8								☆	★							
		SNMG120412-BR	12.7	12.7	4.76	5.16	1.2								☆	★							
		SNMG150612-BR	15.875	15.875	6.35	6.35	1.2								☆	★							
		SNMG190616-BR	19.05	19.05	6.35	7.94	1.6								☆	★							
Heavy machining		SNMM150612-GZ	15.875	15.875	6.35	6.35	1.2	★	☆	★	☆												
		SNMM190608-GZ	19.05	19.05	6.35	7.94	0.8	★	☆	★	☆												
		SNMM190612-GZ	19.05	19.05	6.35	7.94	1.2	★	☆	★	☆												
		SNMM190616-GZ	19.05	19.05	6.35	7.94	1.6	★	☆	★	☆												
		SNMM190624-GZ	19.05	19.05	6.35	7.94	2.4	★	☆	★	☆												
		SNMM250924-GZ	25.4	25.4	9.525	9.12	2.4	★	☆	★	☆												
		SNMM250932-GZ	25.4	25.4	9.525	9.12	3.2	★	☆	★	☆												

★ Recommended grade ☆ Available grade

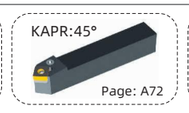
Applicable tools



DSBNR/L



PSBNR/L



PSDNN



PSKNR/L

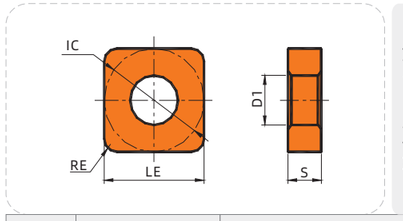


MSBNR/L



MSKNR/L

90°SN□□

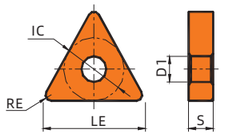


Working condition: ● Stable ◕ Average ⌗ Tough

Workpiece material

| | | |

60°TN□□



Working condition: ● Stable ◔ Average ⌗ Tough

Workpiece material

P	Steel
M	Stainless steel
K	Cast iron
N	Non-ferrous metal
S	Heat resistant super alloys Titanium alloy

Operation type	Insert shape	Type	Dimension (mm)					CVD						PVD				Cemented carbide		Cermet	
			LE	IC	S	D1	RE	HR8105	HR8115	HR8125	HR8225	HR8135	HR6115	HR6215	HR7115	HR7125	HR7225	HR9205	HR9215	HRK10	HRK20	HRC10	HR115C
Semi-finishing		TNMG160404-GM	16.5	9.525	4.76	3.81	0.4	☆	★	☆	★												
		TNMG160408-GM	16.5	9.525	4.76	3.81	0.8	☆	★	☆	★												
		TNMG160412-GM	16.5	9.525	4.76	3.81	1.2	☆	★	☆	★												
		TNMG220408-GM	22	12.7	4.76	5.16	0.8	☆	★	☆	★												
		TNMG220412-GM	22	12.7	4.76	5.16	1.2	☆	★	☆	★												
Semi-finishing		TNMG160404-BM	16.5	9.525	4.76	3.81	0.4									☆	★						
		TNMG160408-BM	16.5	9.525	4.76	3.81	0.8									☆	★						
		TNMG160412-BM	16.5	9.525	4.76	3.81	1.2									☆	★						
Semi-finishing		TNMG160404-SM	16.5	9.525	4.76	3.81	0.4								☆			★	★				
		TNMG160408-SM	16.5	9.525	4.76	3.81	0.8								☆			★	★				
		TNMG160412-SM	16.5	9.525	4.76	3.81	1.2								☆			★	★				
Cast iron machining		TNMG160404	16.5	9.525	4.76	3.81	0.4						★										
		TNMG160408	16.5	9.525	4.76	3.81	0.8						★										
		TNMG160212	16.5	9.525	4.76	3.81	1.2						★										
		TNMG220408	22	12.7	4.76	5.16	0.8						★										
		TNMG220412	22	12.7	4.76	5.16	1.2						★										
		TNMG220416	22	12.7	4.76	5.16	1.6						★										

★ Recommended grade ☆ Available grade

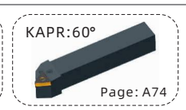
Applicable tools



DTGNR/L



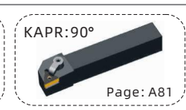
PTFNR/L



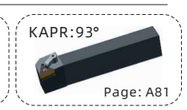
PTTNR/L



PTGNR/L

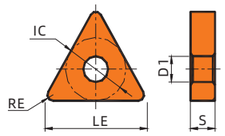


MTGNR/L



MTJNR/L

60°TN□□



Working condition: ● Stable ◔ Average ⌗ Tough

Workpiece material

P	Steel
M	Stainless steel
K	Cast iron
N	Non-ferrous metal
S	Heat resistant super alloys Titanium alloy

Operation type	Insert shape	Type	Dimension (mm)					CVD						PVD				Cemented carbide		Cermet	
			LE	IC	S	D1	RE	HR8105	HR8115	HR8125	HR8225	HR8135	HR6115	HR6215	HR7115	HR7125	HR7225	HR9205	HR9215	HRK10	HRK20	HRC10	HR115C
Roughing		TNMA160404	16.5	9.525	4.76	3.81	0.4						★										
		TNMA160408	16.5	9.525	4.76	3.81	0.8						★										
		TNMA160412	16.5	9.525	4.76	3.81	1.2						★										
		TNMA220408	22	12.7	4.76	5.16	0.8						★										
		TNMA220412	22	12.7	4.76	5.16	1.2						★										
		TNMA220416	22	12.7	4.76	5.16	1.6						★										
Cast iron machining		TNMG160404-ZR	16.5	9.525	4.76	3.81	0.4							★									
		TNMG160408-ZR	16.5	9.525	4.76	3.81	0.8							★									
		TNMG160412-ZR	16.5	9.525	4.76	3.81	1.2							★									
Roughing		TNMG160408-GR	16.5	9.525	4.76	3.81	0.8	☆	★	☆	★												
		TNMG160412-GR	16.5	9.525	4.76	3.81	1.2	☆	★	☆	★												
Roughing		TNMG160408-BR	16.5	9.525	4.76	3.81	0.8									☆	★						
		TNMG160412-BR	16.5	9.525	4.76	3.81	1.2									☆	★						

★ Recommended grade ☆ Available grade

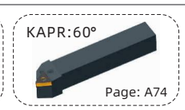
Applicable tools



DTGNR/L



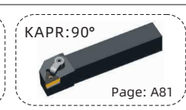
PTFNR/L



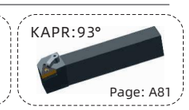
PTTNR/L



PTGNR/L

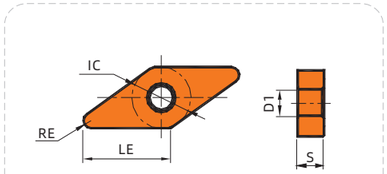


MTGNR/L



MTJNR/L

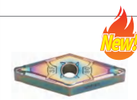
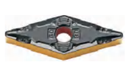
35°VN□□



Working condition: ● Stable ◔ Average ⌗ Tough

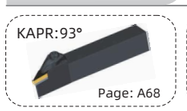
Workpiece material

P	Steel
M	Stainless steel
K	Cast iron
N	Non-ferrous metal
S	Heat resistant super alloys Titanium alloy

Operation type	Insert shape	Type	Dimension (mm)					CVD						PVD					Cemented carbide		Cermet	
			LE	IC	S	D1	RE	HR8105	HR8115	HR8125	HR8225	HR8135	HR6115	HR6215	HR7115	HR7125	HR7225	HR9205	HR9215	HRK10	HRK20	HRC10	HR115C
Finishing		VNMG160404-GC	16.6	9.525	4.76	3.81	0.4	★	☆	☆	★												
		VNMG160408-GC	16.6	9.525	4.76	3.81	0.8	★	☆	☆	★												
Finishing		VNMG160402-GF	16.6	9.525	4.76	3.81	0.2	★	☆	☆	★												
		VNMG160404-GF	16.6	9.525	4.76	3.81	0.4	★	☆	☆	★												
		VNMG160408-GF	16.6	9.525	4.76	3.81	0.8	★	☆	☆	★												
Finishing		VNMG160404-BF	16.6	9.525	4.76	3.81	0.4								☆	★							
		VNMG160408-BF	16.6	9.525	4.76	3.81	0.8								☆	★							
Finishing		VNMG160404-SF	16.6	9.525	4.76	3.81	0.4								☆		★	★					
		VNMG160408-SF	16.6	9.525	4.76	3.81	0.8								☆		★	★					
Semi-finishing		VNMG160404-GQ	16.6	9.525	4.76	3.81	0.4	☆	★	☆	★												
		VNMG160408-GQ	16.6	9.525	4.76	3.81	0.8	☆	★	☆	★												
		VNMG160412-GQ	16.6	9.525	4.76	3.81	1.2	☆	★	☆	★												
Semi-finishing		VNMG160404HQ	16.6	9.525	4.76	3.81	0.4															★	★
		VNMG160408HQ	16.6	9.525	4.76	3.81	0.8															★	★

★ Recommended grade ☆ Available grade

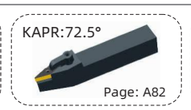
Applicable tools



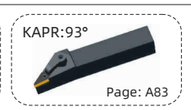
DVJNR/L



DVVNN

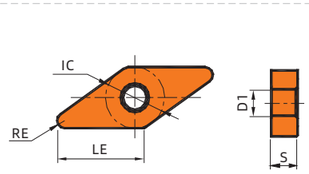


MVVNN



MVJNR/L

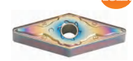
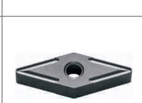
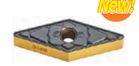
35°VN□□



Working condition: ● Stable ◔ Average ⌗ Tough

Workpiece material

P	Steel
M	Stainless steel
K	Cast iron
N	Non-ferrous metal
S	Heat resistant super alloys Titanium alloy

Operation type	Insert shape	Type	Dimension (mm)					CVD						PVD					Cemented carbide		Cermet	
			LE	IC	S	D1	RE	HR8105	HR8115	HR8125	HR8225	HR8135	HR6115	HR6215	HR7115	HR7125	HR7225	HR9205	HR9215	HRK10	HRK20	HRC10	HR115C
Semi-finishing		VNMG160404-GM	16.6	9.525	4.76	3.81	0.4	☆	★	☆	★												
		VNMG160408-GM	16.6	9.525	4.76	3.81	0.8	☆	★	☆	★												
		VNMG160412-GM	16.6	9.525	4.76	3.81	1.2	☆	★	☆	★												
Semi-finishing		VNMG160404-BM	16.6	9.525	4.76	3.81	0.4									☆	★						
		VNMG160408-BM	16.6	9.525	4.76	3.81	0.8									☆	★						
		VNMG160412-BM	16.6	9.525	4.76	3.81	1.2									☆	★						
Semi-finishing		VNMG160404-SM	16.6	9.525	4.76	3.81	0.4								☆		★	★					
		VNMG160408-SM	16.6	9.525	4.76	3.81	0.8								☆		★	★					
Cast iron machining		VNMG160404	16.6	9.525	4.76	3.81	0.4					★											
		VNMG160408	16.6	9.525	4.76	3.81	0.8					★											
Cast iron machining		VNMA160404	16.6	9.525	4.76	3.81	0.4					★											
		VNMA160408	16.6	9.525	4.76	3.81	0.8					★											
Cast iron machining		VNMG160404-ZR	16.6	9.525	4.76	3.81	0.4						★										
		VNMG160408-ZR	16.6	9.525	4.76	3.81	0.8						★										

★ Recommended grade ☆ Available grade

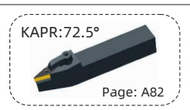
Applicable tools



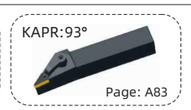
DVJNR/L



DVVNN

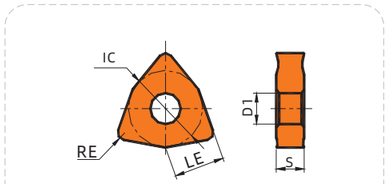


MVVNN



MVJNR/L

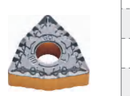
80°WN□□



Working condition: ● Stable ◔ Average ⌗ Tough

Workpiece material

P	Steel
M	Stainless steel
K	Cast iron
N	Non-ferrous metal
S	Heat resistant super alloys Titanium alloy

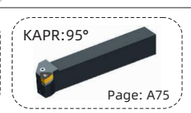
Operation type	Insert shape	Type	Dimension (mm)					CVD						PVD				Cemented carbide		Cermet	
			LE	IC	S	D1	RE	HR8105	HR8115	HR8125	HR8225	HR8135	HR6115	HR6215	HR7115	HR7125	HR7225	HR9205	HR9215	HRK10	HRK20	HRC10	HR115C
Finishing		WNMG080404-GC	8.7	12.7	4.76	5.16	0.4	★	☆	☆	★												
		WNMG080408-GC	8.7	12.7	4.76	5.16	0.8	★	☆	☆	★												
Finishing		WNMG060408-GF	6.6	9.525	4.76	3.81	0.8	★	☆	☆	★												
		WNMG080404-GF	8.7	12.7	4.76	5.16	0.4	★	☆	☆	★												
		WNMG080408-GF	8.7	12.7	4.76	5.16	0.8	★	☆	☆	★												
Finishing		WNMG080402-BF	8.7	12.7	4.76	5.16	0.2									☆	★						
		WNMG080404-BF	8.7	12.7	4.76	5.16	0.4									☆	★						
		WNMG080408-BF	8.7	12.7	4.76	5.16	0.8									☆	★						
Finishing		WNMG080404-SF	8.7	12.7	4.76	5.16	0.4								☆			★	★				
		WNMG080408-SF	8.7	12.7	4.76	5.16	0.8								☆			★	★				
Semi-finishing		WNMG060412-GQ	6.6	9.525	4.76	3.81	1.2	☆	★	☆	★												
		WNMG080404-GQ	8.7	12.7	4.76	5.16	0.4	☆	★	☆	★												
		WNMG080408-GQ	8.7	12.7	4.76	5.16	0.8	☆	★	☆	★												
		WNMG080412-GQ	8.7	12.7	4.76	5.16	1.2	☆	★	☆	★												
		WNMG080416-GQ	8.7	12.7	4.76	5.16	1.6	☆	★	☆	★												

★ Recommended grade ☆ Available grade

Applicable tools



DWLNR/L

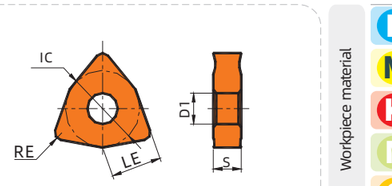


PWLNR/L



MWLNR/L

80°WN□□



Working condition: ● Stable ◔ Average ⌗ Tough

Workpiece material

P	Steel
M	Stainless steel
K	Cast iron
N	Non-ferrous metal
S	Heat resistant super alloys Titanium alloy

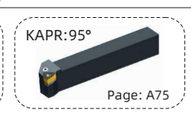
Operation type	Insert shape	Type	Dimension (mm)					CVD						PVD				Cemented carbide		Cermet	
			LE	IC	S	D1	RE	HR8105	HR8115	HR8125	HR8225	HR8135	HR6115	HR6215	HR7115	HR7125	HR7225	HR9205	HR9215	HRK10	HRK20	HRC10	HR115C
Semi-finishing		WNMG080404-HQ	8.7	12.7	4.76	5.16	0.4															★	★
		WNMG080408-HQ	8.7	12.7	4.76	5.16	0.8															★	★
Semi-finishing		WNMG080404-GM	8.7	12.7	4.76	5.16	0.4	☆	★	☆	★												
		WNMG080408-GM	8.7	12.7	4.76	5.16	0.8	☆	★	☆	★												
		WNMG080412-GM	8.7	12.7	4.76	5.16	1.2	☆	★	☆	★												
Semi-finishing		WNMG06T312-BM	6.6	9.525	3.97	3.81	1.2									☆	★						
		WNMG060412-BM	6.6	9.525	4.76	3.81	1.2									☆	★						
		WNMG080404-BM	8.7	12.7	4.76	5.16	0.4									☆	★						
		WNMG080408-BM	8.7	12.7	4.76	5.16	0.8									☆	★						
		WNMG080412-BM	8.7	12.7	4.76	5.16	1.2									☆	★						
Semi-finishing		WNMG080404-SM	8.7	12.7	4.76	5.16	0.4								☆			★	★				
		WNMG080408-SM	8.7	12.7	4.76	5.16	0.8								☆			★	★				
		WNMG080412-SM	8.7	12.7	4.76	5.16	1.2								☆			★	★				

★ Recommended grade ☆ Available grade

Applicable tools



DWLNR/L



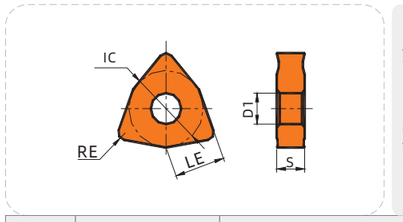
PWLNR/L



MWLNR/L

HUAREAL

80°WN□□



Working condition: ● Stable ◕ Average ⌗ Tough

Workpiece material

P	Steel
M	Stainless steel
K	Cast iron
N	Non-ferrous metal
S	Heat resistant super alloys Titanium alloy

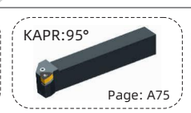
Operation type	Insert shape	Type	Dimension (mm)					CVD						PVD				Cemented carbide		Cermet	
			LE	IC	S	D1	RE	HR8105	HR8115	HR8125	HR8225	HR8135	HR6115	HR6215	HR7115	HR7125	HR7225	HR9205	HR9215	HRK10	HRK20	HRC10	HR115C
Cast iron machining		WNMG080404	8.7	12.7	4.76	5.16	0.4						★										
		WNMG080408	8.7	12.7	4.76	5.16	0.8						★										
		WNMG080412	8.7	12.7	4.76	5.16	1.2						★										
Cast iron machining		WNMA060404	6.6	9.525	4.76	3.81	0.4						★										
		WNMA060408	6.6	9.525	4.76	3.81	0.8						★										
		WNMA080404	8.7	12.7	4.76	5.16	0.4						★										
		WNMA080408	8.7	12.7	4.76	5.16	0.8						★										
		WNMA080412	8.7	12.7	4.76	5.16	1.2						★										
		WNMA080416	8.7	12.7	4.76	5.16	1.6						★										
Cast iron machining		WNMG080404-ZR	8.7	12.7	4.76	5.16	0.4							★									
		WNMG080408-ZR	8.7	12.7	4.76	5.16	0.8							★									
		WNMG080412-ZR	8.7	12.7	4.76	5.16	1.2							★									
Roughing		WNMG080408-GR	8.7	12.7	4.76	5.16	0.8	☆	★	☆	★												
		WNMG080412-GR	8.7	12.7	4.76	5.16	1.2	☆	★	☆	★												
Roughing		WNMG080408-BR	8.7	12.7	4.76	5.16	0.8								☆	★							
		WNMG080412-BR	8.7	12.7	4.76	5.16	1.2								☆	★							

★ Recommended grade ☆ Available grade

Applicable tools



DWLNR/L

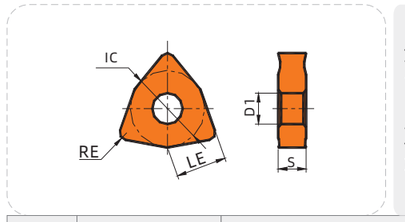


PWLNR/L



MWLNR/L

Planer machining



Working condition: ● Stable ◕ Average ⌗ Tough

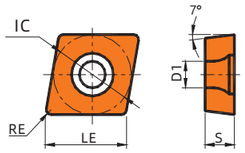
Workpiece material

P	Steel
M	Stainless steel
K	Cast iron
N	Non-ferrous metal
S	Heat resistant super alloys Titanium alloy

Operation type	Insert shape	Type	Dimension (mm)					CVD						PVD				Cemented carbide		Cermet	
			LE	IC	S	D1	RE	HR8105	HR8115	HR8125	HR8225	HR8135	HR6115	HR6215	HR7115	HR7125	HR7225	HR9205	HR9215	HRK10	HRK20	HRC10	HR115C
Planer machining		WNGX1509L-BG	13	22.225	9.525	7.94	1.6	★	★														
		WNGX1509L-GM	13	22.225	9.525	7.94	1.6	★	★														
		WNGX221224L-GM	15	31.750	13	9.12	2.4	★	★														

★ Recommended grade ☆ Available grade

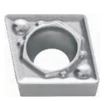
80°CC□□



Working condition: ● Stable ◕ Average ⌗ Tough

Workpiece material

P	Steel
M	Stainless steel
K	Cast iron
N	Non-ferrous metal
S	Heat resistant super alloys Titanium alloy

Operation type	Insert shape	Type	Dimension (mm)					CVD						PVD				Cemented carbide		Cermet	
			LE	IC	S	D1	RE	HR8105	HR8115	HR8125	HR8225	HR8135	HR6115	HR6215	HR7115	HR7125	HR7225	HR9205	HR9215	HRK10	HRK20	HRC10	HR115C
Finishing		CCGT060202-AK	6.4	6.35	2.38	2.8	0.2													★	☆		
		CCGT060204-AK	6.4	6.35	2.38	2.8	0.4													★	☆		
		CCGT09T302-AK	9.7	9.525	3.97	4.4	0.2													★	☆		
		CCGT09T304-AK	9.7	9.525	3.97	4.4	0.4													★	☆		
		CCGT09T308-AK	9.7	9.525	3.97	4.4	0.8													★	☆		
		CCGT120404-AK	12.9	12.7	4.76	5.56	0.4													★	☆		
		CCGT120408-AK	12.9	12.7	4.76	5.56	0.8													★	☆		
Finishing		CCMT060202-TF	6.4	6.35	2.38	2.8	0.2	★	☆	★					☆	★	★	☆					
		CCMT060204-TF	6.4	6.35	2.38	2.8	0.4	★	☆	★					☆	★	★	☆					
		CCMT060208-TF	6.4	6.35	2.38	2.8	0.8	★	☆	★					☆	★	★	☆					
		CCMT09T302-TF	9.7	9.525	3.97	4.4	0.2	★	☆	★					☆	★	★	☆					
		CCMT09T304-TF	9.7	9.525	3.97	4.4	0.4	★	☆	★					☆	★	★	☆					
		CCMT09T308-TF	9.7	9.525	3.97	4.4	0.8	★	☆	★					☆	★	★	☆					
		CCMT120404-TF	12.9	12.7	4.76	5.56	0.4	★	☆	★					☆	★	★	☆					
		CCMT120408-TF	12.9	12.7	4.76	5.56	0.8	★	☆	★					☆	★	★	☆					
Semi-finishing		CCMT060204-TM	6.4	6.35	2.38	2.8	0.4	★	☆	★					☆	★							
		CCMT060208-TM	6.4	6.35	2.38	2.8	0.8	★	☆	★					☆	★							
		CCMT09T304-TM	9.7	9.525	3.97	4.4	0.4	★	☆	★					☆	★							
		CCMT09T308-TM	9.7	9.525	3.97	4.4	0.8	★	☆	★					☆	★							
		CCMT120404-TM	12.9	12.7	4.76	5.56	0.4	★	☆	★					☆	★							
		CCMT120408-TM	12.9	12.7	4.76	5.56	0.8	★	☆	★					☆	★							
		CCMT120412-TM	12.9	12.7	4.76	5.56	1.2	★	☆	★					☆	★							
Semi-finishing		CCMT060204HQ	6.4	6.35	2.38	2.8	0.4															★	★
		CCMT09T302HQ	9.7	9.525	3.97	4.4	0.2															★	★
		CCMT09T304HQ	9.7	9.525	3.97	4.4	0.4															★	★
		CCMT09T308HQ	9.7	9.525	3.97	4.4	0.8															★	★
		CPMH090308HQ	9.7	9.525	3.18	4.4	0.8															★	★

★ Recommended grade ☆ Available grade

Applicable tools

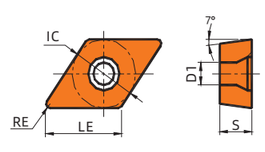


C□□-SCLCR/L



S□□-SCLCR/L

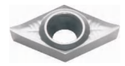
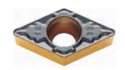
55°DC□□



Working condition: ● Stable ◕ Average ⌗ Tough

Workpiece material

P	Steel
M	Stainless steel
K	Cast iron
N	Non-ferrous metal
S	Heat resistant super alloys Titanium alloy

Operation type	Insert shape	Type	Dimension (mm)					CVD						PVD				Cemented carbide		Cermet	
			LE	IC	S	D1	RE	HR8105	HR8115	HR8125	HR8225	HR8135	HR6115	HR6215	HR7115	HR7125	HR7225	HR9205	HR9215	HRK10	HRK20	HRC10	HR115C
Finishing		DCGT070202-AK	7.8	6.35	2.38	2.8	0.2													★	☆		
		DCGT070204-AK	7.8	6.35	2.38	2.8	0.4													★	☆		
		DCGT11T302-AK	11.6	9.525	3.97	4.4	0.2													★	☆		
		DCGT11T304-AK	11.6	9.525	3.97	4.4	0.4													★	☆		
		DCGT11T308-AK	11.6	9.525	3.97	4.4	0.8													★	☆		
Finishing		DCMT070202-TF	7.8	6.35	2.38	2.8	0.2	★	☆	★					☆	★	★	☆					
		DCMT070204-TF	7.8	6.35	2.38	2.8	0.4	★	☆	★					☆	★	★	☆					
		DCMT070208-TF	7.8	6.35	2.38	2.8	0.8	★	☆	★					☆	★	★	☆					
		DCMT11T302-TF	11.6	9.525	3.97	4.4	0.2	★	☆	★					☆	★	★	☆					
		DCMT11T304-TF	11.6	9.525	3.97	4.4	0.4	★	☆	★					☆	★	★	☆					
		DCMT11T308-TF	11.6	9.525	3.97	4.4	0.8	★	☆	★					☆	★	★	☆					
Semi-finishing		DCMT070204-TM	7.8	6.35	2.38	2.8	0.4	★	☆	★					☆	★							
		DCMT070208-TM	7.8	6.35	2.38	2.8	0.8	★	☆	★					☆	★							
		DCMT11T304-TM	11.6	9.525	3.97	4.4	0.4	★	☆	★					☆	★							
		DCMT11T308-TM	11.6	9.525	3.97	4.4	0.8	★	☆	★					☆	★							
		DCMT11T312-TM	11.6	9.525	3.97	4.4	1.2	★	☆	★					☆	★							
Finishing to semi-finishing		DCMT070202HQ	7.8	6.35	2.38	2.8	0.2															★	★
		DCMT070204HQ	7.8	6.35	2.38	2.8	0.4															★	★
		DCMT070208HQ	7.8	6.35	2.38	2.8	0.8															★	★
		DCMT11T302HQ	11.6	9.525	3.97	4.4	0.2															★	★
		DCMT11T304HQ	11.6	9.525	3.97	4.4	0.4															★	★
		DCMT11T308HQ	11.6	9.525	3.97	4.4	0.8															★	★

★ Recommended grade ☆ Available grade

Applicable tools



C□□-SDQCR/L



C□□-SDUCR/L

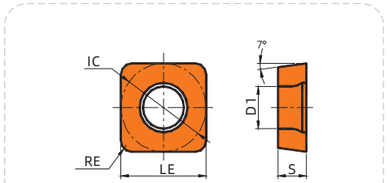


S□□-SDQCR/L



S□□-SDUCR/L

90°SC□□



Working condition: ● Stable ◔ Average ⌗ Tough

Workpiece material

P	Steel
M	Stainless steel
K	Cast iron
N	Non-ferrous metal
S	Heat resistant super alloys Titanium alloy

Operation type	Insert shape	Type	Dimension (mm)					CVD						PVD				Cemented carbide		Cermet	
			LE	IC	S	D1	RE	HR8105	HR8115	HR8125	HR8225	HR8135	HR6115	HR6215	HR7115	HR7125	HR7225	HR9205	HR9215	HRK10	HRK20	HRC10	HR115C
Finishing		SCMT09T304-TF	9.525	9.525	3.97	4.4	0.4		★	☆	★					☆	★	★	☆				
		SCMT09T308-TF	9.525	9.525	3.97	4.4	0.8		★	☆	★					☆	★	★	☆				
		SCMT120404-TF	12.7	12.7	4.76	5.56	0.4		★	☆	★					☆	★	★	☆				
		SCMT120408-TF	12.7	12.7	4.76	5.56	0.8		★	☆	★					☆	★	★	☆				
Semi-finishing		SCMT09T304-TM	9.525	9.525	3.97	4.4	0.4		★	☆	★					☆	★						
		SCMT09T308-TM	9.525	9.525	3.97	4.4	0.8		★	☆	★					☆	★						
		SCMT120404-TM	12.7	12.7	4.76	5.56	0.4		★	☆	★					☆	★						
		SCMT120408-TM	12.7	12.7	4.76	5.56	0.8		★	☆	★					☆	★						
		SCMT120412-TM	12.7	12.7	4.76	5.56	1.2		★	☆	★					☆	★						

★ Recommended grade ☆ Available grade

Applicable tools

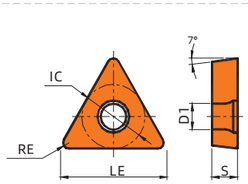
KAPR:75°



Page: A89

S□□-SSKCR/L

60°TC□□



Working condition: ● Stable ◔ Average ⌗ Tough

Workpiece material

P	Steel
M	Stainless steel
K	Cast iron
N	Non-ferrous metal
S	Heat resistant super alloys Titanium alloy

Operation type	Insert shape	Type	Dimension (mm)					CVD						PVD				Cemented carbide		Cermet	
			LE	IC	S	D1	RE	HR8105	HR8115	HR8125	HR8225	HR8135	HR6115	HR6215	HR7115	HR7125	HR7225	HR9205	HR9215	HRK10	HRK20	HRC10	HR115C
Finishing		TCGT090204-AK	9.7	5.56	2.38	2.8	0.4													★	☆		
		TCGT110204-AK	11.0	6.35	2.38	2.8	0.4													★	☆		
		TCGT16T304-AK	16.5	9.525	3.97	4.4	0.4													★	☆		
Finishing		TCMT110204-TF	11.0	6.35	2.38	2.8	0.4		★	☆	★					☆	★	★	☆				
		TCMT110208-TF	11.0	6.35	2.38	2.8	0.8		★	☆	★					☆	★	★	☆				
		TCMT16T304-TF	16.5	9.525	3.97	4.4	0.4		★	☆	★					☆	★	★	☆				
		TCMT16T308-TF	16.5	9.525	3.97	4.4	0.8		★	☆	★					☆	★	★	☆				
Semi-finishing		TCMT110204-TM	11.0	6.35	2.38	2.8	0.4		★	☆	★					☆	★						
		TCMT110208-TM	11.0	6.35	2.38	2.8	0.8		★	☆	★					☆	★						
		TCMT16T304-TM	16.5	9.525	3.97	4.4	0.4		★	☆	★					☆	★						
		TCMT16T308-TM	16.5	9.525	3.97	4.4	0.8		★	☆	★					☆	★						
		TCMT16T312-TM	16.5	9.525	3.97	4.4	1.2		★	☆	★					☆	★						
Semi-finishing		TCMT110204HQ	11.0	6.35	2.38	2.8	0.4															★	★

★ Recommended grade ☆ Available grade

Applicable tools

KAPR:90°



Page: A86

C□□-STFCR/L

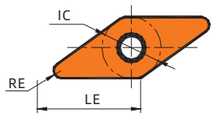
KAPR:90°



Page: A90

S□□-STFCR/L

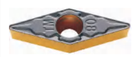
35°VB□□



Working condition: ● Stable ◕ Average ⌗ Tough

Workpiece material

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

Operation type	Insert shape	Type	Dimension (mm)					CVD							PVD				Cemented carbide		Cermet	
			LE	IC	S	D1	RE	HR8105	HR8115	HR8125	HR8225	HR8135	HR6115	HR6215	HR7115	HR7125	HR7225	HR9205	HR9215	HRK10	HRK20	HRC10	HR115C
Finishing		VBGT160402-AK	16.5	9.525	4.76	4.4	0.2													★	☆		
		VBGT160404-AK	16.5	9.525	4.76	4.4	0.4													★	☆		
		VBGT160408-AK	16.5	9.525	4.76	4.4	0.8													★	☆		
Finishing		VBMT110302-TF	11.0	6.35	3.18	2.8	0.2	★	☆	★					☆	★	★	☆				
		VBMT110304-TF	11.0	6.35	3.18	2.8	0.4	★	☆	★					☆	★	★	☆				
		VBMT110308-TF	11.0	6.35	3.18	2.8	0.8	★	☆	★					☆	★	★	☆				
		VBMT160402-TF	16.5	9.525	4.76	4.4	0.2	★	☆	★					☆	★	★	☆				
		VBMT160404-TF	16.5	9.525	4.76	4.4	0.4	★	☆	★					☆	★	★	☆				
		VBMT160408-TF	16.5	9.525	4.76	4.4	0.8	★	☆	★					☆	★	★	☆				
Semi-finishing		VBMT110304-TM	11.0	6.35	3.18	2.8	0.4	★	☆	★					☆	★						
		VBMT110308-TM	11.0	6.35	3.18	2.8	0.8	★	☆	★					☆	★						
		VBMT160404-TM	16.5	9.525	4.76	4.4	0.4	★	☆	★					☆	★						
		VBMT160408-TM	16.5	9.525	4.76	4.4	0.8	★	☆	★					☆	★						
		VBMT160412-TM	16.5	9.525	4.76	4.4	1.2	★	☆	★					☆	★						
Finishing to semi-finishing		VBMT110304HQ	11.0	6.35	3.18	2.8	0.4															★	★
		VBMT110308HQ	11.0	6.35	3.18	2.8	0.8															★	★
		VBMT160404HQ	16.5	9.525	4.76	4.4	0.4															★	★
		VBMT160408HQ	16.5	9.525	4.76	4.4	0.8															★	★

★ Recommended grade ☆ Available grade

Applicable tools

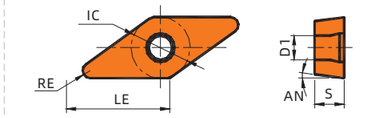


S□□-SVQBR/L



S□□-SVUBR/L

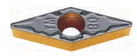
35°VC□□



Working condition: ● Stable ◕ Average ⌗ Tough

Workpiece material

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

Operation type	Insert shape	Type	Dimension (mm)					CVD							PVD				Cemented carbide		Cermet	
			LE	IC	S	D1	RE	HR8105	HR8115	HR8125	HR8225	HR8135	HR6115	HR6215	HR7115	HR7125	HR7225	HR9205	HR9215	HRK10	HRK20	HRC10	HR115C
Semi-finishing		VCGT110302-AK	11.0	6.35	3.18	2.8	0.2													★	☆		
		VCGT110304-AK	11.0	6.35	3.18	2.8	0.4													★	☆		
		VCGT160402-AK	16.5	9.525	4.76	4.4	0.2													★	☆		
		VCGT160404-AK	16.5	9.525	4.76	4.4	0.4													★	☆		
		VCGT160408-AK	16.5	9.525	4.76	4.4	0.8													★	☆		
Semi-finishing		VCMT110304-TF	11.0	6.35	3.18	2.8	0.4	★	☆	★					☆	★	★	☆				
		VCMT110308-TF	11.0	6.35	3.18	2.8	0.8	★	☆	★					☆	★	★	☆				
		VCMT160404-TF	16.5	9.525	4.76	4.4	0.4	★	☆	★					☆	★	★	☆				
		VCMT160408-TF	16.5	9.525	4.76	4.4	0.8	★	☆	★					☆	★	★	☆				
Semi-finishing		VCMT110304-TM	11.0	6.35	3.18	2.8	0.4	★	☆	★					☆	★						
		VCMT110308-TM	11.0	6.35	3.18	2.8	0.8	★	☆	★					☆	★						
		VCMT160404-TM	16.5	9.525	4.76	4.4	0.4	★	☆	★					☆	★						
		VCMT160408-TM	16.5	9.525	4.76	4.4	0.8	★	☆	★					☆	★						
		VCMT160412-TM	16.5	9.525	4.76	4.4	1.2	★	☆	★					☆	★						

★ Recommended grade ☆ Available grade

Applicable tools



C□□-SVQCR/L



C□□-SVUCR/L

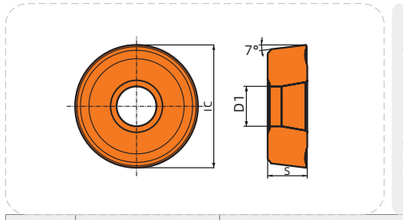


S□□-SVQCR/L



S□□-SVUCR/L

Profile Turning Insert



Working condition: ● Stable ◔ Average ⌗ Tough

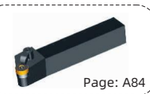
Workpiece material

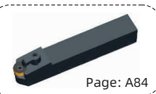
P	Steel
M	Stainless steel
K	Cast iron
N	Non-ferrous metal
S	Heat resistant super alloys Titanium alloy

Operation type	Insert shape	Type	Dimension (mm)			CVD						PVD							Cemented carbide		Cermet	
			IC	S	D1	HR8105	HR8115	HR8125	HR8225	HR8135	HR6115	HR1135	HR9105	HR7115	HR7125	HR7225	HR5125	HR5225	HRK10	HRK20	HRC10	HR115C
Profile turning		RCMX1003MO	10	3.18	3.6	☆	★	☆	★													
		RCMX1204MO	12	4.76	4.4	☆	★	☆	★													
		RCMX1606MO	16	6.35	5.5	☆	★	☆	★													
		RCMX2006MO	20	6.35	6.5	☆	★	☆	★													
		RCMX2507MO	25	7.94	7.2	☆	★	☆	★													
		RCMX3209MO	32	9.525	9.5	☆	★	☆	★													
Profile turning		RCMX1606MO-MR	16	6.35	5.5	☆	★	☆	★													
		RCMX2006MO-MR	20	6.35	6.5	☆	★	☆	★													
		RCMX2507MO-MR	25	7.94	7.2	☆	★	☆	★													

★ Recommended grade ☆ Available grade

Applicable tools


Page: A84
MRGCR/L


Page: A84
MRDCN



A Turning

General Turning Tool

- General turning tool code key A57
  - General external turning tool code key A57
  - General internal turning tool code key A58
- General external turning tool clamping form A59
- General turning tool overview A60
- General turning tool A66
  - D-type clamping external turning tool A66
  - P-type clamping external turning tool A70
  - M-type clamping external turning tool A76
  - S-type clamping internal turning tool A85
- Technical information of general turning A95

General External Turning Tools Code Ke

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

① Clamping	
D	Double clamping
M	Rigid clamping
P	Lever clamping

②Insert shape		
C	80° rhombus	80°
D	55° rhombus	55°
R	Circular	
S	Square	90°
T	Regular triangle	60°
V	35° rhombus	35°
W	Equilateral unequal hexagon	80°

③ Entering angle(KAPR)			
B	D	F	G
75°	45°	90°	90°
J	K	L	P
93°	75°	95°	62°30'
S	T	V	R
45°	60°	72°30'	75°

④ Insert clearance angle	
N	Negative（0°）

⑤Hand of tool	
R	Right hand
L	Left hand
N	Left and right hands

⑥Corner height (mm)	
8	08
10	10
12	12
16	16
20	20
25	25
32	32

⑦Tool width,WF dimension (mm)	
8	08
10	10
12	12
16	16
20	20
25	25
32	32

⑧ Tool length, LF dimension (mm)	
D	60
E	70
F	80
H	100
K	125
M	150
P	170
Q	180
R	200

⑨Cutting edge length (mm)

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

General Internal Turning Tools Code Key

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

① Tool material	
C	Cemented carbide
S	Steel

② Tool diameter (mm)	
08	08
10	10
12	12
16	16
20	20
25	25
32	32

③ Tool length (mm)	
K	125
M	150
Q	180
R	200
S	250
T	300
U	350

④ Clamping	
S	Screw clamping

⑤ Insert shape		
C	80° rhombus	80°
D	55° rhombus	55°
S	Square	90°
T	Regular triangle	60°
V	35° rhombus	35°

⑥ Entering angle(KAPR)			
F	K	L	Q
90°	75°	95° 95°	107°30'
U			
93°			

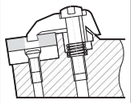
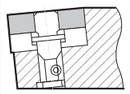
⑦ Insert clearance angle	
C	7°
P	11°

⑧Hand of tool	
R	Right hand
L	Left hand
N	Left and right hands

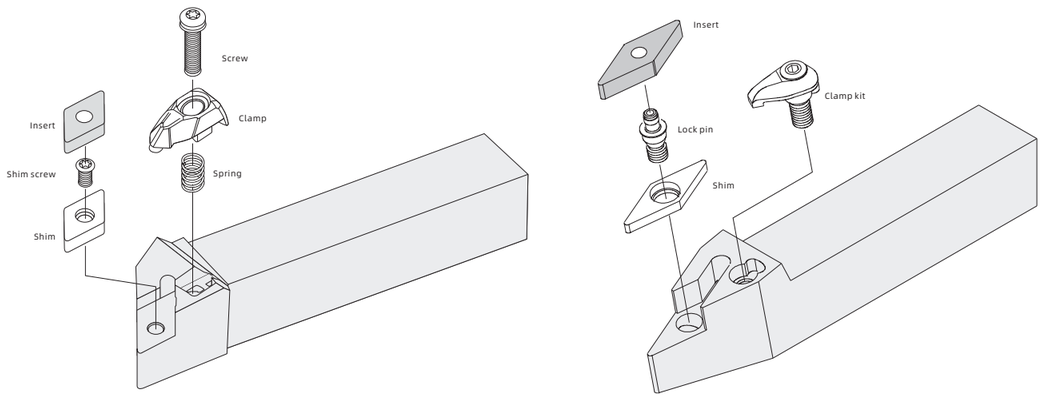
⑨Cutting edge length (mm)

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

General External Turning Tools Clamping System

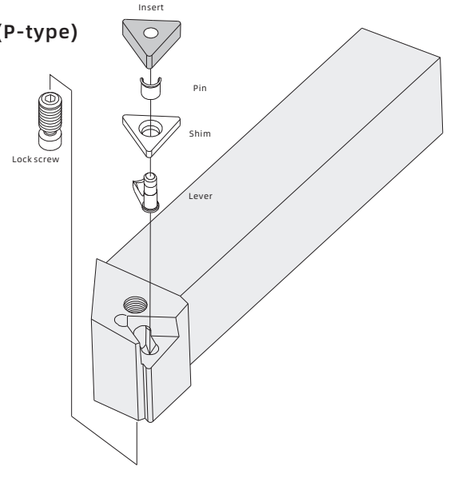
Clamping system	Structure		Features	Clamping system	Structure		Structure
Double clamping (D-type)			◦ High clamping rigidity effectively improves the resistance of the insert to chipping and damage ◦ High positioning accuracy can enhance machining precision	Rigid clamping (M-type)			◦ Composite locking structure, with good stability ◦ Excellent clamping rigidity and positioning accuracy, high safety
Lever clamping (P-type)			◦ The chip evacuation space is unobstructed, ensuring smooth chip evacuation ◦ High positioning accuracy and strong universality				

● Double clamping (D-type)



● Rigid clamping (M-type)

● Lever clamping (P-type)



Overview of general turning tools (external machining)

Clamping system	Model	Entering angle (KAPR)°	Application: External turning	Face turning	External and face turning	Profiling	Profiling	Profiling	Workpiece shape		Page
D	DCLNR/L	95°			☺				☺		A66
	DDJNR/L	93°					☺		☺	☹	A66
	DDNNN	62.5°						☺	☺		A67
	DSBNR/L	75°	☺						☺		A67
	DTGNR/L	91°	☺						☺	☹	A68
	DVJNR/L	93°					☺		☺	☹	A68
	DVVNN	72.5°						☺	☺		A69
	DWLNR/L	95°			☺				☺		A69
P	PCBNR/L	75°	☺						☺		A70
	PCLNR/L	95°			☺				☺		A70
	PDJNR/L	93°					☺		☺	☹	A71
	PDPNN	62.5°						☺	☺		A71
	PSBNR/L	75°	☺						☺		A72
	PSDNN	45°						☺	☺		A72

☺ Recommanded ☹ Available

Overview of general turning tools (external machining)

Clamping system	Model	Entering angle (KAPR)°	Application: External turning	Face turning	External and face turning	Profiling	Profiling	Profiling	Workpiece shape		Page
P	PSKNR/L	75°		☺					☺		A73
	PSSNR/L	45°	☺						☺		A73
	PTFNR/L	90°		☺					☺	☹	A74
	PTTNR/L	60°	☺						☺		A74
	PTGNR/L	90°	☺						☺		A75
	PWLNR/L	95°			☺				☺	☹	A75
M	MCBNR/L	75°	☺						☺		A76
	MCLNR/L	95°			☺				☺		A76
	MDJNR/L	93°					☺		☺		A77
	MDPNN	62.5°						☺	☺		A78
	MSBNR/L	75°	☺						☺	☹	A79
	MSRNR/L	75°	☺						☺		A79
	MSKNR/L	75°		☺					☺		A80
	MSDNN	45°						☺	☺		A80

☺ Recommanded ☹ Available

Overview of general turning tools (external machining)

Clamping system	Model	Entering angle (KAPR)°	Application: External turning	Face turning	External and face turning	Profiling	Profiling	Profiling	Workpiece shape		Page
M	MTGNR/L	90°	☺						☺		A81
	MTJNR/L	93°	☺						☺		A81
	MTFNR/L	90°		☺					☺	☹	A82
	MVVNN	72.5°						☺	☺		A82
	MVJNR/L	93°					☺		☺		A83
	MWLNR/L	95°			☺				☺	☹	A83
	MRGCR/L	/				☺			☺		A84
	MRDCN	/				☺			☺		A84

☺ Recommanded ☹ Available

Overview of general turning tools (Internal machining)-cemented carbide tool holder

Model	Tool shape	Entering angle (KAPR)°	Tool shank diameter	Tool length	Minimum workpiece diameter	Page
C□□-SCLCR/L		95°	7	125	10	A85
			8	125	10	
			10	150	12	
			12	180	14	
			12	180	16	
			14	180	16	
			16	200	18	
			20	250	22	
			25	300	28	
C□□-SDQCR/L		107.5°	10	150	13	A85
			12	180	16	
			16	180	20	
C□□-SDUCR/L		93°	10	150	13	A86
			12	180	16	
			16	200	20	
			20	250	25	
C□□-STFCR/L		90°	12	180	16	A86
			16	200	18	
			20	250	25	
C□□-SVQCR/L		107.5°	16	200	22	A87
			20	250	26	
C□□-SVUCR/L		93°	16	200	24	A87
			20	250	28	

Overview of general turning tools (Internal machining)-steel tool holder

Model	Tool shape	Entering angle (KAPR)°	Tool shank diameter	Tool length	Minimum workpiece diameter	Page
S□□-SCLCR/L		95°	12	150	16	A88
			16	180	20	
			20	200	25	
			25	250	32	
S□□-SDQCR/L		107.5°	12	150	16	A88
			16	180	20	
			20	200	25	
			25	250	32	
S□□-SDUCR/L		93°	12	150	16	A89
			16	180	20	
			20	200	25	
S□□-SSKCR/L		75°	12	150	16	A89
			16	180	20	
			20	200	25	
			25	250	32	
S□□-STFCR/L		90°	16	180	20	A90
			20	200	25	
			25	250	32	
S□□-SVQBR/L		107.5°				A90
			20	200	27	
			25	250	35	
S□□-SVUBR/L		93°				A91
			25	250	35	
S□□-SVQCR/L		107.5°				A91
			16	180	22	
			25	250	35	
S□□-SVUCR/L		93°				A92
			20	200	28	
			25	250	35	
S□□-SCLPR/L		95°	12	150	16	A92
			16	180	20	
			20	200	25	
S□□-SDQPR/L		107.5°	12	150	16	A93
			16	180	20	
			20	200	25	

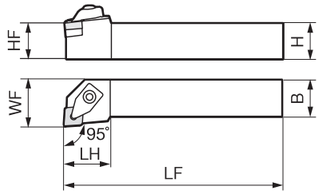
Overview of general turning tools (Internal machining)

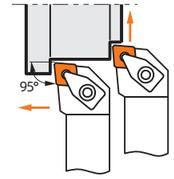
Model	Tool shape	Entering angle (KAPR)°	Tool shank diameter	Tool length	Minimum workpiece diameter	Page
S□□-SDUPR/L		93°	12	150	16	A93
			16	180	20	
S□□-STUPR/L		93°	12	180	16	A94
			16	180	20	

External turning tool

DCLNR/L

KAPR:95°





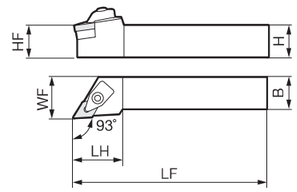
• The illustration shows the right hand（R）

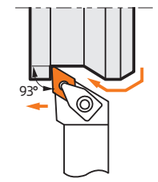
Model		Inventory		Dimension (mm)						Accessories						Matching insert
				Size of cutter square		Length size		Corner height	Head width	Lever lock screw	Shim	Wrench	Lever	Shim screw	Spring	
		R	L	H	B	LF	LH	HF	WF							
DCLNR/L	2020K12	▲	▲	20	20	125	32	20	25	DM5	HC12WI	WR25L	HYP1	SM6	DD4L	CN**1204
	2525M12	▲	▲	25	25	150	32	25	32							
	2525M16	△	△	25	25	150	32	25	32	DM6	HC16WI	WR30L	HYP2	SM7	DD5L	CN**1606
	3232P16	▲	▲	32	32	170	32	32	40							
	3232P19	△	△	32	32	170	42	32	40	DM7	HC19WI	WR40L	HYP3	SM8	DD6L	CN**1906
	4040S25	△	△	40	40	250	53	40	50	DM8	HC25WI	WR50L	HYP4	SM9	DD7L	CN**2509

▲Standing inventory △Make-to-order

DDJNR/L

KAPR:93°





• The illustration shows the right hand（R）

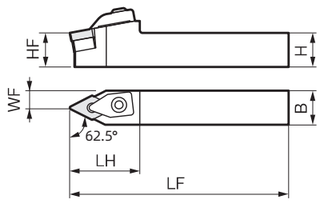
Model		Inventory		Dimension (mm)						Accessories						Matching insert
				Size of cutter square		Length size		Corner height	Head width	Lever lock screw	Shim	Wrench	Lever	Shim screw	Shim pin	
		R	L	H	B	LF	LH	HF	WF							
DDJNR/L	2020K11	▲	▲	16	16	100	30	20	25	DM4	HD11WI	WR20L	HYP	SM5	DD3L	DN**1104
	2020K15	△	△	20	20	125	38	20	25	DM5	HD15WI	WR25L	HYP1	SM6	DD4L	DN**1506
	2525M15	▲	▲	25	25	150	38	25	32							
	2020K15H	△	△	20	20	125	38	20	25	DM5	HD15WI	WR25L	HYP1	SM6	DD4L	DN**1504
	2525M15H	▲	▲	25	25	150	38	25	32							

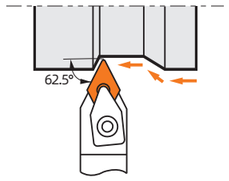
▲Standing inventory △Make-to-order

External turning tool

DDNNN

KAPR:62.5°



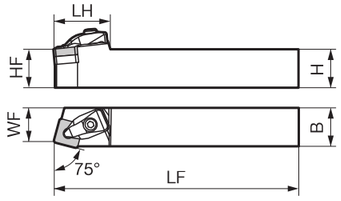


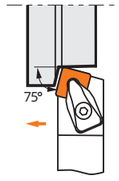
Model		Inventory		Dimension (mm)						Accessories						Matching insert
				Size of cutter square		Length size		Corner height	Head width	Lever lock screw	Shim	Wrench	Lever	Shim screw	Shim pin	
		R	L	H	B	LF	LH	HF	WF							
DDNNN	2020K15	△	△	20	20	125	40	20	10.5	DM5	HD15WI	WR25L	HYP1	SM6	DD4L	DN**1506
	2525M15	▲	▲	25	25	150	40	25	13							
	2020K15H	△	△	20	20	125	40	20	10.5	DM5	HD15WI	WR25L	HYP1	SM6	DD4L	DN**1504
	2525M15H	▲	▲	25	25	150	40	25	13							

▲Standing inventory △Make-to-order

DSBNR/L

KAPR:75°





• The illustration shows the right hand（R）

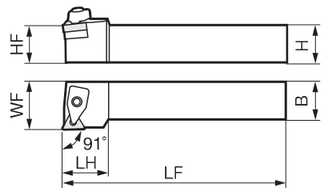
Model		Inventory		Dimension (mm)						Accessories						Matching insert
				Size of cutter square		Length size		Corner height	Head width	Lever lock screw	Shim	Wrench	Lever	Shim screw	Shim pin	
		R	L	H	B	LF	LH	HF	WF							
DSBNR/L	2020K12	△	△	20	20	125	34	20	17	DM5	HS12WI	WR25L	HYP1	SM6	DD4L	SN**1204
	2525M12	▲	▲	25	25	150	34	25	22							
	3232P15	△	△	32	32	170	41	32	27	DM6	HS16WI	WR30L	HYP2	SM7	DD5L	SN**1506
	4040S19	△	△	40	40	250	45	40	35	DM7	HS19WI	WR40L	HYP3	SM8	DD6L	SN**1906
	4040S2507	△	△	40	40	250	58	40	35	DM8	HS25WI	WR50L	HYP4	SM9	DD7L	SN**2507
	4040S2509	△	△	40	40	250	58	40	35	DM8	HS25WI	WR50L	HYP4	SM9	DD7L	SN**2509

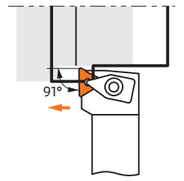
▲Standing inventory △Make-to-order

External turning tool

DTGNR/L

KAPR:91°





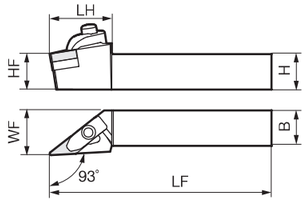
• The illustration shows the right hand（R）

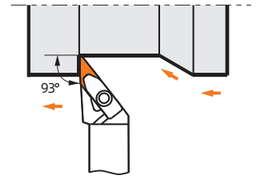
Model		Inventory		Dimension (mm)						Accessories						Matching insert
				Size of cutter square		Length size		Corner height	Head width	Lever lock screw	Shim	Wrench	Lever	Shim screw	Shim pin	
		R	L	H	B	LF	LH	HF	WF							
DTGNR/L	1616H16	△	△	16	16	100	25	16	22	DM4	HT16WI	WR20L	HYP	SM5	DD3L	TN**1604
	2020K16	△	△	20	20	125	25	20	25							
	2525M16	▲	▲	25	25	150	25	25	32							

▲Standing inventory △Make-to-order

DVJNR/L

KAPR:93°





• The illustration shows the right hand（R）

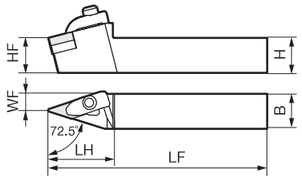
Model		Inventory		Dimension (mm)						Accessories						Matching insert
				Size of cutter square		Length size		Corner height	Head width	Lever lock screw	Shim	Wrench	Lever	Shim screw	Shim pin	
		R	L	H	B	LF	LH	HF	WF							
DVJNR/L	2020K16	△	△	20	20	125	35	20	25	DM4	HV16WI	WR20L	HYP	SM5	DD3L	VN**1604
	2525M16	▲	▲	25	25	125	35	32	35							

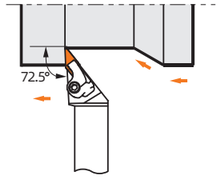
▲Standing inventory △Make-to-order

External turning tool

DVVNN

KAPR:72.5°



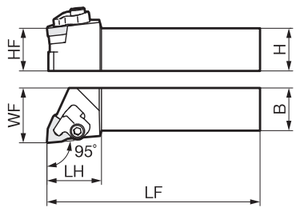


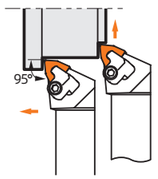
Model		Inventory		Dimension (mm)						Accessories						Matching insert
				Size of cutter square		Length size		Corner height	Head width	Lever lock screw	Shim	Wrench	Lever	Shim screw	Shim pin	
		R	L	H	B	LF	LH	HF	WF							
DVVNN	2020K16	△	△	20	20	125	37	20	10	DM4	HV16WI	WR20L	HYP	SM5	DD3L	VN**1604
	2525M16	▲	▲	25	25	150	37	25	12.5							

▲Standing inventory △Make-to-order

DWLNR/L

KAPR:95°





• The illustration shows the right hand（R）

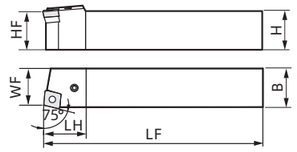
Model		Inventory		Dimension (mm)						Accessories						Matching insert
				Size of cutter square		Length size		Corner height	Head width	Lever lock screw	Shim	Wrench	Lever	Shim screw	Shim pin	
		R	L	H	B	LF	LH	HF	WF							
DWLNR/L	2020K08	△	△	20	20	125	32	20	25	DM5	HW08W1	WR25L	HYP1	SM6	DD4L	WN**0804
	2525M08	▲	▲	25	25	150	32	25	32							
	2525P08	△	△	32	32	170	32	32	32							

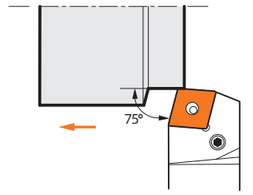
▲Standing inventory △Make-to-order

External turning tool

PCBNR/L

KAPR:75°



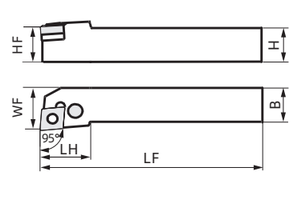


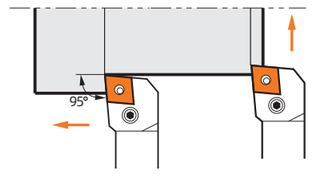
Model		Inventory		Dimension (mm)						Accessories						Matching insert
				Size of cutter square		Length size		Corner height	Head width	Lever lock screw	Shim	Wrench	Lever	Shim pin		
		R	L	H	B	LF	LH	HF	WF							
PCBNR/L	2020K12	△	△	20	20	125	27	20	17							
	2525M12	▲	▲	25	25	150	27	25	22	LLS0821	HC12WE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

▲Standing inventory △Make-to-order

PCLNR/L

KAPR:95°





• The illustration shows the right hand（R）

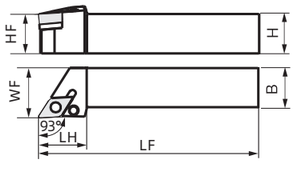
Model		Inventory		Dimension (mm)						Accessories						Matching insert
				Size of cutter square		Length size		Corner height	Head width	Lever lock screw	Shim	Wrench	Lever	Shim pin		
		R	L	H	B	LF	LH	HF	WF							
PCLNR/L	2020K12	△	△	20	20	125	28	20	25							
	2525M12	▲	▲	25	25	150	32	25	32	LLS0821	HC12WE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

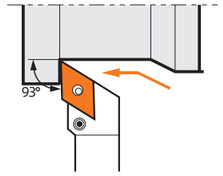
▲Standing inventory △Make-to-order

External turning tool

PDJNR/L

KAPR:93°





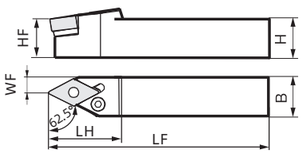
• The illustration shows the right hand（R）

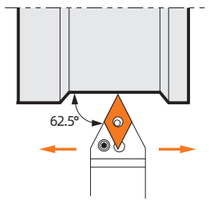
Model		Inventory		Dimension (mm)						Accessories					Matching insert
				Size of cutter square		Length size		Corner height	Head width	Lever lock screw	Shim	Wrench	Lever	Shim pin	
		R	L	H	B	LF	LH	HF	WF						
PDJNR/L	2020K11	△	△	20	20	125	25	20	25	LLS0617	HD11WE	WR25L	GH3	DD3L	DN**1104
	2525M11	▲	▲	25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

▲Standing inventory　△Make-to-order

PDPNN

KAPR:62.5°





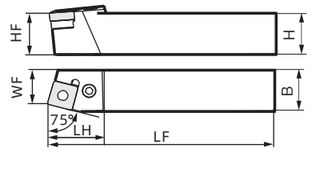
Model		Inventory	Dimension (mm)						Accessories					Matching insert
			Size of cutter square		Length size		Corner height	Head width	Lever lock screw	Shim	Wrench	Lever	Shim pin	
			H	B	LF	LH	HF	WF						
PDPNN	2020K15	▲	20	20	125	38	20	8	LLS0821	HD15WE	WR30L	GHB	DD4L	DN**1506
	2525M15	▲	25	25	150	38	25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

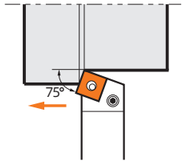
▲Standing inventory　△Make-to-order

External turning tool

PSBNR/L

KAPR:75°





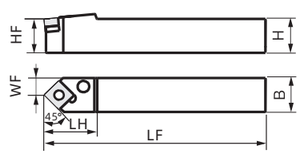
• The illustration shows the right hand（R）

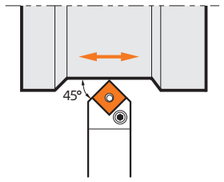
Model		Inventory		Dimension (mm)						Accessories					Matching insert
				Size of cutter square		Length size		Corner height	Head width	Lever lock screw	Shim	Wrench	Lever	Shim pin	
		R	L	H	B	LF	LH	HF	WF						
PSBNR/L	2020K12	△	△	20	20	125	28	20	17						
	2525M12	▲	▲	25	25	150	28	25	22	LLS0821	HS12WE	WR30L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

▲Standing inventory　△Make-to-order

PSDNN

KAPR:45°





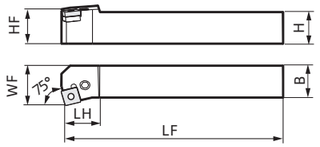
Model		Inventory		Dimension (mm)						Accessories					Matching insert
				Size of cutter square		Length size		Corner height	Head width	Lever lock screw	Shim	Wrench	Lever	Shim pin	
		R	L	H	B	LF	LH	HF	WF						
PSDNN	2020K12	△	△	20	20	125	30	20	10						
	2525M12	▲	▲	25	25	150	30	25	12.5	LLS0821	HS12WE	WR30L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

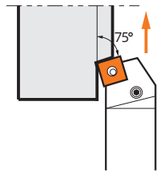
▲Standing inventory　△Make-to-order

External turning tool

PSKNR/L

KAPR:75°





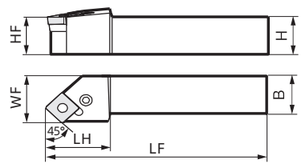
• The illustration shows the right hand（R）

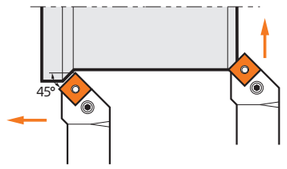
Model		Inventory		Dimension (mm)						Accessories					Matching insert
				Size of cutter square		Length size		Corner height	Head width	Lever lock screw	Shim	Wrench	Lever	Shim pin	
		R	L	H	B	LF	LH	HF	WF						
PSKNR/L	2020K12	△	△	20	20	125	28	20	25	LLS0821	HS12WE	WR30L	GH4	DD4L	SN**1204
	2525M12	▲	▲	25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

▲Standing inventory △Make-to-order

PSSNR/L

KAPR:45°





• The illustration shows the right hand（R）

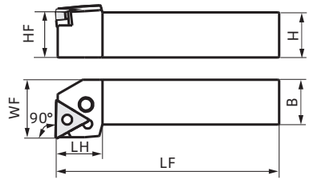
Model		Inventory		Dimension (mm)						Accessories					Matching insert
				Size of cutter square		Length size		Corner height	Head width	Lever lock screw	Shim	Wrench	Lever	Shim pin	
		R	L	H	B	LF	LH	HF	WF						
PSSNR/L	2020K12	△	△	20	20	125	28	20	25	LLS0821	HS12E	WR30L	GH4	DD4L	SN**1204
	2525M12	▲	▲	25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

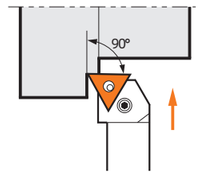
▲Standing inventory △Make-to-order

External turning tool

PTFNR/L

KAPR:90°





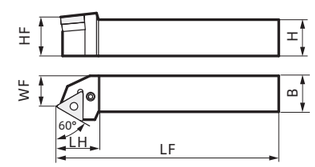
• The illustration shows the right hand（R）

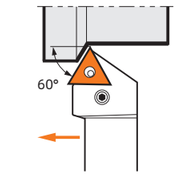
Model		Inventory		Dimension (mm)						Accessories					Matching insert
				Size of cutter square		Length size		Corner height	Head width	Lever lock screw	Shim	Wrench	Lever	Shim pin	
		R	L	H	B	LF	LH	HF	WF						
PTFNR/L	2020K16	△	△	20	20	125	23	20	25	LLS0617	HT16WE	WR25L	GH3	DD3L	TN**1604
	2525M16	▲	▲	25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

▲Standing inventory △Make-to-order

PTTNR/L

KAPR:60°





• The illustration shows the right hand（R）

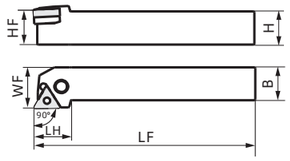
Model		Inventory		Dimension (mm)						Accessories					Matching insert
				Size of cutter square		Length size		Corner height	Head width	Lever lock screw	Shim	Wrench	Lever	Shim pin	
		R	L	H	B	LF	LH	HF	WF						
PTTNR/L	2020K16	△	△	20	20	125	23	20	17	LLS0617	HT16WE	WR25L	GH3	DD3L	TN**1604
	2525M16	▲	▲	25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

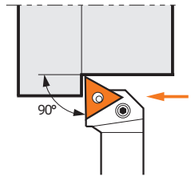
▲Standing inventory △Make-to-order

External turning tool

PTGNR/L

KAPR:90°





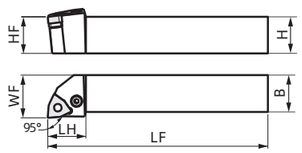
• The illustration shows the right hand（R）

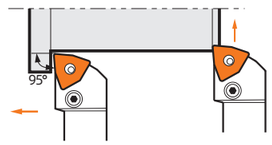
Model		Inventory		Dimension (mm)						Accessories					Matching insert
				Size of cutter square		Length size		Corner height	Head width	Lever lock screw	Shim	Wrench	Lever	Shim pin	
		R	L	H	B	LF	LH	HF	WF						
PTGNR/L	2020K16	△	△	20	20	125	23	20	25						
	2525M16	▲	▲	25	25	150	23	25	32	LLS0617	HT16WE	WR25L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

▲Standing inventory △Make-to-order

PWLNR/L

KAPR:95°





• The illustration shows the right hand（R）

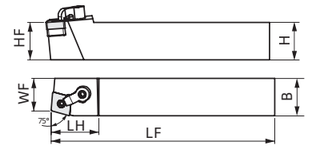
Model		Inventory		Dimension (mm)						Accessories					Matching insert
				Size of cutter square		Length size		Corner height	Head width	Lever lock screw	Shim	Wrench	Lever	Shim pin	
		R	L	H	B	LF	LH	HF	WF						
PWLNR/L	2020K06	△	△	20	20	125	23	20	25						
	2525M06	▲	▲	25	25	150	23	25	32	LLS0617	HW06WE	WR25L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

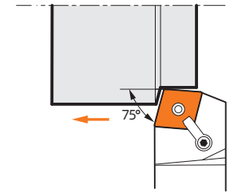
▲Standing inventory △Make-to-order

External turning tool

MCBNR/L

KAPR:75°





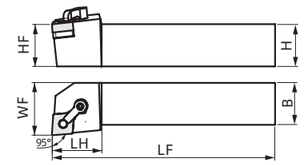
• The illustration shows the right hand（R）

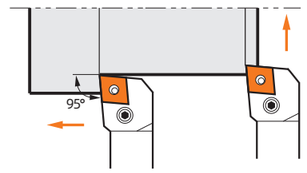
Model		Inventory		Dimension (mm)						Accessories					Matching insert
				Size of cutter square		Length size		Corner height	Head width	Clamp screw	Shim	Wrench	Lever	Pin screw	
		R	L	H	B	LF	LH	HF	WF						
MCBNR/L	2020K12	△	△	20	20	125	35	20	17						
	2525M12	▲	▲	25	25	150	35	25	22	HM6×20	HC12WI	WR25L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

▲Standing inventory △Make-to-order

MCLNR/L

KAPR:95°





• The illustration shows the right hand（R）

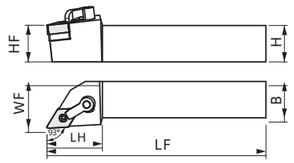
Model		Inventory		Dimension (mm)						Accessories					Matching insert
				Size of cutter square		Length size		Corner height	Head width	Clamp screw	Shim	Wrench	Lever	Pin screw	
		R	L	H	B	LF	LH	HF	WF						
MCLNR/L	2020K12	△	△	20	20	125	32	20	25	HM6×20					
	2525M12	▲	▲	25	25	150	32	25	32	HM6×25	HC12WI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

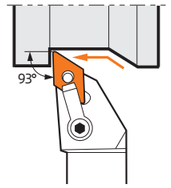
▲Standing inventory △Make-to-order

External turning tool

MDJNR/L

KAPR:93°





• The illustration shows the right hand（R）

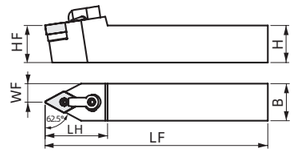
Model		Inventory		Dimension (mm)						Accessories					Matching insert
				Size of cutter square		Length size		Corner height	Head width	Clamp screw	Shim	Wrench	Lever	Pin screw	
		R	L	H	B	LF	LH	HF	WF						
MDJNR/L	2020K11	△	△	20	20	125	32	20	25	HM6×25	HD11WI	WR20L WR30L	HYD1	MP5×13	DN**1104
	2525M11	▲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

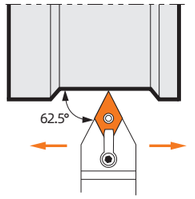
▲Standing inventory △Make-to-order

External turning tool

MDPNN

KAPR:62.5°





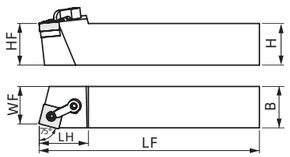
Model		Inventory		Dimension (mm)						Accessories					Matching insert
				Size of cutter square		Length size		Corner height	Head width	Clamp screw	Shim	Wrench	Lever	Pin screw	
		R	L	H	B	LF	LH	HF	WF						
MDPNN	2020K11	△	△	20	20	125	35	20	10	HM6×20	HD11WI	WR20L WR30L	HYD1	MP5×13	DN**1104
	2525M11	▲	▲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

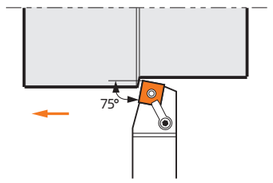
▲Standing inventory △Make-to-order

External turning tool

MSBNR/L

KAPR:75°





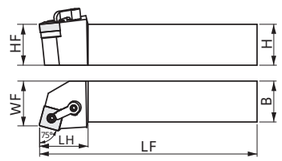
• The illustration shows the right hand（R）

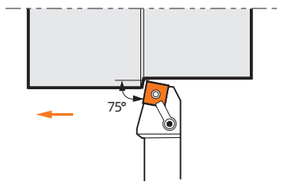
Model		Inventory		Dimension (mm)						Accessories					Matching insert
				Size of cutter square		Length size		Corner height	Head width	Clamp screw	Shim	Wrench	Lever	Pin screw	
		R	L	H	B	LF	LH	HF	WF						
MSBNR/L	2020K12	△	△	20	20	125	32	20	17	HM6×20	HS12WI	WR25L WR30L	HYD1	MP6×17	SN**1204
	2525M12	▲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

▲Standing inventory　△Make-to-order

MSRNR/L

KAPR:75°





• The illustration shows the right hand（R）

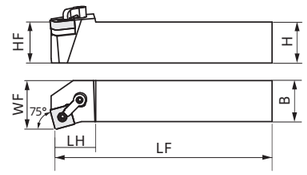
Model		Inventory		Dimension (mm)						Accessories					Matching insert
				Size of cutter square		Length size		Corner height	Head width	Clamp screw	Shim	Wrench	Lever	Pin screw	
		R	L	H	B	LF	LH	HF	WF						
MSRNR/L	2020K12	△	△	20	20	125	32	20	22	HM6×20	HS12WI	WR25L WR30L	HYD1	MP6×17	SN**1204
	2525M12	▲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

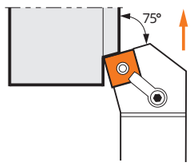
▲Standing inventory　△Make-to-order

External turning tool

MSKNR/L

KAPR:75°





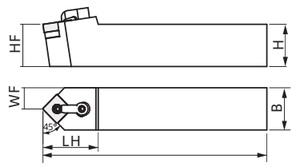
• The illustration shows the right hand（R）

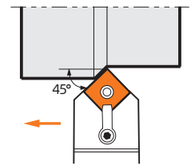
Model		Inventory		Dimension (mm)						Accessories					Matching insert
				Size of cutter square		Length size		Corner height	Head width	Clamp screw	Shim	Wrench	Lever	Pin screw	
		R	L	H	B	LF	LH	HF	WF						
MSKNR/L	2020K12	△	△	20	20	125	32	20	25	HM6×20	HS12WI	WR25L WR30L	HYD1	MP6×17	SN**1204
	2525M12	▲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

▲Standing inventory　△Make-to-order

MSDNN

KAPR:45°





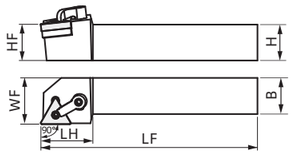
Model		Inventory	Dimension (mm)						Accessories					Matching insert
			Size of cutter square		Length size		Corner height	Head width	Clamp screw	Shim	Wrench	Lever	Pin screw	
			H	B	LF	LH	HF	WF						
MSDNN	2020K12	△	20	20	125	35	20	10	HM6×25	HS12WI	WR25L WR30L	HYD1	MP6×17	SN**1204
	2525M12	▲	25	25	150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

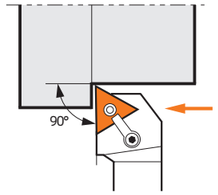
▲Standing inventory　△Make-to-order

External turning tool

MTGNR/L

KAPR:90°





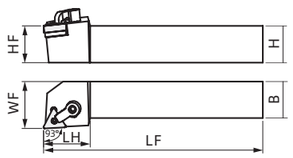
• The illustration shows the right hand（R）

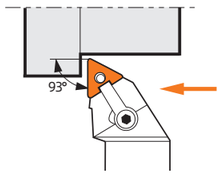
Model		Inventory		Dimension (mm)						Accessories					Matching insert
				Size of cutter square		Length size		Corner height	Head width	Clamp screw	Shim	Wrench	Lever	Pin screw	
		R	L	H	B	LF	LH	HF	WF						
MTGNR/L	2020K16	△	△	20	20	125	32	20	25	HM6×25	HT16WI	WR20L WR30L	HYD1	MP5×13	TN**1604
	2525M16	▲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

▲Standing inventory　△Make-to-order

MTJNR/L

KAPR:93°





• The illustration shows the right hand（R）

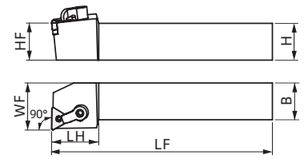
Model		Inventory		Dimension (mm)						Accessories					Matching insert
				Size of cutter square		Length size		Corner height	Head width	Clamp screw	Shim	Wrench	Lever	Pin screw	
		R	L	H	B	LF	LH	HF	WF						
MTJNR/L	2020K16	△	△	20	20	125	32	20	25	HM6×25	HT16WI	WR20L WR30L	HYD1	MP5×13	TN**1604
	2525M16	▲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

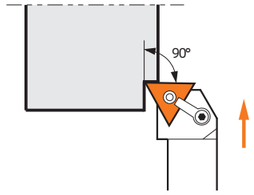
▲Standing inventory　△Make-to-order

External turning tool

MTFNR/L

KAPR:90°





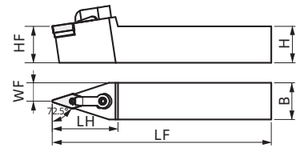
• The illustration shows the right hand（R）

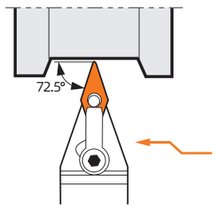
Model		Inventory		Dimension (mm)						Accessories					Matching insert
				Size of cutter square		Length size		Corner height	Head width	Clamp screw	Shim	Wrench	Lever	Pin screw	
		R	L	H	B	LF	LH	HF	WF						
MTFNR/L	2020K16	△	△	20	20	125	32	20	25	HM6×25	HT16WI	WR20L WR30L	HYD1	MP5×13	TN**1604
	2525M16	▲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

▲Standing inventory　△Make-to-order

MVVNN

KAPR:72.5°





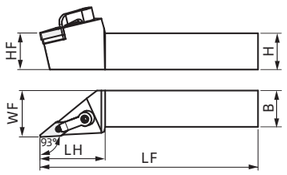
Model		Inventory	Dimension (mm)						Accessories					Matching insert
			Size of cutter square		Length size		Corner height	Head width	Clamp screw	Shim	Wrench	Lever	Pin screw	
			H	B	LF	LH	HF	WF						
MVVNN	2020K16	△	20	20	125	45	20	10	HM6×25	HV16WI	WR20L WR30L	HYD3	MP5×13	VN**1604
	2525M16	▲	25	25	150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

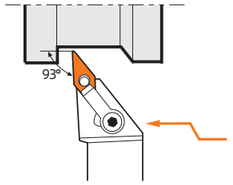
▲Standing inventory　△Make-to-order

External turning tool

MVJNR/L

KAPR:93°





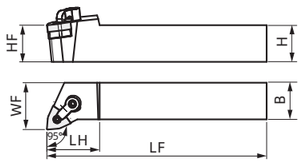
• The illustration shows the right hand（R）

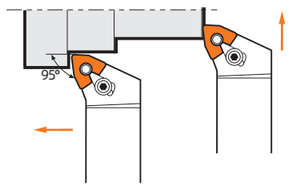
Model		Inventory		Dimension (mm)						Accessories					Matching insert
				Size of cutter square		Length size		Corner height	Head width	Clamp screw	Shim	Wrench	Lever	Pin screw	
		R	L	H	B	LF	LH	HF	WF						
MVJNR/L	2020K16	△	△	20	20	125	45	20	25	HM6×25	HV16WI	WR20L MR30L	HYD3	MP5×13	VN**1604
	2525M16	▲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

▲Standing inventory　△Make-to-order

MWLNR/L

KAPR:95°





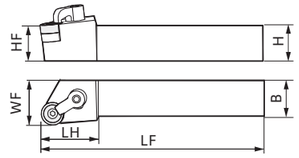
• The illustration shows the right hand（R）

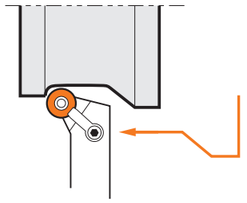
Model		Inventory		Dimension (mm)						Accessories					Matching insert
				Size of cutter square		Length size		Corner height	Head width	Clamp screw	Shim	Wrench	Lever	Pin screw	
		R	L	H	B	LF	LH	HF	WF						
MWLNR/L	2020K06	△	△	20	20	125	28	20	25	HM5×20	HW06WI	WR20L WR30L	HYD0	MP5×13	WN**0604
	2525M06	▲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

▲Standing inventory　△Make-to-order

External turning tool

MRGCR/L



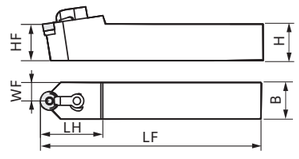


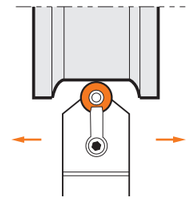
• The illustration shows the right hand（R）

Model		Inventory		Dimension (mm)						Accessories					Matching insert
				Size of cutter square		Length size		Corner height	Head width	Clamp screw	Shim	Wrench	Lever	Pin screw	
		R	L	H	B	LF	LH	HF	WF						
MRGCR/L	2525M12	△	△	25	25	150	45	25	32	HM6×25	HR12WI	WR25L WR30L	HYD1	MP6×17	RC**1204
	3232P12	▲	▲	32	32	170	45	32	40	HM6×28					

▲Standing inventory　△Make-to-order

MRDCN





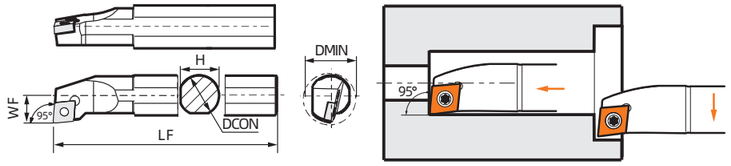
Model		Inventory		Dimension (mm)						Accessories					Matching insert
				Size of cutter square		Length size		Corner height	Head width	Clamp screw	Shim	Wrench	Lever	Pin screw	
		R	L	H	B	LF	LH	HF	WF						
MRDCN	2020K12	△	△	20	20	125	35	20	10	HM6×25	HR12WI	WR30L	HYD1	MP6×17	RC**1204
	2525M12	▲	▲	25	25	150	35	25	12.5	HM6×30					
	3232P12	△	△	32	32	170	35	32	16						

▲Standing inventory　△Make-to-order

Internal Turning Tool (cemented carbide)

C□□-SCLCR/L

KAPR:95°



• The illustration shows the right hand（R）

Model		Inventory		Dimension (mm)					Accessories		Matching insert
		R	L	DMIN	DCON	H	LF	WF	Insert screw	Wrench	
	C07K-SCLCR/L06	△	△	10	7	6.5	125	4.5	M2.5X5.5	WR07	CC**0602
	C08K-SCLCR/L06	△	△	10	8	7.5	125	5			
	C10M-SCLCR/L06	△	△	12	10	9.5	150	6			
	C12Q-SCLCR/L06	△	△	14	12	11	180	7			
	C12Q-SCLCR/L09	△	△	16	12	11	180	8	M3.5X8	WR15	CC**09T3
	C14Q-SCLCR/L09	△	△	16	14	13	180	8			
	C16R-SCLCR/L09	△	△	18	16	15	200	9			
	C20S-SCLCR/L09	△	△	22	20	19	250	11			
	C25T-SCLCR/L09	△	△	28	25	23	300	14			

▲Standing inventory △Make-to-order

C□□-SDQCR/L

KAPR:107.5°



• The illustration shows the right hand（R）

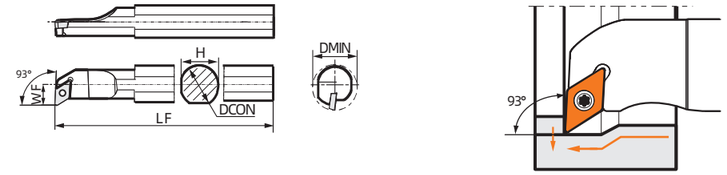
Model		Inventory		Dimension (mm)					Accessories		Matching insert
		R	L	DMIN	DCON	H	LF	WF	Insert screw	Wrench	
	C10M-SDQCR/L07	△	△	13	10	9.5	150	7	M2.5×6.5	WR07	DC**0702
	C12Q-SDQCR/L07	△	△	16	12	11	180	9			
	C16R-SDQCR/L07	△	△	20	16	15	180	13			

▲Standing inventory △Make-to-order

Internal Turning Tool (cemented carbide)

C□□-SDUCR/L

KAPR:93°



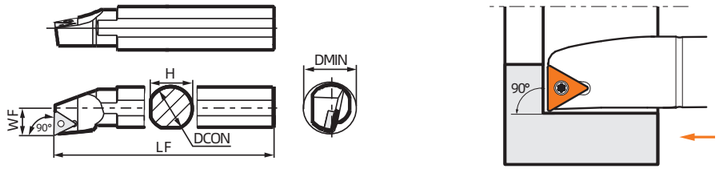
• The illustration shows the right hand（R）

Model		Inventory		Dimension (mm)					Accessories		Matching insert
		R	L	DMIN	DCON	H	LF	WF	Insert screw	Wrench	
	C10M-SDUCR/L07	△	△	13	10	9.5	150	7	M2.5X6.5	WR07	DC**0702
	C12Q-SDUCR/L07	△	△	16	12	11	180	9			
	C16R-SDUCR/L07	△	△	20	16	15	200	11			
	C20S-SDUCR/L07	△	△	25	20	19	250	13			

▲Standing inventory △Make-to-order

C□□-STFCR/L

KAPR:90°



• The illustration shows the right hand（R）

Model		Inventory		Dimension (mm)					Accessories		Matching insert
		R	L	DMIN	DCON	H	LF	WF	Insert screw	Wrench	
	C12Q-STFCR/L11	△	△	16	12	11	180	8	M2.5X6.5	WR07	TC**1102
	C16R-STFCR/L11	△	△	18	16	15	200	9			
	C20S-STFCR/L11	△	△	25	20	19	250	12			

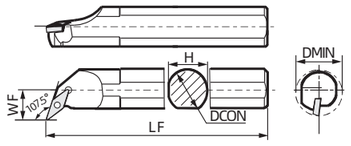
▲Standing inventory △Make-to-order

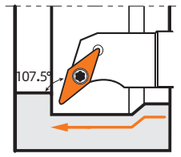
HUAREAL

Internal Turning Tool (cemented carbide)

C□□-SVQCR/L

KAPR:107.5°





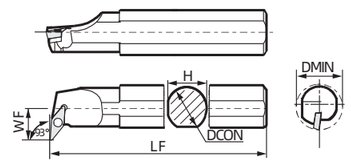
• The illustration shows the right hand（R）

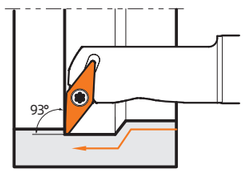
Model		Inventory		Dimension (mm)					Accessories		Matching insert
		R	L	DMIN	DCON	H	LF	WF	Insert screw	Wrench	
	C16R-SVQCR/L11	△	△	22	16	15	200	13	M2.5x6.5	WR07	VC**1103
	C20S-SVQCR/L11	△	△	26	20	18	250	15			

▲Standing inventory △Make-to-order

C□□-SVUCR/L

KAPR:93°





• The illustration shows the right hand（R）

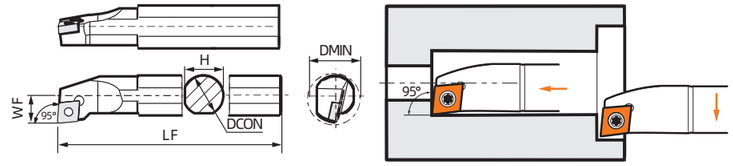
Model		Inventory		Dimension (mm)					Accessories		Matching insert
		R	L	DMIN	DCON	H	LF	WF	Insert screw	Wrench	
	C16R-SVUCR/L11	△	△	24	16	15	200	15	M2.5x6.5	WR07	VC**1103
	C20S-SVUCR/L11	△	△	28	20	18	250	17			

▲Standing inventory △Make-to-order

Internal Turning Tool (steel)

S□□-SCLCR/L

KAPR:95°



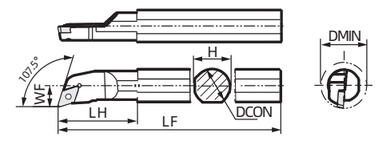
• The illustration shows the right hand（R）

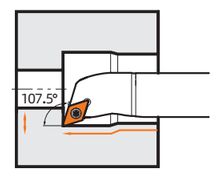
Model		Inventory		Dimension (mm)					Accessories		Matching insert
		R	L	DMIN	DCON	H	LF	WF	Insert screw	Wrench	
	S12M-SCLCR/L06	△	△	16	12	11	150	7.5	M2.5×5.5	WR07	CC**0602
	S12M-SCLCR/L09	△	△	16	12	11	150	8	M3.5×8	WR15	CC**09T3
	S16Q-SCLCR/L09	△	△	20	16	15	180	10			
	S20R-SCLCR/L09	▲	▲	25	20	19	200	12	M3.5×10		
	S25S-SCLCR/L09	▲	▲	32	25	24	250	15.5			
	S20R-SCLCR/L12	▲	▲	25	20	19	200	12.5	M4.0×11		CC**1204
	S25S-SCLCR/L12	▲	▲	32	25	24	250	15.5			

▲Standing inventory △Make-to-order

S□□-SDQCR/L

KAPR:107.5°





• The illustration shows the right hand（R）

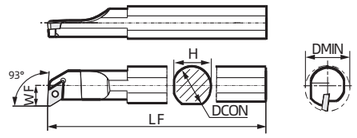
Model		Inventory		Dimension (mm)					Accessories		Matching insert
		R	L	DMIN	DCON	H	LF	WF	Insert screw	Wrench	
	S12M-SDQCR/L07	△	△	16	12	11	150	9	M2.5×6.5	WR07	DC**0702
	S16Q-SDQCR/L07	△	△	20	16	15	180	11			
	S20R-SDQCR/L11	▲	▲	25	20	19	200	13	M3.5×8	WR15	DC**11T3
	S25S-SDQCR/L11	▲	▲	32	25	24	250	17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

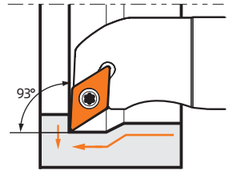
▲Standing inventory △Make-to-order

Internal Turning Tool (steel)

S□□-SDUCR/L

KAPR:93°





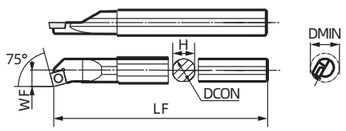
• The illustration shows the right hand（R）

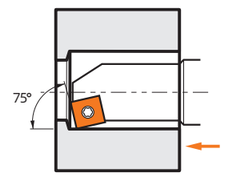
Model		Inventory		Dimension (mm)					Accessories		Matching insert
		R	L	DMIN	DCON	H	LF	WF	Insert screw	Wrench	
	S12M-SDUCR/L07	△	△	16	12	11	150	9	M2.5×6.5	WR07	DC**0702
	S16Q-SDUCR/L07	△	△	20	16	15	180	11			
	S20R-SDUCR/L11	▲	▲	25	20	19	200	13	M3.5×8	WR15	DC**11T3

▲Standing inventory △Make-to-order

S□□-SSKCR/L

KAPR:75°





• The illustration shows the right hand（R）

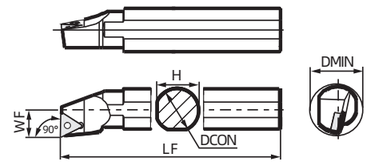
Model		Inventory		Dimension (mm)					Accessories		Matching insert
		R	L	DMIN	DCON	H	LF	WF	Insert screw	Wrench	
	S12M- SSKCR/L09	△	△	16	12	11	150	9	M3.5×8	WR15	SC**09T3
	S16Q- SSKCR/L09	△	△	20	16	15	180	11			
	S20R- SSKCR/L09	▲	▲	25	20	19	200	13			
	S25S- SSKCR/L12	▲	▲	32	25	24	250	17	M4×1	WR15	SC**1204

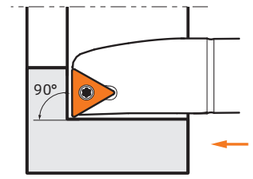
▲Standing inventory △Make-to-order

Internal Turning Tool (steel)

S□□-STFCR/L

KAPR:90°





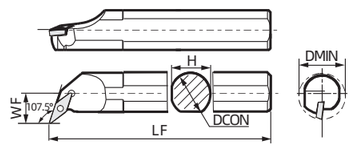
• The illustration shows the right hand（R）

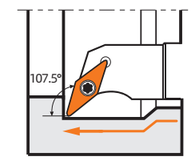
Model		Inventory		Dimension (mm)					Accessories		Matching insert
		R	L	DMIN	DCON	H	LF	WF	Insert screw	Wrench	
	S16Q-STFCR/L11	△	△	20	16	15	180	10	M2.5×6.5	WR07	TC**1102
	S20R-STFCR/L11	△	△	25	20	19	200	12			
	S25S-STFCR/L16	▲	▲	32	25	24	250	16	M3.5×10	WR15	TC**16T3

▲Standing inventory △Make-to-order

S□□-SVQBR/L

KAPR:107.5°





• The illustration shows the right hand（R）

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

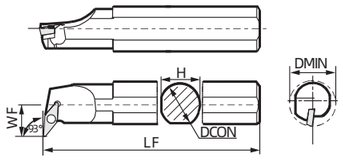
▲Standing inventory △Make-to-order

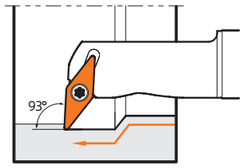
HUAREAL

Internal Turning Tool

S□□-SVUBR/L

KAPR:93°





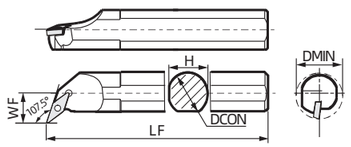
• The illustration shows the right hand（R）

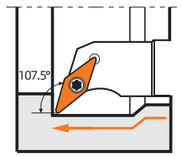
Model		Inventory		Dimension (mm)					Accessories		Matching insert
		R	L	DMIN	DCON	H	LF	WF	Insert screw	Wrench	
	S25S- SVUBR/L16	▲	▲	35	25	24	250	20	M3.5×12	WR15	VB**1604

▲Standing inventory △Make-to-order

S□□-SVQCR/L

KAPR:107.5°





• The illustration shows the right hand（R）

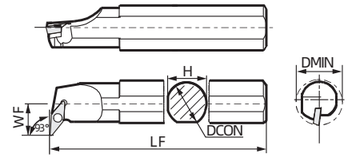
Model		Inventory		Dimension (mm)					Accessories		Matching insert
		R	L	DMIN	DCON	H	LF	WF	Insert screw	Wrench	
	S16Q-SVQCR/L11	▲	▲	22	16	15	180	12	M2.5×6.5	WR07	VC**1103
	S25S-SVQCR/L16	▲	▲	35	25	24	250	20	M3.5×12	WR15	VC**1604

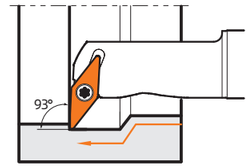
▲Standing inventory △Make-to-order

Internal Turning Tool

S□□-SVUCR/L

KAPR:93°





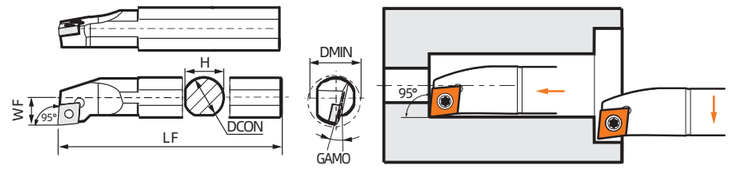
• The illustration shows the right hand（R）

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

▲Standing inventory △Make-to-order

S□□-SCLPR/L

KAPR:95°



• The illustration shows the right hand（R）

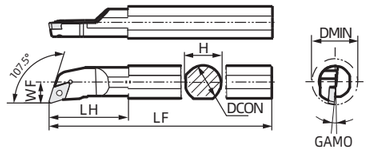
Model		Inventory		Dimension (mm)						Accessories		Matching insert
		R	L	DMIN	DCON	H	LF	WF	GAMO	Insert screw	Wrench	
	S12M-SCLPR/L06	△	△	16	12	11	150	8	-4°	M2.5×5.5	WR07	CP**0602
	S16Q-SCLPR/L09	△	△	20	16	15	180	10	-4°	M3.5×8	WR15	CP**09T3
	S20R-SCLPR/L09	▲	▲	25	20	18	200	13	-4°			

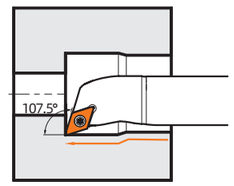
▲Standing inventory △Make-to-order

Internal Turning Tool

S□□-SDQPR/L

KAPR:107.5°





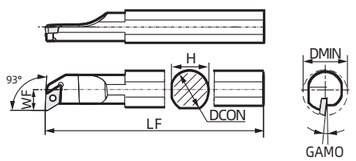
• The illustration shows the right hand（R）

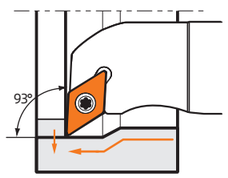
Model		Inventory		Dimension (mm)						Accessories		Matching insert
		R	L	DMIN	DCON	H	LF	WF	GAMO	Insert screw	Wrench	
	S12M-SDQPR/L07	△	△	16	12	11	150	9	-8°	M2.5×5.5	WR07	DP**0702
	S16Q-SDQPR/L07	△	△	20	16	15	180	11	-6°	M2.5×6.5		
	S20R-SDQPR/L11	▲	▲	25	20	18	200	13	-6°	M3.5×8	WR15	DP**11T3

▲Standing inventory △Make-to-order

S□□-SDUPR/L

KAPR:93°





• The illustration shows the right hand（R）

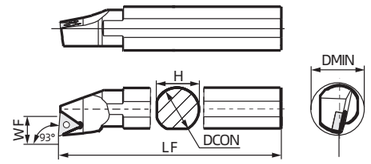
Model		Inventory		Dimension (mm)						Accessories		Matching insert
		R	L	DMIN	DCON	H	LF	WF	GAMO	Insert screw	Wrench	
	S12M-SDUPR/L07	△	△	16	12	11	150	9	-8°	M2.5×5.5	WR07	DP**0702
	S16Q-SDUPR/L07	▲	▲	20	16	15	180	11	-6°	M2.5×6.5		

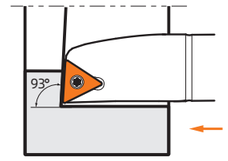
▲Standing inventory △Make-to-order

Internal Turning Tool

S□□-STUPR/L

KAPR:93°





• The illustration shows the right hand（R）

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

▲Standing inventory △Make-to-order

Comparison table of general turning inserts in metric and Inch (Negative)

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

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

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

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

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

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

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

Comparison table of general turning inserts in metric and Inch (Positive)

C-type positive angle	ISO	Inch
CCMT/ CCGT	060202	2(1.5)0
	060204	2(1.5)1
	060208	2(1.5)2
	09T302	3(2.5)0
	09T304	3(2.5)1
	09T308	3(2.5)2
	120404	431
	120408	432
	120412	433

D-type positive angle	ISO	Inch
DCMT/ DCGT	070202	2(1.5)0
	070204	2(1.5)1
	070208	2(1.5)2
	11T302	3(2.5)0
	11T304	3(2.5)1
	11T308	3(2.5)2
	11T312	3(2.5)3

S-type positive angle	ISO	Inch
SCMT	060204	2(1.5)1
	09T302	3(2.5)0
	09T304	3(2.5)1
	09T308	3(2.5) 2
	120404	431
	120408	432
	120412	433
	150404	531
	150408	532
	150412	533
	190408	632
	190412	633
	190416	634

T-type positive angle	ISO	Inch
TCMT/ TCGT	06T102	1.2(1.2)0
	06T104	1.2(1.2)1
	06T108	1.2(1.2)2
	090202	1.8(1.5)0
	090204	1.8(1.5)1
	090208	1.8(1.5)2
	110202	2(1.5)0
	110204	2(1.5)1
	110208	2(1.5)2
	110302	220
	110304	221
	110308	222
	16T302	3(2.5)0
	16T304	3(2.5)1
	16T308	3(2.5)2
	16T312	3(2.5)3
	160400	330
	220408	432
	220412	433
	220416	434
	270408	532
	270412	533
	330612	643
	330616	644

V-type positive angle	ISO	Inch
VBMT/ VBGT	110202	2(1.5)0
	110204	2(1.5)1
	110208	2(1.5)2
	110302	220
	110304	221
	110308	222
VCMT/ VCGT	160402	330
	160404	331
	160408	332
	160412	333

HUAREAL

Cutting parameter recommendations for general external turning

| Machined workpiece materials | | | | | | Product grade | | | | | |

HUAREAL

Cutting parameter recommendations for general external turning

| Machined workpiece materials | | | | | Product grade | | | | |

Cutting parameters recommendation for internal turning

(Positive style: standard machining diameter ＞ϕ10)

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

ISO	Workpiece material	Hardness	Processing	Condition	Recommended material	Corner radius (RE)	Lower limit - recommended value -upper limit		
							Speed Vc (m/min)	Cutting depth ap (mm)	Feed f (mm/rev)
P	Low carbon steel Low carbon alloy Steel	≤ 300HB	Precision finishing	Continuous Interrupt	HR8115 HR8225	0.4	250-300- 350 120-170- 220	0.05-0.3 -0.5 0.05 -0.3 -0.5	0.03- 0.1- 0.15 0.03- 0.1- 0.15
			Finishing	Continuous Interrupt	HR8115 HR8225	0.4 0.8	200-250- 300 150-200- 250	0.2 -0.5 -1.0 0.2 -0.5 -1.0	0.05- 0.1- 0.2 0.05- 0.1- 0.2
			Finishing ~ semi-finishing	Continuous Interrupt	HR8115 HR8225	0.4 0.8	150-200- 250 100-150- 200	0.5 -1.0 -2.0 0.5 -1.0 -1.5	0.1- 0.15-0.25 0.1- 0 15- 0.2
			Semi-finishing	Continuous Interrupt	HR8115 HR8225	0.4 0.8	100-150- 200 80- 120- 150	1.0 -1.5 -2.5 1.0 -1.5 -2.0	0.1- 0.15- 0.3 0.1- 0.15- 0.2
	Medium carbon steel Medium carbon alloy	≤ 300HB	Precision finishing	Continuous Interrupt	HR8115 HR8225	0.4 0.8	150-200- 250 120-140- 170	0.05-0.3 -0.5 0.05-0.3 -0.5	0.03- 0.1- 0.15 0.03- 0.1- 0.15
			Finishing	Continuous Interrupt	HR8115 HR8225	0.4 0.8	150-200- 250 120-180- 200	0.2 -0.5 -1.0 0.2 -0.5 -1.0	0.05- 0.1- 0.2 0.05- 0.1- 0.2
			Finishing ~ semi-finishing	Continuous Interrupt	HR8115 HR8225	0.4 0.8	120-180- 220 100-150- 200	0.5 -1.0 -2.0 0.5 -1.0 -1.5	0.1- 0.15-0.25 0.1- 0.15- 0.2
			Semi-finishing	Continuous Interrupt	HR8115 HR8225	0.4 0.8	100-150- 200 80- 120- 150	1.0 -1.5 -2.5 1.0 -1.5 -2.0	0.1- 0.15- 0.3 0.1- 0.15 - 0.2
	High carbon Alloy steel	≤ 280HB	Precision finishing	Continuous Interrupt	HR8115 HR8225	0.4 0.8	120-150- 180 110-130- 160	0.05-0.3 -0.5 0.05-0.3 -0.5	0.03- 0.1- 0.15 0.03- 0.1- 0.15
			Finishing	Continuous Interrupt	HR8115 HR8225	0.4 0.8	120-150- 180 100-120- 150	0.2 -0.5 -1.0 0.2 -0.5 -1.0	0.05- 0.1- 0.2 0.05- 0.1- 0.2
			Finishing ~ semi-finishing	Continuous Interrupt	HR8115 HR8225	0.4 0.8	120-150- 180 100-120- 150	0.5 -1.0 -2.0 0.5 -1.0 -1.5	0.1- 0.15-0.25 0.1- 0.15- 0.2
			Semi-finishing	Continuous Interrupt	HR8115 HR8225	0.4 0.8	100-120- 150 80- 100- 120	1.0 -1.5 -2.5 1.0 -1.5 -2.0	0.1- 0.15- 0.3 0.1- 0 15- 0.2
M	Stainless steel (austenite)	≤ 220HB	Finishing	Continuous Interrupt	HR7125 HR7225	0.4 0.8	120-150- 180 100-120- 150	0.2 -0.5 -0.8 0.2 -0.5 -0.8	0.05 -0.08- 0.1 0.05-0.08 - 0.1
			Semi-finishing	Continuous Interrupt	HR7125 HR7225	0.4 0.8	120-150- 180 100-120- 150	0.5 -1.0 -1.5 0.5 -1.0 -1.5	0.05 - 0.1 - 0.2 0.05- 0.1 - 0.2
	Stainless steel (precipitation and hardening)	≤ 300HB	Finishing	Continuous Interrupt	HR7125 HR7225	0.4 0.8	80- 100- 120 60- 80- 100	0.2 -0.7 -1.0 0.2 -0.7 -1.0	0.05- 0.1 - 0.15 0.05- 0.1 - 0.15
			Semi-finishing	Continuous Interrupt	HR7125 HR7225	0.4 0.8	80- 100- 120 60- 80- 100	0.5 -1.0 -1.5 0.5 -1.0 -1.5	0.05- 0.1 - 0.2 0.05- 0.1 - 0.2
K	Grey cast iron	≤ 250HB	High speed finishing	Continuous Interrupt	HR6115	0.4 0.8	400-500- 600 200-250- 350	0.05-0.2 -0.5 0.2 -0.5 -1.0	0.05- 0.1 - 0.15 0.05- 0.1 - 0.15
			Finishing (with high luster)	Continuous Interrupt	HR6115	0.4 0.8	200-250- 300 120-180- 230	0.2 -0.5 -1.0 0.2 -0.5 -1.0	0.05- 0.1 - 0.2 0.05- 0.1 - 0.2
			Finishing	Continuous Interrupt	HR6115	0.4 0.8	150-180- 200 100-150- 180	0.2 -0.5 -1.0 0.2 -0.5 -1.0	0.05- 0.1 - 0.2 0.05- 0.1 - 0.2
			Semi-finishing	Continuous Interrupt	HR6115	0.4 0.8	100-150- 200 80- 120- 150	0.5 -1.0 -2.0 0.5 -1.0 -2.0	0.1- 0.15- 0.2 0.05- 0.1 - 0.15
	Nodular cast iron	≤ 270HB	High speed finishing	Continuous Interrupt	HR6215	0.4 0.8	200-300- 400 150-200- 250	0.05-0.2 -0.5 0.2 -0.5 -1.0	0.03- 0.05- 0.1 0.05- 0 1 - 0.15
			Finishing (with high luster)	Continuous Interrupt	HR6215	0.4 0.8	150-200- 250 120-150- 200	0.2 -0.5 -1.0 0.2 -0.5 -1.0	0.05- 0.1 - 0.2 0.05- 0.1- 0.2
			Finishing	Continuous Interrupt	HR6215	0.4 0.8	120-150- 180 100-120- 150	0.2 -0.5 -1.0 0.2 -0.5 -1.0	0.05- 0.1 - 0.2 0.05- 0.1 - 0.2
			Semi-finishing	Continuous Interrupt	HR6215	0.4 0.8	100-120- 150 80- 100- 120	0.5 -1.0 -2.0 0.5 -1.0 -2.0	0.05- 0.1 - 0.2 0.05- 0.1 - 0.15
N	Non-ferrous metal Copper-copper alloy Aluminum/ aluminum alloy (Si < 10%), etc.	≤ 100HB	High speed finishing (Iridescence surface luster)	Continuous	HRK10 HRK20	0.4 0.8	200-400-1000	0.05-0.1-0.3	0.05-0.1-0.15
			Finishing	Continuous Interrupt	HRK10 HRK20	0.4 0.8	100-200- 400 100-200- 400	0.05-0.5 -1.0 0.05-0.5 -1.0	0.03- 0.1- 0.2 0.03- 0.1- 0.2
S	Titanium alloy	≤ 400HB	High speed finishing (Iridescence surface luster)	Continuous Interrupt	HR9205 HR9215	0.4 0.8	100-120- 150 70- 100- 120	0.05-0.1 -0.3 0.05-0.1 -0.3	0.03- 0.07- 0.1 0.03- 0.07- 0.1
			Finishing	Continuous Interrupt	HR9205 HR9215	0.4 0.8	30- 50- 70 30- 50- 70	0.05-0.5 -1.0 0.05-0.5 -1.0	0.03- 0.1- 0.2 0.03- 0.1- 0.2
	Heat resistant super alloys	≤ 350HB	Finishing	Continuous Interrupt	HR9205 HR9215	0.4 0.8	10- 30- 50 10- 30- 50	0.05-0.5 -1.0 0.05-0.5 -1.0	0.03- 0.1- 0.2 0.03- 0.1- 0.2
			Finishing	Continuous Interrupt	HR9205 HR9215	0.4 0.8	40- 60- 80 40- 60- 80	0.1 -0.3 -0.5 0.1 -0.3 -0.5	0.03- 0.05- 0.1 0.03- 0.05- 0.1

Cutting parameters recommendation for cermet

Grade	Material name	Low carbon steel/ low carbon alloy steel	Middle carbon steel/ middle carbon alloy steel	High carbon alloy steel
	Hardness	150HB	250HB	350HB
HRC10	V_c (m/min)	100-200-300		100-150-200
	f_n (mm/rev)	0.10~0.30		0.05~0.25
HR115C	v_c (m/min)	200-300-400		180-260-320
	f_n (mm/rev)	0.10~0.30		0.05~0.25

Cutting parameters for S-type internal turning

Workpiece material		Hardness	Processing	L/D≤3		L/D=4		L/D=5		L/D=6	
				Feed (mm/rev)	Cutting depth (mm)	Feed (mm/rev)	Cutting depth (mm)	Feed (mm/rev)	Cutting depth (mm)	Feed (mm/rev)	Cutting depth (mm)
P	Carbon steel, alloy steel 45#42CrMo	180-280 HB	Finishing	0.05-0.1-0.15	< 0.2	0.05-0.1-0.15	< 0.2				
			Semi-finishing	0.15-0.25-0.35	< 3.0	0.1-0.15-0.2	< 1.5				
M	Stainless steel 1Cr18Ni9Ti 0Cr18Ni9	≤ 220HB	Finishing	0.05-0.1-0.15	< 0.2	0.05-0.1-0.15	< 0.2				
			Semi-finishing	0.15-0.2-0.25	< 2.0	0.1-0.15-0.2	< 1.0				
N	Aluminum alloy	—	Finishing	0.05-0.1-0.15	< 0.2	0.05-0.1-0.15	< 0.2	0.05-0.1-0.15	-0.15	0.05-0.1-0.15	< 0.1
			Semi-finishing	0.05-0.1-0.15	< 2.0	0.05-0.1-0.15	< 1.5	0.05-0.1-0.15	-1.0	0.05-0.1-0.15	< 1.0

Cutting parameters for C-type internal turning

Workpiece material		Processing	Chipbreaker	Grade	Feed(mm/rev)	Cutting depth(mm)
P	Steel HB180-280	Finishing	TF	HR8225 HR7225	0.05-0.2-0.35	0.05-0.1-0.3-0.5
M	Stainless steel ≤HB220				0.05-0.2-0.35	0.05-0.1-0.3-0.5
K	Cast iron HB170-230				0.05-0.2-0.35	0.05-0.1-0.3-0.5

Cutting parameters recommendation for general turning chipbreaker (Negative)

Workpiece material	Hardness	Chipbreaker	Cutting range	Grade	Cuttingspeed (m/min)	Fn (mm/rev)	Ap (mm)
Mild steel (45#、A3etc)	≤180HB	GC	●	HR8105	250-420	0.08-0.36	0.30-2.00
			●	HR8115	230-400	0.08-0.36	0.30-2.00
			●	HR8125	215-360	0.08-0.36	0.30-2.00
			●	HR8225	225-380	0.08-0.36	0.30-2.00
			◕	HR8105	250-420	0.08-0.36	0.30-2.00
			◕	HR8115	230-400	0.08-0.31	0.30-2.00
			◕	HR8125	215-360	0.08-0.31	0.30-2.00
			◕	HR8225	225-380	0.08-0.31	0.30-2.00
		GF	●	HR8105	230-400	0.10-0.30	0.30-1.50
			●	HR8115	215-360	0.10-0.30	0.30-1.50
			●	HR8125	190-355	0.10-0.30	0.30-1.50
			●	HR8225	205-375	0.10-0.30	0.30-1.50
			◕	HR8105	230-400	0.10-0.25	0.30-1.50
			◕	HR8115	215-360	0.10-0.25	0.30-1.50
			◕	HR8125	190-355	0.10-0.25	0.30-1.50
			◕	HR8225	205-375	0.10-0.25	0.30-1.50
			⌗	HR8125	190-355	0.10-0.20	0.30-1.50
			⌗	HR8225	205-375	0.10-0.20	0.30-1.50
		GQ	●	HR8105	230-400	0.14-0.50	1.00-5.00
			●	HR8115	215-360	0.14-0.50	1.00-5.00
			●	HR8125	190-355	0.14-0.50	1.00-5.00
			●	HR8225	205-375	0.14-0.50	1.00-5.00
			◕	HR8105	230-400	0.14-0.45	1.00-5.00
			◕	HR8115	215-360	0.14-0.45	1.00-5.00
			◕	HR8125	190-355	0.14-0.45	1.00-5.00
			◕	HR8225	205-375	0.14-0.45	1.00-5.00
			⌗	HR8125	190-355	0.14-0.40	1.00-5.00
			⌗	HR8225	205-375	0.14-0.40	1.00-5.00
		GM	●	HR8105	230-400	0.16-0.55	1.00-5.00
			●	HR8115	215-360	0.16-0.55	1.00-5.00
			●	HR8125	190-355	0.16-0.55	1.00-5.00
			●	HR8225	205-375	0.16-0.55	1.00-5.00
			◕	HR8105	225-380	0.16-0.50	1.00-5.00
			◕	HR8115	200-380	0.16-0.50	1.00-5.00
			◕	HR8125	185-350	0.16-0.50	1.00-5.00
			◕	HR8225	195-360	0.16-0.50	1.00-5.00
			⌗	HR8125	185-320	0.16-0.45	1.00-5.00
			⌗	HR8225	195-360	0.16-0.45	1.00-5.00

● Stable ◕ Average ⌗ Tough

Workpiece material	Hardness	Chipbreaker	Cutting range	Grade	Cuttingspeed (m/min)	Fn (mm/rev)	Ap (mm)
Mild steel (45#、A3etc)	≤180HB	GR	●	HR8115	235-320	0.25-0.60	2.00-7.00
			●	HR8125	185-295	0.25-0.60	2.00-7.00
			●	HR8225	195-315	0.25-0.60	2.00-7.00
			◕	HR8115	235-320	0.25-0.55	2.00-7.00
			◕	HR8125	195-315	0.25-0.55	2.00-7.00
			◕	HR8225	185-295	0.25-0.55	2.00-7.00
			⌗	HR8115	235-320	0.25-0.50	2.00-7.00
			⌗	HR8125	185-295	0.25-0.50	2.00-7.00
			⌗	HR8225	195-315	0.25-0.50	2.00-7.00
		GZ	●	HR8105	120-255	0.25-1.00	3.00-12.00
			●	HR8115	100-200	0.25-1.00	3.00-12.00
			●	HR8125	100-180	0.25-1.00	3.00-12.00
			●	HR8225	100-195	0.25-1.00	3.00-12.00
			◕	HR8105	120-255	0.25-0.95	3.00-12.00
			◕	HR8115	100-200	0.25-0.95	3.00-12.00
			◕	HR8125	100-180	0.25-0.95	3.00-12.00
			◕	HR8225	100-195	0.25-0.95	3.00-12.00
			⌗	HR8115	60-180	0.25-0.90	3.00-12.00
			⌗	HR8125	60-180	0.25-0.90	3.00-12.00
			⌗	HR8115	60-180	0.25-0.90	3.00-12.00
			⌗	HR8225	60-180	0.25-0.90	3.00-12.00
		GX	●	HR8105	135-230	0.40-1.20	4.50-13.00
			●	HR8115	135-220	0.40-1.20	4.50-13.00
			●	HR8125	80-140	0.40-1.20	4.50-13.00
			●	HR8225	80-160	0.40-1.20	4.50-13.00
			◕	HR8105	120-220	0.40-1.15	4.50-13.00
			◕	HR8115	100-180	0.40-1.15	4.50-13.00
			◕	HR8125	100-160	0.40-1.15	4.50-13.00
			◕	HR8225	115-170	0.40-1.15	4.50-13.00
			⌗	HR8115	60-180	0.40-1.10	4.50-13.00
			⌗	HR8125	60-160	0.40-1.10	4.50-13.00
			⌗	HR8225	60-170	0.40-1.10	4.50-13.00
Carbon steel ,alloy steel (40Cr、42CrMo etc)	180-280HB	GC	●	HR8105	250-420	0.08-0.36	0.30-2.00
			●	HR8115	230-400	0.08-0.36	0.30-2.00
			●	HR8125	215-360	0.08-0.36	0.30-2.00
			●	HR8225	225-380	0.08-0.36	0.30-2.00
			◕	HR8105	250-420	0.08-0.36	0.30-2.00
			◕	HR8115	230-400	0.08-0.31	0.30-2.00
			◕	HR8125	215-360	0.08-0.31	0.30-2.00
			◕	HR8225	225-380	0.08-0.31	0.30-2.00

● Stable ◕ Average ⌗ Tough

Cutting parameters recommendation for general turning chipbreaker (Negative)

Workpiece material	Hardness	Chipbreaker	Cutting range	Grade	Cuttingspeed (m/min)	Fn (mm/rev)	Ap (mm)
Carbon steel ,alloy steel (40Cr、42CrMo etc)	180-280HB	GF	●	HR8105	230-400	0.10-0.30	0.30-1.50
			●	HR8115	215-360	0.10-0.30	0.30-1.50
			●	HR8125	190-355	0.10-0.30	0.30-1.50
			●	HR8225	205-375	0.10-0.30	0.30-1.50
			◕	HR8105	230-400	0.10-0.25	0.30-1.50
			◕	HR8115	215-360	0.10-0.25	0.30-1.50
			◕	HR8125	190-355	0.10-0.25	0.30-1.50
			◕	HR8225	205-375	0.10-0.25	0.30-1.50
			⌗	HR8125	190-355	0.10-0.20	0.30-1.50
			⌗	HR8225	205-375	0.10-0.20	0.30-1.50
		GQ	●	HR8105	230-400	0.14-0.50	1.00-5.00
			●	HR8115	215-360	0.14-0.50	1.00-5.00
			●	HR8125	190-355	0.14-0.50	1.00-5.00
			●	HR8225	205-375	0.14-0.50	1.00-5.00
			◕	HR8105	230-400	0.14-0.45	1.00-5.00
			◕	HR8115	215-360	0.14-0.45	1.00-5.00
			◕	HR8125	190-355	0.14-0.45	1.00-5.00
			◕	HR8225	205-375	0.14-0.45	1.00-5.00
			⌗	HR8125	190-355	0.14-0.40	1.00-5.00
			⌗	HR8225	205-375	0.14-0.40	1.00-5.00
		GM	●	HR8105	230-400	0.16-0.55	1.00-5.00
			●	HR8115	215-360	0.16-0.55	1.00-5.00
			●	HR8125	190-355	0.16-0.55	1.00-5.00
			●	HR8225	205-375	0.16-0.55	1.00-5.00
			◕	HR8105	225-430	0.16-0.50	1.00-5.00
			◕	HR8115	200-405	0.16-0.50	1.00-5.00
			◕	HR8125	185-350	0.16-0.50	1.00-5.00
			◕	HR8225	195-360	0.16-0.50	1.00-5.00
			⌗	HR8125	185-350	0.16-0.45	1.00-5.00
			⌗	HR8225	195-360	0.16-0.45	1.00-5.00
		GR	●	HR8115	235-320	0.25-0.60	2.00-7.00
			●	HR8125	195-315	0.25-0.60	2.00-7.00
			●	HR8225	185-295	0.25-0.60	2.00-7.00
			◕	HR8115	235-320	0.25-0.55	2.00-7.00
			◕	HR8125	195-315	0.25-0.55	2.00-7.00
			◕	HR8225	185-295	0.25-0.55	2.00-7.00
			⌗	HR8115	235-320	0.25-0.50	2.00-7.00
			⌗	HR8125	195-315	0.25-0.50	2.00-7.00
			⌗	HR8225	185-295	0.25-0.50	2.00-7.00

● Stable ◕ Average ⌗ Tough

Workpiece material	Hardness	Chipbreaker	Cutting range	Grade	Cuttingspeed (m/min)	Fn (mm/rev)	Ap (mm)
Carbon steel ,alloy steel (40Cr、42CrMo etc)	180-280HB	GZ	●	HR8105	120-255	0.25-1.00	3.00-12.00
			●	HR8115	100-200	0.25-1.00	3.00-12.00
			●	HR8125	100-180	0.25-1.00	3.00-12.00
			●	HR8225	100-195	0.25-1.00	3.00-12.00
			◕	HR8105	120-255	0.25-0.95	3.00-12.00
			◕	HR8115	100-200	0.25-0.95	3.00-12.00
			◕	HR8125	100-180	0.25-0.95	3.00-12.00
			◕	HR8225	100-195	0.25-0.95	3.00-12.00
			⌗	HR8115	60-180	0.25-0.90	3.00-12.00
			⌗	HR8125	60-180	0.25-0.90	3.00-12.00
			⌗	HR8225	60-180	0.25-0.90	3.00-12.00
		GX	●	HR8105	135-230	0.40-1.20	4.50-13.00
			●	HR8115	135-220	0.40-1.20	4.50-13.00
			●	HR8125	80-140	0.40-1.20	4.50-13.00
			●	HR8225	80-160	0.40-1.20	4.50-13.00
			◕	HR8105	120-220	0.40-1.15	4.50-13.00
			◕	HR8115	100-180	0.40-1.15	4.50-13.00
			◕	HR8125	100-160	0.40-1.15	4.50-13.00
			◕	HR8225	115-170	0.40-1.15	4.50-13.00
			⌗	HR8115	60-180	0.40-1.10	4.50-13.00
			⌗	HR8125	60-160	0.40-1.10	4.50-13.00
			⌗	HR8225	60-170	0.40-1.10	4.50-13.00
Carbon steel, alloy steel (quenching material, etc)	≥280HB	GC	●	HR8105	230-400	0.10-0.40	0.30-2.00
			●	HR8115	210-380	0.10-0.40	0.30-2.00
			◕	HR8105	230-380	0.10-0.35	0.30-2.00
			◕	HR8115	210-360	0.10-0.35	0.30-2.00
		GF	●	HR8105	215-380	0.10-0.30	0.30-1.50
			●	HR8115	190-360	0.10-0.30	0.30-1.50
			◕	HR8105	215-400	0.10-0.25	0.30-1.50
			◕	HR8115	190-380	0.10-0.25	0.30-1.50
		GQ	●	HR8105	220-400	0.20-0.60	0.90-4.00
			●	HR8115	205-380	0.20-0.60	0.90-4.00
			◕	HR8105	220-380	0.20-0.55	0.90-4.00
			◕	HR8115	205-360	0.20-0.55	0.90-4.00
		GM	●	HR8105	220-400	0.20-0.55	1.00-4.00
			●	HR8115	205-380	0.20-0.55	1.00-4.00
			◕	HR8105	220-380	0.20-0.50	1.00-4.00
			◕	HR8115	205-360	0.20-0.50	1.00-4.00

● Stable ◕ Average ⌗ Tough

Cutting parameters recommendation for general turning chipbreaker (Negative)

Workpiece material	Hardness	Chipbreaker	Cutting range	Grade	Cuttingspeed (m/min)	Fn (mm/rev)	Ap (mm)
Carbon steel, alloy steel (quenching material, etc)	≥280HB	GR	●	HR8115	225-360	0.25-0.60	1.50-6.00
			◕	HR8225	225-340	0.25-0.55	1.50-6.00
		GZ	●	HR8115	120-245	0.50-1.26	3.00-11.00
			●	HR8225	100-190	0.50-1.26	3.00-11.00
			◕	HR8115	110-245	0.50-1.21	3.00-11.00
			◕	HR8225	90-190	0.50-1.21	3.00-11.00
		GX	●	HR8115	120-220	0.70-1.30	4.00-12.00
			●	HR8225	120-210	0.70-1.30	4.00-12.00
			◕	HR8115	80-220	0.70-1.25	4.00-12.00
			◕	HR8225	80-210	0.70-1.25	4.00-12.00
Austenitic stainless steel (SUS304、SUS316 etc)	≤200HB	BF	●	HR7125	95-185	0.08-0.30	0.20-2.00
			●	HR7225	95-185	0.08-0.30	0.20-2.00
			◕	HR7125	95-185	0.08-0.25	0.20-2.00
			◕	HR7225	95-185	0.08-0.25	0.20-2.00
		BM	●	HR7125	90-170	0.10-0.52	1.00-5.80
			●	HR7225	90-170	0.10-0.52	1.00-5.80
			◕	HR7125	90-170	0.10-0.47	1.00-5.80
			◕	HR7225	90-170	0.10-0.47	1.00-5.80
			⌗	HR7125	90-170	0.10-0.42	1.00-5.80
			⌗	HR7225	90-170	0.10-0.42	1.00-5.80
		BR	●	HR7125	80-150	0.18-0.66	1.70-7.00
			●	HR7225	80-150	0.18-0.66	1.70-7.00
			◕	HR7125	80-150	0.18-0.61	1.70-7.00
			◕	HR7225	80-150	0.18-0.61	1.70-7.00
			⌗	HR7125	80-150	0.18-0.56	1.70-7.00
			⌗	HR7225	80-150	0.18-0.56	1.70-7.00
Martebsitic stainless steel (SUS431、SUS420 etc)	>200HB	BF	●	HR7225	85-175	0.08-0.30	0.20-2.00
			◕	HR7225	85-175	0.08-0.25	0.20-2.00
		BM	●	HR7225	80-160	0.10-0.52	1.00-5.80
			◕	HR7225	80-160	0.10-0.47	1.00-5.80
			⌗	HR7225	80-160	0.10-0.42	1.00-5.80
		BR	●	HR7225	70-140	0.18-0.66	1.70-7.00
			◕	HR7225	70-140	0.18-0.61	1.70-7.00
			⌗	HR7225	70-140	0.18-0.56	1.70-7.00

● Stable ◕ Average ⌗ Tough

Workpiece material	Hardness	Chipbreaker	Cutting range	Grade	Cuttingspeed (m/min)	Fn (mm/rev)	Ap (mm)
Grey cast iron (HT200、HT300 etc)	≤350MPa	无槽	●	HR6115	155-285	0.20-0.60	2.50-6.00
			◕	HR6115	155-285	0.20-0.55	2.50-6.00
			⌗	HR6115	155-285	0.20-0.50	2.50-6.00
		通槽	●	HR6115	165-300	0.25-0.60	1.60-5.00
			◕	HR6115	165-300	0.25-0.55	1.60-5.00
			⌗	HR6115	165-300	0.25-0.50	1.60-5.00
Nodular cast iron (QT400、QT500 etc)	≤450MPa	ZR	●	HR6215	145-285	0.15-0.50	0.50-5.00
			◕	HR6215	145-285	0.15-0.50	0.50-5.00
			⌗	HR6215	145-285	0.15-0.50	0.50-5.00
Heat-resistant alloy (GH4169 etc)	——	SF	●	HR9205	40-80	0.02-0.20	0.20-1.80
			●	HR9215	30-70	0.02-0.20	0.20-1.80
			◕	HR9205	40-80	0.02-0.20	0.20-1.80
			◕	HR9215	30-70	0.02-0.20	0.20-1.80
			⌗	HR9205	40-80	0.02-0.20	0.20-1.80
			⌗	HR9215	30-70	0.02-0.20	0.20-1.80
		SM	●	HR9205	40-80	0.15-0.40	0.70-3.00
			●	HR9215	30-70	0.15-0.40	0.70-3.00
			◕	HR9205	40-80	0.15-0.35	0.70-3.00
			◕	HR9215	30-70	0.15-0.35	0.70-3.00
			⌗	HR9205	40-80	0.15-0.30	0.70-3.00
			⌗	HR9215	30-70	0.15-0.30	0.70-3.00

● Stable ◕ Average ⌗ Tough

Cutting parameters recommendation for general turning chipbreaker (Positive)

Workpiece material	Hardness	Chipbreaker	Cutting range	Grade	Cuttingspeed (m/min)	Fn (mm/rev)	Ap (mm)
Mild steel (45#、A3etc)	≤180HB	TF	●	HR8105	250-425	0.10-0.30	0.30-2.00
			●	HR8115	230-355	0.10-0.30	0.30-2.00
			●	HR8125	225-320	0.10-0.30	0.30-2.00
			●	HR8225	220-310	0.10-0.30	0.30-2.00
			◕	HR8105	250-425	0.10-0.25	0.30-2.00
			◕	HR8115	230-355	0.10-0.25	0.30-2.00
			◕	HR8125	225-320	0.10-0.25	0.30-2.00
			◕	HR8225	220-310	0.10-0.25	0.30-2.00
		TM	●	HR8105	230-440	0.15-0.35	0.50-3.00
			●	HR8115	215-415	0.15-0.35	0.50-3.00
			●	HR8125	190-355	0.15-0.35	0.50-3.00
			●	HR8225	205-375	0.15-0.35	0.50-3.00
			◕	HR8105	225-430	0.15-0.30	0.50-3.00
			◕	HR8115	200-405	0.15-0.30	0.50-3.00
			◕	HR8125	185-350	0.15-0.30	0.50-3.00
			◕	HR8225	195-360	0.15-0.30	0.50-3.00
			⌗	HR8125	185-350	0.15-0.25	0.50-3.00
			⌗	HR8225	195-360	0.15-0.25	0.50-3.00
Carbon steel, alloy steel(40Cr、42CrMo etc)	180-280HB	TF	●	HR8105	250-480	0.10-0.30	0.30-2.00
			●	HR8115	230-440	0.10-0.30	0.30-2.00
			●	HR8125	215-415	0.10-0.30	0.30-2.00
			●	HR8225	225-410	0.10-0.30	0.30-2.00
			◕	HR8105	250-480	0.10-0.25	0.30-2.00
			◕	HR8115	230-440	0.10-0.25	0.30-2.00
			◕	HR8125	215-415	0.10-0.25	0.30-2.00
			◕	HR8225	225-410	0.10-0.25	0.30-2.00
		TM	●	HR8105	230-440	0.15-0.35	0.50-3.00
			●	HR8115	215-415	0.15-0.35	0.50-3.00
			●	HR8125	190-355	0.15-0.35	0.50-3.00
			●	HR8225	205-375	0.15-0.35	0.50-3.00
			◕	HR8105	225-430	0.15-0.30	0.50-3.00
			◕	HR8115	200-405	0.15-0.30	0.50-3.00
			◕	HR8125	185-350	0.15-0.30	0.50-3.00
			◕	HR8225	195-360	0.15-0.30	0.50-3.00
			⌗	HR8125	185-350	0.15-0.25	0.50-3.00
			⌗	HR8225	195-360	0.15-0.25	0.50-3.00

● Stable ◕ Average ⌗ Tough

Workpiece material	Hardness	Chipbreaker	Cutting range	Grade	Cuttingspeed (m/min)	Fn (mm/rev)	Ap (mm)
Carbon steel, alloy steel (quenching material, etc)	≥280HB	TF	●	HR8115	230-460	0.10-0.30	0.30-2.00
			●	HR8225	210-420	0.10-0.30	0.30-2.00
			◕	HR8115	230-460	0.10-0.25	0.30-2.00
			◕	HR8225	210-420	0.10-0.25	0.30-2.00
		TM	●	HR8115	215-420	0.15-0.35	0.50-3.00
			●	HR8225	190-395	0.15-0.35	0.50-3.00
			◕	HR8115	215-420	0.15-0.30	0.50-3.00
			◕	HR8225	190-395	0.15-0.30	0.50-3.00
Austenitic stainless steel (SUS304、SUS316etc)	≤200HB	TF	●	HR7125	95-185	0.10-0.30	0.30-2.00
			●	HR7225	95-185	0.10-0.30	0.30-2.00
			◕	HR7125	95-185	0.10-0.25	0.30-2.00
			◕	HR7225	95-185	0.10-0.25	0.30-2.00
		TM	●	HR7125	80-150	0.15-0.35	0.50-3.00
			●	HR7225	80-150	0.15-0.35	0.50-3.00
			◕	HR7125	80-150	0.15-0.30	0.50-3.00
			◕	HR7225	80-150	0.15-0.30	0.50-3.00
			⌗	HR7125	80-150	0.15-0.25	0.50-3.00
			⌗	HR7225	80-150	0.15-0.25	0.50-3.00
Martebsitic stainless steel (SUS431、SUS420 etc)	>200HB	TF	●	HR7125	85-175	0.10-0.30	0.30-2.00
			●	HR7225	85-175	0.10-0.30	0.30-2.00
			◕	HR7125	85-175	0.10-0.25	0.30-2.00
			◕	HR7225	85-175	0.10-0.25	0.30-2.00
		TM	●	HR7125	70-140	0.15-0.35	0.50-3.00
			●	HR7225	70-140	0.15-0.35	0.50-3.00
			◕	HR7125	70-140	0.15-0.30	0.50-3.00
			◕	HR7225	70-140	0.15-0.30	0.50-3.00
			⌗	HR7125	70-140	0.15-0.25	0.50-3.00
			⌗	HR7225	70-140	0.15-0.25	0.50-3.00
Heat-resistant alloy (Gh4169 etc)	——	TF	●	HR9205	40-80	0.05-0.20	0.30-1.50
			●	HR9215	30-70	0.05-0.20	0.30-1.50
			◕	HR9205	40-80	0.05-0.20	0.30-1.50
			◕	HR9215	30-70	0.05-0.20	0.30-1.50
Non-ferrous metal(aluminum alloy etc)	——	AK	●	HRK10	300-700	0.10-0.30	0.50-3.00
			●	HRK20	300-700	0.10-0.30	0.50-3.00
			◕	HRK10	300-700	0.10-0.25	0.50-3.00
			◕	HRK20	300-700	0.10-0.25	0.50-3.00
			⌗	HRK10	300-700	0.10-0.20	0.50-3.00
			⌗	HRK20	300-700	0.10-0.20	0.50-3.00

● Stable ◕ Average ⌗ Tough

Comparison table of chipbreaker for general turning

ISO	Application	HUAREAL	SANDVIK	KENNAMETAL	ISCAR	MITSUBISHI	HITACHI	TUNGALOY	KYOCERA	SUMITOMO	TAEGUTEC	ZCC.CT
P	Finishing (Negative)	GC GF	LC XF PF QF	FF FS VF LF	SF PF	FP FH F FY	BE CE B BH	TF TSF AS	GP XP XF VF	FA FB SP FP	SF FA FG FC	DF SF
	Semi-finishing (Negative)	GQ GM	MN QM PMC PM SM	MN CT FN	NF TF PP	MA MV MH MP	CT AB AY AE	TM ZM AM NM	PS HQ PQ GS PT PG	LU SX GU HM	MLP MP MC MT	NM DM PM
	Roughing (Negative)	GR	PR XMR KR	RP RN RW	R3P NR	RP GH	RE AR	TH	PH	MU MX	RT RGP	DR ER
	Heavy machining (Negative)	GR GZ GX	QR HR PR	RM RP RH	MH HR	HZ HX HL HR HV	TE UE H HX HE	TRS TU TUS	PX	HG MP HU HW HF	RX RH HT HD HY HZ	DR HDR HPR
	Finishing (Positive)	TF	UF PF	UF	PF	FV PF	JQ	PS PF	CK GP VF	FP LU	FA FG FX	HF
	Semi-finishing (Positive)	TM	UM PM	MF LF	SM 14	MV MP	JE	PM	HQ XQ GK	SU SC	MT PC	HM
M	Finishing (Negative)	BF	MF	FF FP LF	MF F3M	LS FS SA	MP AB	SS TF SF	MQ	SU EF	EA SF FG	EF
	Semi-finishing (Negative)	BM	MM MMC	MS MP UP	M3M PP	MS MG MM MA	DE PV SE	HRM SM SA	TK MS MU SU	UP GU EX	ML EM MP	EM
	Roughing (Negative)	BR	MR MMR	RP	R3M MR	RM GH	AE	TU SH	HU	MU	ET	ER
	Finishing (Positive)	TF	UF MF	UF	PF	FM FV LM	MF	PF	MQ	LU	PF	EF
	Semi-finishing (Positive)	TM	MM UM	LF MF	SM 14	MV MM	MP	PS PM	MS	SU SC	SM 14	EM
K	Semi-finishing (Negative)	ZR All-round	KM	UN CT	NR	MK GK All round	VH VA	CM All round	All round C KG	UZ MU	MG	All round
	Roughing (Negative)	ZR Flat	KR	RP	NMA	GK GH	VE RE	LH NMA	ZS GC KH	GZ	KT RT NMA	DR
N	Non-ferrous metal machining	AK	AL	HP	AF AS	AZ		AL	AH	AW AG	FL	LH
S	Finishing (Negative)	SF	SF	FS	NF	LS FS	----	TF	MQ SQ	SU	EA SF	EF
	Semi-finishing (Negative)	SM	SM SMC	MS UP	PP TF	MS MJ	VI	HMM SA HRM	TK MS MU	UP EG EX	ML SU MK	NF
	Finishing (Positive)	SF	MF	HP	PF SM	MJ	----	PS	HQ	LU	FA	NGF
H	Finishing	----	----	----	----	----		HP*	----	FV*	----	No
	Semi-finishing	----	----	----	----	----		----	----	GH	----	No

Turning of small components





A

Turning

Turning of small components

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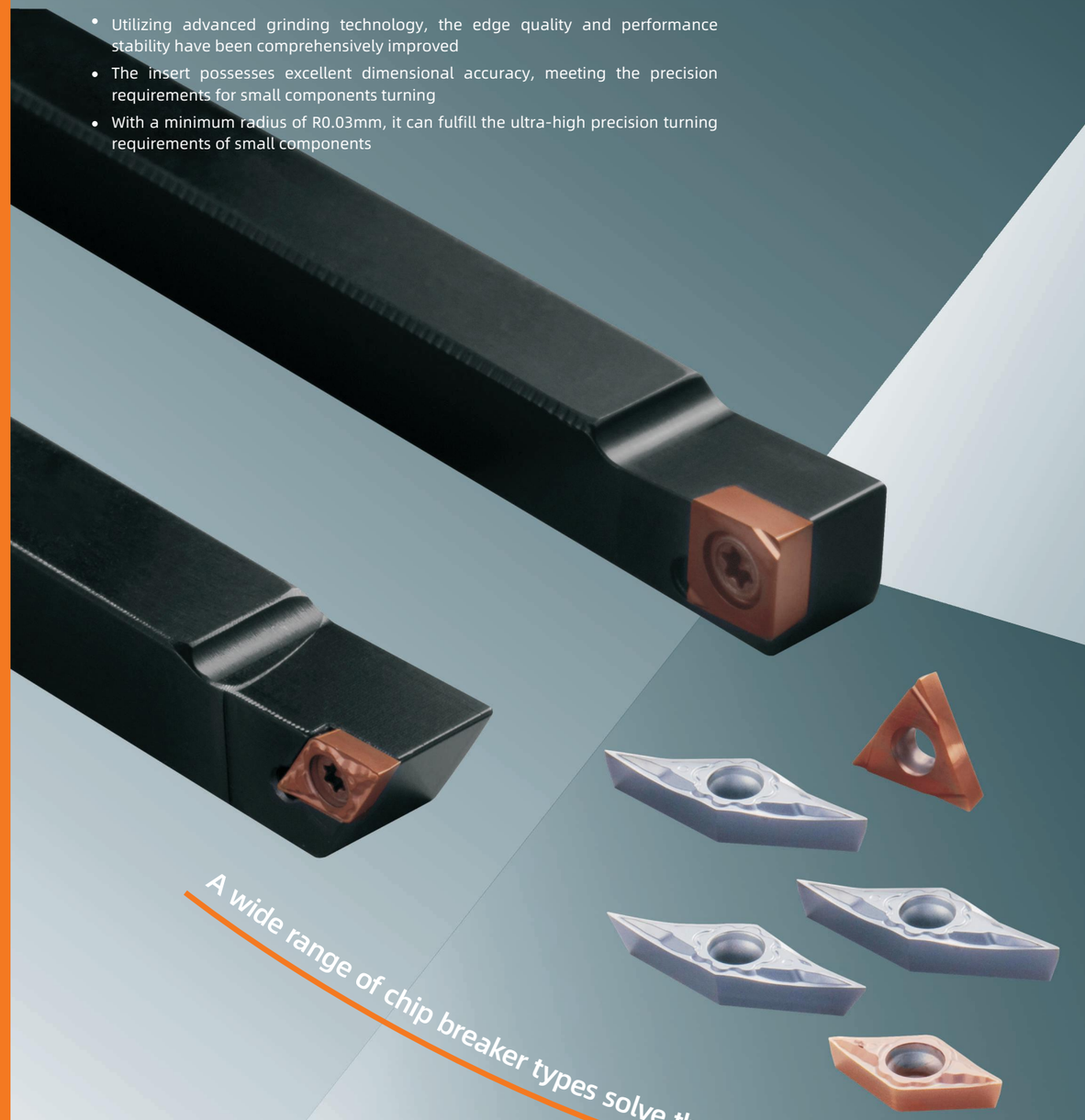
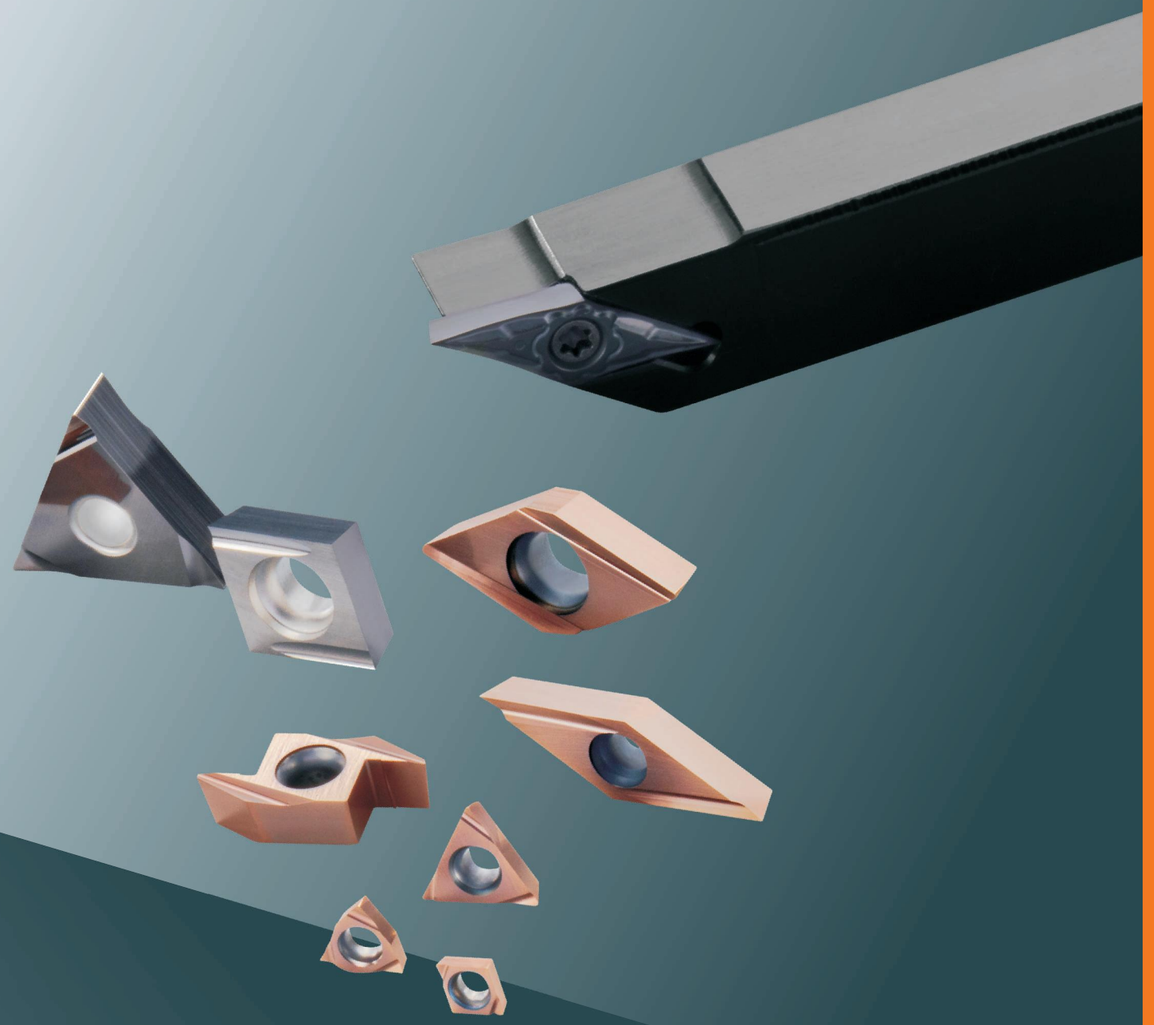
Small Components Turning Tools

- Utilizing advanced grinding technology, the edge quality and performance stability have been comprehensively improved
- The insert possesses excellent dimensional accuracy, meeting the precision requirements for small components turning
- With a minimum radius of R0.03mm, it can fulfill the ultra-high precision turning requirements of small components



A wide range of chip breaker types solve the chip problem perfectly



- High precision
- High surface quality
- High stability

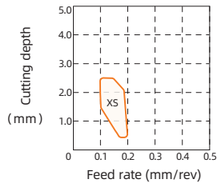
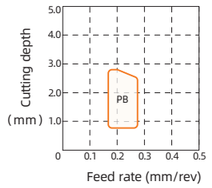
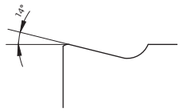
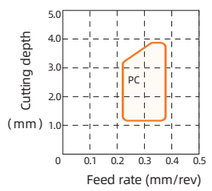
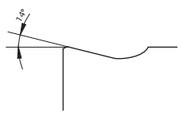
Grade application form for small components turning

Type	Material	ISO	PVD coating			Cermet	Coated cermet	ISO
			HR1135	HR7215	HR7125	HRC10	HR115C	
P	Non-alloyed steel	P05	HR1135			HRC10	HR115C	P05
		P15			HR7125			P15
		P25		Stainless steel				P25
		P35						P35
M	Stainless steel	M05	HR1135	HR7215				M05
		M15			HR7125			M15
		M25						M25
		M35						M35
S	High-temp alloy	S05						S05
		S15		HR7215	HR7125			S15
		S25						S25
		S35						S35
H	Hardened steel	H05						H05
		H15	HR1135					H15
		H25						H25
		H35						H35

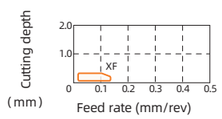
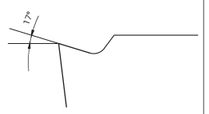
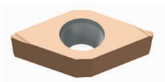
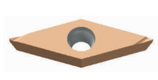
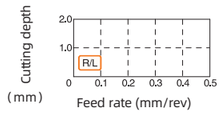
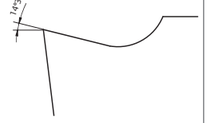
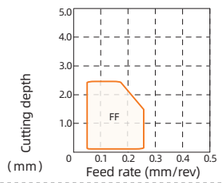
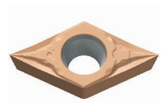
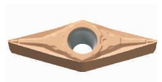
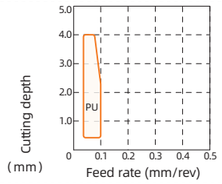
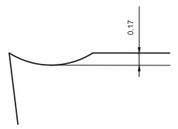
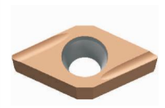
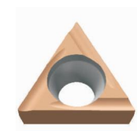
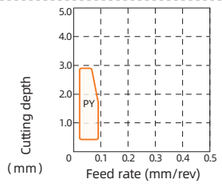
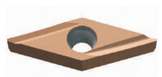
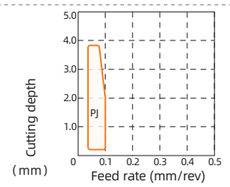
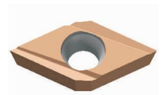
Overview of small components turning grade

Grade	Type	Features	Application
HR1135	PVD coating Cemented carbide	The fine-grain cemented carbide matrix with the new nano-gradient composite structural coating has excellent wear resistance and build-up edge resistance, ensuring the stability of the insert life and the high quality of the machined surface.	High wear resistance grade, suitable for high cutting speed turning of small components.
HR7215	PVD coating Cemented carbide	The uniformly refined sub-micron hard phase, coupled with a newly designed grain inhibitor composition, effectively prevents coarse grain.Combined with a nano-gradient composite structure reinforced by a novel non-metallic modifying component, it is suitable for relatively stable machining conditions and has better performance in high-speed machining.	Suitable for precision turning of stainless steel and high-temp alloy for small components.
HR7125	PVD coating Cemented carbide	Unique coating materials combined with new coating technology, the surface of product is smooth, with low friction coefficient, high nano-hardness, and excellent antioxidant performance.	With great versatility, it is preferred grade for precision small component turning.
HRC10	Cermet	Newly upgraded cermet grade with hard and compact surface, good chemical stability and adhesion resistance. This grade also has great wear resistance and chipping resistance, good performance stability and excellent surface quality.	Good stability, especially suitable for low carbon steel finish turning, and high requirement for workpiece surface quality.
HR115C	Coated cermet	The coated cermet grade, with a new nano-gradient composite structure coating, further improves the wear resistance and high-temperature resistance. The unique transition layer treatment technology effectively improves the adhesion between the coating and the substrate, reduces the friction coefficient between the insert and workpiece. Insert services life and stability are outstanding.	It exhibits superior high-temperature resistance; compared to cermet grades, it allows for higher cutting speeds.

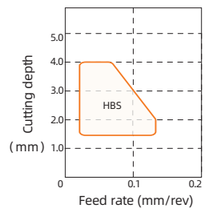
Overview of small components turning insert (Negative)

Type	Usage	Tolerance	Chipbreaker	Features	Chipbreaker diagram	Sectional view of chipbreaker		80° C-type	55° D-type	90° S-type	60° T-type	35° V-type	80° W-type
Negative insert	Superfinishing	G	XS	◆Sloped chipbreaker design with stable control of chip removal direction can ensure smooth cutting. ◆Sharp cutting edge can effectively reduce cutting force and achieve excellent cutting performance.						 A125		
	Semi-finishing	G	PB	◆The cutting corner with high strength is suitable for machining with a feed rate of 0.15-0.25mm/r.						 A125		
	Semi-finishing	G	PC	◆The universal chipbreaker for precise grinding; tool tip with high strength. ◆It is more suitable for machining with a feed rate of 0.2-0.35mm/rev.						 A125		

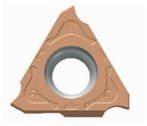
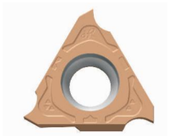
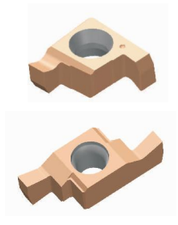
Overview of small components turning insert (Positive)

Type	Usage	Tolerance	Chipbreaker	Features	Chipbreaker diagram	Sectional view of chipbreaker		80° C-type	55° D-type	90° S-type	60° T-type	35° V-type	80° W-type
Positive insert	Superfinishing	G	XF	◆Inclined chipbreaker design ensures stable control of chip removal direction and smooth cutting. ◆Sharp cutting edge can effectively reduce cutting force and achieve excellent cutting results.				 A126	 A129			 A135	 A138
			No code name	◆Design of cutting inclination angle can well control chip removal direction and reduce cutting force. ◆Non-cutting width design with sharp edge provides excellent surface quality.							 A132、A134		
	Finishing	G	FF	◆The first recommended chipbreaker for finishing. ◆The edges are finely ground, ensuring a sharp cutting edge and high versatility.				 A127	 A130			 A135、A136、A137	
			PU	◆Suitable for small feed rate machining with wide cutting depth.				 A128	 A131		 A133		
			PY	◆The large rake angle design effectively reduces cutting resistance, stably controls the chip evacuation direction, and ensures stable machining.								 A135	
			PJ	◆Can adapt to low feed rate and cutting depth change, with stable chip control.					 A130				

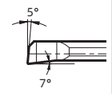
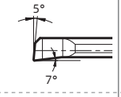
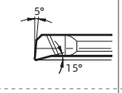
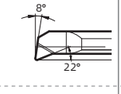
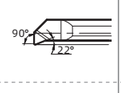
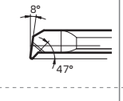
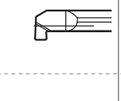
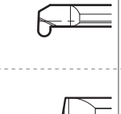
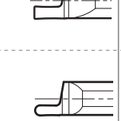
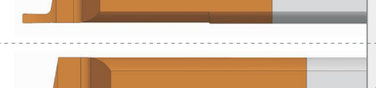
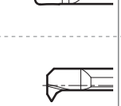
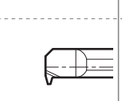
Overview of back turning insert for small components

Type	Usage	Chipbreaker	Features	Chipbreaker diagram	Insert shape	Page
Back turning insert	Back turning	HBS	◆The specially designed insert shape meets the requirements of back turning for small components. ◆The unique chipbreaker design can stably control the direction of chip removal and reduce cutting resistance.			A151

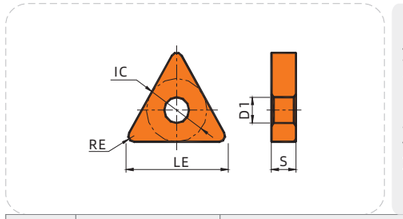
Overview of small components grooving

Type	Processing	Tool model	Cutting edge width (mm)	Depth of cut maximum (mm)	Corner radius (mm)	Insert shape	Page
Parting & grooving	Shallow grooving	THR□□	0.5-4.5	1.2-5.0	0.05-2.0		A156
	Shallow grooving	THF□□	0.25-3.0	0.6-3.0	0.05-0.1		A159
	Parting	PTA□□	0.5-3.0	2.5-8	0.05		A166
	Internal grooving	HIER□□	1.0-4.0	5-4.5	0.05-0.2		A171

Overview of solid carbide boring tool

Type		Processing	Tool model	Tool nose diagram	Insert shape	Page
Solid carbide boring tool	General turning	Internal turning	MTR/L			A176
			MTRS			A180
			MNR			A181
		Profile turning	MPR/L			A182
			MUR			A183
			MQR/L			A184
	Grooving	Internal grooving	MGR/L			A185
		Radius grooving	MKR			A188
		Face grooving	MFR/L			A189
		Face radius grooving	MZR/L			A191
	Threading	Universal thread turning	MIR/L			A193
		Trapezoidal thread turning	MIR□□TR			A196

Negative insert



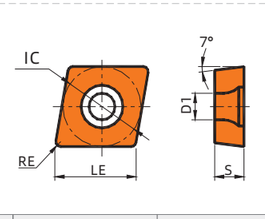
Working condition: ● Stable ◕ Average ⌗ Tough

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

Operation type	Insert shape	Type	Dimension (mm)					PVD			Cermet		Applicable tools
			LE	IC	S	D1	RE	HR1135	HR7215	HR7125	HRC10	HR115C	
Super finishing		TNGG160402R-XS	16.5	9.525	4.76	3.81	0.2	★		☆	☆		PTGN**-16
		TNGG160402L-XS	16.5	9.525	4.76	3.81	0.2	★		☆	☆		
		TNGG160404R-XS	16.5	9.525	4.76	3.81	0.4	★		☆	☆		
		TNGG160404L-XS	16.5	9.525	4.76	3.81	0.4	★		☆	☆		
		TNGG160408R-XS	16.5	9.525	4.76	3.81	0.8	★		☆	☆		
		TNGG160408L-XS	16.5	9.525	4.76	3.81	0.8	★		☆	☆		
Semi-finishing		TNGG160402R-PB	16.5	9.525	4.76	3.81	0.2	☆			★		PTGN**-16
		TNGG160402L-PB	16.5	9.525	4.76	3.81	0.2	☆			★		
		TNGG160404R-PB	16.5	9.525	4.76	3.81	0.4	☆			★		
		TNGG160404L-PB	16.5	9.525	4.76	3.81	0.4	☆			★		
		TNGG160408R-PB	16.5	9.525	4.76	3.81	0.8	☆			★		
		TNGG160408L-PB	16.5	9.525	4.76	3.81	0.8	☆			★		
Semi-finishing		TNGG160402R-PC	16.5	9.525	4.76	3.81	0.2	☆			★		PTGN**-16
		TNGG160402L-PC	16.5	9.525	4.76	3.81	0.2	☆			★		
		TNGG160404R-PC	16.5	9.525	4.76	3.81	0.4	☆			★		
		TNGG160404L-PC	16.5	9.525	4.76	3.81	0.4	☆			★		
		TNGG160408R-PC	16.5	9.525	4.76	3.81	0.8	☆			★		
		TNGG160408L-PC	16.5	9.525	4.76	3.81	0.8	☆			★		

★ Recommended grade ☆ Available grade

Postive insert



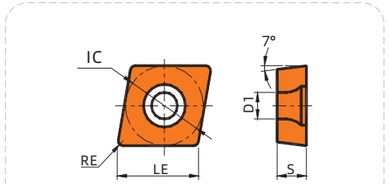
Working condition: ● Stable ◕ Average ⌗ Tough

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

Operation type	Insert shape	Type	Dimension (mm)					PVD			Cermet		Applicable tools
			LE	IC	S	D1	RE	HR1135	HR7215	HR7125	HRC10	HR115C	
Super finishing		CCGT0301005R-XF	3.6	3.5	1.4	1.9	0.05	★		★	☆		SCLC**-03 S-SCLC**-03
		CCGT0301005L-XF	3.6	3.5	1.4	1.9	0.05	★		★	☆		
		CCGT030101R-XF	3.6	3.5	1.4	1.9	0.1	★		★	☆		
		CCGT030101L-XF	3.6	3.5	1.4	1.9	0.1	★		★	☆		
		CCGT030102R-XF	3.6	3.5	1.4	1.9	0.2	★		★	☆		
		CCGT030102L-XF	3.6	3.5	1.4	1.9	0.2	★		★	☆		
		CCGT030104R-XF	3.6	3.5	1.4	1.9	0.4	★		★	☆		
		CCGT030104L-XF	3.6	3.5	1.4	1.9	0.4	★		★	☆		
		CCGT0401005R-XF	4.4	4.3	1.8	2.3	0.05	★		★	☆		SCLC**-04 S-SCLC**-04
		CCGT0401005L-XF	4.4	4.3	1.8	2.3	0.05	★		★	☆		
		CCGT040101R-XF	4.4	4.3	1.8	2.3	0.1	★		★	☆		
		CCGT040101L-XF	4.4	4.3	1.8	2.3	0.1	★		★	☆		
		CCGT040102R-XF	4.4	4.3	1.8	2.3	0.2	★		★	☆		
		CCGT040102L-XF	4.4	4.3	1.8	2.3	0.2	★		★	☆		
		CCGT040104R-XF	4.4	4.3	1.8	2.3	0.4	★		★	☆		
		CCGT040104L-XF	4.4	4.3	1.8	2.3	0.4	★		★	☆		
		CCGT060201R-XF	6.4	6.35	2.38	2.8	0.1	★		★	☆		SCLC**-06 S-SCLC**-06
		CCGT060201L-XF	6.4	6.35	2.38	2.8	0.1	★		★	☆		
		CCGT060202R-XF	6.4	6.35	2.38	2.8	0.2	★		★	☆		
		CCGT060202L-XF	6.4	6.35	2.38	2.8	0.2	★		★	☆		
		CCGT060204R-XF	6.4	6.35	2.38	2.8	0.4	★		★	☆		
		CCGT060204L-XF	6.4	6.35	2.38	2.8	0.4	★		★	☆		
		CCGT09T3005R-XF	9.7	9.525	3.97	4.4	0.05	★		★	☆		SCLC**-09 S-SCLC**-09
		CCGT09T3005L-XF	9.7	9.525	3.97	4.4	0.05	★		★	☆		
		CCGT09T301R-XF	9.7	9.525	3.97	4.4	0.1	★		★	☆		
		CCGT09T301L-XF	9.7	9.525	3.97	4.4	0.1	★		★	☆		
		CCGT09T302R-XF	9.7	9.525	3.97	4.4	0.2	★		★	☆		
		CCGT09T302L-XF	9.7	9.525	3.97	4.4	0.2	★		★	☆		
		CCGT09T304R-XF	9.7	9.525	3.97	4.4	0.4	★		★	☆		
		CCGT09T304L-XF	9.7	9.525	3.97	4.4	0.4	★		★	☆		

★ Recommended grade ☆ Available grade

Postive insert



Working condition: ● Stable ◕ Average ⌗ Tough

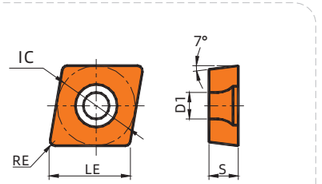
Workpiece material

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

Operation type	Insert shape	Type	Dimension (mm)					PVD			Cermet		Applicable tools
			LE	IC	S	D1	RE	HR1135	HR7215	HR7125	HRC10	HR115C	
Finishing		CCGT0602005-FF	6.4	6.35	2.38	2.8	0.05			★			
		CCGT060201-FF	6.4	6.35	2.38	2.8	0.1			★			SCLC**-06
		CCGT060202-FF	6.4	6.35	2.38	2.8	0.2			★			S-SCLC**-06
		CCGT060204-FF	6.4	6.35	2.38	2.8	0.4			★			
		CCGT09T3005-FF	9.7	5.525	3.97	4.4	0.05			★			
		CCGT09T301-FF	9.7	5.525	3.97	4.4	0.1			★			SCLC**-09
		CCGT09T302-FF	9.7	5.525	3.97	4.4	0.2			★			S-SCLC**-09
		CCGT09T304-FF	9.7	5.525	3.97	4.4	0.4			★			
		CCGT060201E-FF	6.4	6.35	2.38	2.8	0.1		★				
		CCGT060202E-FF	6.4	6.35	2.38	2.8	0.2		★				SCLC**-06
		CCGT060204E-FF	6.4	6.35	2.38	2.8	0.4		★				S-SCLC**-06
		CCGT09T301E-FF	9.7	5.525	3.97	4.4	0.1		★				
		CCGT09T302E-FF	9.7	5.525	3.97	4.4	0.2		★				SCLC**-09
		CCGT09T304E-FF	9.7	5.525	3.97	4.4	0.4		★				S-SCLC**-09

★ Recommended grade ☆ Available grade

Postive insert



Working condition: ● Stable ◕ Average ⌗ Tough

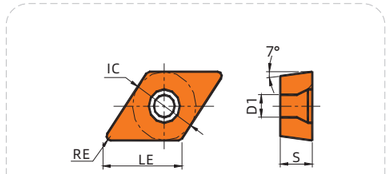
Workpiece material

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

Operation type	Insert shape	Type	Dimension (mm)					PVD			Cermet		Applicable tools
			LE	IC	S	D1	RE	HR1135	HR7215	HR7125	HRC10	HR115C	
Finishing		CCGT0602005FR-PU	6.4	6.35	2.38	2.8	0.05	★		★	☆		
		CCGT0602005FL-PU	6.4	6.35	2.38	2.8	0.05	★		★	☆		
		CCGT060201FR-PU	6.4	6.35	2.38	2.8	0.1	★		★	☆		
		CCGT060201FL-PU	6.4	6.35	2.38	2.8	0.1	★		★	☆		SCLC**-06
		CCGT060202FR-PU	6.4	6.35	2.38	2.8	0.2	★		★	☆		S-SCLC**-06
		CCGT060202FL-PU	6.4	6.35	2.38	2.8	0.2	★		★	☆		
		CCGT060204FR-PU	6.4	6.35	2.38	2.8	0.4	★		★	☆		
		CCGT060204FL-PU	6.4	6.35	2.38	2.8	0.4	★		★	☆		
		CCGT09T3005FR-PU	9.7	9.525	3.97	4.4	0.05	★		★	☆		
		CCGT09T3005FL-PU	9.7	9.525	3.97	4.4	0.05	★		★	☆		
		CCGT09T301FR-PU	9.7	9.525	3.97	4.4	0.1	★		★	☆		
		CCGT09T301FL-PU	9.7	9.525	3.97	4.4	0.1	★		★	☆		SCLC**-09
		CCGT09T302FR-PU	9.7	9.525	3.97	4.4	0.2	★		★	☆		S-SCLC**-09
		CCGT09T302FL-PU	9.7	9.525	3.97	4.4	0.2	★		★	☆		
		CCGT09T304FR-PU	9.7	9.525	3.97	4.4	0.4	★		★	☆		
		CCGT09T304FL-PU	9.7	9.525	3.97	4.4	0.4	★		★	☆		
		CCGT060201R-PU	6.4	6.35	2.38	2.8	0.1	★		★	☆		
		CCGT060201L-PU	6.4	6.35	2.38	2.8	0.1	★		★	☆		
		CCGT060202R-PU	6.4	6.35	2.38	2.8	0.2	★		★	☆		SCLC**-06
		CCGT060202L-PU	6.4	6.35	2.38	2.8	0.2	★		★	☆		S-SCLC**-06
		CCGT060204R-PU	6.4	6.35	2.38	2.8	0.4	★		★	☆		
		CCGT060204L-PU	6.4	6.35	2.38	2.8	0.4	★		★	☆		
		CCGT09T301R-PU	9.7	9.525	3.97	4.4	0.1	★		★	☆		
		CCGT09T301L-PU	9.7	9.525	3.97	4.4	0.1	★		★	☆		
		CCGT09T302R-PU	9.7	9.525	3.97	4.4	0.2	★		★	☆		SCLC**-09
		CCGT09T302L-PU	9.7	9.525	3.97	4.4	0.2	★		★	☆		S-SCLC**-09
		CCGT09T304R-PU	9.7	9.525	3.97	4.4	0.4	★		★	☆		
		CCGT09T304L-PU	9.7	9.525	3.97	4.4	0.4	★		★	☆		

★ Recommended grade ☆ Available grade

Postive insert



Working condition: ● Stable ◕ Average ⌗ Tough

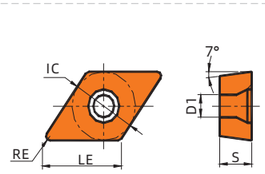
Workpiece material

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

Operation type	Insert shape	Type	Dimension (mm)					PVD			Cermet		Applicable tools
			LE	IC	S	D1	RE	HR1135	HR7215	HR7125	HRC10	HR115C	
Super finishing		DCGT0702005R-XF	7.8	6.35	2.38	2.8	0.05	★		★	☆		SDJC**-07 SDNC**-07 S-SDUC**-07
		DCGT0702005L-XF	7.8	6.35	2.38	2.8	0.05	★		★	☆		
		DCGT070201R-XF	7.8	6.35	2.38	2.8	0.1	★		★	☆		
		DCGT070201L-XF	7.8	6.35	2.38	2.8	0.1	★		★	☆		
		DCGT070202R-XF	7.8	6.35	2.38	2.8	0.2	★		★	☆		
		DCGT070202L-XF	7.8	6.35	2.38	2.8	0.2	★		★	☆		
		DCGT070204R-XF	7.8	6.35	2.38	2.8	0.4	★		★	☆		
		DCGT070204L-XF	7.8	6.35	2.38	2.8	0.4	★		★	☆		
		DCGT11T3005R-XF	11.6	9.525	3.97	4.4	0.05	★		★	☆		SDJC**-11 SDNC**-11 S-SDUC**-11
		DCGT11T3005L-XF	11.6	9.525	3.97	4.4	0.05	★		★	☆		
		DCGT11T301R-XF	11.6	9.525	3.97	4.4	0.1	★		★	☆		
		DCGT11T301L-XF	11.6	9.525	3.97	4.4	0.1	★		★	☆		
		DCGT11T302R-XF	11.6	9.525	3.97	4.4	0.2	★		★	☆		
		DCGT11T302L-XF	11.6	9.525	3.97	4.4	0.2	★		★	☆		
		DCGT11T304R-XF	11.6	9.525	3.97	4.4	0.4	★		★	☆		
		DCGT11T304L-XF	11.6	9.525	3.97	4.4	0.4	★		★	☆		

★ Recommended grade ☆ Available grade

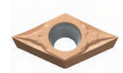
Postive insert



Working condition: ● Stable ◕ Average ⌗ Tough

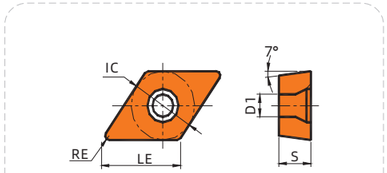
Workpiece material

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

Operation type	Insert shape	Type	Dimension (mm)					PVD			Cermet		Applicable tools
			LE	IC	S	D1	RE	HR1135	HR7215	HR7125	HRC10	HR115C	
Finishing		DCGT0702005-FF	7.8	6.35	2.38	2.8	0.05			★			SDJC**-07 SDNC**-07 S-SDUC**-07
		DCGT070201-FF	7.8	6.35	2.38	2.8	0.1			★			
		DCGT070202-FF	7.8	6.35	2.38	2.8	0.2			★			
		DCGT070204-FF	7.8	6.35	2.38	2.8	0.4			★			
		DCGT11T3005-FF	11.6	9.525	3.97	4.4	0.05			★			SDJC**-11 SDNC**-11 S-SDUC**-11
		DCGT11T301-FF	11.6	9.525	3.97	4.4	0.1			★			
		DCGT11T302-FF	11.6	9.525	3.97	4.4	0.2			★			
		DCGT11T304-FF	11.6	9.525	3.97	4.4	0.4			★			
		DCGT070201E-FF	7.8	6.35	2.38	2.8	0.1		★				SDJC**-07 SDNC**-07 S-SDUC**-07
		DCGT070202E-FF	7.8	6.35	2.38	2.8	0.2		★				
		DCGT070204E-FF	7.8	6.35	2.38	2.8	0.4		★				
		DCGT11T301E-FF	11.6	9.525	3.97	4.4	0.1		★				SDJC**-11 SDNC**-11 S-SDUC**-11
		DCGT11T302E-FF	11.6	9.525	3.97	4.4	0.2		★				
		DCGT11T304E-FF	11.6	9.525	3.97	4.4	0.4		★				
Finishing		DCGT11T301FR-PJ	11.6	9.525	3.97	4.4	0.1	★		★	☆		SDJC**-11 SDNC**-11 S-SDUC**-11
		DCGT11T302FR-PJ	11.6	9.525	3.97	4.4	0.2	★		★	☆		
		DCGT11T304ER-PJ	11.6	9.525	3.97	4.4	0.4	★		★	☆		

★ Recommended grade ☆ Available grade

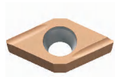
Postive insert



Workpiece material

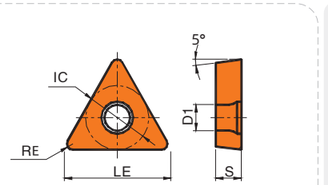
Working condition: ● Stable ◕ Average ⌗ Tough

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

Operation type	Insert shape	Type	Dimension (mm)					PVD			Cermet		Applicable tools
			LE	IC	S	D1	RE	HR1135	HR7215	HR7125	HRC10	HR115C	
Finishing		DCGT0702005FR-PU	7.8	6.35	2.38	2.8	0.05	★		★	☆		SDJC**-07 SDNC**-07 S-SDUC**-07
		DCGT0702005FL-PU	7.8	6.35	2.38	2.8	0.05	★		★	☆		
		DCGT070201FR-PU	7.8	6.35	2.38	2.8	0.1	★		★	☆		
		DCGT070201FL-PU	7.8	6.35	2.38	2.8	0.1	★		★	☆		
		DCGT070202FR-PU	7.8	6.35	2.38	2.8	0.2	★		★	☆		
		DCGT070202FL-PU	7.8	6.35	2.38	2.8	0.2	★		★	☆		
		DCGT070204FR-PU	7.8	6.35	2.38	2.8	0.4	★		★	☆		
		DCGT070204FL-PU	7.8	6.35	2.38	2.8	0.4	★		★	☆		
		DCGT11T3005FR-PU	11.6	9.525	3.97	4.4	0.05	★		★	☆		SDJC**-11 SDNC**-11 S-SDUC**-11
		DCGT11T3005FL-PU	11.6	9.525	3.97	4.4	0.05	★		★	☆		
		DCGT11T301FR-PU	11.6	9.525	3.97	4.4	0.1	★		★	☆		
		DCGT11T301FL-PU	11.6	9.525	3.97	4.4	0.1	★		★	☆		
		DCGT11T302FR-PU	11.6	9.525	3.97	4.4	0.2	★		★	☆		
		DCGT11T302FL-PU	11.6	9.525	3.97	4.4	0.2	★		★	☆		
		DCGT11T304FR-PU	11.6	9.525	3.97	4.4	0.4	★		★	☆		
		DCGT11T304FL-PU	11.6	9.525	3.97	4.4	0.4	★		★	☆		
		DCGT070201R-PU	7.8	6.35	2.38	2.8	0.1	★		★	☆		SDJC**-07 SDNC**-07 S-SDUC**-07
		DCGT070201L-PU	7.8	6.35	2.38	2.8	0.1	★		★	☆		
		DCGT070202R-PU	7.8	6.35	2.38	2.8	0.2	★		★	☆		
		DCGT070202L-PU	7.8	6.35	2.38	2.8	0.2	★		★	☆		
		DCGT070204R-PU	7.8	6.35	2.38	2.8	0.4	★		★	☆		
		DCGT070204L-PU	7.8	6.35	2.38	2.8	0.4	★		★	☆		
		DCGT11T301R-PU	11.6	9.525	3.97	4.4	0.1	★		★	☆		SDJC**-11 SDNC**-11 S-SDUC**-11
		DCGT11T301L-PU	11.6	9.525	3.97	4.4	0.1	★		★	☆		
		DCGT11T302R-PU	11.6	9.525	3.97	4.4	0.2	★		★	☆		
		DCGT11T302L-PU	11.6	9.525	3.97	4.4	0.2	★		★	☆		
		DCGT11T304R-PU	11.6	9.525	3.97	4.4	0.4	★		★	☆		
		DCGT11T304L-PU	11.6	9.525	3.97	4.4	0.4	★		★	☆		

★ Recommended grade ☆ Available grade

Postive insert



Workpiece material

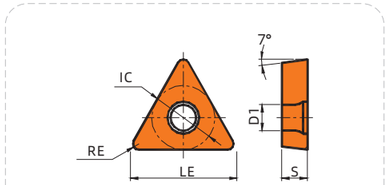
Working condition: ● Stable ◕ Average ⌗ Tough

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

Operation type	Insert shape	Type	Dimension (mm)					PVD			Cermet		Applicable tools
			LE	IC	S	D1	RE	HR1135	HR7215	HR7125	HRC10	HR115C	
Super finishing		TBGT060101R	6.9	3.97	1.59	2.3	0.1	★		★	☆		S-STLB**-06
		TBGT060101L	6.9	3.97	1.59	2.3	0.1	★		★	☆		
		TBGT060102R	6.9	3.97	1.59	2.3	0.2	★		★	☆		
		TBGT060102L	6.9	3.97	1.59	2.3	0.2	★		★	☆		
		TBGT060104R	6.9	3.97	1.59	2.3	0.4	★		★	☆		
		TBGT060104L	6.9	3.97	1.59	2.3	0.4	★		★	☆		

★ Recommended grade ☆ Available grade

Postive insert



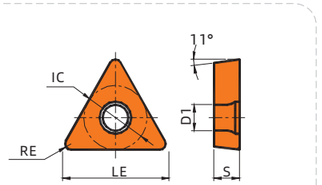
Working condition: ● Stable ◕ Average ⌗ Tough

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

Operation type	Insert shape	Type	Dimension (mm)					PVD			Cermet		Applicable tools
			LE	IC	S	D1	RE	HR1135	HR7215	HR7125	HRC10	HR115C	
Super finishing		TCGT080201R-PU	8.2	4.76	2.38	2.3	0.1	★		★	☆		STGC**-08
		TCGT080201L-PU	8.2	4.76	2.38	2.3	0.1	★		★	☆		
		TCGT080202R-PU	8.2	4.76	2.38	2.3	0.2	★		★	☆		
		TCGT080202L-PU	8.2	4.76	2.38	2.3	0.2	★		★	☆		
		TCGT080204R-PU	8.2	4.76	2.38	2.3	0.4	★		★	☆		
		TCGT080204L-PU	8.2	4.76	2.38	2.3	0.4	★		★	☆		
		TCGT110301R-PU	11	6.35	3.18	2.8	0.1	★		★	☆		STGC**-11
		TCGT110301L-PU	11	6.35	3.18	2.8	0.1	★		★	☆		
		TCGT110302R-PU	11	6.35	3.18	2.8	0.2	★		★	☆		
		TCGT110302L-PU	11	6.35	3.18	2.8	0.2	★		★	☆		
		TCGT110304R-PU	11	6.35	3.18	2.8	0.4	★		★	☆		
		TCGT110304L-PU	11	6.35	3.18	2.8	0.4	★		★	☆		
		TCGT0802005FR-PU	8.2	4.76	2.38	2.3	0.05	★		★	☆		STGC**-08
		TCGT0802005FL-PU	8.2	4.76	2.38	2.3	0.05	★		★	☆		
		TCGT080201FR-PU	8.2	4.76	2.38	2.3	0.1	★		★	☆		
		TCGT080201FL-PU	8.2	4.76	2.38	2.3	0.1	★		★	☆		
		TCGT080202FR-PU	8.2	4.76	2.38	2.3	0.2	★		★	☆		
		TCGT080202FL-PU	8.2	4.76	2.38	2.3	0.2	★		★	☆		
		TCGT080204FR-PU	8.2	4.76	2.38	2.3	0.4	★		★	☆		
		TCGT080204FL-PU	8.2	4.76	2.38	2.3	0.4	★		★	☆		
		TCGT1103005FR-PU	11	6.35	3.18	2.8	0.05	★		★	☆		STGC**-11
		TCGT1103005FL-PU	11	6.35	3.18	2.8	0.05	★		★	☆		
		TCGT110301FR-PU	11	6.35	3.18	2.8	0.1	★		★	☆		
		TCGT110301FL-PU	11	6.35	3.18	2.8	0.1	★		★	☆		
		TCGT110302FR-PU	11	6.35	3.18	2.8	0.2	★		★	☆		
		TCGT110302FL-PU	11	6.35	3.18	2.8	0.2	★		★	☆		
		TCGT110304FR-PU	11	6.35	3.18	2.8	0.4	★		★	☆		
		TCGT110304FL-PU	11	6.35	3.18	2.8	0.4	★		★	☆		

★ Recommended grade ☆ Available grade

Postive insert



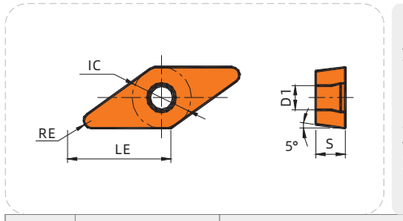
Working condition: ● Stable ◕ Average ⌗ Tough

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

Operation type	Insert shape	Type	Dimension (mm)					PVD			Cermet		Applicable tools
			LE	IC	S	D1	RE	HR1135	HR7215	HR7125	HRC10	HR115C	
Super finishing		TPGH080201R	8.2	4.76	2.38	2.3	0.1	★		★	☆		STGP**-08 S-STLP**-08
		TPGH080201L	8.2	4.76	2.38	2.3	0.1	★		★	☆		
		TPGH080202R	8.2	4.76	2.38	2.3	0.2	★		★	☆		
		TPGH080202L	8.2	4.76	2.38	2.3	0.2	★		★	☆		
		TPGH080204R	8.2	4.76	2.38	2.3	0.4	★		★	☆		
		TPGH080204L	8.2	4.76	2.38	2.3	0.4	★		★	☆		
		TPGH090201R	9.6	5.56	2.38	3.2	0.1	★		★	☆		STGP**-09 S-STLP**-09
		TPGH090201L	9.6	5.56	2.38	3.2	0.1	★		★	☆		
		TPGH090202R	9.6	5.56	2.38	3.2	0.2	★		★	☆		
		TPGH090202L	9.6	5.56	2.38	3.2	0.2	★		★	☆		
		TPGH090204R	9.6	5.56	2.38	3.2	0.4	★		★	☆		
		TPGH090204L	9.6	5.56	2.38	3.2	0.4	★		★	☆		
		TPGH110202R	11	6.35	2.38	2.8	0.2	★		★	☆		STGP**-11 S-STLP**-11
		TPGH110202L	11	6.35	2.38	2.8	0.2	★		★	☆		
		TPGH110204R	11	6.35	2.38	2.8	0.4	★		★	☆		
		TPGH110204L	11	6.35	2.38	2.8	0.4	★		★	☆		
		TPGH110302R	11	6.35	3.18	3.3	0.2	★		★	☆		
		TPGH110302L	11	6.35	3.18	3.3	0.2	★		★	☆		
		TPGH110304R	11	6.35	3.18	3.3	0.4	★		★	☆		
		TPGH110304L	11	6.35	3.18	3.3	0.4	★		★	☆		
		TPGH110308R	11	6.35	3.18	3.3	0.8	★		★	☆		
		TPGH110308L	11	6.35	3.18	3.3	0.8	★		★	☆		

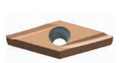
★ Recommended grade ☆ Available grade

Postive insert



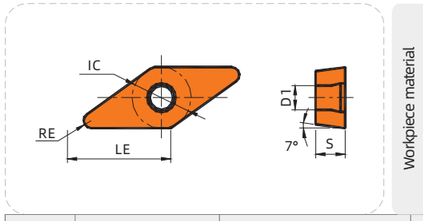
Working condition: ● Stable ◕ Average ⌗ Tough

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

Operation type	Insert shape	Type	Dimension (mm)					PVD			Cermet		Applicable tools
			LE	IC	S	D1	RE	HR1135	HR7215	HR7125	HRC10	HR115C	
Super finishing		VBGT1103005R-XF	11	6.35	3.18	2.8	0.05	★		★	☆		SVJB**-11 SVVB**-11
		VBGT1103005L-XF	11	6.35	3.18	2.8	0.05	★		★	☆		
		VBGT110301R-XF	11	6.35	3.18	2.8	0.1	★		★	☆		
		VBGT110301L-XF	11	6.35	3.18	2.8	0.1	★		★	☆		
		VBGT110302R-XF	11	6.35	3.18	2.8	0.2	★		★	☆		
		VBGT110302L-XF	11	6.35	3.18	2.8	0.2	★		★	☆		
		VBGT110304R-XF	11	6.35	3.18	2.8	0.4	★		★	☆		
		VBGT110304L-XF	11	6.35	3.18	2.8	0.4	★		★	☆		
Finishing		VBGT1103005-FF	11	6.35	3.18	2.8	0.05			★			SVJB**-11 SVVB**-11
		VBGT110301-FF	11	6.35	3.18	2.8	0.1			★			
		VBGT110302-FF	11	6.35	3.18	2.8	0.2			★			
		VBGT110304-FF	11	6.35	3.18	2.8	0.4			★			
		VBGT110301E-FF	11	6.35	3.18	2.8	0.1		★				SVJB**-11 SVVB**-11
		VBGT110302E-FF	11	6.35	3.18	2.8	0.2		★				
		VBGT110304E-FF	11	6.35	3.18	2.8	0.4		★				
Finishing		VBGT1103005R-PY	11	6.35	3.18	2.8	0.05	★		★	☆		SVJB**-11 SVVB**-11
		VBGT1103005L-PY	11	6.35	3.18	2.8	0.05	★		★	☆		
		VBGT110301R-PY	11	6.35	3.18	2.8	0.1	★		★	☆		
		VBGT110301L-PY	11	6.35	3.18	2.8	0.1	★		★	☆		
		VBGT110302R-PY	11	6.35	3.18	2.8	0.2	★		★	☆		
		VBGT110302L-PY	11	6.35	3.18	2.8	0.2	★		★	☆		
		VBGT110304R-PY	11	6.35	3.18	2.8	0.4	★		★	☆		
		VBGT110304L-PY	11	6.35	3.18	2.8	0.4	★		★	☆		
		VBGT160402R-PY	16.6	9.525	4.76	4.4	0.2	★		★	☆		SVJB**-16 SVVB**-16
		VBGT160402L-PY	16.6	9.525	4.76	4.4	0.2	★		★	☆		
		VBGT160404R-PY	16.6	9.525	4.76	4.4	0.4	★		★	☆		
		VBGT160404L-PY	16.6	9.525	4.76	4.4	0.4	★		★	☆		
		VBGT160408R-PY	16.6	9.525	4.76	4.4	0.8	★		★	☆		
		VBGT160408L-PY	16.6	9.525	4.76	4.4	0.8	★		★	☆		

★ Recommended grade ☆ Available grade

Postive insert



Working condition: ● Stable ◕ Average ⌗ Tough

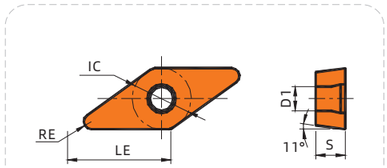
Workpiece material						
P	Steel	●		◕	●	●
M	Stainless steel	◕	◕	◕		
K	Cast iron					
N	Non-ferrous metal					
S	Heat resistant super alloys Titanium alloy	●	●	●		

Operation type	Insert shape	Type	Dimension (mm)					PVD			Cermet		Applicable tools
			LE	IC	S	D1	RE	HR1135	HR7215	HR7125	HRC10	HR115C	
Finishing		VCGT1103005-FF	11	6.35	3.18	2.8	0.05			★			SVJC**-11 SVVC**-11
		VCGT110301-FF	11	6.35	3.18	2.8	0.1			★			
		VCGT110302-FF	11	6.35	3.18	2.8	0.2			★			
		VCGT110304-FF	11	6.35	3.18	2.8	0.4			★			
		VCGT110301E-FF	11	6.35	3.18	2.8	0.1		★				SVJC**-11 SVVC**-11
		VCGT110302E-FF	11	6.35	3.18	2.8	0.2		★				
		VCGT110304E-FF	11	6.35	3.18	2.8	0.4		★				

★ Recommended grade ☆ Available grade

HUAREAL

Postive insert



Working condition: ● Stable ◕ Average ⌗ Tough

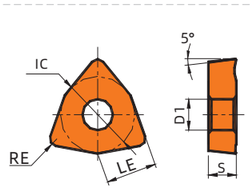
Workpiece material

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

Operation type	Insert shape	Type	Dimension (mm)					PVD			Cermet		Applicable tools
			LE	IC	S	D1	RE	HR1135	HR7215	HR7125	HRC10	HR115C	
Finishing		VPGT1103005-FF	11	6.35	3.18	2.8	0.05			★			SVJP**-11 SVVP**-11
		VPGT110301-FF	11	6.35	3.18	2.8	0.1			★			
		VPGT110302-FF	11	6.35	3.18	2.8	0.2			★			
		VPGT110304-FF	11	6.35	3.18	2.8	0.4			★			

★ Recommended grade ☆ Available grade

Postive insert



Working condition: ● Stable ◕ Average ⌗ Tough

Workpiece material

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

Operation type	Insert shape	Type	Dimension (mm)					PVD			Cermet		Applicable tools
			LE	IC	S	D1	RE	HR1135	HR7215	HR7125	HRC10	HR115C	
Super finishing		WBGT060101L-XF	3.3	4	1.59	2.3	0.1	★		★	☆		S-SWUB**-06
		WBGT060102L-XF	3.3	4	1.59	2.3	0.2	★		★	☆		
		WBGT060104L-XF	3.3	4	1.59	2.3	0.4	★		★	☆		

★ Recommended grade ☆ Available grade

Code key of external machining tool for small components

S	C	L	C	R	12	12	JX	-	09	N
①	②	③	④	⑤	⑥	⑦	⑧		⑨	⑩

①Clamping system	
A	Back clamp
C	Top clamp
P	Lever clamp
S	Screw clamp

②Insert shape		
C	80°rhombus	80°
D	55° rhombus	55°
W	80° W-type	80°
T	60° T-type	60°
V	35° rhombus	35°

③Entering angle (KAPR)			
A	B	D	F
90°	75°	45°	90°
G	J	K	L
90°	93°	75°	95°
N	P	S	T
63°	117°30'	45°	60°
V			
72°30'			

④Insert clearance angle	
B	5° Positive
C	7° Positive
N	0° Negative
P	11° Positive

⑤Hand of tool	
R	Right hand
L	Left hand
N	Left and right hands

⑥Corner height(mm)	
8	08
10	10
12	12
16	16
20	20
25	25

⑦Tool width,WF dimension（mm）	
8	08
10	10
12	12
16	16
20	20
25	25

⑧Tool length, LF dimension（mm）	
F	80
H	100
JX	120
K	125
M	150

⑩Others	
N	Without offset
No code name	Offset

⑨Cutting edge length（mm）					
Inscribed circle diameter	Insert shape				
	Square	Regular triangle	80° rhombus	55° rhombus	35° rhombus
6.00	-	-	-	-	-
6.35	-	11	06	07	11
7.94	-	13	-	-	-
8.00	-	-	-	-	-
9.525	09	16	09	11	16
10.00	-	-	-	-	-
12.00	-	-	-	-	-
12.70	12	22	12	15	-

Code key of internal machining tool for small components

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

①Tool material	
S	Steel

②Tool diameter(mm)	
08	08
10	10
12	12
16	16
20	20
25	25
32	32

③Tool length（mm）	
K	125
M	150
Q	180
R	200
S	250
T	300
U	350
H	100
L	140
X	Special

⑥Entering angle(KAPR)			
F	K	L	Q
90°	75°	95° 95°	107°30'
U			
93°			

⑤Insert shape		
C	80°rhombus	80°
D	55° rhombus	55°
W	80° W-type	80°
T	60° T-type	60°
V	35° rhombus	35°

④Clamping system	
S	Screw clamp

⑦Insert clearance angle	
C	7°
P	11°

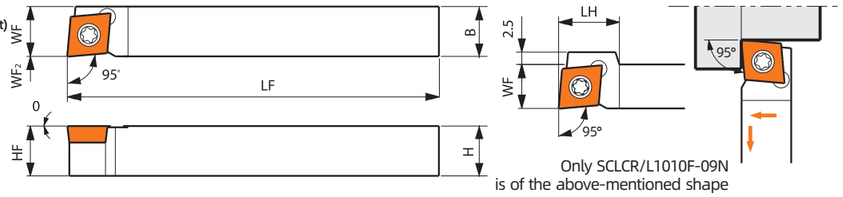
⑧Hand of tool	
R	Right hand
L	Left hand
N	Left and right hands

⑨Cutting edge length（mm）					
Inscribed circle diameter	Insert shape				
	W-type	Regular triangle	80°rhombus	55° rhombus	35° rhombus
4.0	06				
5.556	-	09	-	-	-
6.350	-	11	06	07	11
9.525	09	16	09	11	16
12.70	12	-	12	-	-

Turning tool for small components

SCLCR/L (Without offset)

KARP:95°



Only SCLCR/L1010F-09N is of the above-mentioned shape

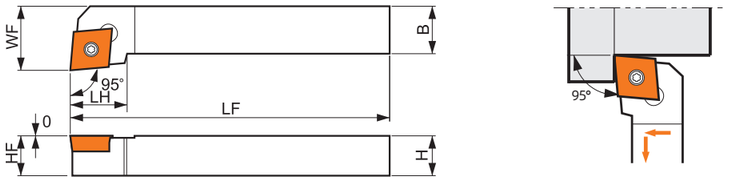
• The illustration shows the right hand (R)

Model		Inventory		Dimension (mm)						Accessories		Matching insert
		R	L	H	HF	B	LF	LH	WF	Insert screw	Wrench	
SCLCR/L	1010F-06N	△	△	10	10	10	80	-	10	M2.5X7	WR15	CCGT06**
	1010F-09N	△	△	10	10	10	80	15	10	M4.0X8.5	WR15	CCGT09**
	1212H-09N	▲	▲	12	12	12	100	-	12			
	1616H-09N	△	△	16	16	16	100	-	16			

▲Standing inventory △Make-to-order

SCLCR/L

KARP:95°



• The illustration shows the right hand (R)

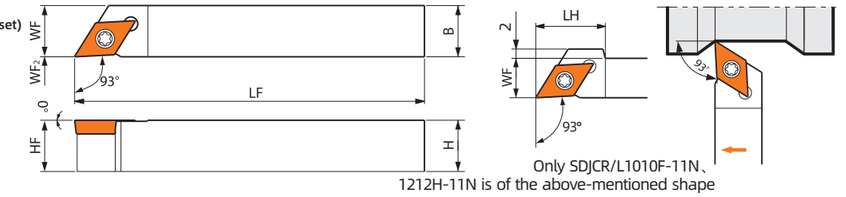
Model		Inventory		Dimension (mm)						Accessories		Matching insert
		R	L	H	HF	B	LF	LH	WF	Insert screw	Wrench	
SCLCR/L	1010F-06	△	△	10	10	10	80	9	12	M2.5X7	WR15	CCGT06**
	1010F-09	△	△	10	10	10	80	14	14	M4.0X8.5	WR15	CCGT09**
	1212H-09	▲	▲	12	12	12	100	14	16			
	1616H-09	△	△	16	16	16	100	15	20			

▲Standing inventory △Make-to-order

Turning tool for small components

SDJCR/L (Without offset)

KARP:93°



Only SDJCR/L1010F-11N、1212H-11N is of the above-mentioned shape

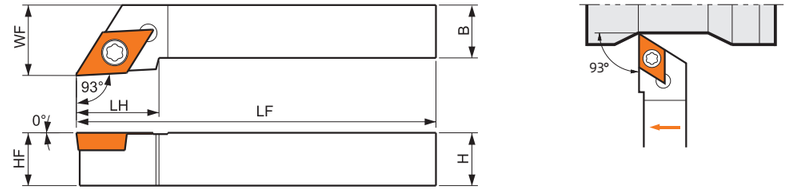
• The illustration shows the right hand (R)

Model		Inventory		Dimension (mm)						Accessories		Matching insert
		R	L	H	HF	B	LF	LH	WF	Insert screw	Wrench	
SDJCR/L	1010JX-07N	△	△	10	10	10	120	-	10	M2.5X7	WR08	DCGT07**
	1010JX-11N	△	△	10	10	10	120	20	10	M4.0X8.5	WR15	DCGT11**
	1212JX-11N	▲	▲	12	12	12	120	20	12			
	1616JX-11N	△	△	16	16	16	120	-	16			

▲Standing inventory △Make-to-order

SDJCR/L

KARP:93°



• The illustration shows the right hand (R)

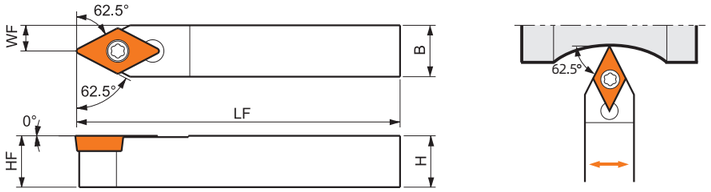
Model		Inventory		Dimension (mm)						Accessories		Matching insert
		R	L	H	HF	B	LF	LH	WF	Insert screw	Wrench	
SDJCR/L	1010F-07	△	△	10	10	10	80	12	12	M2.5X7	WR08	DCGT07**
	1010F-11	△	△	10	10	10	80	18	12	M4.0X8.5	WR15	DCGT11**
	1212H-11	▲	▲	12	12	12	100	18	16			
	1616H-11	△	△	16	16	16	100	18	20			

▲Standing inventory △Make-to-order

Turning tool for small components

SDNCN

KARP:62.5°



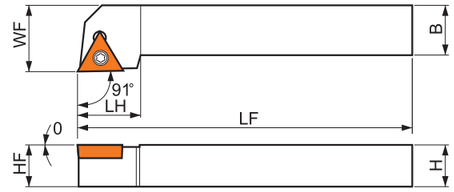
Model		Inventory	Dimension（mm）					Accessories		Matching insert
		N	H	HF	B	LF	WF	Insert screw	Wrench	
SDNCN	1010JX-07	△	10	10	10	120	5	M2.5X7	WR8	DCGT07**
	1212JX-07	▲	12	12	12	120	6			
	1010JX-11	△	10	10	10	120	5	M4.0X8.5	WR15	DCGT11**
	1212JX-11	▲	12	12	12	120	6			
	1616JX-11	△	16	16	16	120	8			
	1010F-11	△	10	10	10	80	5			
	1212F-11	▲	12	12	12	80	6			
	1616H-11	△	16	16	16	100	8			

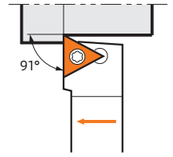
▲Standing inventory　△Make-to-order

Turning tool for small components

STGC(P)

KARP:91°





• The illustration shows the right hand（R）

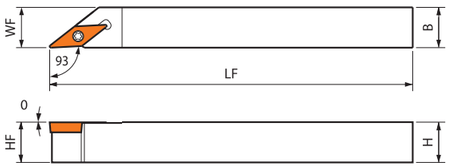
Model		Inventory		Dimension（mm）						Accessories		Matching insert
		R	L	H	HF	B	LF	LH	WF	Insert screw	Wrench	
STGCR/L	0808E-08	△	△	8	8	8	70	12	10	M2.0X5	WR6	TCGT08**
	1010F-08	△	△	10	10	10	80	12	12			
	1010F-11	△	△	10	10	10	80	15	14	M2.5X7	WR8	TCGT11**
	1212H-11	▲	▲	12	12	12	100	15	16			
	1616H-11	△	△	16	16	16	100	15	20			
STGPR/L	0808E-08	△	△	8	8	8	70	12	10	M2.0X5	WR6	TPGT08**
	1010F-09	△	△	10	10	10	80	12	12			TPGH09**
	1010F-11	△	△	10	10	10	80	15	14	M2.5X7	WR8	TPGT11**
	1212H-11	▲	▲	12	12	12	100	15	16			
	1616H-11	△	△	16	16	16	100	15	20			

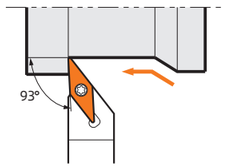
▲Standing inventory　△Make-to-order

Turning tool for small components

SVJBR/L(Without offset)

KARP:93°





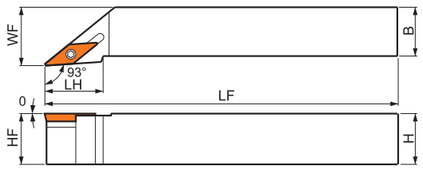
• The illustration shows the right hand（R）

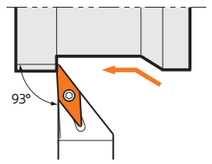
Model		Inventory		Dimension（mm）					Accessories		Matching insert
		R	L	H	HF	B	LF	WF	Insert screw	Wrench	
SVJBR/L	1010JX-11N	△	△	10	10	10	120	10	M2.5X7	WR8	VBGT11**
	1212JX-11N	△	△	12	12	12	120	12			
	1616JX-11N	△	△	16	16	16	120	16			

▲Standing inventory △Make-to-order

SVJBR/L

KARP:93°





• The illustration shows the right hand（R）

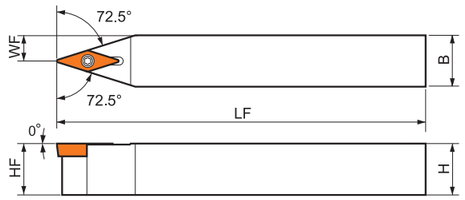
Model		Inventory		Dimension（mm）						Accessories		Matching insert
		R	L	H	HF	B	LF	LH	WF	Insert screw	Wrench	
SVJBR/L	1010JX-11	△	△	10	10	10	120	30	12	M2.5X7	WR8	VBGT11**
	1212JX-11	△	△	12	12	12	120	30	16			
	1616JX-11	△	△	16	16	16	120	30	20			

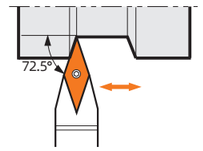
▲Standing inventory △Make-to-order

Turning tool for small components

SVVBN

KARP:72.5°



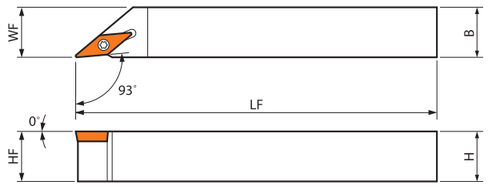


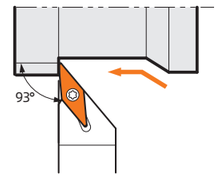
Model		Inventory	Dimension（mm）					Accessories		Matching insert
		N	H	HF	B	LF	WF	Insert screw	Wrench	
SVVBN	1010JX-11	△	10	10	10	120	5	M2.5X7	WR8	VBGT11**
	1212JX-11	△	12	12	12	120	6			
	1616JX-11	△	16	16	16	120	8			
	1010F-11	△	10	10	10	80	5			
	1212F-11	△	12	12	12	80	6			
	1616H-11	△	16	16	16	100	8			

▲Standing inventory △Make-to-order

SVJCR/L (Without offset)

KARP:93°





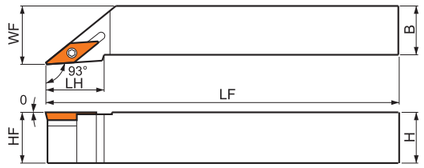
• The illustration shows the right hand（R）

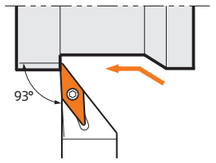
Model		Inventory		Dimension（mm）					Accessories		Matching insert
		R	L	H	HF	B	LF	WF	Insert screw	Wrench	
SVJCR/L	1010JX-11N	△	△	10	10	10	120	10	M2.5X7	WR8	VCGT11**
	1212JX-11N	△	△	12	12	12	120	12			
	1616JX-11N	△	△	16	16	16	120	16			

▲Standing inventory △Make-to-order

Turning tool for small components

SVJCR/L
KARP:93°



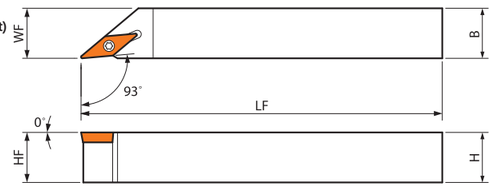


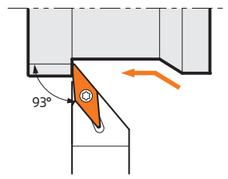
• The illustration shows the right hand（R）

Model		Inventory		Dimension（mm）						Accessories		Matching insert
		R	L	H	HF	B	LF	LH	WF	Insert screw	Wrench	
SVJCR/L	1010JX-11	△	△	10	10	10	120	30	12	M2.5X7	WR8	VCGT11**
	1212JX-11	△	△	12	12	12	120	30	16			
	1616JX-11	△	△	16	16	16	120	30	20			

▲Standing inventory △Make-to-order

SVJPR/L (Without offset)
KARP:93°





• The illustration shows the right hand（R）

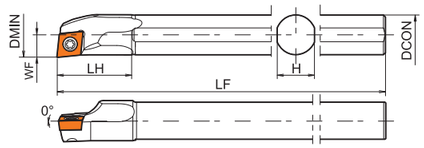
Model		Inventory		Dimension（mm）					Accessories		Matching insert
		R	L	H	HF	B	LF	WF	Insert screw	Wrench	
SVJPR/L	1010JX-11N	△	△	10	10	10	120	10	M2.5X7	WR8	VPGT11**
	1212JX-11N	△	△	12	12	12	120	12			
	1616JX-11N	△	△	16	16	16	120	16			

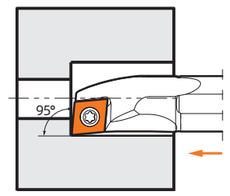
▲Standing inventory △Make-to-order

Turning tool for small components

S-SCLCR/L
KARP:95°







• The illustration shows the right hand（R）

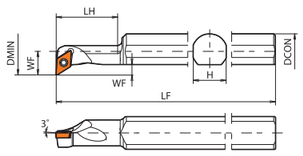
Model		Inventory		Dimension（mm）						Accessories		Matching insert
		R	L	DMIN	DCON	H	LF	LH	WF	Insert screw	Wrench	
S10H-SCLCR/L	03-05	△	△	5	10	9	100	24	2.5	M1.6X3.5	WR6	CCGT03**
	03-06	△	△	6	10	9	100	28	3			
	04-07	△	△	7	10	9	100	32	3.5	M2.0X3.5	WR6	CCGT04**
	04-08	△	△	8	10	9	100	37	4			
S08X-SCLCR/L	06-10	△	△	10	8	7	120	16	5	M2.5X4.5	WR8	CCGT06**
S10H-SCLCR/L	06-12	▲	▲	12	10	9	140	20	6			
S12M-SCLCR/L	06-14	△	△	14	12	11	150	24	7			
S16Q-SCLCR/L	09-18	△	△	18	16	15	180	30	9	M4.0X6.5	WR15	CCGT09**

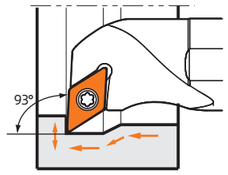
▲Standing inventory △Make-to-order

Turning tool for small components

S-SDUCR/L

KARP:93°





• The illustration shows the right hand（R）

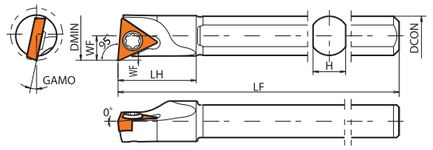
Model		Inventory		Dimension（mm）						Accessories		Matching insert
		R	L	DMIN	DCON	H	LF	LH	WF	Insert screw	Wrench	
S10L-SDUCR/L	07-14	△	△	14	10	9	140	19	8.7	M2.5X6.0	WR8	DCGT07**
S16Q-SDUCR/L	07-14	△	△	14	16	15	180	28	10.8			
S12M-SDUCR/L	07-16	△	△	16	12	11	150	21	9.7			
S16Q-SDUCR/L	07-20	△	△	20	16	15	180	21	11.7			
S20R-SDUCR/L	11-20	△	△	20	20	19	200	48	15.6	M4.0X6.5	WR15	DCGT11**
S16Q-SDUCR/L	11-23	▲	▲	23	16	15	180	21	14.5			

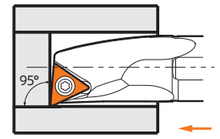
▲Standing inventory △Make-to-order

Turning tool for small components

S-STLB(P)

KARP:95°





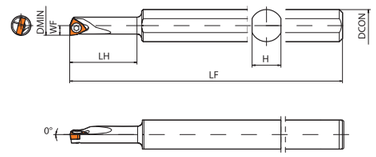
• The illustration shows the right hand（R）

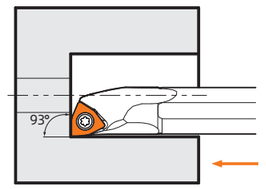
Model		Inventory		Dimension（mm）						Accessories		Matching insert
		R	L	DMIN	DCON	H	LF	LH	WF	Insert screw	Wrench	
S06H-STLBR/L	06-08	△	△	8	6	5	100	12	3.8	M2.0X3.5	WR6	TBGT06**
S08X-STLPR/L	08-10	△	△	10	8	7	120	16	5	M2.0X3.5	WR6	TPGH08**
	09-10	△	△	10	8	7	120	16	5	M2.5X4.5	WR8	TPGH09**
S10L-STLPR/L	09-12	△	△	12	10	9	140	20	6.2			
	11-12	△	△	12	10	9	140	20	6	M2.5X4.5	WR8	TPGH11**
S12M-STLPR/L	11-14	▲	▲	14	12	11	150	24	7.2			
	09-16	△	△	16	12	11	150	24	8	M2.5X4.5	WR8	TPGH09**
S16Q-STLPR/L	11-18	△	△	18	16	15	180	30	9.2	M2.5X4.5	WR8	TPGH11**

▲Standing inventory △Make-to-order

S-SWUBR/L

KARP:93°





• The illustration shows the right hand（R）

Model		Inventory		Dimension（mm）						Accessories		Matching insert
		R	L	DMIN	DCON	H	LF	LH	WF	Insert screw	Wrench	
S10H-SWUBR/L	06-06	△	△	6	10	9	100	21	3	M2.0X5	WR6	WBGT06**
	06-07	△	△	7	10	9	100	25	3.5			

▲Standing inventory △Make-to-order

Back turning tool

Code key of back turning insert

HBS	15	R	4	005
①	②	③	④	⑤

①Insert name	
HBS	Back turning insert

②Insert length（mm）	
15	15.4

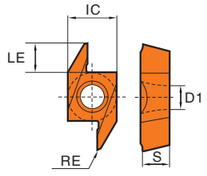
③Hand of tool	
R	Right hand

④Insert width（mm）	
4	4.2

⑤Corner radius（mm）	
005	0.05

Back turning insert

Working condition: ● Stable ◕ Average ⌗ Tough



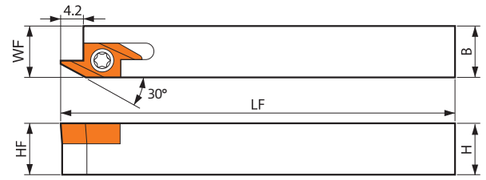
Workpiece material						
P	Steel	●		◕	●	●
M	Stainless steel	◕	◕	◕		
K	Cast iron					
N	Non-ferrous metal					
S	Heat resistant super alloys Titanium alloy	●	●	●		

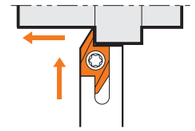
Operation type	Insert shape	Type	Dimension (mm)					PVD			Cermet		Applicable tools
			LE	IC	S	D1	RE	HR1135	HR7215	HR7125	HRC10	HR115C	
Back turning		HBS15R4005	4.2	7	3.97	3.4	0.05	★		★	☆		SABSR**-40F
		HBS15R4015	4.2	7	3.97	3.4	0.15	★		★	☆		

★ Recommended grade ☆ Available grade

Back turning tool

SABS-40F

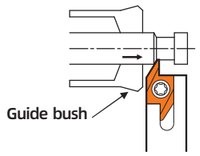




Model		Inventory	Dimension（mm）					Accessories		Matching insert
		R	H	HF	B	LF	WF	Insert screw	Wrench	
SABSR	1010JX-40F	△	10	10	10	120	10.2	M3X8	WR8	HBS**
	1212JX-40F	△	12	12	12	120	12.2			
	1616JX-40F	△	16	16	16	120	16.2			

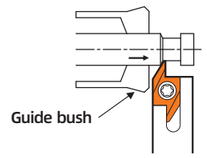
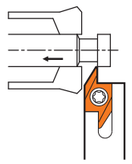
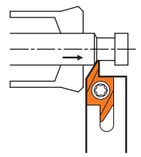
▲Standing inventory △Make-to-order

Features of back turning tool

Hand of tool	Illustration	Feature
Right hand (R)		For small components machining or high-precision machining, due to the wider tool tip, it is possible to machine closer to the guide bush.

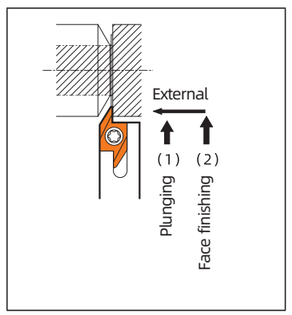
Usage of back turning tool

- For roughing and finishing

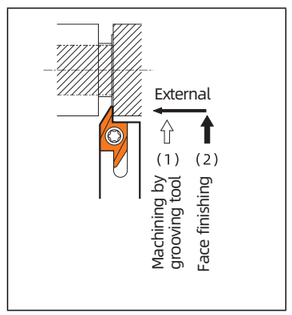
Hand of tool	Roughing	Movement of the workpiece	Finishing
Right hand (R)			

Countermeasure against peeled surface in face back turning

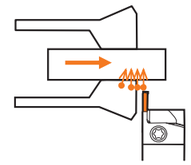
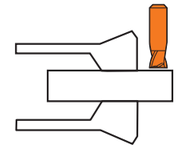
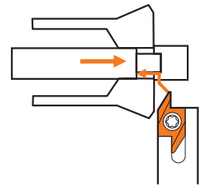
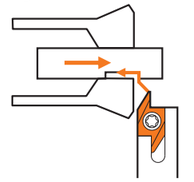
Countermeasures 1:
Face finishing



Countermeasures 2:
Face finishing after grooving



Chip control improvement in back turning

	Countermeasures 1:	Countermeasures 2:
Roughing (Pre-stage machining)	Roughing with grooving tools 	Pre-stage machining is processed with solid end mill 
Finishing	(1) When using HBS15R□□for back turning  Advantages: Good surface roughness Disadvantages: If a machining pass is long, the guide bush can not support the workpiece.	(1) When using HBS15R□□for back turning  Advantages: Chips are broken into small pieces and removed smoothly , though the workpiece material is sticky Disadvantages: The pre-stage machining may cause fractures, because of interrupted machining

Shallow grooving tool

Code key of shallow grooving insert

TH	F	16	R	100	-	005	□□
①	②	③	④	⑤		⑥	⑦

①Insert series	
TH	Triangle

②Insert type	
R	Universal type (10°rake angle)
F	Sharp type (20°rake angle)

③Inscribed circle diameter(mm)	
16	9.525
22	12.7

④Hand of tool	
R	Right hand
L	Left hand

⑤Cutting edge width(mm)	
050	0.5
100	1.0
...	

⑥Corner radius(mm)	
005	0.05
020	0.2
...	

⑦Chipbreaker	
Default	Ground chipbreaker (square)
R	Full-R (round)

Shallow grooving tool code key

TH	R	25	25	R	22	-	M	25
①	②	③	④	⑤	⑥		⑦	⑧

①Tool series	
TH	Shallow grooving tool holder

②Applicable insert	
R	Universal type
F	Sharp type

③Corner height (mm)	
25	25

④Tool width,WF dimension (mm)	
25	25

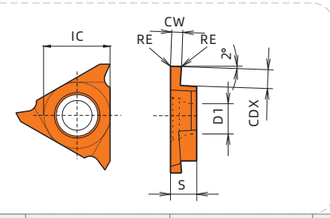
⑤Hand of tool	
R	Righ Hand
L	Left Hand

⑥Inscribed circle diameter(mm)	
16	9.525
22	12.7

⑦Tool length, LF dimension(mm)	
F	120
K	125
M	150

⑧Insert width range(mm)	
Default	Universal
15	Cutting width < 2.5
25	2.5≤ Cutting width < 3.5
35	3.5≤ Cutting width

Shallow Grooving Insert--THR16 Universal Type



Working condition: ● Stable ◕ Average ⌗ Tough

Workpiece material

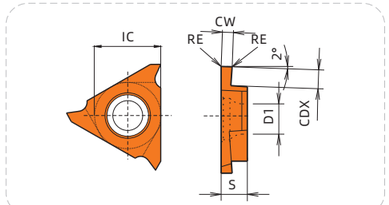
P	Steel	●		◕	●	●
M	Stainless steel	◕	◕	◕		
K	Cast iron					
N	Non-ferrous metal					
S	Heat resistant super alloys Titanium alloy	●	●	●		

Operation type	Insert shape	Type	Dimension (mm)						PVD			Cermet		Applicable tools
			IC	S	D1	CW	CDX	RE	HR1135	HR7215	HR7125	HRC10	HR115C	
Shallow grooving	 The illustration shows the right hand	THR16R050-005	9.525	3.2	4.4	0.50	1.2	0.05	★		★			THR***R16-K THR***R16-M
		THR16R075-005	9.525	3.2	4.4	0.75	2.0	0.05	★		★			
		THR16R100-005	9.525	3.2	4.4	1.00	2.0	0.05	★		★			
		THR16R125-020	9.525	3.2	4.4	1.25	2.0	0.2	★		★			
		THR16R150-020	9.525	3.2	4.4	1.50	2.5	0.2	★		★			
		THR16R175-020	9.525	3.2	4.4	1.75	2.5	0.2	★		★			
		THR16R200-020	9.525	3.2	4.4	2.00	2.5	0.2	★		★			
		THR16R225-020	9.525	3.2	4.4	2.25	2.5	0.2	★		★			
		THR16R250-020	9.525	3.2	4.4	2.50	2.5	0.2	★		★			
		THR16R300-020	9.525	3.2	4.4	3.00	2.5	0.2	★		★			
		THR16L050-005	9.525	3.2	4.4	0.50	1.2	0.05	★		★			THR***L16-K THR***L16-M
		THR16L075-005	9.525	3.2	4.4	0.75	2.0	0.05	★		★			
		THR16L100-005	9.525	3.2	4.4	1.00	2.0	0.05	★		★			
		THR16L125-020	9.525	3.2	4.4	1.25	2.0	0.2	★		★			
		THR16L150-020	9.525	3.2	4.4	1.50	2.5	0.2	★		★			
		THR16L175-020	9.525	3.2	4.4	1.75	2.5	0.2	★		★			
		THR16L200-020	9.525	3.2	4.4	2.00	2.5	0.2	★		★			
		THR16L225-020	9.525	3.2	4.4	2.25	2.5	0.2	★		★			
		THR16L250-020	9.525	3.2	4.4	2.50	2.5	0.2	★		★			
		THR16L300-020	9.525	3.2	4.4	3.00	2.5	0.2	★		★			

Customization supported for models not listed ★ Recommended grade ☆ Available grade

Shallow Grooving Insert--THR22 Universal Type

Working condition: ● Stable ◕ Average ⌗ Tough



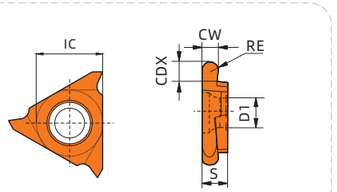
Workpiece material							
P	Steel	●		◕	●	●
M	Stainless steel	◕	◕	◕		
K	Cast iron					
N	Non-ferrous metal					
S	Heat resistant super alloys Titanium alloy	●	●	●		

Operation type	Insert shape	Type	Dimension (mm)						PVD			Cermet		Applicable tools
			IC	S	D1	CW	CDX	RE	HR1135	HR7215	HR7125	HRC10	HR115C	
Shallow grooving	 The illustration shows the right hand	THR22R125-020	12.7	4.8	5.5	1.25	2.0	0.2	★		★			THR***R22-K15 THR***R22-M15
		THR22R150-020	12.7	4.8	5.5	1.50	3.5	0.2	★		★			
		THR22R175-020	12.7	4.8	5.5	1.75	3.5	0.2	★		★			
		THR22R200-020	12.7	4.8	5.5	2.00	3.5	0.2	★		★			
		THR22R225-020	12.7	4.8	5.5	2.25	3.5	0.2	★		★			
		THR22R250-030	12.7	4.8	5.5	2.50	5.0	0.3	★		★			THR***R22-K25 THR***R22-M25
		THR22R300-030	12.7	4.8	5.5	3.00	5.0	0.3	★		★			
		THR22R350-030	12.7	4.8	5.5	3.50	5.0	0.3	★		★			
		THR22R400-040	12.7	4.8	5.5	4.00	5.0	0.4	★		★			THR***R22-K35 THR***R22-M35
		THR22R450-040	12.7	4.8	5.5	4.50	5.0	0.4	★		★			
		THR22L125-020	12.7	4.8	5.5	1.25	2.0	0.2	★		★			THR***L22-K15 THR***L22-M15
		THR22L150-020	12.7	4.8	5.5	1.50	3.5	0.2	★		★			
		THR22L175-020	12.7	4.8	5.5	1.75	3.5	0.2	★		★			
		THR22L200-020	12.7	4.8	5.5	2.00	3.5	0.2	★		★			
		THR22L225-020	12.7	4.8	5.5	2.25	3.5	0.2	★		★			
		THR22L250-030	12.7	4.8	5.5	2.50	5.0	0.3	★		★			THR***L22-K25 THR***L22-M25
		THR22L300-030	12.7	4.8	5.5	3.00	5.0	0.3	★		★			
		THR22L350-030	12.7	4.8	5.5	3.50	5.0	0.3	★		★			
		THR22L400-040	12.7	4.8	5.5	4.00	5.0	0.4	★		★			THR***L22-K35 THR***L22-M35
		THR22L450-040	12.7	4.8	5.5	4.50	5.0	0.4	★		★			

Customization supported for models not listed ★ Recommended grade ☆ Available grade

Shallow Grooving Insert--Profiling

Working condition: ● Stable ◕ Average ⌗ Tough

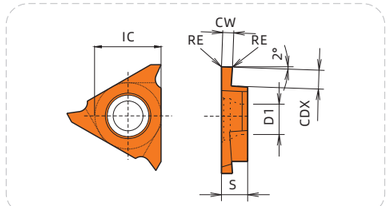


Workpiece material							
P	Steel	●		◕	●	●
M	Stainless steel	◕	◕	◕		
K	Cast iron					
N	Non-ferrous metal					
S	Heat resistant super alloys Titanium alloy	●	●	●		

Operation type	Insert shape	Type	Dimension (mm)						PVD			Cermet		Applicable tools
			IC	S	D1	CW	CDX	RE	HR1135	HR7215	HR7125	HRC10	HR115C	
Shallow grooving (Profiling)	 The illustration shows the right hand	THR16R200-100R	9.525	3.2	4.4	2.00	2.5	1.00	★		★			THR***R16-K THR***R16-M
		THR16R300-150R	9.525	3.2	4.4	3.00	2.5	1.50	★		★			
		THR16L200-100R	9.525	3.2	4.4	2.00	2.5	1.00	★		★			THR***L16-K THR***L16-M
		THR16L300-150R	9.525	3.2	4.4	3.00	2.5	1.50	★		★			
		THR22R100-050R	12.7	4.8	5.5	1.00	2.0	0.50	★		★			THR***R22-K15 THR***R22-M15
		THR22R150-075R	12.7	4.8	5.5	1.50	3.5	0.75	★		★			
		THR22R200-100R	12.7	4.8	5.5	2.00	3.5	1.00	★		★			
		THR22R250-125R	12.7	4.8	5.5	2.50	4.0	1.25	★		★			THR***R22-K25 THR***R22-M25
		THR22R300-150R	12.7	4.8	5.5	3.00	4.0	1.50	★		★			
		THR22R400-200R	12.7	4.8	5.5	4.00	5.0	2.00	★		★			THR***R22-K35 THR***R22-M35
		THR22L100-050R	12.7	4.8	5.5	1.00	2.0	0.50	★		★			THR***L22-K15 THR***L22-M15
		THR22L150-075R	12.7	4.8	5.5	1.50	3.5	0.75	★		★			
		THR22L200-100R	12.7	4.8	5.5	2.00	3.5	1.00	★		★			
		THR22L250-125R	12.7	4.8	5.5	2.50	4.0	1.25	★		★			THR***L22-K25 THR***L22-M25
		THR22L300-150R	12.7	4.8	5.5	3.00	4.0	1.50	★		★			
		THR22L400-200R	12.7	4.8	5.5	4.00	5.0	2.00	★		★			THR***L22-K35 THR***L22-M35

Customization supported for models not listed ★ Recommended grade ☆ Available grade

Shallow Grooving Insert--THF16 Sharp Type



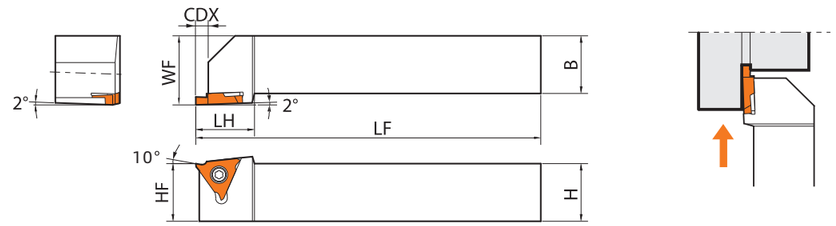
Working condition: ● Stable ◕ Average ⌗ Tough

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

Operation type	Insert shape	Type	Dimension (mm)						PVD			Cermet		Applicable tools
			IC	S	D1	CW	CDX	RE	HR1135	HR7215	HR7125	HRC10	HR115C	
Shallow grooving	 The illustration shows the right hand	THF16R025-005	9.525	3.2	4.4	0.25	0.6	0.05	★		★			THF***R16-F
		THF16R050-005	9.525	3.2	4.4	0.50	1.2	0.05	★		★			
		THF16R075-005	9.525	3.2	4.4	0.75	2.0	0.05	★		★			
		THF16R100-005	9.525	3.2	4.4	1.00	2.0	0.05	★		★			
		THF16R125-010	9.525	3.2	4.4	1.25	2.0	0.1	★		★			
		THF16R150-010	9.525	3.2	4.4	1.50	2.7	0.1	★		★			
		THF16R175-010	9.525	3.2	4.4	1.75	3.0	0.1	★		★			
		THF16R200-010	9.525	3.2	4.4	2.00	3.0	0.1	★		★			
		THF16R225-010	9.525	3.2	4.4	2.25	3.0	0.1	★		★			
		THF16R250-010	9.525	3.2	4.4	2.50	3.0	0.1	★		★			
		THF16R300-010	9.525	3.2	4.4	3.00	3.0	0.1	★		★			
		THF16L025-005	9.525	3.2	4.4	0.25	0.6	0.05	★		★			THF***L16-F
		THF16L050-005	9.525	3.2	4.4	0.50	1.2	0.05	★		★			
		THF16L075-005	9.525	3.2	4.4	0.75	2.0	0.05	★		★			
		THF16L100-005	9.525	3.2	4.4	1.00	2.0	0.05	★		★			
		THF16L125-010	9.525	3.2	4.4	1.25	2.0	0.1	★		★			
		THF16L150-010	9.525	3.2	4.4	1.50	2.7	0.1	★		★			
		THF16L175-010	9.525	3.2	4.4	1.75	3.0	0.1	★		★			
		THF16L200-010	9.525	3.2	4.4	2.00	3.0	0.1	★		★			
		THF16L225-010	9.525	3.2	4.4	2.25	3.0	0.1	★		★			
		THF16L250-010	9.525	3.2	4.4	2.50	3.0	0.1	★		★			
		THF16L300-010	9.525	3.2	4.4	3.00	3.0	0.1	★		★			

Customization supported for models not listed ★ Recommended grade ☆ Available grade

Shallow grooving tool

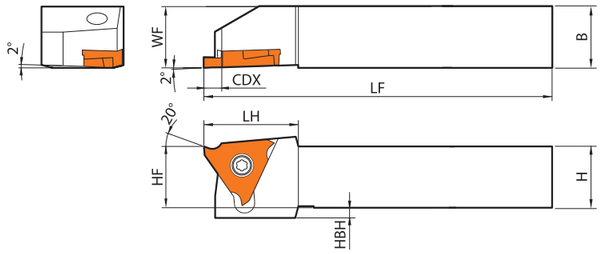


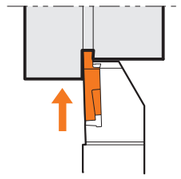
• The illustration shows the right hand (R)

Model		Dimension (mm)								Mounting screw	Wrench	Matching insert
		Inventory	H	HF	B	LF	LH	WF	CDX			
THR	2020R16-K	▲	20	20	20	125	24	25	2.5	STH□16	WR8	THR16□□
	2020L16-K	△	20	20	20	125	24	25	2.5			
	2525R16-M	▲	25	25	25	150	24	30	2.5			
	2525L16-M	▲	25	25	25	150	24	30	2.5			
	2020R22-K15	▲	20	20	20	125	25.5	25	4	STH□22	WR15	THR22□□
	2020L22-K15	△	20	20	20	125	25.5	25	4			
	2525R22-M15	▲	25	25	25	150	25.5	30	4			
	2525L22-M15	△	25	25	25	150	25.5	30	4			
	2020R22-K25	▲	20	20	20	125	25.5	25	5.5			
	2020L22-K25	△	20	20	20	125	25.5	25	5.5			
	2525R22-M25	▲	25	25	25	150	25.5	30	5.5			
	2525L22-M25	△	25	25	25	150	25.5	30	5.5			
	2020R22-K35	▲	20	20	20	125	25.5	25	5.5			
	2020L22-K35	△	20	20	20	125	25.5	25	5.5			
	2525R22-M35	▲	25	25	25	150	25.5	30	5.5			
	2525L22-M35	△	25	25	25	150	25.5	30	5.5			

▲Standing inventory △Make-to-order

Shallow grooving tool





• The illustration shows the right hand（R）

Model		Dimension（mm）									Mounting screw	Wrench	Matching insert
		Inventory	H	HF	HBH	B	LF	LH	WF	CDX			
THF	1010R16-F	▲	10	10	4	10	120	18.5	10	3	STH□16	WR15	THF16□□
	1010L16-F	▲	10	10	4	10	120	18.5	10	3			
	1212R16-F	▲	12	12	2	12	120	18.5	12	3			
	1212L16-F	▲	12	12	2	12	120	18.5	12	3			
	1616R16-F	▲	16	16	-	16	120	18.5	16	3			
	1616L16-F	▲	16	16	-	16	120	18.5	16	3			
	2020R16-F	▲	20	20	-	20	120	18.5	20	3			
	2020L16-F	▲	20	20	-	20	120	18.5	20	3			

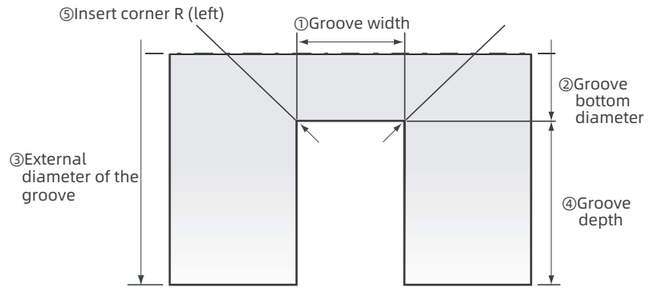
▲Standing inventory　△Make-to-order

Shallow grooving insert non-standard customized form

STEP 1

Confirm the form of the grooving and choose between Style A and Style B

Style A



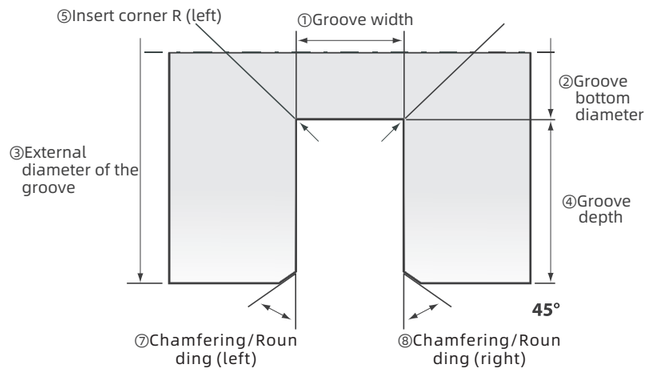
■ Customizable form

Groove width/(mm)	≤0.5	≤1.25
Maximum groove depth/(mm)	≤1.2	≤2.0

Groove width/(mm)	≤3	≤4.5
Maximum groove depth/(mm)	≤5.0	≤5.0

*Insert corner R can be precise to 0.05mm

Style B



■ Customizable form

Groove width/(mm)	≤0.5	≤1.25
Maximum groove depth/(mm)	≤1.2	≤2.0

Groove width/(mm)	≤3	≤4.5
Maximum groove depth/(mm)	≤5.0	≤5.0

*Insert corner R can be precise to 0.05mm

Shallow grooving insert non-standard customized form

STEP 2

Fill in the form

1	Groove width	mm（Tolerance： ）	
2	Groove bottom diameter	mm（Tolerance： ）	
3	External diameter of the groove	Left:	（Tolerance： ）
		Right:	（Tolerance： ）
4	Groove depth	Left:	
		Right:	
5	Insert corner R	Left:	
		Right:	
6	Chamfering/Rounding	Left:	mm×45°
		Right:	mm×45°

STEP 3

Fill in the processing form

Workpiece material		Size of cutter square	
Cooling system			
Cutting parameters			
Tool change standard:	☐THF ☐THR		
Tool holder type		Tool holder hand	

STEP 4

Fill in customer information

Company name		Department/position	
Name		Telephone number	
Address			

Recommended cutting conditions for shallow grooving

Workpiece material	Recommended cutting conditions						
	Cutting speed v_c（m/min）			(1)Feed for grooving（mm/rev） (2)Feed for transverse cutting（mm/rev） (3) Cutting depth for transverse cutting（mm）			
	HR1135	HR7215	HR7125	TH□□ 025-100	TH□□ 125-200	TH□□ 225-300	TH□□ 350-450
Carbon steel	80-180		80-180	(1)0.03-0.08 (2)Not recommended (3)Not recommended	(1)0.04-0.09 (2)0.04-0.09 (3)max 0.3	(1)0.05-0.12 (2)0.05-0.09 (3)max 0.5	(1)0.05-0.12 (2)0.05-0.1 (3)max 0.8
Alloy steel	60-150		60-150	(1)0.03-0.07 (2)Not recommended (3)Not recommended	(1)0.04-0.09 (2)0.04-0.09 (3)max 0.3	(1)0.05-0.1 (2)0.05-0.09 (3)max 0.5	(1)0.05-0.1 (2)0.05-0.1 (3)max 0.5
Stainless steel	50-150		50-130	(1)0.03-0.07 (2)Not recommended (3)Not recommended	(1)0.04-0.08 (2)0.04-0.08 (3)max 0.3	(1)0.05-0.09 (2)0.05-0.09 (3)max 0.5	(1)0.05-0.1 (2)0.05-0.1 (3)max 0.5
Cast iron				(1)0.03-0.08 (2)Not recommended (3)Not recommended	(1)0.04-0.09 (2)0.04-0.09 (3)max 0.3	(1)0.05-0.1 (2)0.05-0.1 (3)max 0.5	(1)0.05-0.12 (2)0.05-0.1 (3)max 0.8
Aluminum alloy				(1)0.05-0.12 (2)Not recommended (3)Not recommended	(1)0.05-0.15 (2)0.05-0.15 (3)max 0.5	(1)0.08-0.15 (2)0.08-0.15 (3)max 0.8	(1)0.08-0.15 (2)0.08-0.15 (3)max 0.8
High-hardness material			60-120		(1)0.02-0.05 (2)Not recommended (3)Not recommended	(1)0.03-0.07 (2)0.01-0.04 (3)max 0.1	

Notes: The table above presents the parameters for external grooving. For internal grooving, please reduce the cutting speed and feed rate by approximately 10%.

Parting & Grooving Tool

Code key of parting & grooving insert for small components

PTA ① 12 ② R ③ 100 ④ - S ⑤ - 16 ⑥ R ⑦

①Tool series	
PTA	Parting & grooving tool for small components

②Maximum cutting diameter (mm)	
12	12
16	16

③Hand of tool	
R	Right hand
L	Left hand

④Edge width（mm）	
100	1.0

⑤Chipbreaker	
S	S-type chipbreaker

⑥Cutting edge angle	
Default	0°
16	16°

⑦Edge inclination direction	
R	Right
L	Left

Code key of parting & grooving tool for small components

HRPTA ① 12 ② 12 ③ R ④ - 12 ⑤

①Tool series	
HRPTA	Parting & grooving tool for small components

②Corner height(mm)	
12	12

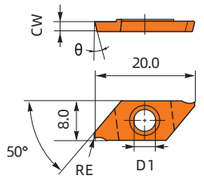
③Tool width,WF dimension（mm）	
12	12

④Hand of tool	
R	Right hand
L	Left hand

⑤Maximum cutting diameter（mm）	
12	12
16	16

Parting & Grooving Insert-PTA12 Series

Working condition: ● Stable ◕ Average ⌗ Tough

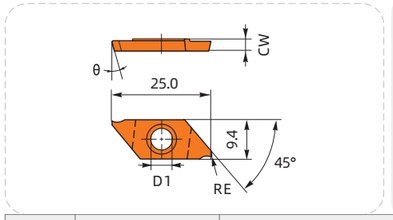


Workpiece material						
P	Steel	●		◕	●	●
M	Stainless steel	◕	◕	◕		
K	Cast iron					
N	Non-ferrous metal					
S	Heat resistant super alloys Titanium alloy	●	●	●		

Operation type	Insert shape	Type	Dimension (mm)					PVD			Cermet		Applicable tools
			CW	θ	RE	D1	T-Max	HR1135	HR7215	HR7125	HRC10	HR115C	
Parting & grooving	 The illustration shows the left hand	PTA12R050-S	0.50	0°	0.05	4.6	2.5	★		★			HRPTA***R/L-12
		PTA12R070-S	0.70	0°	0.05	4.6	4	★		★			
		PTA12R100-S	1.00	0°	0.05	4.6	6	★		★			
		PTA12R125-S	1.25	0°	0.05	4.6	6	★		★			
		PTA12R150-S	1.50	0°	0.05	4.6	6	★		★			
		PTA12R200-S	2.00	0°	0.05	4.6	6	★		★			
		PTA12L050-S	0.50	0°	0.05	4.6	2.5	★		★			
		PTA12L070-S	0.70	0°	0.05	4.6	4	★		★			
		PTA12L100-S	1.00	0°	0.05	4.6	6	★		★			
		PTA12L125-S	1.25	0°	0.05	4.6	6	★		★			
		PTA12L150-S	1.50	0°	0.05	4.6	6	★		★			
		PTA12L200-S	2.00	0°	0.05	4.6	6	★		★			
		PTA12R050-S-16R	0.50	16°	0.05	4.6	2.5	★		★			HRPTA***R/L-12
		PTA12R070-S-16R	0.70	16°	0.05	4.6	4	★		★			
		PTA12R100-S-16R	1.00	16°	0.05	4.6	5.5	★		★			
		PTA12R125-S-16R	1.25	16°	0.05	4.6	5.5	★		★			
		PTA12R150-S-16R	1.50	16°	0.05	4.6	5.5	★		★			
		PTA12R200-S-16R	2.00	16°	0.05	4.6	5.5	★		★			
		PTA12L050-S-16R	0.50	16°	0.05	4.6	2.5	★		★			
		PTA12L070-S-16R	0.70	16°	0.05	4.6	4	★		★			
		PTA12L100-S-16R	1.00	16°	0.05	4.6	5.5	★		★			
		PTA12L125-S-16R	1.25	16°	0.05	4.6	5.5	★		★			
		PTA12L150-S-16R	1.50	16°	0.05	4.6	5.5	★		★			
		PTA12L200-S-16R	2.00	16°	0.05	4.6	5.5	★		★			

Customization supported for models not listed ★ Recommended grade ☆ Available grade

Parting & Grooving Insert-PTA16 Series



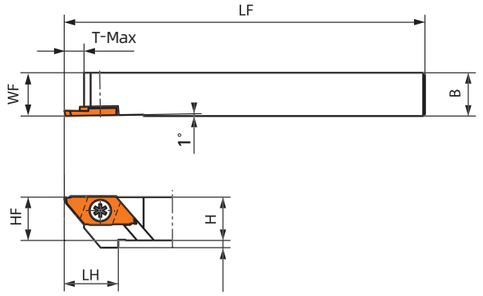
Working condition: ● Stable ◕ Average ⌗ Tough

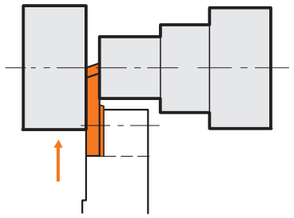
Workpiece material						
P	Steel	●		◕	●	●
M	Stainless steel	◕	◕	◕		
K	Cast iron					
N	Non-ferrous metal					
S	Heat resistant super alloys Titanium alloy	●	●	●		

Operation type	Insert shape	Type	Dimension (mm)					PVD			Cermet		Applicable tools
			CW	θ	RE	D1	T-Max	HR1135	HR7215	HR7125	HRC10	HR115C	
Parting & grooving	 The illustration shows the left hand	PTA16R150-S	1.50	0°	0.05	4.6	8	★		★			HRPTA***R/L-16
		PTA16R200-S	2.00	0°	0.05	4.6	8	★		★			
		PTA16R300-S	3.00	0°	0.05	4.6	8	★		★			
		PTA16L150-S	1.50	0°	0.05	4.6	8	★		★			
		PTA16L200-S	2.00	0°	0.05	4.6	8	★		★			
		PTA16L300-S	3.00	0°	0.05	4.6	8	★		★			
		PTA16R150-S-16R	1.50	16°	0.05	4.6	8	★		★			HRPTA***R/L-16
		PTA16R200-S-16R	2.00	16°	0.05	4.6	8	★		★			
		PTA16R300-S-16R	3.00	16°	0.05	4.6	8	★		★			
		PTA16L150-S-16R	1.50	16°	0.05	4.6	8	★		★			
		PTA16L200-S-16R	2.00	16°	0.05	4.6	8	★		★			
		PTA16L300-S-16R	3.00	16°	0.05	4.6	8	★		★			

Customization supported for models not listed ★ Recommended grade ☆ Available grade

Parting & grooving tool for small components





• The illustration shows the right hand（R）

Model		Inventory	Dimension (mm) H	HF	B	LF	LH	WF	T-Max	lock screw	Wrench	Matching insert
HRPTA	1010R-12	▲	10	10	10	120	15	10	6	STH□16	WR8	PTA12□□
	1010L-12	△	10	10	10	120	15	10	6			
	1212R-12	▲	12	12	12	120	15	12	6			
	1212L-12	▲	12	12	12	120	15	12	6			
	1616R-12	▲	16	16	16	120	15	16	6			
	1616L-12	△	16	16	16	120	15	16	6			
	2020R-12	▲	20	20	20	120	15	20	6			
	2020L-12	△	20	20	20	120	15	20	6			
HRPTA	1010R-16	▲	10	10	10	120	20	10	8	STH□16	WR8	PTA16□□
	1010L-16	△	10	10	10	120	20	10	8			
	1212R-16	▲	12	12	12	120	20	12	8			
	1212L-16	▲	12	12	12	120	20	12	8			
	1616R-16	▲	16	16	16	120	20	16	8			
	1616L-16	△	16	16	16	120	20	16	8			
	2020R-16	▲	20	20	20	120	20	20	8			
	2020L-16	△	20	20	20	120	20	20	8			

▲Standing inventory △Make-to-order

Recommended cutting conditions for parting & grooving inserts

Workpiece material	Grade		PTA12□□						PTA16□□		
			Edge width CW(mm)						Edge width CW(mm)		
	HR1135	HR7125	0.5	0.7	1.0	1.25	1.5	2.0	1.5	2.0	3.0
	Cutting speed v_c(m/min)		Feed rate f_n (mm/rev)						Feed rate f_n (mm/rev)		
Carbon steel	70~170	70~150	0.01~0.02	0.01~0.03	0.01~0.04	0.01~0.04	0.01~0.04	0.01~0.04	0.02~0.07	0.02~0.07	0.02~0.07
Alloy steel	70~170	70~150	0.01~0.02	0.01~0.03	0.01~0.04	0.01~0.04	0.01~0.04	0.01~0.04	0.02~0.07	0.02~0.07	0.02~0.07
Stainless steel	60~140	60~120	0.005~0.015	0.01~0.02	0.01~0.02	0.01~0.02	0.01~0.02	0.01~0.02	0.01~0.04	0.01~0.04	0.01~0.04

Micro dia internal grooving tool

Code key of micro dia internal grooving insert for small components

H	I	E	R	150	-	010	-	14
①	②	③	④	⑤		⑥		⑦

①Brand code	
H	Huareal

②Operation type	
I	Micro dia internal grooving

③Tolerance	
E	E-class tolerance

④Hand of tool	
R	Right hand
L	Left hand

⑤Cutting width	
150	1.50mm

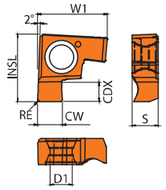
⑥Corner radius	
010	0.10mm

⑦Minimum machining hole diameter	
14	14mm

HUAREAL

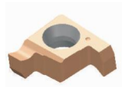
Micro dia internal grooving insert for small components

Working condition: ● Stable ◕ Average ⌗ Tough



Workpiece material

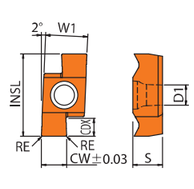
P	Steel	●		◕	●	●	
M	Stainless steel	◕	◕	◕			
K	Cast iron						
N	Non-ferrous metal						
S	Heat resistant super alloys Titanium alloy	●	●	●			

Operation type	Insert shape	Type	Dimension (mm)							PVD			Cermet		Applicable tools
			CW	CDX	INSL	S	W1	D1	RE	HR1135	HR7215	HR7125	HRC10	HR115C	
Internal grooving	 The illustration shows the left hand	HIER100-005-08	1	1.5	6.5	2.58	6.69	2.5	0.05	★		★			HRIER/L**-08
		HIEL100-005-08	1	1.5	6.5	2.58	6.69	2.5	0.05	★		★			
		HIER120-005-08	1.2	1.5	6.5	2.58	6.69	2.5	0.05	★		★			
		HIEL120-005-08	1.2	1.5	6.5	2.58	6.69	2.5	0.05	★		★			
		HIER125-005-08	1.25	1.5	6.5	2.58	6.69	2.5	0.05	★		★			
		HIEL125-005-08	1.25	1.5	6.5	2.58	6.69	2.5	0.05	★		★			
		HIER150-010-08	1.5	1.5	6.5	2.58	6.69	2.5	0.1	★		★			
		HIEL150-010-08	1.5	1.5	6.5	2.58	6.69	2.5	0.1	★		★			
		HIER200-010-08	2	1.5	6.5	2.58	6.69	2.5	0.1	★		★			
		HIEL200-010-08	2	1.5	6.5	2.58	6.69	2.5	0.1	★		★			
	 The illustration shows the left hand	HIER100-005-10	1	2.2	8.2	3.18	8.46	2.7	0.05	★		★			HRIER/L**-10
		HIEL100-005-10	1	2.2	8.2	3.18	8.46	2.7	0.05	★		★			
		HIER120-005-10	1.2	2.2	8.2	3.18	8.46	2.7	0.05	★		★			
		HIEL120-005-10	1.2	2.2	8.2	3.18	8.46	2.7	0.05	★		★			
		HIER125-005-10	1.25	2.2	8.2	3.18	8.46	2.7	0.05	★		★			
		HIEL125-005-10	1.25	2.2	8.2	3.18	8.46	2.7	0.05	★		★			
		HIER145-010-10	1.45	2.2	8.2	3.18	8.46	2.7	0.1	★		★			
		HIEL145-010-10	1.45	2.2	8.2	3.18	8.46	2.7	0.1	★		★			
		HIER150-010-10	1.5	2.2	8.2	3.18	8.46	2.7	0.1	★		★			
		HIEL150-010-10	1.5	2.2	8.2	3.18	8.46	2.7	0.1	★		★			
		HIER200-010-10	2	2.2	8.2	3.18	8.46	2.7	0.1	★		★			
		HIEL200-010-10	2	2.2	8.2	3.18	8.46	2.7	0.1	★		★			
		HIER250-020-10	2.5	2.2	8.2	3.18	8.46	2.7	0.2	★		★			
		HIEL250-020-10	2.5	2.2	8.2	3.18	8.46	2.7	0.2	★		★			
		HIER300-020-10	3	2.2	8.2	3.18	8.46	2.7	0.2	★		★			
		HIEL300-020-10	3	2.2	8.2	3.18	8.46	2.7	0.2	★		★			

Customization supported for models not listed ★ Recommended grade ☆ Available grade

Micro dia internal grooving insert for small components

Working condition: ● Stable ◕ Average ⌗ Tough



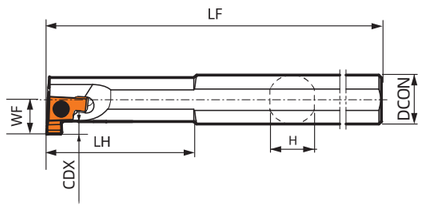
Workpiece material

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

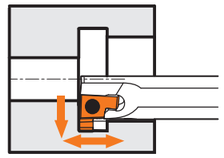
Operation type	Insert shape	Type	Dimension (mm)							PVD			Cermet		Applicable tools
			CW	CDX	INSL	S	W1	D1	RE	HR1135	HR7125	HR7125	HRC10	HR115C	
Internal grooving		HIER100-005-14	1	2.5	11.48	4.05	5.8	3.1	0.05	★		★			HRIER/L***-14
		HIER120-005-14	1.2	2.5	11.48	4.05	5.8	3.1	0.05	★		★			
		HIER125-005-14	1.25	2.5	11.48	4.05	5.8	3.1	0.05	★		★			
		HIER140-005-14	1.4	2.5	11.48	4.05	5.8	3.1	0.05	★		★			
		HIER145-010-14	1.45	2.5	11.48	4.05	5.8	3.1	0.1	★		★			
		HIER150-010-14	1.5	2.5	11.48	4.05	5.8	3.1	0.1	★		★			
		HIER170-010-14	1.7	2.5	11.48	4.05	5.8	3.1	0.1	★		★			
		HIER185-010-14	1.85	2.5	11.48	4.05	5.8	3.1	0.1	★		★			
		HIER195-010-14	1.95	2.5	11.48	4.05	5.8	3.1	0.1	★		★			
		HIER200-010-14	2	2.5	11.48	4.05	5.8	3.1	0.1	★		★			
		HIER250-020-14	2.5	2.5	11.48	4.05	5.8	3.1	0.2	★		★			
		HIER300-020-14	3	2.5	11.48	4.05	5.8	3.1	0.2	★		★			
		HIER350-020-14	3.5	2.5	11.48	4.05	5.8	3.1	0.2	★		★			
		HIER100-005-20	1	2.5	16.66	5.05	6.8	3.6	0.05	★		★			HRIER/L***-20
		HIER140-005-20	1.4	2.5	16.66	5.05	6.8	3.6	0.05	★		★			
		HIER145-010-20	1.45	2.5	16.66	5.05	6.8	3.6	0.1	★		★			
		HIER150-010-20	1.5	3.0	16.66	5.05	6.8	3.6	0.1	★		★			
		HIER170-010-20	1.7	3.0	16.66	5.05	6.8	3.6	0.1	★		★			
		HIER185-010-20	185	3.0	16.66	5.05	6.8	3.6	0.1	★		★			
		HIER195-010-20	1.95	3.0	16.66	5.05	6.8	3.6	0.1	★		★			
		HIER200-010-20	2	3.2	16.66	5.05	6.8	3.6	0.1	★		★			
		HIER225-010-20	2.25	3.2	16.66	5.05	6.8	3.6	0.1	★		★			
		HIER230-020-20	2.3	3.2	16.66	5.05	6.8	3.6	0.2	★		★			
		HIER250-020-20	2.5	3.2	16.66	5.05	6.8	3.6	0.2	★		★			
		HIER280-020-20	2.8	3.2	16.66	5.05	6.8	3.6	0.2	★		★			
		HIER300-020-20	3	4.5	16.66	5.05	6.8	3.6	0.2	★		★			
		HIER330-020-20	3.3	4.5	16.66	5.05	6.8	3.6	0.2	★		★			
		HIER350-020-20	3.5	4.5	16.66	5.05	6.8	3.6	0.2	★		★			
		HIER400-020-20	4	4.5	16.66	5.05	6.8	3.6	0.2	★		★			

Customization supported for models not listed ★ Recommended grade ☆ Available grade

Micro dia internal grooving tool for small components



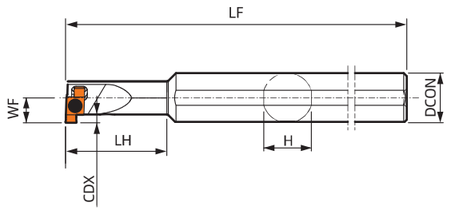


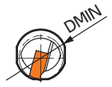


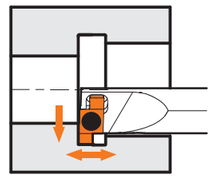
• The illustration shows the right hand（R）

Model		Inventory		Dimension（mm）							lock screw	Wrench	Matching insert
		R	L	DMIN	DCON	H	LF	LH	WF	CDX			
HRIER/L	0808-08	△	△	8	8	7.2	100	20	4.8	1.5	M2.0x4.5	WR6	HIER□□-08
	1010-10	△	△	10	10	9	125	25	6.2	2.2	M2.2x5.5	WR7	HIER□□-10
	1210-10	△	△	12	12	9	125	30	7	2.2			

▲Standing inventory △Make-to-order







Model		Inventory		Dimension（mm）							lock screw	Wrench	Matching insert
		R	L	DMIN	DCON	H	LF	LH	WF	CDX			
HRIER	1412-14	△	△	14	12	11.4	150	33	8	2.5	M2.5x7.0	WR8	HIER□□-14
	1612-14	△	△	16	12	11.4	150	20	8.5	2.5			
	1616-14	△	△	16	16	15	160	36	9	2.5			
	2020-20	△	△	20	20	19	180	40	12.1	4.5	M3.0x8.0	WR10	HIER□□-20

▲Standing inventory △Make-to-order

Recommended cutting conditions for micro dia internal grooving inserts

Workpiece material	Grade		(1)Feed for grooving(mm/rev) (2) Feed for transverse cutting (mm/rev) (3)Cutting depth for transverse cutting(mm)					
	HR1135	HR7215						
	Cutting speed v_c（m/min）		HRIER/L□□-08	HRIER/L□□-08	HRIER/L□□-14 (100-200) HRIER/L□□-20 (100-145)	HRIER/L□□-14 (250-350) HRIER/L□□-20 (150-195)	HRIER/L□□-20 (200-280)	HRIER/L□□-20 (300-400)
Carbon steel	50~80	50~80	(1)0.01~0.03 (2)0.01~0.03 (3) Max.0.05	(1)0.02~0.04 (2)0.02~0.04 (3)Max.0.1	(1)0.03~0.08 (2)0.03~0.08 (3)Max.0.3	(1)0.03~0.08 (2)0.03~0.08 (3)Max.0.3	(1)0.04~0.09 (2)0.04~0.09 (3)Max.0.3	(1)0.05~0.12 (2)0.05~0.1 (3)Max.0.5
Alloy steel	50~80	50~80	(1)0.01~0.03 (2)0.01~0.03 (3)Max.0.05	(1)0.02~0.04 (2)0.02~0.04 (3)Max.0.1	(1)0.03~0.07 (2)0.03~0.1 (3)Max.0.3	(1)0.03~0.07 (2)0.03~0.1 (3)Max.0.3	(1)0.04~0.08 (2)0.04~0.08 (3) Max.0.3	(1)0.05~0.1 (2)0.05~0.1 (3)Max.0.5
Stainless steel	50~80	50~80	(1)0.01~0.03 (2)0.01~0.03 (3)Max.0.05	(1)0.01~0.03 (2)0.01~0.03 (3)Max.0.1	(1)0.03~0.07 (2)0.03~0.1 (3)Max.0.3	(1)0.03~0.07 (2)0.03~0.1 (3)Max.0.3	(1)0.04~0.08 (2)0.04~0.08 (3)Max.0.3	(1)0.05~0.1 (2)0.05~0.1 (3) Max.0.5

Code key of solid carbide boring tool

M	T	R	2	R0.1	L10	D3
①	②	③	④	⑤	⑥	⑦

①Clamping system	
M	Side clamping

②Tool series	
T	Internal turning
N	Internal turning
P	Profile turning
U	90°Profile turning
Q	Profile turning
G	Internal grooving
K	Radius grooving
I	Thread turning
F	Face grooving
Z	Face radius grooving

③Insert direction	
R	Right hand
L	Left hand

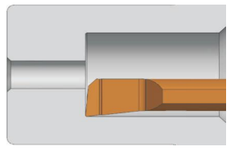
④Minimum machining hole diameter(mm)	
2	2
3	3

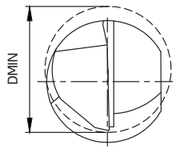
⑤Cutting edge form	
A	Thread angle
B	Groove width
R	Insert corner radius
TR	Trapezoidal thread

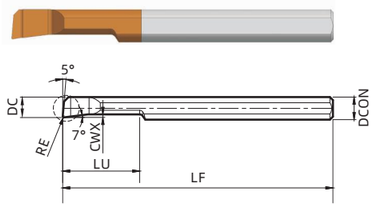
⑥Effective length(mm)	
L10	10
L15	15

⑦Shank diameter(mm)	
D4	4
D6	6

MTR--Internal Turning



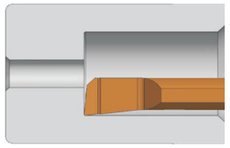


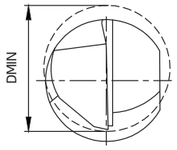


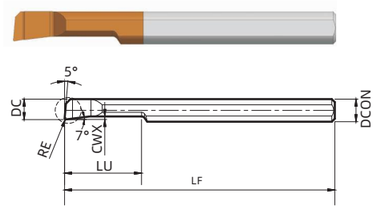
Model	Dimension（mm）							Inventory
	DCON	LF	LU	RE	CWX	DC	DMIN	
MTR 0.9 R0.05 L3 D4	4	50	3	0.05	0.15	0.75	0.9	●
MTR 1 R 0.05 L3 D4	4	50	3	0.05	0.15	0.85	1.0	●
MTR 1 R 0.05 L4 D4	4	50	4	0.05	0.15	0.85	1.0	●
MTR 1.2 R0.05 L4 D4	4	50	4	0.05	0.2	1	1.2	●
MTR 1.4 R0.05 L5 D4	4	50	5	0.05	0.2	1.2	1.4	●
MTR 1.5 R0.1 L6 D4	4	50	6	0.1	0.2	1.3	1.5	●
MTR 1.5 R0.1 L10 D4	4	50	10	0.1	0.2	1.3	1.5	●
MTR 1.6 R0.05 L6 D4	4	50	6	0.05	0.2	1.4	1.6	●
MTR 1.6 R0.1 L6 D4	4	50	6	0.1	0.2	1.4	1.6	●
MTR 1.8 R0.1 L7 D4	4	50	7	0.1	0.2	1.6	1.8	●
MTR 2 R 0.1 L8 D4	4	50	8	0.1	0.25	1.8	2.0	●
MTR 2 R 0.15 L10 D4	4	50	10	0.15	0.25	1.8	2.0	●
MTR 2.5 R0.1 L10 D4	4	50	10	0.1	0.3	2.3	2.5	●
MTR 2.5 R0.15 L10 D4	4	50	10	0.15	0.3	2.3	2.5	●
MTR 2.5 R0.15 L15 D4	4	50	15	0.15	0.3	2.3	2.5	●
MTR 2 R0.1 L10 D3	3	50	10	0.1	0.25	1.8	1.0	●
MTR 2 R0.15 L10 D3	3	50	10	0.15	0.25	1.8	2.0	●
MTR 3 R0.1 L10 D3	3	50	10	0.1	0.3	2.7	3.0	●
MTR 3 R0.1 L15 D3	3	50	15	0.1	0.3	2.7	3.0	●
MTR 3 R0.15 L10 D3	3	50	10	0.15	0.3	2.7	3.0	●
MTR 3 R0.15 L15 D3	3	50	15	0.15	0.3	2.7	3.0	●
MTR 3 R0.2 L10 D3	3	50	10	0.2	0.3	2.7	3.0	●
MTR 3 R0.2 L15 D3	3	50	15	0.2	0.3	2.7	3.0	●
MTR 3 R0.4 L10 D3	3	50	10	0.4	0.3	2.7	3.0	●
MTR 3 R0.15 L15 D4	4	50	15	0.15	0.3	2.7	3.0	●
MTR 3 R0.2 L15 D4	4	50	15	0.2	0.3	2.7	3.0	●
MTR 3.5 R0.1 L10 D4	4	50	10	0.1	0.3	3.3	3.5	●
MTR 3.5 R0.1 L15 D4	4	50	15	0.1	0.3	3.3	3.5	●
MTR 3.5 R0.1 L22 D4	4	50	22	0.1	0.3	3.3	3.5	●
MTR 3.5 R0.15 L15 D4	4	50	15	0.15	0.3	3.3	3.5	●
MTR 3.5 R0.2 L10 D4	4	50	10	0.2	0.3	3.3	3.5	●
MTR 3.5 R0.2 L15 D4	4	50	15	0.2	0.3	3.3	3.5	●

●Standing inventory ○Make-to-order

MTR--Internal Turning



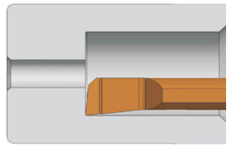


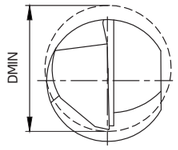


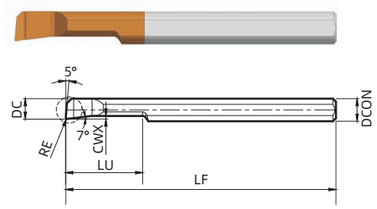
Model	Dimension（mm）							Inventory
	DCON	LF	LU	RE	CWX	DC	DMIN	
MTR 4 R0.1 L10 D4	4	50	10	0.1	0.4	3.7	4.0	●
MTR 4 R0.1 L15 D4	4	50	15	0.1	0.4	3.7	4.0	●
MTR 4 R0.1 L22 D4	4	50	22	0.1	0.4	3.7	4.0	●
MTR 4 R0.15 L10 D4	4	50	10	0.15	0.4	3.7	4.0	●
MTR 4 R0.15 L15 D4	4	50	15	0.15	0.4	3.7	4.0	●
MTR 4 R0.15 L22 D4	4	50	22	0.15	0.4	3.7	4.0	●
MTR 4 R0.2 L10 D4	4	50	10	0.2	0.4	3.7	4.0	●
MTR 4 R0.2 L15 D4	4	50	15	0.2	0.4	3.7	4.0	●
MTR 4 R0.2 L22 D4	4	50	22	0.2	0.4	3.7	4.0	●
MTR 4 R0.2 L27 D4	4	50	27	0.2	0.4	3.7	4.0	●
MTR 4 R0.4 L15 D4	4	50	15	0.4	0.4	3.7	4.0	●
MTR 4 R0.4 L22 D4	4	50	22	0.4	0.4	3.7	4.0	●
MTR 4 R0.2 L22 D6	6	50	22	0.2	0.4	3.7	4.0	●
MTR 4 R0.2 L30 D6	6	60	30	0.2	0.4	3.7	4.0	●
MTR 4.5 R0.1 L15 D5	5	50	15	0.1	0.45	4.2	4.5	●
MTR 4.5 R0.2 L15 D5	5	50	15	0.2	0.45	4.2	4.5	●
MTR 4.5 R0.2 L22 D5	5	50	22	0.2	0.45	4.2	4.5	●
MTR 5 R0.1 L15 D5	5	50	15	0.1	0.5	4.7	5.0	●
MTR 5 R0.1 L22 D5	5	50	22	0.1	0.5	4.7	5.0	●
MTR 5 R0.15 L20 D5	5	50	20	0.15	0.5	4.7	5.0	●
MTR 5 R0.2 L10 D5	5	50	10	0.2	0.5	4.7	5.0	●
MTR 5 R0.2 L15 D5	5	50	15	0.2	0.5	4.7	5.0	●
MTR 5 R0.2 L20 D5	5	50	20	0.2	0.5	4.7	5.0	●
MTR 5 R0.2 L22 D5	5	50	22	0.2	0.5	4.7	5.0	●
MTR 5 R0.2 L25 D5	5	50	25	0.2	0.5	4.7	5.0	●
MTR 5 R0.2 L30 D5	5	60	30	0.2	0.5	4.7	5.0	●
MTR 5 R0.2 L35 D5	5	60	35	0.2	0.5	4.7	5.0	●
MTR 5 R0.3 L15 D5	5	50	15	0.3	0.5	4.7	5.0	●
MTR 5 R0.4 L22 D5	5	50	22	0.4	0.5	4.7	5.0	●
MTR 5 R0.2 L22 D6	6	50	22	0.2	0.5	4.7	5.0	●
MTR 5.5 R0.1 L15 D6	6	50	15	0.1	0.5	5.2	5.5	●
MTR 5.5 R0.2 L15 D6	6	50	15	0.2	0.5	5.2	5.5	●

●Standing inventory ○Make-to-order

MTR--Internal Turning



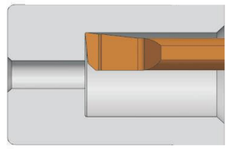


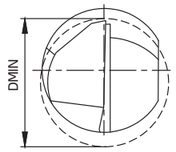


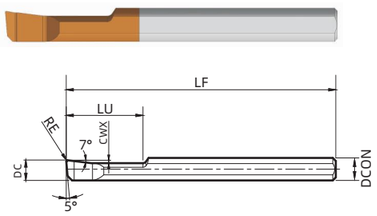
Model	Dimension（mm）							Inventory
	DCON	LF	LU	RE	CWX	DC	DMIN	
MTR 5.5 R0.2 L22 D6	6	50	22	0.2	0.5	5.2	5.5	●
MTR 5.5 R0.2 L30 D6	6	60	30	0.2	0.5	5.2	5.5	●
MTR 6 R0.1 L10 D6	6	50	10	0.1	0.5	5.7	6.0	●
MTR 6 R0.1 L15 D6	6	50	15	0.1	0.5	5.7	6.0	●
MTR 6 R0.1 L22 D6	6	50	22	0.1	0.5	5.7	6.0	●
MTR 6 R0.15 L22 D6	6	50	22	0.15	0.5	5.7	6.0	●
MTR 6 R0.2 L10 D6	6	50	10	0.2	0.5	5.7	6.0	●
MTR 6 R0.2 L15 D6	6	50	15	0.2	0.5	5.7	6.0	●
MTR 6 R0.2 L22 D6	6	50	22	0.2	0.5	5.7	6.0	●
MTR 6 R0.2 L30 D6	6	60	30	0.2	0.5	5.7	6.0	●
MTR 6 R0.2 L35 D6	6	60	35	0.2	0.5	5.7	6.0	●
MTR 6 R0.2 L40 D6 80L	6	80	40	0.2	0.5	5.7	6.0	●
MTR 6 R0.2 L40 D6 100L	6	100	40	0.2	0.5	5.7	6.0	●
MTR 6 R0.4 L22 D6	6	50	22	0.4	0.5	5.7	6.0	●
MTR 7 R0.2 L22 D7	7	60	22	0.2	0.5	6.5	7.0	●
MTR 7 R0.2 L30 D7	7	60	30	0.2	0.5	6.5	7.0	●
MTR 7 R0.2 L35 D7	7	60	35	0.2	0.5	6.5	7.0	●
MTR 8 R0.2 L22 D8	8	60	22	0.2	0.5	7.5	8.0	●
MTR 8 R0.2 L32 D8	8	65	32	0.2	0.5	7.5	8.0	●
MTR 8 R0.2 L40 D8	8	80	40	0.2	0.5	7.5	8.0	●
MTR 8 R0.2 L50 D8	8	90	50	0.2	0.5	7.5	8.0	●
MTR 8 R0.4 L22 D8	8	60	22	0.4	0.5	7.5	8.0	●
MTR 9 R0.2 L30 D9	9	75	30	0.2	0.6	8.7	9.0	●
MTR 10 R0.2 L35 D10	10	75	35	0.2	0.6	9.7	10.0	●
MTR 12 R0.2 L35 D12	12	75	35	0.2	0.6	11.7	12.0	●

●Standing inventory ○Make-to-order

MTL--Internal Turning



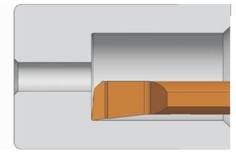


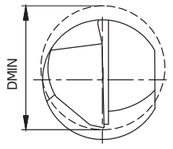


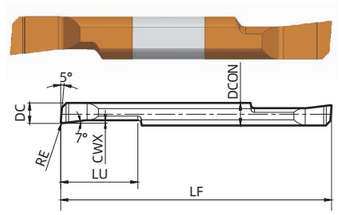
Model	Dimension（mm）							Inventory
	DCON	LF	LU	RE	CWX	DC	DMIN	
MTL 3 R0.15 L15 D3	3	50	15	0.15	0.3	2.7	3.0	○
MTL 2 R0.1 L10 D4	4	50	10	0.1	0.25	1.8	2.0	○
MTL 3 R0.15 L10 D4	4	50	10	0.15	0.3	2.7	3.0	○
MTL 4 R0.15 L15 D4	4	50	15	0.15	0.4	3.7	4.0	○
MTL 5 R0.2 L15 D5	5	50	15	0.2	0.5	4.7	5.0	○
MTL 5 R0.2 L22 D5	5	50	22	0.2	0.5	4.7	5.0	○
MTL 6 R0.2 L15 D6	6	50	15	0.2	0.5	5.7	6.0	○
MTL 6 R0.2 L22 D6	6	50	22	0.2	0.5	5.7	6.0	○
MTL 7 R0.2 L30 D7	7	60	30	0.2	0.5	6.5	7.0	○
MTL 8 R0.2 L22 D8	8	60	22	0.2	0.5	7.5	8.0	○
MTL 8 R0.2 L32 D8	8	65	32	0.2	0.5	7.5	8.0	○
MTL 8 R0.3 L22 D8	8	60	22	0.3	0.5	7.5	8.0	○

●Standing inventory ○Make-to-order

MTRS--Internal Turning(Doulbe-ended)



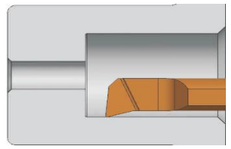


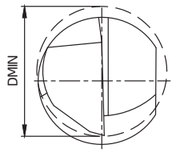


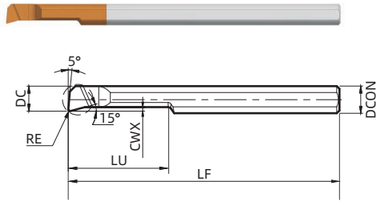
Model	Dimension（mm）							Inventory
	DCON	LF	LU	RE	CWX	DC	DMIN	
MTRS 3 R0.15 L10 D3	3	50	10	0.15	0.3	2.7	3.0	●
MTRS 4 R0.15 L10 D4	4	50	10	0.15	0.4	3.7	4.0	●
MTRS 4 R0.15 L15 D4	4	60	15	0.15	0.4	3.7	4.0	●
MTRS 4 R0.2 L10 D4	4	50	10	0.2	0.4	3.7	4.0	●
MTRS 5 R0.2 L15 D5	5	60	15	0.2	0.5	4.7	5.0	●
MTRS 5 R0.2 L22 D5	5	75	22	0.2	0.5	4.7	5.0	●
MTRS 6 R0.2 L15 D6	6	60	15	0.2	0.5	5.7	6.0	●
MTRS 6 R0.2 L22 D6	6	75	22	0.2	0.5	5.7	6.0	●

●Standing inventory ○Make-to-order

MNR--(Internal Turning)



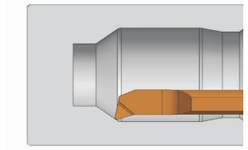


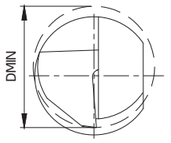


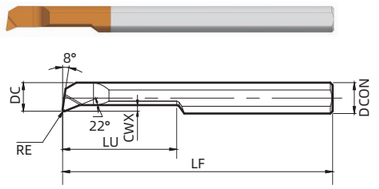
Model	Dimension（mm）							Inventory
	DCON	LF	LU	RE	CWX	DC	DMIN	
MNR 1.0 R0.05 L4 D4	4	50	4	0.05	0.2	0.8	1.0	●
MNR 1.2 R0.05 L5 D4	4	50	5	0.05	0.2	1	1.2	●
MNR 1.4 R0.05 L5 D4	4	50	5	0.05	0.2	1.2	1.4	●
MNR 1.5 R0.1 L10 D4	4	50	10	0.1	0.2	1.2	1.5	●
MNR 2 R0.15 L10 D4	4	50	10	0.15	0.2	1.7	2.0	●
MNR 2 R0.15 L10 D3	3	50	10	0.15	0.2	1.7	2.0	●
MNR 2 R0.15 L15 D3	3	50	15	0.15	0.2	1.7	2.0	●
MNR 3 R0.1 L10 D3	3	50	10	0.1	0.4	2.7	3.0	●
MNR 3 R0.15 L10 D3	3	50	10	0.15	0.4	2.7	3.0	●
MNR 3 R0.2 L10 D3	3	50	10	0.2	0.4	2.7	3.0	●
MNR 3 R0.2 L15 D3	3	50	15	0.2	0.4	2.7	3.0	●
MNR 4 R0.1 L10 D4	4	50	10	0.1	0.5	3.7	4.0	●
MNR 4 R0.1 L15 D4	4	50	15	0.1	0.5	3.7	4.0	●
MNR 4 R0.15 L15 D4	4	50	15	0.15	0.5	3.7	4.0	●
MNR 4 R0.2 L10 D4	4	50	10	0.2	0.5	3.7	4.0	●
MNR 4 R0.2 L15 D4	4	50	15	0.2	0.5	3.7	4.0	●
MNR 4 R0.2 L22 D4	4	50	22	0.2	0.5	3.7	4.0	●
MNR 5 R0.1 L15 D5	5	50	15	0.1	0.9	4.7	5.0	●
MNR 5 R0.2 L15 D5	5	50	15	0.2	0.9	4.7	5.0	●
MNR 5 R0.2 L22 D5	5	50	22	0.2	0.9	4.7	5.0	●
MNR 6 R0.1 L15 D6	6	50	15	0.1	0.9	5.7	6.0	●
MNR 6 R0.2 L15 D6	6	50	15	0.2	0.9	5.7	6.0	●
MNR 6 R0.2 L22 D6	6	50	22	0.2	0.9	5.7	6.0	●
MNR 7 R0.2 L30 D7	7	60	30	0.2	1	6.8	7.0	●
MNR 8 R0.2 L22 D8	8	60	22	0.2	1	7.8	8.0	●
MNR 8 R0.2 L32 D8	8	65	32	0.2	1	7.8	8.0	●

●Standing inventory ○Make-to-order

MPR/L--(Profile Turning)





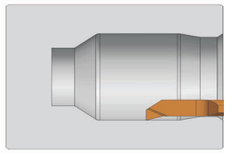


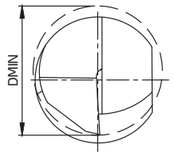
• The illustration shows the right hand（R）

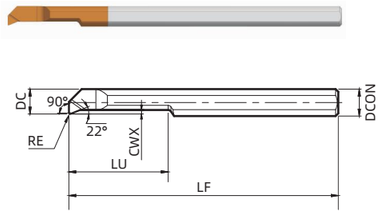
Model	Dimension（mm）							Inventory
	DCON	LF	LU	RE	CWX	DC	DMIN	
MPR 2 R0.1 L10 D3	3	50	10	0.1	0.3	1.8	2.0	●
MPR 3 R0.15 L10 D3	3	50	10	0.15	0.3	2.7	3.0	●
MPR 3 R0.15 L15 D3	3	50	15	0.15	0.3	2.7	3.0	●
MPR 3 R0.2 L10 D3	3	50	10	0.2	0.3	2.7	3.0	●
MPR 3 R0.2 L15 D3	3	50	15	0.2	0.3	2.7	3.0	●
MPR 4 R0.15 L15 D4	4	50	15	0.15	0.7	3.7	4.0	●
MPR 4 R0.2 L15 D4	4	50	15	0.2	0.7	3.7	4.0	●
MPR 4 R0.2 L22 D4	4	50	22	0.2	0.7	3.7	4.0	●
MPR 5 R0.2 L15 D5	5	50	15	0.2	1.2	4.7	5.0	●
MPR 5 R0.2 L22 D5	5	50	22	0.2	1.2	4.7	5.0	●
MPR 5 R0.4 L15 D5	5	50	15	0.4	1.2	4.7	5.0	●
MPR 6 R0.2 L15 D6	6	50	15	0.2	1.2	5.7	6.0	●
MPR 6 R0.2 L22 D6	6	50	22	0.2	1.2	5.7	6.0	●
MPR 6 R0.2 L30 D6	6	60	30	0.2	1.2	5.7	6.0	●
MPR 6 R0.4 L22 D6	6	50	22	0.4	1.2	5.7	6.0	●
MPR 7 R0.2 L35 D7	7	60	35	0.2	1.5	6.7	7.0	●
MPR 8 R0.2 L22 D8	8	60	22	0.2	1.5	7.5	8.0	●
MPR 8 R0.2 L27 D8	8	60	27	0.2	1.5	7.5	8.0	●
MPL 4 R0.2 L15 D4	4	50	15	0.2	0.7	3.7	4.0	○
MPL 5 R0.2 L22 D5	5	50	22	0.2	1.2	4.7	5.0	○
MPL 6 R0.2 L22 D6	6	50	22	0.2	1.2	5.7	6.0	○

●Standing inventory ○Make-to-order

MUR--(Profile Turning)



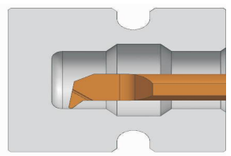


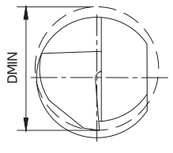


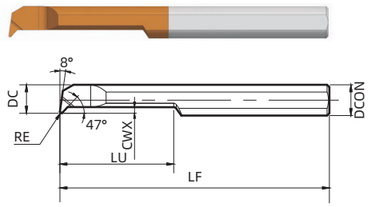
Model	Dimension（mm）							Inventory
	DCON	LF	LU	RE	CWX	DC	DMIN	
MUR 3 R0.1 L10 D3	3	50	10	0.1	0.4	2.7	3.0	●
MUR 3 R0.1 L15 D3	3	50	15	0.1	0.4	2.7	3.0	●
MUR 4 R0.15 L10 D4	4	50	10	0.15	0.5	3.7	4.0	●
MUR 4 R0.15 L15 D4	4	50	15	0.15	0.5	3.7	4.0	●
MUR 4 R0.15 L22 D4	4	50	22	0.15	0.5	3.7	4.0	●
MUR 5 R0.15 L15 D5	5	50	15	0.15	0.7	4.7	5.0	●
MUR 5 R0.15 L22 D5	5	50	22	0.15	0.7	4.7	5.0	●
MUR 5 R0.15 L25 D5	5	50	25	0.15	0.7	4.7	5.0	●
MUR 5 R0.2 L15 D5	5	50	15	0.2	0.7	4.7	5.0	●
MUR 5 R0.2 L22 D5	5	50	22	0.2	0.7	4.7	5.0	●
MUR 6 R0.06 L22 D6	6	50	22	0.06	1	5.7	6.0	●
MUR 6 R0.15 L22 D6	6	50	22	0.15	1	5.7	6.0	●
MUR 6 R0.2 L22 D6	6	50	22	0.2	1	5.7	6.0	●
MUR 6 R0.4 L22 D6	6	50	22	0.4	1	5.7	6.0	●
MUR 8 R0.2 L22 D8	8	60	22	0.2	1	7.7	8.0	●
MUR 8 R0.2 L27 D8	8	60	27	0.2	1	7.7	8.0	●

●Standing inventory ○Make-to-order

MQR/L--(Profile Turning)





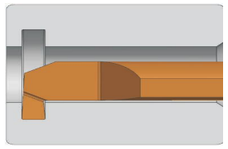


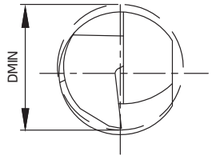
• The illustration shows the right hand（R）

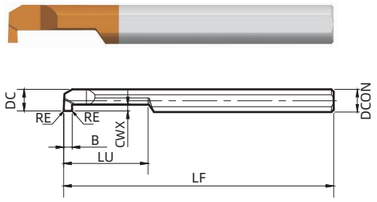
Model	Dimension（mm）							Inventory
	DCON	LF	LU	RE	CWX	DC	DMIN	
MQR 3 R0.15 L10 D3	3	50	10	0.15	0.6	2.8	3.0	●
MQR 3 R0.2 L10 D3	3	50	10	0.2	0.6	2.8	3.0	●
MQR 4 R0.15 L15 D4	4	50	15	0.15	0.8	3.8	4.0	●
MQR 4 R0.15 L22 D4	4	50	22	0.15	0.8	3.8	4.0	●
MQR 4 R0.2 L15 D4	4	50	15	0.2	0.8	3.8	4.0	●
MQR 4 R0.5 L15 D4	4	50	15	0.5	0.8	3.8	4.0	●
MQR 5 R0.2 L15 D5	5	50	15	0.2	1	4.8	5.0	●
MQR 5 R0.2 L22 D5	5	50	22	0.2	1	4.8	5.0	●
MQR 6 R0.1 L15 D6	6	50	15	0.1	1.4	5.8	6.0	●
MQR 6 R0.1 L22 D6	6	50	22	0.1	1.4	5.8	6.0	●
MQR 6 R0.2 L15 D6	6	50	15	0.2	1.4	5.8	6.0	●
MQR 6 R0.2 L22 D6	6	50	22	0.2	1.4	5.8	6.0	●
MQR 6 R0.2 L30 D6	6	60	30	0.2	1.4	5.8	6.0	●
MQR 6 R0.4 L22 D6	6	50	22	0.4	1.4	5.8	6.0	●
MQR 7 R0.2 L35 D8	8	75	35	0.2	1.5	6.8	7.0	●
MQR 8 R0.15 L22 D8	8	60	22	0.15	1.6	7.8	8.0	●
MQR 8 R0.2 L22 D8	8	60	22	0.2	1.6	7.8	8.0	●
MQR 8 R0.2 L27 D8	8	60	27	0.2	1.6	7.8	8.0	●
MQR 8 R0.4 L27 D8	8	60	27	0.4	1.6	7.8	8.0	●
MQL 4 R0.1 L15 D4	4	50	15	0.1	0.8	3.8	4.0	○
MQL 4 R0.2 L15 D4	4	50	15	0.2	0.8	3.8	4.0	○
MQL 5 R0.2 L22 D5	5	50	22	0.2	1	4.8	5.0	○
MQL 6 R0.2 L22 D6	6	50	22	0.2	1.4	5.8	6.0	○

●Standing inventory ○Make-to-order

MGR--Internal Grooving



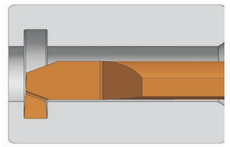


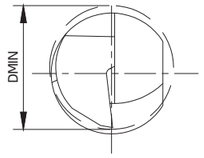


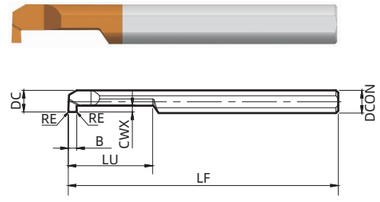
Model	Dimension（mm）								Inventory
	DCON	LF	LU	RE	CWX	DC	DMIN	B	
MGR 3 B0.5 L10 D3	3	50	10	0.05	0.6	2.8	3.0	0.5	●
MGR 3 B0.7 L5 D3	3	50	5	0.05	0.6	2.8	3.0	0.7	●
MGR 3 B0.7 L10 D3	3	50	10	0.05	0.6	2.8	3.0	0.7	●
MGR 3 B1.0 L10 D3	3	50	10	0.1	0.8	2.8	3.0	1	●
MGR 3 B1.5 L10 D3	3	50	10	0.1	0.8	2.8	3.0	1.5	●
MGR 4 B0.5 L10 D4	4	50	10	0.05	0.7	3.8	4.0	0.5	●
MGR 4 B0.7 L10 D4	4	50	10	0.05	1.0	3.8	4.0	0.7	●
MGR 4 B1.0 L10 D4	4	50	10	0.1	1.0	3.8	4.0	1	●
MGR 4 B1.0 L15 D4	4	50	15	0.1	1.0	3.8	4.0	1	●
MGR 4 B1.5 L5 D4	4	50	5	0.1	1.0	3.8	4.0	1.5	●
MGR 4 B1.5 L10 D4	4	50	10	0.1	1.0	3.8	4.0	1.5	●
MGR 4 B1.5 L15 D4	4	50	15	0.1	1.0	3.8	4.0	1.5	●
MGR 4 B2.0 L10 D4	4	50	10	0.1	1.0	3.8	4.0	2	●
MGR 4 B2.0 L15 D4	4	50	15	0.1	1.0	3.8	4.0	2	●
MGR 5 B0.75 L15 D5	5	50	15	0.05	1.2	4.8	5.0	0.75	●
MGR 5 B0.75 L22 D5	5	50	22	0.05	1.2	4.8	5.0	0.75	●
MGR 5 B1.0 L10 D5	5	50	10	0.1	1.2	4.8	5.0	1	●
MGR 5 B1.0 L15 D5	5	50	15	0.1	1.2	4.8	5.0	1	●
MGR 5 B1.0 L22 D5	5	50	22	0.1	1.2	4.8	5.0	1	●
MGR 5 B1.5 L10 D5	5	50	10	0.1	1.2	4.8	5.0	1.5	●
MGR 5 B1.5 L15 D5	5	50	15	0.1	1.2	4.8	5.0	1.5	●
MGR 5 B1.5 L22 D5	5	50	22	0.1	1.2	4.8	5.0	1.5	●
MGR 5 B2.0 L10 D5	5	50	10	0.1	1.2	4.8	5.0	2	●
MGR 5 B2.0 L15 D5	5	50	15	0.1	1.2	4.8	5.0	2	●
MGR 5 B2.0 L22 D5	5	50	22	0.1	1.2	4.8	5.0	2	●
MGR 6 B0.75 L15 D6	6	50	15	0.05	1.5	5.8	6.0	0.75	●
MGR 6 B0.75 L22 D6	6	50	22	0.05	1.5	5.8	6.0	0.75	●
MGR 6 B1.0 L10 D6	6	50	10	0.1	1.8	5.8	6.0	1	●
MGR 6 B1.0 L15 D6	6	50	15	0.1	1.8	5.8	6.0	1	●
MGR 6 B1.0 L22 D6	6	50	22	0.1	1.8	5.8	6.0	1	●
MGR 6 B1.2 L22 D6	6	50	22	0.1	1.8	5.8	6.0	1.2	●

●Standing inventory ○Make-to-order

MGR--Internal Grooving



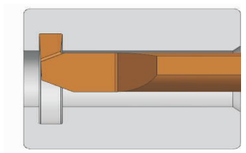


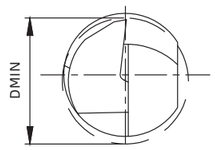


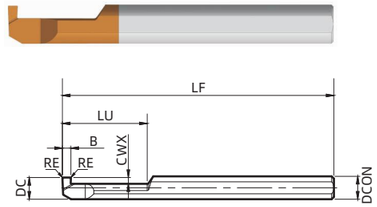
Model	Dimension（mm）								Inventory
	DCON	LF	LU	RE	CWX	DC	DMIN	B	
MGR 6 B1.5 L10 D6	6	50	10	0.1	1.8	5.8	6.0	1.5	●
MGR 6 B1.5 L15 D6	6	50	15	0.1	1.8	5.8	6.0	1.5	●
MGR 6 B1.5 L22 D6	6	50	22	0.1	1.8	5.8	6.0	1.5	●
MGR 6 B2.0 L10 D6	6	50	10	0.1	1.8	5.8	6.0	2	●
MGR 6 B2.0 L15 D6	6	50	15	0.1	1.8	5.8	6.0	2	●
MGR 6 B2.0 L22 D6	6	50	22	0.1	1.8	5.8	6.0	2	●
MGR 6 B2.5 L10 D6	6	50	10	0.1	1.8	5.8	6.0	2.5	●
MGR 6 B2.5 L15 D6	6	50	15	0.1	1.8	5.8	6.0	2.5	●
MGR 6 B2.5 L22 D6	6	50	22	0.1	1.8	5.8	6.0	2.5	●
MGR 6 B3.0 L10 D6	6	50	10	0.1	1.8	5.8	6.0	3	●
MGR 6 B3.0 L15 D6	6	50	15	0.1	1.8	5.8	6.0	3	●
MGR 6 B3.0 L22 D6	6	50	22	0.1	1.8	5.8	6.0	3	●
MGR 7 B1.0 L22 D7	7	60	22	0.1	2	6.8	7.0	1	●
MGR 7 B1.5 L22 D7	7	60	22	0.1	2	6.8	7.0	1.5	●
MGR 7 B2.0 L22 D7	7	60	22	0.1	2	6.8	7.0	2	●
MGR 8 B1.0 L22 D8	8	60	22	0.1	1.7	7.8	8.0	1	●
MGR 8 B1.5 L22 D8	8	60	22	0.1	2	7.8	8.0	1.5	●
MGR 8 B2.0 L22 D8	8	60	22	0.1	2.6	7.8	8.0	2	●
MGR 8 B2.0 L32 D8	8	65	32	0.1	3.2	7.8	8.0	2	●
MGR 8 B2.5 L22 D8	8	60	22	0.1	2.6	7.8	8.0	2.5	●
MGR 8 B3.0 L22 D8	8	60	22	0.1	2.6	7.8	8.0	3	●
MGR 10 B2.0 L30 D10	10	60	30	0.1	3.5	9.8	10.0	2	●
MGR 10 B2.5 L30 D10	10	60	30	0.1	3.5	9.8	10.0	2.5	●
MGR 10 B3.0 L30 D10	10	60	30	0.1	3.5	9.8	10.0	3	●
MGR 10 B4.0 L30 D10	10	60	30	0.1	3.5	9.8	10.0	4	●

●Standing inventory ○Make-to-order

MGL--Internal Grooving



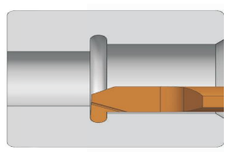


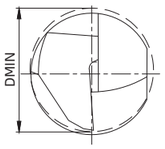


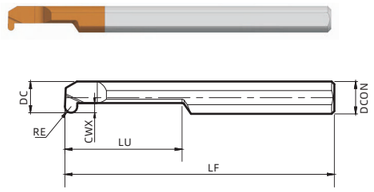
Model	Dimension（mm）								Inventory
	DCON	LF	LU	RE	CWX	DC	DMIN	B	
MGL 3 B0.5 L10 D3	3	50	10	0.05	0.6	2.8	3.0	0.5	○
MGL 3 B0.7L10D3	3	50	10	0.05	0.6	2.8	3.0	0.7	○
MGL 3 B1.0 L10 D3	3	50	10	0.1	0.8	2.8	3.0	1	○
MGL 4 B0.5 L10 D4	4	50	10	0.05	0.7	3.8	4.0	0.5	○
MGL 4 B0.7 L10 D4	4	50	10	0.05	1.0	3.8	4.0	0.7	○
MGL 4 B1.0 L10 D4	4	50	10	0.1	1.0	3.8	4.0	1	○
MGL 4 B1.0 L15 D4	4	50	15	0.1	1.0	3.8	4.0	1	○
MGL 4 B1.5 L10 D4	4	50	10	0.1	1.0	3.8	4.0	1.5	○
MGL 4 B1.5 L15 D4	4	50	15	0.1	1.0	3.8	4.0	1.5	○
MGL 4 B2.0 L10 D4	4	50	10	0.1	1.0	3.8	4.0	2	○
MGL 4 B2.0 L15 D4	4	50	15	0.1	1.0	3.8	4.0	2	○
MGL 5 B1.0 L15 D5	5	50	15	0.1	1.2	5.1	5.0	1	○
MGL 5 B1.0 L22 D5	5	50	22	0.1	1.2	5.1	5.0	1	○
MGL 5 B1.5 L15 D5	5	50	15	0.1	1.2	5.1	5.0	1.5	○
MGL 5 B1.5 L22 D5	5	50	22	0.1	1.2	5.1	5.0	1.5	○
MGL 5 B2.0 L15 D5	5	50	15	0.1	1.2	5.1	5.0	2	○
MGL 5 B2.0 L22 D5	5	50	22	0.1	1.2	5.1	5.0	2	○
MGL 6 B1.0 L15 D6	6	50	15	0.1	1.8	6.1	6.0	1	○
MGL 6 B1.0 L22 D6	6	50	22	0.1	1.8	6.1	6.0	1	○
MGL 6 B1.5 L15 D6	6	50	15	0.1	1.8	6.1	6.0	1.5	○
MGL 6 B1.5 L22 D6	6	50	22	0.1	1.8	6.1	6.0	1.5	○
MGL 6 B2.0 L15 D6	6	50	15	0.1	1.8	6.1	6.0	2	○
MGL 6 B2.0 L22 D6	6	50	22	0.1	1.8	6.1	6.0	2	○
MGL 6 B2.5 L15 D6	6	50	15	0.1	1.8	6.1	6.0	2.5	○
MGL 6 B2.5 L22 D6	6	50	22	0.1	1.8	6.1	6.0	2.5	○
MGL 6 B3.0 L15 D6	6	50	15	0.1	1.8	6.1	6.0	3	○
MGL 6 B3.0 L22 D6	6	50	22	0.1	1.8	6.1	6.0	3	○

●Standing inventory ○Make-to-order

MKR--Radius Grooving



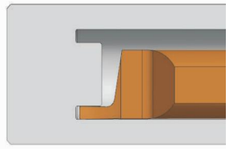


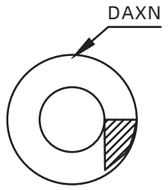


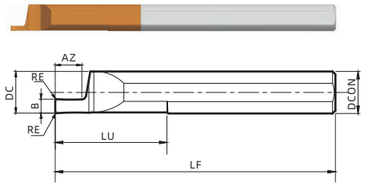
Model	Dimension（mm）							Inventory
	DCON	LF	LU	RE	CWX	DC	DMIN	
MKR 4 R0.5 L10 D4	4	50	10	0.5	1	3.7	4.0	●
MKR 4 R0.75 L10 D4	4	50	10	0.75	1	3.7	4.0	●
MKR 5 R0.5 L15 D5	5	50	15	0.5	1.2	4.8	5.0	●
MKR 5 R0.75 L15 D5	5	50	15	0.75	1.2	4.8	5.0	●
MKR 5 R1.0 L15 D5	5	50	15	1	1.2	4.8	5.0	●
MKR 6 R0.5 L15 D6	6	50	15	0.5	1.6	5.8	6.0	●
MKR 6 R0.5 L22 D6	6	50	22	0.5	1.6	5.8	6.0	●
MKR 6 R0.75 L15 D6	6	50	15	0.75	1.6	5.8	6.0	●
MKR 6 R0.75 L22 D6	6	50	22	0.75	1.6	5.8	6.0	●
MKR 6 R1.0 L15 D6	6	50	15	1	1.6	5.8	6.0	●
MKR 6 R1.0 L22 D6	6	50	22	1	1.8	5.8	6.0	●
MKR 6 R1.15 L22 D6	6	50	22	1.15	1.8	5.8	6.0	●

●Standing inventory ○Make-to-order

MFR--Face Grooving



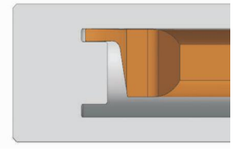


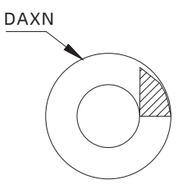


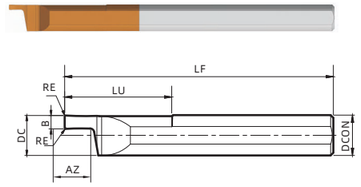
Model	Dimension（mm）								Inventory
	DCON	LF	LU	RE	AZ	DC	B	DAXN	
MFR 4 B0.75 L15 D4	4	50	15	0.1	1.7	3.95	0.75	5	●
MFR 4 B1.0 L15 D4	4	50	15	0.1	1.8	3.95	1	5	●
MFR 4 B1.5 L15 D4	4	50	15	0.1	3	3.95	1.5	5	●
MFR 5 B0.75 L22 D5	5	50	22	0.1	2	4.95	0.75	6	●
MFR 5 B1.0 L22 D5	5	50	22	0.1	2.1	4.95	1	6	●
MFR 5 B1.5 L22 D5	5	50	22	0.1	2.5	4.95	1.5	6	●
MFR 5 B2.0 L22 D5	5	50	22	0.1	4	4.95	2	6	●
MFR 6 B0.75 L22 D6	6	50	22	0.1	2	5.95	0.75	8	●
MFR 6 B1.0 L22 D6	6	50	22	0.1	2.3	5.95	1	8	●
MFR 6 B1.2 L22 D6	6	50	22	0.1	2.8	5.95	1.2	8	●
MFR 6 B1.5 L22 D6	6	50	22	0.1	3.6	5.95	1.5	8	●
MFR 6 B2.0 L22 D6	6	50	22	0.1	3.8	5.95	2	8	●
MFR 6 B2.5 L22 D6	6	50	22	0.1	4.6	5.95	2.5	8	●
MFR 6 B3.0 L22 D6	6	50	22	0.1	5	5.95	3	8	●
MFR 8 B1.0 L25 D8	8	60	25	0.1	2.3	7.95	1	10	●
MFR 8 B1.5 L25 D8	8	60	25	0.1	3.5	7.95	1.5	10	●
MFR 8 B2.0 L25 D8	8	60	25	0.1	4	7.95	2	10	●
MFR 8 B2.5 L25 D8	8	60	25	0.1	5	7.95	2.5	10	●
MFR 8 B3.0 L25 D8	8	60	25	0.1	6	7.95	3	10	●

●Standing inventory ○Make-to-order

MFL--Face Grooving



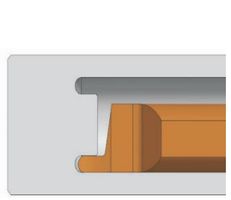


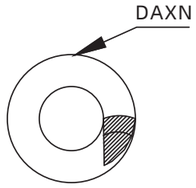


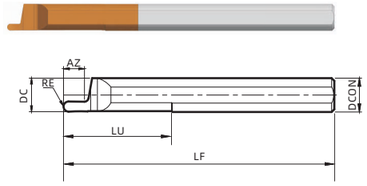
Model	Dimension（mm）								Inventory
	DCON	LF	LU	RE	AZ	DC	B	DAXN	
MFL 4 B0.5 L15 D4	4	50	15	0.05	1.2	3.95	0.5	5	○
MFL 4 B0.75 L15 D4	4	50	15	0.1	1.7	3.95	0.75	5	○
MFL 4 B1.0 L15 D4	4	50	15	0.1	1.8	3.95	1	5	○
MFL 4 B1.5 L15 D4	4	50	15	0.1	3	3.95	1.5	5	○
MFL 6 B1.0 L22 D6	6	50	22	0.1	2.3	5.95	1	8	○
MFL 6 B1.5 L22 D6	6	50	22	0.1	3.6	5.95	1.5	8	○
MFL 6 B2.0 L22 D6	6	50	22	0.1	3.8	5.95	2	8	○
MFL 6 B2.5 L22 D6	6	50	22	0.1	4.6	5.95	2.5	8	○
MFL 6 B3.0 L22 D6	6	50	22	0.1	5	5.95	3	8	○
MFL 8 B1.0 L25 D8	8	60	25	0.1	2.3	7.95	1	10	○
MFL 8 B1.5 L25 D8	8	60	25	0.1	3.5	7.95	1.5	10	○
MFL 8 B2.0 L25 D8	8	60	25	0.1	4	7.95	2	10	○
MFL 8 B2.5 L25 D8	8	60	25	0.1	5	7.95	2.5	10	○
MFL 8 B3.0 L25 D8	8	60	25	0.1	6	7.95	3	10	○

●Standing inventory ○Make-to-order

MZR--Face Radius Grooving



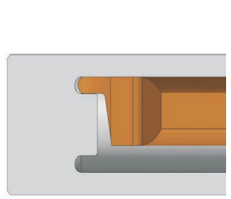


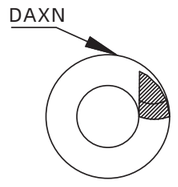


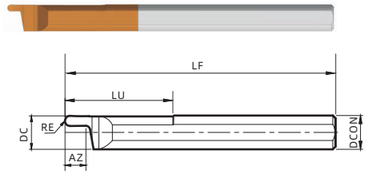
Model	Dimension（mm）							Inventory
	DCON	LF	LU	RE	AZ	DC	DAXN	
MZR 4 R0.5 L15 D4	4	50	15	0.5	1.3	3.95	5	●
MZR 4 R0.75 L15 D4	4	50	15	0.75	1.6	3.95	5	●
MZR 5 R0.5 L22 D5	5	50	22	0.5	1.3	4.95	6	●
MZR 5 R0.75 L22 D5	5	50	22	0.75	1.6	4.95	6	●
MZR 5 R1.0 L22 D5	5	50	22	1	2.6	4.95	6	●
MZR 6 R0.5 L22 D6	6	50	22	0.5	1.3	5.95	8	●
MZR 6 R0.75 L22 D6	6	50	22	0.75	1.6	5.95	8	●
MZR 6 R1.0 L22 D6	6	50	22	1	2.6	5.95	8	●

●Standing inventory ○Make-to-order

MZL--Face Radius Grooving



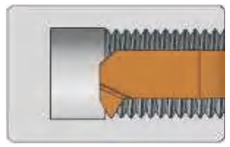


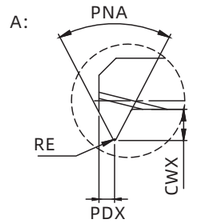


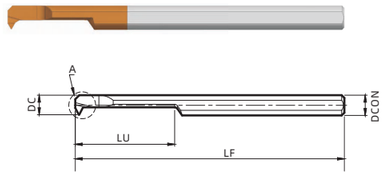
Model	Dimension（mm）							Inventory
	DCON	LF	LU	RE	AZ	DC	DAXN	
MZL 4 R0.5 L15 D4	4	50	15	0.5	1.3	3.95	5	○
MZL 4 R0.75 L15 D4	4	50	15	0.75	1.6	3.95	5	○
MZL 5 R0.5 L22 D5	5	50	22	0.5	1.3	4.95	6	○
MZL 5 R0.75 L22 D5	5	50	22	0.75	1.6	4.95	6	○
MZL 5 R1.0 L22 D5	5	50	22	1	2.6	4.95	6	○
MZL 6 R0.5 L22 D6	6	50	22	0.5	1.3	5.95	8	○
MZL 6 R0.75 L22 D6	6	50	22	0.75	1.6	5.95	8	○
MZL 6 R1.0 L22 D6	6	50	22	1	2.6	5.95	8	○

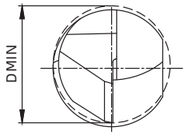
●Standing inventory ○Make-to-order

MIR(55°)—Universal Thread Turning





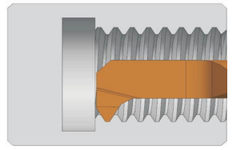


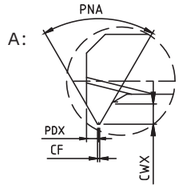


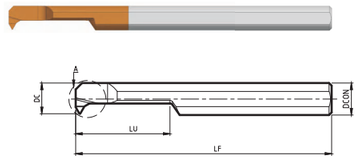
Model	Dimension（mm）										Inventory
	DCON	LF	LU	TP	PNA	CWX	DC	RE	PDX	DMIN	
MIR 3 A55 L15 D3	3	50	15	0.5-1.0	55°	1	2.9	0.05	0.55	3.2	●
MIR 4 A55 L15 D4	4	50	15	0.5-1.0	55°	1	3.8	0.05	0.55	4.1	●
MIR 5 A55 L15 D5	5	50	15	0.5-1.25	55°	1.3	4.8	0.05	0.68	5.1	●
MIR 5 A55 L22 D5	5	50	22	0.5-1.25	55°	1.3	4.8	0.05	0.68	5.1	●
MIR 6 A55 L15 D6	6	50	15	0.5-1.5	55°	1.5	5.6	0.05	0.8	6.1	●
MIR 6 A55 L22 D6	6	50	22	0.5-1.5	55°	1.5	5.6	0.05	0.8	6.1	●
MIR 8 A55 L22 D8	8	60	22	0.75-2.0	55°	1.8	7.6	0.08	0.95	8.1	●

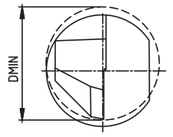
●Standing inventory ○Make-to-order

MIR(60°)—Universal Thread Turning





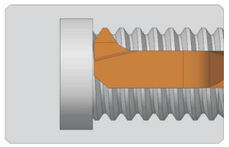


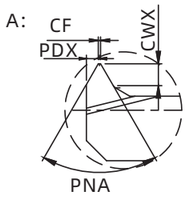


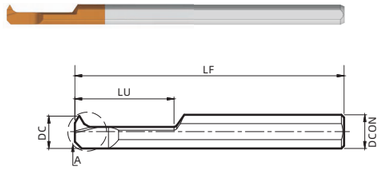
Model	Dimension（mm）										Inventory
	DCON	LF	LU	TP	PNA	CWX	DC	CF	PDX	DMIN	
MIR 3 A60 L10 D3	3	50	10	0.7-1.0	60°	0.8	2.9	0.08	0.45	3.2	●
MIR 3 A60 L15 D3	3	50	15	0.7-1.0	60°	0.8	2.9	0.08	0.45	3.2	●
MIR 4 A60 L10 D4	4	50	10	0.8-1.25	60°	0.9	3.8	0.09	0.525	4.1	●
MIR 4 A60 L15 D4	4	50	15	0.8-1.25	60°	0.9	3.8	0.09	0.525	4.1	●
MIR 4 A60 L22 D4	4	50	22	0.8-1.25	60°	0.9	3.8	0.09	0.525	4.1	●
MIR 5 A60 L15 D5	5	50	15	1.0-1.5	60°	1.15	4.8	0.11	0.65	5.1	●
MIR 5 A60 L22 D5	5	50	22	1.0-1.5	60°	1.15	4.8	0.11	0.65	5.1	●
MIR 6 A60 L15 D6	6	50	15	1.0-1.5	60°	1.15	5.6	0.11	0.65	6.1	●
MIR 6 A60 L22 D6	6	50	22	1.0-1.5	60°	1.15	5.6	0.11	0.65	6.1	●
MIR 6 A60 L30 D6	6	60	30	1.0-1.5	60°	1.15	5.6	0.11	0.65	6.1	●
MIR 7 A60 L25 D7	7	60	25	1.0-2.0	60°	1.5	6.6	0.11	0.9	7.1	●
MIR 8 A60 L22 D8	8	60	22	1.0-2.0	60°	1.5	7.6	0.11	0.9	8.1	●
MIR 8 A60 L30 D8	8	60	30	1.0-2.0	60°	1.5	7.6	0.11	0.9	8.1	●

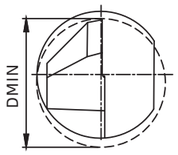
●Standing inventory ○Make-to-order

MIL(60°)—Universal Thread Turning





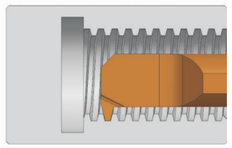


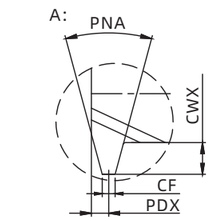


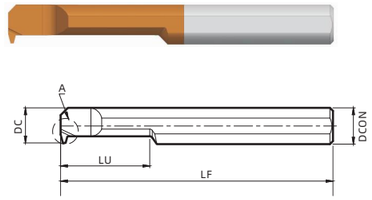
Model	Dimension（mm）										Inventory
	DCON	LF	LU	TP	PNA	CWX	DC	CF	PDX	DMIN	
MIL 3 A60 L10 D3	3	50	10	0.7-1.0	60°	0.8	2.9	0.08	0.45	3.2	○
MIL 3 A60 L15 D3	3	50	15	0.7-1.0	60°	0.8	2.9	0.08	0.45	3.2	○
MIL 4 A60 L15 D4	4	50	15	0.8-1.25	60°	0.9	3.8	0.09	0.525	4.1	○
MIL 5 A60 L15 D5	5	50	15	1.0-1.5	60°	1.15	4.8	0.11	0.65	5.1	○
MIL 5 A60 L22 D5	5	50	22	1.0-1.5	60°	1.15	4.8	0.11	0.65	5.1	○
MIL 6 A60 L15 D6	6	50	15	1.0-1.5	60°	1.15	5.6	0.11	0.65	6.1	○
MIL 6 A60 L22 D6	6	50	22	1.0-1.5	60°	1.15	5.6	0.11	0.65	6.1	○
MIL 8 A60 L22 D8	8	60	22	1.0-2.0	60°	1.5	7.6	0.11	0.9	8.1	○
MIL 8 A60 L30 D8	8	60	30	1.0-2.0	60°	1.5	7.6	0.11	0.9	8.1	○

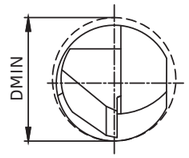
●Standing inventory ○Make-to-order

MIR(TR)—Trapezoidal Thread Turning









Model	Dimension（mm）									Inventory
	DCON	LF	LU	TP	PNA	DC	CF	PDX	DMIN	
MIR 6 L23 1.5TR D6	6	50	23	1.5	30°	5.8	0.45	0.6	6.4	○
MIR 7 L28 2.0TR D7	7	60	28	2	30°	6.7	0.63	0.8	7.5	○
MIR 8 L35 3.0TR D8	8	65	35	3	30°	7.8	1	1.1	8.5	○
MIR 10 L45 4.0TR D10	10	100	45	4	30°	9.8	1.36	1.5	11.5	●
MIR 10 L55 5.0TR D10	10	100	55	5	30°	9.8	1.73	1.9	11.5	●

●Standing inventory ○Make-to-order

Cutting parameter recommendations for solid carbide boring tool

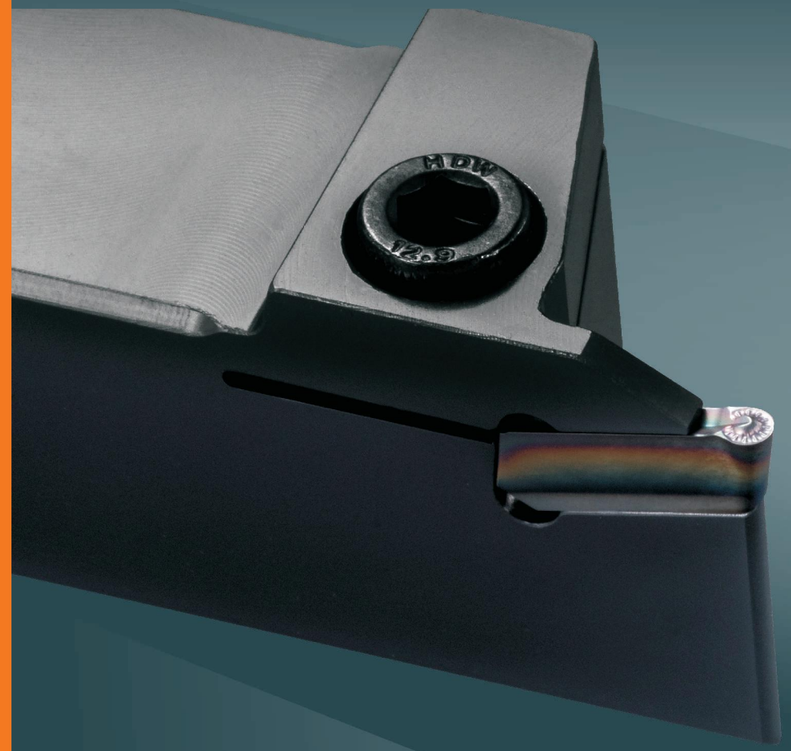
ISO	Classification of materials			Hardness of Brinell (HB)	Tensile strength (N/mm^2)	Operation type					
						Internal Turning			Grooving		Threading
						Cutting parameters					
						v_c(m/min)	f_n(mm/r)	APMX(mm)	v_c(m/min)	f_n(mm/r)	v_c(m/min)
P	Unalloyed steel	C≤0.25%	Annealing	125	428	50-120	0.05	0.4	50-120	0.03	140-200
		0.25<C≤0.55%	Annealing	190	639	40-100	0.04	0.4	40-100	0.02	120-180
		0.25<C≤0.55%	Quenching and tempering	210	708	30-80	0.03	0.4	30-80	0.01	110-180
		C>0.55%	Annealing	190	639	40-100	0.04	0.4	40-100	0.03	120-180
		C>0.55%	Quenching and tempering	300	1013	40-80	0.03	0.4	40-80	0.01	110-180
		Short chip steel	Annealing	220	745	40-100	0.04	0.4	40-100	0.02	110-180
	Low-alloyed steel	Annealing		175	591	50-70	0.04	0.3	50-70	0.02	100-155
		Quenching and tempering		300	1013	40-60	0.04	0.3	40-60	0.01	90-145
		Quenching and tempering		380	1282	30-50	0.03	0.3	30-50	0.01	65-115
		Quenching and tempering		430	430	20-30	0.03	0.3	20-30	0.01	100-155
	High alloy steel and high alloy tool steel	Annealing		200	675	30-50	0.04	0.15	30-50	0.02	65-115
		Quenching and tempering		300	1013	25-40	0.03	0.15	25-40	0.01	50-100
		Quenching and tempering		400	1361	20-40	0.03	0.15	20-40	0.01	40-80
M	Stainless steel	Ferrite/martensite,annealing		200	675	60-100	0.04	0.2	60-100	0.01	80-120
		Martensite, quenching and tempering		330	1114	40-60	0.03	0.15	40-60	0.01	60-100
	Stainless steel	Austenite, quenching		200	675	50-90	0.04	0.2	50-90	0.01	60-80
		Austenite, precipitation hardening stainless steel (PH stainless steel)		300	1013	40-60	0.03	0.15	40-60	0.01	50-70
		Austenite- ferrite, duplex stainless steel		230	778	30-50	0.03	0.15	30-50	0.01	60-80
K	Malleable cast iron	Ferrite		200	400	50-70	0.02	0.25	50-70	0.02	60-80
		Pearlite		260	700	50-70	0.01	0.25	50-70	0.01	60-80
	Grey cast iron	Low tensile strength		180	200	50-70	0.02	0.4	50-70	0.02	60-80
		High tensile strength/austenite		245	350	40-60	0.01	0.4	40-60	0.15	40-70
	Nodular cast iron	Ferrite		155	400	60-80	0.02	0.4	60-80	0.02	70-90
		Pearlite		265	700	50-70	0.01	0.4	50-70	0.01	60-80
	Compacted graphite iron GGV (CGI)			230	400	60-80	0.02	0.4	60-80	0.02	70-90
S	Iron-based alloy	Iron-based	Annealing	200	680	25-45	0.04	0.2	25-45	0.01	25-45
			Aged	280	940	20-30	0.03	0.15	20-30	0.01	20-30
		Nickel-based or cobalt-based	Annealing	250	840	15-20	0.01	0.15	15-20	0.01	15-20
			Aged	350	1180	10-15	0.01	0.15	10-15	0.01	10-15
			Casting	320	1080	15-20	0.01	0.15	15-20	0.01	15-20
	Cobalt-based alloy	Pure titanium		200	680	10-15	0.01	0.15	10-15	0.01	10-15
		α and β phase alloys, aged		375	1260	15-20	0.01	0.15	15-20	0.01	15-20
		β phase alloy		410	1400	15-20	0.01	0.15	15-20	0.01	15-20
	Nickel-based alloy	1177		300	1010	60-100	0.02	0.15	60-100	0.02	60-100
	Titanium alloy	1262		300	1010	40-50	0.02	0.15	40-50	0.02	40-50
H	Hardened steel	Quenching and tempering		50HRC		20-45	0.01	0.05	20-45	0.01	20-40
		Quenching and tempering		55HRC		20-40	0.01	0.05	20-40	0.01	20-40
		Quenching and tempering		60HRC		15-30	0.01	0.05	15-30	0.01	15-30
	Hardened cast steel	Quenching and tempering		50HRC		20-40	0.01	0.15	20-40	0.01	20-40

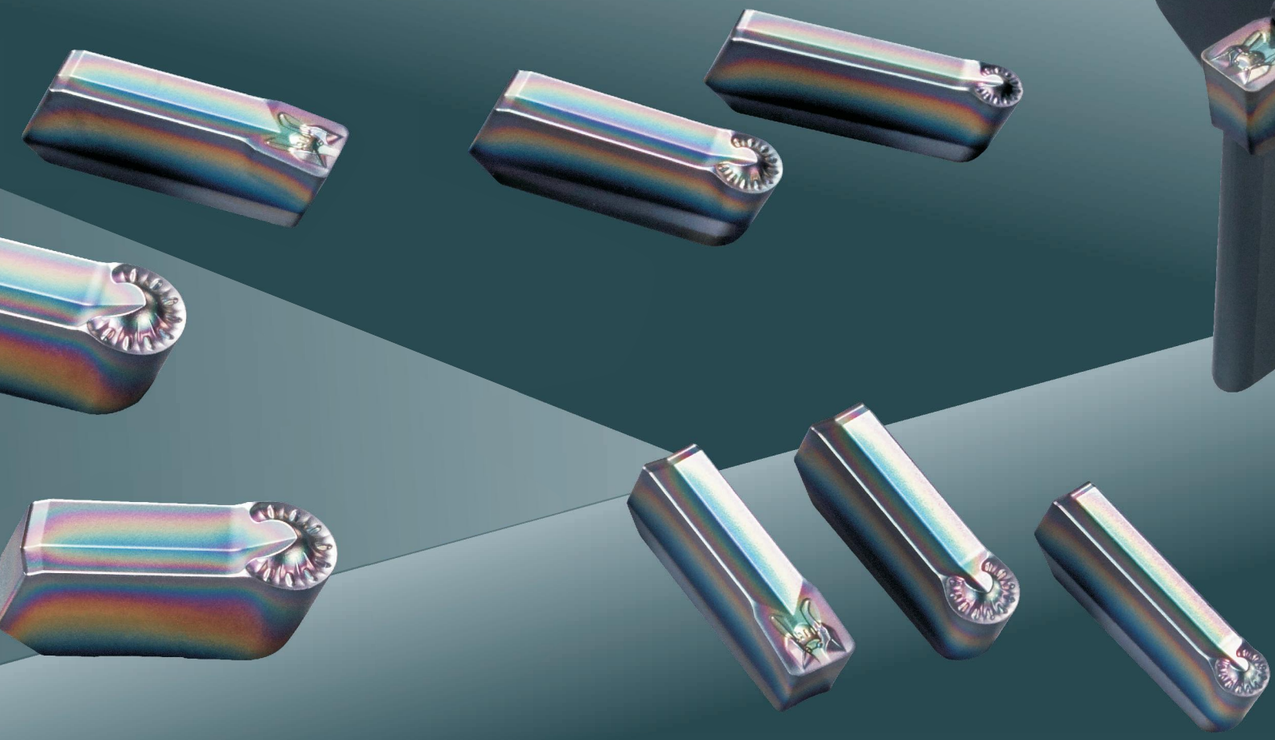
Parting & Grooving



Kylin Series--Parting and grooving inserts

- The new HCMA series of single-edge square grooving inserts and the HPMA series of single-edge round grooving inserts have comprehensive specifications and strong versatility. They meet the machining demand of difficult-to-cut materials for grooving, side-turning, and profiling, effectively addressing multiple requirements such as chip control, surface quality, and long service life.
- Paired with the new series of grades HR9205 and HR9215, it meets the processing requirements for parting and grooving of difficult-to-machine materials such as high-temperature alloys.







ST: Parting/grooving/side-turning chipbreaker

- Designs featuring variable rake angles, variable edge widths, and variable curvatures effectively enhance the surface quality of grooving
- The enhanced strength of the cutting edge significantly improves the safety of cutting processes
- The special chipbreaker structure, as well as the curvature and angle of the rake face, effectively ensures excellent chip breaking performance

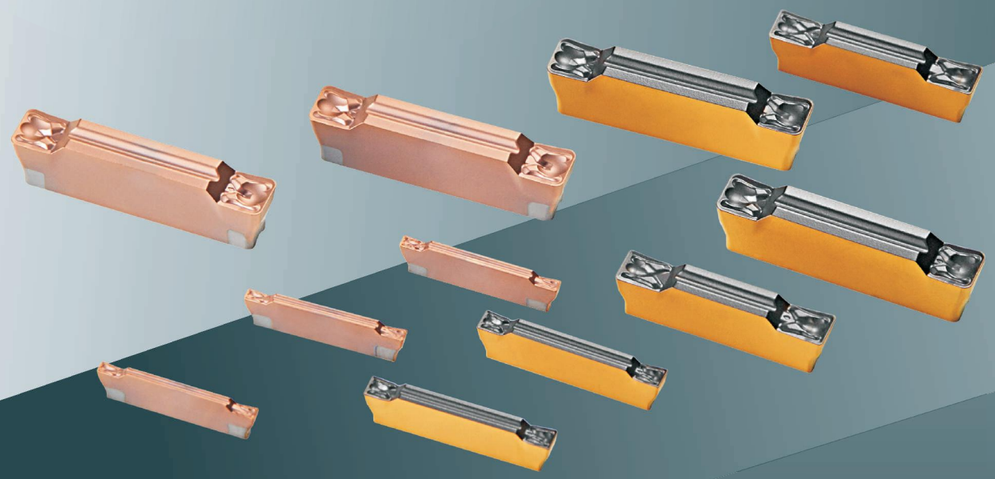
SR: Profiling chipbreaker

- The cutting edge is sharp, resulting in low cutting resistance
- The special chipbreaker design enables chip bending in all directions during cutting, effectively ensuring the surface quality
- The optimized positioning slot design ensures high repeatability and effectively guarantees the machining accuracy

CT Chipbreaker

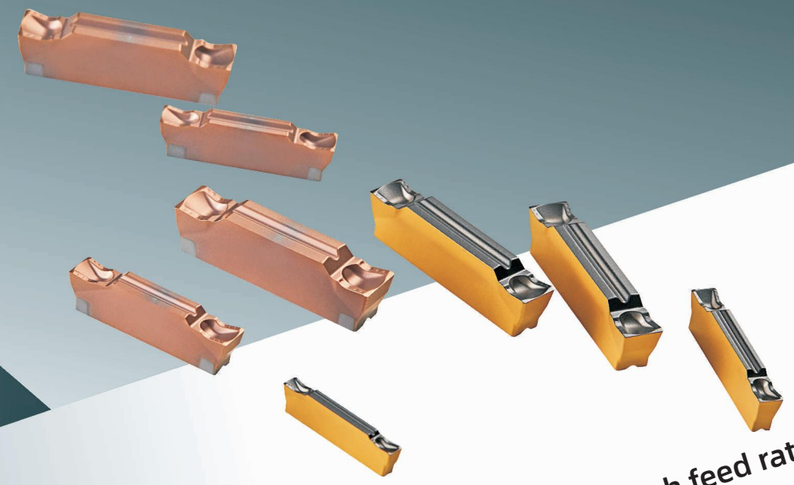
Parting and side-turning

The optimized positioning slot reduces the risk of abnormal insert breakage



GT Chipbreaker

Parting and grooving

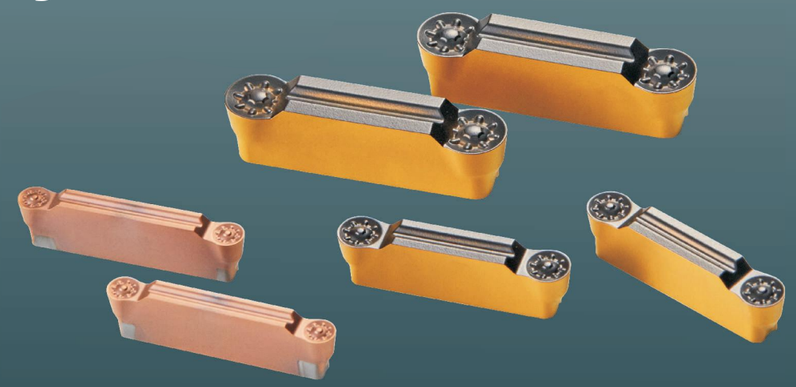


Meet the requirements of efficient (high feed rate) grooving

Omnidirectional chip control meets the processing requirements for higher surface quality

RM Chipbreaker

Profiling

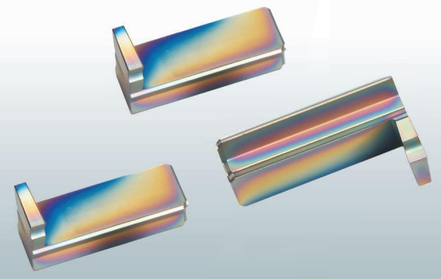


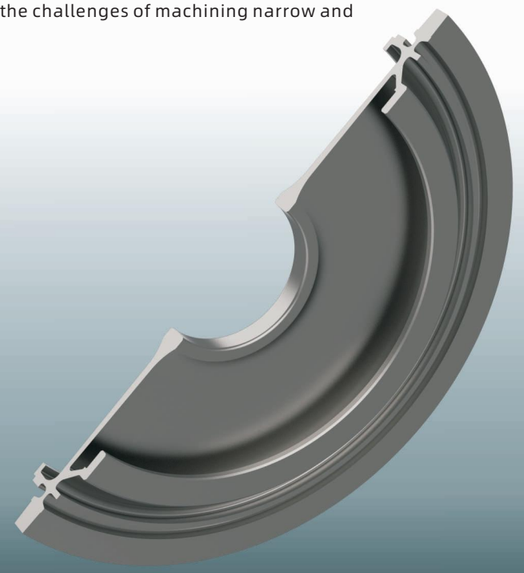


Non-standard mortise grooving tools for the aerospace industry

For the non-standard grooves in the aerospace industry that are narrow, deep, irregularly shaped, and difficult to break chips, Huareal can customize tools with groove depth T-MAX≤6.5mm, groove width CW≤5.8mm, and non-standard grooving tools

Considering the processing characteristics of high-temp alloys and titanium alloys, specialized substrates and coatings are employed to effectively tackle the challenges of machining narrow and deep grooves as well as irregular grooves.





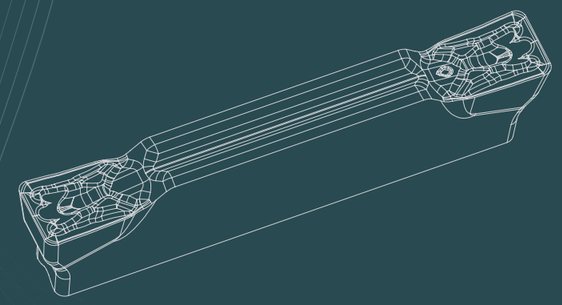
List of partial models:

Product Model	HR7225	HR9205
HRSR2002-90-5.0	☆	☆
HRSL2002-90-5.0	☆	☆
HRSR4004-90-5.0	☆	☆
HRSL4004-90-5.0	☆	☆
.....		

Turning

Parting and grooving

- Code key of parting and grooving insert A205
- Overview of parting and grooving tool A206
- Kylin series--Parting and grooving insert A207
- Kylin series--Parting and grooving tool A208
- Universal series--Parting and grooving insert A209
- Universal series--Parting and grooving tool A211
- Technical information for parting and grooving A216



Code key of parting and grooving insert

QC	M	B	30	04	–	CT
①	②	③	④	⑤		⑥

①Insert type	
Code	Type
HC	Kylin-series parting insert
HP	Kylin-series profiling insert
QD	Parting insert
QC	Grooving insert
QP	Profiling insert

②Tolerance class	
Code	Type
M	M-Class tolerance
K	K-Class tolerance
E	E-class tolerance

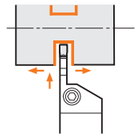
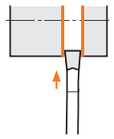
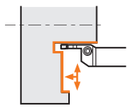
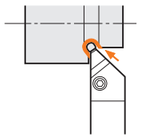
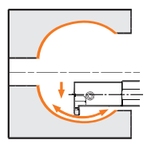
③Cutting edge count	
Code	Type
A	Single edge
B	Double edges
C	Triple edges

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

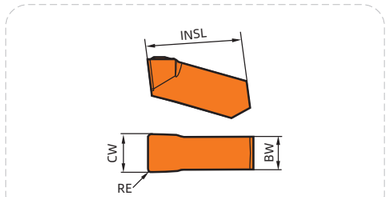
⑤Corner radius	
Code	Corner radius (mm)
00	0.00
02	0.20
03	0.30
04	0.40
08	0.80

⑥Chipbreaker type	
ST	ST chipbreaker
SR	SR chipbreaker
Default	All-round chipbreaker
CT	CT chipbreaker
GT	GT chipbreaker
RM	RM chipbreaker
AK	AK chipbreaker

Overview of parting and grooving tools

Machining form	Diagram	Applicable tools	Applicable inserts	Features
External grooving and side turning		HRED□□ A208 HREH□□ A211	HCMA□□ HPMA□□ A207 QCMB□□ QCKB□□ QPMB□□ QPEB□□ A209、A210	• The multi-purpose cutting tool is compatible with different inserts such as grooving, profiling and parting inserts. • The insert has both pressing groove or grinding groove, which meet different machining requirements. • The maximum groove depth is 23 mm. • With a profiling insert, it can be used to a variety of materials.
Parting		HRED□□ PHRG□□ A208 HREH□□ A211	HCMA□□ A207 QCMB□□ QCKB□□ A209	• With our parting inserts, it can be used to cut various materials. • Maximum parting diameter is 46 mm.
Face grooving and side turning		HRFH□□ A213	QCMB□□ QCKB□□ QPMB□□ A209、A210	• The multi-purpose cutting tool is compatible with different inserts such as grooving, profiling and parting inserts. • The groove depth is from 10 to 15 mm.
Relief groove machining		HREU□□ A214	QPMB□□ A210	• The 45° cutting tool structure shall complete a variety of forms of relief groove machining. • Maximum vertical depth of the relief groove is 3.3mm.
Internal grooving and turning		HRIV□□ A215	QCMB□□ QCKB□□ QPMB□□ A209、A210	• The multi-purpose cutting tool is compatible with different inserts such as grooving, profiling and parting inserts. • Minimum inscribed circle diameter for machining is 20 mm. • Maximum groove depth is 8mm.

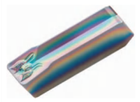
Kylin- series parting and grooving inserts



Working condition: ● Stable ◕ Average ⌗ Tough

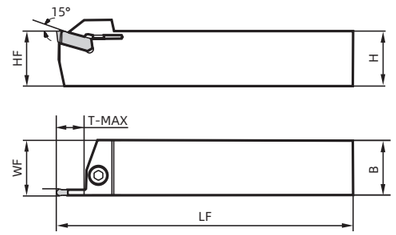
Workpiece material

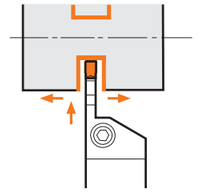
P	Steel
M	Stainless steel
K	Cast iron
N	Non-ferrous metal
S	Heat resistant super alloys Titanium alloy

Operation type	Insert shape	Type	Dimension (mm)				CVD						PVD				Cemented carbide		Cermet	
			INSL	CW	BWS	RE	HR8105	HR8115	HR8125	HR8225	HR8135	HR6115	HR6215	HR7115	HR7125	HR7225	HR9205	HR9215	HRK10	HRK20	HRC10	HR115C
Parting, grooving and side turning		HCMA3004-ST	15.3	3.0(±0.025)	2.4	0.4(±0.05)									☆	★	☆	★				
		HCMA4006-ST	15.3	4.0(±0.025)	3.2	0.6(±0.05)									☆	★	☆	★				
		HCMA5006-ST	15.3	5.0(±0.025)	3.9	0.6(±0.05)									☆	★	☆	★				
		HCMA6008-ST	15.3	6.0(±0.025)	5	0.8(±0.05)									☆	★	☆	★				

★ Recommended grade ☆ Available grade

Kylin-series external parting, grooving and turning tools



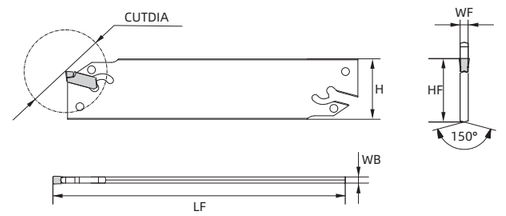


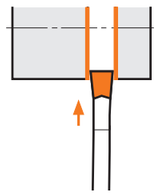
• The illustration shows the right hand（R）

Type		Inventory	Dmension (mm)						Insert screw	Wrench	Matching insert
			H	B	LF	LH	WF	T-MAX			
HREDR/L	2525-3	▲	25	25	150	25	25.3	13	HHA0512	WR40L	H□MA30
	2525-4	▲	25	25	150	25	25.3	13	HHA0616	WR50L	H□MA40
	2525-5	▲	25	25	150	25	25.4	13			H□MA50
	2525-6	▲	25	25	150	25	25.4	13			H□MA60

▲Standing inventory △Make-to-order

Kylin-series external parting plates

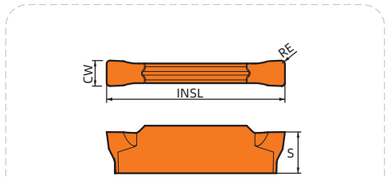




Type		Inventory	Dmension (mm)						Wrench	Matching insert
			H	LF	WF	HF	WB	CUTDIA		
PHRGN	32-3DG	▲	32	150	3	24.8	2.38	52	HRED23	H□MA30
	32-4DG	▲	32	150	4	24.8	3.2	54		H□MA40
	32-5DG	▲	32	150	5	24.8	3.97	54		H□MA50
	32-6DG	▲	32	150	6	24.8	5.16	54		H□MA60

▲Standing inventory △Make-to-order

Parting and grooving inserts



Working condition: ● Stable ◕ Average ⌗ Tough

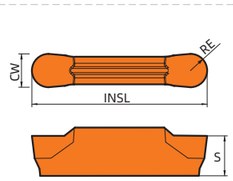
Workpiece material

P	Steel
M	Stainless steel
K	Cast iron
N	Non-ferrous metal
S	Heat resistant super alloys Titanium alloy

Operation type	Insert shape	Type	Dimension (mm)				CVD							PVD						Cemented carbide		Cermet	
			INSL	CW	S	RE	HR8105	HR8115	HR8125	HR8225	HR8135	HR6115	HR6215	HR7115	HR7125	HR7225	HR9205	HR9215	HRK10	HRK20	HRC10	HR115C
Parting and grooving		QCMB1502-GT	16.0	1.5(+0.03 0)	3.50	0.2(±0.03)				★		☆			☆	★						☆	
		QCMB2002-GT	16.0	2.0(+0.03 0)	3.55	0.2(±0.03)				★		☆			☆	★						☆	
		QCMB2502-GT	18.5	2.5(+0.05 0)	3.90	0.2(±0.05)				★		☆			☆	★						☆	
		QCMB3002-GT	21.0	3.0(+0.05 0)	4.86	0.2(±0.05)				★		☆			☆	★						☆	
		QCMB4002-GT	21.0	4.0(+0.05 0)	4.86	0.2(±0.05)				★		☆			☆	★						☆	
		QCMB5003-GT	26.0	5.0(+0.05 0)	5.80	0.3(±0.05)				★		☆			☆	★						☆	
		QCMB6003-GT	26.0	6.0(+0.05 0)	5.90	0.3(±0.05)				★		☆			☆	★						☆	
Grooving		QCKB2002	16.0	2.0(±0.02)	3.55	0.2(±0.05)									☆	★							
		QCKB2502	18.5	2.5(±0.025)	3.90	0.2(±0.05)									☆	★							
		QCKB3004	21.0	3.0(±0.025)	4.86	0.4(±0.05)									☆	★							
		QCKB4004	21.0	4.0(±0.025)	4.86	0.4(±0.05)									☆	★							
		QCKB5008	26.0	5.0(±0.025)	5.80	0.8(±0.05)									☆	★							
Grooving and side turning		QCMB1502-CT	16.0	1.5(+0.03 0)	3.50	0.2(±0.03)				★		☆		☆	☆	★	★	★				☆	
		QCMB2002-CT	16.0	2.0(+0.03 0)	3.55	0.2(±0.03)				★		☆		☆	☆	★	★	★				☆	
		QCMB2502-CT	18.5	2.5(+0.05 0)	3.90	0.2(±0.05)				★		☆		☆	☆	★	★	★				☆	
		QCMB3004-CT	21.0	3.0(+0.05 0)	4.86	0.4(±0.05)				★		☆		☆	☆	★	★	★				☆	
		QCMB4004-CT	21.0	4.0(+0.05 0)	4.86	0.4(±0.05)				★		☆		☆	☆	★	★	★				☆	
		QCMB5008-CT	26.0	5.0(+0.05 0)	5.80	0.8(±0.05)				★		☆		☆	☆	★	★	★				☆	
		QCMB6004-CT	26.0	6.0(+0.05 0)	5.90	0.4(±0.05)				★		☆		☆	☆	★	★	★				☆	
		QCMB6008-CT	26.0	6.0(+0.05 0)	5.90	0.8(±0.05)				★		☆		☆	☆	★	★	★				☆	

★ Recommended grade ☆ Available grade

Profile grooving inserts



Working condition: ● Stable ◕ Average ⌗ Tough

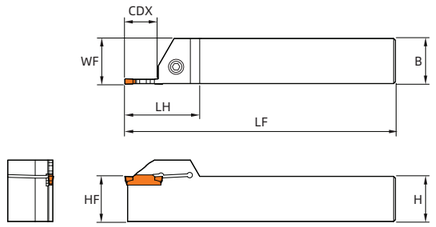
Workpiece material

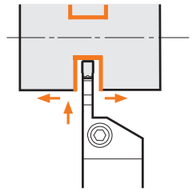
P	Steel
M	Stainless steel
K	Cast iron
N	Non-ferrous metal
S	Heat resistant super alloys Titanium alloy

Operation type	Insert shape	Type	Dimension (mm)				CVD							PVD						Cemented carbide		Cermet	
			INSL	CW	S	RE	HR8105	HR8115	HR8125	HR8225	HR8135	HR6115	HR6215	HR7115	HR7125	HR7225	HR9205	HR9215	HRK10	HRK20	HRC10	HR115C
Profile grooving		QPMB2010-RM	16.0	2.0(+0.05 0)	3.5	1.0(±0.05)				★		☆		☆	☆	★							
		QPMB3015-RM	21.0	3.0(+0.05 0)	4.8	1.5(±0.05)				★		☆		☆	☆	★							
		QPMB4020-RM	21.0	4.0(+0.05 0)	4.8	2.0(±0.05)				★		☆		☆	☆	★							
		QPMB5025-RM	26.0	5.0(+0.05 0)	5.8	2.5(±0.05)				★		☆		☆	☆	★							
		QPMB6030-RM	26.0	6.0(+0.05 0)	5.9	3.0(±0.05)				★		☆		☆	☆	★							
Aluminum wheel hub grooving		QPEB8040-AK	30.0	8.0(±0.025)	8.365	4.0(±0.05)													★	★			

★ Recommended grade ☆ Available grade

External grooving, parting and turning tools



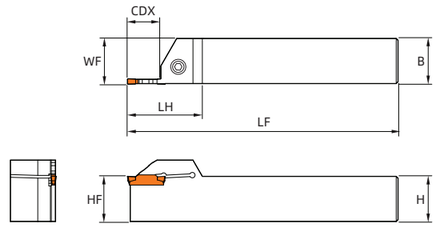


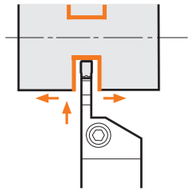
• The illustration shows the right hand（R）

Type		Inventory	Dmension (mm)						Insert screw	Wrench	Matching insert
			H=B	HF	LF	WF	LH	CDX			
HREHR/L	1616-1.5-T12	△	16	16	100	16.2	36.5	12	HHA0512	WR40L	QCMB15□□
	2020-1.5-T12	△	20	20	125	20.2	36.5	12			
	2525-1.5-T12	△	25	25	150	25.2	36.5	12			
	1212-2-T08	△	12	12	100	12.2	32	8	HHA0512	WR40L	QCMB20□□ QCKB20□□ QPMB20□□
	1616-2-T08	△	16	16	100	16.2	36.5	8			
	2020-2-T08	▲	20	20	125	20.2	36.5	8			
	2525-2-T08	▲	25	25	150	25.2	36.5	8			
	1616-2-T12	△	16	16	100	16.2	36.5	12			
	2020-2-T12	△	20	20	125	20.2	36.5	12			
	2525-2-T12	▲	25	25	150	25.2	36.5	12			
	1616-2.5-T17	△	16	16	100	16.3	39	17	HHA0512	WR40L	QCMB25□□
	2020-2.5-T17	△	20	20	125	20.3	39	17			
	2525-2.5-T17	△	25	25	150	25.3	39	17			
	1616-3-T10	△	16	16	100	16.4	41.5	10	HHA0512	WR40L	QCMB30□□ QCKB30□□ QPMB30□□
	2020-3-T10	▲	20	20	125	20.4	41.5	10			
	2525-3-T10	▲	25	25	150	25.4	41.5	10			
	1616-3-T13	△	16	16	100	16.4	41.5	13			
	2020-3-T13	▲	20	20	125	20.4	41.5	13			
	2525-3-T13	▲	25	25	150	25.4	41.5	13			
	1616-3-T20	△	16	16	100	16.4	41.5	20			
	2020-3-T20	△	20	20	125	20.4	41.5	20			
	2525-3-T20	△	25	25	150	25.4	41.5	20			
	2020-4-T10	▲	20	20	125	20.4	41.5	10	HHA0616	WR50L	QCMB40□□ QCKB40□□ QPMB40□□
	2525-4-T10	▲	25	25	150	25.4	41.5	10			
	3232-4-T10	△	32	32	150	32.4	41.5	10			
	2020-4-T15	△	20	20	125	20.4	41.5	15			
	2525-4-T15	▲	25	25	150	25.4	41.5	15			
	2020-4-T20	△	20	20	125	20.4	41.5	20			
	2525-4-T20	△	25	25	150	25.4	41.5	20			
	3232-4-T20	△	32	32	170	32.4	41.5	20			

▲Standing inventory △Make-to-order

External grooving, parting and turning tools



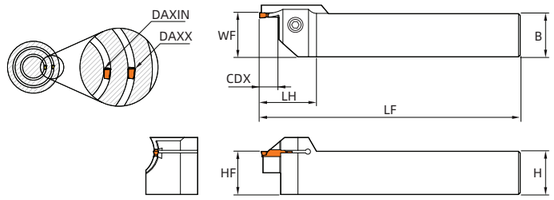


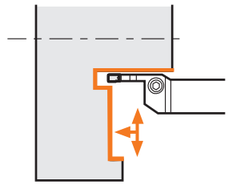
• The illustration shows the right hand（R）

Type		Inventory	Dmension (mm)						Insert screw	Wrench	Matching insert
			H=B	HF	LF	WF	LH	CDX			
HREHR/L	2020-5-T15	△	20	20	125	20.5	46.5	15	HHA0616	WR50L	QCMB50□□ QCKB50□□ QPMB50□□
	2525-5-T15	△	25	25	150	25.5	40.5	15			
	3232-5-T15	▲	32	32	170	32.5	46.5	15			
	2020-5-T23	△	20	20	125	20.5	46.5	23			
	2525-5-T23	△	25	25	150	25.5	46.5	23			
	3232-5-T23	△	32	32	170	32.5	46.5	23			
	2525-6-T15	▲	25	25	150	25.6	46.5	15	HHA0616	WR50L	QCMB60□□ QPMB60□□
	3232-6-T15	△	32	32	170	32.6	46.5	15			
	2525-6-T23	△	25	25	150	25.6	46.5	23			
	3232-6-T23	△	32	32	170	32.6	46.5	23			

▲Standing inventory △Make-to-order

90° end face grooving tools



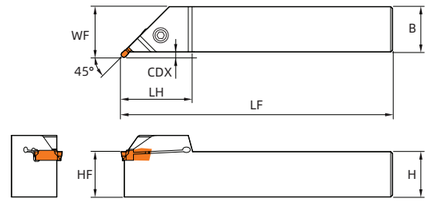


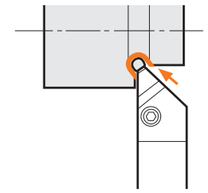
• The illustration shows the right hand（R）

Type		Inventory	Dmension (mm)							Insert screw	Wrench	Matching insert
			H=B	HF	LF	WF	CDX	DAXIN	DAXX			
HRFHR/L	325-34/50-T10	△	25	25	150	25.5	10	34	50	HHA0512	WR40L	QCMB30□□ QCKB30□□ QPMB30□□
	325-44/70-T15	▲	25	25	150	25.5	15	44	70			
	325-64/100-T15	△	25	25	150	25.5	15	64	100			
	425-40/60-T10	△	25	25	150	25.6	10	40	60	HHA0616	WR50L	QCMB40□□ QCKB40□□ QPMB40□□
	425-44/70-T15	▲	25	25	150	25.6	15	44	70			
	425-84/92-T15	△	25	25	150	25.6	15	84	92			
	425-60/120-T15	▲	25	25	150	25.6	15	60	120			
	425-112/200-T15	△	25	25	150	25.6	15	112	200			

▲Standing inventory △Make-to-order

Relief grooving tools



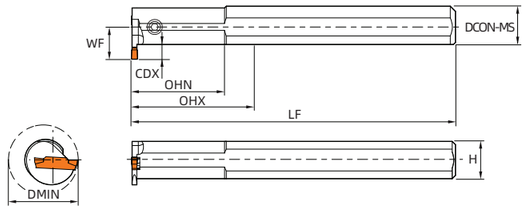


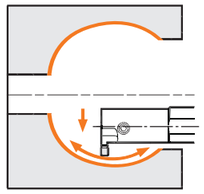
• The illustration shows the right hand（R）

Type		Inventory	Dmension (mm)						Insert screw	Wrench	Matching insert
			H=B	HF	LF	WF	LH	CDX			
HREUR/L	2020-3	△	20	20	125	23	40	2.8	HHA0512	WR40L	QPMB30□□
	2525-3	▲	25	25	150	28	40	2.8			
	3232-3	△	32	32	170	35	40	2.8			
	2020-4	▲	20	20	125	23	40	2.8	HHA0616	WR50L	QPMB40□□
	2525-4	▲	25	25	150	28	40	2.8			
	3232-4	△	32	32	170	35	40	2.8			
	2020-5	▲	20	20	125	23.5	50	3.3	HHA0616	WR50L	QPMB50□□
	3232-5	△	32	32	170	35.5	50	3.3			
	2020-6	△	20	20	125	23.5	50	3.3	HHA0616	WR50L	QPMB60□□
	2525-6	▲	25	25	150	28.5	50	3.3			

▲Standing inventory △Make-to-order

Internal grooving and turning tools





• The illustration shows the right hand（R）

Type		Inventory	Dmension (mm)							Insert screw	Wrench	Matching insert
			DMIN	DCON-MS	LF	OHN	CDX	H	WF			
HRIVR/L	2016-1.5	△	20	16	125	35	3.5	15	11.3	HHB0410	WR30L	QCMB15□□
	2520-1.5	△	25	20	150	45	3.5	18	13.1	HHA0512	WR40L	
	2925-1.5	△	29	25	200	45	3.5	23	16.2			
	2016-2	△	20	16	125	35	4.5	15	12.4	HHB0410	WR30L	QCMB20□□ QCKB20□□ QPMB20□□
	2520-2	▲	25	20	150	45	4.5	18	14.0	HHA0512	WR40L	
	2925-2	△	29	25	200	45	4.5	23	17.2			
	2016-2.5	▲	20	16	125	35	4.5	15	12.5	HHB0410	WR30L	QCMB25□□
	2520-2.5	△	25	20	150	45	4.5	18	15.1	HHA0512	WR40L	
	2925-2.5	△	29	25	200	45	4.5	23	18.2			
	2520-3	▲	25	20	150	45	5	18	15.6	HHA0512	WR40L	QCMB30□□ QCKB30□□ QPMB30□□
	3125-3	△	31	25	200	45	6	23	18.9			
	3732-3	△	37	32	250	65	6	30	21.5			
	2520-4	△	35	20	150	45	6	18	15.6	HHA0512	WR40L	QCMB40□□ QCKB40□□ QPMB40□□
	3125-4	△	31	25	200	45	6	23	18.9			
	3732-4	▲	37	32	250	65	6	30	21.5			
	3125-5	△	31	25	200	45	8	23	19.4	BHA0616	WR50L	QCMB50□□ QCKB50□□ QPMB50□□
	3732-5	△	37	32	250	65	8	30	21.5			
	3125-6	△	31	25	200	45	8	23	19.4			QCMB60□□ QPMB60□□
	3732-6	△	37	32	250	65	8	30	21.5			

▲Standing inventory △Make-to-order

Cutting parameter recommendations for parting and grooving

ISO	Classification of materials			Hardness of Brinell (HB)	Tensile strength (N/mm^2)	Cutting Speed Recommendations v_c (m/min)													
						HR8225			HR7225			HR6115			HR9205			HR9215	
						Feed (mm/rev)													
						0.1	0.3	0.5	0.1	0.3	0.5	0.1	0.3	0.5	0.1	0.2	0.3	0.1	0.2	0.3
P	Unalloyed steel	C≤0.25%	Annealing	125	428	280	200	130	260	180	120									
		0.25<C≤0.55%	Annealing	190	639	240	160	115	200	140	105									
		0.25<C≤0.55%	Quenching and tempering	210	708	130	115	100	120	110	100									
		C>0.55%	Annealing	190	639	145	130	115	130	120	110									
		C>0.55%	Quenching and tempering	300	1013	115	100	80	110	95	70									
		Short chip steel	Annealing	220	745	130	115	100	120	105	90									
	Low-alloyed steel	Annealing		175	591	280	200	130	170	135	120									
		Quenching and tempering		300	1013	115	100	80	105	90	70									
		Quenching and tempering		380	1282	170	90	70	160	80	60									
		Quenching and tempering		430	430															
	High alloy steel and high alloy tool steel	Annealing		200	675															
		Quenching and tempering		300	1013															
		Quenching and tempering		400	1361															
M	Stainless steel	Ferrite/martensite,annealing		200	675				200	150	105									
		Martensite, quenching and tempering		330	1114				150	115	70									
	Stainless steel	Austenite, quenching		200	675				185	155	125									
		Austenite, precipitation hardening stainless steel (PH stainless steel)		300	1013				165	135	95									
		Austenite- ferrite, duplex stainless steel		230	778				145	110	85									
K	Malleable cast iron	Ferrite		200	400							220	160	80						
		Pearlite		260	700							115	90	65						
	Grey cast iron	Low tensile strength		180	200							260	220	150						
		High tensile strength/austenite		245	350							240	200	130						
	Nodular cast iron	Ferrite		155	400							160	130	80						
		Pearlite		265	700							145	110	80						
	Compacted graphite iron GGV (CGI)			230	400							150	120	90						
S	Iron-based alloy	Iron-based	Annealing	200	680										70	50		60	40	
			Aged	280	940										50	40		40	30	
		Nickel-based or cobalt-based	Annealing	250	840										50	40		40	30	
			Aged	350	1180										40	30		35	25	
			Casting	320	1080										30	25		25	20	
	Cobalt-based alloy	Pure titanium		200	680															
		α and β phase alloys, aged		375	1260										50	40	30	40	30	20
		β phase alloy		410	1400										40	35	30	30	25	20
	Nickel-based alloy	1177		300	1010															
	Titanium alloy	1262		300	1010															

Notes:
1. Cutting parameters are suitable for wet cutting.
2. For internal and section machining, it is recommended to reduce the cutting speed by 30%-50%.

Precautions for parting and grooving:

Parting

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

External grooving, turning and profiling

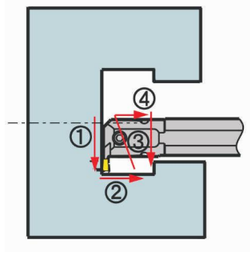
- Pass sequence: When cutting depth > 0.5mm, radial feed (the maximum cutting depth can reach 0.75 x insert width S) → radial return about 0.1mm → axial pass → oblique return → axial pass → radial machining to the required depth.

Face grooving and turning

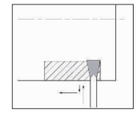
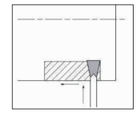
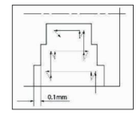
- Finish machining (multi-groove cutting)
  Cutting inwards from the largest diameter, and the insert is slightly offset towards the central insert when returning the insert.
- Recess turning
  Axial turning depth:≤0.75 xS (insert width)
  If the groove width is greater than the depth, recess turning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

Internal grooving and turning

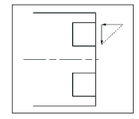
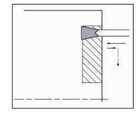
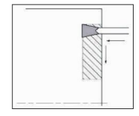
- Please follow the machining sequence as shown.
  In order to facilitate cutting outflow, please always feed outward from the far end face side.



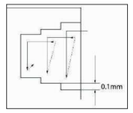
Precautions for external parting, grooving and turning

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

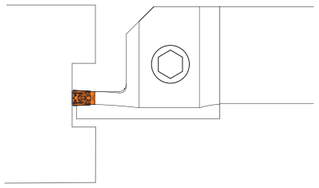
Precautions for face grooving

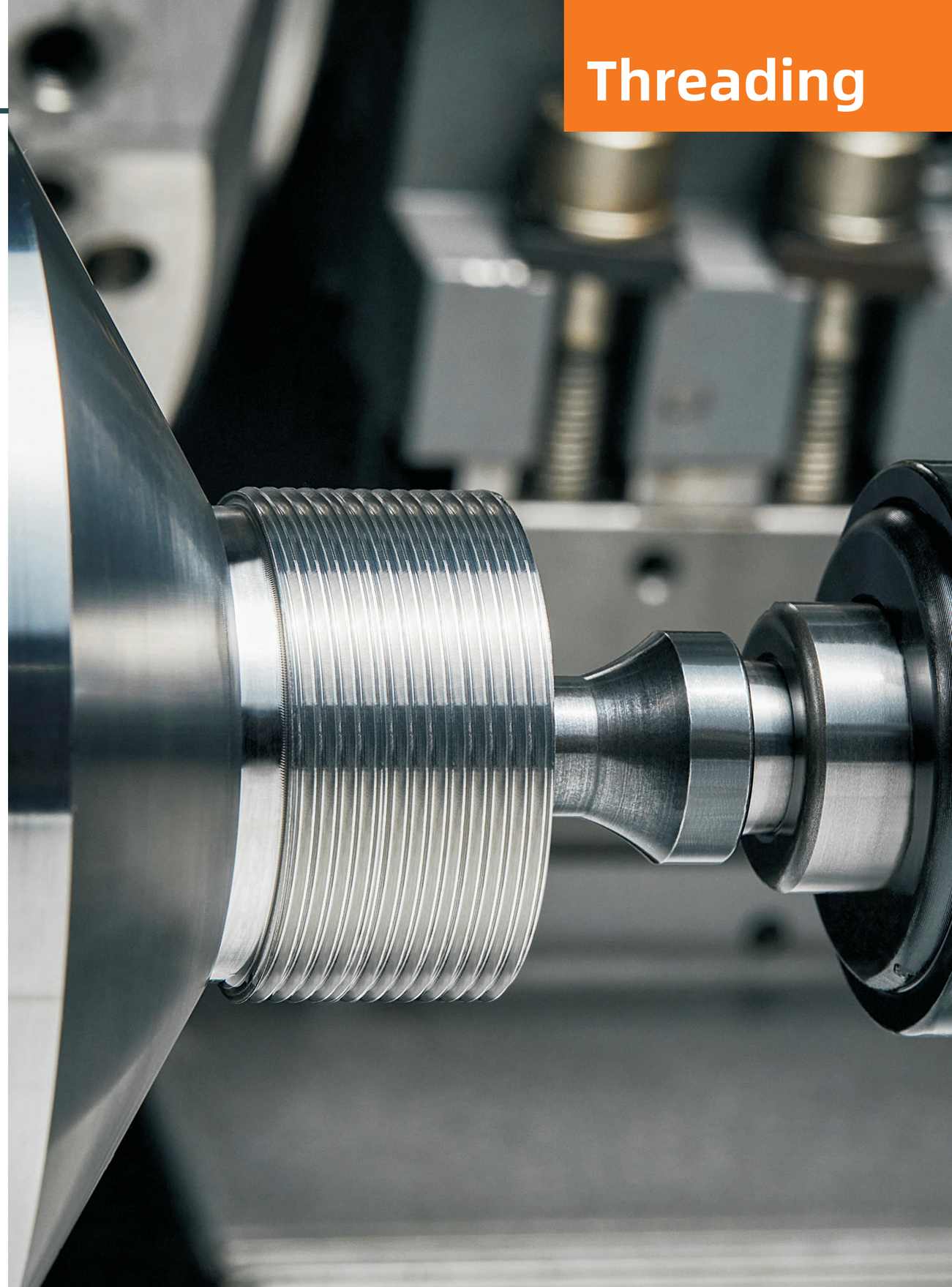
S/N	Machining subjects	Precautions	Diagram
1	Precautions for too holder selection	(1) Choose the model that fits the groove width of the cut material. (2) Check the groove depth. (3) It is recommended to mount the cutter bar facing downwards (reversed).	
		Perform transverse feed machining from the outer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

Precautions for face grooving

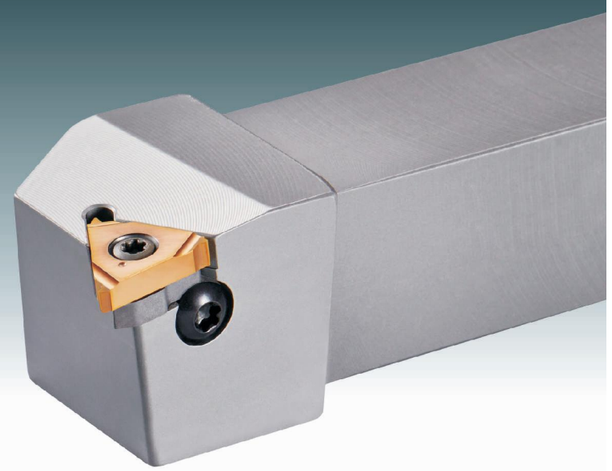
S/N	Machining subjects	Precautions	Diagram
3	End face groove expansion machining	Rough machining: please stagger them into step shape for machining.	
		Finish machining: when the cutting depth is set to 0.5mm or above on one side, the chip disposal performs well.	

FAQs of parting and grooving

Condition	Countermeasures
There is white turbidity at the bottom of the face	(1) Increase the cutting speed only in the finish machining. (2) When method No. 1 does not work, please readjust the parallelism of the insert and the corner. Correction method: Adjust the cutter bar to within ± 5° tolerance of the perpendicularity between the cut-in angle and the material to be cut. 
When grooving, the tool gets entangled with chips.	(1) Install the cutter bar facing downwards (reversed). Please spray the coolant from the rear side of the insert to the corner. (2) When expanding the groove, please process it shallowly and extensively as a whole. (Deep recess machining cannot be done at the same time)
The insert collapses during the transverse feed machining.	Please replace the outside-inside machining by the inside-outside machining.
The recesses cannot be accessed vertically.	Please correct the parallelism of the corner. Reduce the feed rate.



Threading New



Provide a full range of ground threading inserts
Meet the requirements of higher precision



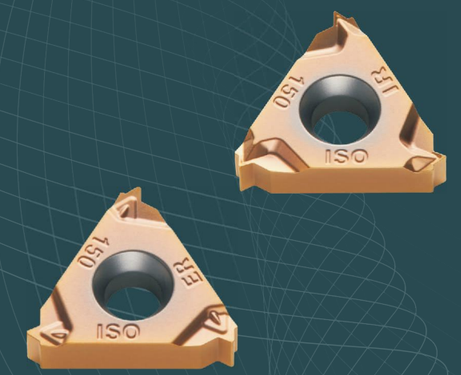
- We offer a complete range of threading products including ISO, universal thread, and Whitworth threads, meeting the machining requirements of various industries
- Equipped with press-formed and ground-formed thread inserts, we can meet the requirements for superior chip control and higher precision machining respectively
- The new grade HR5225 enables high-efficiency, long-life thread machining

A

Turning

Thread turning

- Code key of threading insert A223
- Overview of threading A224
- Threading insert A225
  - Press-formed threading insert A225
  - Ground-formed threading insert A232
- Threading tool A244
- Technical information for threading A246



Code key of threading insert

16	E	R	150	ISO	–	P
①	②	③	④	⑤		⑥

①Insert size(mm)	
Code	Inscribed circle diameter
11	6.35
16	9.525
22	12.7

②Cutting type	
Code	Type
E	External threading insert
I	Internal threading insert

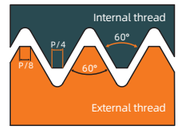
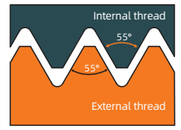
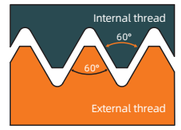
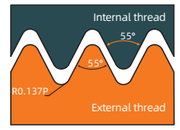
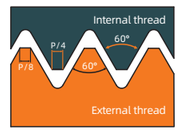
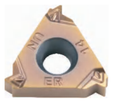
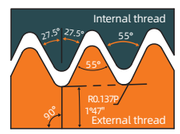
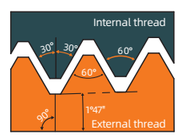
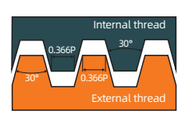
③Cutting direction	
Code	Direction
R	Right
L	Left

④Thread pitch		
Full form (indicated by pitch X 100)		
mm	TPI	
0.35-9.0	72-2	
V-profile (pitch indicated by letters)		
Code	mm	TPI
A	0.5-1.5	48-16
AG	0.5-3.0	48-8
G	1.75-3.0	14-8
N	3.5-5.0	7-5
Q	5.5-6.0	41/2-4

⑤Thread type	
Code	Type
ISO	ISO metric thread
UN	UN thread
W	Whitworth thread
BSPT	BSPT
NPT	NPT
TR	30°standard trapezoidal thread

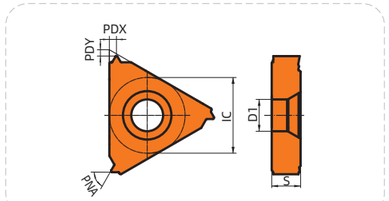
⑥Forming method	
Code	Type
Default	Mold pressing
P	Precision grinding

Overview of thread machining

Industry	Diagram	Thread type	Thread profile	Insert shape	Thread pitch	Number of teeth
General industry		ISO metric thread	ISO Metric 60° thread	 A225、A232	1-6	4-25
General industry		Universal thread	55 ° universal pitch thread	 A227、A235	0.5-5	5-51
			60 ° universal pitch thread			
General industry		Whitworth thread	W	 A228、A237		8-28
Aerospace industry equipemt		UN thread	UN	 A229、A239		5-28
Pipe thread for gas, heating and tap water		BSPT	BSPT	 A230、A240		11-28
For Pipeline connected with gas and tap water faucets		NPT	NPT	 A231、A241		8-27
Transimition & Transportation equipment		30°Standard trapezoidal thread	TR	 A242	1.5-6.0	

ISO metric 60° thread (Mold pressing)

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



Working condition: ● Stable ◕ Average ⌗ Tough

Workpiece material

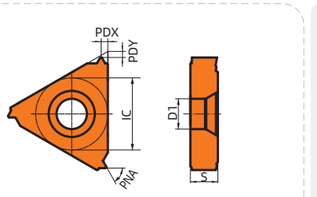
P	Steel
M	Stainless steel
K	Cast iron
N	Non-ferrous metal
S	Heat resistant super alloys Titanium alloy

Operation type	Insert shape	Type	Pitch/ number of teeth	Dimension (mm)						CVD						PVD							Cemented carbide		Cermet	
				IC	PDX	PDY	S	D1	PNA	HR8105	HR8115	HR8125	HR8225	HR8135	HR6215	HR7115	HR7125	HR7225	HR9205	HR9215	HR5125	HR5225	HRK10	HRK20	HRC10	HR115C
External thread		16ER100ISO	1.00	9.525	0.7	0.7	3.52	4.0	60°											☆	★				
		16ER125ISO	1.25	9.525	0.9	0.8	3.52	4.0	60°											☆	★				
		16ER150ISO	1.50	9.525	1.0	0.8	3.52	4.0	60°											☆	★				
		16ER175ISO	1.75	9.525	1.2	0.9	3.52	4.0	60°											☆	★				
		16ER200ISO	2.00	9.525	1.3	1.0	3.52	4.0	60°											☆	★				
		16ER250ISO	2.50	9.525	1.5	1.2	3.52	4.0	60°											☆	★				
		16ER300ISO	3.00	9.525	1.6	1.3	3.52	4.0	60°											☆	★				
		22ER350ISO	3.50	12.700	2.3	1.6	4.65	5.0	60°											☆	★				
		22ER400ISO	4.00	12.700	2.3	1.6	4.65	5.0	60°											☆	★				
		22ER450ISO	4.50	12.700	2.4	1.7	4.65	5.0	60°											☆	★				
		22ER500ISO	5.00	12.700	2.4	1.7	4.65	5.0	60°											☆	★				
		22ER550ISO	5.50	12.700	2.5	1.6	4.65	5.0	60°											☆	★				
		22ER600ISO	6.00	12.700	2.7	1.7	4.65	5.0	60°											☆	★				

★ Recommended grade ☆ Available grade

ISO metric 60° thread (Mold pressing)

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



Working condition: ● Stable ◕ Average ⌗ Tough

Workpiece material

P	Steel
M	Stainless steel
K	Cast iron
N	Non-ferrous metal
S	Heat resistant super alloys Titanium alloy

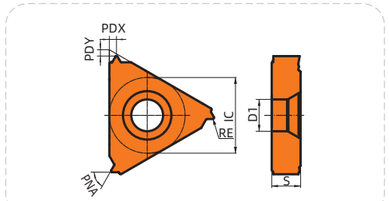
Operation type	Insert shape	Type	Pitch/ number of teeth	Dimension (mm)						CVD						PVD							Cemented carbide		Cermet	
				IC	PDX	PDY	S	D1	PNA	HR8105	HR8115	HR8125	HR8225	HR8135	HR6215	HR7115	HR7125	HR7225	HR9205	HR9215	HR5125	HR5225	HRK10	HRK20	HRC10	HR115C
Internal thread		11IR100ISO	1.00	6.35	0.7	0.7	3.05	3.2	60°											☆	★				
		11IR125ISO	1.25	6.35	0.9	0.8	3.05	3.2	60°											☆	★				
		11IR150ISO	1.50	6.35	1.0	0.8	3.05	3.2	60°											☆	★				
		16IR100ISO	1.00	9.525	0.7	0.7	3.52	4.0	60°											☆	★				
		16IR125ISO	1.25	9.525	0.9	0.8	3.52	4.0	60°											☆	★				
		16IR150ISO	1.50	9.525	1.0	0.8	3.52	4.0	60°											☆	★				
		16IR175ISO	1.75	9.525	1.2	0.9	3.52	4.0	60°											☆	★				
		16IR200ISO	2.00	9.525	1.3	1.0	3.52	4.0	60°											☆	★				
		16IR250ISO	5.50	9.525	1.5	1.1	3.52	4.0	60°											☆	★				
		16IR300ISO	3.00	9.525	1.5	1.1	3.52	4.0	60°											☆	★				
		22IR350ISO	3.50	12.700	2.3	1.6	4.65	5.0	60°											☆	★				
		22IR400ISO	4.00	12.700	2.3	1.6	4.65	5.0	60°											☆	★				
		22IR450ISO	4.50	12.700	2.4	1.6	4.65	5.0	60°											☆	★				
		22IR500ISO	5.00	12.700	2.4	1.6	4.65	5.0	60°											☆	★				
		22IR550ISO	5.50	12.700	2.5	1.6	4.65	5.0	60°											☆	★				
		22IR600ISO	6.00	12.700	2.5	1.8	4.65	5.0	60°											☆	★				

★ Recommended grade ☆ Available grade

Universal thread (Mold pressing)

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

Working condition: ● Stable ◕ Average ⌗ Tough



Workpiece material

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

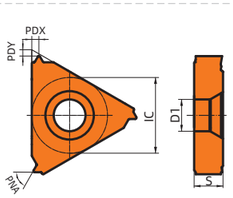
Operation type	Insert shape	Type	Pitch/ number of teeth	Dimension (mm)							CVD						PVD							Cemented carbide		Cermet	
				IC	PDX	PDY	S	RE	D1	PNA	HR8105	HR8115	HR8125	HR8225	HR8135	HR6215	HR7115	HR7125	HR7225	HR9205	HR9215	HR5125	HR5225	HRK10	HRK20	HRC10	HR115C
External thread		16ERA55	0.5-1.5	9.525	0.9	0.8	3.52	0.05	4.0	55°												☆	★				
		16ERG55	1.75-3.0	9.525	1.7	1.2	3.52	0.23	4.0	55°												☆	★				
		16ERAG55	0.5-3.0	9.525	1.7	1.2	3.52	0.06	4.0	55°												☆	★				
		22ERN55	3.5-5.0	12.7	2.5	1.7	4.65	0.51	5.0	55°												☆	★				
		16ERA60	0.5-1.5	9.525	0.9	0.8	3.52	0.06	4.0	60°												☆	★				
		16ERG60	1.75-3.0	9.525	1.7	1.2	3.52	0.18	4.0	60°												☆	★				
		16ERAG60	0.5-3.0	9.525	1.7	1.2	3.52	0.07	4.0	60°												☆	★				
		22ERN60	3.5-5.0	12.7	2.5	1.7	4.65	0.51	5.0	60°												☆	★				

★ Recommended grade ☆ Available grade

Whitworth thread (Mold pressing)

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

Working condition: ● Stable ◕ Average ⌗ Tough



Workpiece material

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

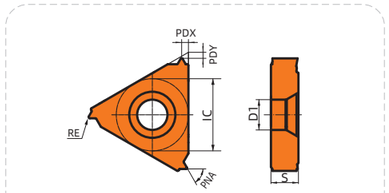
Operation type	Insert shape	Type	Pitch/ number of teeth	Dimension (mm)						CVD						PVD							Cemented carbide		Cermet	
				IC	PDX	PDY	S	D1	PNA	HR8105	HR8115	HR8125	HR8225	HR8135	HR6215	HR7115	HR7125	HR7225	HR9205	HR9215	HR5125	HR5225	HRK10	HRK20	HRC10	HR115C
External thread		16ER8W	8	9.525	1.5	1.2	3.52	4.0	55°												☆	★				
		16ER11W	11	9.525	1.5	1.1	3.52	4.0	55°												☆	★				
		16ER12W	12	9.525	1.4	1.1	3.52	4.0	55°												☆	★				
		16ER14W	14	9.525	1.2	1.0	3.52	4.0	55°												☆	★				
		16ER19W	19	9.525	1.0	0.8	3.52	4.0	55°												☆	★				

★ Recommended grade ☆ Available grade

Universal thread (Mold pressing)

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

Working condition: ● Stable ◕ Average ⌗ Tough



Workpiece material

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

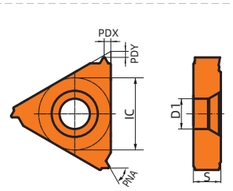
Operation type	Insert shape	Type	Pitch/ number of teeth	Dimension (mm)							CVD						PVD							Cemented carbide		Cermet	
				IC	PDX	PDY	S	RE	D1	PNA	HR8105	HR8115	HR8125	HR8225	HR8135	HR6215	HR7115	HR7125	HR7225	HR9205	HR9215	HR5125	HR5225	HRK10	HRK20	HRC10	HR115C
Internal thread		11IRA55	0.5-1.5	6.350	0.9	0.8	3.05	0.05	3.2	55°												☆	★				
		16IRA55	0.5-1.5	9.525	0.9	0.8	3.52	0.05	4.0	55°												☆	★				
		16IRG55	1.75-3.0	9.525	1.7	1.2	3.52	0.21	4.0	55°												☆	★				
		16IRAG55	0.5-3.0	9.525	1.7	1.2	3.52	0.06	4.0	55°												☆	★				
		22IRN55	3.5-5.0	12.7	2.5	1.7	4.65	0.26	5.0	55°												☆	★				
		11IRA60	0.5-1.5	6.350	0.9	0.8	3.05	0.05	3.2	60°												☆	★				
		16IRA60	0.5-1.5	9.525	0.9	0.8	3.52	0.05	4.0	60°												☆	★				
		16IRG60	1.75-3.0	9.525	1.7	1.2	3.52	0.10	4.0	60°												☆	★				
		16IRAG60	0.5-3.0	9.525	1.7	1.2	3.52	0.08	4.0	60°												☆	★				
		22IRN60	3.5-5.0	12.7	2.5	1.7	4.65	0.26	5.0	60°												☆	★				

★ Recommended grade ☆ Available grade

Whitworth thread (Mold pressing)

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

Working condition: ● Stable ◕ Average ⌗ Tough



Workpiece material

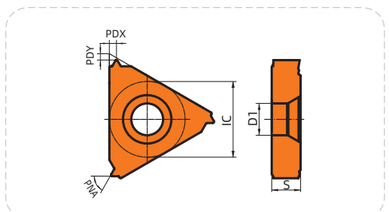
- P Steel ● ● ◕ ◕ ⌗ ◕◕ ◕◕ ◕◕
- M Stainless steel ◕◕ ◕◕ ◕◕ ◕◕
- K Cast iron ◕
- N Non-ferrous metal ● ●
- S Heat resistant super alloys Titanium alloy ● ● ◕

Operation type	Insert shape	Type	Pitch/ number of teeth	Dimension (mm)						CVD						PVD							Cemented carbide		Cermet	
				IC	PDX	PDY	S	D1	PNA	HR8105	HR8115	HR8125	HR8225	HR8135	HR6215	HR7115	HR7125	HR7225	HR9205	HR9215	HR5125	HR5225	HRK10	HRK20	HRC10	HR115C
Internal thread		16IR8W	8	9.525	1.5	1.2	3.52	4.0	55°												☆	★				
		16IR11W	11	9.525	1.5	1.1	3.52	4.0	55°												☆	★				
		16IR12W	12	9.525	1.4	1.1	3.52	4.0	55°												☆	★				
		16IR14W	14	9.525	1.2	1.0	3.52	4.0	55°												☆	★				
		16IR19W	19	9.525	1.0	0.8	3.52	4.0	55°												☆	★				

★ Recommended grade ☆ Available grade

UN thread (Mold pressing)

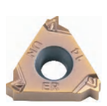
Standard: ANSI B1.1:74
Tolerance class: 2A/2B



Workpiece material

Working condition: ● Stable ◕ Average ⌗ Tough

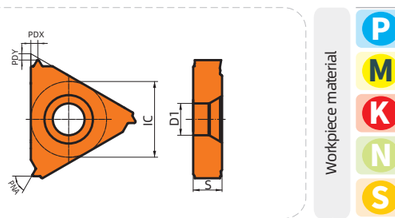
		Stable	Average	Tough
P	Steel	● ●	◕ ◕	⌗ ⌗
M	Stainless steel		◕ ◕	◕ ◕
K	Cast iron		◕	
N	Non-ferrous metal			● ●
S	Heat resistant super alloys Titanium alloy		●	◕ ◕

Operation type	Insert shape	Type	Pitch/ number of teeth	Dimension (mm)						CVD						PVD						Cemented carbide		Cermet	
				IC	PDX	PDY	S	D1	PNA	HR8105	HR8115	HR8125	HR8225	HR8135	HR6215	HR7115	HR7125	HR7225	HR9205	HR9215	HR5125	HR5225	HRK10	HRK20	HRC10	HR115C
External thread		16ER8UN	8	9.525	1.7	1.2	3.52	4.0	60°										☆	★					
		16ER12UN	12	9.525	1.4	1.1	3.52	4.0	60°										☆	★					
		16ER14UN	14	9.525	1.2	1.0	3.52	4.0	60°										☆	★					
		16ER16UN	16	9.525	1.1	0.9	3.52	4.0	60°										☆	★					
		16ER18UN	18	9.525	1.1	0.8	3.52	4.0	60°										☆	★					
		16ER20UN	20	9.525	1.1	0.8	3.52	4.0	60°										☆	★					

★ Recommended grade ☆ Available grade

BSPT (Mold pressing)

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



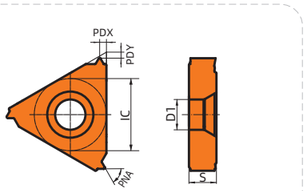
Workpiece material

Working condition: ● Stable ◕ Average ⌗ Tough

		Stable	Average	Tough
P	Steel	● ●	◕ ◕	⌗ ⌗
M	Stainless steel		◕ ◕	◕ ◕
K	Cast iron		◕	
N	Non-ferrous metal			● ●
S	Heat resistant super alloys Titanium alloy		●	◕ ◕

Operation type	Insert shape	Type	Pitch/ number of teeth	Dimension (mm)						CVD						PVD						Cemented carbide		Cermet	
				IC	PDX	PDY	S	D1	PNA	HR8105	HR8115	HR8125	HR8225	HR8135	HR6215	HR7115	HR7125	HR7225	HR9205	HR9215	HR5125	HR5225	HRK10	HRK20	HRC10	HR115C
External thread		16ER11BSPT	11	9.525	1.5	1.1	3.52	4.0	55°											☆	★				
		16ER14BSPT	14	9.525	1.2	1.0	3.52	4.0	55°											☆	★				
		16ER19BSPT	19	9.525	0.9	0.8	3.52	4.0	55°											☆	★				

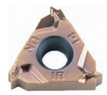
★ Recommended grade ☆ Available grade



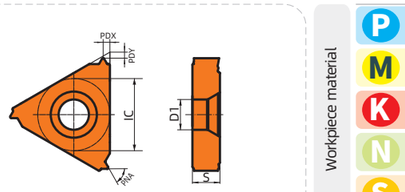
Workpiece material

Working condition: ● Stable ◕ Average ⌗ Tough

		Stable	Average	Tough
P	Steel	● ●	◕ ◕	⌗ ⌗
M	Stainless steel		◕ ◕	◕ ◕
K	Cast iron		◕	
N	Non-ferrous metal			● ●
S	Heat resistant super alloys Titanium alloy		●	◕ ◕

Operation type	Insert shape	Type	Pitch/ number of teeth	Dimension (mm)						CVD						PVD						Cemented carbide		Cermet	
				IC	PDX	PDY	S	D1	PNA	HR8105	HR8115	HR8125	HR8225	HR8135	HR6215	HR7115	HR7125	HR7225	HR9205	HR9215	HR5125	HR5225	HRK10	HRK20	HRC10	HR115C
Internal thread		16IR8UN	8	9.525	1.7	1.2	3.52	4.0	60°										☆	★					
		16IR12UN	12	9.525	1.4	1.1	3.52	4.0	60°										☆	★					
		16IR14UN	14	9.525	1.2	1.0	3.52	4.0	60°										☆	★					
		16IR16UN	16	9.525	1.1	0.9	3.52	4.0	60°										☆	★					
		16IR18UN	18	9.525	1.1	0.8	3.52	4.0	60°										☆	★					
		16IR20UN	20	9.525	1.1	0.8	3.52	4.0	60°										☆	★					

★ Recommended grade ☆ Available grade



Workpiece material

Working condition: ● Stable ◕ Average ⌗ Tough

		Stable	Average	Tough
P	Steel	● ●	◕ ◕	⌗ ⌗
M	Stainless steel		◕ ◕	◕ ◕
K	Cast iron		◕	
N	Non-ferrous metal			● ●
S	Heat resistant super alloys Titanium alloy		●	◕ ◕

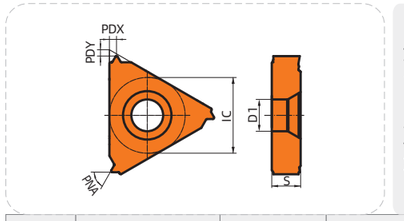
Operation type	Insert shape	Type	Pitch/ number of teeth	Dimension (mm)						CVD						PVD						Cemented carbide		Cermet	
				IC	PDX	PDY	S	D1	PNA	HR8105	HR8115	HR8125	HR8225	HR8135	HR6215	HR7115	HR7125	HR7225	HR9205	HR9215	HR5125	HR5225	HRK10	HRK20	HRC10	HR115C
Internal thread		16IR11BSPT	11	9.525	1.5	1.1	3.52	4.0	55°											☆	★				
		16IR14BSPT	14	9.525	1.2	1.0	3.52	4.0	55°											☆	★				
		16IR19BSPT	19	9.525	0.9	0.8	3.52	4.0	55°											☆	★				

★ Recommended grade ☆ Available grade

HUAREAL

NPT (Mold pressing)

Standard: USAS B2.1:1968
Tolerance class: NPT



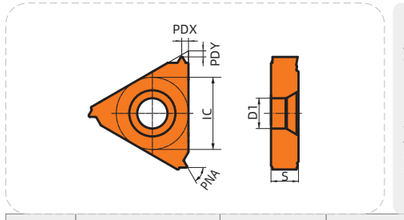
Working condition: ● Stable ◔ Average ⌗ Tough

Workpiece material

P	Steel
M	Stainless steel
K	Cast iron
N	Non-ferrous metal
S	Heat resistant super alloys Titanium alloy

Operation type	Insert shape	Type	Pitch/ number of teeth	Dimension (mm)						CVD						PVD						Cemented carbide		Cermet	
				IC	PDX	PDY	S	D1	PNA	HR8105	HR8115	HR8125	HR8225	HR8135	HR6215	HR7115	HR7125	HR7225	HR9205	HR9215	HR5125	HR5225	HRK10	HRK20	HRC10	HR115C
External thread		16ER115NPT	11.5	9.525	1.5	1.1	3.52	4.0	60°											☆	★				
		16ER14NPT	14.0	9.525	1.2	0.9	3.52	4.0	60°											☆	★				
		16ER18NPT	18.0	9.525	1.0	0.8	3.52	4.0	60°											☆	★				

★ Recommended grade ☆ Available grade



Working condition: ● Stable ◔ Average ⌗ Tough

Workpiece material

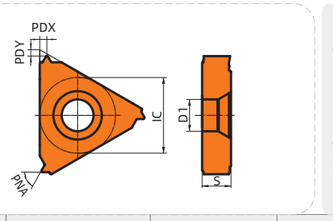
P	Steel
M	Stainless steel
K	Cast iron
N	Non-ferrous metal
S	Heat resistant super alloys Titanium alloy

Operation type	Insert shape	Type	Pitch/ number of teeth	Dimension (mm)						CVD						PVD						Cemented carbide		Cermet	
				IC	PDX	PDY	S	D1	PNA	HR8105	HR8115	HR8125	HR8225	HR8135	HR6215	HR7115	HR7125	HR7225	HR9205	HR9215	HR5125	HR5225	HRK10	HRK20	HRC10	HR115C
Internal thread		16IR115NPT	11.5	9.525	1.5	1.1	3.52	4.0	60°											☆	★				
		16IR14NPT	14.0	9.525	1.2	0.9	3.52	4.0	60°											☆	★				
		16IR18NPT	18.0	9.525	1.0	0.8	3.52	4.0	60°											☆	★				

★ Recommended grade ☆ Available grade

ISO metric 60° thread (Precision grinding)

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



Working condition: ● Stable ◔ Average ⌗ Tough

Workpiece material

P	Steel
M	Stainless steel
K	Cast iron
N	Non-ferrous metal
S	Heat resistant super alloys Titanium alloy

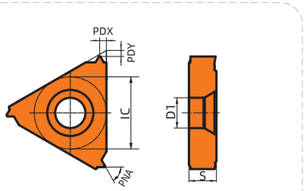
Operation type	Insert shape	Type	Pitch/ number of teeth	Dimension (mm)						CVD						PVD						Cemented carbide		Cermet	
				IC	PDX	PDY	S	D1	PNA	HR8105	HR8115	HR8125	HR8225	HR8135	HR6215	HR7115	HR7125	HR7225	HR9205	HR9215	HR5125	HR5225	HRK10	HRK20	HRC10	HR115C
External thread		16ER100ISO-P	1.00	9.525	0.7	0.7	3.52	4.0	60°											☆	★				
		16EL100ISO-P	1.00	9.525	0.7	0.7	3.52	4.0	60°											☆	★				
		16ER125ISO-P	1.25	9.525	0.9	0.8	3.52	4.0	60°											☆	★				
		16EL125ISO-P	1.25	9.525	0.9	0.8	3.52	4.0	60°											☆	★				
		16ER150ISO-P	1.50	9.525	1.0	0.8	3.52	4.0	60°											☆	★				
		16EL150ISO-P	1.50	9.525	1.0	0.8	3.52	4.0	60°											☆	★				
		16ER175ISO-P	1.75	9.525	1.2	0.9	3.52	4.0	60°											☆	★				
		16EL175ISO-P	1.75	9.525	1.2	0.9	3.52	4.0	60°											☆	★				
		16ER200ISO-P	2.00	9.525	1.3	1.0	3.52	4.0	60°											☆	★				
		16EL200ISO-P	2.00	9.525	1.3	1.0	3.52	4.0	60°											☆	★				
		16ER250ISO-P	2.50	9.525	1.5	1.2	3.52	4.0	60°											☆	★				
		16EL250ISO-P	2.50	9.525	1.5	1.2	3.52	4.0	60°											☆	★				
		16ER300ISO-P	3.00	9.525	1.6	1.3	3.52	4.0	60°											☆	★				
		16EL300ISO-P	3.00	9.525	1.6	1.3	3.52	4.0	60°											☆	★				
		22ER350ISO-P	3.50	12.7	2.3	1.6	4.65	5.0	60°											☆	★				
		22EL350ISO-P	3.50	12.7	2.3	1.6	4.65	5.0	60°											☆	★				
		22ER400ISO-P	4.00	12.7	2.3	1.6	4.65	5.0	60°											☆	★				
		22EL400ISO-P	4.00	12.7	2.3	1.6	4.65	5.0	60°											☆	★				
		22ER450ISO-P	4.50	12.7	2.4	1.7	4.65	5.0	60°											☆	★				
		22EL450ISO-P	4.50	12.7	2.4	1.7	4.65	5.0	60°											☆	★				
		22ER500ISO-P	5.00	12.7	2.4	1.7	4.65	5.0	60°											☆	★				
		22EL500ISO-P	5.00	12.7	2.4	1.7	4.65	5.0	60°											☆	★				
		22ER550ISO-P	5.50	12.7	2.6	1.7	4.65	5.0	60°											☆	★				
		22EL550ISO-P	5.50	12.7	2.6	1.7	4.65	5.0	60°											☆	★				
		22ER600ISO-P	6.00	12.7	2.7	1.7	4.65	5.0	60°											☆	★				
		22EL600ISO-P	6.00	12.7	2.7	1.7	4.65	5.0	60°											☆	★				

★ Recommended grade ☆ Available grade

ISO metric 60° thread (Precision grinding)

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

Working condition: ● Stable ◕ Average ⌗ Tough



Workpiece material

- P Steel
- M Stainless steel
- K Cast iron
- N Non-ferrous metal
- S Heat resistant super alloys Titanium alloy

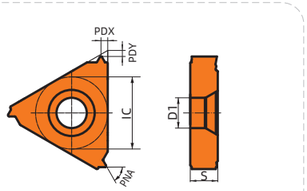
Operation type	Insert shape	Type	Pitch/ number of teeth	Dimension (mm)						CVD						PVD							Cemented carbide		Cermet	
				IC	PDX	PDY	S	D1	PNA	HR8105	HR8115	HR8125	HR8225	HR8135	HR6215	HR7115	HR7125	HR7225	HR9205	HR9215	HR5125	HR5225	HRK10	HRK20	HRC10	HR115C
Internal thread		06IR050ISO-P	0.5	3.97	0.9	0.5	1.91	2.3	60°											☆	☆				
		06IL050ISO-P	0.5	3.97	0.9	0.5	1.91	2.3	60°											☆	☆				
		06IR075ISO-P	0.75	3.97	0.8	0.5	1.91	2.3	60°											☆	☆				
		06IL075ISO-P	0.75	3.97	0.8	0.5	1.91	2.3	60°											☆	☆				
		06IR100ISO-P	1	3.97	0.7	0.6	1.91	2.3	60°											☆	☆				
		06IL100ISO-P	1	3.97	0.7	0.6	1.91	2.3	60°											☆	☆				
		06IR150ISO-P	1.25	3.97	0.6	0.6	1.91	2.3	60°											☆	☆				
		06IL150ISO-P	1.25	3.97	0.6	0.6	1.91	2.3	60°											☆	☆				
		08IR075ISO-P	0.75	4.76	0.6	0.5	2.38	2.3	60°											☆	☆				
		08IL075ISO-P	0.75	4.76	0.6	0.5	2.38	2.3	60°											☆	☆				
		08IR100ISO-P	1	4.76	0.6	0.6	2.38	2.3	60°											☆	☆				
		08IL100ISO-P	1	4.76	0.6	0.6	2.38	2.3	60°											☆	☆				
		08IR120ISO-P	1.25	4.76	0.6	0.7	2.38	2.3	60°											☆	☆				
		08IL120ISO-P	1.2	4.76	0.6	0.7	2.38	2.3	60°											☆	☆				
		08IR150ISO-P	1.5	4.76	0.6	0.7	2.38	2.3	60°											☆	☆				
		08IL150ISO-P	1.5	4.76	0.6	0.7	2.38	2.3	60°											☆	☆				
		08IR175ISO-P	1.75	4.76	0.6	0.8	2.38	2.3	60°											☆	☆				
		08IL175ISO-P	1.75	4.76	0.6	0.8	2.38	2.3	60°											☆	☆				
		11IR100ISO-P	1	6.35	0.7	0.7	3.05	3.2	60°											☆	☆				
		11IL100ISO-P	1	6.35	0.7	0.7	3.05	3.2	60°											☆	☆				
		11IR125ISO-P	1.25	6.35	0.9	0.9	3.05	3.2	60°											☆	☆				
		11IL125ISO-P	1.25	6.35	0.9	0.9	3.05	3.2	60°											☆	☆				
		11IR150ISO-P	1.5	6.35	1	1	3.05	3.2	60°											☆	☆				
		11IL150ISO-P	1.5	6.35	1	1	3.05	3.2	60°											☆	☆				
		11IR175ISO-P	1.75	6.35	1.2	1.2	3.05	3.2	60°											☆	☆				
		11IL175ISO-P	1.75	6.35	1.2	1.2	3.05	3.2	60°											☆	☆				
		11IR200ISO-P	2	6.35	1.3	1.3	3.05	3.2	60°											☆	☆				
		11IL200ISO-P	2	6.35	1.3	1.3	3.05	3.2	60°											☆	☆				
		11IR250ISO-P	2.5	6.35	1.5	1.5	3.05	3.2	60°											☆	☆				
		11IL250ISO-P	2.5	6.35	1.5	1.5	3.05	3.2	60°											☆	☆				

★ Recommended grade ☆ Available grade

ISO metric 60° thread (Precision grinding)

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

Working condition: ● Stable ◕ Average ⌗ Tough



Workpiece material

- P Steel
- M Stainless steel
- K Cast iron
- N Non-ferrous metal
- S Heat resistant super alloys Titanium alloy

Operation type	Insert shape	Type	Pitch/ number of teeth	Dimension (mm)						CVD						PVD							Cemented carbide		Cermet	
				IC	PDX	PDY	S	D1	PNA	HR8105	HR8115	HR8125	HR8225	HR8135	HR6215	HR7115	HR7125	HR7225	HR9205	HR9215	HR5125	HR5225	HRK10	HRK20	HRC10	HR115C
Internal thread		16IR100ISO-P	1	9.525	0.7	0.7	3.52	4	60°											☆	☆				
		16IL100ISO-P	1	9.525	0.7	0.7	3.52	4	60°											☆	☆				
		16IR125ISO-P	1.25	9.525	0.9	0.9	3.52	4	60°											☆	☆				
		16IL125ISO-P	1.25	9.525	0.9	0.9	3.52	4	60°											☆	☆				
		16IR150ISO-P	1.5	9.525	1	1	3.52	4	60°											☆	☆				
		16IL150ISO-P	1.5	9.525	1	1	3.52	4	60°											☆	☆				
		16IR175ISO-P	1.75	9.525	1.2	1.2	3.52	4	60°											☆	☆				
		16IL175ISO-P	1.75	9.525	1.2	1.2	3.52	4	60°											☆	☆				
		16IR200ISO-P	2	9.525	1.3	1.3	3.52	4	60°											☆	☆				
		16IL200ISO-P	2	9.525	1.3	1.3	3.52	4	60°											☆	☆				
		16IR250ISO-P	2.5	9.525	1.5	1.5	3.52	4	60°											☆	☆				
		16IL250ISO-P	2.5	9.525	1.5	1.5	3.52	4	60°											☆	☆				
		16IR300ISO-P	3	9.525	1.5	1.5	3.52	4	60°											☆	☆				
		16IL300ISO-P	3	9.525	1.5	1.5	3.52	4	60°											☆	☆				
		22IR350ISO-P	3.5	12.7	2.3	1.6	4.65	5	60°											☆	☆				
		22IL350ISO-P	3.5	12.7	2.3	1.6	4.65	5	60°											☆	☆				
		22IR400ISO-P	4	12.7	2.3	1.6	4.65	5	60°											☆	☆				
		22IL400ISO-P	4	12.7	2.3	1.6	4.65	5	60°											☆	☆				
		22IR450ISO-P	4.5	12.7	2.4	1.6	4.65	5	60°											☆	☆				
		22IL450ISO-P	4.5	12.7	2.4	1.6	4.65	5	60°											☆	☆				
		22IR500ISO-P	5	12.7	2.4	1.6	4.65	5	60°											☆	☆				
		22IL500ISO-P	5	12.7	2.4	1.6	4.65	5	60°											☆	☆				
		22IR550ISO-P	5.5	12.7	2.5	1.7	4.65	5	60°											☆	☆				
		22IL550ISO-P	5.5	12.7	2.5	1.7	4.65	5	60°											☆	☆				
		22IR600ISO-P	6	12.7	2.5	1.8	4.65	5	60°											☆	☆				
		22IL600ISO-P	6	12.7	2.5	1.8	4.65	5	60°											☆	☆				

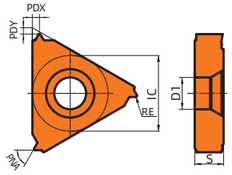
★ Recommended grade ☆ Available grade

HUAREAL

Universal thread (Precision grinding)

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

Working condition: ● Stable ◕ Average ⌗ Tough



Workpiece material

- P Steel
- M Stainless steel
- K Cast iron
- N Non-ferrous metal
- S Heat resistant super alloys Titanium alloy

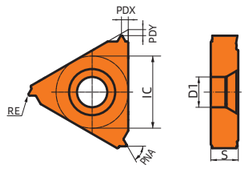
Operation type	Insert shape	Type	Pitch/ number of teeth	Dimension (mm)							CVD						PVD						Cemented carbide		Cermet	
				IC	PDX	PDY	S	RE	D1	PNA	HR8105	HR8115	HR8125	HR8225	HR8135	HR6215	HR7115	HR7125	HR7225	HR9205	HR9215	HR5125	HR5225	HRK10	HRK20	HRC10	HR115C
External thread		16ERA55-P	0.5-1.5	9.525	0.9	0.8	3.52	0.05	4.0	55°												☆	☆				
		16ELA55-P	0.5-1.5	9.525	0.9	0.8	3.52	0.05	4.0	55°												☆	☆				
		16ERG55-P	1.75-3.0	9.525	1.7	1.2	3.52	0.23	4.0	55°												☆	☆				
		16ELG55-P	1.75-3.0	9.525	1.7	1.2	3.52	0.23	4.0	55°												☆	☆				
		16ERAG55-P	0.5-3.0	9.525	1.7	1.2	3.52	0.06	4.0	55°												☆	☆				
		22ERN55-P	3.5-5.0	12.7	2.5	1.7	3.52	0.44	4.0	55°												☆	☆				
		22ELN55-P	3.5-5.0	12.7	2.5	1.7	3.52	0.44	4.0	55°												☆	☆				
		16ERA60-P	0.5-1.5	9.525	0.9	0.8	3.52	0.06	4.0	60°												☆	☆				
		16ELA60-P	0.5-1.5	9.525	0.9	0.8	3.52	0.06	4.0	60°												☆	☆				
		16ERG60-P	1.75-3.0	9.525	1.7	1.2	3.52	0.18	4.0	60°												☆	☆				
		16ELG60-P	1.75-3.0	9.525	1.7	1.2	3.52	0.18	4.0	60°												☆	☆				
		16ERAG60-P	0.5-3.0	9.525	1.7	1.2	3.52	0.07	4.0	60°												☆	☆				
		16ELAG60-P	0.5-3.0	9.525	1.7	1.2	3.52	0.07	4.0	60°												☆	☆				
		22ERN60-P	3.5-5.0	12.7	2.5	1.7	3.52	0.51	4.0	60°												☆	☆				
		22ELN60-P	3.5-5.0	12.7	2.5	1.7	3.52	0.51	4.0	60°												☆	☆				

★ Recommended grade ☆ Available grade

Universal thread (Precision grinding)

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

Working condition: ● Stable ◕ Average ⌗ Tough



Workpiece material

- P Steel
- M Stainless steel
- K Cast iron
- N Non-ferrous metal
- S Heat resistant super alloys Titanium alloy

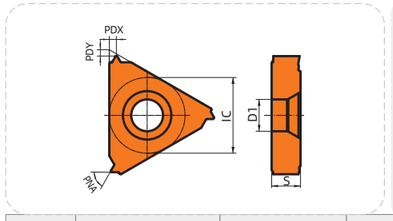
Operation type	Insert shape	Type	Pitch/ number of teeth	Dimension (mm)							CVD						PVD						Cemented carbide		Cermet	
				IC	PDX	PDY	S	RE	D1	PNA	HR8105	HR8115	HR8125	HR8225	HR8135	HR6215	HR7115	HR7125	HR7225	HR9205	HR9215	HR5125	HR5225	HRK10	HRK20	HRC10	HR115C
Internal thread		16IRA55-P	0.5-1.5	9.525	0.9	0.8	3.52	0.05	4.0	55°												☆	☆				
		16ILA55-P	0.5-1.5	9.525	0.9	0.8	3.52	0.05	4.0	55°												☆	☆				
		16IRG55-P	1.75-3.0	9.525	1.7	1.2	3.52	0.21	4.0	55°												☆	☆				
		16ILG55-P	1.75-3.0	9.525	1.7	1.2	3.52	0.21	4.0	55°												☆	☆				
		16IRAG55-P	0.5-3.0	9.525	1.7	1.2	3.52	0.06	4.0	55°												☆	☆				
		22IRN55-P	3.5-5.0	12.7	2.5	1.7	3.52	0.43	4.0	55°												☆	☆				
		22ILN55-P	3.5-5.0	12.7	2.5	1.7	3.52	0.43	4.0	55°												☆	☆				
		16IRA60-P	0.5-1.5	9.525	0.9	0.8	3.52	0.05	4.0	60°												☆	☆				
		16ILA60-P	0.5-1.5	9.525	0.9	0.8	3.52	0.05	4.0	60°												☆	☆				
		16IRG60-P	1.75-3.0	9.525	1.7	1.2	3.52	0.10	4.0	60°												☆	☆				
		16ILG60-P	1.75-3.0	9.525	1.7	1.2	3.52	0.10	4.0	60°												☆	☆				
		16IRAG60-P	0.5-3.0	9.525	1.7	1.2	3.52	0.08	4.0	60°												☆	☆				
		16ILAG60-P	0.5-3.0	9.525	1.7	1.2	3.52	0.08	4.0	60°												☆	☆				
		22IRN60-P	3.5-5.0	12.7	2.5	1.7	3.52	0.26	4.0	60°												☆	☆				
		22ILN60-P	3.5-5.0	12.7	2.5	1.7	3.52	0.26	4.0	60°												☆	☆				

★ Recommended grade ☆ Available grade

HUAREAL

Whitworth thread (Precision grinding)

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



Working condition: ● Stable ◕ Average ⌗ Tough

Workpiece material

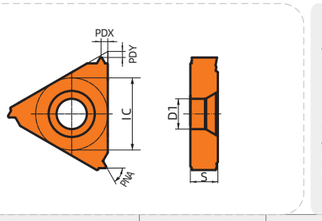
P	Steel
M	Stainless steel
K	Cast iron
N	Non-ferrous metal
S	Heat resistant super alloys Titanium alloy

Operation type	Insert shape	Type	Pitch/ number of teeth	Dimension (mm)						CVD						PVD							Cemented carbide		Cermet	
				IC	PDX	PDY	S	D1	PNA	HR8105	HR8115	HR8125	HR8225	HR8135	HR6215	HR7115	HR7125	HR7225	HR9205	HR9215	HR5125	HR5225	HRK10	HRK20	HRC10	HR115C
External thread		16ER8W-P	8	9.525	1.7	1.2	3.52	4.0	55°											☆	☆				
		16ER9W-P	9	9.525	1.7	1.2	3.52	4.0	55°											☆	☆				
		16ER10W-P	10	9.525	1.5	1.1	3.52	4.0	55°											☆	☆				
		16ER11W-P	11	9.525	1.5	1.1	3.52	4.0	55°											☆	☆				
		16ER12W-P	12	9.525	1.4	1.1	3.52	4.0	55°											☆	☆				
		16ER14W-P	14	9.525	1.2	1.0	3.52	4.0	55°											☆	☆				
		16ER16W-P	16	9.525	1.1	0.9	3.52	4.0	55°											☆	☆				
		16ER18W-P	18	9.525	1.0	0.8	3.52	4.0	55°											☆	☆				
		16ER19W-P	19	9.525	1.0	0.8	3.52	4.0	55°											☆	☆				
		16ER20W-P	20	9.525	0.9	0.8	3.52	4.0	55°											☆	☆				
		16ER26W-P	26	9.525	0.8	0.7	3.52	4.0	55°											☆	☆				
		16ER28W-P	28	9.525	0.7	0.6	3.52	4.0	55°											☆	☆				

★ Recommended grade ☆ Available grade

Whitworth thread (Precision grinding)

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



Working condition: ● Stable ◕ Average ⌗ Tough

Workpiece material

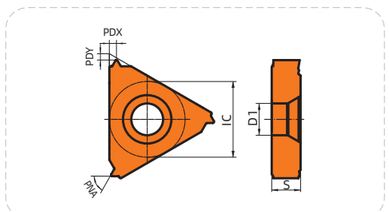
P	Steel
M	Stainless steel
K	Cast iron
N	Non-ferrous metal
S	Heat resistant super alloys Titanium alloy

Operation type	Insert shape	Type	Pitch/ number of teeth	Dimension (mm)						CVD						PVD							Cemented carbide		Cermet	
				IC	PDX	PDY	S	D1	PNA	HR8105	HR8115	HR8125	HR8225	HR8135	HR6215	HR7115	HR7125	HR7225	HR9205	HR9215	HR5125	HR5225	HRK10	HRK20	HRC10	HR115C
Internal thread		11IR14W-P	14	6.35	1.0	0.8	3.05	3.2	55°											☆	☆				
		11IR19W-P	19	6.35	1.2	1.0	3.05	3.2	55°											☆	☆				
		16IR8W-P	8	9.525	1.7	1.2	3.52	4.0	55°											☆	☆				
		16IR9W-P	9	9.525	1.7	1.2	3.52	4.0	55°											☆	☆				
		16IR10W-P	10	9.525	1.5	1.1	3.52	4.0	55°											☆	☆				
		16IR11W-P	11	9.525	1.5	1.1	3.52	4.0	55°											☆	☆				
		16IR12W-P	12	9.525	1.4	1.1	3.52	4.0	55°											☆	☆				
		16IR14W-P	14	9.525	1.2	1.0	3.52	4.0	55°											☆	☆				
		16IR16W-P	16	9.525	1.1	0.9	3.52	4.0	55°											☆	☆				
		16IR18W-P	18	9.525	1.0	0.8	3.52	4.0	55°											☆	☆				
		16IR19W-P	19	9.525	1.0	0.8	3.52	4.0	55°											☆	☆				
		16IR20W-P	20	9.525	0.9	0.8	3.52	4.0	55°											☆	☆				
		16IR26W-P	26	9.525	0.8	0.7	3.52	4.0	55°											☆	☆				
		16IR28W-P	28	9.525	0.7	0.6	3.52	4.0	55°											☆	☆				

★ Recommended grade ☆ Available grade

UN thread (Precision grinding)

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



Workpiece material

Working condition: ● Stable ◕ Average ⌗ Tough

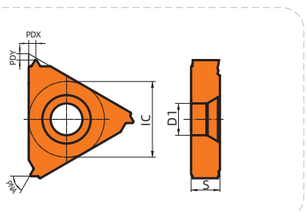
		Working condition
P	Steel	● ● ◕ ◕ ⌗ ◕ ◕ ◕ ◕
M	Stainless steel	◕ ◕ ◕ ◕ ◕ ◕
K	Cast iron	◕
N	Non-ferrous metal	● ●
S	Heat resistant super alloys Titanium alloy	● ◕ ◕ ◕

Operation type	Insert shape	Type	Pitch/ number of teeth	Dimension (mm) IC	PDX	PDY	S	D1	PNA	CVD HR8105	HR8115	HR8125	HR8225	HR8135	HR6215	PVD HR7115	HR7125	HR7225	HR9205	HR9215	HR5125	HR5225	Cemented carbide HRK10	HRK20	Cermet HRC10	HR115C
External thread		16ER8UN-P	8	9.525	1.7	1.2	3.52	4.0	60°												☆	☆				
		16ER12UN-P	12	9.525	1.4	1.1	3.52	4.0	60°												☆	☆				
		16ER14UN-P	14	9.525	1.2	1.0	3.52	4.0	60°												☆	☆				
		16ER16UN-P	16	9.525	1.1	0.9	3.52	4.0	60°												☆	☆				
		16ER18UN-P	18	9.525	1.1	0.8	3.52	4.0	60°												☆	☆				
		16ER20UN-P	20	9.525	1.1	0.8	3.52	4.0	60°												☆	☆				

★ Recommended grade ☆ Available grade

BSPT (Precision grinding)

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



Workpiece material

Working condition: ● Stable ◕ Average ⌗ Tough

		Working condition
P	Steel	● ● ◕ ◕ ⌗ ◕ ◕ ◕ ◕
M	Stainless steel	◕ ◕ ◕ ◕ ◕ ◕
K	Cast iron	◕
N	Non-ferrous metal	● ●
S	Heat resistant super alloys Titanium alloy	● ◕ ◕ ◕

Operation type	Insert shape	Type	Pitch/ number of teeth	Dimension (mm) IC	PDX	PDY	S	D1	PNA	CVD HR8105	HR8115	HR8125	HR8225	HR8135	HR6215	PVD HR7115	HR7125	HR7225	HR9205	HR9215	HR5125	HR5225	Cemented carbide HRK10	HRK20	Cermet HRC10	HR115C
External thread		16ER11BSPT-P	11	9.525	1.5	1.1	3.52	4.0	55°												☆	☆				
		16ER14BSPT-P	14	9.525	1.2	1.0	3.52	4.0	55°												☆	☆				
		16ER19BSPT-P	19	9.525	0.9	0.8	3.52	4.0	55°												☆	☆				
		16ER28BSPT-P	28	9.525	0.6	0.6	3.52	4.0	55°												☆	☆				

★ Recommended grade ☆ Available grade

Working condition: ● Stable ◕ Average ⌗ Tough

		Working condition
P	Steel	● ● ◕ ◕ ⌗ ◕ ◕ ◕ ◕
M	Stainless steel	◕ ◕ ◕ ◕ ◕ ◕
K	Cast iron	◕
N	Non-ferrous metal	● ●
S	Heat resistant super alloys Titanium alloy	● ◕ ◕ ◕

Operation type	Insert shape	Type	Pitch/ number of teeth	Dimension (mm) IC	PDX	PDY	S	D1	PNA	CVD HR8105	HR8115	HR8125	HR8225	HR8135	HR6215	PVD HR7115	HR7125	HR7225	HR9205	HR9215	HR5125	HR5225	Cemented carbide HRK10	HRK20	Cermet HRC10	HR115C
Internal thread		11IR14UN-P	14	6.35	1	0.8	3.05	3.2	60°												☆	☆				
		11IR18UN-P	18	6.35	1	0.8	3.05	3.2	60°												☆	☆				
		11IR20UN-P	20	6.35	1	0.8	3.05	3.2	60°												☆	☆				
		16IR8UN-P	8	9.525	1.7	1.2	3.52	4.0	60°												☆	☆				
		16IR12UN-P	12	9.525	1.4	1.1	3.52	4.0	60°												☆	☆				
		16IR14UN-P	14	9.525	1.2	1.0	3.52	4.0	60°												☆	☆				
		16IR16UN-P	16	9.525	1.1	0.9	3.52	4.0	60°												☆	☆				
		16IR18UN-P	18	9.525	1.1	0.8	3.52	4.0	60°												☆	☆				
		16IR20UN-P	20	9.525	1.1	0.8	3.52	4.0	60°												☆	☆				

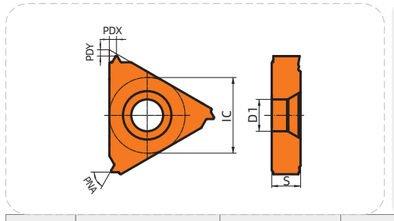
★ Recommended grade ☆ Available grade

Operation type	Insert shape	Type	Pitch/ number of teeth	Dimension (mm) IC	PDX	PDY	S	D1	PNA	CVD HR8105	HR8115	HR8125	HR8225	HR8135	HR6215	PVD HR7115	HR7125	HR7225	HR9205	HR9215	HR5125	HR5225	Cemented carbide HRK10	HRK20	Cermet HRC10	HR115C
Internal thread		11IR14BSPT-P	14	6.35	1.2	0.8	3.05	3.2	55°												☆	☆				
		11IR19BSPT-P	19	6.35	1.0	0.8	3.05	3.2	55°												☆	☆				
		11IR28BSPT-P	28	6.35	0.8	0.6	3.05	3.2	55°												☆	☆				
		16IR11BSPT-P	11	9.525	1.5	1.1	3.52	4.0	55°												☆	☆				
		16IR14BSPT-P	14	9.525	1.2	1.0	3.52	4.0	55°												☆	☆				
		16IR19BSPT-P	19	9.525	0.9	0.8	3.52	4.0	55°												☆	☆				
		16IR28BSPT-P	28	9.525	0.6	0.6	3.52	4.0	55°												☆	☆				

★ Recommended grade ☆ Available grade

NPT (Precision grinding)

Standard: USAS B2.1:1968
Tolerance class: NPT



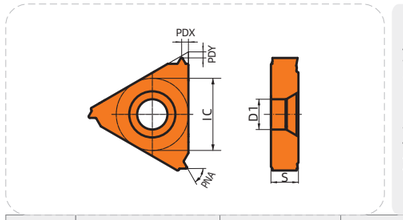
Working condition: ● Stable ◕ Average ⌗ Tough

Workpiece material

P	Steel
M	Stainless steel
K	Cast iron
N	Non-ferrous metal
S	Heat resistant super alloys Titanium alloy

Operation type	Insert shape	Type	Pitch/ number of teeth	Dimension (mm)						CVD						PVD						Cemented carbide		Cermet	
				IC	PDX	PDY	S	D1	PNA	HR8105	HR8115	HR8125	HR8225	HR8135	HR6215	HR7115	HR7125	HR7225	HR9205	HR9215	HR5125	HR5225	HRK10	HRK20	HRC10	HR115C
External thread		16ER8NPT-P	8	9.525	1.8	1.3	3.52	4.0	60°											☆	☆				
		16ER115NPT-P	11.5	9.525	1.5	1.1	3.52	4.0	60°											☆	☆				
		16ER14NPT-P	14	9.525	1.2	0.9	3.52	4.0	60°											☆	☆				
		16ER18NPT-P	18	9.525	1.0	0.8	3.52	4.0	60°											☆	☆				
		16ER27NPT-P	27	9.525	0.8	0.7	3.52	4.0	60°											☆	☆				

★ Recommended grade ☆ Available grade



Working condition: ● Stable ◕ Average ⌗ Tough

Workpiece material

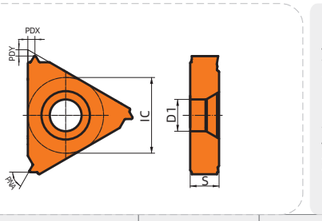
P	Steel
M	Stainless steel
K	Cast iron
N	Non-ferrous metal
S	Heat resistant super alloys Titanium alloy

Operation type	Insert shape	Type	Pitch/ number of teeth	Dimension (mm)						CVD						PVD						Cemented carbide		Cermet	
				IC	PDX	PDY	S	D1	PNA	HR8105	HR8115	HR8125	HR8225	HR8135	HR6215	HR7115	HR7125	HR7225	HR9205	HR9215	HR5125	HR5225	HRK10	HRK20	HRC10	HR115C
Internal thread		11IR14NPT-P	14	6.35	1.2	0.9	3.05	3.2	60°											☆	☆				
		11IR18NPT-P	18	6.35	1.0	0.8	3.05	3.2	60°											☆	☆				
		11IR27NPT-P	27	6.35	0.8	0.6	3.05	3.2	60°											☆	☆				
		16IR8NPT-P	8	9.525	1.8	1.3	3.52	4.0	60°											☆	☆				
		16IR115NPT-P	11.5	9.525	1.5	1.1	3.52	4.0	60°											☆	☆				
		16IR14NPT-P	14	9.525	1.2	0.9	3.52	4.0	60°											☆	☆				
		16IR18NPT-P	18	9.525	1.0	0.8	3.52	4.0	60°											☆	☆				
		16IR27NPT-P	27	9.525	0.8	0.7	3.52	4.0	60°											☆	☆				

★ Recommended grade ☆ Available grade

30° Standard trapezoidal thread

Standard: DIN103-2-1977
Tolerance class: 7e7H thread



Working condition: ● Stable ◕ Average ⌗ Tough

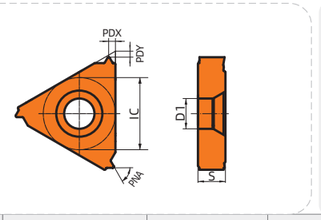
Workpiece material

P	Steel
M	Stainless steel
K	Cast iron
N	Non-ferrous metal
S	Heat resistant super alloys Titanium alloy

Operation type	Insert shape	Type	Pitch/ number of teeth	Dimension (mm)						CVD						PVD						Cemented carbide		Cermet	
				IC	PDX	PDY	S	D1	PNA	HR8105	HR8115	HR8125	HR8225	HR8135	HR6215	HR7115	HR7125	HR7225	HR9205	HR9215	HR5125	HR5225	HRK10	HRK20	HRC10	HR115C
External thread		16ER150TR-P	1.50	9.525	0.80	0.70	3.52	4.00	30°											☆	☆				
		16EL150TR-P	1.50	9.525	0.80	0.70	3.52	4.00	30°											☆	☆				
		16ER200TR-P	2.00	9.525	1.30	1.10	3.52	4.00	30°											☆	☆				
		16EL200TR-P	2.00	9.525	1.30	1.10	3.52	4.00	30°											☆	☆				
		16ER300TR-P	3.00	9.525	1.30	1.10	3.52	4.00	30°											☆	☆				
		16EL300TR-P	3.00	9.525	1.30	1.10	3.52	4.00	30°											☆	☆				
		22ER400TR-P	4.00	12.7	2.30	1.80	4.65	5.00	30°											☆	☆				
		22EL400TR-P	4.00	12.7	2.30	1.80	4.65	5.00	30°											☆	☆				
		22ER500TR-P	5.00	12.7	2.30	1.80	4.65	5.00	30°											☆	☆				
		22EL500TR-P	5.00	12.7	2.30	1.80	4.65	5.00	30°											☆	☆				
		22ER600TR-P	6.00	12.7	2.30	1.90	4.65	5.00	30°											☆	☆				
		22EL600TR-P	6.00	12.7	2.30	1.90	4.65	5.00	30°											☆	☆				

★ Recommended grade ☆ Available grade

30° Standard trapezoidal thread



Working condition: ● Stable ◕ Average ⌗ Tough

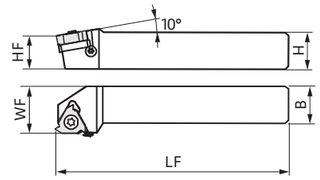
Workpiece material

		HR8105	HR8115	HR8125	HR8225	HR8135	HR6215	HR7115	HR7125	HR7225	HR9205	HR9215	HR5125	HR5225	HRK10	HRK20	HRC10	HRC115C
P	Steel	●	●	◕	◕	⌗	⌗						●	●			●	●
M	Stainless steel								●	●			●	●				
K	Cast iron						●											
N	Non-ferrous metal														●	●		
S	Heat resistant super alloys Titanium alloy							●			●	●						

Operation type	Insert shape	Type	Pitch/ number of teeth	Dimension (mm) IC	PDX	PDY	S	D1	PNA	CVD						PVD						Cemented carbide		Cermet	
										HR8105	HR8115	HR8125	HR8225	HR8135	HR6215	HR7115	HR7125	HR7225	HR9205	HR9215	HR5125	HR5225	HRK10	HRK20	HRC10	HR115C
Internal thread		16IR150TR-P	1.50	9.525	0.80	0.70	3.52	4.00	30°												☆	☆				
		16IL150TR-P	1.50	9.525	0.80	0.70	3.52	4.00	30°												☆	☆				
		16IR200TR-P	2.00	9.525	1.30	1.10	3.52	4.00	30°												☆	☆				
		16IL200TR-P	2.00	9.525	1.30	1.10	3.52	4.00	30°												☆	☆				
		16IR300TR-P	3.00	9.525	1.30	1.10	3.52	4.00	30°												☆	☆				
		16IL300TR-P	3.00	9.525	1.30	1.10	3.52	4.00	30°												☆	☆				
		22IR400TR-P	4.00	12.7	2.30	1.80	4.65	5.00	30°												☆	☆				
		22IL400TR-P	4.00	12.7	2.30	1.80	4.65	5.00	30°												☆	☆				
		22IR500TR-P	5.00	12.7	2.30	1.80	4.65	5.00	30°												☆	☆				
		22IL500TR-P	5.00	12.7	2.30	1.80	4.65	5.00	30°												☆	☆				
		22IR600TR-P	6.00	12.7	2.30	1.90	4.65	5.00	30°												☆	☆				
		22IL600TR-P	6.00	12.7	2.30	1.90	4.65	5.00	30°												☆	☆				

★ Recommended grade ☆ Available grade

External threading tool

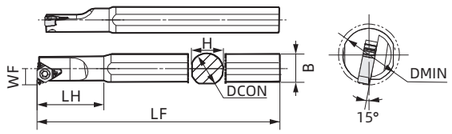


• The illustration shows the right hand（R）

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

▲Standing inventory △Make-to-order

Internal threading tool



• The illustration shows the right hand（R）

Type		Inventory	Dimension (mm)							Accessories				
			DCON	LF	B	DMIN	WF	H	LH	Insert screw	Shim	Shim Screw	Wrench	Matching insert
SNR	0006H06	△	6	100	6	7	3.3	5.8	10	M2.2×6.5	-	-	WR07	06□□
	0008H08	▲	8	100	7.6	9	4.6	7.4	15	M2.5×6.5				08□□
	0010H11	△	10	100	9.5	12	7.2	9	25	M2.5×6.5				11□□
	0012H11	△	12	125	11.5	16	9	11	32					
	0016K11	△	16	125	16	12	10	15	20.9					
	0016M11	▲	16	150	15.5	16	10.5	15	25.9					
	0016M16	△	16	150	15.5	20	12	15	27	M3.5×8			WR15	16□□
	0020M16	△	20	150	19	25	14	18	28.7	M3.5×12	HT16-□□M	HM4×8		
	0020Q16	△	20	180	19	25	14	18	34					
	0025M16	▲	25	150	24	32	17	23	28.8					
	0032R16	△	32	200	31	40	22	30	30.9					
	0032S16	△	32	250	31	40	22	30	30.9					
	0020Q22	▲	20	180	21.5	25	15	18	35	M5×10	-	-	WR20	22□□
	0025R22	△	25	200	24	32	19	23	39	M5×17	HT22-□□M	HM4×8		
	0032S22	△	32	250	31	40	22	30	36.4					
SNL	0006H06	△	6	100	6	7	3.3	5.8	10	M2.2×6.5	-	-	WR07	06□□
	0008H08	▲	8	100	7.6	9	4.6	7.4	15	M2.5×6.5				08□□
	0010H11	△	10	100	9.5	12	7.2	9	25	M2.5×6.5				11□□
	0012H11	△	12	125	11.5	16	9	11	32					
	0016K11	△	16	125	16	12	10	15	20.9					
	0016M11	▲	16	150	15.5	16	10.5	15	25.9					
	0016M16	△	16	150	15.5	20	12	15	27	M3.5×8			WR15	16□□
	0020M16	△	20	150	19	25	14	18	28.7	M3.5×12	HT16-□□M	HM4×8		
	0020Q16	△	20	180	19	25	14	18	34					
	0025M16	▲	25	150	24	32	17	23	28.8					
	0032R16	△	32	200	31	40	22	30	30.9					
	0032S16	△	32	250	31	40	22	30	30.9					
	0020Q22	△	20	180	21.5	25	15	18	35	M5×10	-	-	WR20	22□□
	0025R22	▲	25	200	24	32	19	23	39	M5×17	HT22-□□M	HM4×8		
	0032S22	△	32	250	31	40	22	30	36.4					

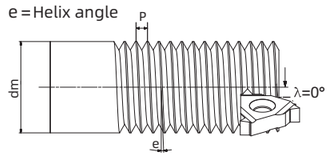
▲Standing inventory △Make-to-order

Selection of shim and helix angle

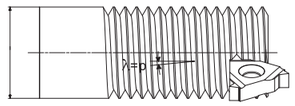
The lead angle of a thread, also known as the helix angle, is the angle between the circumferential line of the thread at the pitch diameter when unfolded and the helical line. During thread turning, the lead angle will influence the cutting plane and the reference plane. As a result, the rake angle and clearance angle of the thread turning insert differ from their ground values. The larger the lead angle, the more significant the effect on the rake angle and clearance angle. Therefore, the influence of the lead angle on thread turning inserts must be taken into account.

$$e = \arctan \frac{p}{d_2 \times \pi}$$

e = Helix angle



λ = Inclination angle



P = pitch

d_2 = diameter of thread

The most common angle of inclination is 1°
Clearance calculation
Clearance calculation formula

$$\beta = \arctan (\tan\theta \times \tan\alpha)$$

2θ = Thread tooth angle

α = Rake angle of tool. External thread 10°, internal thread 15°

Helix angle ≤ clearance angle of tools. Better switch shim, the different between helix angle and inclination angle of shim adjust to 0°-2°.

Spl：P=1.5、d_2=24mm
Helix angle1.14°-（2°~0°）=inclnation angle
（-0.86°~1.14°）apply standard 1° shim.

Specification table of shim

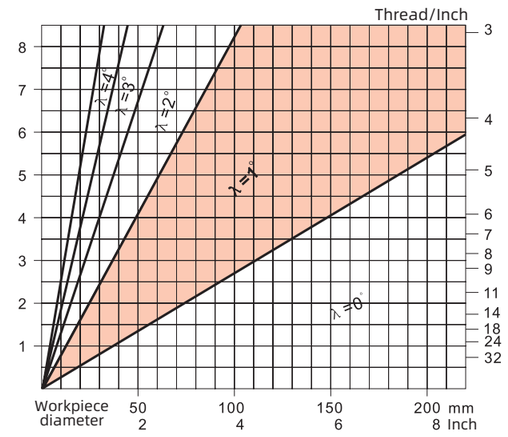
pitch	insert size	inclination angle	Shim
0.5-3.0	16	0	HT16-00M
		1	HT16-01M
		2	HT16-02M
		3	HT16-03M
3.5-6.0	22	0	HT22-00M
		1	HT22-01M
		2	HT22-02M
		3	HT22-03M

Note: The standard of shim is 1° for threading tool (MT16-01M or MT22-01M)

The following table is used for specific values

thread tooth angle 2θ	β	
	external thread	internal thread
60°	5.8°	8.79°
55°	5.24°	7.94°
30°	2.7°	4.1°

Selection of shim



Cutting parameter recommendations for threading

Machined workpiece materials				Hardness of Brinell (HB)	Tensile strength (N/mm^2)	Cutting speed v_c(m/min)	
ISO	Classification of materials					HR5125	HR5225
P	Unalloyed steel	C≤0.25%	Annealing	125	428	160-180	168-185
		0.25<C≤0.55%	Annealing	190	639	150-160	155-165
		0.25<C≤0.55%	Quenching and tempering	210	708	145-155	155-165
		C>0.55%	Annealing	190	639	135-150	140-155
		C>0.55%	Quenching and tempering	300	1013	120-140	125-140
	Low-alloyed steel	Annealing		175	591	120-140	130-145
		Quenching and tempering		300	1013	90-110	95-115
		Quenching and tempering		380	1282	80-100	85-100
		Quenching and tempering		430	430	70-95	80-95
	High alloy steel	Annealing		200	675	90-120	98-125
		Quenching and tempering		300	1013	80-100	85-110
M	Stainless steel	Austenite		180	675	120-140	120-140
		Ferrite/Martensite		200	778	140-180	145-180
K	Malleable cast iron	Ferrite		200	400	120-145	130-145
		Pearlite		260	700	80-115	85-120
	Grey cast iron	Low tensile strength		180	200	115-150	110-160
		High tensile strength/austenite		245	350	90-115	90-125
	Nodular cast iron	Ferrite		155	400	110-130	110-140
		Pearlite		265	700	90-115	95-120
N	Wrought aluminum alloy	Non-aging		60	—	1000-1400	1100-1500
		Aged		100	340	500-600	550-650
	Foundry aluminum alloy	Non-aging		75	260	450-500	450-550
		Aged		90	310	300-400	320-450
S	Nickel-based alloy	Nickel-based	Annealing	200	680	35-50	35-55
			Aging	280	940	25-35	25-40
		Nickel-based or cobalt-based	Annealing	250	840	20-30	22-35
			Aging	350	1180	10-25	10-30
			Aged	320	1080	10-20	10-25
	Titanium alloy	1262		300	1010	20-25	20-30
H	Hardened steel	Quenching and tempering		50HRC		60-70	60-75
		Quenching and tempering		55HRC		40-50	45-55
		Quenching and tempering		60HRC		30-40	30-48

Feed rate recommendation table

ISO Metric 60°external thread

Pitch (mm)	Total cutting depth	Steps of machining													
		1	2	3	4	5	6	7	8	9	10	11	12	13	14
0.50	0.31	0.10	0.08	0.07	0.06										
0.75	0.46	0.16	0.14	0.10	0.06										
1.00	0.61	0.18	0.15	0.12	0.10	0.06									
1.25	0.77	0.19	0.17	0.14	0.11	0.10	0.06								
1.50	0.92	0.22	0.21	0.17	0.14	0.12	0.06								
1.75	1.07	0.22	0.21	0.16	0.13	0.11	0.09	0.09	0.06						
2.00	1.23	0.24	0.23	0.17	0.16	0.14	0.12	0.11	0.06						
2.50	1.53	0.26	0.23	0.19	0.17	0.15	0.13	0.12	0.11	0.11	0.06				
3.00	1.84	0.27	0.25	0.20	0.18	0.16	0.14	0.13	0.12	0.12	0.11	0.10	0.06		
3.50	2.15	0.33	0.30	0.24	0.21	0.18	0.17	0.15	0.14	0.14	0.12	0.11	0.06		
4.00	2.45	0.34	0.31	0.24	0.22	0.19	0.17	0.16	0.14	0.14	0.13	0.12	0.12	0.11	0.06
4.50	2.76	0.38	0.34	0.28	0.24	0.22	0.20	0.18	0.16	0.16	0.15	0.14	0.13	0.12	0.06
5.00	3.07	0.42	0.38	0.32	0.27	0.24	0.22	0.20	0.18	0.18	0.17	0.16	0.15	0.12	0.06
5.50	3.35	0.43	0.40	0.38	0.36	0.32	0.28	0.24	0.20	0.16	0.16	0.15	0.14	0.12	0.06
6.00	3.82	0.44	0.42	0.40	0.38	0.34	0.30	0.30	0.28	0.25	0.18	0.17	0.16	0.12	0.06

ISO Metric 60° internal thread

Pitch (mm)	Total cutting depth	Steps of machining													
		1	2	3	4	5	6	7	8	9	10	11	12	13	14
0.50	0.29	0.09	0.07	0.07	0.06										
0.75	0.43	0.15	0.13	0.09	0.06										
1.00	0.58	0.17	0.15	0.11	0.09	0.06									
1.25	0.72	0.18	0.16	0.12	0.11	0.09	0.06								
1.50	0.87	0.21	0.20	0.16	0.13	0.11	0.06								
1.75	1.01	0.21	0.20	0.15	0.12	0.10	0.09	0.08	0.06						
2.00	1.15	0.24	0.22	0.18	0.14	0.12	0.10	0.09	0.06						
2.50	1.44	0.25	0.24	0.21	0.15	0.13	0.12	0.10	0.09	0.09	0.06				
3.00	1.73	0.26	0.25	0.22	0.17	0.14	0.13	0.12	0.11	0.10	0.09	0.08	0.06		
3.50	2.02	0.32	0.30	0.23	0.19	0.17	0.15	0.14	0.13	0.12	0.11	0.10	0.06		
4.00	2.31	0.33	0.31	0.24	0.22	0.18	0.15	0.14	0.13	0.12	0.12	0.11	0.10	0.10	0.06
4.50	2.60	0.36	0.33	0.28	0.24	0.21	0.19	0.16	0.15	0.14	0.13	0.12	0.12	0.11	0.06
5.00	2.89	0.41	0.38	0.32	0.27	0.24	0.21	0.18	0.16	0.15	0.14	0.13	0.12	0.12	0.06
5.50	3.15	0.42	0.35	0.3	0.28	0.26	0.24	0.22	0.2	0.2	0.2	0.16	0.14	0.12	0.06
6.00	3.54	0.43	0.38	0.35	0.32	0.3	0.28	0.28	0.26	0.22	0.2	0.18	0.16	0.12	0.06

Feed rate recommendation table

Whitworth external thread

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

Whitworth internal thread

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

Feed rate recommendation table

UN external thread

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

UN internal thread

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

Feed rate recommendation table

BSPT - external thread

Pitch (number of teeth/inch)	Total cutting depth	Steps of machining													
		1	2	3	4	5	6	7	8	9	10	11	12	13	14
28	0.58	0.17	0.14	0.11	0.10	0.06									
19	0.86	0.22	0.19	0.15	0.12	0.12	0.06								
14	1.16	0.24	0.20	0.17	0.14	0.12	0.12	0.11	0.06						
11	1.48	0.25	0.23	0.21	0.18	0.16	0.14	0.13	0.12	0.06					

BSPT - internal thread

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

NPT - external thread

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

NPT - internal thread

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

Feed rate recommendation table

ISO 30°trapezoidal- external thread

Pitch (mm)	Total cutting depth	Steps of machining													
		1	2	3	4	5	6	7	8	9	10	11	12	13	14
1.5	0.91	0.23	0.21	0.17	0.13	0.11	0.06								
2	1.26	0.29	0.25	0.22	0.18	0.14	0.12	0.06							
3	1.77	0.32	0.31	0.25	0.20	0.18	0.17	0.15	0.13	0.06					
4	2. 26	0.33	0.32	0.25	0.22	0.21	0.17	0.16	0.15	0.14	0.13	0.12	0.06		
5	2.75	0.35	0.32	0.26	0.24	0.22	0.21	0.19	0.19	0.17	0.15	0.14	0.13	0.12	0.06
6	3.52	0.37	0.35	0.34	0.33	0.32	0.31	0.27	0.26	0.25	0.24	0.16	0.14	0.12	0.06

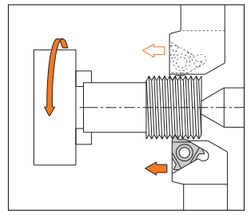
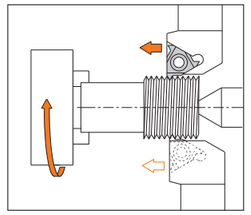
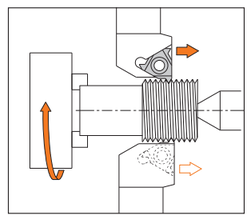
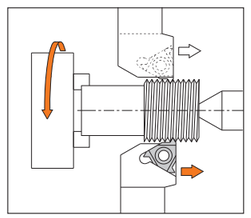
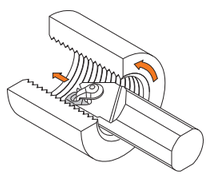
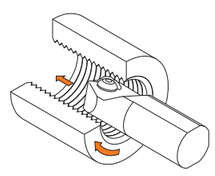
ISO 30°trapezoidal- internal thread

Pitch (mm)	Total cutting depth	Steps of machining													
		1	2	3	4	5	6	7	8	9	10	11	12	13	14
1.5	0.90	0.23	0.20	0.17	0.13	0.11	0.06								
2	1.25	0.29	0.25	0.21	0.18	0.14	0.12	0.06							
3	1.75	0.32	0.30	0.24	0.20	0.18	0.17	0.15	0.13	0.06					
4	2. 26	0.33	0.32	0.25	0.22	0.21	0.17	0.16	0.15	0.14	0.13	0.12	0.06		
5	2.75	0.35	0.32	0.26	0.24	0.22	0.21	0.19	0.19	0.17	0.15	0.14	0.13	0.12	0.06
6	3.52	0.37	0.35	0.34	0.33	0.32	0.31	0.27	0.26	0.25	0.24	0.16	0.14	0.12	0.06

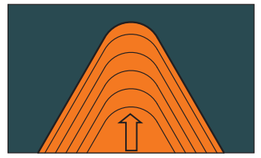
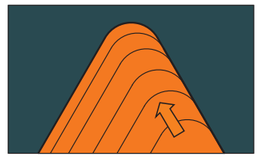
Features of thread turning insert

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

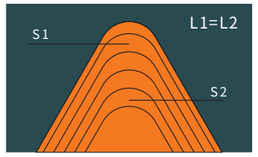
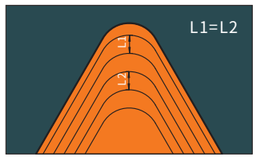
Machining type of thread tools

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

Threading (crosscutting) method

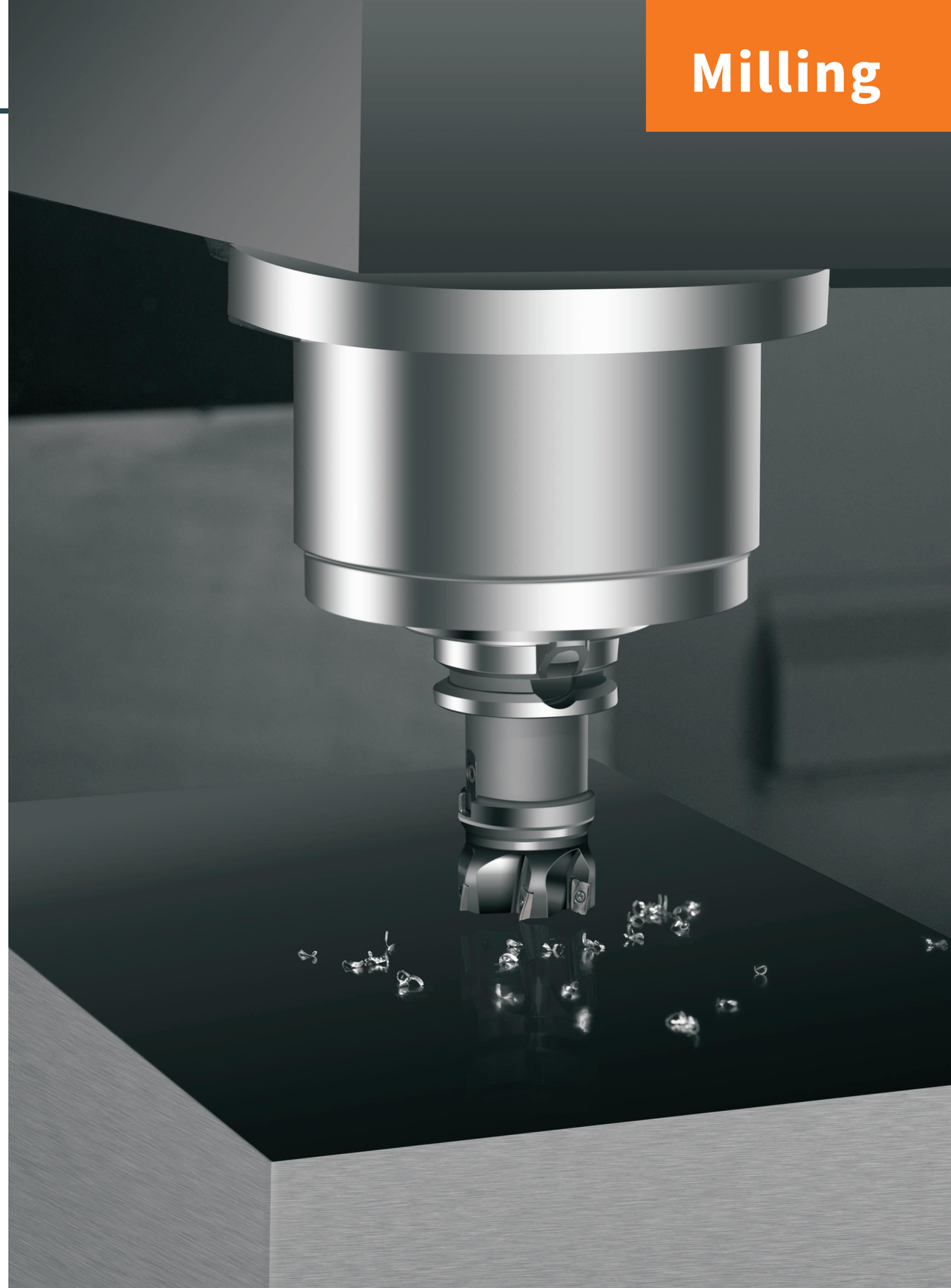
Graph	Machining method	Features	
		Advantages	Disadvantages
	Radial crosscutting (vertical feeding)	● Easiest to use (standard procedure for threading) ● High versatility (easy to change conditions such as cutting depth) ● Average wear on the rear insert face of the left and right cutting edges	● It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

Cutting Depth of Threading

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

Wiper Edge

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



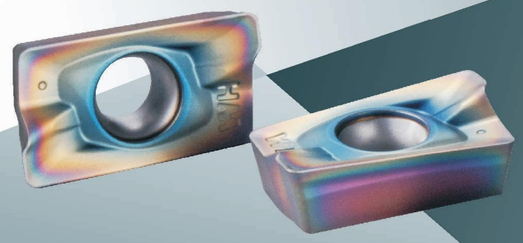
Kylin Series — Indexable Milling Inserts

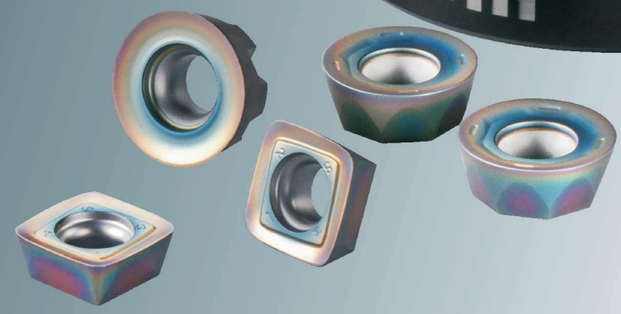
Adopting the newly upgraded grade HR7240, paired with our company's various indexable milling inserts, it meets the requirements of multiple processes such as face milling, shoulder milling, and cavity milling for superalloys, achieving the dual goals of long service life and high safety.

New!









CVD-Coated Grades for Cast Iron Milling

HR6130

Paired with various types of indexable milling inserts, it meets the requirements of various milling processes such as face milling and shoulder milling

CVD



Excellent wear resistance, perfectly suited for the high-efficiency milling of ISO K category materials.

- **Substrate**

  The alloy substrate composed of medium-grain hard medium-grain hard phases and high-strength binder phases ensures excellent structural strength.

- **Coating**

  Adopting directed growth aluminum oxide deposition technology, it forms a high strength composite CVD coating with excellent wear resistance.



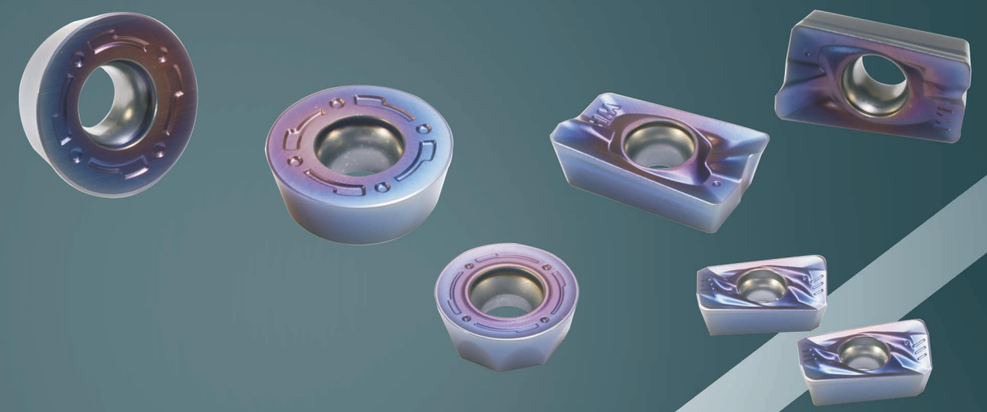
- **Post-treatment Process**

  The specialized post-coating treatment process delivers an ultra-smooth insert surface and effectively reduces cutting temperatures.

Dedicated Grade for Hardened Steel Milling

HR5210

Ideal for the milling of high-hardness materials (50-65HRC).



General Face Milling Cutter

CFM145

Suitable for face milling of carbon steel, stainless steel and cast iron.



Load-bearing Face Milling Cutter

CFM345

Ideal for roughing and light-duty face milling applications



C/SSM190

Square Shoulder Milling Cutter



C/SSM690

Square Shoulder Milling Cutter



Overview of Indexable Milling Inserts

Type	Material	ISO	CVD coating		PVD coating									Carbide	Cermet	ISO
			HR6130	HR8140	HR5110	HR5210	HR5120	HR5220	HR5130	HR530	HR7130	HR7140	HR7240	HRK10	HRC10	
P	Unalloyed steel/Alloy steel	P01														P01
		P05				HR5210										P05
		P10			HR5110											P10
		P15						HR5220							HRC10	P15
		P20					HR5120									P20
		P25							HR5130		HR7130					P25
		P30		HR8140						HR530			HR7240			P30
		P35										HR7140				P35
		P40														P40
		P45														P45
		P50														P50
M	Stainless steel	M05				HR5210										M05
		M10			HR5110											M10
		M15						HR5220								M15
		M20					HR5120									M20
		M25							HR5130							M25
		M30								HR530			HR7240			M30
		M35										HR7140				M35
		M40														M40
		M45														M45
K	Cast iron	K01														K01
		K05														K05
		K10				HR5210										K10
		K15			HR5110											K15
		K20						HR5220								K20
		K25	HR6130				HR5120									K25
		K30							HR5130							K30
		K35														K35
		K40														K40
		K45														K45
		K50														K50
N	Aluminum/aluminum alloy	N01														N01
		N05														N05
		N10												HRK10		N10
		N15														N15
		N20														N20
		N25														N25
		N30														N30
S	Heat resistant super alloys Titanium alloy	S01														S01
		S05														S05
		S10											HR7240			S10
		S15										HR7140				S15
		S20														S20
		S25														S25
		S30														S30
		S40														S40

Milling

Indexable Milling

- Code key of indexable milling tools B1
- Code key of indexable milling inserts B3
- Grade overview of indexable milling inserts B5
- Overview of indexable milling tools B7
- Overview of indexable milling inserts B11
- Details of indexable milling tools B13
  - Face milling tool series B13
  - Square shoulder milling tools series B28
  - Profile milling tools series B53
  - High feed milling tool series B73
  - Helical end milling cutter series B82
  - Heavy milling inserts B89

Solid Carbide End Mills

- Selection guidance of solid carbide end mills B113
- Code key of solid carbide end mills B114
- Overview of solid carbide end mills B115
- Details and parameters recommendation of solid carbide end mills B116
  - P Series - General-Purpose End Mills B116
  - A Series - High-Efficiency Aluminum Alloy End Mills B136
  - K Series - High-Temperature Alloy End Mills B140
  - R Series - Heavy-Duty Roughing End Mills B144
  - T Series - Titanium Alloy End Mills B148
  - X Series - Special Application End Mills B154

HUAREAL

Code Key of Indexable Milling Tools

C	FM	1	45	L	-	063	A
①	②	③	④	⑤		⑥	⑦

22	I	05	L	T	-	S	N	10
⑧	⑨	⑩	⑪	⑫		⑬	⑭	⑮

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

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

③ Type	
1	Type 1
2	Type 2
…	…

④ Entering angle	
45	45°
60	60°
75	75°
90	90°
00	Exception

⑤ Cutting direction	
R	Default
L	Left

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

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

⑧Sizes of tool installation parts	
16	Ø16mm
22	Ø22mm
27	Ø27mm
32	Ø32mm
40	Ø40mm
60	Ø60mm

⑫ Necking type	
T	Taper Neck
Omit	No neck

⑨ Unit	
I	Inch
Default	Metric

⑬ Shape	
A	
H	
L	
O	
R	
S	
T	
W	
Omit	

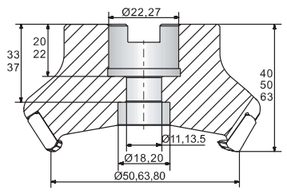
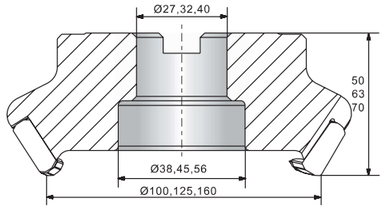
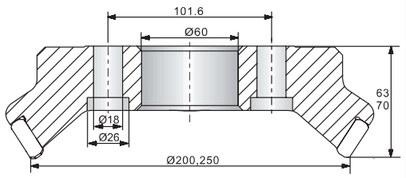
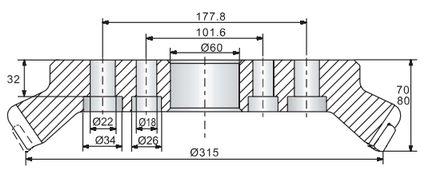
⑩Number of tooth	
02	Two teeth
03	Three teeth
04	Four teeth
…	…

⑭ Clearance Angle	
A	3°
B	5°
C	7°
D	15°
E	20°
F	25°
G	30°
N	0°
P	11°
O	Omit

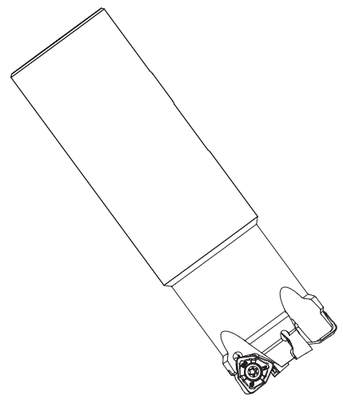
⑪Length type	
Cutter	Omit
Shank	Omit
S	Short
L	Long
XL	Lengthened

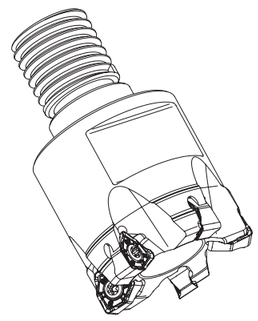
⑮ Cutting edge length	
09	9mm
10	10mm
12	12mm
15	15mm
19	19mm
Omit	

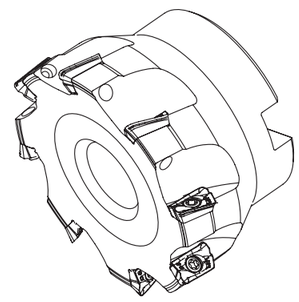
Structure of tool installation part (Sleeve structure)

A-type interface		B-type interface	
ϕ200-ϕ250 sleeve face milling tools specified in GB5342-96		ϕ100-ϕ160 sleeve face milling tools specified in GB5342-96	
C-type interface		D-type interface	
ϕ200-ϕ250 sleeve face milling tools specified in GB5342-96		Sleeve face milling tools with ϕ315 and above specified in GB5342-96	

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



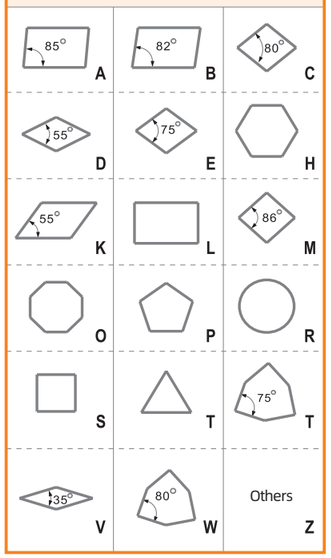




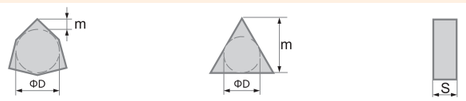
Code Key of Indexable Milling Inserts

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

① Shape code



③ Tolerance (mm)



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

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

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

◆ Inscribed circle (ΦD) tolerance

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

⑤ Cutting edge length

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

⑥ Insert thickness



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

② Cutting edge clearance angle major

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

④ Chipbreaker and clamping form

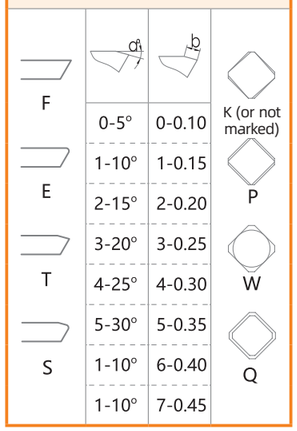
Code	Hole	Chipbreaker	Sectional view	Code	Hole	Chipbreaker	Sectional view
B	Y	N/A	>65°	N	N/A	N/A	
H	Y	Single-sided	>65°	R	N/A	Single-sided	
C	Y	N/A	>65°	F	N/A	Double-sided	
J	Y	Double-sided	>65°	A	Y	N/A	
W	Y	N/A	≤65°	M	Y	Single-sided	
T	Y	Single-sided	≤65°	G	Y	Double-sided	
Q	Y	N/A	≤65°	X	---	---	Exception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

⑦ Wiper edge



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

⑧ Cutting edge form



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

⑨ Cutting direction

Code	Direction
R	Right
L	Left
N	Two-way

⑩ Chipbreaker code

Grade overview of indexable milling inserts

Grade type	Grade	ISO	Color	Coating type	Coating Composition	Characteristics
Coated Carbide	HR6130	ISO P ISO K	Black& Yellow	CVD	TiN+MT-TiCN+Al_2O_3	It is suitable for semi-finishing and rough millingoperations on P and K materials. Adopting a high-strength composite coating, itbalances the operational requirements for wearresistance and strength in milling processes. The brand-new post-treatment process effectively enhances the toughness of the insert.
	HR8140	ISO P	Black& Yellow	CVD	TiN+MT-TiCN+Al_2O_3	It is widely applicable to heavy-duty milling operationson P materials. Featuring a thin CVD coating design, it balances theoperational requirements for wear resistance andstrength in milling processes. Meanwhile, paired with a substrate material withexcellent resistance to high-temperature plasticdeformation, it boasts both high hardness and stable performance.
	HR5110	ISO P	Bronze	PVD	TiAlN+CrAlN +TiSiN	It is suitable for milling operations on H materials (45–55 HRC). Combined with a brand-new nano-gradedcomposite structure coating, the ultra-finegrain cemented carbide substrate endows theproduct with a smooth and refined surface, along with low friction coefficient, high nanohardness and excellent oxidation resistance.
	HR5210	ISO P ISO H	Rainbow	PVD	AlTiN+TiSiN	It is suitable for milling operations on H materials(50–65 HRC). Paired with a wear-resistant coating featuringsuperior thermal stability and oxidation resistance, the uniform ultra-fine nano-particles greatlyenhance the red hardness of the coating, endowingit with the ability to withstand more severe cuttingtemperatures and making it id
	HR5120	ISO P ISO M ISO K	Bronze	PVD	TiAlN+CrAlN +TiSiN	It is designed for general-purpose milling ofvarious materials including P, M and K, andis especially suited for machining mater with a hardness range of 35–50 HRC. It boasts excellent wear resistance andtoughness, and combined with the latestmulti-component nano-coating, it delivers superior high-temperature hardness.
	HR5220	ISO P ISO M ISO K	Bronze	PVD	AlTiN+TiSiN	It is designed for general-purpose milling of various materials including P, M and K, and is especially suited for machining materials with a hardness range of 40–50 HRC. Adopting a dual-layer coating structure of AlTiN and TiSiN, it exhibits excellent strength, toughness and wear resistance, which reduces the propagation of longitudinal cracks and effectively enhances the chipping resistance of the coating.

Grade type	Grade	ISO	Color	Coating type	Coating Composition	Characteristics
Coated Carbide	HR5130	ISO P ISO M	Gray	PVD	AlTiN	It is designed for general-purpose milling of various materials including P, M and K, and is especially suitable for machining materials with a hardness below 30 HRC. The substrate material with a special formulation effectively enhances its wear resistance and toughness while reducing the risk of chipping. Combined with the latest nano-coating, the product delivers outstanding comprehensive performance in high-efficiency milling operations.
	HR530	ISO P ISO M	Gray	PVD	AlTiN/AlCrN	It is specifically designed for milling operations on mild steel and stainless steel. Featuring the brand-new nano multi-layer composite coating technology, it significantly enhances wear resistance. Combined with the brand-new coating process, the high-toughness substrate enables higher cutting speeds and feed rates. Meanwhile, its excellent filmsubstrate bonding strength effectively reduces the risk of insert breakage.
	HR7130	ISO P	Purple Gray	PVD	TiAlN	It is widely used for heavy-duty milling operations on P-grade materials. Featuring a thick PVD coating design, itoffers excellent wear resistance and impactresistance. Paired with a substrate material with superior resistance to hightemperature plastic deformation, it boasts both high hardness and high stability.
	HR7140	ISO M ISO S	Gray	PVD	AlCrN	It is suitable for milling operations on stainless steel, titanium alloy and superalloy. The substrate with special trace elements delivers excellent toughness and high-temperature performance.
	HR7240 NEW	ISO M ISO S	Rainbow	PVD	AlCrN	It is suitable for milling of difficult-to-machinematerials such as stainless steel, superalloy andtitanium alloy. Adopting an alloy substrate with a speciallyformulated composition, its red hardness at hightemperatures is further enhanced. The uniformly distributed hard phases and binder phases balance wear resistance, high toughness and excellent fatigue fracture resistance. The highly distinctive iridescent coating greatly improves the product'shigh-temperature resistance and high-temperature hardness.
Cermet	HRC10	ISO P	Bronze	No coating	TiAlSiN	It is suitable for finish and semi-finish milling operations on P materials. It features high thermal stability and wear resistance as well as excellent thermal shock resistance. A brand-new ultra-fine grain substrate with high tungsten and nitrogen content, supplemented by high levels of tantalum and niobium, boasts both outstanding high-temperature resistance and chipping resistance.

Overview of Indexable Milling Tools

Machining form	Series/shape	Cutting edge angle	Applicable inserts	Insert shape	Usage and features	Page
Face milling tool	CFM143 	KAPR=43°	OD□□0605		◎ Light and fast in cutting, it is cost-effective with unilateral octagonal inserts; ◎ It is suitable for face milling P, M, K and other materials.	B13-B14
	CFM145 	KAPR=45°	SNGX1005ANR-GM SNGX1005ANR-GE		◎ Fittedwithground-grade/precision molded-gradequadrilateralnegativerake inserts, itensuressmoothandlight cuttingperformance. Thetoolisavailableinsparse-toothanddense-toothstructures, cateringtodifferentworking conditionsand machiningefficiency requirements. ◎ Idealforface millingof P, M and K materials, itservesasthepreferred toolseriesforgeneral-purposemachining.	B15-B16
	CFM245 	KAPR=45°	SEET13T3-GM SEMT13T3AGTN-FM		◎ Fittedwithground-grade/precision molded-grade quadrilateralinsertswitha 20° clearanceangle, itgeneratesslow cuttingforce. ◎ Featuringascrewclamping structure, itenableseasytool mountingandisidealforlight cuttingoperations.	B17-B18
	CFM345 	KAPR=45°	SZMX1206ANR-GM		◎ Fittedwithindependentlydeveloped insertsfeaturinganewgroovestructure , itbalances machining efficiencyandinsertservicelife. ◎ Suitablefor machining P, M and K materials, itisthepreferredtoolfor general-purposerough machining.	B19-B20
	CFM445 	KAPR=45°	SEEN1203AFTN SEKR1203AFTN SEMR1203AFTN		◎ General-purpose millingcutter, fittedwithcuttinginsertswitha 20° largeclearanceangle, delivers smoothandlightcutting performance. ◎ Itissuitableforface milling of P, M and K materials.	B21-B22
	CFM645 	KAPR=45°	HN□X0906□□		◎ High Cost-Effective Face Milling Cutter Series ◎ Equippedwithdouble-sided hexagonalinsertsthathavea totalof 12 cuttingedges, these insertsalsofeaturehigh strength.	B23-B24
	CFM745 	KAPR=45°	XN□□0705 XN□□0906		◎ High Cost-Effective Face Milling Cutter Series. ◎ Equippedwithdouble-sided heptagonalinserts, ithasatotal of 14 cuttingedges.	B25-B27

Overview of Indexable Milling Tools

Machining form	Series/shape	Cutting edge angle	Applicable inserts	Insert shape	Usage and features	Page
Square shoulder milling tool	CSM188 	KAPR=88°	SNGX1005ZNN-GM SNMX100512-GM		◎ Fittedwithground-grade/precision molded-gradequadrilateralnegativerake inserts, itensuresstablecutting performance. ◎ Balancingcost-effectivenessand versatility, itisidealfor general-purposeface millingof P, M and K materials.	B28-B30
	SSM188 					
	CSM190 	KAPR=90°	AOKT06□□ AOKT11□□ AOKT16□□		◎ High-Precision Shoulder Milling Cutter Series ◎ The 90° shoulder millingcutter,featuringahelicaledgede sign, deliverslowcuttingforce. ◎ Tooldiametersrangingfrom Φ11 to Φ80areavailable. ◎ Idealfor multi-functional machining operationssuchasside milling, slot millingand ramp millingon P, M, K and S materials, itisthe preferredtoolfor shoulder milling.	B31-B35
	SSM190 					
	KH 					
	CSM290 	KAPR=90°	APKT11□□ APKT16□□		◎ High-Performance Shoulder Milling Cutter Series, Ideal for milling operations on mild steel, stainless steel, titanium alloy, superalloy and other materials. ◎ Itfeaturestooldiameters rangingfrom Φ16to Φ80and a 90° majorcuttingedge angledesign. ◎ Capableofperforming shoulder milling, slot milling, ramp milling, face millingand other machiningoperations.	B36-B38
	SSM290 					
	CSM390 	KAPR=90°	ZNMU0403□□ ZNMU0604□□ ZNMU0806□□		◎ Economical Shoulder Milling Cutter Series ◎ Double-sideddesignwith 6 usablecuttingedges. ◎ tensuresstabletool positioningandreliablecutting performance. Availableinshank-type, shell-typecutterheadsand indexableheadtools.	B39-B44
	SSM390 					
	KH 					

Overview of Indexable Milling Tools

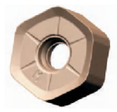
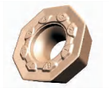
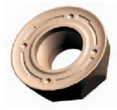
Machining form	Series/shape	Cutting edge angle	Applicable inserts	Insert shape	Usage and features	Page
Square shoulder milling tool	CSM590 	KAPR=90°	APMT11□□ APGT11□□ APMT16□□ APGT16□□		◎ Universal Shoulder Milling Cutter Series. ◎ Suitableforshoulder milling, slot milling, ramp millingandface millingoperationson P, K, N andother materialgroups.	B45-B47
	SSM590 					
	CSM690 NEW 	KAPR=90°	LNHX09□□ LNHX13□□		◎ Clamp-on 90° Shoulder Milling Cutter Series. ◎ Suitableforhigh-efficiency machiningof P, M, K andother materialgroups, aswellas cuttingconditionswithheavy impact. ◎ Availableinstaggered-tooth, dense-toothandultra-dense-toothconfigurations.	B48-B52
	SSM690 NEW 					
	KH NEW 					
Profile milling tool	CPM100 	/	RC□□		◎ Suitablefor machiningof P, M, K andother materialgroups. ◎ A widerangeofcutter diametersisavailable, applicable f orface, profileandcavity machining.	B53-B55
	SPM100 					
	CPM200 	/	RP□□		◎ Suitablefor machiningof P, M, K andother materialgroups. ◎ A widerangeofcutter diametersisavailable, applicable f orface, profileandcavity machining.	B56-B58
	SPM200 					

Overview of Indexable Milling Tools

Machining form	Series/shape	Cutting edge angle	Applicable inserts	Insert shape	Usage and features	Page
Profile milling tool	CPM300 	/	RD□□		◎ Suitablefor machining P, K materialgroupsandhardened materials. ◎ A comprehensiverangeof cutterdiametersisavailable, ideal forface, profileandcavity machining.	B59-B61
	SPM300 					
	SPM400 NEW 	/	BNM□□		◎ Finish Milling Ball Nose Cutter Series ◎ Thecuttinginsertarcismanufacturedvi aanultra-precisiongrindingprocess, withtheperipheraledge R toleranceachieving ±0.005 mm, whichdeliversa mirror finish machiningeffect.	B65-B68
	SPM500 NEW 	/	UNM□□		◎ Rough Milling Ball Nose Cutter Series ◎ Suitableforprofile roughingof P, M, K, S and other materialgroups. Its uniquegroovegeometryand largerakeangledesign achieveseffectivecontrol ofchipcurlingandflow direction, whilereducing cuttingresistance.	B69-B72
	KH NEW 					
High-feed milling tool	CEM100 	/	SDMT12□□ SDMT15□□		◎ Suitableforcavity milling, face millingandotheroperationson P, K andother materialgroups. It enableshighfeedratesandis alsoapplicableforplunge millin ◎ Cutterdiametersranging from Φ20 to Φ160 mm are available.	B73-B76
	SEM100 					
	CEM300 NEW 	/	SDKT09□□ SDKT12□□		◎ High-Efficiency Machining Cutter Seriesfor Difficult-to-Machine Materialssuchas Stainless Steel, Titanium Alloysand Superalloys ◎ Itsinnovativestructural designbalanceshigh-efficiencyroughingandthe requirementsofvarious machiningscenarios, includingface milling, cavity milling, slot millingand ramp milling. ◎ Thesharpgroovegeometry combinedwithoptimized cuttingedgedesigneffectively maintains machiningstability,ensuringconsist ent performanceacrossttheentire depthofcut.	B77-B81
	SEM300 NEW 					
	KH NEW 					
Helical end mill	CHM190 	KAPR=90°	SP12□□ AP15□□		◎ Heavy-Depth Plunge Milling Cutterfor Steel, Alloy Steeland Cast Iron ◎ Availableincutter diametersof Φ63 mm and Φ80 mm, with BT andJT taper interfacesasoptions.	B82-B83
	CHM690 NEW 	KAPR=90°	LNHX09□□ LNHX13□□		◎ Clamp-on 90° Helical End Mill Series ◎ Thecuttinginsertsare mounted inanorientedconfiguration, ensuringthecutterbodyand insertsdeliverenhancedrigidity androbustness.	B84-B85

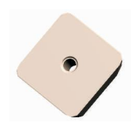
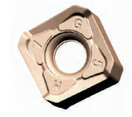
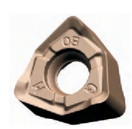
Overview of Indexable Milling Inserts

Insert shape	Insert model	Page
	APMT1135PDER-HM APMT113516PDER-HM APMT1605PDER-HM APMT160520PDER-HM APMT160530PDER-HM	B47
	APGT1135PDFR-AK APGT1604PDFR-AK	B47
	APKT113604PEER-FM APKT1136PEER-FM APKT113612PEER-FM APKT113620PEER-FM APKT1605PDER-FM APKT160512PDER-FM APKT160520PDER-FM	B38
 	SPMT120408-MM APMT150412-MM SPHX120408T21 APHX1504	B83
	AOKT060202PEER-VM AOKT060204PEER-VM AOKT060208PEER-VM AOKT113504PEER-VM AOKT113508PEER-VM AOKT113512PEER-VM AOKT113516PEER-VM AOKT160408PEER-VM AOKT160412PEER-VM AOKT160416PEER-VM	B34

Insert shape	Insert model	Page
	BNM1203-S BNM1604-S BNM2005-S BNM2506-S BNM3007-S BNM3207-S BNM2005 BNM2506 BNM3007 BNM3207	B67
	HNMX0906ANSN-F HNMX0906ANSN-M HNMX0906ANSN-R HNGX0906ANSN	B24
	LNHX090404R-GM LNHX130608R-GM	B52 B85
	ODKT0605ADN ODMT060508-R	B14
	RCKT10T3MO-FM RCKT1204MO-FM RCKT1606MO-FM RCKT2006MO-FM	B55
	RDMW0501MO RDMW0602MO RDMW0702MO RDMW0802MO RDMW10T3MO RDMW1204MO RDMW1605MO	B61
	RDKW10T3MO RDKW1204MO RDKW1604MO	B61
	RPMT08T2MO-HM RPMW1003MO RPMT1204MO-HM	B58

Overview of Indexable Milling Inserts

Insert shape	Insert model	Page
	RPKT10T3MO-MS RPKT1204MO-MS RPKT1606MO-MS	B58
	RPMT08T2MO-SM RPMT10T3MO-SM RPMT1204MO-SM RPMT1606MO-SM	B58
	SDKT09T312ZDER-SM SDKT120520ZDER-SM	B80
	SDMT1205ZTN-FM SDMT1505ZTN-FM	B75
	SDMW1205ZTN SDMW1505ZTN	B75
	SEET13T3-GM SEMT13T3AGTN-FM	B18
	SEKR1203AFTN SEMR1203AFTN	B22
	SEEN1203AFTN	B22

Insert shape	Insert model	Page
	SPKN1504EDTL SPKN1504EDTR	/
	SNGX1005ANR-GM SNGX1005ANR-GE	B16
	SNGX1005ZNN-GM SNMX100512-GM	B30
	SZMX1206ANR-GM	B20
	UNM1603-CE UNM20T3-CE UNM2504-CE UNM3006-CE UNM3206-CE UNM4007-CE	B72
	XNMX070508-M XNMX0705ANN-M XNGX0705ANN-M XNGX0705ANN-R XNMX090612-M XNMX0906ANN-M XNMX0906ANN-R XNGX0705ANN-W XNGX0906ANN-W XNGX0906-W	B27
	ZNMU040308PNR-GM ZNMU060408PNR-GM ZNMU080608PNR-GM ZNMU080608PNR-GL ZNMU080608PNR-GR ZNMU080616PNR-GR	B44

HUAREAL

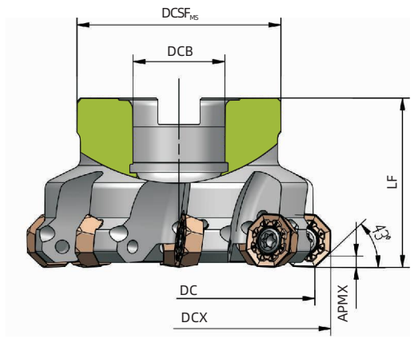
Face Milling

CFM143 series



KAPR=43°





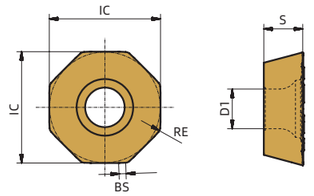
Tool specification	Number of edges	Inventory	Dmension (mm)					APMX (mm)	Interface form	Applicable inserts	Screw	Wrench
			DC	DCB	DCSFMS	DCX	LF					
CFM143-040A1603-OD06	3	△	40	16	35	50	40	4	A	OD□□	M50130	HTT20IP
CFM143-050A2204-OD06	4	△	50	22	47	60	40	4				
CFM143-063A2205-OD06	5	△	63	22	47	72	40	4				
CFM143-080A2706-OD06	6	▲	80	27	62	90	50	4				
CFM143-100A3207-OD06	7	▲	100	32	77	110	50	4				
CFM143-125B4008-OD06	8	△	125	40	90	135	63	4	B			
CFM143-160C4010-OD06	10	△	160	40	92	170	63	4	C			HAT20IP
CFM143-200C6012-OD06	12	△	200	60	175	210	63	4				

▲Standing inventory △Make-to-order

Applicable Inserts

OD□□





Working condition: ● Stable ◕ Average ⌗ Tough

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

Type	Dimension (mm)					APMX (mm)	CVD		PVD								Cemented carbide	Cermet
	IC	S	D1	BS	RE		HR6130	HR8140	HR5110	HR5210	HR5120	HR5220	HR5130	HR530	HR7130	HR7140	HR7240	HRK10	HRC10
ODKT0605ADN	15.875	5.56	5.5	1.2	0.8	4	★		☆	☆	★	★	★						
ODMT060508-R	15.875	5.56	5.5	1.2	0.8	4	★		☆	☆	★	★	★						

★ Recommended grade ☆ Available grade

Recommended cutting parameters

Workpiece material		Hardness (HB)	Insert grade	Cutting data	
				Cutting speed vc (m/min)	Feed rate fz(mm/z)
P	Low-carbon steel, mild steel	≤180	HR5120	270(220-350)	0.3(0.1-0.5)
			HR5220	240(200-320)	
			HR5130	220(200-320)	
	High-carbon steel, alloy steel	180-280	HR5110	240(200-320)	0.2(0.1-0.4)
			HR5120	200(160-280)	
			HR5220	200(160-280)	
			HR5130	200(160-260)	
	Alloy tool steel	280-350	HR5110	220(170-340)	0.15(0.1-0.3)
			HR5210	200(150-280)	
			HR5120	180(150-250)	
			HR5220	180(150-250)	
M	Stainless steel	≤270	HR5120	180(120-240)	0.2(0.1-0.3)
			HR5130	150(120-180)	
K	Cast iron	180-250	HR6130	280(180-320)	0.2(0.1-0.4)
			HR5110	200(150-250)	
			HR5120	200(150-250)	

HUAREAL

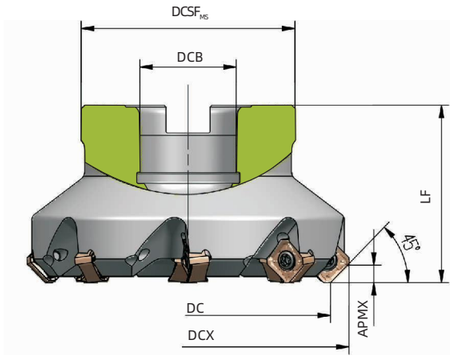
Face Milling

CFM145 series



KAPR=45°



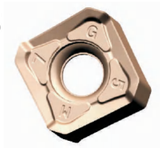


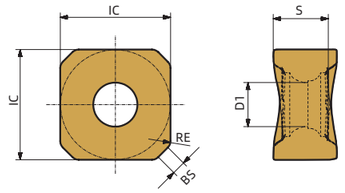
Tool specification	Number of edges	Inventory	Dmension (mm) DC	DCB	DCSFMS	DCX	LF	APMX (mm)	Interface form	Applicable inserts	Screw	Wrench
CFM145-050A2204-SN10	4	▲	50	22	47	60.5	40	4.7	A	SNGX□□	M35100	HTT10IP
CFM145-050A2205-SN10	5	△	50	22	47	60.5	40	4.7				
CFM145-063A2205-SN10	5	△	63	22	47	73.5	40	4.7				
CFM145-063A2206-SN10	6	▲	63	22	47	73.5	40	4.7				
CFM145-080A2706-SN10	6	△	80	27	62	90.5	50	4.7				
CFM145-080A2708-SN10	8	▲	80	27	62	90.5	50	4.7				
CFM145-100A3206-SN10	6	△	100	32	77	110.5	50	4.7				
CFM145-100A3208-SN10	8	▲	100	32	77	110.5	50	4.7				
CFM145-100A3210-SN10	10	△	100	32	77	110.5	50	4.7				
CFM145-125B4008-SN10	8	△	125	40	90	135.5	63	4.7	B			
CFM145-125B4010-SN10	10	△	125	40	90	135.5	63	4.7				
CFM145-125B4012-SN10	12	△	125	40	90	135.5	63	4.7				
CFM145-160C4008-SN10	8	△	160	40	92	170.5	63	4.7	C			HAT10IP
CFM145-160C4012-SN10	12	▲	160	40	92	170.5	63	4.7				
CFM145-160C4014-SN10	14	△	160	40	92	170.5	63	4.7				

▲Standing inventory △Make-to-order

Applicable Inserts

SN □□





Working condition: ● Stable ◕ Average ⌗ Tough

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

Type	Dimension (mm) IC	S	D1	BS	RE	APMX (mm)	CVD HR6130	CVD HR8140	PVD HR5110	PVD HR5210	PVD HR5120	PVD HR5220	PVD HR5130	PVD HR530	PVD HR7130	PVD HR7140	PVD HR7240	Cemented carbide HRK10	Cermet HRC10
SNGX1005ANR-GM	10.0	5.0	4.0	1.2	0.8	4.7	★		☆	☆	★	★	★						
SNGX1005ANR-GE	10.0	5.0	4.0	1.2	0.8	4.7	★		☆	☆	★	★	★						

★ Recommended grade ☆ Available grade

Recommended cutting parameters

Workpiece material		Hardness (HB)	Insert grade	Cutting data: Cutting speed vc (m/min)	Cutting data: Feed rate fz(mm/z)
P	Low-carbon steel, mild steel	≤180	HR5120	270(220-350)	0.3(0.1-0.5)
			HR5220	240(200-320)	
			HR5130	220(200-320)	
	High-carbon steel, alloy steel	180-280	HR5110	240(200-320)	0.2(0.1-0.4)
			HR5120	200(160-280)	
			HR5220	200(160-280)	
			HR5130	200(160-260)	
	Alloy tool steel	280-350	HR5110	220(170-340)	0.15(0.1-0.3)
			HR5210	200(150-280)	
			HR5120	180(150-250)	
			HR5220	180(150-250)	
M	Stainless steel	≤270	HR5120	180(120-240)	0.2(0.1-0.3)
			HR5130	150(120-180)	
K	Cast iron	180-250	HR6130	280(180-320)	0.2(0.1-0.4)
			HR5110	200(150-250)	
			HR5120	200(150-250)	

HUAREAL

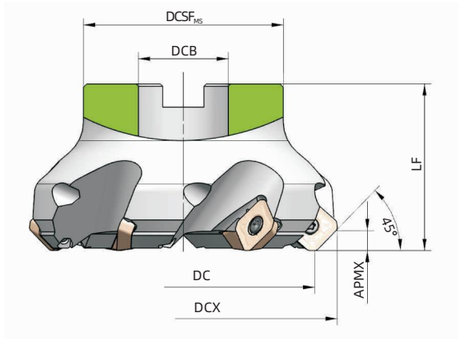
Face Milling

CFM245 series



KAPR=45°





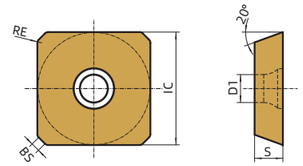
Tool specification	Number of edges	Inventory	Dmension (mm) DC	DCB	DCSFMS	DCX	LF	APMX (mm)	Interface form	Applicable inserts	Screw	Wrench
CFM245-050A2203-SE13	3	△	50	22	47	61	40	6	A	SEET□□	M35100	HTT10IP
CFM245-050A2204-SE13	4	△	50	22	47	61	40	6				
CFM245-063A2204-SE13	4	△	63	22	47	74	40	6				
CFM245-063A2205-SE13	5	▲	63	22	47	74	40	6				
CFM245-080A2704-SE13	4	△	80	27	62	91	50	6				
CFM245-080A2706-SE13	6	▲	80	27	62	91	50	6				
CFM245-100A3205-SE13	5	△	100	32	77	107	50	6				
CFM245-100A3207-SE13	7	△	100	32	77	111	50	6				
CFM245-125B4006-SE13	6	△	125	40	90	136	63	6	B			
CFM245-125B4008-SE13	8	△	125	40	90	136	63	6				
CFM245-160C4010-SE13	10	△	160	40	92	171	63	6	C			HAT10IP
CFM245-160C4012-SE13	12	△	160	40	92	171	63	6				
CFM245-200C6014-SE13	14	△	200	60	175	211	63	6				
CFM245-200C6018-SE13	18	△	200	60	175	211	63	6				

▲Standing inventory △Make-to-order

Applicable Inserts

SE □□





Working condition: ● Stable ◕ Average ⌗ Tough

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

Type	Dimension (mm) IC	S	D1	BS	RE	APMX (mm)	CVD HR6130	CVD HR8140	PVD HR5110	PVD HR5210	PVD HR5120	PVD HR5220	PVD HR5130	PVD HR530	PVD HR7130	PVD HR7140	PVD HR7240	Cemented carbide HRK10	Cermet HRC10
SEET13T3-GM	13.4	3.97	4.1	1.4	1.5	6	★		☆	☆	★	★	★						
SEMT13T3AGTN-FM	13.4	3.97	4.1	1.4	1.5	6	★		☆	☆	★	★	★						

★ Recommended grade ☆ Available grade

Recommended cutting parameters

Workpiece material		Hardness (HB)	Insert grade	Cutting data: Cutting speed vc (m/min)	Cutting data: Feed rate fz(mm/z)
P	Low-carbon steel, mild steel	≤180	HR5120	270(220-350)	0.3(0.1-0.5)
			HR5220	240(200-320)	
			HR5130	220(200-320)	
	High-carbon steel, alloy steel	180-280	HR5110	240(200-320)	0.2(0.1-0.4)
			HR5120	200(160-280)	
			HR5220	200(160-280)	
			HR5130	200(160-260)	
	Alloy tool steel	280-350	HR5110	220(170-340)	0.15(0.1-0.3)
			HR5210	200(150-280)	
			HR5120	180(150-250)	
			HR5220	180(150-250)	
M	Stainless steel	≤270	HR5120	180(120-240)	0.2(0.1-0.3)
			HR5130	150(120-180)	
K	Cast iron	180-250	HR6130	280(180-320)	0.2(0.1-0.4)
			HR5110	200(150-250)	
			HR5120	200(150-250)	

HUAREAL

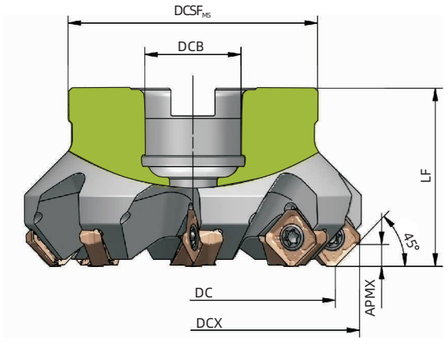
Face Milling

CFM345 series



KAPR=45°





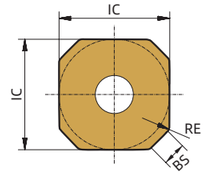
Tool specification	Number of edges	Inventory	Dmension (mm) DC	DCB	DCSFMS	DCX	LF	APMX (mm)	Interface form	Applicable inserts	Screw	Wrench
CFM345-050A2204-SZ12	4	▲	50	22	47	63.7	40	6	A	SZMX□□	M40100	HTT15IP
CFM345-050A2205-SZ12	5	△	50	22	47	63.7	40	6				
CFM345-063A2205-SZ12	5	△	63	22	47	76.7	40	6				
CFM345-063A2206-SZ12	6	▲	63	22	47	76.7	40	6				
CFM345-080A2706-SZ12	6	△	80	27	62	93.7	50	6				
CFM345-080A2708-SZ12	8	▲	80	27	62	93.7	50	6				
CFM345-100A3206-SZ12	6	△	100	32	77	113.7	50	6				
CFM345-100A3208-SZ12	8	△	100	32	77	113.7	50	6				
CFM345-100A3210-SZ12	10	△	100	32	77	113.7	50	6				
CFM345-125B4008-SZ12	8	△	125	40	90	138.7	63	6	B			
CFM345-125B4010-SZ12	10	△	125	40	90	138.7	63	6				
CFM345-125B4012-SZ12	12	△	125	40	90	138.7	63	6				
CFM345-160C4008-SZ12	8	△	160	40	92	173.7	63	6	C			HAT15IP
CFM345-160C4012-SZ12	12	△	160	40	92	173.7	63	6				
CFM345-160C4014-SZ12	14	△	160	40	92	173.7	63	6				

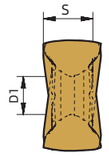
▲Standing inventory △Make-to-order

Applicable Inserts

SZMX □□







Working condition: ● Stable ◕ Average ⌗ Tough

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

Type	Dimension (mm) IC	S	D1	BS	RE	APMX (mm)	CVD HR6130	CVD HR8140	PVD HR5110	PVD HR5210	PVD HR5120	PVD HR5220	PVD HR5130	PVD HR530	PVD HR7130	PVD HR7140	PVD HR7240	Cemented carbide HRK10	Cermet HRC10
SZMX1206ANR-GM	13.4	6.0	4.6	1.4	0.8	6	★		☆	☆	★	★	★						

★ Recommended grade ☆ Available grade

Recommended cutting parameters

Workpiece material		Hardness (HB)	Insert grade	Cutting data: Cutting speed vc (m/min)	Cutting data: Feed rate fz(mm/z)
P	Low-carbon steel, mild steel	≤180	HR5120	270(220-350)	0.3(0.1-0.5)
			HR5220	240(200-320)	
			HR5130	220(200-320)	
	High-carbon steel, alloy steel	180-280	HR5110	240(200-320)	0.2(0.1-0.4)
			HR5120	200(160-280)	
			HR5220	200(160-280)	
			HR5130	200(160-260)	
	Alloy tool steel	280-350	HR5110	220(170-340)	0.15(0.1-0.3)
			HR5210	200(150-280)	
			HR5120	180(150-250)	
			HR5220	180(150-250)	
M	Stainless steel	≤270	HR5120	180(120-240)	0.2(0.1-0.3)
			HR5130	150(120-180)	
K	Cast iron	180-250	HR6130	280(180-320)	0.2(0.1-0.4)
			HR5110	200(150-250)	
			HR5120	200(150-250)	

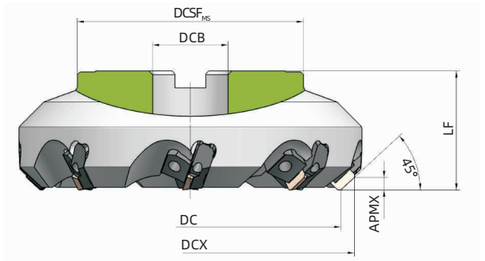
Face Milling

CFM445 series

KAPR=45°







Tool specification	Number of edges	Inventory	Dmension (mm)					APMX (mm)	Interface form	Applicable inserts
			DC	DCB	DCSF$_{MS}$	DCX	LF			
CFM445-080A2704-SE12	4	▲	80	27	62	103	50	5.5	A	SE□R1203□
CFM445-100A3205-SE12	5	▲	100	32	77	122	50	5.5		
CFM445-125B4006-SE12	6	△	125	40	90	147	63	5.5	B	
CFM445-160C4008-SE12	8	△	160	40	92	181	63	5.5	C	
CFM445-200C6010-SE12	10	△	200	60	175	221	63	5.5		
CFM445-250C6012-SE12	12	△	250	60	210	270	63	5.5		
CFM445-315D6015-SE12	15	△	315	60	250	353	63	5.5	D	

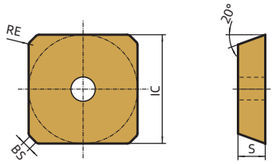
▲Standing inventory △Make-to-order

Insert	Tool holder	Clamping Block	Stud Bolt	Clamping Screw	Wrench
SE□□12	HSERR/L	H05R/L	HM8×21	HOM5×15.4	HT20T HH40T

Applicable Inserts

SE □□





Working condition: ● Stable ◕ Average ⌗ Tough

Applicable inserts	Workpiece material		Working condition
	P	Steel	● ⌗ ● ◕ ◕ ◕ ⌗ ◕ ⌗
	M	Stainless steel	● ◕ ◕ ◕ ⌗ ◕ ⌗ ●
	K	Cast iron	◕ ⌗ ● ● ◕ ◕ ⌗
	N	Non-ferrous metal	●
	S	Heat resistant super alloys Titanium alloy	◕ ●

Type	Dimension (mm)					APMX (mm)	CVD		PVD								Cemented carbide	Cermet
	IC	S	D1	BS	RE		HR6130	HR8140	HR5110	HR5210	HR5120	HR5220	HR5130	HR530	HR7130	HR7140	HR7240	HRK10	HRC10
SEEN1203AFTN	12.7	3.18	2.5	1.2	0.8	5.5													★
SEKR1203AFTN	12.7	3.18	2.5	1.3	1.6	5.5	★		☆	☆	★	★	★						
SEMR1203AFTN	12.7	3.18	2.5	1.3	1.6	5.5	★		☆	☆	★	★	★						

★ Recommended grade ☆ Available grade

Recommended cutting parameters

Workpiece material		Hardness (HB)	Insert grade	Cutting data	
				Cutting speed vc (m/min)	Feed rate fz(mm/z)
P	Low-carbon steel, mild steel	≤180	HR5120	270(220-350)	0.3(0.1-0.5)
			HR5220	240(200-320)	
			HR5130	220(200-320)	
	High-carbon steel, alloy steel	180-280	HR5110	240(200-320)	0.2(0.1-0.4)
			HR5120	200(160-280)	
			HR5220	200(160-280)	
			HR5130	200(160-260)	
	Alloy tool steel	280-350	HR5110	220(170-340)	0.15(0.1-0.3)
			HR5210	200(150-280)	
			HR5120	180(150-250)	
			HR5220	180(150-250)	
M	Stainless steel	≤270	HR5120	180(120-240)	0.2(0.1-0.3)
			HR5130	150(120-180)	
K	Cast iron	180-250	HR6130	280(180-320)	0.2(0.1-0.4)
			HR5110	200(150-250)	
			HR5120	200(150-250)	

HUAREAL

A General turning
Turing of small components
Parting and grooving
Threading
B Indexable milling
Solid carbide end mill
C
Short hole drill
Solid carbide drill

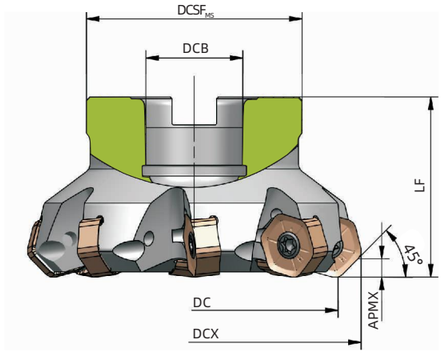
Face Milling

CFM645 series



KAPR=45°



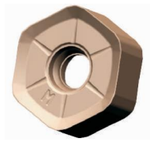


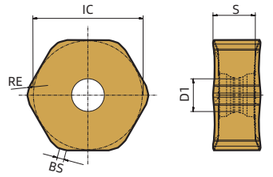
Tool specification	Number of edges	Inventory	Dmension (mm)					APMX (mm)	Interface form	Applicable inserts	Screw	Wrench
			DC	DCB	DCSFMS	DCX	LF					
CFM645-050A2204-HN09	4	△	50	22	47	61.7	40	5	A	HNMX0906□□	M45120	HTT15IP
CFM645-063A2206-HN09	6	△	63	22	47	74.7	40	5				
CFM645-080A2706-HN09	6	△	80	27	62	91.7	50	5				
CFM645-080A2708-HN09	8	▲	80	27	62	91.7	50	5				
CFM645-100A3206-HN09	6	△	100	32	77	111.7	50	5				
CFM645-100A3208-HN09	8	▲	100	32	77	111.7	50	5				
CFM645-100A3210-HN09	10	△	100	32	77	111.7	50	5				
CFM645-125B4006-HN09	6	△	125	40	90	136.7	63	5	B			
CFM645-125B4008-HN09	8	△	125	40	90	136.7	63	5				
CFM645-125B4010-HN09	10	△	125	40	90	136.7	63	5				
CFM645-125B4012-HN09	12	△	125	40	90	136.7	63	5				
CFM645-160C4008-HN09	8	△	160	40	92	171.7	63	5	C			HAT15IP
CFM645-160C4012-HN09	12	▲	160	40	92	171.7	63	5				
CFM645-160C4014-HN09	14	△	160	40	92	171.7	63	5				
CFM645-200C6010-HN09	10	△	200	60	175	211.7	63	5				
CFM645-250C6014-HN09	14	△	250	60	210	261.7	63	5				
CFM645-315D6016-HN09	16	△	315	60	250	326.7	80	5				

▲Standing inventory △Make-to-order

Applicable Inserts

HNMX □□





Working condition: ● Stable ◕ Average ⌗ Tough

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

Type	Dimension (mm)					APMX (mm)	CVD		PVD								Cemented carbide	Cermet
	IC	S	D1	BS	RE		HR6130	HR8140	HR5110	HR5210	HR5120	HR5220	HR5130	HR530	HR7130	HR7140	HR7240	HRK10	HRC10
HNMX0906ANSN-F	16.5	6.34	4.9	1	1.2	5	★		☆	☆	★	★	★						
HNMX0906ANSN-M	16.5	6.34	4.9	1	1.2	5	★		☆	☆	★	★	★						
HNMX0906ANSN-R	16.5	6.34	4.9	1	1.2	5	★		☆	☆	★	★	★						
HNGX0906ANSN	16.5	6.34	4.9	1.2	1	5	★		☆	☆	★	★	★						

★ Recommended grade ☆Available grade

Recommended cutting parameters

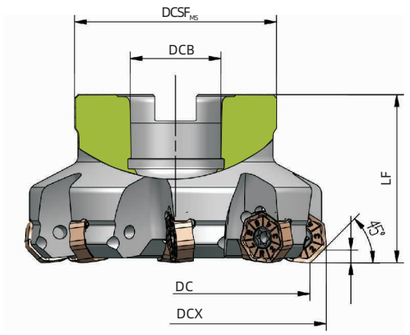
Workpiece material		Hardness (HB)	Insert grade	Cutting data	
				Cutting speed vc (m/min)	Feed rate fz(mm/z)
P	Low-carbon steel, mild steel	≤180	HR5120	270(220-350)	0.3(0.1-0.5)
			HR5220	240(200-320)	
			HR5130	220(200-320)	
	High-carbon steel, alloy steel	180-280	HR5110	240(200-320)	0.2(0.1-0.4)
			HR5120	200(160-280)	
			HR5220	200(160-280)	
			HR5130	200(160-260)	
	Alloy tool steel	280-350	HR5110	220(170-340)	0.15(0.1-0.3)
			HR5210	200(150-280)	
			HR5120	180(150-250)	
			HR5220	180(150-250)	
M	Stainless steel	≤270	HR5120	180(120-240)	0.2(0.1-0.3)
			HR5130	150(120-180)	
K	Cast iron	180-250	HR6130	280(180-320)	0.2(0.1-0.4)
			HR5110	200(150-250)	
			HR5120	200(150-250)	

Face Milling

CFM745 series

KAPR=45°





Tool specification	Number of edges	Inventory	Dmension (mm)					APMX (mm)	Interface form	Applicable inserts	Screw	Wrench
			DC	DCB	DCSFMS	DCX	LF					
CFM745-040A1603-XN07	3	△	40	16	35	49.6	40	4.4	A	XN□X0705□□	M35120	HTT15IP
CFM745-050A2204-XN07	4	▲	50	22	47	59.6	40	4.4				
CFM745-050A2205-XN07	5	△	50	22	47	59.6	40	4.4				
CFM745-063A2205-XN07	5	▲	63	22	47	72.6	40	4.4				
CFM745-063A2206-XN07	6	△	63	22	47	72.6	40	4.4				
CFM745-080A2706-XN07	6	△	80	27	62	89.6	50	4.4				
CFM745-080A2707-XN07	7	▲	80	27	62	89.6	50	4.4				
CFM745-100A3207-XN07	7	▲	100	32	77	109.6	50	4.4				
CFM745-100A3208-XN07	8	△	100	32	77	109.6	50	4.4				
CFM745-125B4008-XN07	8	△	125	40	90	134.6	63	4.4	B			
CFM745-125B4010-XN07	10	△	125	40	90	134.6	63	4.4				
CFM745-160C4011-XN07	11	△	160	40	92	169.6	63	4.4	C			HAT15IP
CFM745-160C4012-XN07	12	△	160	40	92	169.6	63	4.4				
CFM745-063A2205-XN09	5	△	63	22	47	79	50	6	A	XN□X0906□□	M50130	HTT20IP
CFM745-080A2706-XN09	6	△	80	27	62	93	50	6				
CFM745-100A3207-XN09	7	△	100	32	77	113	50	6				
CFM745-100A3208-XN09	8	△	100	32	77	113	50	6				
CFM745-125B4008-XN09	8	△	125	40	90	138	63	6	B			
CFM745-125B4010-XN09	10	△	125	40	90	138	63	6				
CFM745-160C4009-XN09	9	△	160	40	92	173	63	6	C			HAT20IP
CFM745-160C4010-XN09	10	△	160	40	92	173	63	6				
CFM745-200C6012-XN09	12	△	200	60	175	213	63	6				

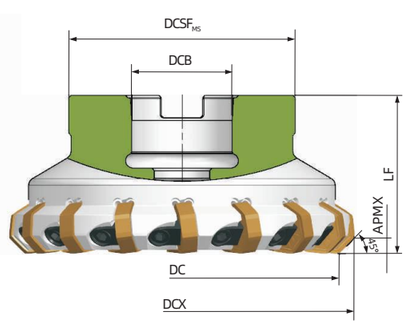
▲Standing inventory △Make-to-order

Face Milling

CFM745 series

KAPR=45°





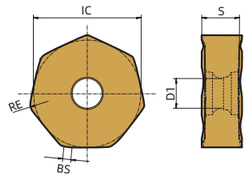
Tool specification	Number of edges	Inventory						APMX (mm)	Interface form	Applicable inserts	Clamping Block	Screw	Wrench
			DC	DCB	DCSFMS	DCX	LF						
CFM745-080A2709W-XN09	9	▲	80	27	62	92	50	6	A	XN□X0906□□	HW01N	HM8.0X30X1.0	WR40L
CFM745L-080A2709W-XN09	9	△	80	27	62	92	50	6					
CFM745-100A3212W-XN09	12	▲	100	32	77	112	50	6					
CFM745L-100A3212W-XN09	12	△	100	32	77	112	50	6					
CFM745-125A4016W-XN09	16	▲	125	40	90	137	63	6					
CFM745L-125A4016W-XN09	16	△	125	40	90	137	63	6					
CFM745-160C4020W-XN09	20	▲	160	40	92	172	63	6	C				
CFM745L-160C4020W-XN09	20	△	160	40	92	172	63	6					
CFM745-200C6026W-XN09	26	▲	200	60	131	212	63	6					
CFM745L-200C6026W-XN09	26	△	200	60	131	212	63	6					
CFM745-250C6030W-XN09	30	▲	250	60	137	262	80	6					
CFM745L-250C6030W-XN09	30	△	250	60	137	262	80	6					

▲Standing inventory △Make-to-order

Applicable Inserts

XN □□





Working condition: ● Stable ◕ Average ⌗ Tough

Applicable inserts	Workpiece material	
	P	Steel
	M	Stainless steel
	K	Cast iron
	N	Non-ferrous metal
	S	Heat resistant super alloys Titanium alloy

Type	Dimension (mm)					APMX (mm)	CVD		PVD							Cemented carbide	Cermet
	IC	S	D1	BS	RE		HR6130	HR8140	HR5110	HR5210	HR5120	HR5220	HR5130	HR530	HR7130	HR7140	HR7240	HRK10	HRC10
XNMX070508-M	14.5	5	4.06	/	0.8	4.4	★	★	☆	☆	★		★			★			
XNMX0705ANN-M	14.5	5	4.06	1.0	0.8	4.4	★	★	☆	☆	★		★			★			
XNGX0705ANN-M	14.5	5	4.06	1.0	0.8	4.4	★	★	☆	☆	★		★			★			
XNGX0705ANN-R	14.5	5	4.06	1.0	0.8	4.4	★	★	☆	☆	★		★			★			
XNMX090612-M	19.05	5.85	5.5	/	1.2	6.0	★	★	☆	☆	★		★			★			
XNMX0906ANN-M	19.05	5.85	5.5	1.4	0.8	6.0	★	★	☆	☆	★		★			★			
XNMX0906ANN-R	19.05	5.85	5.5	1.4	0.8	6.0	★	★	☆	☆	★		★			★			
XNGX0705ANN-W	14.5	5	4.06	6	1	4.4					★		★						
XNGX0906ANN-W	19.05	5.85	5.5	7.5	1	6.0					★		★						
XNGX0906-W	19.05	5.85	2.8	7.5	1.5	6.0					★		★						

· XNGX**ANN-W are only compatible with XN**ANN.
· XNGX0906-W are only compatible with XNMX090612-M, and must be used with wedge-clamping cutter bodies.

★ Recommended grade ☆ Available grade

Recommended cutting parameters

Workpiece material		Hardness (HB)	Insert grade	Cutting data	
				Cutting speed vc (m/min)	Feed rate fz(mm/z)
P	Low-carbon steel, mild steel	≤180	HR5120	270(220-350)	0.3(0.1-0.5)
			HR5130	220(200-320)	
	High-carbon steel, alloy steel	180-280	HR5120	200(160-280)	0.2(0.1-0.4)
			HR5130	200(160-260)	
	Alloy tool steel	280-350	HR5110	220(170-340)	0.15(0.1-0.3)
			HR5120	180(150-250)	
			HR5130	180(150-250)	
M	Stainless steel	≤270	HR5120	180(120-240)	0.2(0.1-0.3)
			HR5130	150(120-180)	
K	Cast iron	180-250	HR6130	280(180-320)	0.2(0.1-0.4)
			HR5120	200(150-250)	

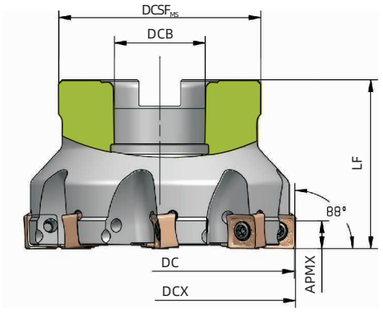
Square Shoulder Milling

CSM188 series



KAPR=88°





Tool specification	Number of edges	Inventory	DC	DCB	DCSFMS	DCX	LF	APMX (mm)	Interface form	Applicable inserts	Screw	Wrench
CSM188-050A2204-SN10	4	▲	50	22	47	50.7	40	8	A	SN□X1005□	M35100	HTT10IP
CSM188-050A2205-SN10	5	△	50	22	47	50.7	40	8				
CSM188-063A2205-SN10	5	▲	63	22	47	63.7	40	8				
CSM188-063A2206-SN10	6	△	63	22	47	63.7	40	8				
CSM188-080A2706-SN10	6	▲	80	27	62	80.7	50	8				
CSM188-080A2708-SN10	8	△	80	27	62	80.7	50	8				
CSM188-100A3206-SN10	6	△	100	32	77	100.7	50	8				
CSM188-100A3208-SN10	8	▲	100	32	77	100.7	50	8				
CSM188-100A3211-SN10	11	△	100	32	77	100.7	50	8				
CSM188-125B4008-SN10	8	△	125	40	90	125.7	63	8	B			
CSM188-125B4010-SN10	10	▲	125	40	90	125.7	63	8				
CSM188-125B4014-SN10	14	△	125	40	90	125.7	63	8				
CSM188-160C4008-SN10	8	△	160	40	92	160.7	63	8	C			HTA10IP
CSM188-160C4012-SN10	12	△	160	40	92	160.7	63	8				
CSM188-160C4014-SN10	14	△	160	40	92	160.7	63	8				

▲Standing inventory △Make-to-order

HUAREAL

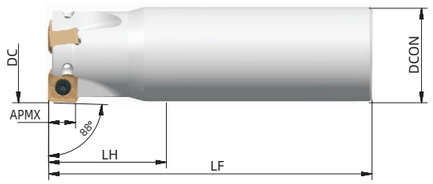
Square Shoulder Milling

SSM188 series



KAPR=88°





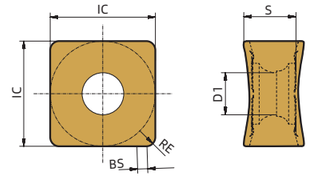
Tool specification	Number of edges	Inventory	Dmension (mm)				APMX (mm)	Applicable inserts	Screw	Wrench
			DC	DCON	LF	LH				
SSM188-032G3202-SN10	2	▲	32	32	110	32.8	8	SN□X1005□	M35100	HTT10IP
SSM188-032G3203-SN10	3	△	32	32	110	32.8	8			
SSM188-040G3203-SN10	3	△	40	32	110	40.8	8			
SSM188-040G3204-SN10	4	△	40	32	110	40.8	8			

▲Standing inventory △Make-to-order

Applicable Inserts

SN □□





Working condition: ● Stable ◕ Average ⌗ Tough

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

Type	Dimension (mm)					APMX (mm)	CVD		PVD								Cemented carbide	Cermet
	IC	S	D1	BS	RE		HR6130	HR8140	HR5110	HR5210	HR5120	HR5220	HR5130	HR530	HR7130	HR7140	HR7240	HRK10	HRC10
SNGX1005ZNN-GM	10.0	5.0	4.0	1.0	0.8	8	★		☆	☆	★	★	★						
SNMX100512-GM	10.0	5.0	4.0	/	1.2	8	★		☆	☆	★	★	★						

★ Recommended grade ☆Available grade

Recommended cutting parameters

Workpiece material		Hardness (HB)	Insert grade	Cutting data	
				Cutting speed vc (m/min)	Feed rate fz(mm/z)
P	Low-carbon steel, mild steel	≤180	HR5120	270(220-350)	0.3(0.1-0.5)
			HR5220	240(200-320)	
			HR5130	220(200-320)	
	High-carbon steel, alloy steel	180-280	HR5110	240(200-320)	0.2(0.1-0.4)
			HR5120	200(160-280)	
			HR5220	200(160-280)	
			HR5130	200(160-260)	
	Alloy tool steel	280-350	HR5110	220(170-340)	0.15(0.1-0.3)
			HR5210	200(150-280)	
			HR5120	180(150-250)	
			HR5220	180(150-250)	
M	Stainless steel	≤270	HR5120	180(120-240)	0.2(0.1-0.3)
			HR5130	150(120-180)	
K	Cast iron	180-250	HR6130	280(180-320)	0.2(0.1-0.4)
			HR5110	200(150-250)	
			HR5120	200(150-250)	

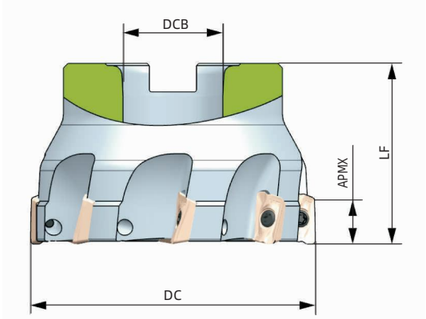
Square Shoulder Milling

CSM190 series



KAPR=90°





Tool specification	Number of edges	Inventory	Dmension (mm)			APMX (mm)	Interface form	Applicable inserts	Screw	Wrench
			DC	DCB	LF					
CSM190-040A1610-AO06	10	△	40	16	40	6.4	A	AOKT06□□	M18039	HFT05IP
CSM190-050A2212-AO06	12	△	50	22	40	6.4				
CSM190-063A2214-AO06	14	△	63	22	40	6.4				
CSM190-040A1605-AO11	5	△	40	16	40	9.5		AOKT11□□	M25065	HFT08IP
CSM190-050A2206-AO11	6	▲	50	22	40	9.5				
CSM190-063A2207-AO11	7	▲	63	22	40	9.5				
CSM190-050A2204-AO16	4	△	50	22	40	14.5		AOKT16□□	M40100	HTT15IP
CSM190-063A2205-AO16	5	▲	63	22	40	14.5				
CSM190-080A2706-AO16	6	▲	80	27	50	14.5				

▲Standing inventory △Make-to-order

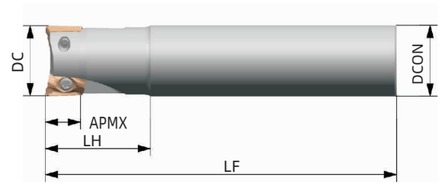
Square Shoulder Milling

SSM190 series



KAPR=90°





Tool specification	Number of edges	Inventory	Dmension (mm)				APMX (mm)	Applicable inserts	Screw	Wrench
			DC	DCON	LF	LH				
SSM190-010G0802L-AO06	2	△	10	8	100	/	6.4	AOKT06□□	M18036	HFT06IP
SSM190-010G1002-AO06	2	▲	10	10	80	20	6.4			
SSM190-010G1002L-AO06	2	△	10	10	120	30	6.4		M18039	HFT05IP
SSM190-012G1203-AO06	3	▲	12	12	80	25	6.4			
SSM190-012G1203L-AO06	3	△	12	12	120	/	6.4			
SSM190-014G1203L-AO06	3	△	14	12	120	30	6.4			
SSM190-016G1602-AO11	2	▲	16	16	130	40	9.5	AOKT11□□	M25065	HFT08IP
SSM190-016G1602L-AO11	2	△	16	16	160	40	9.5			
SSM190-017G1602-AO11	2	▲	17	16	130	40	9.5			
SSM190-017G1602L-AO11	2	△	17	16	160	40	9.5			
SSM190-020G2002-AO11	2	▲	20	20	130	40	9.5			
SSM190-020G2002L-AO11	2	△	20	20	160	40	9.5			
SSM190-021G2002L-AO11	2	△	21	20	160	50	9.5			
SSM190-021G2002-AO11	2	▲	21	20	130	50	9.5			
SSM190-025G2503-AO11	3	▲	25	25	120	50	9.5			
SSM190-025G2503L-AO11	3	△	25	25	160	50	9.5			
SSM190-025G2502-AO16	2	▲	25	25	160	50	14.5	AOKT16□□	M40090	HTT15IP
SSM190-025G2502L-AO16	2	△	25	25	200	50	14.5			
SSM190-026G2502-AO16	2	▲	26	25	160	50	14.5			
SSM190-026G2502L-AO16	2	△	26	25	200	50	14.5			
SSM190-032G3202-AO16	2	▲	32	32	160	80	14.5			
SSM190-032G3202L-AO16	2	△	32	32	200	80	14.5			

▲Standing inventory △Make-to-order

HUAREAL

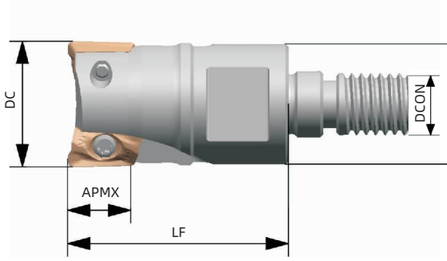
Square Shoulder Milling

KH- series



KAPR=90°





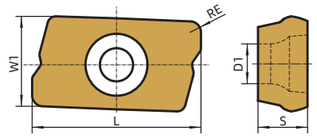
Tool specification	Number of edges	Inventory	Dmension (mm)				APMX (mm)	Applicable inserts	Screw	Wrench
			DC	DCSF$_{MS}$	LF	DCON				
KH-1102-AOKT06-M05	2	△	11	9	18	5	4.5	AOKT06□□	M18036	HFT06IP
KH-1303-AOKT06-M06	3	▲	13	11	18	6	4.5			
KH-1503-AOKT06-M08	3	▲	15	14	22	8	4.5			
KH-1704-AOKT06-M08	4	△	17	14	22	8	4.5			
KH-1702-AOKT11-M08	2	▲	17	14	25	8	9.5	AOKT11□□	M25065	HFT08IP
KH-2102-AOKT11-M10	2	▲	21	18	30	10	9.5			
KH-2603-AOKT11-M12	3	▲	26	23	35	12	9.5			
KH-3304-AOKT11-M16	4	▲	33	29	40	16	9.5			

▲Standing inventory △Make-to-order

Applicable Inserts

AO □□





Working condition: ● Stable ◕ Average ⌗ Tough

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

Type	Dimension (mm)					APMX (mm)	CVD		PVD							Cemented carbide	Cermet
	L	W1	S	D1	RE		HR6130	HR8140	HR5110	HR5210	HR5120	HR5220	HR5130	HR530	HR7130	HR7140	HR7240	HRK10	HRC10
AOKT060202PEER-VM	7.61	4.20	2.38	2.1	0.2	4.5					★	★	★	☆					☆
AOKT060204PEER-VM	7.61	4.20	2.38	2.1	0.4	4.5					★	★	★	☆					☆
AOKT060208PEER-VM	7.61	4.20	2.38	2.1	0.8	4.5					★	★	★	☆					☆
AOKT113504PEER-VM	11.75	6.42	3.50	2.8	0.4	9.5	★		☆	☆	★	★	★	☆			☆		☆
AOKT113508PEER-VM	11.75	6.42	3.50	2.8	0.8	9.5	★		☆	☆	★	★	★	☆			☆		☆
AOKT113512PEER-VM	11.75	6.42	3.50	2.8	1.2	9.5	★		☆	☆	★	★	★	☆			☆		☆
AOKT113516PEER-VM	11.75	6.42	3.50	2.8	1.6	9.5	★		☆	☆	★	★	★	☆			☆		☆
AOKT113520PEER-VM	11.75	6.42	3.50	2.8	2.0	9.5	★		☆	☆	★	★	★	☆			☆		☆
AOKT113532PEER-VM	11.75	6.42	3.50	2.8	3.2	9.5	★		☆	☆	★	★	★	☆			☆		☆
AOKT160408PEER-VM	17.65	9.64	4.76	4.4	0.8	14.5	★		☆	☆	★	★	★	☆			☆		☆
AOKT160412PEER-VM	17.65	9.64	4.76	4.4	1.2	14.5	★		☆	☆	★	★	★	☆			☆		☆
AOKT160416PEER-VM	17.65	9.64	4.76	4.4	1.6	14.5	★		☆	☆	★	★	★	☆			☆		☆

★ Recommended grade ☆ Available grade

Recommended cutting parameters

Workpiece material		Hardness (HB)	Insert grade	Cutting data	
				Cutting speed vc (m/min)	Feed rate fz(mm/z)
P	Low-carbon steel, mild steel	≤180HB	HR5120	280(220-340)	0.2(0.1-0.3)
			HR5130	180(120-250)	
			HR530	180(120-250)	
	High-carbon steel, alloy steel	180-280HB	HR5110	240(180-300)	0.2(0.1-0.3)
			HR5120	200(140-260)	
			HR5220	200(140-260)	
			HR5130	160(100-220)	
	Alloy tool steel	280-350HB	HR5110	220(140-280)	0.15(0.1-0.25)
			HR5210	160(100-220)	
			HR5120	160(100-220)	
			HR5220	120(80-180)	
M	Stainless steel	≤270HB	HR5120	180(100-260)	0.2(0.1-0.3)
			HR5130	140(80-200)	
			HR530	140(80-200)	
K	Cast iron	180-250HB	HR6130	250(150-320)	0.2(0.1-0.3)
			HR5210	180(150-250)	
			HR5220	180(150-250)	
S	Heat-resistant alloys / titanium alloys	≤400HB	HR5120	60(30-120)	0.1(0.06-0.22)
			HR7240	60(30-120)	
H	High-hardness materials	45-55HRC	HR5220	150(100-250)	0.2(0.1-0.3)
		≥55HRC	HR5210	120(80-200)	

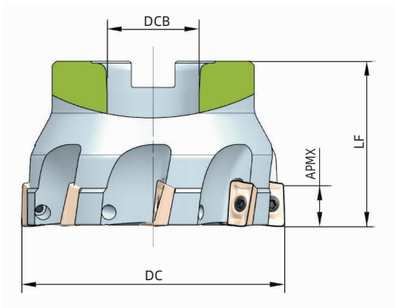
Square Shoulder Milling

CSM290 series



KAPR=90°





Tool specification	Number of edges	Inventory	Dmension (mm)			APMX (mm)	Interface form	Applicable inserts	Screw	Wrench
			DC	DCB	LF					
CSM290-050A2206-AP11	6	△	50	22	40	9.5	A	APKT11	M25065	HFT08IP
CSM290-063A2207-AP11	7	▲	63	22	40	9.5				
CSM290-080A2708-AP11	8	△	80	27	50	9.5				
CSM290-100B3210-AP11	10	△	100	32	50	9.5	B			
CSM290-050A2204-AP16	4	△	50	22	40	14.5	A	APKT16	M40100	HTT15IP
CSM290-063A2205-AP16	5	▲	63	22	40	14.5				
CSM290-080A2706-AP16	6	▲	80	27	50	14.5				
CSM290-100B3208-AP16	8	△	100	32	50	14.5	B			
CSM290-125B4010-AP16	10	△	125	40	63	14.5				

▲Standing inventory △Make-to-order

HUAREAL

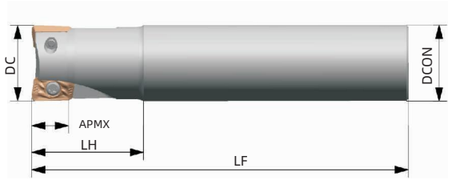
Square Shoulder Milling

SSM290 series



KAPR=90°





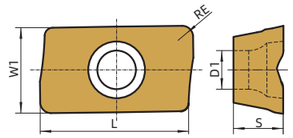
Tool specification	Number of edges	Inventory	Dmension (mm)				APMX (mm)	Applicable inserts	Screw	Wrench
			DC	DCON	LF	LH				
SSM290-016G1602-AP11	2	▲	16	16	130	40	9.5	APKT11	M25065	HFT08IP
SSM290-016G1602L-AP11	2	△	16	16	160	50	9.5			
SSM290-020G2002-AP11	2	▲	20	20	130	40	9.5			
SSM290-020G2002L-AP11	2	△	20	20	160	50	9.5			
SSM290-025G2503-AP11	3	▲	25	25	130	40	9.5			
SSM290-025G2503L-AP11	3	△	25	25	160	50	9.5			
SSM290-032G3204-AP11	4	△	32	32	130	40	9.5			
SSM290-032G3204L-AP11	4	△	32	32	160	50	9.5			
SSM290-025G2502-AP16	2	▲	25	25	160	50	14.5	APKT16	M40090	HTT15IP
SSM290-025G2502L-AP16	2	△	25	25	200	75	14.5			
SSM290-032G3202-AP16	2	△	32	32	160	50	14.5			
SSM290-032G3202L-AP16	2	△	32	32	200	80	14.5			
SSM290-040G3204-AP16	4	△	40	32	160	50	14.5			
SSM290-040G3204L-AP16	4	△	40	32	200	80	14.5			

▲Standing inventory △Make-to-order

Applicable Insert

AP □□





Working condition: ● Stable ◕ Average ⌗ Tough

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

Type	Dimension (mm)					APMX (mm)	CVD		PVD							Cemented carbide	Cermet
	L	W1	S	D1	RE		HR6130	HR8140	HR5110	HR5210	HR5120	HR5220	HR5130	HR530	HR7130	HR7140	HR7240	HRK10	HRC10
APKT113604PEER-FM	11.30	6.25	3.60	2.8	0.4	9.5	★		☆	☆	★	★	★	☆					☆
APKT1136PEER-FM	11.30	6.25	3.60	2.8	0.8	9.5	★		☆	☆	★	★	★	☆					☆
APKT113612PEER-FM	11.30	6.25	3.60	2.8	1.2	9.5	★		☆	☆	★	★	★	☆					☆
APKT113620PEER-FM	11.30	6.25	3.60	2.8	2.0	9.5	★		☆	☆	★	★	★	☆					☆
APKT1605PDER-FM	17.42	9.33	5.20	4.5	0.8	14.5	★		☆	☆	★	★	★	☆					☆
APKT160512PDER-FM	17.42	9.33	5.20	4.5	1.2	14.5	★		☆	☆	★	★	★	☆					☆
APKT160520PDER-FM	17.42	9.33	5.20	4.5	2.0	14.5	★		☆	☆	★	★	★	☆					☆

★ Recommended grade ☆ Available grade

Recommended cutting parameters

Workpiece material		Hardness (HB)	Insert grade	Cutting data	
				Cutting speed vc (m/min)	Feed rate fz(mm/z)
P	Low-carbon steel, mild steel	≤180HB	HR5120	280(220-340)	0.2(0.1-0.3)
			HR5130	180(120-250)	
			HR530	180(120-250)	
	High-carbon steel, alloy steel	180-280HB	HR5110	240(180-300)	0.2(0.1-0.3)
			HR5120	200(140-260)	
			HR5220	200(140-260)	
			HR5130	160(100-220)	
	Alloy tool steel	280-350HB	HR5110	220(140-280)	0.15(0.1-0.25)
			HR5210	160(100-220)	
			HR5120	160(100-220)	
			HR5220	120(80-180)	
M	Stainless steel	≤270HB	HR5120	180(100-260)	0.2(0.1-0.3)
			HR5130	140(80-200)	
			HR530	140(80-200)	
K	Cast iron	180-250HB	HR6130	250(150-320)	0.2(0.1-0.3)
			HR5210	180(150-250)	
			HR5220	180(150-250)	
H	High-hardness materials	45-55HRC	HR5220	150(100-250)	0.2(0.1-0.3)
		≥55HRC	HR5210	120(80-200)	

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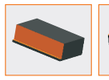
Square Shoulder Milling

CSM390 series





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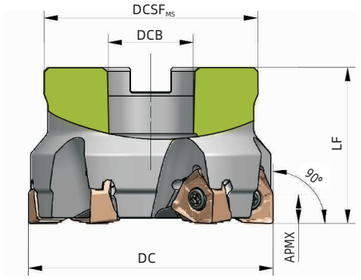


Tool specification	Number of edges	Inventory	Dmension (mm)				APMX (mm)	Interface form	Applicable inserts	Screw	Wrench
			DC	DCB	DCSF$_{MS}$	LF					
CSM390-040A1605-ZN04	5	▲	40	16	35	40	4.2	A	ZNMU0403□□	M25065	HAT08IP
CSM390-040A1607-ZN04	7	△	40	16	35	40	4.2				
CSM390-050A2206-ZN04	6	▲	50	22	47	40	4.2				
CSM390-050A2208-ZN04	8	△	50	22	47	40	4.2				
CSM390-063A2207-ZN04	7	▲	63	22	47	40	4.2				
CSM390-063A2210-ZN04	10	△	63	22	47	40	4.2				
CSM390-040A1604-ZN06	4	▲	40	16	35	40	6.3		ZNMU0608□□	M35076	HTT10IP
CSM390-040A1605-ZN06	5	△	40	16	35	40	6.3				
CSM390-050A2204-ZN06	4	▲	50	22	47	40	6.3				
CSM390-050A2206-ZN06	6	△	50	22	47	40	6.3				
CSM390-063A2204-ZN06	4	△	63	22	47	40	6.3				
CSM390-063A2206-ZN06	6	▲	63	22	47	40	6.3				
CSM390-080A2706-ZN06	6	△	80	27	62	50	6.3				
CSM390-080A2707-ZN06	7	▲	80	27	62	50	6.3				
CSM390-080A2709-ZN06	9	△	80	27	62	50	6.3				
CSM390-100A3207-ZN06	7	△	100	32	77	50	6.3				
CSM390-100A3208-ZN06	8	▲	100	32	77	50	6.3				
CSM390-100A3211-ZN06	11	△	100	32	77	50	6.3				
CSM390-125A4008-ZN06	8	▲	125	40	90	63	6.3				
CSM390-125A4011-ZN06	11	▲	125	40	90	63	6.3				
CSM390-125A4014-ZN06	14	△	125	40	90	63	6.3				
CSM390-160C4010-ZN06	10	△	160	40	92	63	6.3	C			
CSM390-160C4012-ZN06	12	▲	160	40	92	63	6.3				
CSM390-160C4016-ZN06	16	△	160	40	92	63	6.3				
CSM390-200C6014-ZN06	14	△	200	60	137	63	6.3				
CSM390-200C6018-ZN06	18	△	200	60	137	63	6.3				
CSM390-250C6018-ZN06	18	△	250	60	137	63	6.3				
CSM390-250C6022-ZN06	22	△	250	60	137	63	6.3				

▲Standing inventory △Make-to-order

Square Shoulder Milling

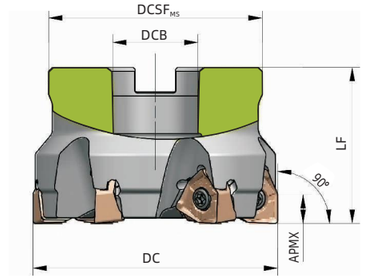
CSM390 series





KAPR=90°



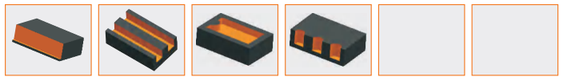


Tool specification	Number of edges	Inventory	Dmension (mm)				APMX (mm)	Interface form	Applicable inserts	Screw	Wrench
			DC	DCB	DCSF$_{MS}$	LF					
CSM390-050A2204-ZN08	4	▲	50	22	47	40	7.3	A	ZNMU0806□□	M40110	HTT15IP
CSM390-050A2205-ZN08	5	△	50	22	47	40	7.3				
CSM390-063A2205-ZN08	5	▲	63	22	47	40	7.3				
CSM390-063A2206-ZN08	6	△	63	22	47	40	7.3				
CSM390-080A2706-ZN08	6	▲	80	27	62	50	7.3				
CSM390-080A2707-ZN08	7	△	80	27	62	50	7.3				
CSM390-080A2709-ZN08	9	△	80	27	62	50	7.3				
CSM390-100A3207-ZN08	7	▲	100	32	77	50	7.3				
CSM390-100A3208-ZN08	8	△	100	32	77	50	7.3				
CSM390-100A3211-ZN08	11	△	100	32	77	50	7.3				
CSM390-125B4008-ZN08	8	▲	125	40	90	63	7.3	B			
CSM390-125B4011-ZN08	11	▲	125	40	90	63	7.3				
CSM390-125B4014-ZN08	14	△	125	40	90	63	7.3				
CSM390-160C4010-ZN08	10	△	160	40	92	63	7.3	C			HAT15IP
CSM390-160C4012-ZN08	12	▲	160	40	92	63	7.3				
CSM390-160C4016-ZN08	16	△	160	40	92	63	7.3				
CSM390-200C6012-ZN08	12	△	200	60	175	63	7.3				
CSM390-200C6016-ZN08	16	△	200	60	175	63	7.3				
CSM390-250C6014-ZN08	14	△	250	60	210	63	7.3				
CSM390-250C6018-ZN08	18	△	250	60	210	63	7.3				

▲Standing inventory △Make-to-order

Square Shoulder Milling

SSM390 series



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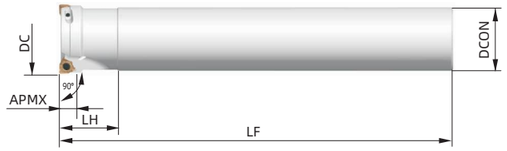
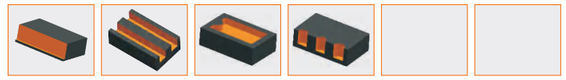


Tool specification	Number of edges	Inventory	Dmension (mm)				APMX (mm)	Applicable inserts	Screw	Wrench
			DC	DCON	LF	LH				
SSM390-018G1602L-ZN04	2	△	18	16	150	30	4.2	ZNMU0403□□	M25065	HFT08IP
SSM390-020G2002L-ZN04	2	▲	20	20	150	30	4.2			
SSM390-020G2003L-ZN04	3	△	20	20	150	30	4.2			
SSM390-021G2002L-ZN04	2	▲	21	20	150	30	4.2			
SSM390-021G2003L-ZN04	3	△	21	20	150	30	4.2			
SSM390-025G2502L-ZN04	2	▲	25	25	170	30	4.2			
SSM390-025G2503L-ZN04	3	▲	25	25	170	30	4.2			
SSM390-025G2504L-ZN04	4	△	25	25	170	30	4.2			
SSM390-025G2505L-ZN04	5	△	25	25	170	30	4.2			
SSM390-026G2502L-ZN04	2	▲	26	25	170	30	4.2			
SSM390-026G2503L-ZN04	3	△	26	25	170	30	4.2			
SSM390-032G3202L-ZN04	2	▲	32	32	200	30	4.2			
SSM390-032G3203L-ZN04	3	▲	32	32	200	30	4.2			
SSM390-032G3204L-ZN04	4	△	32	32	200	30	4.2			
SSM390-032G3205L-ZN04	5	△	32	32	200	30	4.2			
SSM390-032G3206L-ZN04	6	△	32	32	200	30	4.2			
SSM390-035G3202L-ZN04	2	▲	35	32	200	30	4.2			
SSM390-035G3203L-ZN04	3	▲	35	32	200	30	4.2			
SSM390-035G3204L-ZN04	4	△	35	32	200	30	4.2			
SSM390-040G3204L-ZN04	4	△	40	32	200	30	4.2			
SSM390-040G3205L-ZN04	5	△	40	32	200	30	4.2			
SSM390-040G3206L-ZN04	6	△	40	32	200	30	4.2			
SSM390-026G2502L-ZN06	2	△	26	25	170	30	6.3	ZNMU0604□□	M35076	HTT10IP
SSM390-032G3202L-ZN06	2	▲	32	32	200	30	6.3			
SSM390-032G3203L-ZN06	3	▲	32	32	200	30	6.3			
SSM390-035G3202L-ZN06	2	▲	35	32	200	30	6.3			
SSM390-035G3203L-ZN06	3	▲	35	32	200	30	6.3			
SSM390-035G3204L-ZN06	4	△	35	32	200	30	6.3			
SSM390-040G3202L-ZN06	2	△	40	32	200	30	6.3			
SSM390-040G3203L-ZN06	3	▲	40	32	200	30	6.3			
SSM390-040G3204L-ZN06	4	△	40	32	200	30	6.3			

▲Standing inventory △Make-to-order

Square Shoulder Milling

SSM390 series



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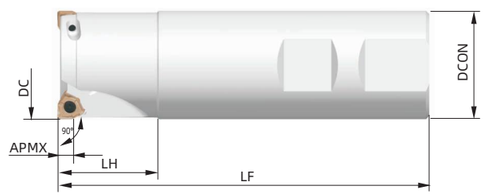
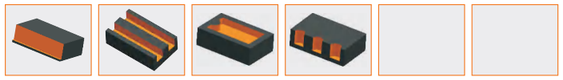


Tool specification	Number of edges	Inventory	Dmension (mm)				APMX (mm)	Applicable inserts	Screw	Wrench
			DC	DCON	LF	LH				
SSM390-020X2002-ZN04	2	△	20	20	90	30	4.2	ZNMU0403□□	M25065	HFT08IP
SSM390-020X2003-ZN04	3	△	20	20	90	30	4.2			
SSM390-025X2502-ZN04	2	▲	25	25	100	30	4.2			
SSM390-025X2503-ZN04	3	▲	25	25	100	30	4.2			
SSM390-025X2504-ZN04	4	△	25	25	100	30	4.2			
SSM390-025X2505-ZN04	5	△	25	25	100	30	4.2			
SSM390-032X3202-ZN04	2	▲	32	32	110	30	4.2			
SSM390-032X3203-ZN04	3	▲	32	32	110	30	4.2			
SSM390-032X3204-ZN04	4	△	32	32	110	30	4.2			
SSM390-032X3205-ZN04	5	△	32	32	110	30	4.2			
SSM390-032X3206-ZN04	6	△	32	32	110	30	4.2			
SSM390-032X3202-ZN06	2	▲	32	32	110	30	6.3	ZNMU0604□□	M35076	HTT10IP
SSM390-032X3203-ZN06	3	▲	32	32	110	30	6.3			
SSM390-035X3202-ZN06	2	△	35	32	110	30	6.3			
SSM390-035X3203-ZN06	3	▲	35	32	110	30	6.3			
SSM390-035X3204-ZN06	4	△	35	32	110	30	6.3			
SSM390-040X3202-ZN06	2	△	40	32	110	30	6.3			
SSM390-040X3203-ZN06	3	▲	40	32	110	30	6.3			
SSM390-040X3204-ZN06	4	△	40	32	110	30	6.3			

▲Standing inventory △Make-to-order

Square Shoulder Milling

KH- series



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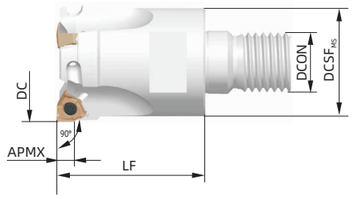
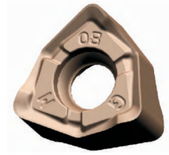


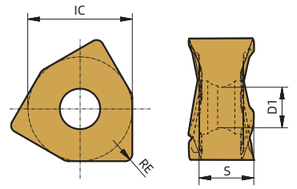
Tool specification	Number of edges	Inventory	Dmension (mm)				APMX (mm)	Applicable inserts	Screw	Wrench
			DC	DCSFMS	LF	DCON				
KH-2002-ZN04-M10	2	▲	20	18	30	10	4.2	ZNMU0403□□	M25065	HFT08IP
KH-2003-ZN04-M10	3	△	20	18	30	10	4.2			
KH-2502-ZN04-M12	2	△	25	23	30	12	4.2			
KH-2503-ZN04-M12	3	▲	25	23	30	12	4.2			
KH-2504-ZN04-M12	4	△	25	23	30	12	4.2			
KH-2505-ZN04-M12	5	△	25	23	30	12	4.2			
KH-3202-ZN04-M16	2	△	32	30	40	16	4.2			
KH-3203-ZN04-M16	3	△	32	30	40	16	4.2			
KH-3204-ZN04-M16	4	▲	32	30	40	16	4.2			
KH-3205-ZN04-M16	5	△	32	30	40	16	4.2			
KH-3206-ZN04-M16	6	△	32	30	40	16	4.2			
KH-3202-ZN06-M16	2	△	32	30	40	16	6.3	ZNMU0604□□	M35076	HTT10IP
KH-3203-ZN06-M16	3	△	32	30	40	16	6.3			
KH-3502-ZN06-M16	2	△	35	30	40	16	6.3			
KH-3503-ZN06-M16	3	△	35	30	40	16	6.3			
KH-4003-ZN06-M16	3	△	40	30	40	16	6.3			
KH-4004-ZN06-M16	4	△	40	30	40	16	6.3			

▲Standing inventory △Make-to-order

Applicable Inserts

ZN□□





Working condition: ● Stable ◕ Average ⌗ Tough

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

Type	Dimension (mm)				APMX (mm)	CVD		PVD								Cemented carbide	Cermet
	IC	S	D1	RE		HR6130	HR8140	HR5110	HR5210	HR5120	HR5220	HR5130	HR530	HR7130	HR7140	HR7240	HRK10	HRC10
ZNMU040308PNR-GM	7.00	3.65	2.8	0.8	4.2	★		☆	☆	★	★	★	☆					☆
ZNMU060408PNR-GM	10.16	4.41	4.2	0.8	6.3	★		☆	☆	★	★	★	☆					☆
ZNMU080608PNR-GM	12.00	6.35	4.6	0.8	7.3	★		☆	☆	★	★	★	☆					☆
ZNMU080608PNR-GL	12.00	6.35	4.6	0.8	7.3	★		☆	☆	★	★	★	☆					☆
ZNMU080608PNR-GR	12.00	6.35	4.6	0.8	7.3	★		☆	☆	★	★	★	☆					☆
ZNMU080616PNR-GR	12.00	6.35	4.6	1.6	7.3	★		☆	☆	★	★	★	☆					☆

★ Recommended grade ☆ Available grade

Recommended cutting parameters

Workpiece material		Hardness (HB)	Insert grade	Cutting data	
				Cutting speed vc (m/min)	Feed rate fz(mm/z)
P	Low-carbon steel, mild steel	≤180HB	HR5120	280(220-340)	0.2(0.1-0.3)
			HR5130	180(120-250)	
			HR530	180(120-250)	
	High-carbon steel, alloy steel	180-280HB	HR5110	240(180-300)	0.2(0.1-0.3)
			HR5120	200(140-260)	
			HR5220	200(140-260)	
			HR5130	160(100-220)	
	Alloy tool steel	280-350HB	HR5110	220(140-280)	0.15(0.1-0.25)
			HR5210	160(100-220)	
			HR5120	160(100-220)	
			HR5220	120(80-180)	
M	Stainless steel	≤270HB	HR5120	180(100-260)	0.2(0.1-0.3)
			HR5130	140(80-200)	
			HR530	140(80-200)	
K	Cast iron	180-250HB	HR6130	250(150-320)	0.2(0.1-0.3)
			HR5210	180(150-250)	
			HR5220	180(150-250)	
H	High-hardness materials	45-55HRC	HR5220	150(100-250)	0.2(0.1-0.3)
		≥55HRC	HR5210	120(80-200)	

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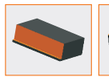
Square Shoulder Milling

CSM590 series



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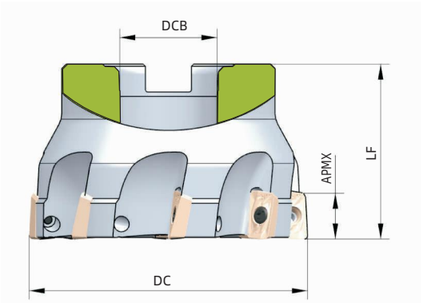


Tool specification	Number of edges	Inventory	Dmension (mm)			APMX (mm)	Interface form	Applicable inserts	Screw	Wrench
			DC	DCB	LF					
CSM590-050A2206-AP11	6	△	50	22	40	9.5	A	APMT11□□ APGT11□□	M25065	HTT08IP
CSM590-063A2208-AP11	8	△	63	22	40	9.5				
CSM590-080A2708-AP11	8	▲	80	27	50	9.5				
CSM590-100B3210-AP11	10	△	100	32	50	9.5				
CSM590-050A2205-AP16	5	△	50	22	40	14.5	B	APMT16□□ APGT16□□	M40100	HTT15IP
CSM590-063A2206-AP16	6	△	63	22	40	14.5				
CSM590-080A2707-AP16	7	△	80	27	50	14.5				
CSM590-100B3208-AP16	8	△	100	32	50	14.5				
CSM590-125B4010-AP16	10	△	125	40	63	14.5				

▲Standing inventory △Make-to-order

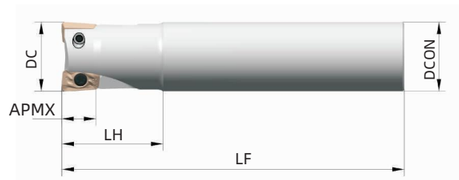
Square Shoulder Milling

SSM590 series



KAPR=90°





Tool specification	Number of edges	Inventory	Dmension (mm)				APMX (mm)	Applicable inserts	Screw	Wrench
			DC	DCON	LF	LH				
SSM590-016G1602-AP11	2	△	16	16	130	40	9.5	APMT11□□ APGT11□□	M25065	HFT08IP
SSM590-016G1602L-AP11	2	△	16	16	160	50	9.5			
SSM590-020G2002-AP11	2	△	20	20	130	40	9.5			
SSM590-020G2002L-AP11	2	△	20	20	160	50	9.5			
SSM590-025G2503-AP11	3	▲	25	25	130	40	9.5			
SSM590-025G2503L-AP11	3	△	25	25	160	50	9.5			
SSM590-032G3204-AP11	4	△	32	32	130	40	9.5			
SSM590-032G3204L-AP11	4	△	32	32	160	50	9.5			
SSM590-025G2502-AP16	2	▲	25	25	160	50	15	APMT16□□ APGT16□□	M40090	HTT15IP
SSM590-025G2502L-AP16	2	△	25	25	200	75	15			
SSM590-032G3202-AP16	2	△	32	32	160	50	15			
SSM590-032G3202L-AP16	2	△	32	32	200	80	15			
SSM590-040G3204-AP16	4	△	40	32	160	50	15			
SSM590-040G3204L-AP16	4	△	40	32	200	80	15			

▲Standing inventory △Make-to-order

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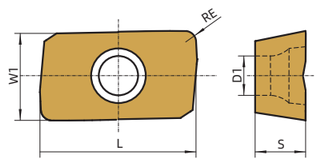
Applicable Inserts

AP□□





Working condition: ● Stable ◕ Average ⌗ Tough

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

Type	Dimension (mm)					APMX (mm)	CVD		PVD								Cemented carbide	Cermet
	L	W1	S	D1	RE		HR6130	HR8140	HR5110	HR5210	HR5120	HR5220	HR5130	HR530	HR7130	HR7140	HR7240	HRK10	HRC10
APMT1135PDER-HM	11.30	6.25	3.50	2.8	0.8	9.5	★		☆	★	★	★	★	☆			☆		
APMT113516PDER-HM	11.30	6.25	3.50	2.8	1.6	9.5	★		☆	★	★	★	★	☆			☆		
APMT1605PDER-HM	17.25	9.25	5.22	4.4	0.8	14.5	★		☆	★	★	★	★	☆			☆		
APMT160520PDER-HM	17.25	9.25	5.22	4.4	2.0	14.5	★		☆	★	★	★	★	☆			☆		
APMT160530PDER-HM	17.25	9.25	5.22	4.4	3.0	14.5	★		☆	★	★	★	★	☆			☆		
APGT1135PDFR-AK	11.30	6.25	3.50	2.8	0.8	9.5												☆	
APGT1604PDFR-AK	17.25	9.25	4.76	4.4	0.8	14.5												☆	

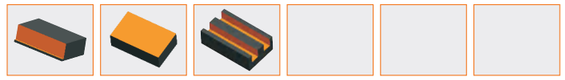
★ Recommended grade ☆ Available grade

Recommended cutting parameters

Workpiece material		Hardness (HB)	Insert grade	Cutting data	
				Cutting speed vc (m/min)	Feed rate fz(mm/z)
P	Low-carbon steel, mild steel	≤180HB	HR5120	280(220-340)	0.2(0.1-0.3)
			HR5130	180(120-250)	
			HR530	180(120-250)	
	High-carbon steel, alloy steel	180-280HB	HR5110	240(180-300)	0.2(0.1-0.3)
			HR5120	200(140-260)	
			HR5220	200(140-260)	
			HR5130	160(100-220)	
	Alloy tool steel	280-350HB	HR5110	220(140-280)	0.15(0.1-0.25)
			HR5210	160(100-220)	
			HR5120	160(100-220)	
			HR5220	120(80-180)	
M	Stainless steel	≤270HB	HR5120	180(100-260)	0.2(0.1-0.3)
			HR5130	140(80-200)	
			HR530	140(80-200)	
K	Cast iron	180-250HB	HR6130	250(150-320)	0.2(0.1-0.3)
			HR5210	180(150-250)	
			HR5220	180(150-250)	
S	Heat-resistant alloys / titanium alloys	≤400HB	HR5120	60(30-120)	0.1(0.06-0.22)
			HR7240	60(30-120)	
H	High-hardness materials	45-55HRC	HR5220	150(100-250)	0.2(0.1-0.3)
		≥55HRC	HR5210	120(80-200)	

Square Shoulder Milling

CSM690 series



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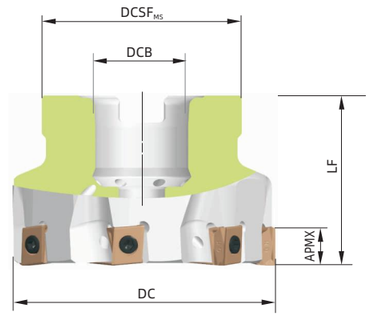
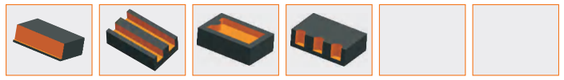


Tool specification	Number of edges	Inventory	Dmension (mm)				APMX (mm)	Interface form	Applicable inserts	Screw	Wrench
			DC	DCB	DCSFMS	LF					
CSM690-040A1604-LN09	4	▲	40	16	35	40	8	A	LNHX09□□	M30075	HFT09IP
CSM690-040A1606-LN09	6	△	40	16	35	40	8				
CSM690-050A2205-LN09	5	▲	50	22	47	40	8				
CSM690-050A2207-LN09	7	△	50	22	47	40	8				
CSM690-063A2207-LN09	7	▲	63	22	47	40	8				
CSM690-063A2210-LN09	10	△	63	22	47	40	8				
CSM690-080A2709-LN09	9	▲	80	27	62	50	8				
CSM690-080A2713-LN09	13	△	80	27	62	50	8				
CSM690-040A1604-LN13	4	▲	40	16	35	40	12		LNHX13□□	M40110	HTT15IP
CSM690-040A1605-LN13	5	△	40	16	35	40	12				
CSM690-050A2205-LN13	5	▲	50	22	47	40	12				
CSM690-050A2206-LN13	6	△	50	22	47	40	12				
CSM690-063A2206-LN13	6	▲	63	22	47	40	12				
CSM690-063A2208-LN13	8	△	63	22	47	40	12				
CSM690-080A2707-LN13	7	▲	80	27	62	50	12				
CSM690-080A2710-LN13	10	△	80	27	62	50	12				
CSM690-100A3209-LN13	9	▲	100	32	77	50	12				
CSM690-100A3213-LN13	13	△	100	32	77	50	12				
CSM690-125B4011-LN13	11	▲	125	40	90	63	12	B			
CSM690-125B4016-LN13	16	△	125	40	90	63	12				
CSM690-160C4013-LN13	13	△	160	40	92	63	12	C			

▲Standing inventory △Make-to-order

Square Shoulder Milling

SSM690 series



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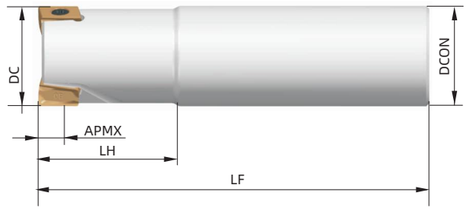
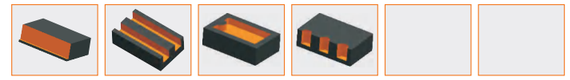


Tool specification	Number of edges	Inventory	Dmension (mm)				APMX (mm)	Applicable inserts	Screw	Wrench
			DC	DCB	LF	LH				
SSM690-020G2002-LN09	2	△	20	20	110	30	8	LNHX09□□	M30075	HFT09IP
SSM690-020G2003-LN09	3	△	20	20	110	30	8			
SSM690-021G2002-LN09	2	△	21	20	200	30	8			
SSM690-025G2503-LN09	3	▲	25	25	200	34	8			
SSM690-025G2504-LN09	4	△	25	25	200	34	8			
SSM690-026G2503-LN09	3	△	26	25	200	34	8			
SSM690-028G2503-LN09	3	△	28	25	110	34	8			
SSM690-032G3204-LN09	4	▲	32	32	250	45	8			
SSM690-032G3205-LN09	5	△	32	32	250	45	8			
SSM690-033G3204-LN09	4	△	33	32	250	45	8			
SSM690-025G2502-LN13	2	▲	25	25	115	35	12	LNHX13□□	M40110-076	HTT15IP
SSM690-025G2502L-LN13	2	△	25	25	170	70	12			
SSM690-028G2502-LN13	2	△	28	25	125	35	12			
SSM690-028G2502L-LN13	2	△	28	25	125	35	12			
SSM690-030G2502-LN13	2	△	30	25	125	35	12			
SSM690-030G2503-LN13	3	△	30	25	125	35	12			
SSM690-032G3202-LN13	2	▲	32	32	125	45	12			
SSM690-032G3203-LN13	3	△	32	32	125	45	12			
SSM690-032G3203L-LN13	3	△	32	32	190	90	12			
SSM690-035G3203L-LN13	3	▲	35	32	190	45	12			
SSM690-040G3203-LN13	3	▲	40	32	125	45	12			
SSM690-040G3204-LN13	4	△	40	32	125	45	12			
SSM690-050G3204-LN13	4	△	50	32	125	45	12			
SSM690-050G3206-LN13	6	△	50	32	125	45	12			

▲Standing inventory △Make-to-order

Square Shoulder Milling

SSM690 series



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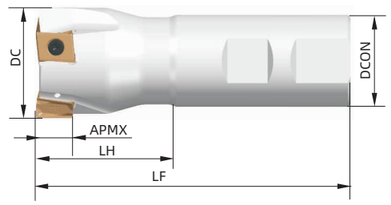

Tool specification	Number of edges	Inventory	Dmension (mm)				APMX (mm)	Applicable inserts	Screw	Wrench
			DC	DCB	LF	LH				
SSM690-025X2503-LN09	3	△	25	25	100	39	8	LNHX09□□	M30075	HFT09IP
SSM690-025X2504-LN09	4	△	25	25	100	39	8			
SSM690-032X3204-LN09	4	▲	32	32	110	44	8			
SSM690-032X3205-LN09	5	△	32	32	110	44	8			
SSM690-040X3204-LN09	4	▲	40	32	110	25	8			
SSM690-040X3206-LN09	6	△	40	32	110	25	8			

▲Standing inventory △Make-to-order

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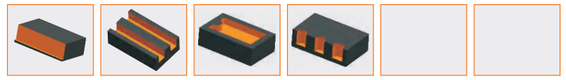
Square Shoulder Milling

KH- series



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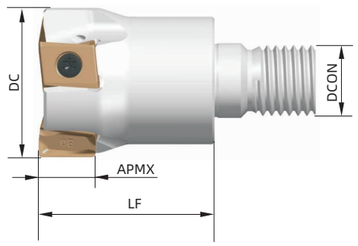
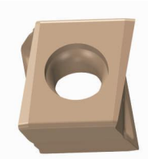


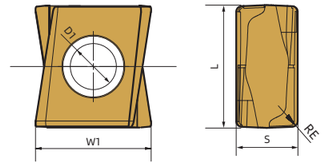
Tool specification	Number of edges	Inventory	Dmension (mm)				APMX (mm)	Applicable inserts	Screw	Wrench
			DC	DCSFMS	LF	DCON				
KH-2502-LN13-M12	2	▲	25	23.5	35	12	12	LNHX13□□	M40110	HTT15IP
KH-2802-LN13-M12	2	▲	28	23.5	35	12	12			
KH-3202-LN13-M16	2	△	32	28.5	40	16	12			
KH-3203-LN13-M16	3	▲	32	28.5	40	16	12			
KH-3502-LN13-M16	2	△	35	28.5	40	16	12			
KH-3503-LN13-M16	3	▲	35	28.5	40	16	12			
KH-4003-LN13-M16	3	▲	40	28.5	40	16	12			
KH-4004-LN13-M16	4	△	40	28.5	40	16	12			

▲Standing inventory △Make-to-order

Applicable Inserts

LN□□





Working condition: ● Stable ◕ Average ⌗ Tough

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

Type	Dimension (mm)					APMX (mm)	CVD		PVD							Cemented carbide	Cermet
	L	W1	S	D1	RE		HR6130	HR8140	HR5110	HR5210	HR5120	HR5220	HR5130	HR530	HR7130	HR7140	HR7240	HRK10	HRC10
LNHX090404R-GM	9	8.5	4.5	3.4	0.4	8					★		★			☆			
LNHX130608R-GM	13	11.8	6.8	4.55	0.8	12					★		★			☆			

★ Recommended grade ☆ Available grade

Recommended cutting parameters

Workpiece material		Hardness (HB)	Insert grade	Cutting data	
				Cutting speed vc (m/min)	Feed rate fz(mm/z)
P	Low-carbon steel, mild steel	≤180HB	HR5120	220(170-320)	0.2(0.1-0.35)
			HR5130	180(130-280)	
	High-carbon steel, alloy steel	180-280HB	HR5120	220(150-300)	0.2(0.1-0.3)
			HR5130	180(110-260)	
	Alloy tool steel	280-350HB	HR5120	200(130-280)	0.2(0.1-0.3)
			HR5130	160(100-240)	
M	Stainless steel	≤270HB	HR5120	140(100-200)	0.2(0.1-0.3)
			HR5130	120(100-160)	
			HR7140	160(120-220)	
K	Cast iron	180-250HB	HR5120	160(120-220)	0.2(0.1-0.35)
			HR5130	140(100-180)	
S	Heat-resistant alloys / titanium alloys	≤400HB	HR5120	60(30-120)	0.1(0.06-0.22)
			HR7140	60(30-120)	

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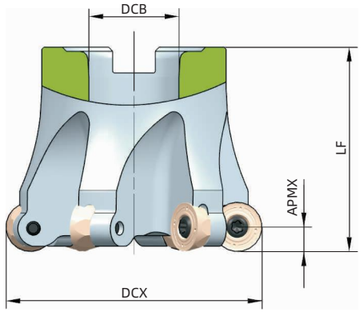
Profile Milling

CPM100 series







Tool specification	Number of edges	Inventory	Dmension (mm)			APMX (mm)	Interface form	Applicable inserts	Screw	Wrench
			DCX	DCB	LF					
CPM100-063A2204-RC12	4	△	63	22	40	6	A	RC□□12	M40100	HTT15IP
CPM100-080B2705-RC16	5	▲	80	27	50	8	B	RC□□16	M50130	HTT20IP
CPM100-100B3206-RC16	6	△	100	32	50	8				
CPM100-125B4007-RC20	7	△	125	40	63	10		RC□□20	M60160	HTT20
CPM100-160B4008-RC20	8	△	160	40	63	10				

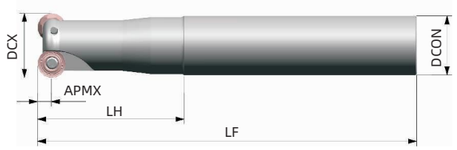
▲Standing inventory △Make-to-order

Profile Milling

SPM100 series







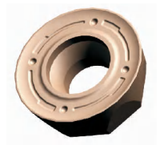
Tool specification	Number of edges	Inventory	Dmension (mm)				APMX (mm)	Applicable inserts	Screw	Wrench
			DCX	DCON	LF	LH				
SPM100-025G2502-RC10	2	▲	25	25	100	30	5	RC□□10	M40090	HTT15IP
SPM100-032G3203-RC10	3	▲	32	32	120	35	5			
SPM100-040G4003-RC12	3	△	40	40	120	40	6	RC□□12	M40090	HTT15IP

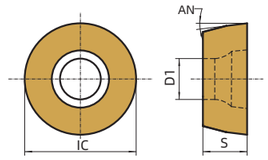
▲Standing inventory △Make-to-order

HUAREAL

Applicable Inserts

RC □□





Working condition: ● Stable ◕ Average ⌗ Tough

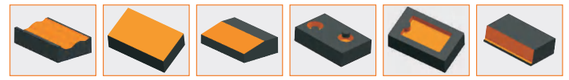
Applicable inserts	Workpiece material		
		P	Steel
		M	Stainless steel
		K	Cast iron
		N	Non-ferrous metal
		S	Heat resistant super alloys Titanium alloy

Type	Dimension (mm)				APMX (mm)	CVD		PVD								Cemented carbide	Cermet
	IC	S	D1	AN		HR6130	HR8140	HR5110	HR5210	HR5120	HR5220	HR5130	HR530	HR7130	HR7140	HR7240	HRK10	HRC10
RCKT10T3MO-FM	10.00	3.97	4.40	7°	5	☆		☆	★	★	★	★	☆			☆		
RCKT1204MO-FM	12.00	4.76	4.40	7°	6	☆		☆	★	★	★	★	☆			☆		
RCKT1606MO-FM	16.00	6.35	5.50	7°	8	☆		☆	★	★	★	★	☆			☆		
RCKT2006MO-FM	20.00	6.35	6.55	7°	10	☆		☆	★	★	★	★	☆			☆		

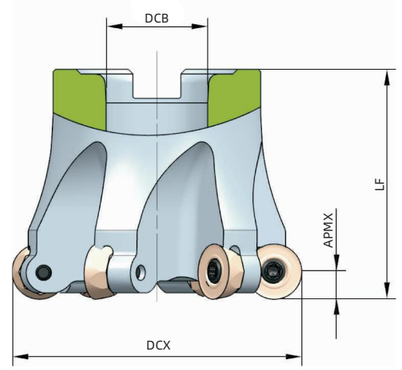
★ Recommended grade ☆ Available grade

Profile Milling

CPM200 series







Tool specification	Number of edges	Inventory	Dmension (mm)			APMX (mm)	Interface form	Applicable inserts	Screw	Wrench
			DCX	DCB	LF					
CPM200-050A2204-RP12	4	△	50	22	40	6	A	RP□□12	M40100	HTT15IP
CPM200-063A2205-RP12	5	▲	63	22	40	6				
CPM200-080B2706-RP12	6	▲	80	27	50	6	B			
CPM200-063A2204-RP16	4	▲	63	22	40	8	A	RP□□16	M501145	HTT20IP
CPM200-080B2705-RP16	5	▲	80	27	50	8	B			
CPM200-100B3206-RP16	6	△	100	32	50	8				
CPM200-125B4007-RP16	7	△	125	40	63	8				

▲Standing inventory △Make-to-order

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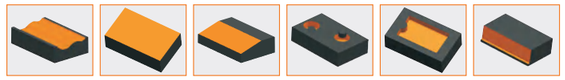
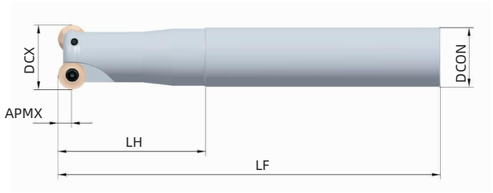
Profile Milling

SPM200 series







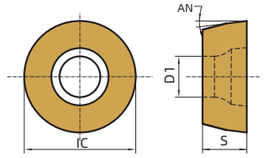
Tool specification	Number of edges	Inventory	Dmension (mm)				APMX (mm)	Applicable inserts	Screw	Wrench
			DCX	DCON	LF	LH				
SPM200-025G2503-RP08	3	▲	25	25	100	30	4	RP□□08	M30075	HFT09IP
SPM200-032G3204-RP08	4	▲	32	32	120	35	4			
SPM200-025G2502-RP10	2	▲	25	25	100	30	5	RP□□10	M40090	HTT15IP
SPM200-032G3203-RP10	3	▲	32	32	120	35	5			
SPM200-025G2502-RP10(MS)	2	▲	25	25	100	30	5	RP□□10(MS)	M30075	HFT09IP
SPM200-032G3203-RP10(MS)	3	▲	32	32	120	35	5			
SPM200-040G3203-RP12	3	△	40	32	120	40	6	RP□□12	M40090	HTT15IP

▲Standing inventory △Make-to-order

Applicable Inserts

RP □□





Working condition: ● Stable ◕ Average ⌗ Tough

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

Type	Dimension (mm)				APMX (mm)	CVD		PVD								Cemented carbide	Cermet
	IC	S	D1	AN		HR6130	HR8140	HR5110	HR5210	HR5120	HR5220	HR5130	HR530	HR7130	HR7140	HR7240	HRK10	HRC10
RPMT08T2MO-HM	8.00	2.78	3.4	11°	4	☆		☆	★	★	★	★	☆			☆		
RPMW1003MO	10.00	3.18	4.5	11°	5	☆		☆	★	★	★	★	☆			☆		
RPMT1204MO-HM	12.00	4.76	4.4	11°	6	☆		☆	★	★	★	★	☆			☆		

★ Recommended grade ☆ Available grade

Blade Milling Inserts

Working condition: ● Stable ◕ Average ⌗ Tough

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

Type	Dimension (mm)				APMX (mm)	CVD		PVD								Cemented carbide	Cermet
	IC	S	D1	AN		HR6130	HR8140	HR5110	HR5210	HR5120	HR5220	HR5130	HR530	HR7130	HR7140	HR7240	HRK10	HRC10
RPKT10T3MO-MS	10.00	3.97	3.4	11°	5										★	★		
RPKT1204MO-MS	12.00	4.76	4.4	11°	6										★	★		
RPKT1606MO-MS	16.00	6.35	5.5	11°	8		★								★	★		
RPMT08T2MO-SM	8.00	2.78	3.4	11°	4										★	★		
RPMT10T3MO-SM	10.00	3.97	4.4	11°	5										★	★		
RPMT1204MO-SM	12.00	4.76	4.4	11°	6										★	★		
RPMT1606MO-SM	16.00	6.35	5.5	11°	8		★								★	★		

★ Recommended grade ☆ Available grade

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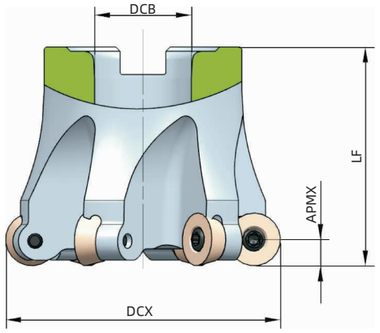
Profile Milling

CPM300 series





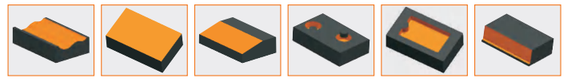


Tool specification	Number of edges	Inventory	Dmension (mm)			APMX (mm)	Interface form	Applicable inserts	Screw	Wrench
			DCX	DCB	LF					
CPM300-050A2204-RD12	4	△	50	22	40	6	A	RD□□12	M40100	HTT15IP
CPM300-063A2205-RD12	5	▲	63	22	40	6				
CPM300-080B2705-RD16	5	▲	80	27	50	8	B	RD□□16	M50130	HTT20IP
CPM300-100B3206-RD16	6	△	100	32	50	8				
CPM300-125B4007-RD16	7	△	125	40	63	8				
CPM300-160B4008-RD16	8	△	160	40	63	8				

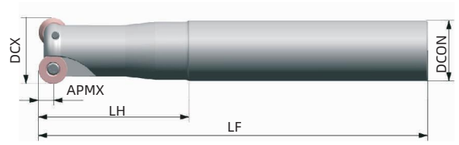
▲Standing inventory △Make-to-order

Profile Milling

SPM300 series







Tool specification	Number of edges	Inventory	Dmension (mm)				APMX (mm)	Applicable inserts	Screw	Wrench
			DCX	DCON	LF	LH				
SPM300-020G2003-RD06	3	△	20	20	100	30	3	RD□□06	M22055	HFT07IP
SPM300-020G2002-RD08	2	△	20	20	100	30	4	RD□□08	M30075	HFT09IP
SPM300-025G2502-RD10	2	▲	25	25	100	30	5	RD□□10	M40090	HTT15IP
SPM300-032G3203-RD10	3	▲	32	32	120	35	5			
SPM300-040G3203-RD12	3	△	40	32	120	40	6	RD□□12	M40090	HTT15IP

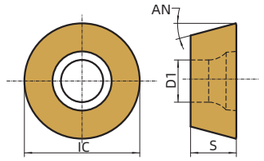
▲Standing inventory △Make-to-order

HUAREAL

Applicable Inserts

RD □□





Working condition: ● Stable ◕ Average ⌗ Tough

Applicable inserts	Workpiece material		Working condition
	P	Steel	● ⌗ ● ● ◕ ◕⌗ ⌗ ◕ ⌗ ●
	M	Stainless steel	● ◕ ◕ ◕⌗ ⌗ ◕ ⌗ ●
	K	Cast iron	◕⌗ ⌗ ● ● ◕ ◕ ⌗
	N	Non-ferrous metal	●
	S	Heat resistant super alloys Titanium alloy	◕⌗ ●

Type	Dimension (mm)				APMX (mm)	CVD		PVD								Cemented carbide	Cermet
	IC	S	D1	AN		HR6130	HR8140	HR5110	HR5210	HR5120	HR5220	HR5130	HR530	HR7130	HR7140	HR7240	HRK10	HRC10
RDMW0501MO	5.00	1.40	2.16	15°	2.5	☆		☆	★	★	★	★	☆					
RDMW0602MO	6.00	2.38	2.5	15°	3	☆		☆	★	★	★	★	☆					
RDMW0702MO	7.00	2.38	2.9	15°	3.5	☆		☆	★	★	★	★	☆					
RDMW0802MO	8.00	2.38	3.4	15°	4	☆		☆	★	★	★	★	☆					
RDMW10T3MO	10.00	3.97	4.4	15°	5	☆		☆	★	★	★	★	☆					
RDMW1204MO	12.00	4.76	4.5	15°	6	☆		☆	★	★	★	★	☆					
RDMW1605MO	16.00	5.56	5.5	15°	8	☆		☆	★	★	★	★	☆					
RDKW10T3MO	10.00	3.97	4.4	15°	5	☆		☆	★	★	★	★	☆					
RDKW1204MO	12.00	4.76	4.4	15°	6				★	★								
RDKW1604MO	16.00	4.76	5.5	15°	8				★	★								

★ Recommended grade ☆ Available grade

Recommended cutting parameters

Workpiece material		Hardness (HB)	Insert grade	Cutting data	Tool Specifications		
					ø20	ø25	ø32
P	Low-carbon steel, mild steel	≤180HB	HR5120 HR5220 HR5130 HR530	v_c(m/min)	100-200	100-200	100-200
				f_z(mm/z)	0.2-0.3	0.25-0.35	0.25-0.35
				ap(mm)	1.25	1.5	2
				ae(mm)	1.25	1.5	2
	High-carbon steel, alloy steel	180-280HB	HR5110 HR5210 HR5120 HR5220	v_c(m/min)	80-180	80-180	80-180
				f_z(mm/z)	0.2-0.3	0.25-0.35	0.25-0.35
				ap(mm)	1.25	1.5	2
				ae(mm)	1.25	1.5	2
	Alloy tool steel	280-350HB	HR5110 HR5210 HR5120 HR5220	v_c(m/min)	60-150	60-150	60-150
				f_z(mm/z)	0.2-0.3	0.25-0.35	0.25-0.35
				ap(mm)	1.25	1.5	2
				ae(mm)	1.25	1.5	2
M	Stainless steel	≤180HB	HR5120 HR5130 HR530	v_c(m/min)	70-150	70-150	70-150
				f_z(mm/z)	0.1-0.25	0.2-0.3	0.2-0.3
				ap(mm)	1	1.25	1.5
				ae(mm)	1	1.25	1.5
K	Cast iron	180-250HB	HR6130 HR5110 HR5120 HR5220	v_c(m/min)	160-300	160-300	160-300
				f_z(mm/z)	0.25-0.35	0.3-0.4	0.3-0.4
				ap(mm)	1.8	2	2.5
				ae(mm)	1.8	2	2.5
S	Heat-resistant alloys / titanium alloys	≤400HB	HR7140 HR7240	v_c(m/min)	40-120	40-120	40-120
				f_z(mm/z)	0.25-0.35	0.3-0.5	0.3-0.5
				ap(mm)	0.3	0.5	0.8
				ae(mm)	1	1.25	1.5
H	High-hardness materials	50-65HRC	HR6130 HR5110 HR5120 HR5220	v_c(m/min)	80-160	80-160	80-160
				f_z(mm/z)	0.2-0.5	0.3-0.6	0.4-0.8
				ap(mm)	0.2	0.3	0.5
				ae(mm)	1	1.25	1.5

Technical Information for Profile Milling Tool Applications

◆ Feed Rate Conversion Factor (Based on Reference Depth of Cut)

Inserts	Maximum Depth of Cut ap (mm)	Feed Rate Conversion Factor ap/(mm)							
		0.5	1.0	1.5	2.0	2.5	3.0	4.0	5.0
R□□08□□	4	1.7	1.3	1.1	1(Ref.)	0.9	0.8	0.7	0.7
R□□10□□	5	1.9	1.4	1.2	1	1(Ref.)	0.9	0.8	0.7
R□□12□□	6	2.1	1.5	1.3	1.1	1	1(Ref.)	0.9	0.8
R□□16□□	8	2.4	1.7	1.4	1.3	1.1	1.1	1(Ref.)	0.9
R□□20□□	10	2.5	1.8	1.5	1.4	1.2	1.1	1	1(Ref.)

Calculation Example:

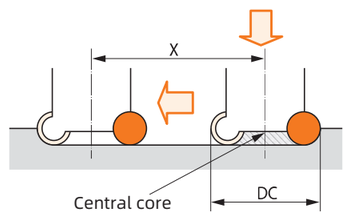
When machining 45#steel (equivalent to C45 carbon steel) with insert RCKT10T3MO-FM, the recommended feed rate is 0.2mm per revolution (0.2mm/r). For a depthof cut ap = 1mm, the recommended feed rate is calculated as:

f=1.4*0.2mm/r=0.28mm/r。

◆ Recommended Cutting Parametersfor Ramp Milling, Helical Milling, Drill-MillingandOther Machining Processes

Tool Specifications			Ramp Milling		Helical Milling		Drill-Milling	
Insert	Cutter Dia. (mm)	Max. ap (mm)	Max. Ramp Angle	Cutting Length (mm)	Min. Bore Dia. (mm)	Max. Bore Dia. (mm)	Max. Machining Depth (mm)	Min. Flat Bottom Machining Dia. (mm)
R08	16	4	8°	28	20	30	0.7	9
	20		9°	25	26	38	1.4	13
	25		5°	45	36	48	1.4	18
R10	25	5	5°	28	33	48	0.6	16
	32		6°	47	47	62	1.9	23
	40		4°	71	63	78	1.9	31
	63		3°	95	109	124	1.9	54
R12	40	6	5°	68	59	78	2.4	29
	63		2°	171	105	124	2.4	52
	80		2°	171	139	158	2.4	69
	100		1°	171	179	198	2.4	89
R16	63	8	4°	114	97	124	3.4	48
	80		3°	152	131	158	3.4	65
	100		2°	229	171	198	3.4	85
	125		1°	458	221	248	3.4	110

◆ Drill-Milling Machining Precautions

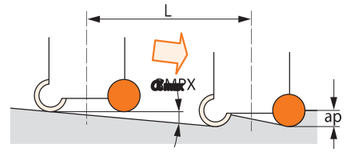


After drill-milling and direct transverse feeding:

① Reduce the table feed rate to half the normal rate until the center is fully machined away.

② The minimum cutting length X for a flat bottom is given in the table above.

◆ Ramp Milling Machining Precautions



For ramp milling, set the angle below RMPX.

Set the feed rate to 70% or less of the standard value.

◆ Helical Milling Machining Precautions

① Set the plunge depth per revolution h for helical milling below the maximum depth of cut ap.

② The plunge angle formed by the tool center path must not exceed the maximum ramp angle RMPX.

③ Set the feed rate to 70% or less of the standard value.

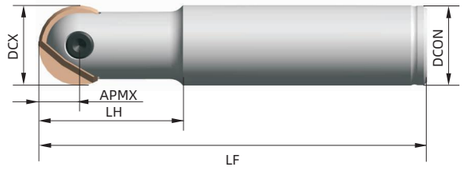
◆ Maximum Depth of Cut (ap) and Recommended Matching Tooth Count

Tooth Count	R08	R10	R12	R16	R20
≤3	ap=2.0-4.0mm	ap=2.5-5.0 mm	ap=3.0-6.0 mm	ap=4.0-8.0 mm	ap=5.0-10.0 mm
>3	ap<2.0 mm	ap<2.5 mm	ap<6.0 mm	ap<4.0 mm	ap<5.0 mm

Profile Milling

SPM400 series





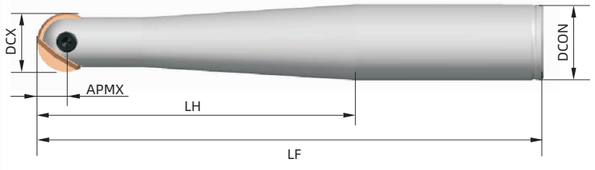
Tool specification	Number of edges	Inventory	Dmension (mm)				APMX (mm)	Applicable inserts	Screw	Wrench
			DCX	DCON	LF	LH				
SPM400-012G1201S-BNM12	1	△	12	12	70	25	6	BNM12□□	M35096-40°	HTT10
SPM400-012G1201-BNM12	1	▲	12	12	85	25	6			
SPM400-012G1201L-BNM12	1	△	12	12	100	40	6			
SPM400-016G1601S-BNM16	1	△	16	16	72	32	8	BNM16□□	M40135-40°	HTT15
SPM400-016G1601-BNM16	1	▲	16	16	92	32	8			
SPM400-016G1601L-BNM16	1	△	16	16	112	52	8			
SPM400-020G2001S-BNM20	1	△	20	20	79	38	10	BNM20□□	M50164-40°	HTT20
SPM400-020G2001-BNM20	1	▲	20	20	104	38	10			
SPM400-020G2001L-BNM20	1	△	20	20	129	63	10			
SPM400-025G2501S-BNM25	1	△	25	25	91	45	12.5	BNM25□□	M60200-40°	HTT30
SPM400-025G2501-BNM25	1	▲	25	25	121	45	12.5			
SPM400-025G2501L-BNM25	1	△	25	25	151	75	12.5			
SPM400-030G3201S-BNM30	1	△	30	32	98	53	15	BNM30□□ BNM32□□	M80250-40°	HTT40
SPM400-030G3201-BNM30	1	▲	30	32	133	53	15			
SPM400-030G3201L-BNM30	1	△	30	32	168	88	15			

▲Standing inventory △Make-to-order

Profile Milling

SPM400 series





Tool specification	Number of edges	Inventory						APMX (mm)	Applicable inserts	Screw	Wrench
			DCX	DCON	LF	LU	B5				
SPM400-012G1601LT-BNM12	1	△	12	16	145	85	1.4°	6	BNM12□□	M35096-40°	HTT10
SPM400-016G2001LT-BNM16	1	△	16	20	166	100	1.2°	8	BNM16□□	M40135-40°	HTT15
SPM400-020G2501LT-BNM20	1	△	20	25	191	115	1.3°	10	BNM20□□	M50164-40°	HTT20
SPM400-025G3201LT-BNM25	1	△	25	32	215	135	1.6°	12.5	BNM25□□	M60200-40°	HTT30
SPM400-030G3201LT-BNM30	1	△	30	32	240	160	0.3°	15	BNM30□□ BNM32□□	M80250-40°	HTT40

▲Standing inventory △Make-to-order

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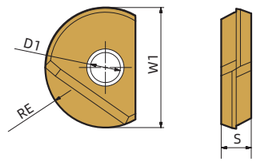
Applicable Inserts

BNM□□





Working condition: ● Stable ◕ Average ⌗ Tough

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

Type	Dimension (mm)				APMX (mm)	CVD		PVD								Cemented carbide	Cermet
	W1	S	D1	RE		HR6130	HR8140	HR5110	HR5210	HR5120	HR5220	HR5130	HR530	HR7130	HR7140	HR7240	HRK10	HRC10
BNM1203-S	12	3	3.5	6	6				★		☆	☆						
BNM1604-S	16	4	4	8	8				★		☆	☆						
BNM2005-S	20	5	5	10	10				★		☆	☆						
BNM2506-S	25	6	6	12.5	12.5				★		☆	☆						
BNM3007-S	30	7	8	15	15				★		☆	☆						
BNM3207-S	32	7	8	16	16				★		☆	☆						
BNM2005	20	5	5	10	10				★		☆	☆						
BNM2506	25	6	6	12.5	12.5				★		☆	☆						
BNM3007	30	7	8	15	15				★		☆	☆						
BNM3207	32	7	8	16	16				★		☆	☆						

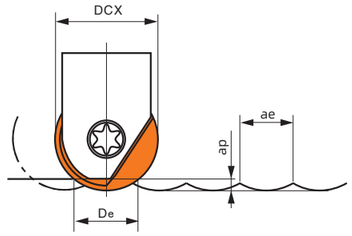
★ Recommended grade ☆ Available grade

Recommended cutting parameters

Workpiece material		Hardness (HB)	Insert grade	Cutting speed v_c (m/min)	Cutting Speed f_n(mm/r) DC(mm)						Max. Axial Depth of cut (mm)	Max. Radial Depth of Cut (mm)
					12	16	20	25	30	32		
P	Low-carbon steel, mild steel	≤180	HR5130	180-230	0.4	0.5	0.5	0.6	0.6	0.6	DC/15	DC/15
		180-280	HR5130	150-200	0.4	0.5	0.5	0.6	0.6	0.6	DC/15	DC/15
	High-carbon steel, alloy steel Alloy tool steel	280-350	HR5220 / HR5130	110-170	0.4	0.4	0.4	0.5	0.5	0.5	DC/20	DC/20
M	Stainless steel	≤270	HR5220 / HR5130	90-130	0.4	0.4	0.4	0.5	0.5	0.5	DC/20	DC/20
K	Cast iron	180-250	HR5130	150-400	0.5	0.6	0.6	0.7	0.7	0.7	DC/15	DC/15
H	High-hardness materials	40-65HRC	HR5210 / HR5220	70-90	0.4	0.5	0.5	0.6	0.6	0.6	DC/30	DC/30

SPM400 Series Application Tech Info

◆ Cutting Parameter Calculation



$$n = \frac{V_c \times 1000}{\pi \times De}$$

$$De = 2 \times \sqrt{ap \times (Dc - ap)}$$

n = Spindle Speed (r/min)
V_c = Cutting Speed (m/min)
De = Effective Cutter Dia.(mm)
ap = Axial Depth of Cut (mm)

◆ Effective Cutter Diameter Table

Cutter Dia. DC(mm)	Axial Depthof Cut ap(mm)													
	0.2	0.3	0.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0	4.5	5.0	5.5	6.0
12	3.1	3.7	4.8	6.6	7.9	8.9	9.7							
16	3.6	4.3	5.6	7.7	9.3	10.6	11.6	12.5						
20	4.0	4.9	6.2	8.7	10.5	12.0	13.2	14.3	15.2	16.0				
25	4.5	5.4	7.0	9.8	11.9	13.6	15.0	16.2	17.3	18.3	19.2	20.0		
30	4.9	6.0	7.7	10.8	13.1	15.0	16.6	18.0	19.3	20.4	21.4	22.4	23.2	24.0
32	5.0	6.2	7.9	11.1	13.5	15.5	17.2	18.7	20.0	21.2	22.2	23.2	24.1	25.0

◆ When an included angle exists between the tool axis and the normal vector of the workpiece's machined surface, the programmed cutting speed (or spindle speed) shall be adjusted from the recommended cutting speed (or spindle speed) by applying the correction factors specified in the table below.



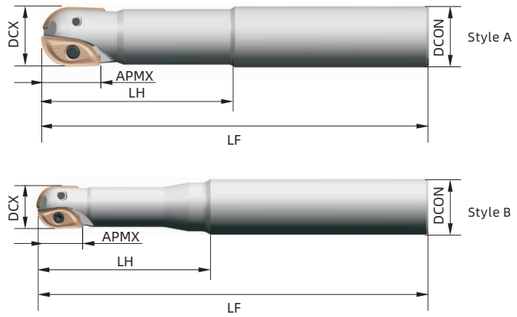
Cutter Dia.DC (mm)		12		16		20		25		30		32	
ap (mm)		0.2	0.5	0.2	0.5	0.2	0.5	0.2	0.5	0.2	0.5	0.2	0.5
Inc. Angle α (°)	15°	1	1	1	1	1	1.02	1	1.01	1	1	1	1
	30°	1.04	1.01	1.05	1.01	1.02	1.04	1.03	1.04	1.04	1.01	1.04	1
	45°	1.16	1.07	1.18	1.1	1.12	1.06	1.14	1.08	1.16	1.06	1.16	1.06
	60°	1.42	1.24	1.47	1.3	1.34	1.21	1.38	1.25	1.42	1.21	1.43	1.22
	75°	2.02	1.6	2.14	1.73	1.83	1.53	1.93	1.62	2.01	1.53	2.04	1.55
	90°	3.92	2.5	4.48	2.87	3.2	2.29	3.57	2.55	3.9	2.29	4.03	2.37

Profile Milling

SPM500 series







Tool specification	Number of edges	Inventory	Dmension (mm)				APMX (mm)	Interface form	Applicable inserts	Screw	Wrench
			DCX	DCON	LF	LH					
SPM500-016G1602S-UNM16	2	△	16	16	130	50	16	A	UNM16□□	M25065	HFT8IP
SPM500-016G2002S-UNM16	2	△	16	20	150	70	16	B			
SPM500-016G2002-UNM16	2	▲	16	20	180	80	16	B			
SPM500-020G2002S-UNM20	2	△	20	20	160	80	20	A	UNM20□□	M35076	HTT10IP
SPM500-020G2002-UNM20	2	▲	20	20	200	120	20	A			
SPM500-020G2502S-UNM20	2	△	20	25	180	80	20	B			
SPM500-020G2502-UNM20	2	▲	20	25	200	100	20	B			
SPM500-020G2502L-UNM20	2	△	20	25	250	110	20	B			
SPM500-020G2502XL-UNM20	2	△	20	25	300	110	20	B			
SPM500-025G2502S-UNM25	2	▲	25	25	160	80	25	A	UNM25□□	M40100	HTT15IP
SPM500-025G2502-UNM25	2	▲	25	25	200	100	25	A			
SPM500-025G2502L-UNM25	2	△	25	25	250	110	25	A			
SPM500-025G2502XL-UNM25	2	△	25	25	300	120	25	A			
SPM500-030G3202S-UNM30	2	▲	30	32	200	120	30	B	UNM30□□	M501145	HTT20IP
SPM500-030G3202-UNM30	2	▲	30	32	250	150	30	B			
SPM500-030G3202L-UNM30	2	△	30	32	300	200	30	B			
SPM500-030G3202XL-UNM30	2	△	30	32	350	300	30	B			
SPM500-032G3202S-UNM32	2	▲	32	32	200	120	32	A	UNM32□□		
SPM500-032G3202-UNM32	2	▲	32	32	250	150	32	A			
SPM500-032G3202L-UNM32	2	△	32	32	300	200	32	A			
SPM500-032G3202XL-UNM32	2	△	32	32	350	200	32	A			
SPM500-040G4002S-UNM40	2	▲	40	40	200	120	40	A	UNM40□□	M60160	HTT25
SPM500-040G4002-UNM40	2	▲	40	40	250	150	40	A			
SPM500-040G4002L-UNM40	2	△	40	40	300	200	40	A			
SPM500-040G4002XL-UNM40	2	△	40	40	350	200	40	A			

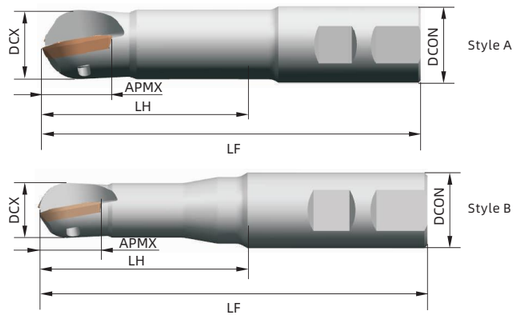
▲Standing inventory △Make-to-order

Profile Milling

SPM500 series







Tool specification	Number of edges	Inventory	Dmension (mm)				APMX (mm)	Interface form	Applicable inserts	Screw	Wrench
			DCX	DCON	LF	LH					
SPM500-016X2002-UNM16	2	△	16	20	120	70	16	B	UNM16□□	M25065	HFT08IP
SPM500-020X2502-UNM20	2	▲	20	25	130	70	20	B	UNM20□□	M35076	HTT10IP
SPM500-020X2502L-UNM20	2	△	20	25	150	80	20	B			
SPM500-025X2502-UNM25	2	▲	25	25	140	80	25	A	UNM25□□	M40100	HTT15IP
SPM500-025X2502L-UNM25	2	△	25	25	200	100	25	A			
SPM500-032X3202-UNM32	2	▲	32	32	160	100	32	A	UNM32□□	M501145	HTT20IP
SPM500-032X3202L-UNM32	2	△	32	32	250	120	32	A			
SPM500-040X4002-UNM40	2	▲	40	40	200	115	40	A	UNM40□□	M60160	HTT25
SPM500-040X4002L-UNM40	2	△	40	40	250	135	40	A			

▲Standing inventory △Make-to-order

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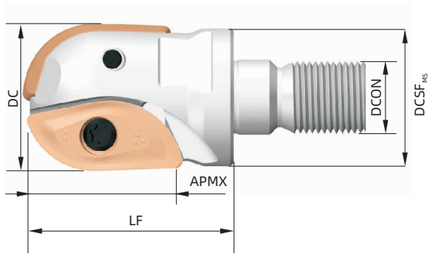
Profile Milling

KH series







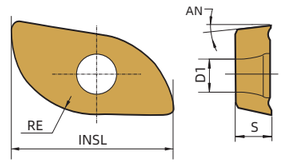
Tool specification	Number of edges	Inventory	Dmension (mm)				APMX (mm)	Applicable inserts	Screw	Wrench
			DCX	DCSF MS	LF	DCON				
KH-1602-UNM16-M10	2	△	16	18	30	10	16	UNM16□□	M25065	HFT08IP
KH-2002-UNM20-M12	2	▲	20	21.5	35	12	20	UNM20□□	M35076	HTT10IP
KH-2502-UNM25-M12	2	▲	25	23	35	12	25	UNM25□□	M40100	HTT15IP
KH-3002-UNM30-M16	2	▲	30	29	43	16	30	UNM30□□	M501145	HTT20IP
KH-3202-UNM32-M16	2	△	32	29	43	16	32	UNM32□□		

▲Standing inventory △Make-to-order

Applicable Inserts

UNM□□





Working condition: ● Stable ◕ Average ⌗ Tough

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

Type	Dimension (mm)					APMX (mm)	CVD		PVD								Cemented carbide	Cermet
	INSL	D1	S	AN	RE		HR6130	HR8140	HR5110	HR5210	HR5120	HR5220	HR5130	HR530	HR7130	HR7140	HR7240	HRK10	HRC10
UNM1603-CE	16	2.8	3.18	15°	8	16					☆		★			★			
UNM20T3-CE	19	4	3.97	15°	10	20					☆		★			★			
UNM2504-CE	24	4.7	4.76	15°	12.5	25					☆		★			★			
UNM3006-CE	27	5.5	6.35	15°	15	30					☆		★			★			
UNM3206-CE	31	5.5	6.35	15°	16	32					☆		★			★			
UNM4007-CE	38	6.7	7.94	11°	20	40					☆		★			★			

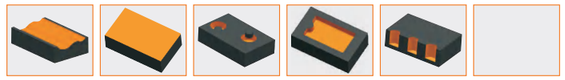
★ Recommended grade ☆ Available grade

Recommended cutting parameters

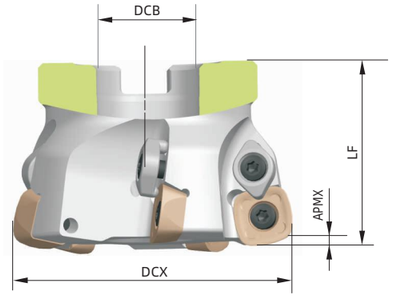
Workpiece material		Hardness (HB)	Insert grade	Cutting data	
				Cutting speed v_c (m/min)	Feed rate f_z(mm/z)
P	Low-carbon steel, mild steel	≤180HB	HR5120	180(150-260)	0.2(0.1-0.35)
			HR5130		
	High-carbon steel, alloy steel	180-280HB	HR5120	150(100-200)	0.2(0.1-0.3)
			HR5130		
	Alloy tool steel	280-350HB	HR5120	120(80-180)	0.2(0.1-0.3)
			HR5130		
M	Stainless steel	≤270HB	HR5120	120(90-160)	0.2(0.1-0.3)
			HR5130		
			HR7140		
K	Cast iron	180-250HB	HR5120	200(150-300)	0.2(0.1-0.35)
			HR5130		
S	Heat-resistant alloys / titanium alloys	≤400HB	HR5120	80(40-120)	0.1(0.06-0.22)
			HR7140		
H	High-hardness materials	45-55HRC	HR5120	120(80-200)	0.1(0.06-0.22)
			HR5130		

High Feed Milling

CEM100 series





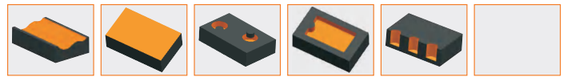


Tool specification	Number of edges	Inventory	Dmension (mm)			APMX (mm)	Interface form	Applicable inserts	Clamp	Screw	Wrench
			DCX	DCB	LF						
CEM100-042A1604-SD12	4	△	42	16	40	2.3	A	SD□□12	HYB1	M40100	HTT15IP
CEM100-050A2204-SD12	4	▲	50	22	40	2.3					
CEM100-063A2205-SD12	5	▲	63	22	40	2.3					
CEM100-063A2705-SD12	5	△	63	27	40	2.3					
CEM100-080A2705-SD12	5	▲	80	27	50	2.3					
CEM100-080A2706-SD12	6	▲	80	27	50	2.3					
CEM100-063A2704-SD15	4	▲	63	27	40	2.9		SD□□15	HYB2	M50130	HTT20IP
CEM100-080A3205-SD15	5	▲	80	32	50	2.9					
CEM100-100A3206-SD15	6	▲	100	32	50	2.9					
CEM100-125B4008-SD15	8	△	125	40	63	2.9	B				
CEM100-160C4010-SD15	10	△	160	40	63	2.9	C				

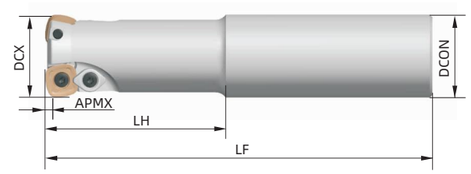
▲Standing inventory △Make-to-order

High Feed Milling

SEM100 series







Tool specification	Number of edges	Inventory					APMX (mm)	Applicable inserts	Clamp	Screw	Wrench
			DCX	DCB	LF	LH					
SEM100-032G3202-SD12	2	▲	32	32	150	70	2.3	SD□□12	HYB1	M40090	HTT15IP
SEM100-040G4003-SD12	3	△	40	40	150	70	2.3				
SEM100-040G4002-SD15	2	▲	40	40	200	70	2.9	SD□□15	HYB2	M50085	HTT20IP

▲Standing inventory △Make-to-order

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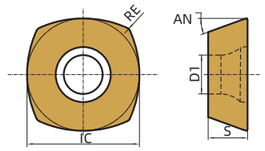
Applicable Inserts

SD □□





Working condition: ● Stable ◕ Average ⌗ Tough

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

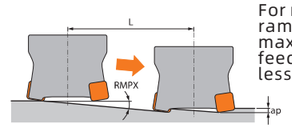
Type	Dimension (mm)					APMX (mm)	CVD		PVD									Cemented carbide	Cermet
	IC	S	D1	AN	RE		HR6130	HR8140	HR5110	HR5210	HR5120	HR5220	HR5130	HR530	HR7130	HR7140	HR7240	HRK10	HRC10
SDMT1205ZTN-FM	12.700	5.56	4.6	15°	3.0	2.3	☆		☆	☆	★	★	★	☆					
SDMT1505ZTN-FM	15.875	5.56	5.5	15°	0.8	2.9	☆		☆	☆	★	★	★	☆					
SDMW1205ZTN	12.700	5.56	4.6	15°	3.0	2.3	☆		☆	☆	★	★	★	☆					
SDMW1505ZTN	15.875	5.56	5.5	15°	0.8	2.9	☆		☆	☆	★	★	★	☆					

★ Recommended grade ☆ Available grade

Technical information of application of high feed milling tools （C/SEM100）

◆ Ramp Milling Angle & Effective Cutting Length

SPECS	Diameter mm	32	40	50	63	80	100
SD□□12□□	RMPX	3.5°	2.8°	2.5°	1.7°	1°	
SD□□15□□	RMPX		2.5°	2.2°	1.5°	0.8°	0.5°
	Cutting Length (L)	ap/ tanRMPX					

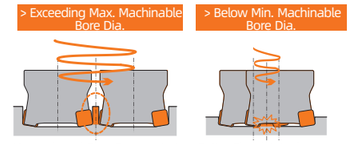


Ramp Milling Operation Diagram

For ramp milling operations, the ramp angle shall be set below the maximum ramp angle RMPX. The feed rate shall be set to 70% or less of the standard value.

◆ Helical Milling Machining Precautions

For helical milling operations, machining must be performed within the range of the maximum to minimum machinable bore diameter



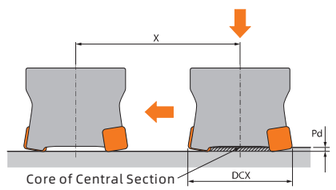
Unmachined Core Remnant at Central Core Remnant the Helical Milling Center

Cutter Shank Interference Caused by the Central Unmachined Core Remnant

SPECS	Minimum Machinable Bore Diameter	Maximum Machinable Bore Diameter
C/SEM100**12	2*DC-16	2*DC-2
C/SEM100**15	2*DC-26	2*DC-2

Note:①Plunge depth per revolution h < Max. axialdepthof cut APMX;
②Table feed rate ≤ 50% of recommended value.

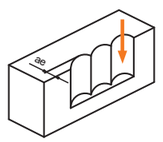
◆ Drill-Milling Machining Precautions



SPECS	Max. Drilling Depth	Min. Cutting Length for Flat Bottom Milling
C/SEM100**SD12	1.5mm	DC-16
C/SEM100**SD15	2mm	DC-25

Note: For radial feed machining after drillingoperation
① The feed rate shallbe reduced to 50% of that for standard radial machininguntil the central core remnant is fully removed;
② For drillingoperation, the axial feed per revolution shallbe set to f_n =0.2 mm/rev.

◆ Side Wall Drill-Milling



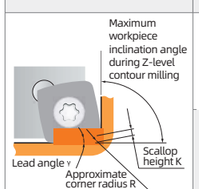
Note: For side wall contour milling, the recommended feed per tooth is fz ≤ 0.2 mm/z

Insert specs	Maximum Radial Depth of Cut(ae)
SD**12	10mm
SD**15	12mm

Recommended cutting parameters

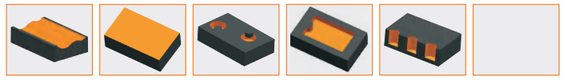
Workpiece material		Hardness (HB)	Insert grade	Cutting speed Vc (m/min)	Ø20 / Ø25		Ø30 / Ø35		Ø40	
					Axial cutting depth (mm)	Feed rate per tooth (mm)	Axial cutting depth (mm)	Feed rate per tooth (mm)	Axial cutting depth (mm)	Feed rate per tooth (mm)
P	Low-carbon steel, mild steel	≤180	HR5120	200(120-220)	0.3-1.5	0.6-1.2	0.3-1.2	0.5-1.4	0.3-1.5	0.8-1.5
			HR5220	200(120-220)	0.3-1.5	0.6-1.2	0.3-1.2	0.5-1.4	0.3-1.5	0.8-1.5
			HR5130	160(80-180)	0.2-1.2	0.6-1.2	0.2-1.0	0.5-1.4	0.2-1.2	0.6-1.5
			HR530	160(80-180)	0.2-1.2	0.6-1.2	0.2-1.0	0.5-1.4	0.2-1.2	0.6-1.5
	High-carbon steel, alloy steel Alloy tool steel	180-350	HR5110	120(80-220)	0.1-0.5	0.3-0.7	0.1-0.5	0.4-0.8	0.15-0.6	0.5-1.0
			HR5120	120(80-220)	0.1-0.5	0.3-0.7	0.1-0.5	0.4-0.8	0.15-0.6	0.5-1.0
			HR5210	150(100-250)	0.2-0.8	0.3-0.8	0.2-1.0	0.4-1.0	0.2-1.0	0.5-1.0
			HR5220	150(100-250)	0.2-0.8	0.3-0.8	0.2-1.0	0.4-1.0	0.2-1.0	0.5-1.0
M	Stainless steel	≤180	HR5120	150(80-190)	0.3-1.0	0.6-1.0	0.3-1.2	0.6-1.2	0.3-1.2	0.5-1.6
			HR5130	150(80-190)	0.3-1.0	0.6-1.0	0.3-1.2	0.6-1.2	0.3-1.2	0.5-1.6
			HR530	180(80-190)	0.3-1.0	0.5-1.2	0.2-1.0	0.5-1.4	0.2-1.2	0.8-1.6
K	Cast iron	180-250	HR6130	250(80-190)	0.3-1.0	0.5-1.2	0.2-1.0	0.5-1.4	0.2-1.2	0.8-1.6
			HR5110	180(80-190)	0.3-1.0	0.5-1.2	0.2-1.0	0.5-1.4	0.2-1.2	0.8-1.6
			HR5120	180(80-190)	0.3-1.0	0.5-1.2	0.2-1.0	0.5-1.4	0.2-1.2	0.8-1.6
			HR5220	180(80-190)	0.3-1.0	0.5-1.2	0.2-1.0	0.5-1.4	0.2-1.2	0.8-1.6

Approximate Radius Setting - During CNC Programming

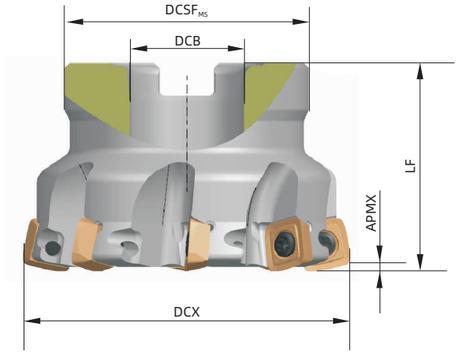
Illust.	SPECS	Entering Angle γ	R/ mm	Machining Remnant K/mm	Max. Inclination Angle for Contour Milling
	C/SEM 100**SD12	10°	3.0	0.85	90°
	C/SEM 100**SD15	10°	3.5	1.37	90°

High Feed Milling

CEM300 series





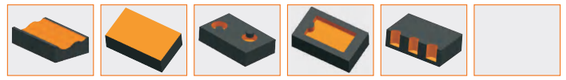


Tool specification	Number of edges	Inventory	Dmension (mm)				APMX (mm)	Applicable inserts	Screw	Wrench
			DC	DCB	DCSF$_{MS}$	LF				
CEM300-040A1604-SD09	4	▲	40	16	35	40	1.2	SDKT09□□	M35076	HFT15IP
CEM300-040A1605-SD09	5	△	40	16	35	40	1.2			
CEM300-050A2205-SD09	5	▲	50	22	47	40	1.2			
CEM300-050A2206-SD09	6	▲	50	22	47	40	1.2			
CEM300-050A2207-SD09	7	△	50	22	47	40	1.2			
CEM300-063A2206-SD09	6	▲	63	22	47	40	1.2			
CEM300-063A2208-SD09	8	△	63	22	47	40	1.2			
CEM300-050A2205-SD12	5	▲	50	22	47	40	1.4	SDKT12□□	M40110-076	HF15IP
CEM300-063A2205-SD12	5	▲	63	22	47	40	1.4			
CEM300-063A2206-SD12	6	△	63	22	47	40	1.4			
CEM300-080A2706-SD12	6	▲	80	27	62	50	1.4			
CEM300-080A2708-SD12	8	△	80	27	62	50	1.4			
CEM300-100A3207-SD12	7	▲	100	32	77	50	1.4			
CEM300-125A4008-SD12	8	△	125	40	90	63	1.4			

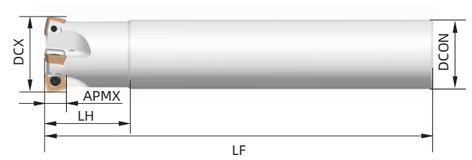
▲Standing inventory △Make-to-order

High Feed Milling

SEM300 series







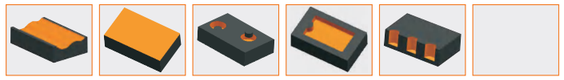
Tool specification	Number of edges	Inventory	Dmension (mm)				APMX (mm)	Applicable inserts	Screw	Wrench
			DCX	DCON	LF	LH				
SEM300-025G2502-SD09	2	▲	25	25	150	50	1.2	SDKT09□□	M35076	HFT15IP
SEM300-025G2503-SD09	3	△	25	25	150	50	1.2			
SEM300-032G3203-SD09	3	▲	32	32	180	60	1.2			
SEM300-032G3204-SD09	4	△	32	32	180	60	1.2			
SEM300-035G3204-SD09	4	▲	35	32	180	/	1.2			
SEM300-032G3202-SD12	2	▲	32	32	180	60	1.4	SDKT12□□	M40110-076	HF15IP
SEM300-032G3202L-SD12	2	△	32	32	250	100	1.4			
SEM300-032G3203-SD12	3	▲	32	32	180	60	1.4			
SEM300-032G3203L-SD12	3	△	32	32	250	100	1.4			
SEM300-035G3203-SD12	3	▲	35	32	180	/	1.4			
SEM300-035G3203L-SD12	3	△	35	32	250	/	1.4			

▲Standing inventory △Make-to-order

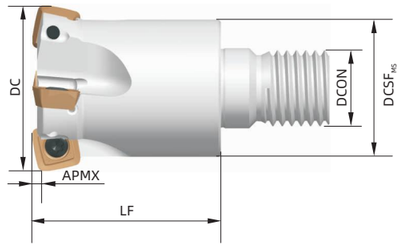
HUAREAL

High Feed Milling

KH series





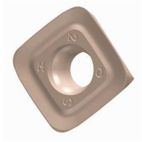


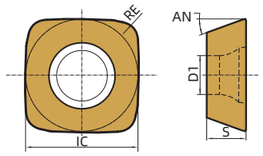
Tool specification	Number of edges	Inventory	Dmension (mm)				APMX (mm)	Applicable inserts	Screw	Wrench
			DCX	DCSFMS	LF	DCON				
KH-2502-SD09-M12	2	▲	25	23	35	12	1.2	SDKT09□□	M35076	HFT15IP
KH-2503-SD09-M12	3	△	25	23	35	12	1.2			
KH-3203-SD09-M16	3	▲	32	29	40	16	1.2			
KH-3204-SD09-M16	4	△	32	29	40	16	1.2			
KH-3503-SD09-M16	3	▲	35	29	40	16	1.2			
KH-3504-SD09-M16	4	△	35	29	40	16	1.2			
KH-4005-SD09-M16	5	▲	40	29	40	16	1.2			
KH-3202-SD12-M16	2	▲	32	29	40	16	1.4	SDKT12□□	M40110-076	HF15IP
KH-3203-SD12-M16	3	△	32	29	40	16	1.4			
KH-3503-SD12-M16	3	▲	35	29	40	16	1.4			
KH-4204-SD12-M16	4	△	42	29	40	16	1.4			

▲Standing inventory △Make-to-order

Applicable Inserts

SD □□





Working condition: ● Stable ◕ Average ⌗ Tough

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

Type	Dimension (mm)					APMX (mm)	CVD		PVD								Cemented carbide	Cermet
	IC	S	D1	AN	RE		HR6130	HR8140	HR5110	HR5210	HR5120	HR5220	HR5130	HR530	HR7130	HR7140	HR7240	HRK10	HRC10
SDKT09T312ZDER-SM	9.525	3.97	4.16	15°	1.2	1.2					☆		★			★	★		
SDKT120520ZDER-SM	12.788	5.00	4.45	15°	2.0	1.4					☆		★			★	★		

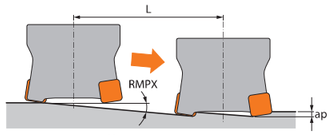
★ Recommended grade ☆ Available grade

Recommended cutting parameters

Workpiece material		Hardness (HB)	Insert grade	Insert grade	Cutting data		
					Cut deep ap (mm)	Cutting speed v_c (m/min)	Feed rate f_z(mm/z)
P	Low-carbon steel, mild steel	≤180HB	HR5120	SDKT09□□	1.2	180(140-220)	0.8(0.6-1.5)
			HR5130	SDKT12□□	1.4		1.2(0.8-2.0)
	High-carbon steel, alloy steel	180-280HB	HR5120	SDKT09□□	1.2	150(110-190)	0.8(0.6-1.5)
			HR5130	SDKT12□□	1.4		1.2(0.8-1.5)
	Alloy tool steel	280-350HB	HR5120	SDKT09□□	1.2	120(80-160)	0.8(0.6-1.5)
			HR5130	SDKT12□□	1.4		1.0(0.6-1.5)
M	Stainless Steel (Austenitic, Duplex)	≤270HB	HR5120	SDKT09□□	1.2	120(80-160)	0.8(0.6-1.5)
			HR7140				
			HR7240	SDKT12□□	1.4		
	Stainless Steel (Ferritic, Martensitic)	≤270HB	HR5120	SDKT09□□	1.2	100(60-140)	0.8(0.6-1.5)
			HR7140				
			HR7240	SDKT12□□	1.4		
S	Heat-resistant alloys / titanium alloys	≤400HB	HR5120	SDKT09□□	1.2	40(30-60)	0.5(0.3-1.1)
			HR7140				
			HR7240	SDKT12□□	1.4		

C/SEM300 Series Application Technical Specifications

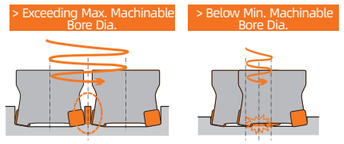
◆ Ramp Milling Angle, Axial Depth of Cut & Travel Length



Ramp Milling Operation Diagram

SPECS	Diameter(mm)	25	32	35	40	42	50	63	80	100	125
SDKT09□□	θ(°)	3	2.5	2	1.8	/	1.5	1	/	/	/
	ap(mm)	1.2	1.2	1.2	1.2	/	1.2	1.2	/	/	/
	Min. Travel Length L (mm) to Reach Max. Depth of Cut	100.5	27.5	34.4	38.2	/	45.8	68.7	/	/	/
SDKT12□□	θ(°)	/	2.5	2	/	1.8	1.5	0.8	0.6	0.5	0.4
	ap(mm)	/	1.4	1.4	/	1.4	1.4	1.4	1.4	1.4	1.4
	Min. Travel Length L (mm) to Reach Max. Depth of Cut	/	32.1	40.1	/	44.5	53.5	100.3	133.7	160.4	200.5

◆ Spiral machining diameter range

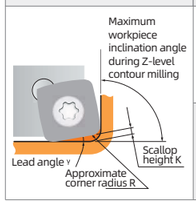


Unmachined Core Remnant at Central Core Remnant the Helical Milling Center

Cutter Shank Interference Caused by the Central Unmachined Core Remnant

SPECS	Diameter(mm)	25	32	35	40	42	50	63	80	100	125
SDKT09□□	Minimum Machinable Bore Diameter (mm)	33	47	53	63	83	83	109	/	/	/
	Maximum Machinable Bore Diameter (mm)	48	62	68	78	98	98	124	/	/	/
SDKT12□□	Minimum Machinable Bore Diameter (mm)	/	41	47	61	61	77	103	137	177	227
	Maximum Machinable Bore Diameter (mm)	/	62	68	82	82	98	124	158	198	248

◆ Approximate Corner Radius Setting - During CNC Programming

Illust.	SPECS	Entering Angle γ	Approximate corner radius R (mm)	Scallop height K (mm)	APMX (mm)
	SDKT09T312ZDER-SM	12°	2.36	0.84	1.2
	SDKT120520ZDER-SM	14°	3.31	1.04	1.4

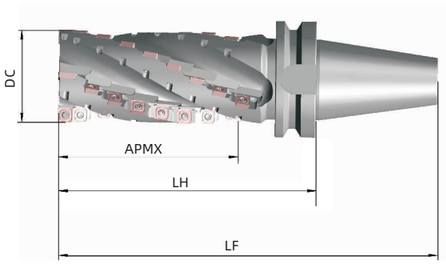
Helical End Milling

CHM190 series



KAPR=90°





Tool specification	Number of slots	Inventory	Dimension (mm) DC	LH	LF	APMX (mm)	Applicable inserts	Screw	Wrench
CHM190-063JT5004-SP12	4	△	63	165	266.75	104	SP□□12 AP□□15	M50105-40°	HAT20IP
CHM190-063JT50L04-SP12	4	△	63	195	296.75	134			
CHM190-080JT5004-SP12	4	△	80	165	266.75	104			
CHM190-080JT50L04-SP12	4	△	80	205	306.75	144			
CHM190-063BT5004-SP12	4	△	63	165	266.75	104			
CHM190-063BT50L04-SP12	4	△	63	195	296.75	134			
CHM190-080BT5004-SP12	4	△	80	165	266.75	104			
CHM190-080BT50L04-SP12	4	△	80	205	306.75	144			

▲Standing inventory △Make-to-order

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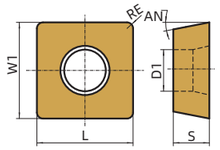
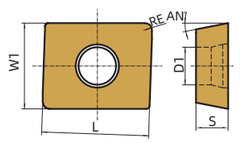
Applicable Inserts

SP □□
AP □□









Working condition: ● Stable ◕ Average ⌗ Tough

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

Type	Dimension (mm)					AN	CVD		PVD								Cemented carbide	Cermet
	L	W1	S	D1	RE		HR6130	HR8140	HR5110	HR5210	HR5120	HR5220	HR5130	HR530	HR7130	HR7140	HR7240	HRK10	HRC10
SPMT120408-MM	12.700	12.70	4.76	5.50	0.80	11°	★			☆	☆	★	★	☆					
APMT150412-MM	15.865	12.69	4.76	5.56	1.20	11°	★			☆	☆	★	★	☆					
SPHX120408T21	12.700	12.70	4.76	5.50	0.80	11°	★			☆	☆	★	★	☆					
APHX1504	15.875	12.70	4.76	5.70	0.40	11°	★			☆	☆	★	★	☆					

★ Recommended grade ☆Available grade

Recommended cutting parameters

Workpiece material		Hardness (HB)	Insert grade	Cutting data	
				Cutting speed v_c(m/min)	Feed rate f_z(mm/z)
P	Low-carbon steel, mild steel	≤180	HR5110	130(60-150)	0.25(0.1-0.35)
			HR5120	140(70-170)	0.3(0.15-0.4)
			HR5130	140(70-170)	0.3(0.15-0.4)
	High-carbon steel, alloy steel	180-280	HR5110	120(60-150)	0.2(0.1-0.35)
			HR5120	130(60-170)	0.25(0.15-0.35)
			HR5130	140(70-170)	0.25(0.15-0.35)
	Alloy tool steel	280-350	HR5110	100(60-150)	0.15(0.08-0.25)
			HR5120	110(70-170)	0.2(0.1-0.35)
			HR5130	120(70-170)	0.2(0.1-0.35)
M	Stainless steel	≤270	HR5110	140(110-200)	0.2(0.1-0.3)
			HR5120	120(100-200)	0.2(0.1-0.3)
			HR5130	120(100-200)	0.2(0.1-0.3)
K	Cast iron	180-250	HR5110	170(90-200)	0.2(0.1-0.35)
			HR5120	130(90-200)	0.25(0.15-0.35)
			HR5130	130(100-210)	0.25(0.15-0.35)

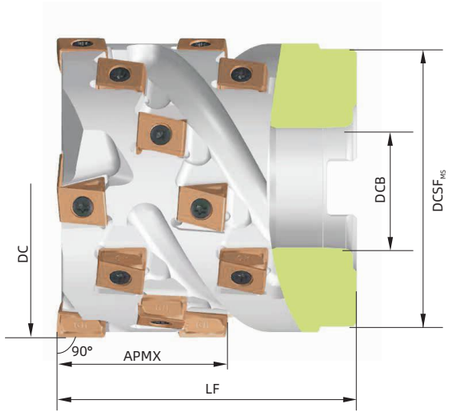
Helical End Milling

CHM690 series



KAPR=90°





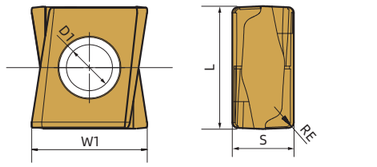
Tool specification	Number of flutes	Inventory	Number of stages	Number of inserts	Dimension (mm)			APMX (mm)	Interface form	Applicable inserts	Screw	Wrench
					DC	DCB	LF					
CHM690-032X35A1602-LN09	2	△	5	10	32	16	55	35	A	LNHX09□□	M30075	HFT09IP
CHM690-032X35A1603-LN09	3	△	5	15	32	16	55	35				
CHM690-040X42A1603-LN09	3	△	6	18	40	16	60	42				
CHM690-040X42A1604-LN09	4	△	6	24	40	16	60	42				
CHM690-050X42A2204-LN09	4	△	6	24	50	22	60	42				
CHM690-050X42A2205-LN09	5	△	6	30	50	22	60	42				
CHM690-040X34A1602-LN13	2	△	3	6	40	16	55	34				
CHM690-040X45A1602-LN13	2	△	4	8	40	16	65	45		LNHX13□□	M40110	HTT15IP
CHM690-050X34A2203-LN13	3	△	3	9	50	22	55	34				
CHM690-050X45A2203-LN13	3	△	4	12	50	22	65	45				
CHM690-063X45A2704-LN13	4	△	4	16	63	27	70	45				
CHM690-063X56A2704-LN13	4	△	5	20	63	27	80	56				
CHM690-080X32A3204-LN13	4	△	3	12	80	32	85	32				
CHM690-080X56A3205-LN13	5	△	5	25	80	32	85	56				

▲Standing inventory △Make-to-order

Applicable Inserts

LN□□





Working condition: ● Stable ◕ Average ⌗ Tough

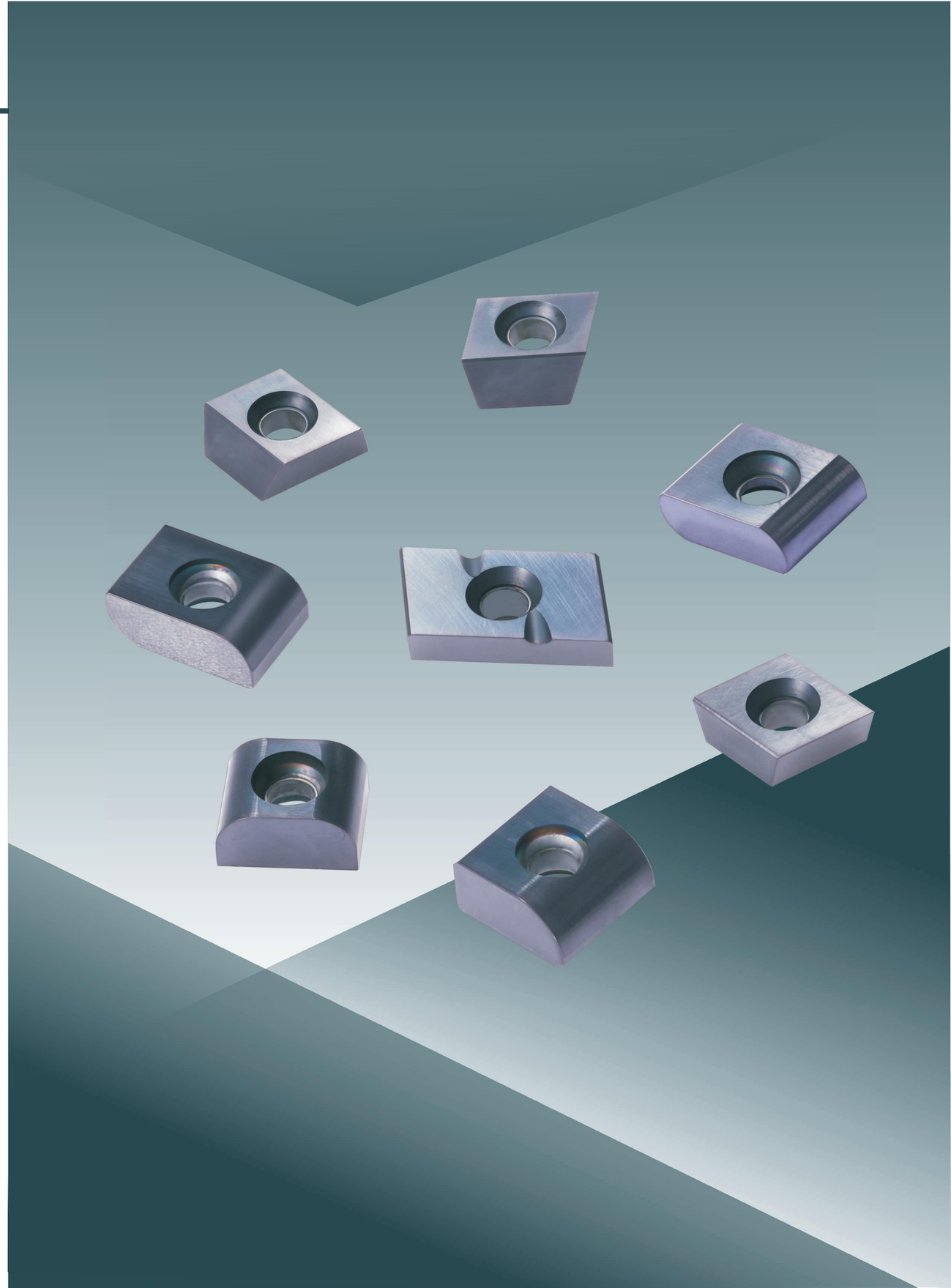
Applicable inserts	Workpiece material		CVD		PVD									Cemented carbide	Cermet
			HR6130	HR8140	HR5110	HR5210	HR5120	HR5220	HR5130	HR530	HR7130	HR7140	HR7240	HRK10	HRC10
	P	Steel	●	⌗	●	●	◕	◕●	⌗◕	◕	⌗◕				●
	M	Stainless steel			●		◕	◕	⌗◕	◕		⌗◕	●		
	K	Cast iron	●◕	⌗	●	●	◕	◕	⌗◕						
	N	Non-ferrous metal												●	
	S	Heat resistant super alloys Titanium alloy										●◕	●		

Type	Dimension (mm)					APMX (mm)	CVD		PVD								Cemented carbide	Cermet
	L	W1	S	D1	RE		HR6130	HR8140	HR5110	HR5210	HR5120	HR5220	HR5130	HR530	HR7130	HR7140	HR7240	HRK10	HRC10
LNHX090404R-GM	9	8.5	4.5	3.4	0.4	8					★		★			☆			
LNHX130608R-GM	13	11.8	6.8	4.55	0.8	12					★		★			☆			

★ Recommended grade ☆ Available grade

Recommended cutting parameters

Workpiece material		Hardness (HB)	Insert grade	Cutting data	
				Cutting speed v_c(m/min)	Feed rate f_z(mm/z)
P	Low-carbon steel, mild steel	≤180HB	HR5120	220(170-320)	0.2(0.1-0.35)
			HR5130	180(130-280)	
	High-carbon steel, alloy steel	180-280HB	HR5120	220(150-300)	0.2(0.1-0.3)
			HR5130	180(110-260)	
	Alloy tool steel	280-350HB	HR5120	200(130-280)	0.2(0.1-0.3)
			HR5130	160(100-240)	
M	Stainless steel	≤270HB	HR5120	140(100-200)	0.2(0.1-0.3)
			HR5130	120(100-160)	
			HR7140	160(120-220)	
K	Cast iron	180-250HB	HR5120	160(120-220)	0.2(0.1-0.35)
			HR5130	140(100-180)	
S	Heat-resistant alloys / titanium alloys	≤400HB	HR5120	60(30-120)	0.1(0.06-0.22)
			HR7140	60(30-120)	



Code Key of Heavy Milling Inserts

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

① Insert shape

C	F	G	L	S	X	Others
80°	78°	70°				Z

② Clearance angle major

N	Q	T	Others
0°	17°	23°	O

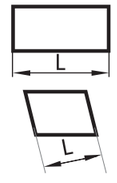
③ Tolerance class

C:	E:	R:
± 0.013 ± 0.025	± 0.025	Blank

④ Clamping form

40° B	60° D	78° F	82° H	X° V	Others (Special requirements such as different clamping forms or hole diameter) X
60° J	78° L	82° N	R R	X° Y	
60° S	78° U	82° W	R R P	X° Z	

⑤ Length



Integer of length

⑥ Width

Integer of width

⑦ Thickness

Integer of thickness

Corresponding sizes of the size codes of length, width and thickness

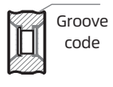
Code	03	03A	04	05	05A	05B	06	06A	06B	06C	06D	06E
Size	3.80	3.97	4.76	5.00	5.95	5.80	6.35	6.00	6.94	6.84	6.55	6.70
Code	07	07A	07B	07C	07D	07E	07F	07G	08	08A	09	09A
Size	7.94	7.05	7.15	7.24	7.35	7.60	7.50	7.82	8.50	8.00	9.52	
Code	09B	10	11	11A	11B	11C	12	12A	12B	12C	13	13A
Size	9.43	10.00	11.50	11.11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

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

⑧ Eigenvalue or code

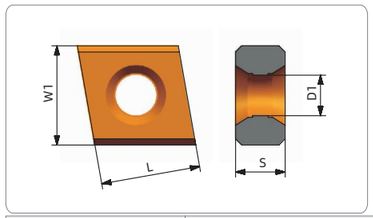
2R 2R**	4** 4**	DR DR**
4R 4R**	4R 4R**H	NR NR**
4A 4A**	4A 4A**M	2NR 2NR**

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



Groove code

Heavy Milling Inserts



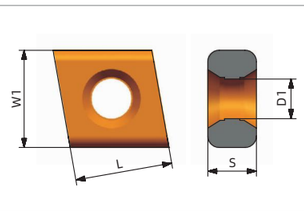
Working condition: ● Stable ◕ Average ⌗ Tough

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

Insert shape	Type	Dimension (mm)				CVD		PVD									Cemented carbide	Cermet
		L	W1	S	D1	HR6130	HR8140	HR5110	HR5210	HR5120	HR5220	HR5130	HR530	HR7130	HR7140	HR7240	HRK10	HRC10
	CNEF121206-405	12.7	12.70	6.35	5.4		☆							★				
	CNEF121206-408	12.7	12.70	6.35	5.4		☆							★				
	CNEL161406-408	16.3	14.29	6.35	5.4		☆							★				

★ Recommended grade ☆ Available grade

Heavy Milling Inserts

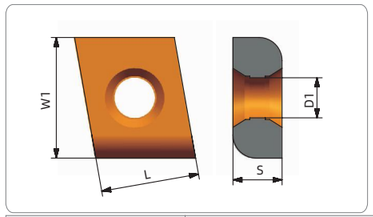


Working condition: ● Stable ◕ Average ⌗ Tough

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

Insert shape	Type	Dimension (mm)				CVD		PVD									Cemented carbide	Cermet
		L	W1	S	D1	HR6130	HR8140	HR5110	HR5210	HR5120	HR5220	HR5130	HR530	HR7130	HR7140	HR7240	HRK10	HRC10
	CNEF161406-4R10	16.3	14.29	6.35	5.4		☆							★				
	CNEF161406-4R15	16.3	14.29	6.35	5.4		☆							★				
	CNEF161406-4R30	16.3	14.29	6.35	5.4		☆							★				

★ Recommended grade ☆ Available grade

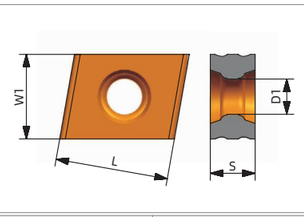


Working condition: ● Stable ◕ Average ⌗ Tough

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

Insert shape	Type	Dimension (mm)				CVD		PVD									Cemented carbide	Cermet
		L	W1	S	D1	HR6130	HR8140	HR5110	HR5210	HR5120	HR5220	HR5130	HR530	HR7130	HR7140	HR7240	HRK10	HRC10
																		
	CNEF161406-2R30	16.3	14.29	6.35	5.4		☆							★				
	CNEF161406-2R50	16.3	14.29	6.35	5.4		☆							★				

★ Recommended grade ☆ Available grade



Working condition: ● Stable ◕ Average ⌗ Tough

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

Insert shape	Type	Dimension (mm)				CVD		PVD									Cemented carbide	Cermet
		L	W1	S	D1	HR6130	HR8140	HR5110	HR5210	HR5120	HR5220	HR5130	HR530	HR7130	HR7140	HR7240	HRK10	HRC10
																		
	CNER16A12A06-L2M	16.00	12.00	6.35	5.4		☆							★				
	CNEF161406-L2M	16.30	14.29	6.35	5.4		☆							★				

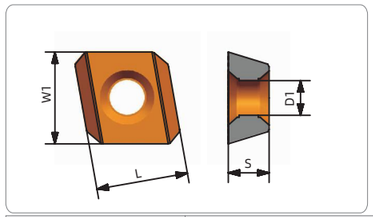
★ Recommended grade ☆ Available grade

HUAREAL

A General turning
Turing of small components
Parting and grooving
Threading
B Indexable milling
Solid carbide end mill
C
Short hole drill
Solid carbide drill

Heavy Milling Inserts

Working condition: ● Stable ◕ Average ⌗ Tough



Workpiece material

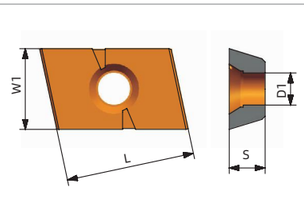
P	Steel	●	⌗	●	●	◕	●●	⌗⌗	◕	⌗⌗				●
M	Stainless steel			●		◕	◕	⌗⌗	◕		⌗⌗	●		
K	Cast iron	●●	⌗	●	●	◕	◕	⌗⌗						
N	Non-ferrous metal												●	
S	Heat resistant super alloys Titanium alloy										●●	●		

Insert shape	Type	Dimension (mm)				CVD		PVD								Cemented carbide	Cermet
		L	W1	S	D1	HR6130	HR8140	HR5110	HR5210	HR5120	HR5220	HR5130	HR530	HR7130	HR7140	HR7240	HRK10	HRC10
	CQEH141406--R02R	14.29	14.29	6.35	5.4		☆							★				
	CQER11A11A04-R01R	11.10	11.10	4.76	5.4		☆							★				

★ Recommended grade ☆ Available grade

Heavy Milling Inserts

Working condition: ● Stable ◕ Average ⌗ Tough



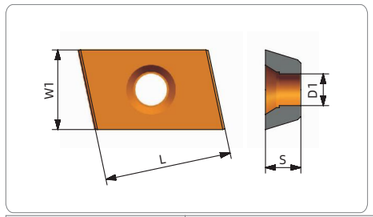
Workpiece material

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

Insert shape	Type	Dimension (mm)				CVD		PVD								Cemented carbide	Cermet
		L	W1	S	D1	HR6130	HR8140	HR5110	HR5210	HR5120	HR5220	HR5130	HR530	HR7130	HR7140	HR7240	HRK10	HRC10
	FQEW221406-R04R	22.8	14.29	6.35	5.4		☆							★				

★ Recommended grade ☆ Available grade

Working condition: ● Stable ◕ Average ⌗ Tough



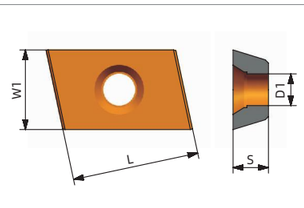
Workpiece material

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

Insert shape	Type	Dimension (mm)				CVD		PVD								Cemented carbide	Cermet
		L	W1	S	D1	HR6130	HR8140	HR5110	HR5210	HR5120	HR5220	HR5130	HR530	HR7130	HR7140	HR7240	HRK10	HRC10
	FQES190906-2R30R	19.05	9.525	6.35	4.4		☆							★				
	FQES190906-2R40R	19.05	9.525	6.35	4.4		☆							★				
	FQES190906-2R45R	19.05	9.525	6.35	4.4		☆							★				
	FQES190906-2R50R	19.05	9.525	6.35	4.4		☆							★				

★ Recommended grade ☆ Available grade

Working condition: ● Stable ◕ Average ⌗ Tough



Workpiece material

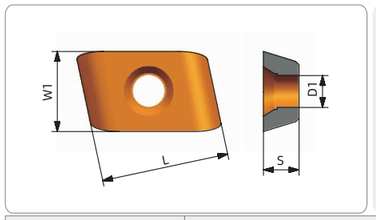
P	Steel	●	⌗	●	●	◕	●●	⌗⌗	◕	⌗⌗				●
M	Stainless steel			●		◕	◕	⌗⌗	◕		⌗⌗	●		
K	Cast iron	●●	⌗	●	●	◕	◕	⌗⌗						
N	Non-ferrous metal												●	
S	Heat resistant super alloys Titanium alloy										●●	●		

Insert shape	Type	Dimension (mm)				CVD		PVD								Cemented carbide	Cermet
		L	W1	S	D1	HR6130	HR8140	HR5110	HR5210	HR5120	HR5220	HR5130	HR530	HR7130	HR7140	HR7240	HRK10	HRC10
	FQEP120904-210L	12.70	9.525	4.76	4.4		☆							★				
	FQEP120904-210R	12.70	9.525	4.76	4.4		☆							★				
	FQEP120904-2R05L	12.70	9.525	4.76	4.4		☆							★				

★ Recommended grade ☆ Available grade

HUAREAL

Heavy Milling Inserts



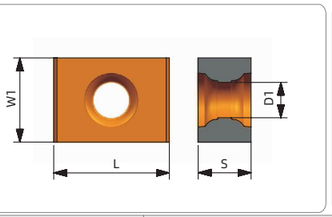
Working condition: ● Stable ◕ Average ⌗ Tough

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

Insert shape	Type	Dimension (mm)				CVD		PVD								Cemented carbide	Cermet
		L	W1	S	D1	HR6130	HR8140	HR5110	HR5210	HR5120	HR5220	HR5130	HR530	HR7130	HR7140	HR7240	HRK10	HRC10
	FQES190906-4RXR	19.05	9.525	6.35	4.4		☆							★				

★ Recommended grade ☆ Available grade

Working condition: ● Stable ◕ Average ⌗ Tough

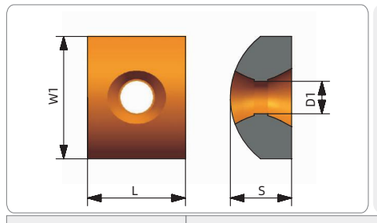


Workpiece material														
P	Steel	●	⌗	●	●	◕	●●	⌗⌗	◕	⌗⌗				●
M	Stainless steel			●		◕	◕	⌗⌗	◕		⌗⌗	●		
K	Cast iron	●●	⌗	●	●	◕	◕	⌗⌗						
N	Non-ferrous metal												●	
S	Heat resistant super alloys Titanium alloy										●●	●		

Insert shape	Type	Dimension (mm)				CVD		PVD								Cemented carbide	Cermet
		L	W1	S	D1	HR6130	HR8140	HR5110	HR5210	HR5120	HR5220	HR5130	HR530	HR7130	HR7140	HR7240	HRK10	HRC10
	LNED150906-408	15.875	9.525	6.35	4.4		☆							★				
	LNER151207-404	15.875	12.70	7.94	5.5		☆							★				
	LNER151208B-408	15.875	12.70	7.82	5.5		☆							★				
	LNER151207-400	15.875	12.70	7.94	5.5		☆							★				
	LNER151207-408	15.875	12.70	7.94	5.5		☆							★				
	LNEF191206-405	19.05	12.70	7.94	5.4		☆							★				
	LNEL191207-400	19.05	12.70	7.94	5.4		☆							★				
	LNEL191406-402	19.05	14.29	6.35	5.4		☆							★				
	LNER191406-400	19.05	14.29	6.35	5.4		☆							★				
	LNER191406-405	19.05	14.29	6.35	5.4		☆							★				
	LNER191406-408	19.05	14.29	6.35	5.5		☆							★				
	LNER191406-410	19.05	14.29	6.35	5.4		☆							★				
	LNER191407A-406	19.05	14.29	7.05	5.4		☆							★				

★ Recommended grade ☆ Available grade

Heavy Milling Inserts



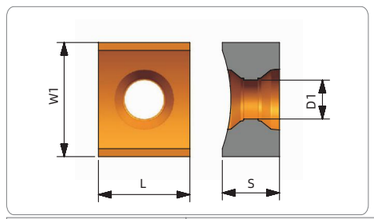
Working condition: ● Stable ◕ Average ⌗ Tough

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

Insert shape	Type	Dimension (mm)				CVD		PVD								Cemented carbide	Cermet
		L	W1	S	D1	HR6130	HR8140	HR5110	HR5210	HR5120	HR5220	HR5130	HR530	HR7130	HR7140	HR7240	HRK10	HRC10
	LNER151207-DR100	15.875	12.70	7.94	5.4		☆							★				
	LNER151207-DR115	15.875	12.70	7.94	5.4		☆							★				
	LNER151207-DR130	15.875	12.70	7.94	5.4		☆							★				
	LNER151207-DR145	15.875	12.70	7.94	5.4		☆							★				
	LNER151207-DR160	15.875	12.70	7.94	5.4		☆							★				
	LNER151207-DR190	15.875	12.70	7.94	5.4		☆							★				
	LNER151207-DR200	15.875	12.70	7.94	5.4		☆							★				
	LNER151207-DR250	15.875	12.70	7.94	5.4		☆							★				
	LNER151207-DR400	15.875	12.70	7.94	5.4		☆							★				
	LNER151207-DR800	15.875	12.70	7.94	5.4		☆							★				

★ Recommended grade ☆ Available grade

Working condition: ● Stable ◕ Average ⌗ Tough



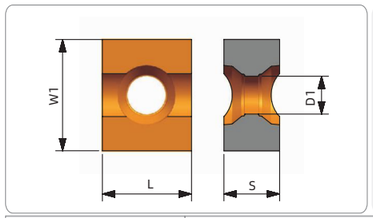
Workpiece material														
P	Steel	●	⌗	●	●	◕	●●	⌗⌗	◕	⌗⌗				●
M	Stainless steel			●		◕	◕	⌗⌗	◕		⌗⌗	●		
K	Cast iron	●●	⌗	●	●	◕	◕	⌗⌗						
N	Non-ferrous metal												●	
S	Heat resistant super alloys Titanium alloy										●●	●		

Insert shape	Type	Dimension (mm)				CVD		PVD								Cemented carbide	Cermet
		L	W1	S	D1	HR6130	HR8140	HR5110	HR5210	HR5120	HR5220	HR5130	HR530	HR7130	HR7140	HR7240	HRK10	HRC10
	LNER151207-NR100	15.875	12.70	7.94	5.4		☆							★				
	LNER151207-NR130	15.875	12.70	7.94	5.4		☆							★				
	LNER151207-NR140	15.875	12.70	7.94	5.4		☆							★				
	LNER151207-NR150	15.875	12.70	7.94	5.4		☆							★				
	LNER151207-NR190	15.875	12.70	7.94	5.4		☆							★				
	LNER151207-NR200	15.875	12.70	7.94	5.4		☆							★				
	LNER151207-NR800	15.875	12.70	7.94	5.4		☆							★				
	LNER151207-NR3000	15.875	12.70	7.94	5.4		☆							★				

★ Recommended grade ☆ Available grade

Heavy Milling Inserts

Working condition: ● Stable ◕ Average ⌗ Tough



Workpiece material

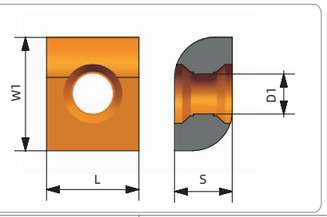
P	Steel	●	⌗	●	●	◕	●●	⌗⌗	◕	⌗⌗				●						
M	Stainless steel			●		◕	◕	⌗⌗	◕		⌗⌗	●								
K	Cast iron	●●	⌗	●	●	◕	◕	⌗⌗												
N	Non-ferrous metal												●							
S	Heat resistant super alloys Titanium alloy										●●	●								

Insert shape	Type	Dimension (mm)				CVD		PVD									Cemented carbide	Cermet
		L	W1	S	D1	HR6130	HR8140	HR5110	HR5210	HR5120	HR5220	HR5130	HR530	HR7130	HR7140	HR7240	HRK10	HRC10
	LNEN151207-2NR100	15.875	12.70	7.94	5.4		☆							★				
	LNEN151207-2NR130	15.875	12.70	7.94	5.4		☆							★				
	LNEN151207-2NR140	15.875	12.70	7.94	5.4		☆							★				
	LNEN151207-2NR190	15.875	12.70	7.94	5.4		☆							★				

★ Recommended grade ☆ Available grade

Heavy Milling Inserts

Working condition: ● Stable ◕ Average ⌗ Tough



Workpiece material

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

Insert shape	Type	Dimension (mm)				CVD		PVD									Cemented carbide	Cermet
		L	W1	S	D1	HR6130	HR8140	HR5110	HR5210	HR5120	HR5220	HR5130	HR530	HR7130	HR7140	HR7240	HRK10	HRC10
	LNER151207-2R20	15.875	12.70	7.94	5.4		☆							★				
	LNER151207-2R30	15.875	12.70	7.94	5.4		☆							★				
	LNER151207-2R35	15.875	12.70	7.94	5.4		☆							★				
	LNER151207-2R40	15.875	12.70	7.94	5.4		☆							★				
	LNER151207-2R45	15.875	12.70	7.94	5.4		☆							★				
	LNER151207-2R50	15.875	12.70	7.94	5.4		☆							★				
	LNER151207A-2R50	15.875	12.70	7.05	5.4		☆							★				
	LNER151207-2R55	15.875	12.70	7.94	5.4		☆							★				
	LNER15C1207-2R50	15.28	12.70	7.94	5.4		☆							★				
	LNER15F1207-2R50	15.68	12.70	7.94	5.4		☆							★				
	LNER191406-2R30	19.05	14.29	6.35	5.4		☆							★				
	LNER191406-2R35	19.05	14.29	6.35	5.4		☆							★				
	LNER190906-2R50	19.05	9.525	6.35	5.4		☆							★				
	LNER191407-2R60	19.05	14.29	7.94	5.4		☆							★				
	LNER191406-2R30M22	19.05	14.29	6.35	5.4		☆							★				
	LNER191406-2R46M15	19.05	14.29	6.35	5.4		☆							★				
	LNER191407-2R60M15	19.05	14.29	7.94	5.4		☆							★				
	LNER191407-2R70M20	19.05	14.29	7.94	5.4		☆							★				
	LNER191408-2R70M20	19.05	14.29	8.50	5.4		☆							★				

★ Recommended grade ☆ Available grade

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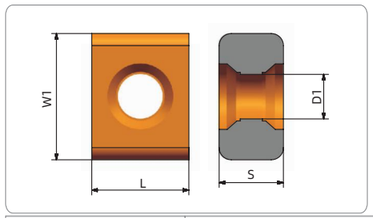
Heavy Milling Inserts



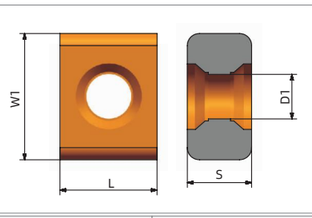
Working condition: ● Stable ◕ Average ⌗ Tough

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

Insert shape	Type	Dimension (mm)				CVD		PVD								Cemented carbide	Cermet
		L	W1	S	D1	HR6130	HR8140	HR5110	HR5210	HR5120	HR5220	HR5130	HR530	HR7130	HR7140	HR7240	HRK10	HRC10
	LNER151206-4R10	15.875	12.70	6.35	5.4		☆							★				
	LNER151206B-4R20	15.875	12.70	6.94	5.4		☆							★				
	LNER151207-4R10	15.875	12.70	7.94	5.5		☆							★				
	LNER151207-4R20	15.875	12.70	7.94	5.5		☆							★				
	LNER191406-4R02	19.05	14.29	6.35	5.4		☆							★				
	LNER191406-4R12	19.05	14.29	6.35	5.4		☆							★				
	LNER191406-4R20	19.05	14.29	6.35	5.4		☆							★				
	LNER191406-4R24	19.05	14.29	6.35	5.4		☆							★				

★ Recommended grade ☆ Available grade

Heavy Milling Inserts

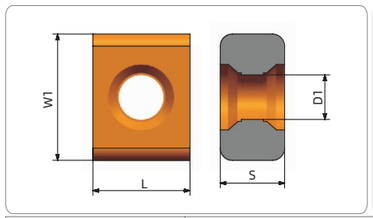


Working condition: ● Stable ◕ Average ⌗ Tough

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

Insert shape	Type	Dimension (mm)				CVD		PVD								Cemented carbide	Cermet
		L	W1	S	D1	HR6130	HR8140	HR5110	HR5210	HR5120	HR5220	HR5130	HR530	HR7130	HR7140	HR7240	HRK10	HRC10
	LNER150904-4R30H	15.875	9.525	4.76	4.4		☆							★				
	LNER151206-4R40H	15.875	12.70	6.35	5.4		☆							★				
	LNER151206-4R50H	15.875	12.70	6.35	5.4		☆							★				
	LNER151207-4R40H	15.875	12.70	7.94	5.4		☆							★				
	LNER151207-4R50H	15.875	12.70	7.94	5.4		☆							★				

★ Recommended grade ☆ Available grade

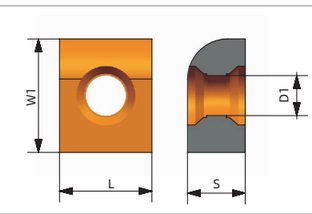


Working condition: ● Stable ◕ Average ⌗ Tough

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

Insert shape	Type	Dimension (mm)				CVD		PVD								Cemented carbide	Cermet
		L	W1	S	D1	HR6130	HR8140	HR5110	HR5210	HR5120	HR5220	HR5130	HR530	HR7130	HR7140	HR7240	HRK10	HRC10
	LNER151206-4R30	15.875	12.70	6.35	5.4		☆							★				
	LNER151206-4R40	15.875	12.70	6.35	5.4		☆							★				
	LNER151206-4R50	15.875	12.70	6.35	5.4		☆							★				
	LNER151206-4R55	15.875	12.70	6.35	5.4		☆							★				
	LNER151206-4R65	15.875	12.70	6.35	5.4		☆							★				
	LNER151207-4R40	15.875	12.70	7.94	5.4		☆							★				
	LNER151207-4R50	15.875	12.70	7.94	5.4		☆							★				

★ Recommended grade ☆ Available grade



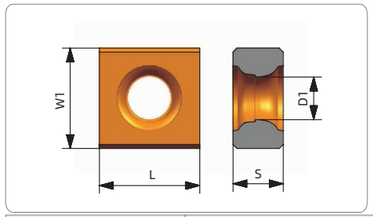
Working condition: ● Stable ◕ Average ⌗ Tough

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

Insert shape	Type	Dimension (mm)				CVD		PVD								Cemented carbide	Cermet
		L	W1	S	D1	HR6130	HR8140	HR5110	HR5210	HR5120	HR5220	HR5130	HR530	HR7130	HR7140	HR7240	HRK10	HRC10
	LNER151207-1R30M20	15.875	12.70	7.94	5.4		☆							★				

★ Recommended grade ☆ Available grade

Heavy Milling Inserts

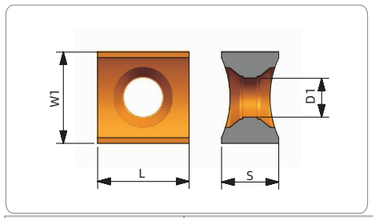


Working condition: ● Stable ◕ Average ⌗ Tough

Workpiece material

| | | |

Heavy Milling Inserts



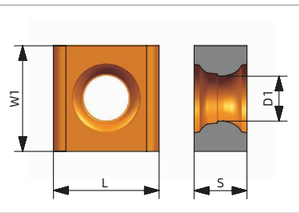
Working condition: ● Stable ◕ Average ⌗ Tough

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

Insert shape	Type	Dimension (mm)				CVD		PVD								Cemented carbide	Cermet
		L	W1	S	D1	HR6130	HR8140	HR5110	HR5210	HR5120	HR5220	HR5130	HR530	HR7130	HR7140	HR7240	HRK10	HRC10
	SNER121207-2NR80	12.70	12.70	7.94	5.4		☆							★				

★ Recommended grade ☆ Available grade

Heavy Milling Inserts



Working condition: ● Stable ◕ Average ⌗ Tough

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

Insert shape	Type	Dimension (mm)				CVD		PVD								Cemented carbide	Cermet
		L	W1	S	D1	HR6130	HR8140	HR5110	HR5210	HR5120	HR5220	HR5130	HR530	HR7130	HR7140	HR7240	HRK10	HRC10
	SNED121206-4R20	12.70	12.70	6.35	5.5		☆							★				
	SNEH151507-4R20	15.875	15.875	7.94	5.4		☆							★				
	SNER121206-4R25	12.70	12.70	6.35	4.4		☆							★				
	SNEY090904-4R30H	9.525	9.525	4.76	4.4		☆							★				

★ Recommended grade ☆ Available grade

Working condition: ● Stable ◕ Average ⌗ Tough

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

Insert shape	Type	Dimension (mm)				CVD		PVD								Cemented carbide	Cermet
		L	W1	S	D1	HR6130	HR8140	HR5110	HR5210	HR5120	HR5220	HR5130	HR530	HR7130	HR7140	HR7240	HRK10	HRC10
	SNED121206-S4R02	12.70	12.70	6.35	5.5		☆							★				
	SNED121206-S4R08	12.70	12.70	6.35	5.5		☆							★				
	SNEY090904-S4R04	9.525	9.525	4.76	4.4		☆							★				

★ Recommended grade ☆ Available grade

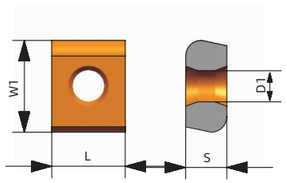
Working condition: ● Stable ◕ Average ⌗ Tough

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

Insert shape	Type	Dimension (mm)				CVD		PVD								Cemented carbide	Cermet
		L	W1	S	D1	HR6130	HR8140	HR5110	HR5210	HR5120	HR5220	HR5130	HR530	HR7130	HR7140	HR7240	HRK10	HRC10
	SNEN151507-2R20	15.875	15.875	7.94	5.4		☆							★				
	SNEN151507-2R30	15.875	15.875	7.94	5.4		☆							★				
	SNEN151507-2R40	15.875	15.875	7.94	5.4		☆							★				
	SNEN151507-2R50	15.875	15.875	7.94	5.4		☆							★				
	SNEN151507-2R60	15.875	15.875	7.94	5.4		☆							★				

★ Recommended grade ☆ Available grade

Heavy Milling Inserts



Working condition: ● Stable ◕ Average ⌗ Tough

Workpiece material

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

Insert shape	Type	Dimension (mm)				CVD		PVD								Cemented carbide	Cermet
		L	W1	S	D1	HR6130	HR8140	HR5110	HR5210	HR5120	HR5220	HR5130	HR530	HR7130	HR7140	HR7240	HRK10	HRC10
	ZNER12A1106-L2R15	12.00	11.50	6.35	4.4		☆							★				
	ZNER12B11C06-2R30	12.40	11.00	6.35	4.4		☆							★				
	ZNER13C11C06-2R30	13.75	11.00	6.35	4.4		☆							★				
	ZNER14A1206-2R25	14.20	12.70	6.35	4.4		☆							★				
	ZNER191408-2R50	19.05	14.29	8.50	5.4		☆							★				
	ZNEB151207B-2R40	15.875	12.70	7.14	5.4		☆							★				
	ZNEN151207-2R45	15.875	12.70	7.94	5.4		☆							★				
	ZNEN151208B-2R45	15.875	12.70	8.14	5.4		☆							★				
	ZNEN16A1408-2R50	16.00	14.00	8.50	5.4		☆							★				
	ZNEN16A1408-2R55	16.00	14.00	8.50	5.4		☆							★				
	ZNEJ151206-2R35	15.875	12.70	6.35	4.4		☆							★				

★ Recommended grade ☆ Available grade

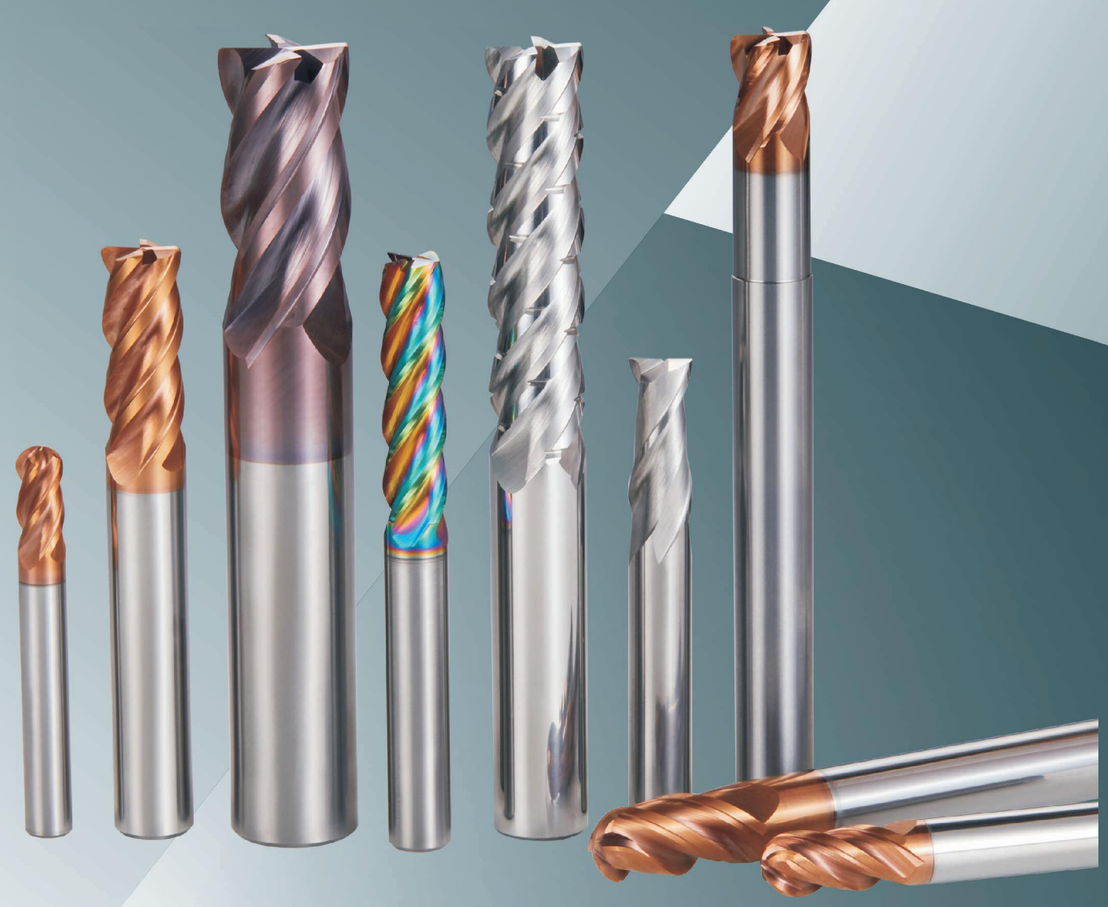


HUAREAL

P series — General-Purpose End Mills

- Suitable for general-purpose machining of a wide range of materials, including steel, stainless steel, cast iron, hard-to-machine materials, and hardened steel.
- With optimized structural design, it delivers outstanding machining stability even under complex working conditions.
- Features high-precision arc control with a radius accuracy of ±0.005mm, enabling high-efficiency and high-precision machining of curved surfaces.
- The application-specifically developed carbide substrate is engineered for extended and predictable tool life.





A series — High-Efficiency Aluminum Alloy End Mills

- Mirror-ground cutting edges effectively reduce cutting resistance, deliver smoother and more stable cutting performance, and significantly improve the machined surface finish.
- Special flute geometry design provides larger chip evacuation space, ensuring smooth chip removal during high-efficiency machining operations.
- Adopts an unequal pitch helix angle design, which effectively disperses and suppresses machining chatter for consistent, stable machining performance.
- Equipped with TAC coating specially developed for non-ferrous metal machining, which delivers outstanding wear resistance and lubricity to greatly extend tool life.



K series — High-Temperature Alloy End Mills

- Designed for high-performance machining of high-temperature alloys and other difficult-to-cut materials.
- Features unique cutting edge geometry and optimized geometric design to ensure smooth, stable and reliable performance throughout the machining process.
- Proprietary coating architecture delivers exceptional thermal barrier performance and high-temperature oxidation resistance.



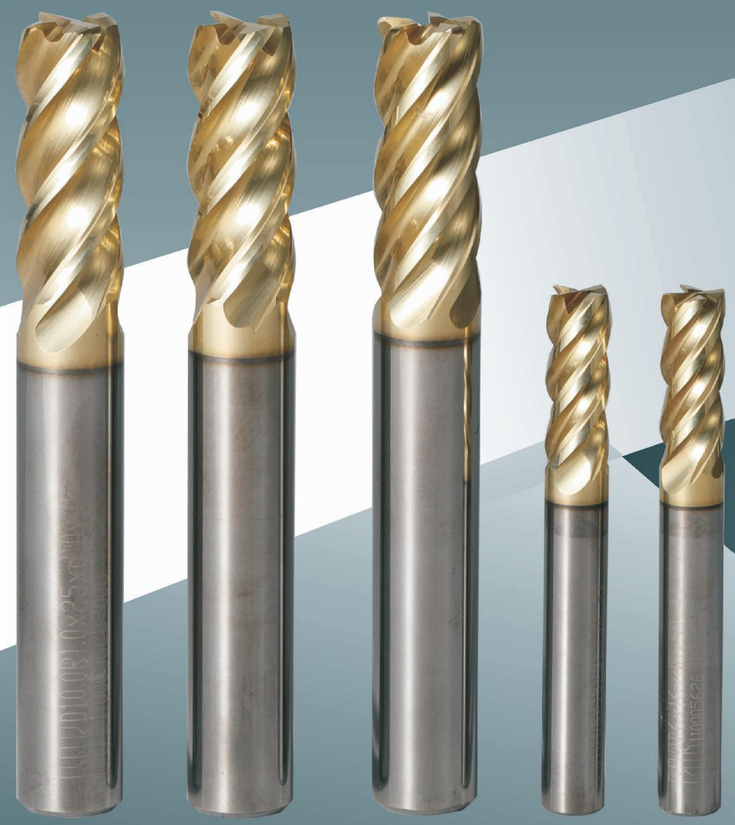
R series — Heavy-Duty Roughing End Mills

- Special profiled flute geometry design effectively increases chip evacuation space, supports high-efficiency slot milling with large depth of cut, and is widely adaptable to various high-efficiency machining scenarios.
- Carbide grade with excellent versatility and high wear resistance, as well as superior transverse rupture strength (TRS), to fully meet the demands of high-efficiency heavy-duty machining.
- Equipped with a coating grade featuring low friction coefficient and outstanding wear resistance, suitable for continuous machining of carbon steel, mild steel, stainless steel and other common materials.



T series — Titanium Alloy End Mills

- Designed for machining titanium alloys, stainless steels and other difficult-to-cut materials.
- Features unequal indexing and variable helix angle design, which effectively disperses and suppresses cutting chatter, significantly improving workpiece surface finish.
- Newly developed proprietary coating delivers exceptional anti-adhesion and high-temperature oxidation resistance, effectively eliminates built-up edge (BUE) and maintains stable performance under high-temperature cutting conditions.
- Substrate optimized for difficult-to-machine materials, combining high strength and exceptional wear resistance.



X series — Special Application End Mills

- Addresses customized special application requirements.
- Special flute and cutting edge geometry significantly optimizes chip flow and evacuation efficiency, thereby greatly increasing material removal rate (MRR) and overall machining efficiency.
- Dedicated cemented carbide substrate and coating ensure outstanding cutting performance and process stability.
- Customized edge preparation technology effectively enhances cutting edge strength and reduces cutting resistance for smoother and more stable machining operations.





B Milling

Solid carbide end mills

- Selection guidance of solid carbide end mills B113
- Code key of solid carbide end mills B114
- Overview of solid carbide end mills B115
- Details and recommended parameters of solid carbide end mills B116
  - P Series - General-Purpose End Mills B116
  - A Series - High-Efficiency Aluminum Alloy End Mills B136
  - K Series - High-Temperature Alloy End Mills B140
  - R Series - Heavy-Duty Roughing End Mills B144
  - T Series - Titanium Alloy End Mills B148
  - X Series - Special Application End Mills B154
- Non-standard customization of solid carbide end mills B162

HUAREAL

Selection guidance of solid carbide end mills

Product type

P Series - General-Purpose End Mills

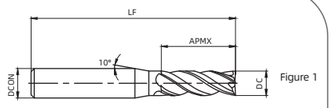
4 Flute Square End Mill (Short Flute Design)

Machining form

Product specification drawing

P4S...LG

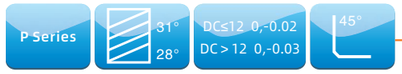





Side machining


Bottom machining


Slot milling



Product outline drawing

Type	Basic dimension (mm)					Pattern	Inventory
	DC	DCON	APMX	LF	ZEFP		
P4S0100LG-4	1.0	4	3	50	4	Figure 1	●
P4S0150LG-4	1.5	4	4	50	4	Figure 1	○
P4S0200LG-4	2.0	4	6	50	4	Figure 1	●
P4S0250LG-4	2.5	4	8	50	4	Figure 1	○
P4S0300LG-4	3.0	4	8	50	4	Figure 1	●
P4S0350LG-4	3.5	4	10	50	4	Figure 1	○
P4S0400LG-4	4.0	4	11	50	4	Figure 2	●
P4S0100LG	1.0	6	3	50	4	Figure 1	●
P4S0150LG	1.5	6	4	50	4	Figure 1	○
P4S0200LG	2.0	6	6	50	4	Figure 1	●
P4S0250LG	2.5	6	8	50	4	Figure 1	○
P4S0300LG	3.0	6	8	50	4	Figure 1	●

●Running stock ○Make-to-order

Product specification

Basic size

Pattern

Inventory information

Helical angle, insert diameter tolerance, etc.

P			M	K	N		S		H		
Carbon steel	Alloy steel	High-alloyed steel	Stainless steel	Cast iron	Non-ferrous alloy	Aluminum alloy	High-temp alloy	Titanium alloy	<54HRC	54--60HRC	≥60HRC
☀	☀	☀	☼	☀			☼	☼	☀		

☀ Fit well ☼ Applicable

Range of workpiece materials

Code key of solid carbide end mills

P	4	S	1000	R0500	B	L	G	-	4
①	②	③	④	⑤	⑥	⑦	⑧		⑨

① Product series	
P	General-Purpose End Mills
A	High-Efficiency Aluminum Alloy End Mills
K	High-Temperature Alloy End Mills
R	Heavy-Duty Roughing End Mills
T	Titanium Alloy End Mills
X	Special Application End Mills

② Number of edges	
2	Two flutes
3	Three flutes
4	Four flutes
...	...

③ Length	
S	Short
L	Long
P	Necking

④ Tool diameter	
1000	Φ10mm
Default	Ball nose mill

⑤ Corner radius	
R0500	Φ10mm
Default	Ball nose mill

⑥ Tool type	
Default	Flat end
	Radius
B	Ball nose
W	Corrugated edge

⑦ Helical angle	
L	Little helical angle
N	Normal helical angle
H	Large helical angle
O	Special helical angle

⑧ Application fields	
G	General
M	Stainless steel machining
N	Aluminum alloy machining
S	High-temp alloy and titanium alloy machining
H	High hardness material machining

⑨ shank diameter	
4	shank diameter 4mm

Overview of solide carbide end mills

Lineup	Shape	Number of Tooth	Model	Size range	Workpiece: P Carbon steel	P Alloy steel	P High-alloyed steel and tool steel	M Stainless steel	K Cast iron	N Non-ferrous alloy	N Aluminum alloy	S High-temp alloy	S Titanium alloy	H Hardened steel < 54HRC	H Hardened steel 54--60 HRC	H Hardened steel > 60HRC	page
General-purpose	flat end	4	P4S...LG	Φ1-Φ20	✹	✹	✹	☼	✹			☼	☼	✹			B116
			P4P...LG	Φ6-Φ20	✹	✹	✹	☼	✹			☼	☼	✹			B118
			P4S...NG	Φ1-Φ20	✹	✹	✹	☼	✹			☼	☼	✹			B120
			P4P...NG	Φ6-Φ20	✹	✹	✹	☼	✹			☼	☼	✹			B122
	Corner Radius End Mill		P4S...R...LG	Φ3-Φ20	✹	✹	✹	☼	✹			☼	☼	✹			B124
			P4P...R...LG	Φ6-Φ20	✹	✹	✹	☼	✹			☼	☼	✹			B126
			P4S...R...NG	Φ3-Φ20	✹	✹	✹	☼	✹			☼	☼	✹			B128
			P4P...R...NG	Φ6-Φ20	✹	✹	✹	☼	✹			☼	☼	✹			B130
	Ball Nose End Mill	2	P2S...BLG	Φ1-Φ20	✹	✹	✹	☼	✹			☼	☼	✹			B132
			P2P...BLG	Φ1-Φ20	✹	✹	✹	☼	✹			☼	☼	✹			B134
High-efficiency aluminum alloy	Square End Mill	3	A2P...NN	Φ3-Φ20						☼	✹						B136
		4	A3P...NN	Φ3-Φ20						☼	✹						B138
Heat resistant super alloys	Square End Mill	4	K4S...NS	Φ3-Φ20				☼				✹	☼				B140
	Corner Radius End Mill		K4S...R...NS	Φ3-Φ20				☼				✹	☼				B142
High-speed milling	Square End Mill	4	R4S...NG	Φ6-Φ12	✹	✹	✹	☼	✹			☼	☼	☼			B144
	Corner Radius End Mill		R4S...R...NG	Φ6-Φ12	✹	✹	✹	☼	✹			☼	☼	☼			B146
Titanium alloy	Square End Mill	4	T4S...NS	Φ6-Φ20				✹				☼	✹				B148
	Corner Radius End Mill		T4S...R...NS	Φ6-Φ20				✹				☼	✹				B150
		5	T5S...R...NS	Φ6-Φ20				✹				☼	✹				B152
Special type	Square End Mill	3	X3S...WLN	Φ6-Φ20						☼	☼						B154
		4	X4S...WNG	Φ6-Φ20	✹	✹	✹	☼	✹					☼			B156
			X4S...HG	Φ4-Φ20	✹	✹	✹	☼	✹			☼	☼	✹			B158
	Corner Radius End Mill	3	X4S...R...HG	Φ6-Φ20	✹	✹	✹	☼	✹			☼	☼	☼			B160

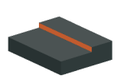
✹ Fit well ☼ Applicable

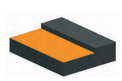
P Series - General-Purpose End Mills

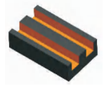
4 Flute Square End Mill (Short Flute Design)

P4S...LG




Side machining


Bottom machining


Slot milling

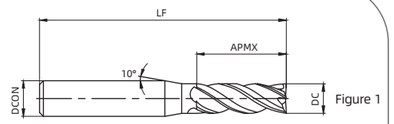


Figure 1

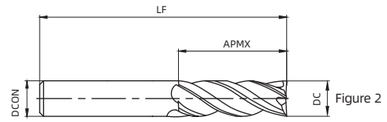


Figure 2

P Series | 31° 28° | DC≤12 0,-0.02 DC>12 0,-0.03 | 45°

Type	Dimension (mm) DC	DCON	APMX	LF	ZEFP	Pattern	Inventory
P4S0100LG-4	1.0	4	3	50	4	Figure 1	●
P4S0150LG-4	1.5	4	4	50	4	Figure 1	○
P4S0200LG-4	2.0	4	6	50	4	Figure 1	●
P4S0250LG-4	2.5	4	8	50	4	Figure 1	○
P4S0300LG-4	3.0	4	8	50	4	Figure 1	●
P4S0350LG-4	3.5	4	10	50	4	Figure 1	○
P4S0400LG-4	4.0	4	11	50	4	Figure 2	●
P4S0100LG	1.0	6	3	50	4	Figure 1	●
P4S0150LG	1.5	6	4	50	4	Figure 1	○
P4S0200LG	2.0	6	6	50	4	Figure 1	●
P4S0250LG	2.5	6	8	50	4	Figure 1	○
P4S0300LG	3.0	6	8	50	4	Figure 1	●
P4S0350LG	3.5	6	10	50	4	Figure 1	○
P4S0400LG	4.0	6	11	50	4	Figure 1	●
P4S0450LG	4.5	6	11	50	4	Figure 1	○
P4S0500LG	5.0	6	13	50	4	Figure 1	●
P4S0550LG	5.5	6	16	50	4	Figure 1	○
P4S0600LG	6.0	6	16	50	4	Figure 2	●
P4S0700LG	7.0	8	20	60	4	Figure 1	○
P4S0800LG	8.0	8	20	60	4	Figure 2	●
P4S0900LG	9.0	10	22	75	4	Figure 1	○
P4S1000LG	10.0	10	25	75	4	Figure 2	●
P4S1100LG	11.0	12	26	75	4	Figure 1	○
P4S1200LG	12.0	12	30	75	4	Figure 2	●
P4S1400LG	14.0	14	32	75	4	Figure 2	○
P4S1600LG	16.0	16	45	100	4	Figure 2	○
P4S1800LG	18.0	18	45	100	4	Figure 2	○
P4S2000LG	20.0	20	45	100	4	Figure 2	○

●Standing inventory ○Make-to-order

P Carbon steel	P Alloy steel	P High-alloyed steel	M Stainless steel	K Cast iron	N Non-ferrous alloy	N Aluminum alloy	S High-temp alloy	S Titanium alloy	H <54HRC	H 54—60HRC	H ≥60HRC
✹	✹	✹	☼	✹			☼	☼	✹		

✹ Fit well ☼ Applicable

Recommended cutting conditions——P4S...LG

Recommended Cutting Speed						
Workpiece material		Strength (N/mm²)	Hardness (HB/HRC)	Cutting speed (m/min)		
				Minimum	Recommendation	Maximum
P	Carbon steel	< 600	< 230	180	210	240
	Alloy steel	< 1200	< 350	150	175	200
	High-alloyed steel and tool steel	< 1400	< 380	100	120	140
M	Austenite and ferrite stainless steel	< 680	<220	80	110	140
	Martensite stainless steel	< 820	< 240	60	90	120
K	Gray cast iron	-	< 280	120	150	180
	Nodular iron	-	< 320	90	110	130
N	Non-ferrous alloy	< 250	< 110	-	-	-
	Aluminum alloy	< 530	< 130	-	-	-
S	Heat resistant super alloys	< 3300	< 350	40	50	60
	Titanium alloy	<2100	< 400	60	70	80
H	Hardened steel	-	< 54HRC	90	120	150
	Hardened steel	-	54-60HRC	-	-	-
	Hardened steel	-	> 60 HRC	-	-	-

Recommended Cutting Parameters						
Machining method	 Side milling			Slot milling		
Diameter （mm）	ap （1xDc）	ae （0.3xDc）	fz （mm/z）	ap （0.75xDc）	ae （1xDc）	fz （mm/z）
1.0	1.0	0.3	0.012	0.8	1.0	0.010
1.5	1.5	0.5	0.015	1.1	1.5	0.012
2.0	2.0	0.6	0.018	1.5	2.0	0.015
2.5	2.5	0.8	0.020	1.9	2.5	0.018
3.0	3.0	0.9	0.025	2.3	3.0	0.020
3.5	3.5	1.1	0.025	2.6	3.5	0.025
4.0	4.0	1.2	0.030	3.0	4.0	0.025
4.5	4.5	1.4	0.035	3.4	4.5	0.030
5.0	5.0	1.5	0.035	3.8	5.0	0.030
5.5	5.5	1.7	0.035	4.1	5.5	0.030
6.0	6.0	1.8	0.045	4.5	6.0	0.035
7.0	7.0	2.1	0.050	5.3	7.0	0.040
8.0	8.0	2.4	0.060	6.0	8.0	0.050
9.0	9.0	2.7	0.065	6.8	9.0	0.055
10.0	10.0	3.0	0.070	7.5	10.0	0.060
11.0	11.0	3.3	0.075	8.3	11.0	0.065
12.0	12.0	3.6	0.085	9.0	12.0	0.070
14.0	14.0	4.2	0.100	10.5	14.0	0.085
16.0	16.0	4.8	0.115	12.0	16.0	0.095
18.0	18.0	5.4	0.130	13.5	18.0	0.105
20.0	20.0	6.0	0.140	15.0	20.0	0.120

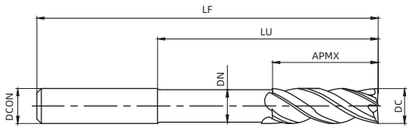
(1) Water-soluble cutting fluid is recommended during machining stainless steel.
(2) If the cutting depth is reduced, the rotating speed and feed rate may be increased appropriately.
(3) The down milling is recommended for side milling.
(4) With poor rigidity of the machine, if there is vibration or abnormal sound during machining, the cutting speed and feed rate of the above table should be lowered in the same proportion.

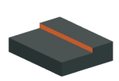
P Series - General-Purpose End Mills

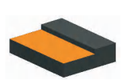
4 Flute Square End Mill (Reduced Neck Design)

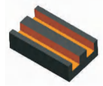
P4P...LG

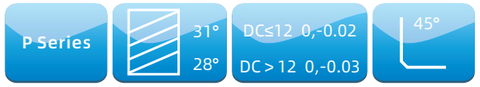





Side machining


Bottom machining


Slot milling



Type	Dimension (mm)							Inventory
	DC	DCON	APMX	LU	DN	LF	ZEFP	
P4P0600LG	6.0	6	9	30	5.8	75	4	●
P4P0800LG	8.0	8	12	40	7.8	100	4	●
P4P1000LG	10.0	10	15	50	9.6	100	4	●
P4P1200LG	12.0	12	18	50	11.5	100	4	●
P4P1600LG	16.0	16	24	50	15.5	150	4	○
P4P2000LG	20.0	20	30	60	19.5	150	4	○

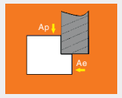
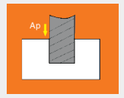
●Standing inventory ○Make-to-order

P			M	K	N		S		H		
Carbon steel	Alloy steel	High-alloyed steel	Stainless steel	Cast iron	Non-ferrous alloy	Aluminum alloy	High-temp alloy	Titanium alloy	<54HRC	54—60HRC	≥60HRC
☀	☀	☀	☼	☀			☼	☼	☀		

☀ Fit well ☼ Applicable

Recommended cutting conditions——P4P...LG

Recommended Cutting Speed						
Workpiece material		Strength (N/mm²)	Hardness (HB/HRC)	Cutting speed (m/min)		
				Minimum	Recommendation	Maximum
P	Carbon steel	< 600	< 230	180	210	240
	Alloy steel	< 1200	< 350	150	175	200
	High-alloyed steel and tool steel	< 1400	< 380	100	120	140
M	Austenite and ferrite stainless steel	< 680	<220	80	110	140
	Martensite stainless steel	< 820	< 240	60	90	120
K	Gray cast iron	-	< 280	120	150	180
	Nodular iron	-	< 320	90	110	130
N	Non-ferrous alloy	< 250	< 110	-	-	-
	Aluminum alloy	< 530	< 130	-	-	-
S	Heat resistant super alloys	< 3300	< 350	40	50	60
	Titanium alloy	<2100	< 400	60	70	80
H	Hardened steel	-	< 54HRC	90	120	150
	Hardened steel	-	54-60HRC	-	-	-
	Hardened steel	-	> 60 HRC	-	-	-

Recommended Cutting Parameters						
Machining method	 Side milling			 Slot milling		
Diameter （mm）	ap （1xDc）	ae （0.3xDc）	fz （mm/z）	ap （0.75xDc）	ae （1xDc）	fz （mm/z）
6.0	6.0	1.8	0.045	4.5	6.0	0.035
8.0	8.0	2.4	0.060	6.0	8.0	0.050
10.0	10.0	3.0	0.070	7.5	10.0	0.060
12.0	12.0	3.6	0.085	9.0	12.0	0.070
16.0	16.0	4.8	0.115	12.0	16.0	0.095
20.0	20.0	6.0	0.140	15.0	20.0	0.120

(1) Water-soluble cutting fluid is recommended during machining stainless steel.
(2) If the cutting depth is reduced, the rotating speed and feed rate may be increased appropriately.
(3) The down milling is recommended for side milling.
(4) With poor rigidity of the machine, if there is vibration or abnormal sound during machining, the cutting speed and feed rate of the above table should be lowered in the same proportion.

P Series - General-Purpose End Mills

4 Flute Square End Mill (Short Flute Design)

P4S...NG



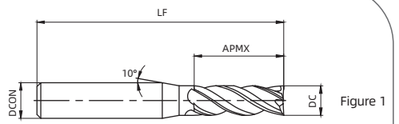


Figure 1

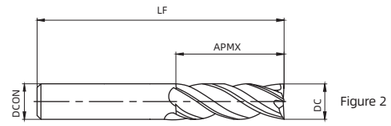
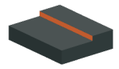
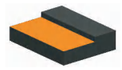
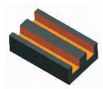
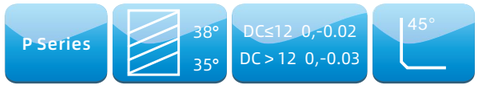


Figure 2


Side machining


Bottom machining


Slot milling



Type	Dimension (mm)					Pattern	Inventory
	DC	DCON	APMX	LF	ZEFP		
P4S0100NG-4	1.0	4	3	50	4	Figure 1	●
P4S0150NG-4	1.5	4	4	50	4	Figure 1	○
P4S0200NG-4	2.0	4	6	50	4	Figure 1	●
P4S0250NG-4	2.5	4	8	50	4	Figure 1	○
P4S0300NG-4	3.0	4	8	50	4	Figure 1	●
P4S0350NG-4	3.5	4	10	50	4	Figure 1	○
P4S0400NG-4	4.0	4	11	50	4	Figure 2	●
P4S0100NG	1.0	6	3	50	4	Figure 1	○
P4S0150NG	1.5	6	4	50	4	Figure 1	○
P4S0200NG	2.0	6	6	50	4	Figure 1	○
P4S0250NG	2.5	6	8	50	4	Figure 1	○
P4S0300NG	3.0	6	8	50	4	Figure 1	○
P4S0350NG	3.5	6	10	50	4	Figure 1	○
P4S0400NG	4.0	6	11	50	4	Figure 1	○
P4S0450NG	4.5	6	11	50	4	Figure 1	○
P4S0500NG	5.0	6	13	50	4	Figure 1	●
P4S0550NG	5.5	6	16	50	4	Figure 1	○
P4S0600NG	6.0	6	16	50	4	Figure 2	●
P4S0700NG	7.0	8	20	60	4	Figure 1	○
P4S0800NG	8.0	8	20	60	4	Figure 2	●
P4S0900NG	9.0	10	22	75	4	Figure 1	○
P4S1000NG	10.0	10	25	75	4	Figure 2	●
P4S1100NG	11.0	12	26	75	4	Figure 1	○
P4S1200NG	12.0	12	30	75	4	Figure 2	●
P4S1400NG	14.0	14	32	75	4	Figure 2	○
P4S1600NG	16.0	16	45	100	4	Figure 2	○
P4S1800NG	18.0	18	45	100	4	Figure 2	○
P4S2000NG	20.0	20	45	100	4	Figure 2	○

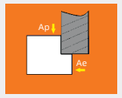
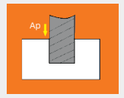
●Standing inventory ○Make-to-order

P			M	K	N		S		H		
Carbon steel	Alloy steel	High-alloyed steel	Stainless steel	Cast iron	Non-ferrous alloy	Aluminum alloy	High-temp alloy	Titanium alloy	<54HRC	54—60HRC	≥60HRC
☀	☀	☀	☼	☀			☼	☼	☀		

☀ Fit well ☼ Applicable

Recommended cutting conditions——P4S...NG

Recommended Cutting Speed						
Workpiece material		Strength (N/mm²)	Hardness (HB/HRC)	Cutting speed (m/min)		
				Minimum	Recommendation	Maximum
P	Carbon steel	< 600	< 230	180	210	240
	Alloy steel	< 1200	< 350	150	175	200
	High-alloyed steel and tool steel	< 1400	< 380	100	120	140
M	Austenite and ferrite stainless steel	< 680	<220	80	110	140
	Martensite stainless steel	< 820	< 240	60	90	120
K	Gray cast iron	-	< 280	120	150	180
	Nodular iron	-	< 320	90	110	130
N	Non-ferrous alloy	< 250	< 110	-	-	-
	Aluminum alloy	< 530	< 130	-	-	-
S	Heat resistant super alloys	< 3300	< 350	40	50	60
	Titanium alloy	<2100	< 400	60	70	80
H	Hardened steel	-	< 54HRC	90	120	150
	Hardened steel	-	54-60HRC	-	-	-
	Hardened steel	-	> 60 HRC	-	-	-

Recommended Cutting Parameters						
Machining method	 Side milling			 Slot milling		
Diameter （mm）	ap （1xDc）	ae （0.3xDc）	fz （mm/z）	ap （0.75xDc）	ae （1xDc）	fz （mm/z）
1.0	1.0	0.3	0.012	0.8	1.0	0.010
1.5	1.5	0.5	0.015	1.1	1.5	0.012
2.0	2.0	0.6	0.018	1.5	2.0	0.015
2.5	2.5	0.8	0.020	1.9	2.5	0.018
3.0	3.0	0.9	0.025	2.3	3.0	0.020
3.5	3.5	1.1	0.025	2.6	3.5	0.025
4.0	4.0	1.2	0.030	3.0	4.0	0.025
4.5	4.5	1.4	0.035	3.4	4.5	0.030
5.0	5.0	1.5	0.035	3.8	5.0	0.030
5.5	5.5	1.7	0.035	4.1	5.5	0.030
6.0	6.0	1.8	0.045	4.5	6.0	0.035
7.0	7.0	2.1	0.050	5.3	7.0	0.040
8.0	8.0	2.4	0.060	6.0	8.0	0.050
9.0	9.0	2.7	0.065	6.8	9.0	0.055
10.0	10.0	3.0	0.070	7.5	10.0	0.060
11.0	11.0	3.3	0.075	8.3	11.0	0.065
12.0	12.0	3.6	0.085	9.0	12.0	0.070
14.0	14.0	4.2	0.100	10.5	14.0	0.085
16.0	16.0	4.8	0.115	12.0	16.0	0.095
18.0	18.0	5.4	0.130	13.5	18.0	0.105
20.0	20.0	6.0	0.140	15.0	20.0	0.120

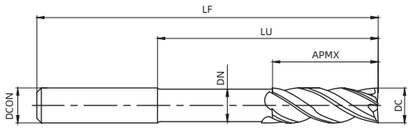
(1) Water-soluble cutting fluid is recommended during machining stainless steel.
(2) If the cutting depth is reduced, the rotating speed and feed rate may be increased appropriately.
(3) The down milling is recommended for side milling.
(4) With poor rigidity of the machine, if there is vibration or abnormal sound during machining, the cutting speed and feed rate of the above table should be lowered in the same proportion.

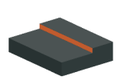
P Series - General-Purpose End Mills

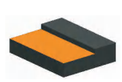
4 Flute Square End Mill (Reduced Neck Design)

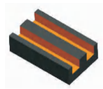
P4P...NG

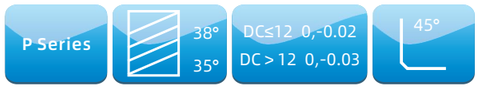





Side machining


Bottom machining


Slot milling



Type	Dimension (mm)							Inventory
	DC	DCON	APMX	LU	DN	LF	ZEFP	
P4P0600NG	6.0	6	9	30	5.8	75	4	●
P4P0800NG	8.0	8	12	40	7.8	100	4	●
P4P1000NG	10.0	10	15	50	9.6	100	4	●
P4P1200NG	12.0	12	18	50	11.5	100	4	●
P4P1600NG	16.0	16	24	50	15.5	150	4	○
P4P2000NG	20.0	20	30	60	19.5	150	4	○

●Standing inventory ○Make-to-order

P			M	K	N		S		H		
Carbon steel	Alloy steel	High-alloyed steel	Stainless steel	Cast iron	Non-ferrous alloy	Aluminum alloy	High-temp alloy	Titanium alloy	<54HRC	54—60HRC	≥60HRC
☀	☀	☀	☼	☀			☼	☼	☀		

☀ Fit well ☼ Applicable

Recommended cutting conditions——P4P...NG

Recommended Cutting Speed						
Workpiece material		Strength (N/mm²)	Hardness (HB/HRC)	Cutting speed (m/min)		
				Minimum	Recommendation	Maximum
P	Carbon steel	< 600	< 230	180	210	240
	Alloy steel	< 1200	< 350	150	175	200
	High-alloyed steel and tool steel	< 1400	< 380	100	120	140
M	Austenite and ferrite stainless steel	< 680	<220	80	110	140
	Martensite stainless steel	< 820	< 240	60	90	120
K	Gray cast iron	-	< 280	120	150	180
	Nodular iron	-	< 320	90	110	130
N	Non-ferrous alloy	< 250	< 110	-	-	-
	Aluminum alloy	< 530	< 130	-	-	-
S	Heat resistant super alloys	< 3300	< 350	40	50	60
	Titanium alloy	<2100	< 400	60	70	80
H	Hardened steel	-	< 54HRC	90	120	150
	Hardened steel	-	54-60HRC	-	-	-
	Hardened steel	-	> 60 HRC	-	-	-

Recommended Cutting Parameters						
Machining method	 Side milling			Slot milling		
Diameter （mm）	ap （1xDc）	ae （0.3xDc）	fz （mm/z）	ap （0.75xDc）	ae （1xDc）	fz （mm/z）
6.0	6.0	1.8	0.045	4.5	6.0	0.035
8.0	8.0	2.4	0.060	6.0	8.0	0.050
10.0	10.0	3.0	0.070	7.5	10.0	0.060
12.0	12.0	3.6	0.085	9.0	12.0	0.070
16.0	16.0	4.8	0.115	12.0	16.0	0.095
20.0	20.0	6.0	0.140	15.0	20.0	0.120

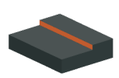
(1) Water-soluble cutting fluid is recommended during machining stainless steel.
(2) If the cutting depth is reduced, the rotating speed and feed rate may be increased appropriately.
(3) The down milling is recommended for side milling.
(4) With poor rigidity of the machine, if there is vibration or abnormal sound during machining, the cutting speed and feed rate of the above table should be lowered in the same proportion.

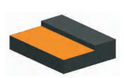
P Series - General-Purpose End Mills

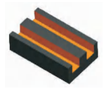
4 Flute Corner Radius End Mill (Short Flute Design)

P4S...R...LG




Side machining


Bottom machining


Slot milling

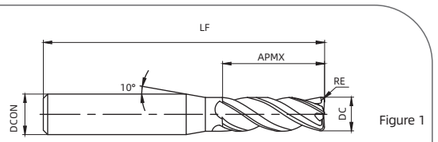


Figure 1

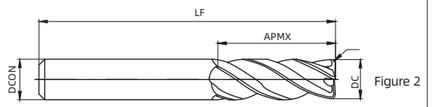
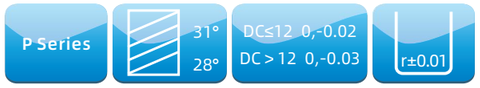


Figure 2



Type	Dimension (mm)						Pattern	Inventory
	DC	DCON	APMX	LF	RE	ZEFP		
P4S0300R0020LG-4	3.0	4	8	50	0.2	4	Figure 1	●
P4S0400R0030LG-4	4.0	4	10	50	0.3	4	Figure 2	●
P4S0400R0050LG-4	4.0	4	10	50	0.5	4	Figure 2	●
P4S0300R0020LG	3.0	6	8	50	0.2	4	Figure 1	●
P4S0400R0030LG	4.0	6	10	50	0.3	4	Figure 1	●
P4S0400R0050LG	4.0	6	10	50	0.5	4	Figure 1	●
P4S0500R0050LG	5.0	6	13	50	0.5	4	Figure 1	●
P4S0500R0100LG	5.0	6	13	50	1.0	4	Figure 1	●
P4S0600R0050LG	6.0	6	16	50	0.5	4	Figure 2	●
P4S0600R0100LG	6.0	6	16	50	1.0	4	Figure 2	●
P4S0800R0050LG	8.0	8	20	60	0.5	4	Figure 2	●
P4S0800R0100LG	8.0	8	20	60	1.0	4	Figure 2	●
P4S1000R0050LG	10.0	10	25	75	0.5	4	Figure 2	●
P4S1000R0100LG	10.0	10	25	75	1.0	4	Figure 2	●
P4S1000R0200LG	10.0	10	25	75	2.0	4	Figure 2	●
P4S1000R0300LG	10.0	10	25	75	3.0	4	Figure 2	○
P4S1200R0050LG	12.0	12	30	75	0.5	4	Figure 2	●
P4S1200R0100LG	12.0	12	30	75	1.0	4	Figure 2	●
P4S1200R0200LG	12.0	12	30	75	2.0	4	Figure 2	○
P4S1200R0300LG	12.0	12	30	75	3.0	4	Figure 2	○
P4S1600R0100LG	16.0	16	45	100	1.0	4	Figure 2	○
P4S1600R0200LG	16.0	16	45	100	2.0	4	Figure 2	○
P4S1600R0300LG	16.0	16	45	100	3.0	4	Figure 2	○
P4S2000R0100LG	20.0	20	45	100	1.0	4	Figure 2	○
P4S2000R0200LG	20.0	20	45	100	2.0	4	Figure 2	○
P4S2000R0300LG	20.0	20	45	100	3.0	4	Figure 2	○

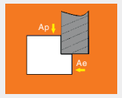
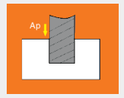
●Standing inventory ○Make-to-order

P			M	K	N		S		H		
Carbon steel	Alloy steel	High-alloyed steel	Stainless steel	Cast iron	Non-ferrous alloy	Aluminum alloy	High-temp alloy	Titanium alloy	<54HRC	54—60HRC	≥60HRC
☀	☀	☀	☼	☀			☼	☼	☀		

☀ Fit well ☼ Applicable

Recommended cutting conditions——P4S...R...LG

Recommended Cutting Speed						
Workpiece material		Strength (N/mm²)	Hardness (HB/HRC)	Cutting speed (m/min)		
				Minimum	Recommendation	Maximum
P	Carbon steel	< 600	< 230	180	210	240
	Alloy steel	< 1200	< 350	150	175	200
	High-alloyed steel and tool steel	< 1400	< 380	100	120	140
M	Austenite and ferrite stainless steel	< 680	<220	80	110	140
	Martensite stainless steel	< 820	< 240	60	90	120
K	Gray cast iron	-	< 280	120	150	180
	Nodular iron	-	< 320	90	110	130
N	Non-ferrous alloy	< 250	< 110	-	-	-
	Aluminum alloy	< 530	< 130	-	-	-
S	Heat resistant super alloys	< 3300	< 350	40	50	60
	Titanium alloy	<2100	< 400	60	70	80
H	Hardened steel	-	< 54HRC	90	120	150
	Hardened steel	-	54-60HRC	-	-	-
	Hardened steel	-	> 60 HRC	-	-	-

Recommended Cutting Parameters						
Machining method	 Side milling			 Slot milling		
Diameter （mm）	ap （1xDc）	ae （0.3xDc）	fz （mm/z）	ap （0.75xDc）	ae （1xDc）	fz （mm/z）
3.0	3.0	0.9	0.025	2.3	3.0	0.020
4.0	4.0	1.2	0.030	3.0	4.0	0.025
5.0	5.0	1.5	0.035	3.8	5.0	0.030
6.0	6.0	1.8	0.045	4.5	6.0	0.035
8.0	8.0	2.4	0.060	6.0	8.0	0.050
10.0	10.0	3.0	0.070	7.5	10.0	0.060
12.0	12.0	3.6	0.085	9.0	12.0	0.070
16.0	16.0	4.8	0.115	12.0	16.0	0.095
20.0	20.0	6.0	0.140	15.0	20.0	0.120

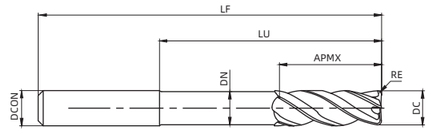
(1) Water-soluble cutting fluid is recommended during machining stainless steel.
(2) If the cutting depth is reduced, the rotating speed and feed rate may be increased appropriately.
(3) The down milling is recommended for side milling.
(4) With poor rigidity of the machine, if there is vibration or abnormal sound during machining, the cutting speed and feed rate of the above table should be lowered in the same proportion.

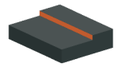
P Series - General-Purpose End Mills

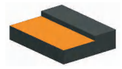
4 Flute Corner Radius End Mill (Reduced Neck Design)

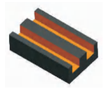
P4P...R...LG

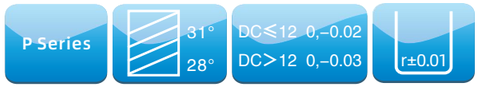





Side machining


Bottom machining


Slot milling



Type	Dimension (mm)								Inventory
	DC	DCON	APMX	LU	DN	LF	RE	ZEFP	
P4P0600R0050LG	6.0	6	6	18	5.8	75	0.5	4	●
P4P0600R0100LG	6.0	6	6	18	5.8	75	1.0	4	●
P4P0800R0050LG	8.0	8	8	24	7.8	100	0.5	4	●
P4P0800R0100LG	8.0	8	8	24	7.8	100	1.0	4	●
P4P1000R0050LG	10.0	10	10	30	9.6	100	0.5	4	●
P4P1000R0100LG	10.0	10	10	30	9.6	100	1.0	4	●
P4P1000R0200LG	10.0	10	10	30	9.6	100	2.0	4	○
P4P1200R0050LG	12.0	12	12	36	11.5	100	0.5	4	●
P4P1200R0100LG	12.0	12	12	36	11.5	100	1.0	4	●
P4P1200R0200LG	12.0	12	12	36	11.5	100	2.0	4	○
P4P1600R0100LG	16.0	16	16	40	15.5	150	1.0	4	○
P4P1600R0200LG	16.0	16	16	40	15.5	150	2.0	4	○

●Standing inventory ○Make-to-order

P			M	K	N		S		H		
Carbon steel	Alloy steel	High-alloyed steel	Stainless steel	Cast iron	Non-ferrous alloy	Aluminum alloy	High-temp alloy	Titanium alloy	<54HRC	54—60HRC	≥60HRC
☀	☀	☀	☼	☀			☼	☼	☀		

☀ Fit well ☼ Applicable

Recommended cutting conditions——P4P...R...LG

Recommended Cutting Speed						
Workpiece material		Strength (N/mm²)	Hardness (HB/HRC)	Cutting speed (m/min)		
				Minimum	Recommendation	Maximum
P	Carbon steel	< 600	< 230	180	210	240
	Alloy steel	< 1200	< 350	150	175	200
	High-alloyed steel and tool steel	< 1400	< 380	100	120	140
M	Austenite and ferrite stainless steel	< 680	<220	80	110	140
	Martensite stainless steel	< 820	< 240	60	90	120
K	Gray cast iron	-	< 280	120	150	180
	Nodular iron	-	< 320	90	110	130
N	Non-ferrous alloy	< 250	< 110	-	-	-
	Aluminum alloy	< 530	< 130	-	-	-
S	Heat resistant super alloys	< 3300	< 350	40	50	60
	Titanium alloy	<2100	< 400	60	70	80
H	Hardened steel	-	< 54HRC	90	120	150
	Hardened steel	-	54-60HRC	-	-	-
	Hardened steel	-	> 60 HRC	-	-	-

Recommended Cutting Parameters						
Machining method	 Side milling			Slot milling		
Diameter （mm）	ap （1xDc）	ae （0.3xDc）	fz （mm/z）	ap （0.75xDc）	ae （1xDc）	fz （mm/z）
6.0	6.0	1.8	0.045	4.5	6.0	0.035
8.0	8.0	2.4	0.060	6.0	8.0	0.050
10.0	10.0	3.0	0.070	7.5	10.0	0.060
12.0	12.0	3.6	0.085	9.0	12.0	0.070
16.0	16.0	4.8	0.115	12.0	16.0	0.095

(1) Water-soluble cutting fluid is recommended during machining stainless steel.
(2) If the cutting depth is reduced, the rotating speed and feed rate may be increased appropriately.
(3) The down milling is recommended for side milling.
(4) With poor rigidity of the machine, if there is vibration or abnormal sound during machining, the cutting speed and feed rate of the above table should be lowered in the same proportion.

P Series - General-Purpose End Mills

4 Flute Corner Radius End Mill (Short Flute Design)

P4S...R...NG



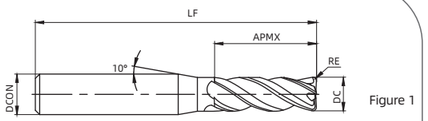


Figure 1

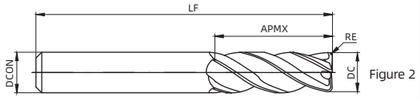
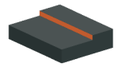
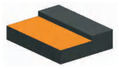
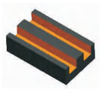
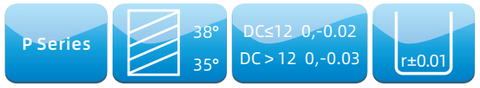


Figure 2


Side machining


Bottom machining


Slot milling



Type	Dimension (mm)						Pattern	Inventory
	DC	DCON	APMX	LF	RE	ZEFP		
P4S0300R0020NG-4	3.0	4	8	50	0.2	4	Figure 1	●
P4S0400R0030NG-4	4.0	4	10	50	0.3	4	Figure 2	●
P4S0400R0050NG-4	4.0	4	10	50	0.5	4	Figure 2	●
P4S0300R0020NG	3.0	6	8	50	0.2	4	Figure 1	●
P4S0400R0030NG	4.0	6	10	50	0.3	4	Figure 1	●
P4S0400R0050NG	4.0	6	10	50	0.5	4	Figure 1	●
P4S0500R0050NG	5.0	6	13	50	0.5	4	Figure 1	●
P4S0500R0100NG	5.0	6	13	50	1.0	4	Figure 1	●
P4S0600R0050NG	6.0	6	16	50	0.5	4	Figure 2	●
P4S0600R0100NG	6.0	6	16	50	1.0	4	Figure 2	●
P4S0800R0050NG	8.0	8	20	60	0.5	4	Figure 2	●
P4S0800R0100NG	8.0	8	20	60	1.0	4	Figure 2	●
P4S1000R0050NG	10.0	10	25	75	0.5	4	Figure 2	●
P4S1000R0100NG	10.0	10	25	75	1.0	4	Figure 2	●
P4S1000R0200NG	10.0	10	25	75	2.0	4	Figure 2	●
P4S1000R0300NG	10.0	10	25	75	3.0	4	Figure 2	○
P4S1200R0050NG	12.0	12	30	75	0.5	4	Figure 2	●
P4S1200R0100NG	12.0	12	30	75	1.0	4	Figure 2	●
P4S1200R0200NG	12.0	12	30	75	2.0	4	Figure 2	●
P4S1200R0300NG	12.0	12	30	75	3.0	4	Figure 2	●
P4S1600R0100NG	16.0	16	45	100	1.0	4	Figure 2	○
P4S1600R0200NG	16.0	16	45	100	2.0	4	Figure 2	○
P4S1600R0300NG	16.0	16	45	100	3.0	4	Figure 2	○
P4S2000R0100NG	20.0	20	45	100	1.0	4	Figure 2	○
P4S2000R0200NG	20.0	20	45	100	2.0	4	Figure 2	○
P4S2000R0300NG	20.0	20	45	100	3.0	4	Figure 2	○

●Standing inventory ○Make-to-order

P			M	K	N		S		H		
Carbon steel	Alloy steel	High-alloyed steel	Stainless steel	Cast iron	Non-ferrous alloy	Aluminum alloy	High-temp alloy	Titanium alloy	<54HRC	54—60HRC	≥60HRC
☀	☀	☀	☼	☀			☼	☼	☀		

☀ Fit well ☼ Applicable

Recommended cutting conditions——P4S...R...NG

Recommended Cutting Speed						
Workpiece material		Strength (N/mm²)	Hardness (HB/HRC)	Cutting speed (m/min)		
				Minimum	Recommendation	Maximum
P	Carbon steel	< 600	< 230	180	210	240
	Alloy steel	< 1200	< 350	150	175	200
	High-alloyed steel and tool steel	< 1400	< 380	100	120	140
M	Austenite and ferrite stainless steel	< 680	<220	80	110	140
	Martensite stainless steel	< 820	< 240	60	90	120
K	Gray cast iron	-	< 280	120	150	180
	Nodular iron	-	< 320	90	110	130
N	Non-ferrous alloy	< 250	< 110	-	-	-
	Aluminum alloy	< 530	< 130	-	-	-
S	Heat resistant super alloys	< 3300	< 350	40	50	60
	Titanium alloy	<2100	< 400	60	70	80
H	Hardened steel	-	< 54HRC	90	120	150
	Hardened steel	-	54-60HRC	-	-	-
	Hardened steel	-	> 60 HRC	-	-	-

Recommended Cutting Parameters						
Machining method	 Side milling			Slot milling		
Diameter （mm）	ap （1xDc）	ae （0.3xDc）	fz （mm/z）	ap （0.75xDc）	ae （1xDc）	fz （mm/z）
3.0	3.0	0.9	0.025	2.3	3.0	0.020
4.0	4.0	1.2	0.030	3.0	4.0	0.025
5.0	5.0	1.5	0.035	3.8	5.0	0.030
6.0	6.0	1.8	0.045	4.5	6.0	0.035
8.0	8.0	2.4	0.060	6.0	8.0	0.050
10.0	10.0	3.0	0.070	7.5	10.0	0.060
12.0	12.0	3.6	0.085	9.0	12.0	0.070
16.0	16.0	4.8	0.115	12.0	16.0	0.095
20.0	20.0	6.0	0.140	15.0	20.0	0.120

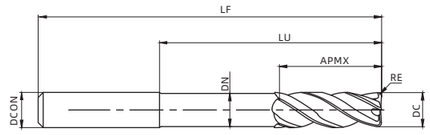
(1) Water-soluble cutting fluid is recommended during machining stainless steel.
(2) If the cutting depth is reduced, the rotating speed and feed rate may be increased appropriately.
(3) The down milling is recommended for side milling.
(4) With poor rigidity of the machine, if there is vibration or abnormal sound during machining, the cutting speed and feed rate of the above table should be lowered in the same proportion.

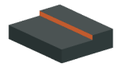
P Series - General-Purpose End Mills

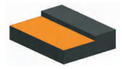
4 Flute Corner Radius End Mill (Reduced Neck Design)

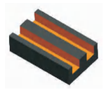
P4P...R...NG

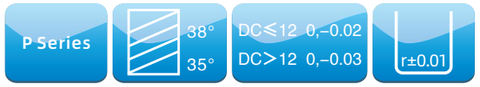





Side machining


Bottom machining


Slot milling



Type	Dimension (mm)								Inventory
	DC	DCON	APMX	LU	DN	LF	RE	ZEFP	
P4P0600R0050NG	6.0	6	6	18	5.8	75	0.5	4	●
P4P0600R0100NG	6.0	6	6	18	5.8	75	1.0	4	●
P4P0800R0050NG	8.0	8	8	24	7.8	100	0.5	4	●
P4P0800R0100NG	8.0	8	8	24	7.8	100	1.0	4	●
P4P1000R0050NG	10.0	10	10	30	9.6	100	0.5	4	●
P4P1000R0100NG	10.0	10	10	30	9.6	100	1.0	4	●
P4P1000R0200NG	10.0	10	10	30	9.6	100	2.0	4	○
P4P1200R0050NG	12.0	12	12	36	11.5	100	0.5	4	●
P4P1200R0100NG	12.0	12	12	36	11.5	100	1.0	4	●
P4P1200R0200NG	12.0	12	12	36	11.5	100	2.0	4	●
P4P1600R0100NG	16.0	16	16	40	15.5	150	1.0	4	○
P4P1600R0200NG	16.0	16	16	40	15.5	150	2.0	4	○

●Standing inventory ○Make-to-order

P			M	K	N		S		H		
Carbon steel	Alloy steel	High-alloyed steel	Stainless steel	Cast iron	Non-ferrous alloy	Aluminum alloy	High-temp alloy	Titanium alloy	<54HRC	54—60HRC	≥60HRC
☀	☀	☀	☼	☀			☼	☼	☀		

☀ Fit well ☼ Applicable

Recommended cutting conditions——P4P...R...NG

Recommended Cutting Speed						
Workpiece material		Strength (N/mm²)	Hardness (HB/HRC)	Cutting speed (m/min)		
				Minimum	Recommendation	Maximum
P	Carbon steel	< 600	< 230	180	210	240
	Alloy steel	< 1200	< 350	150	175	200
	High-alloyed steel and tool steel	< 1400	< 380	100	120	140
M	Austenite and ferrite stainless steel	< 680	<220	80	110	140
	Martensite stainless steel	< 820	< 240	60	90	120
K	Gray cast iron	-	< 280	120	150	180
	Nodular iron	-	< 320	90	110	130
N	Non-ferrous alloy	< 250	< 110	-	-	-
	Aluminum alloy	< 530	< 130	-	-	-
S	Heat resistant super alloys	< 3300	< 350	40	50	60
	Titanium alloy	<2100	< 400	60	70	80
H	Hardened steel	-	< 54HRC	90	120	150
	Hardened steel	-	54-60HRC	-	-	-
	Hardened steel	-	> 60 HRC	-	-	-

Recommended Cutting Parameters						
Machining method	 Side milling			Slot milling		
Diameter （mm）	ap （1xDc）	ae （0.3xDc）	fz （mm/z）	ap （0.75xDc）	ae （1xDc）	fz （mm/z）
3.0	3.0	0.9	0.025	2.3	3.0	0.020
4.0	4.0	1.2	0.030	3.0	4.0	0.025
5.0	5.0	1.5	0.035	3.8	5.0	0.030
6.0	6.0	1.8	0.045	4.5	6.0	0.035
8.0	8.0	2.4	0.060	6.0	8.0	0.050
10.0	10.0	3.0	0.070	7.5	10.0	0.060
12.0	12.0	3.6	0.085	9.0	12.0	0.070
16.0	16.0	4.8	0.115	12.0	16.0	0.095
20.0	20.0	6.0	0.140	15.0	20.0	0.120

(1) Water-soluble cutting fluid is recommended during machining stainless steel.
(2) If the cutting depth is reduced, the rotating speed and feed rate may be increased appropriately.
(3) The down milling is recommended for side milling.
(4) With poor rigidity of the machine, if there is vibration or abnormal sound during machining, the cutting speed and feed rate of the above table should be lowered in the same proportion.

P Series - General-Purpose End Mills

2 Flute Ball Nose End Mill (Short Flute Design)

P2S...BLG



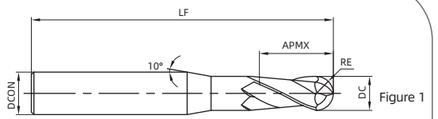


Figure 1

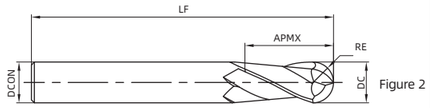
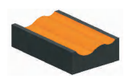
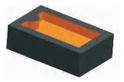
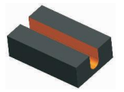
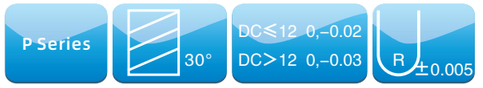


Figure 2


Profile milling


Cavity machining


slot machining



Type	Dimension (mm)						Pattern	Inventory
	DC	DCON	APMX	LF	RE	ZEFP		
P2SR0050BLG-4	1.0	4	2	50	0.5	2	Figure 1	●
P2SR0075BLG-4	1.5	4	3	50	0.75	2	Figure 1	●
P2SR0100BLG-4	2.0	4	4	50	1.0	2	Figure 1	●
P2SR0125BLG-4	2.5	4	5	50	1.25	2	Figure 1	●
P2SR0150BLG-4	3.0	4	6	50	1.5	2	Figure 1	●
P2SR0175BLG-4	3.5	4	8	50	1.75	2	Figure 1	●
P2SR0200BLG-4	4.0	4	8	50	2.0	2	Figure 2	●
P2SR0050BLG	1.0	6	2	50	0.5	2	Figure 1	○
P2SR0075BLG	1.5	6	3	50	0.75	2	Figure 1	○
P2SR0100BLG	2.0	6	4	50	1.0	2	Figure 1	○
P2SR0125BLG	2.5	6	5	50	1.25	2	Figure 1	○
P2SR0150BLG	3.0	6	6	50	1.5	2	Figure 1	○
P2SR0175BLG	3.5	6	8	50	1.75	2	Figure 1	○
P2SR0200BLG	4.0	6	8	50	2.0	2	Figure 1	○
P2SR0250BLG	5.0	6	10	50	2.5	2	Figure 1	○
P2SR0275BLG	5.5	6	12	50	2.75	2	Figure 1	●
P2SR0300BLG	6.0	6	12	50	3.0	2	Figure 2	●
P2SR0350BLG	7.0	8	14	60	3.5	2	Figure 1	○
P2SR0400BLG	8.0	8	16	60	4.0	2	Figure 2	●
P2SR0450BLG	9.0	10	18	75	4.5	2	Figure 1	○
P2SR0500BLG	10.0	10	20	75	5.0	2	Figure 2	●
P2SR0600BLG	12.0	12	24	75	6.0	2	Figure 2	●
P2SR0700BLG	14.0	14	28	75	7.0	2	Figure 2	○
P2SR0800BLG	16.0	16	32	100	8.0	2	Figure 2	○
P2SR1000BLG	20.0	20	40	100	10.0	2	Figure 2	○

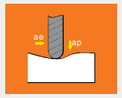
●Standing inventory ○Make-to-order

P			M	K	N		S		H		
Carbon steel	Alloy steel	High-alloyed steel	Stainless steel	Cast iron	Non-ferrous alloy	Aluminum alloy	High-temp alloy	Titanium alloy	<54HRC	54—60HRC	≥60HRC
☀	☀	☀	☀	☀			☼	☼	☀	☼	

☀ Fit well ☼ Applicable

Recommended cutting conditions——P2S...BLG

Recommended Cutting Speed						
Workpiece material		Strength (N/mm²)	Hardness (HB/HRC)	Cutting speed (m/min)		
				Minimum	Recommendation	Maximum
P	Carbon steel	< 600	< 230	180	210	240
	Alloy steel	< 1200	< 350	150	175	200
	High-alloyed steel and tool steel	< 1400	< 380	100	120	140
M	Austenite and ferrite stainless steel	< 680	<220	80	110	140
	Martensite stainless steel	< 820	< 240	60	90	120
K	Gray cast iron	-	< 280	120	150	180
	Nodular iron	-	< 320	90	110	130
N	Non-ferrous alloy	< 250	< 110	-	-	-
	Aluminum alloy	< 530	< 130	-	-	-
S	Heat resistant super alloys	< 3300	< 350	40	50	60
	Titanium alloy	<2100	< 400	60	70	80
H	Hardened steel	-	< 54HRC	90	120	150
	Hardened steel	-	54-60HRC	70	100	130
	Hardened steel	-	> 60 HRC	-	-	-

Recommended Cutting Parameters						
Machining method	 Copy milling					
Diameter （mm）	ap（0.03xDc）	ae（0.03xDc）	fz（mm/z）			
1.0	0.03	0.03	0.012			
1.5	0.045	0.045	0.015			
2.0	0.06	0.06	0.018			
2.5	0.075	0.075	0.020			
3.0	0.09	0.09	0.025			
3.5	0.105	0.105	0.025			
4.0	0.12	0.12	0.030			
5.0	0.15	0.15	0.035			
5.5	0.165	0.165	0.035			
6.0	0.18	0.18	0.045			
7.0	0.21	0.21	0.050			
8.0	0.24	0.24	0.060			
9.0	0.27	0.27	0.065			
10.0	0.30	0.30	0.070			
12.0	0.36	0.36	0.085			
14.0	0.42	0.42	0.100			
16.0	0.48	0.48	0.115			
20.0	0.60	0.60	0.140			

(1) Water-soluble cutting fluid is recommended during machining stainless steel.
(2) If the cutting depth is reduced, the rotating speed and feed rate may be increased appropriately.
(3) The down milling is recommended for side milling.
(4) With poor rigidity of the machine, if there is vibration or abnormal sound during machining, the cutting speed and feed rate of the above table should be lowered in the same proportion.

P Series - General-Purpose End Mills

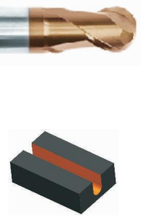
2 Flute Ball Nose End Mill (Reduced Neck Design)

P2P...BLG




Profile milling


Cavity machining


slot machining

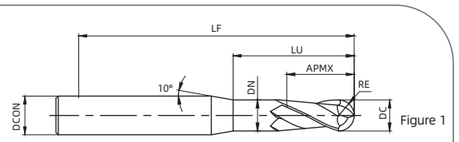


Figure 1

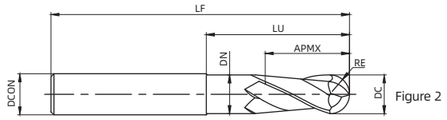
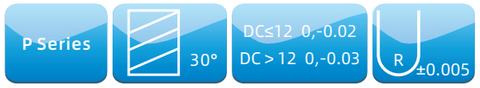


Figure 2



Type	Dimension (mm)								Pattern	Inventory
	DC	DCON	APMX	LU	DN	LF	RE	ZEFP		
P2PR0050BLG-4	1.0	4	1	2.5	0.95	75	0.5	2	Figure 1	●
P2PR0075BLG-4	1.5	4	2	3	1.45	75	0.75	2	Figure 1	●
P2PR0100BLG-4	2.0	4	2	4	1.95	75	1.0	2	Figure 1	●
P2PR0150BLG-4	3.0	4	3	6	2.85	75	1.5	2	Figure 1	●
P2PR0200BLG-4	4.0	4	4	8	3.85	75	2.0	2	Figure 2	●
P2PR0050BLG	1.0	6	1	2.5	0.95	75	0.5	2	Figure 1	○
P2PR0075BLG	1.5	6	2	3	1.45	75	0.75	2	Figure 1	○
P2PR0100BLG	2.0	6	2	4	1.95	75	1.0	2	Figure 1	○
P2PR0150BLG	3.0	6	3	6	2.85	75	1.5	2	Figure 1	○
P2PR0200BLG	4.0	6	4	8	3.85	75	2.0	2	Figure 1	○
P2PR0250BLG	5.0	6	5	10	4.85	75	2.5	2	Figure 1	●
P2PR0300BLG	6.0	6	6	12	5.8	75	3.0	2	Figure 2	●
P2PR0400BLG	8.0	8	8	16	7.8	100	4.0	2	Figure 2	●
P2PR0500BLG	10.0	10	10	20	9.6	100	5.0	2	Figure 2	●
P2PR0600BLG	12.0	12	12	24	11.5	100	6.0	2	Figure 2	●
P2PR0800BLG	16.0	16	16	32	15.5	150	8.0	2	Figure 2	○
P2PR1000BLG	20.0	20	20	40	19.5	150	10.0	2	Figure 2	○

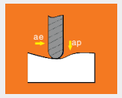
●Standing inventory ○Make-to-order

P			M	K	N		S		H		
Carbon steel	Alloy steel	High-alloyed steel	Stainless steel	Cast iron	Non-ferrous alloy	Aluminum alloy	High-temp alloy	Titanium alloy	<54HRC	54—60HRC	≥60HRC
☀	☀	☀	☀	☀			☼	☼	☀		

☀ Fit well ☼ Applicable

Recommended cutting conditions——P2P...BLG

Recommended Cutting Speed						
Workpiece material		Strength (N/mm²)	Hardness (HB/HRC)	Cutting speed (m/min)		
				Minimum	Recommendation	Maximum
P	Carbon steel	< 600	< 230	180	210	240
	Alloy steel	< 1200	< 350	150	175	200
	High-alloyed steel and tool steel	< 1400	< 380	100	120	140
M	Austenite and ferrite stainless steel	< 680	<220	80	110	140
	Martensite stainless steel	< 820	< 240	60	90	120
K	Gray cast iron	-	< 280	120	150	180
	Nodular iron	-	< 320	90	110	130
N	Non-ferrous alloy	< 250	< 110	-	-	-
	Aluminum alloy	< 530	< 130	-	-	-
S	Heat resistant super alloys	< 3300	< 350	40	50	60
	Titanium alloy	<2100	< 400	60	70	80
H	Hardened steel	-	< 54HRC	90	120	150
	Hardened steel	-	54-60HRC	70	100	130
	Hardened steel	-	> 60 HRC	-	-	-

Recommended Cutting Parameters						
Machining method	 Copy milling					
Diameter （mm）	ap（0.03xDc）	ae（0.03xDc）	fz（mm/z）			
1.0	0.03	0.03	0.012			
1.5	0.045	0.045	0.015			
2.0	0.06	0.06	0.018			
3.0	0.09	0.09	0.025			
4.0	0.12	0.12	0.030			
5.0	0.15	0.15	0.035			
6.0	0.18	0.18	0.045			
8.0	0.24	0.24	0.060			
10.0	0.3	0.3	0.070			
12.0	0.36	0.36	0.085			
16.0	0.48	0.48	0.115			
20.0	0.60	0.60	0.140			

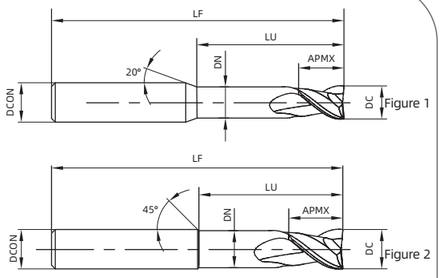
(1) When reducing the axial depth of cut, spindle speed and feed rate can be appropriately increased.
(2) Air cooling or mist cooling is recommended.
(3) If the machine has poor rigidity, or chatter/abnormal noise occurs during machining, reduce the cutting speed and feed rate in the table proportionally.
(4) Keep tool overhang as short as possible while ensuring no tool interference.

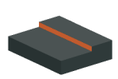
A Series - High-Efficiency Aluminum Alloy End Mills

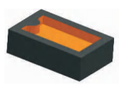
2 Flute Square End Mill (Reduced Neck Design)

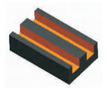
A2P...NN

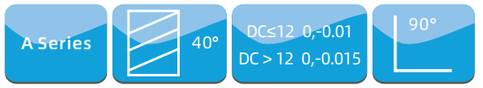




 Side machining

 Bottom machining

 Slot milling



Type	Dimension (mm)							Pattern	Inventory
	DC	DCON	APMX	LU	DN	LF	ZEFP		
A2P0300NN	3.0	6	5	12	2.8	60	2	Figure 1	●
A2P0400NN	4.0	6	6	16	3.8	60	2	Figure 1	●
A2P0500NN	5.0	6	8	20	4.8	60	2	Figure 1	●
A2P0600NN	6.0	6	9	22	5.7	60	2	Figure 2	●
A2P0800NN	8.0	8	12	22	7.6	60	2	Figure 2	●
A2P1000NN	10.0	10	15	28	9.5	75	2	Figure 2	●
A2P1200NN	12.0	12	18	30	11.5	75	2	Figure 2	●
A2P1600NN	16.0	16	24	48	15.5	100	2	Figure 2	○
A2P2000NN	20.0	20	30	48	19.5	100	2	Figure 2	○

●Standing inventory ○Make-to-order

P			M	K	N		S		H		
Carbon steel	Alloy steel	High-alloyed steel	Stainless steel	Cast iron	Non-ferrous alloy	Aluminum alloy	High-temp alloy	Titanium alloy	<54HRC	54—60HRC	≥60HRC
					☼	☀					

☀ Fit well ☼ Applicable

Recommended cutting conditions——A2P...NN

Recommended Cutting Speed						
Workpiece material		Strength (N/mm²)	Hardness (HB/HRC)	Cutting speed (m/min)		
				Minimum	Recommendation	Maximum
P	Carbon steel	< 600	< 230	-	-	-
	Alloy steel	< 1200	< 350	-	-	-
	High-alloyed steel and tool steel	< 1400	< 380	-	-	-
M	Austenite and ferrite stainless steel	< 680	<220	-	-	-
	Martensite stainless steel	< 820	< 240	-	-	-
K	Gray cast iron	-	< 280	-	-	-
	Nodular iron	-	< 320	-	-	-
N	Non-ferrous alloy	< 250	< 110	120	160	350
	Aluminum alloy	< 530	< 130	150	200	300
S	Heat resistant super alloys	< 3300	< 350	-	-	-
	Titanium alloy	<2100	< 400	-	-	-
H	Hardened steel	-	< 54HRC	-	-	-
	Hardened steel	-	54-60HRC	-	-	-
	Hardened steel	-	> 60 HRC	-	-	-

Recommended Cutting Parameters						
Machining method	 Side milling			Slot milling		
Diameter （mm）	ap （1.5xDc）	ae （0.1xDc）	fz （mm/z）	ap （0.75xDc）	ae （1xDc）	fz （mm/z）
3.0	4.5	0.3	0.030	2.3	3.0	0.010
4.0	6.0	0.4	0.040	3.0	4.0	0.013
5.0	7.5	0.5	0.050	3.8	5.0	0.017
6.0	9.0	0.6	0.060	4.5	6.0	0.020
8.0	12.0	0.8	0.080	6.0	8.0	0.027
10.0	15.0	1.0	0.100	7.5	10.0	0.033
12.0	18.0	1.2	0.120	9.0	12.0	0.040
16.0	24.0	1.6	0.160	12.0	16.0	0.053
20.0	30.0	2.0	0.200	15.0	20.0	0.067

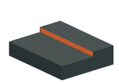
(1) This series of tools are specifically designed for aluminum alloy machining.
(2) When performing slot milling operations, reduce the cutting speed (spindle speed) to 50%-70% of the values in the table above, and reduce the feed rate (feed speed) to 40%-60%.

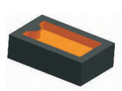
A Series - High-Efficiency Aluminum Alloy End Mills

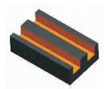
3 Flute Square End Mill (Reduced Neck Design)

A3P...NN




Side machining


Bottom machining


Slot milling

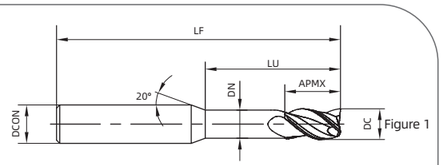


Figure 1

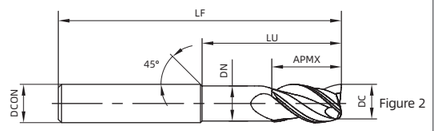
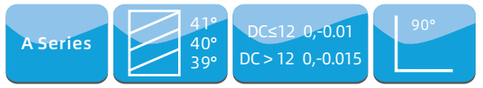


Figure 2



Type	Dimension (mm)							Pattern	Inventory
	DC	DCON	APMX	LU	DN	LF	ZEFP		
A3P0300NN	3.0	6	5	12	2.8	60	3	Figure 1	●
A3P0400NN	4.0	6	6	16	3.8	60	3	Figure 1	●
A3P0500NN	5.0	6	8	20	4.8	60	3	Figure 1	●
A3P0600NN	6.0	6	9	22	5.7	60	3	Figure 2	●
A3P0800NN	8.0	8	12	22	7.6	60	3	Figure 2	●
A3P1000NN	10.0	10	15	26	9.5	75	3	Figure 2	●
A3P1200NN	12.0	12	18	30	11.5	75	3	Figure 2	●
A3P1600NN	16.0	16	24	48	15.5	100	3	Figure 2	○
A3P2000NN	20.0	20	30	50	19.5	100	3	Figure 2	○

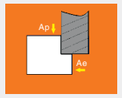
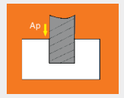
●Standing inventory ○Make-to-order

P			M	K	N		S		H		
Carbon steel	Alloy steel	High-alloyed steel	Stainless steel	Cast iron	Non-ferrous alloy	Aluminum alloy	High-temp alloy	Titanium alloy	<54HRC	54—60HRC	≥60HRC
					☼	☀					

☀ Fit well ☼ Applicable

Recommended cutting conditions——A3P...NN

Recommended Cutting Speed						
Workpiece material		Strength (N/mm²)	Hardness (HB/HRC)	Cutting speed (m/min)		
				Minimum	Recommendation	Maximum
P	Carbon steel	< 600	< 230	-	-	-
	Alloy steel	< 1200	< 350	-	-	-
	High-alloyed steel and tool steel	< 1400	< 380	-	-	-
M	Austenite and ferrite stainless steel	< 680	<220	-	-	-
	Martensite stainless steel	< 820	< 240	-	-	-
K	Gray cast iron	-	< 280	-	-	-
	Nodular iron	-	< 320	-	-	-
N	Non-ferrous alloy	< 250	< 110	120	160	350
	Aluminum alloy	< 530	< 130	150	200	300
S	Heat resistant super alloys	< 3300	< 350	-	-	-
	Titanium alloy	<2100	< 400	-	-	-
H	Hardened steel	-	< 54HRC	-	-	-
	Hardened steel	-	54-60HRC	-	-	-
	Hardened steel	-	> 60 HRC	-	-	-

Recommended Cutting Parameters						
Machining method	 Side milling			 Slot milling		
Diameter （mm）	ap（1.5xDc）	ae（0.1xDc）	fz（mm/z）	ap（0.75xDc）	ae（1xDc）	fz（mm/z）
3.0	4.5	0.3	0.030	2.3	3.0	0.010
4.0	6.0	0.4	0.040	3.0	4.0	0.013
5.0	7.5	0.5	0.050	3.8	5.0	0.017
6.0	9.0	0.6	0.060	4.5	6.0	0.020
8.0	12.0	0.8	0.080	6.0	8.0	0.027
10.0	15.0	1.0	0.100	7.5	10.0	0.033
12.0	18.0	1.2	0.120	9.0	12.0	0.040
16.0	24.0	1.6	0.160	12.0	16.0	0.053
20.0	30.0	2.0	0.200	15.0	20.0	0.067

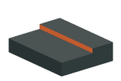
(1) This series of tools are specifically designed for aluminum alloy machining.
(2) When performing slot milling operations, reduce the cutting speed (spindle speed) to 50%-70% of the values in the table above, and reduce the feed rate (feed speed) to 40%-60%.

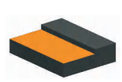
K Series - High-Temperature Alloy End Mills

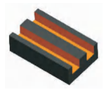
4 Flute Square End Mill

K4S...NS




Side machining


Bottom machining


Slot milling

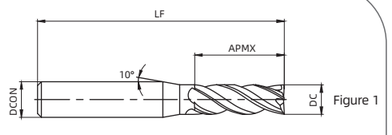


Figure 1

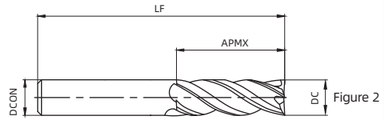


Figure 2



Type	Dimension (mm)					Pattern	Inventory
	DC	DCON	APMX	LF	ZEFP		
K4S0100NS	1.0	6	3	50	4	Figure 1	○
K4S0150NS	1.5	6	4	50	4	Figure 1	○
K4S0200NS	2.0	6	6	50	4	Figure 1	○
K4S0250NS	2.5	6	8	50	4	Figure 1	○
K4S0300NS	3.0	6	8	50	4	Figure 1	○
K4S0350NS	3.5	6	10	50	4	Figure 1	○
K4S0400NS	4.0	6	11	50	4	Figure 1	○
K4S0450NS	4.5	6	11	50	4	Figure 1	○
K4S0500NS	5.0	6	13	50	4	Figure 1	●
K4S0550NS	5.5	6	16	50	4	Figure 1	○
K4S0600NS	6.0	6	16	50	4	Figure 2	●
K4S0700NS	7.0	8	20	60	4	Figure 1	○
K4S0800NS	8.0	8	20	60	4	Figure 2	●
K4S0900NS	9.0	10	22	75	4	Figure 1	○
K4S1000NS	10.0	10	25	75	4	Figure 2	●
K4S1100NS	11.0	12	26	75	4	Figure 1	○
K4S1200NS	12.0	12	30	75	4	Figure 2	●
K4S1400NS	14.0	14	32	75	4	Figure 2	○
K4S1600NS	16.0	16	45	100	4	Figure 2	○
K4S1800NS	18.0	18	45	100	4	Figure 2	○
K4S2000NS	20.0	20	45	100	4	Figure 2	○

●Standing inventory ○Make-to-order

P			M	K	N		S		H		
Carbon steel	Alloy steel	High-alloyed steel	Stainless steel	Cast iron	Non-ferrous alloy	Aluminum alloy	High-temp alloy	Titanium alloy	<54HRC	54—60HRC	≥60HRC
			☼				✹	☼			

✹ Fit well ☼ Applicable

Recommended cutting conditions——K4S...NS

Recommended Cutting Speed						
Workpiece material		Strength (N/mm²)	Hardness (HB/HRC)	Cutting speed (m/min)		
				Minimum	Recommendation	Maximum
P	Carbon steel	< 600	< 230	-	-	-
	Alloy steel	< 1200	< 350	-	-	-
	High-alloyed steel and tool steel	< 1400	< 380	-	-	-
M	Austenite and ferrite stainless steel	< 680	<220	-	-	-
	Martensite stainless steel	< 820	< 240	-	-	-
K	Gray cast iron	-	< 280	-	-	-
	Nodular iron	-	< 320	-	-	-
N	Non-ferrous alloy	< 250	< 110	-	-	-
	Aluminum alloy	< 530	< 130	-	-	-
S	Heat resistant super alloys	< 3300	< 350	20	30	50
	Titanium alloy	<2100	< 400	30	60	80
H	Hardened steel	-	< 54HRC	-	-	-
	Hardened steel	-	54-60HRC	-	-	-
	Hardened steel	-	> 60 HRC	-	-	-

Recommended Cutting Parameters						
Machining method	 Side milling			Slot milling		
Diameter （mm）	ap （1xDc）	ae （0.3xDc）	fz （mm/z）	ap （0.75xDc）	ae （1xDc）	fz （mm/z）
1.0	1.0	0.3	0.012	0.8	1.0	0.010
1.5	1.5	0.5	0.015	1.1	1.5	0.012
2.0	2.0	0.6	0.018	1.5	2.0	0.015
2.5	2.5	0.8	0.020	1.9	2.5	0.018
3.0	3.0	0.9	0.025	2.3	3.0	0.020
3.5	3.5	1.1	0.025	2.6	3.5	0.025
4.0	4.0	1.2	0.030	3.0	4.0	0.025
4.5	4.5	1.4	0.035	3.4	4.5	0.030
5.0	5.0	1.5	0.035	3.8	5.0	0.030
5.5	5.5	1.7	0.035	4.1	5.5	0.030
6.0	6.0	1.8	0.045	4.5	6.0	0.035
7.0	7.0	2.1	0.050	5.3	7.0	0.040
8.0	8.0	2.4	0.060	6.0	8.0	0.050
9.0	9.0	2.7	0.065	6.8	9.0	0.055
10.0	10.0	3.0	0.070	7.5	10.0	0.060
11.0	11.0	3.3	0.075	8.3	11.0	0.065
12.0	12.0	3.6	0.085	9.0	12.0	0.070
14.0	14.0	4.2	0.100	10.5	14.0	0.080
16.0	16.0	4.8	0.100	12.0	16.0	0.080
18.0	18.0	5.4	0.100	13.5	18.0	0.080
20.0	20.0	6.0	0.100	15.0	20.0	0.080

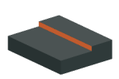
(1) Water-soluble cutting fluid is recommended during machining stainless steel.
(2) If the cutting depth is reduced, the rotating speed and feed rate may be increased appropriately.
(3) The down milling is recommended for side milling.
(4) With poor rigidity of the machine, if there is vibration or abnormal sound during machining, the cutting speed and feed rate of the above table should be lowered in the same proportion.

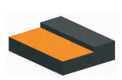
K Series - High-Temperature Alloy End Mills

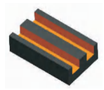
4 Flute Corner Radius End Mill

K4S...R...NS




Side machining


Bottom machining


Slot milling

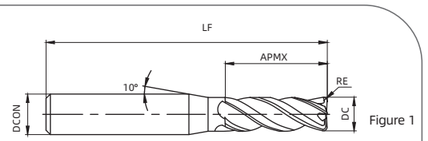


Figure 1

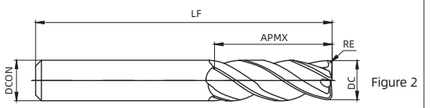


Figure 2



Type	Dimension (mm)						Pattern	Inventory
	DC	DCON	APMX	LF	RE	ZEFP		
K4S0300R0020NS	3.0	6	8	50	0.2	4	Figure 1	○
K4S0400R0030NS	4.0	6	10	50	0.3	4	Figure 1	○
K4S0400R0050NS	4.0	6	10	50	0.5	4	Figure 1	○
K4S0500R0050NS	5.0	6	13	50	0.5	4	Figure 1	●
K4S0500R0100NS	5.0	6	13	50	1.0	4	Figure 1	●
K4S0600R0050NS	6.0	6	16	50	0.5	4	Figure 2	●
K4S0600R0100NS	6.0	6	16	50	1.0	4	Figure 2	●
K4S0800R0050NS	8.0	8	20	60	0.5	4	Figure 2	●
K4S0800R0100NS	8.0	8	20	60	1.0	4	Figure 2	●
K4S1000R0050NS	10.0	10	25	75	0.5	4	Figure 2	●
K4S1000R0100NS	10.0	10	25	75	1.0	4	Figure 2	●
K4S1000R0200NS	10.0	10	25	75	2.0	4	Figure 2	○
K4S1000R0300NS	10.0	10	25	75	3.0	4	Figure 2	○
K4S1200R0050NS	12.0	12	30	75	0.5	4	Figure 2	●
K4S1200R0100NS	12.0	12	30	75	1.0	4	Figure 2	●
K4S1200R0200NS	12.0	12	30	75	2.0	4	Figure 2	○
K4S1200R0300NS	12.0	12	30	75	3.0	4	Figure 2	○
K4S1600R0100NS	16.0	16	45	100	1.0	4	Figure 2	○
K4S1600R0200NS	16.0	16	45	100	2.0	4	Figure 2	○
K4S1600R0300NS	16.0	16	45	100	3.0	4	Figure 2	○
K4S2000R0100NS	20.0	20	45	100	1.0	4	Figure 2	○
K4S2000R0200NS	20.0	20	45	100	2.0	4	Figure 2	○
K4S2000R0300NS	20.0	20	45	100	3.0	4	Figure 2	○

●Standing inventory ○Make-to-order

P			M	K	N		S		H		
Carbon steel	Alloy steel	High-alloyed steel	Stainless steel	Cast iron	Non-ferrous alloy	Aluminum alloy	High-temp alloy	Titanium alloy	<54HRC	54—60HRC	≥60HRC
			☼				✹	☼			

✹ Fit well ☼ Applicable

Recommended cutting conditions——K4S...NS

Recommended Cutting Speed						
Workpiece material		Strength (N/mm²)	Hardness (HB/HRC)	Cutting speed (m/min)		
				Minimum	Recommendation	Maximum
P	Carbon steel	< 600	< 230	-	-	-
	Alloy steel	< 1200	< 350	-	-	-
	High-alloyed steel and tool steel	< 1400	< 380	-	-	-
M	Austenite and ferrite stainless steel	< 680	<220	-	-	-
	Martensite stainless steel	< 820	< 240	-	-	-
K	Gray cast iron	-	< 280	-	-	-
	Nodular iron	-	< 320	-	-	-
N	Non-ferrous alloy	< 250	< 110	-	-	-
	Aluminum alloy	< 530	< 130	-	-	-
S	Heat resistant super alloys	< 3300	< 350	20	30	50
	Titanium alloy	<2100	< 400	30	60	80
H	Hardened steel	-	< 54HRC	-	-	-
	Hardened steel	-	54-60HRC	-	-	-
	Hardened steel	-	> 60 HRC	-	-	-

Recommended Cutting Parameters						
Machining method	 Side milling			Slot milling		
Diameter （mm）	ap （1xDc）	ae （0.3xDc）	fz （mm/z）	ap （0.75xDc）	ae （1xDc）	fz （mm/z）
3.0	3.0	0.9	0.025	2.3	3.0	0.020
4.0	4.0	1.2	0.030	3.0	4.0	0.025
5.0	5.0	1.5	0.035	3.8	5.0	0.030
6.0	6.0	1.8	0.045	4.5	6.0	0.035
8.0	8.0	2.4	0.060	6.0	8.0	0.050
10.0	10.0	3.0	0.070	7.5	10.0	0.060
12.0	12.0	3.6	0.085	9.0	12.0	0.070
16.0	16.0	4.8	0.100	12.0	16.0	0.080
20.0	20.0	6.0	0.100	15.0	20.0	0.080

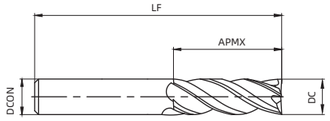
(1) Water-soluble cutting fluid is recommended during machining stainless steel.
(2) If the cutting depth is reduced, the rotating speed and feed rate may be increased appropriately.
(3) The down milling is recommended for side milling.
(4) With poor rigidity of the machine, if there is vibration or abnormal sound during machining, the cutting speed and feed rate of the above table should be lowered in the same proportion.

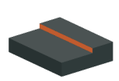
R Series - Heavy-Duty Roughing End Mills

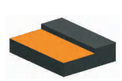
4 Flute Square End Mill

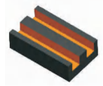
R4S...NG






Side machining


Bottom machining


Slot milling



Type	Dimension (mm)					Inventory
	DC	DCON	APMX	LF	ZEFP	
R4S0600NG	6.0	6	16	50	4	●
R4S0800NG	8.0	8	20	60	4	●
R4S1000NG	10.0	10	25	75	4	●
R4S1200NG	12.0	12	30	75	4	●

●Standing inventory ○Make-to-order

P			M	K	N		S		H		
Carbon steel	Alloy steel	High-alloyed steel	Stainless steel	Cast iron	Non-ferrous alloy	Aluminum alloy	High-temp alloy	Titanium alloy	<54HRC	54—60HRC	≥60HRC
☀	☀	☀	☼	☀			☼	☼	☼		

☀ Fit well ☼ Applicable

Recommended cutting conditions——R4S...NG

Recommended Cutting Speed						
Workpiece material		Strength (N/mm²)	Hardness (HB/HRC)	Cutting speed (m/min)		
				Minimum	Recommendation	Maximum
P	Carbon steel	< 600	< 230	80	110	180
	Alloy steel	< 1200	< 350	100	120	200
	High-alloyed steel and tool steel	< 1400	< 380	80	100	140
M	Austenite and ferrite stainless steel	< 680	<220	50	70	100
	Martensite stainless steel	< 820	< 240	40	60	80
K	Gray cast iron	-	< 280	100	120	200
	Nodular iron	-	< 320	60	80	120
N	Non-ferrous alloy	< 250	< 110	-	-	-
	Aluminum alloy	< 530	< 130	-	-	-
S	Heat resistant super alloys	< 3300	< 350	20	30	50
	Titanium alloy	<2100	< 400	50	70	80
H	Hardened steel	-	< 54HRC	70	100	150
	Hardened steel	-	54-60HRC	-	-	-
	Hardened steel	-	> 60 HRC	-	-	-

Recommended Cutting Parameters						
Machining method	 Side milling			Slot milling		
Diameter （mm）	ap （1xDc）	ae （0.3xDc）	fz （mm/z）	ap （0.75xDc）	ae （1xDc）	fz （mm/z）
6.0	6.0	1.8	0.045	4.5	6.0	0.035
8.0	8.0	2.4	0.060	6.0	8.0	0.050
10.0	10.0	3.0	0.070	7.5	10.0	0.060
12.0	12.0	3.6	0.085	9.0	12.0	0.070

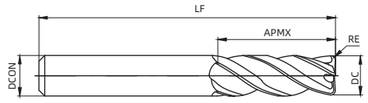
(1) Water-soluble cutting fluid is recommended during machining stainless steel.
(2) If the cutting depth is reduced, the rotating speed and feed rate may be increased appropriately.
(3) The down milling is recommended for side milling.
(4) With poor rigidity of the machine, if there is vibration or abnormal sound during machining, the cutting speed and feed rate of the above table should be lowered in the same proportion.

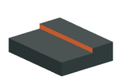
R Series - Heavy-Duty Roughing End Mills

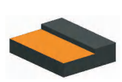
4 Flute Corner Radius End Mill

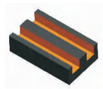
R4S...R...NG






Side machining


Bottom machining


Slot milling

R Series | 41° | DC≤12 0,-0.02 DC＞12 0,-0.03 | r±0.01

Type	Dimension (mm)						Inventory
	DC	DCON	APMX	LF	RE	ZEFP	
R4S0600R0050NG	6.0	6	16	50	0.5	4	●
R4S0600R0100NG	6.0	6	16	50	1.0	4	●
R4S0800R0050NG	8.0	8	20	60	0.5	4	●
R4S0800R0100NG	8.0	8	20	60	1.0	4	●
R4S1000R0050NG	10.0	10	25	75	0.5	4	●
R4S1000R0100NG	10.0	10	25	75	1.0	4	●
R4S1000R0200NG	10.0	10	25	75	2.0	4	○
R4S1000R0300NG	10.0	10	25	75	3.0	4	○
R4S1200R0050NG	12.0	12	30	75	0.5	4	●
R4S1200R0100NG	12.0	12	30	75	1.0	4	●
R4S1200R0200NG	12.0	12	30	75	2.0	4	○
R4S1200R0300NG	12.0	12	30	75	3.0	4	○

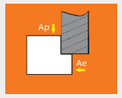
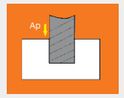
●Standing inventory ○Make-to-order

P			M	K	N		S		H		
Carbon steel	Alloy steel	High-alloyed steel	Stainless steel	Cast iron	Non-ferrous alloy	Aluminum alloy	High-temp alloy	Titanium alloy	<54HRC	54—60HRC	≥60HRC
☀	☀	☀	☼	☀			☼	☼	☼		

☀ Fit well ☼ Applicable

Recommended cutting conditions——R4S...R...NG

Recommended Cutting Speed						
Workpiece material		Strength (N/mm²)	Hardness (HB/HRC)	Cutting speed (m/min)		
				Minimum	Recommendation	Maximum
P	Carbon steel	< 600	< 230	80	110	180
	Alloy steel	< 1200	< 350	100	120	200
	High-alloyed steel and tool steel	< 1400	< 380	80	100	140
M	Austenite and ferrite stainless steel	< 680	<220	50	70	100
	Martensite stainless steel	< 820	< 240	40	60	80
K	Gray cast iron	-	< 280	100	120	200
	Nodular iron	-	< 320	60	80	120
N	Non-ferrous alloy	< 250	< 110	-	-	-
	Aluminum alloy	< 530	< 130	-	-	-
S	Heat resistant super alloys	< 3300	< 350	20	30	50
	Titanium alloy	<2100	< 400	50	70	80
H	Hardened steel	-	< 54HRC	70	100	150
	Hardened steel	-	54-60HRC	-	-	-
	Hardened steel	-	> 60 HRC	-	-	-

Recommended Cutting Parameters						
Machining method	 Side milling			 Slot milling		
Diameter （mm）	ap （1xDc）	ae （0.3xDc）	fz （mm/z）	ap （0.75xDc）	ae （1xDc）	fz （mm/z）
6.0	6.0	1.8	0.045	4.5	6.0	0.035
8.0	8.0	2.4	0.060	6.0	8.0	0.050
10.0	10.0	3.0	0.070	7.5	10.0	0.060
12.0	12.0	3.6	0.085	9.0	12.0	0.070

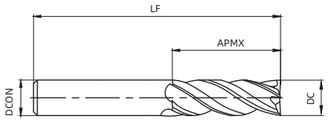
(1) Water-soluble cutting fluid is recommended during machining stainless steel.
(2) If the cutting depth is reduced, the rotating speed and feed rate may be increased appropriately.
(3) The down milling is recommended for side milling.
(4) With poor rigidity of the machine, if there is vibration or abnormal sound during machining, the cutting speed and feed rate of the above table should be lowered in the same proportion.

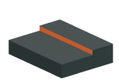
T Series - Titanium Alloy End Mills

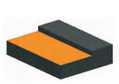
4 Flute Square End Mill

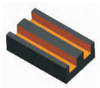
T4S...NS

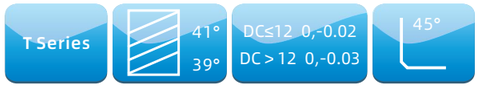





Side machining


Bottom machining


Slot milling



Type	Dimension (mm)					Inventory
	DC	DCON	APMX	LF	ZEFP	
T4S0600NS	6.0	6	16	50	4	●
T4S0800NS	8.0	8	20	60	4	●
T4S1000NS	10.0	10	25	75	4	●
T4S1200NS	12.0	12	30	75	4	●
T4S1400NS	14.0	14	32	75	4	○
T4S1600NS	16.0	16	45	100	4	○
T4S1800NS	18.0	18	45	100	4	○
T4S2000NS	20.0	20	45	100	4	○

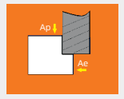
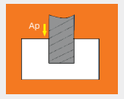
●Standing inventory ○Make-to-order

P			M	K	N		S		H		
Carbon steel	Alloy steel	High-alloyed steel	Stainless steel	Cast iron	Non-ferrous alloy	Aluminum alloy	High-temp alloy	Titanium alloy	<54HRC	54—60HRC	≥60HRC
			☀				☼	☀			

☀ Fit well ☼ Applicable

Recommended cutting conditions——T4S...NS

Recommended Cutting Speed						
Workpiece material		Strength (N/mm²)	Hardness (HB/HRC)	Cutting speed (m/min)		
				Minimum	Recommendation	Maximum
P	Carbon steel	< 600	< 230	-	-	-
	Alloy steel	< 1200	< 350	-	-	-
	High-alloyed steel and tool steel	< 1400	< 380	-	-	-
M	Austenite and ferrite stainless steel	< 680	<220	-	-	-
	Martensite stainless steel	< 820	< 240	-	-	-
K	Gray cast iron	-	< 280	-	-	-
	Nodular iron	-	< 320	-	-	-
N	Non-ferrous alloy	< 250	< 110	-	-	-
	Aluminum alloy	< 530	< 130	-	-	-
S	Heat resistant super alloys	< 3300	< 350	20	30	50
	Titanium alloy	<2100	< 400	40	60	100
H	Hardened steel	-	< 54HRC	-	-	-
	Hardened steel	-	54-60HRC	-	-	-
	Hardened steel	-	> 60 HRC	-	-	-

Recommended Cutting Parameters						
Machining method	 Side milling			 Slot milling		
Diameter （mm）	ap （1xDc）	ae （0.3xDc）	fz （mm/z）	ap （0.75xDc）	ae （1xDc）	fz （mm/z）
6.0	6.0	1.8	0.032	4.5	6.0	0.025
8.0	8.0	2.4	0.042	6.0	8.0	0.035
10.0	10.0	3.0	0.049	7.5	10.0	0.042
12.0	12.0	3.6	0.060	9.0	12.0	0.049
14.0	14.0	4.2	0.070	10.5	14.0	0.060
16.0	16.0	4.8	0.080	12.0	16.0	0.067
18.0	18.0	5.4	0.091	13.5	18.0	0.075
20.0	20.0	6.0	0.100	15.0	20.0	0.084

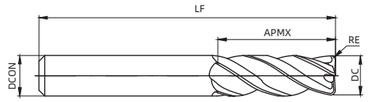
(1) Water-soluble cutting fluid is recommended for titanium alloy machining.
(2) When reducing the axial depth of cut, spindle speed and feed rate can be appropriately increased.
(3) Climb milling is recommended for side milling operations.
(4) If the machine has poor rigidity, or chatter/abnormal noise occurs during machining, reduce the cutting speed and feed rate in the table proportionally.

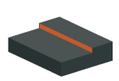
T Series - Titanium Alloy End Mills

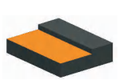
4 Flute Corner Radius End Mill

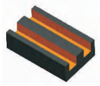
T4S...R...NS

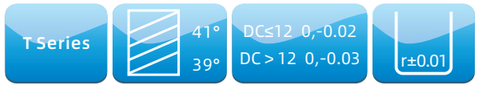





Side machining


Bottom machining


Slot milling



Type	Dimension (mm)						Inventory
	DC	DCON	APMX	LF	RE	ZEFP	
T4S0600R0050NS	6.0	6	16	50	0.5	4	●
T4S0600R0100NS	6.0	6	16	50	1.0	4	●
T4S0800R0050NS	8.0	8	20	60	0.5	4	●
T4S0800R0100NS	8.0	8	20	60	1.0	4	●
T4S1000R0050NS	10.0	10	25	75	0.5	4	●
T4S1000R0100NS	10.0	10	25	75	1.0	4	●
T4S1000R0200NS	10.0	10	25	75	2.0	4	○
T4S1000R0300NS	10.0	10	25	75	3.0	4	○
T4S1200R0050NS	12.0	12	30	75	0.5	4	●
T4S1200R0100NS	12.0	12	30	75	1.0	4	●
T4S1200R0200NS	12.0	12	30	75	2.0	4	○
T4S1200R0300NS	12.0	12	30	75	3.0	4	○
T4S1600R0100NS	16.0	16	45	100	1.0	4	○
T4S1600R0200NS	16.0	16	45	100	2.0	4	○
T4S1600R0300NS	16.0	16	45	100	3.0	4	○
T4S2000R0100NS	20.0	20	45	100	1.0	4	○
T4S2000R0200NS	20.0	20	45	100	2.0	4	○
T4S2000R0300NS	20.0	20	45	100	3.0	4	○

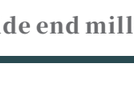
●Standing inventory ○Make-to-order

P			M	K	N		S		H		
Carbon steel	Alloy steel	High-alloyed steel	Stainless steel	Cast iron	Non-ferrous alloy	Aluminum alloy	High-temp alloy	Titanium alloy	<54HRC	54—60HRC	≥60HRC
			☀				☼	☀			

☀ Fit well ☼ Applicable

Recommended cutting conditions——T4S...R...NS

Recommended Cutting Speed						
Workpiece material		Strength (N/mm²)	Hardness (HB/HRC)	Cutting speed (m/min)		
				Minimum	Recommendation	Maximum
P	Carbon steel	< 600	< 230	-	-	-
	Alloy steel	< 1200	< 350	-	-	-
	High-alloyed steel and tool steel	< 1400	< 380	-	-	-
M	Austenite and ferrite stainless steel	< 680	<220	-	-	-
	Martensite stainless steel	< 820	< 240	-	-	-
K	Gray cast iron	-	< 280	-	-	-
	Nodular iron	-	< 320	-	-	-
N	Non-ferrous alloy	< 250	< 110	-	-	-
	Aluminum alloy	< 530	< 130	-	-	-
S	Heat resistant super alloys	< 3300	< 350	20	30	50
	Titanium alloy	<2100	< 400	40	60	100
H	Hardened steel	-	< 54HRC	-	-	-
	Hardened steel	-	54-60HRC	-	-	-
	Hardened steel	-	> 60 HRC	-	-	-

Recommended Cutting Parameters						
Machining method	 Side milling			Slot milling		
Diameter （mm）	ap （1xDc）	ae （0.3xDc）	fz （mm/z）	ap （0.75xDc）	ae （1xDc）	fz （mm/z）
6.0	6.0	1.8	0.032	4.5	6.0	0.025
8.0	8.0	2.4	0.042	6.0	8.0	0.035
10.0	10.0	3.0	0.049	7.5	10.0	0.042
12.0	12.0	3.6	0.060	9.0	12.0	0.049
16.0	16.0	4.8	0.080	12.0	16.0	0.067
20.0	20.0	6.0	0.100	15.0	20.0	0.084

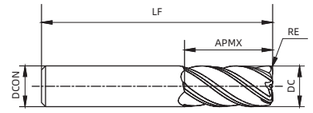
(1) Water-soluble cutting fluid is recommended for titanium alloy machining.
(2) When reducing the axial depth of cut, spindle speed and feed rate can be appropriately increased.
(3) Climb milling is recommended for side milling operations.
(4) If the machine has poor rigidity, or chatter/abnormal noise occurs during machining, reduce the cutting speed and feed rate in the table proportionally.

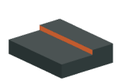
T Series - Titanium Alloy End Mills

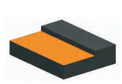
5 Flute Corner Radius End Mill

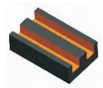
T5S...R...NS






Side machining


Bottom machining


Slot milling



Type	Dimension (mm)						Inventory
	DC	DCON	APMX	LF	RE	ZEFP	
T5S0600R0050NS	6.0	6	16	50	0.5	5	●
T5S0600R0100NS	6.0	6	16	50	1.0	5	●
T5S0800R0050NS	8.0	8	20	60	0.5	5	●
T5S0800R0100NS	8.0	8	20	60	1.0	5	●
T5S1000R0050NS	10.0	10	25	75	0.5	5	●
T5S1000R0100NS	10.0	10	25	75	1.0	5	●
T5S1000R0200NS	10.0	10	25	75	2.0	5	○
T5S1000R0300NS	10.0	10	25	75	3.0	5	○
T5S1200R0050NS	12.0	12	30	75	0.5	5	●
T5S1200R0100NS	12.0	12	30	75	1.0	5	●
T5S1200R0200NS	12.0	12	30	75	2.0	5	○
T5S1200R0300NS	12.0	12	30	75	3.0	5	○
T5S1600R0100NS	16.0	16	45	100	1.0	5	○
T5S1600R0200NS	16.0	16	45	100	2.0	5	○
T5S1600R0300NS	16.0	16	45	100	3.0	5	○
T5S2000R0100NS	20.0	20	45	100	1.0	5	○
T5S2000R0200NS	20.0	20	45	100	2.0	5	○
T5S2000R0300NS	20.0	20	45	100	3.0	5	○

●Standing inventory ○Make-to-order

P			M	K	N		S		H		
Carbon steel	Alloy steel	High-alloyed steel	Stainless steel	Cast iron	Non-ferrous alloy	Aluminum alloy	High-temp alloy	Titanium alloy	<54HRC	54—60HRC	≥60HRC
							☼	☀			

☀ Fit well ☼ Applicable

Recommended cutting conditions——T5S...R...NS

Recommended Cutting Speed						
Workpiece material		Strength (N/mm²)	Hardness (HB/HRC)	Cutting speed (m/min)		
				Minimum	Recommendation	Maximum
P	Carbon steel	< 600	< 230	-	-	-
	Alloy steel	< 1200	< 350	-	-	-
	High-alloyed steel and tool steel	< 1400	< 380	-	-	-
M	Austenite and ferrite stainless steel	< 680	<220	-	-	-
	Martensite stainless steel	< 820	< 240	-	-	-
K	Gray cast iron	-	< 280	-	-	-
	Nodular iron	-	< 320	-	-	-
N	Non-ferrous alloy	< 250	< 110	-	-	-
	Aluminum alloy	< 530	< 130	-	-	-
S	Heat resistant super alloys	< 3300	< 350	20	30	50
	Titanium alloy	<2100	< 400	40	60	100
H	Hardened steel	-	< 54HRC	-	-	-
	Hardened steel	-	54-60HRC	-	-	-
	Hardened steel	-	> 60 HRC	-	-	-

Recommended Cutting Parameters						
Machining method	 Side milling			Slot milling		
Diameter （mm）	ap （1xDc）	ae （0.3xDc）	fz （mm/z）	ap （0.75xDc）	ae （1xDc）	fz （mm/z）
6.0	6.0	1.8	0.032	4.5	6.0	0.025
8.0	8.0	2.4	0.042	6.0	8.0	0.035
10.0	10.0	3.0	0.049	7.5	10.0	0.042
12.0	12.0	3.6	0.060	9.0	12.0	0.049
16.0	16.0	4.8	0.080	12.0	16.0	0.067
20.0	20.0	6.0	0.100	15.0	20.0	0.084

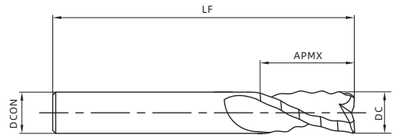
(1) Water-soluble cutting fluid is recommended for titanium alloy machining.
(2) When reducing the axial depth of cut, spindle speed and feed rate can be appropriately increased.
(3) Climb milling is recommended for side milling operations.
(4) If the machine has poor rigidity, or chatter/abnormal noise occurs during machining, reduce the cutting speed and feed rate in the table proportionally.

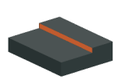
X Series - Special Application End Mills

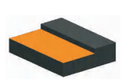
3 Flute Wavy Edge Square End Mill

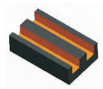
X3S...WLN

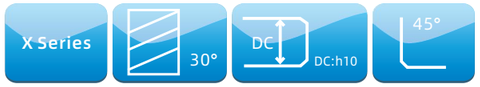





Side machining


Bottom machining


Slot milling



Type	Dimension (mm)					Inventory
	DC	DCON	APMX	LF	ZEFP	
X3S0600WLN	6.0	6	16	50	3	●
X3S0800WLN	8.0	8	20	60	3	●
X3S1000WLN	10.0	10	25	75	3	●
X3S1200WLN	12.0	12	30	75	3	●
X3S1600WLN	16.0	16	45	100	3	○
X3S2000WLN	20.0	20	45	100	3	○

●Standing inventory ○Make-to-order

P			M	K	N		S		H		
Carbon steel	Alloy steel	High-alloyed steel	Stainless steel	Cast iron	Non-ferrous alloy	Aluminum alloy	High-temp alloy	Titanium alloy	<54HRC	54—60HRC	≥60HRC
			☀			☀					

☀ Fit well ☼ Applicable

Recommended cutting conditions——X3S...WLN

Recommended Cutting Speed						
Workpiece material		Strength (N/mm²)	Hardness (HB/HRC)	Cutting speed (m/min)		
				Minimum	Recommendation	Maximum
P	Carbon steel	< 600	< 230	-	-	-
	Alloy steel	< 1200	< 350	-	-	-
	High-alloyed steel and tool steel	< 1400	< 380	-	-	-
M	Austenite and ferrite stainless steel	< 680	<220	-	-	-
	Martensite stainless steel	< 820	< 240	-	-	-
K	Gray cast iron	-	< 280	-	-	-
	Nodular iron	-	< 320	-	-	-
N	Non-ferrous alloy	< 250	< 110	-	-	-
	Aluminum alloy	< 530	< 130	150	200	300
S	Heat resistant super alloys	< 3300	< 350	-	-	-
	Titanium alloy	<2100	< 400	-	-	-
H	Hardened steel	-	< 54HRC	-	-	-
	Hardened steel	-	54-60HRC	-	-	-
	Hardened steel	-	> 60 HRC	-	-	-

Recommended Cutting Parameters						
Machining method	 Side milling			Slot milling		
Diameter （mm）	ap （1xDc）	ae （0.3xDc）	fz （mm/z）	ap （0.75xDc）	ae （1xDc）	fz （mm/z）
6.0	6.0	1.8	0.045	4.5	6.0	0.035
8.0	8.0	2.4	0.060	6.0	8.0	0.050
10.0	10.0	3.0	0.070	7.5	10.0	0.060
12.0	12.0	3.6	0.085	9.0	12.0	0.070
16.0	16.0	4.8	0.115	12.0	16.0	0.095
20.0	20.0	6.0	0.140	15.0	20.0	0.120

X Series - Special Application End Mills

4 Flute Wavy Edge Square End Mill

X4S...WNG



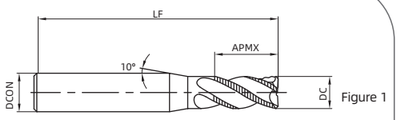


Figure 1

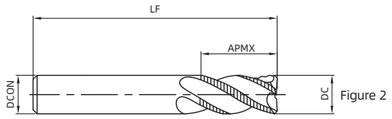
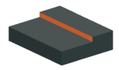
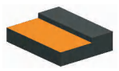
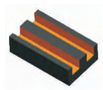
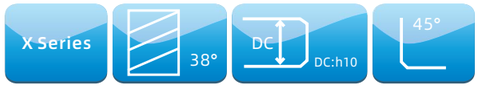


Figure 2


Side machining


Bottom machining


Slot milling



Type	Dimension (mm)					Pattern	Inventory
	DC	DCON	APMX	LF	ZEFP		
X4S0600WNG	6.0	6	16	50	4	Figure 2	●
X4S0700WNG	7.0	8	20	60	4	Figure 1	●
X4S0800WNG	8.0	8	20	60	4	Figure 2	●
X4S0900WNG	9.0	10	22	75	4	Figure 1	●
X4S1000WNG	10.0	10	25	75	4	Figure 2	●
X4S1100WNG	11.0	12	26	75	4	Figure 1	●
X4S1200WNG	12.0	12	30	75	4	Figure 2	●
X4S1600WNG	16.0	16	45	100	4	Figure 2	○
X4S2000WNG	20.0	20	45	100	4	Figure 2	○

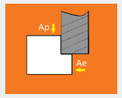
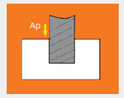
●Standing inventory ○Make-to-order

P			M	K	N		S		H		
Carbon steel	Alloy steel	High-alloyed steel	Stainless steel	Cast iron	Non-ferrous alloy	Aluminum alloy	High-temp alloy	Titanium alloy	<54HRC	54—60HRC	≥60HRC
☀	☀	☀	☼	☀					☼		

☀ Fit well ☼ Applicable

Recommended cutting conditions——X4S...WNG

Recommended Cutting Speed						
Workpiece material		Strength (N/mm²)	Hardness (HB/HRC)	Cutting speed (m/min)		
				Minimum	Recommendation	Maximum
P	Carbon steel	< 600	< 230	180	210	240
	Alloy steel	< 1200	< 350	150	175	200
	High-alloyed steel and tool steel	< 1400	< 380	100	120	140
M	Austenite and ferrite stainless steel	< 680	<220	80	110	140
	Martensite stainless steel	< 820	< 240	60	90	120
K	Gray cast iron	-	< 280	120	150	180
	Nodular iron	-	< 320	90	110	130
N	Non-ferrous alloy	< 250	< 110	-	-	-
	Aluminum alloy	< 530	< 130	-	-	-
S	Heat resistant super alloys	< 3300	< 350	-	-	-
	Titanium alloy	<2100	< 400	-	-	-
H	Hardened steel	-	< 54HRC	90	120	150
	Hardened steel	-	54-60HRC	-	-	-
	Hardened steel	-	> 60 HRC	-	-	-

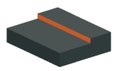
Recommended Cutting Parameters						
Machining method	 Side milling			 Slot milling		
Diameter （mm）	ap （1xDc）	ae （0.3xDc）	fz （mm/z）	ap （0.75xDc）	ae （1xDc）	fz （mm/z）
6.0	6.0	1.8	0.045	4.5	6.0	0.035
7.0	7.0	2.1	0.055	5.3	7.0	0.045
8.0	8.0	2.4	0.060	6.0	8.0	0.050
9.0	9.0	2.7	0.065	6.8	9.0	0.055
10.0	10.0	3.0	0.070	7.5	10.0	0.060
11.0	11.0	3.3	0.080	8.3	11.0	0.065
12.0	12.0	3.6	0.085	9.0	12.0	0.070
16.0	16.0	4.8	0.115	12.0	16.0	0.095
20.0	20.0	6.0	0.140	15.0	20.0	0.120

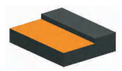
X Series - Special Application End Mills

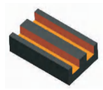
4 Flute Square End Mill

X4S...HG




Side machining


Bottom machining


Slot milling

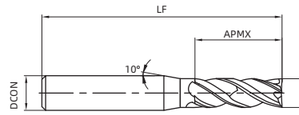


Figure 1

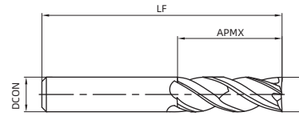


Figure 2

X Series | 45° 42° | DC≤12 0,-0.02 DC＞12 0,-0.03 | 45°

Type	Dimension (mm)					Pattern	Inventory
	DC	DCON	APMX	LF	ZEFP		
X4S0400HG	4.0	6	11	50	4	Figure 1	●
X4S0500HG	5.0	6	13	50	4	Figure 1	●
X4S0600HG	6.0	6	16	50	4	Figure 2	●
X4S0800HG	8.0	8	20	60	4	Figure 2	●
X4S1000HG	10.0	10	25	75	4	Figure 2	●
X4S1200HG	12.0	12	30	75	4	Figure 2	●
X4S1600HG	16.0	16	45	100	4	Figure 2	○
X4S2000HG	20.0	20	45	100	4	Figure 2	○

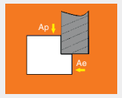
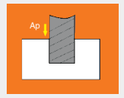
●Standing inventory ○Make-to-order

P			M	K	N		S		H		
Carbon steel	Alloy steel	High-alloyed steel	Stainless steel	Cast iron	Non-ferrous alloy	Aluminum alloy	High-temp alloy	Titanium alloy	<54HRC	54—60HRC	≥60HRC
☀	☀	☀	☼	☀			☼	☼	☀		

☀ Fit well ☼ Applicable

Recommended cutting conditions——X4S...HG

Recommended Cutting Speed						
Workpiece material		Strength (N/mm²)	Hardness (HB/HRC)	Cutting speed (m/min)		
				Minimum	Recommendation	Maximum
P	Carbon steel	< 600	< 230	180	210	240
	Alloy steel	< 1200	< 350	150	175	200
	High-alloyed steel and tool steel	< 1400	< 380	100	120	140
M	Austenite and ferrite stainless steel	< 680	<220	80	110	140
	Martensite stainless steel	< 820	< 240	60	90	120
K	Gray cast iron	-	< 280	120	150	180
	Nodular iron	-	< 320	90	110	130
N	Non-ferrous alloy	< 250	< 110	-	-	-
	Aluminum alloy	< 530	< 130	-	-	-
S	Heat resistant super alloys	< 3300	< 350	40	50	60
	Titanium alloy	<2100	< 400	60	70	80
H	Hardened steel	-	< 54HRC	90	120	150
	Hardened steel	-	54-60HRC	70	100	130
	Hardened steel	-	> 60 HRC	-	-	-

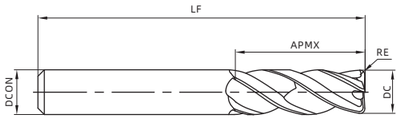
Recommended Cutting Parameters						
Machining method	 Side milling			 Slot milling		
Diameter （mm）	ap （1xDc）	ae （0.3xDc）	fz （mm/z）	ap （0.75xDc）	ae （1xDc）	fz （mm/z）
4.0	4.0	1.2	0.030	3.0	4.0	0.025
5.0	5.0	1.5	0.035	3.8	5.0	0.030
6.0	6.0	1.8	0.045	4.5	6.0	0.035
8.0	8.0	2.4	0.060	6.0	8.0	0.050
10.0	10.0	3.0	0.070	7.5	10.0	0.060
12.0	12.0	3.6	0.085	9.0	12.0	0.070
16.0	16.0	4.8	0.115	12.0	16.0	0.095
20.0	20.0	6.0	0.140	15.0	20.0	0.120

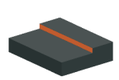
X Series - Special Application End Mills

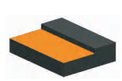
4 Flute Corner Radius End Mill

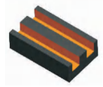
X4S...R...HG






Side machining


Bottom machining


Slot milling



Type	Dimension (mm)						Inventory
	DC	DCON	APMX	LF	RE	ZEFP	
X4S0600R0050HG	6.0	6	16	50	0.5	4	●
X4S0600R0100HG	6.0	6	16	50	1.0	4	●
X4S0800R0050HG	8.0	8	20	60	0.5	4	●
X4S0800R0100HG	8.0	8	20	60	1.0	4	●
X4S1000R0050HG	10.0	10	25	75	0.5	4	●
X4S1000R0100HG	10.0	10	25	75	1.0	4	●
X4S1000R0200HG	10.0	10	25	75	2.0	4	○
X4S1200R0050HG	12.0	12	30	75	0.5	4	●
X4S1200R0100HG	12.0	12	30	75	1.0	4	●
X4S1200R0200HG	12.0	12	30	75	2.0	4	○
X4S1600R0100HG	16.0	16	45	100	1.0	4	○
X4S1600R0200HG	16.0	16	45	100	2.0	4	○
X4S1600R0300HG	16.0	16	45	100	3.0	4	○
X4S2000R0100HG	20.0	20	45	100	1.0	4	○
X4S2000R0200HG	20.0	20	45	100	2.0	4	○
X4S2000R0300HG	20.0	20	45	100	3.0	4	○

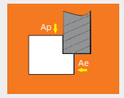
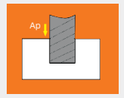
●Standing inventory ○Make-to-order

P			M	K	N		S		H		
Carbon steel	Alloy steel	High-alloyed steel	Stainless steel	Cast iron	Non-ferrous alloy	Aluminum alloy	High-temp alloy	Titanium alloy	<54HRC	54—60HRC	≥60HRC
☀	☀	☀	☼	☀			☼	☼	☀		

☀ Fit well ☼ Applicable

Recommended cutting conditions——X4S...R...HG

Recommended Cutting Speed						
Workpiece material		Strength (N/mm²)	Hardness (HB/HRC)	Cutting speed (m/min)		
				Minimum	Recommendation	Maximum
P	Carbon steel	< 600	< 230	180	210	240
	Alloy steel	< 1200	< 350	150	175	200
	High-alloyed steel and tool steel	< 1400	< 380	100	120	140
M	Austenite and ferrite stainless steel	< 680	<220	80	110	140
	Martensite stainless steel	< 820	< 240	60	90	120
K	Gray cast iron	-	< 280	120	150	180
	Nodular iron	-	< 320	90	110	130
N	Non-ferrous alloy	< 250	< 110	-	-	-
	Aluminum alloy	< 530	< 130	-	-	-
S	Heat resistant super alloys	< 3300	< 350	40	50	60
	Titanium alloy	<2100	< 400	60	70	80
H	Hardened steel	-	< 54HRC	90	120	150
	Hardened steel	-	54-60HRC	70	100	130
	Hardened steel	-	> 60 HRC	-	-	-

Recommended Cutting Parameters						
Machining method	 Side milling			 Slot milling		
Diameter （mm）	ap （1xDc）	ae （0.3xDc）	fz （mm/z）	ap （0.75xDc）	ae （1xDc）	fz （mm/z）
6.0	6.0	1.8	0.025	4.5	6.0	0.020
8.0	8.0	2.4	0.060	6.0	8.0	0.050
10.0	10.0	3.0	0.070	7.5	10.0	0.060
12.0	12.0	3.6	0.085	9.0	12.0	0.070
16.0	16.0	4.8	0.115	12.0	16.0	0.095
20.0	20.0	6.0	0.140	15.0	20.0	0.120

MEMO



HD — Short Hole Drill Series

Short Hole Drill – DX Chipbreaker

- Unique flute geometry with balanced force distribution. Cutting resistance is evenly distributed between the center cutting edge and peripheral cutting edge, ensuring stable drilling process.
- Uniformly varying chamfer and rake angle design enhances the tool's centering capability during entry, enabling smooth and effortless cutting.
- Special edge preparation technology effectively suppresses built-up edge (BUE) and crater wear on the insert cutting edge.
- Available with multiple coating grades to meet drilling requirements for different machining conditions.

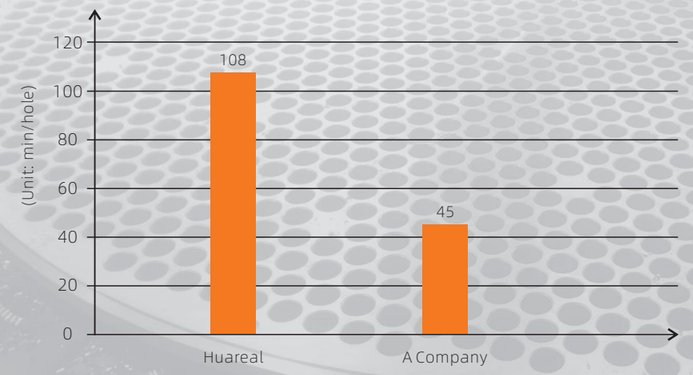




Balances High Precision and Long Service Life

Machining Case Study

Workpiece Name	Tube Sheet
Workpiece Material	S316
Machining Method	Indexable Drilling
Customer Requirement	Excellent chip evacuation, good hole quality, and cost-effective inserts
Test Insert	HR5130/SPMG060204-DX
Cutting Parameters	n=1300r/min(vc=100m/min) F=130mm/min(fn=0.1mm/r)
Test Result	Huarui Dx flute inserts deliver superior chip evacuation, higher hole dimensional accuracy, smaller insert chipping, and significantly better



Drilling / Short hole drills

Tool shape

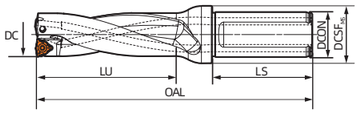
Tool type

Indexable short hole drilling

HD01 2D Series



Tool specification column
(including model, basic size, applicable inserts and accessories)

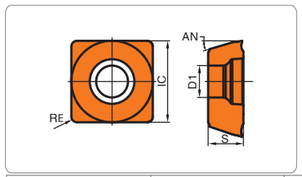


Tool model	Inventory	Dimension (mm)						Applicable inserts	Screw	Wrench
		DC	DCON	$DCSF_{MS}$	LS	LU	OAL			
HD01-2D-440-S40	○	44	40	60	70	91	193	WCMX080412-DX	M40110-076	HTT15IP
HD01-2D-450-S40	○	45	40	60	70	93	195			
HD01-2D-460-S40	○	46	40	60	70	95	197			
HD01-2D-470-S40	○	47	40	60	70	97	199			
HD01-2D-480-S40	○	48	40	70	70	99	201			
HD01-2D-490-S40	○	49	40	70	70	101	203			
HD01-2D-500-S40	○	50	40	70	70	103	205			

●Running stock ○Make-to-order

Selection guidance of indexable short hole drilling inserts

Indexable short hole drilling insert



Working condition: ●Stable ◕Average ⌗Tough

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

Insert shape	Type	Dimension (mm)					CVD			PVD				
		IC	S	RE	D1	AN	HR8115	HR8125	HR8225	HR5110	HR5120	HR5130	HR712	HR7225
	SPMG050204-DX	5.00	2.38	0.4	2.25	14°	☆				☆	★		
	SPMG060204-DX	6.00	2.38	0.4	2.61	14°	☆				☆	★		
	SPMG07T308-DX	7.94	3.97	0.8	2.85	15.5°	☆				☆	★		
	SPMG090408-DX	9.80	4.30	0.8	4.05	17.5°	☆				☆	★		
	SPMG110408-DX	11.50	4.80	0.8	4.50	16.5°	☆				☆	★		

★ Recommended grade ☆ Available grade

Insert shape

Insert type

Insert specification column
(including model, basic size and grade)

C Drilling

Indexable short hole drills

- Overview of drilling tools C1
- Code key of indexable short hole drilling tools C2
- Code key of indexable short hole drilling inserts C3
- Indexable short hole drilling tools C5
- Indexable short hole drilling inserts C17
- Technical information of indexable short hole drilling tools C18

Solid carbide drills

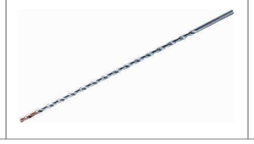
- Selection guidance of solid carbide drills C23
- Code key of solid carbide drilling tools C24
- Detailed List and Parameter Recommendations for Solid Carbide Drill Bits C25
- Technical Information on the Application of Solid Carbide Drills C77

Overview of drilling tools

Tool type	Tool series	Size range (mm)	Tool shape	Cooling method	Applicable inserts	Workpiece material						
						P	M	K	N	S	H	Page
Indexable short hole drill	HD01	Ø16-60		Internal cooling	WCMX□□	✹	✹	☼		☼		C5
	HD02	Ø14-41		Internal cooling	SPMG□□	✹	✹	☼		☼		C13
BD Series Solid carbide drill	BD03	Ø3-20		External cooling	/	✹	✹	☼		☼		C25
	BD03C	Ø3-20		Internal cooling	/	✹	✹	☼		☼		C33
	BD05	Ø3-20		External cooling	/	✹	✹	☼		☼		C41
	BD05C	Ø3-20		Internal cooling	/	✹	✹	☼		☼		C49
	BD08C	Ø3-20		Internal cooling	/	✹	✹	☼		☼		C57

✹ Fit well ☼ Applicable

Overview of drilling tools

Tool type	Tool series	Size range (mm)	Tool shape	Cooling method	Applicable inserts	Workpiece material						
						P	M	K	N	S	H	Page
XD Series Solid carbide drills	XD12C	Ø3-20		Internal cooling	/	✹	✹	☼		☼		C63
	XD20C	Ø3-14		Internal cooling	/	✹	✹	☼		☼		C68
	XD30C	Ø3-10		Internal cooling	/	✹	✹	☼		☼		C73

✹ Fit well ☼ Applicable

Code key of indexable short hole drilling tools

HD ① 01 ② - 2D ③ - 150 ④ - S ⑤ 20 ⑥

① Short hole drilling series

② Series number	
01	With WC insert
02	With SP insert

③ Length-diameter ratio	
2D	Length-diameter ratio: 2
3D	Length-diameter ratio: 3
5D	Length-diameter ratio: 5

④ Tool diameter	
150	15mm
200	20mm
250	25mm
…	…

⑤ Shank type	
S	Shank with flat

⑥ Sizes of tool installation parts	
20	20mm
25	25mm
…	…

Code key of indexable short hole drilling inserts

S	P	M	G	07	T3	08	R	-	DX
①	②	③	④	⑤	⑥	⑦	⑧		⑨

① Shape code

S	
W	

③ Tolerance (mm)





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

⑤ Cutting edge length

Code	Insert shape W	Insert shape S
03	3.8	
04	4.3	
05	5.4	5.0
06	6.5	6.0
07		7.94
08	8.7	
09		9.8
11		11.5

⑥ Insert thickness



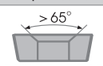
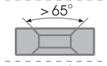
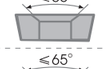
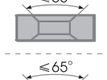
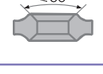


Code	Thickness (mm)	Code	Thickness (mm)
00	0.79	05	5.96
T0	0.99	T5	5.95
01	1.59	06	6.35
T1	1.98	T6	6.75
02	2.38	07	7.94
T2	2.58	09	9.52
03	3.18	11	11.11
T3	3.97	12	12.70
04	4.76		
T4	4.96		

② Clearance angle major

Code	Clearance angle	Code	Clearance angle
A		B	
C		D	
E		F	
G		N	
P		O	Others

④ Chip breaker and clamping form

Code	Hole	Chip breaker	Chip breaker	Code	Hole	Chip breaker	Chip breaker
B		N/A		N	N/A	N/A	
H		Single-sided		R	N/A	Single-sided	
C		N/A		F	N/A	Double-sided	
J		Double-sided		A	Y	N/A	
W		N/A		M	Y	Single-sided	
T		Single-sided		G	Y	Double-sided	
Q		N/A		X	---	---	Exception
U		Double-sided					

⑦ Corner radius

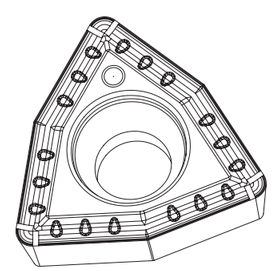
Code	Description
04	0.4mm
08	0.8mm
12	1.2mm

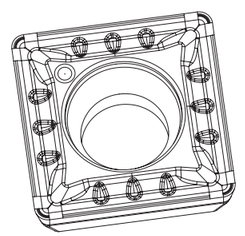
⑧ Cutting direction

Code	Direction
R	Right
L	Left
N	Two-way

⑨ Chip breaker code

Code	Geometry
DX	Dx Geometry

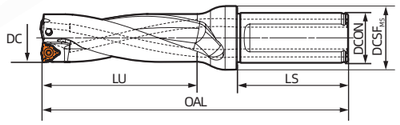




Indexable short hole drilling

HD01 2D Series





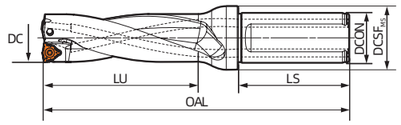
Tool model	Inventory	Dimension (mm)						Applicable inserts	Screw	Wrench
		DC	DCON	$DCSF_{MS}$	LS	LU	OAL			
HD01-2D-160-S20	●	16	20	25	50	36	101	WCMX030204-DX WCMX030208-DX	M25065	HFT08IP
HD01-2D-170-S20	○	17	20	25	50	38	103			
HD01-2D-180-S25	○	18	25	32	56	40	112			
HD01-2D-190-S25	○	19	25	32	56	42	114			
HD01-2D-200-S25	●	20	25	32	56	44	117			
HD01-2D-210-S25	○	21	25	32	56	46	120	WCMX040204-DX WCMX040208-DX	M25065	HFT08IP
HD01-2D-220-S25	○	22	25	32	56	48	122			
HD01-2D-230-S25	○	23	25	32	56	50	125			
HD01-2D-240-S25	○	24	25	32	56	52	127			
HD01-2D-250-S25	●	25	25	32	56	54	130	WCMX050308-DX	M30070	HFT09IP
HD01-2D-260-S32	○	26	32	40	60	56	137			
HD01-2D-270-S32	○	27	32	40	60	58	139			
HD01-2D-280-S32	○	28	32	40	60	60	142			
HD01-2D-290-S32	○	29	32	40	60	62	144			
HD01-2D-300-S32	●	30	32	40	60	64	147			
HD01-2D-310-S40	○	31	40	48	70	66	160	WCMX06T308-DX	M35084	HTT10IP
HD01-2D-320-S40	○	32	40	48	70	68	162			
HD01-2D-330-S40	○	33	40	48	70	70	165			
HD01-2D-340-S40	○	34	40	48	70	73	168			
HD01-2D-350-S40	○	35	40	48	70	75	171			
HD01-2D-360-S40	○	36	40	48	70	77	174			
HD01-2D-370-S40	○	37	40	48	70	78	175			
HD01-2D-380-S40	○	38	40	48	70	80	178			
HD01-2D-390-S40	○	39	40	48	70	82	180			
HD01-2D-400-S40	●	40	40	48	70	84	183	WCMX080412-DX	M40110-076	HTT15IP
HD01-2D-410-S40	○	41	40	48	70	87	187			
HD01-2D-420-S40	○	42	40	48	70	89	189			
HD01-2D-430-S40	○	43	40	48	70	91	192			

●Standing inventory ○Make-to-order

Indexable short hole drilling

HD01 2D Series





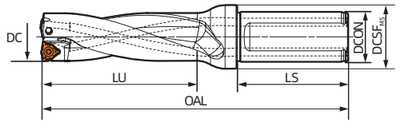
Tool model	Inventory	Dimension (mm)						Applicable inserts	Screw	Wrench
		DC	DCON	$DCSF_{MS}$	LS	LU	OAL			
HD01-2D-440-S40	○	44	40	48	70	93	194	WCMX080412-DX	M40110-076	HTT15IP
HD01-2D-450-S40	○	45	40	62.5	70	95	197			
HD01-2D-460-S40	○	46	40	62.5	70	97	200			
HD01-2D-470-S40	○	47	40	62.5	70	99	202			
HD01-2D-480-S40	○	48	40	62.5	70	101	205			
HD01-2D-490-S40	○	49	40	62.5	70	103	207			
HD01-2D-500-S40	○	50	40	62.5	70	105	210			
HD01-2D-510-S40	○	51	40	62.5	70	108	214			
HD01-2D-520-S40	○	52	40	62.5	70	110	216			
HD01-2D-530-S40	○	53	40	62.5	70	112	219			
HD01-2D-540-S40	○	54	40	62.5	70	114	221			
HD01-2D-550-S40	○	55	40	62.5	70	116	224			
HD01-2D-560-S40	○	56	40	62.5	70	118	227			
HD01-2D-570-S40	○	57	40	62.5	70	120	229			
HD01-2D-580-S40	○	58	40	62.5	70	122	232			
HD01-2D-590-S40	○	59	40	62.5	70	124	234			
HD01-2D-600-S40	○	60	40	62.5	70	126	237			

●Standing inventory ○Make-to-order

Indexable short hole drilling

HD01 3D Series





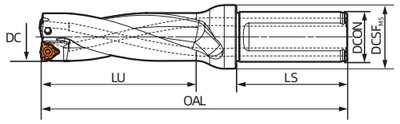
Tool model	Inventory	Dimension (mm)						Applicable inserts	Screw	Wrench
		DC	DCON	$DCSF_{MS}$	LS	LU	OAL			
HD01-3D-160-S20	●	16	20	25	50	51	116	WCMX030204-DX WCMX030208-DX	M25065	HFT08IP
HD01-3D-170-S20	○	17	20	25	50	54	119			
HD01-3D-180-S25	○	18	25	32	56	57	129			
HD01-3D-190-S25	○	19	25	32	56	60	132			
HD01-3D-200-S25	●	20	25	32	56	64	137			
HD01-3D-210-S25	○	21	25	32	56	66	140	WCMX040204-DX WCMX040208-DX	M25065	HFT08IP
HD01-3D-220-S25	○	22	25	32	56	69	143			
HD01-3D-230-S25	○	23	25	32	56	72	147			
HD01-3D-240-S25	○	24	25	32	56	76	151			
HD01-3D-250-S25	●	25	25	32	56	79	155	WCMX050308-DX	M30070	HFT09IP
HD01-3D-260-S32	○	26	32	40	60	81	162			
HD01-3D-270-S32	○	27	32	40	60	84	165			
HD01-3D-280-S32	○	28	32	40	60	87	169			
HD01-3D-290-S32	○	29	32	40	60	90	172			
HD01-3D-300-S32	●	30	32	40	60	94	177			
HD01-3D-310-S40	○	31	40	48	70	97	191	WCMX06T308-DX	M35084	HTT10IP
HD01-3D-320-S40	○	32	40	48	70	100	194			
HD01-3D-330-S40	○	33	40	48	70	103	198			
HD01-3D-340-S40	○	34	40	48	70	106	201			
HD01-3D-350-S40	○	35	40	48	70	109	205			
HD01-3D-360-S40	○	36	40	48	70	112	209			
HD01-3D-370-S40	○	37	40	48	70	115	212			
HD01-3D-380-S40	○	38	40	48	70	118	216			
HD01-3D-390-S40	○	39	40	48	70	121	219			
HD01-3D-400-S40	●	40	40	48	70	124	223	WCMX080412-DX	M40110-076	HTT15IP
HD01-3D-410-S40	○	41	40	48	70	127	227			
HD01-3D-420-S40	○	42	40	48	70	130	230			
HD01-3D-430-S40	○	43	40	48	70	133	234			

●Standing inventory ○Make-to-order

Indexable short hole drilling

HD01 3D Series





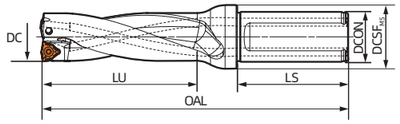
Tool model	Inventory	Dimension (mm)						Applicable inserts	Screw	Wrench
		DC	DCON	$DCSF_{MS}$	LS	LU	OAL			
HD01-3D-440-S40	○	44	40	48	70	136	237	WCMX080412-DX	M40110-076	HTT15IP
HD01-3D-450-S40	○	45	40	62.5	70	140	242			
HD01-3D-460-S40	○	46	40	62.5	70	143	246			
HD01-3D-470-S40	○	47	40	62.5	70	146	249			
HD01-3D-480-S40	○	48	40	62.5	70	149	253			
HD01-3D-490-S40	○	49	40	62.5	70	152	256			
HD01-3D-500-S40	○	50	40	62.5	70	155	260			
HD01-3D-510-S40	○	51	40	62.5	70	158	264			
HD01-3D-520-S40	○	52	40	62.5	70	161	267			
HD01-3D-530-S40	○	53	40	62.5	70	164	271			
HD01-3D-540-S40	○	54	40	62.5	70	167	274			
HD01-3D-550-S40	○	55	40	62.5	70	171	279			
HD01-3D-560-S40	○	56	40	62.5	70	174	283			
HD01-3D-570-S40	○	57	40	62.5	70	177	286			
HD01-3D-580-S40	○	58	40	62.5	70	180	290			
HD01-3D-590-S40	○	59	40	62.5	70	183	293			
HD01-3D-600-S40	○	60	40	62.5	70	186	297			

●Standing inventory ○Make-to-order

Indexable short hole drilling

HD01 4D Series





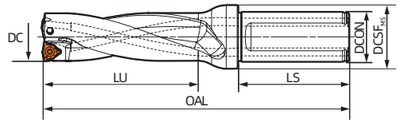
Tool model	Inventory	Dimension (mm)						Applicable inserts	Screw	Wrench
		DC	DCON	$DCSF_{MS}$	LS	LU	OAL			
HD01-4D-160-S20	●	16	20	25	50	67	132	WCMX030204-DX WCMX030208-DX	M25065	HFT08IP
HD01-4D-170-S20	○	17	20	25	50	71	136			
HD01-4D-180-S25	○	18	25	32	56	75	147			
HD01-4D-190-S25	○	19	25	32	56	79	151			
HD01-4D-200-S25	●	20	25	32	56	84	157			
HD01-4D-210-S25	○	21	25	32	56	87	161	WCMX040204-DX WCMX040208-DX	M25065	HFT08IP
HD01-4D-220-S25	○	22	25	32	56	91	165			
HD01-4D-230-S25	○	23	25	32	56	95	170			
HD01-4D-240-S25	○	24	25	32	56	100	175			
HD01-4D-250-S25	●	25	25	32	56	104	180	WCMX050308-DX	M30070	HFT09IP
HD01-4D-260-S32	○	26	32	40	60	107	188			
HD01-4D-270-S32	○	27	32	40	60	111	192			
HD01-4D-280-S32	○	28	32	40	60	115	197			
HD01-4D-290-S32	○	29	32	40	60	119	201			
HD01-4D-300-S32	●	30	32	40	60	124	207			
HD01-4D-310-S40	○	31	40	48	70	128	222	WCMX06T308-DX	M35084	HTT10IP
HD01-4D-320-S40	○	32	40	48	70	132	226			
HD01-4D-330-S40	○	33	40	48	70	136	231			
HD01-4D-340-S40	○	34	40	48	70	140	235			
HD01-4D-350-S40	○	35	40	48	70	144	240			
HD01-4D-360-S40	○	36	40	48	70	148	245			
HD01-4D-370-S40	○	37	40	48	70	152	249			
HD01-4D-380-S40	○	38	40	48	70	156	254			
HD01-4D-390-S40	○	39	40	48	70	160	258			
HD01-4D-400-S40	●	40	40	48	70	164	263	WCMX080412-DX	M40110-076	HTT15IP
HD01-4D-410-S40	○	41	40	48	70	168	268			
HD01-4D-420-S50	○	42	50	62.5	80	172	282			
HD01-4D-430-S50	○	43	50	62.5	80	176	287			

●Standing inventory ○Make-to-order

Indexable short hole drilling

HD01 4D Series





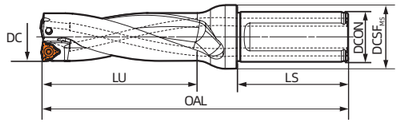
Tool model	Inventory	Dimension (mm)						Applicable inserts	Screw	Wrench
		DC	DCON	$DCSF_{MS}$	LS	LU	OAL			
HD01-4D-440-S50	○	44	50	62.5	80	180	291	WCMX080412-DX	M40110-076	HTT15IP
HD01-4D-450-S50	○	45	50	62.5	80	185	297			
HD01-4D-460-S50	○	46	50	62.5	80	189	302			
HD01-4D-470-S50	○	47	50	62.5	80	193	306			
HD01-4D-480-S50	○	48	50	62.5	80	197	311			
HD01-4D-490-S50	○	49	50	62.5	80	201	315			
HD01-4D-500-S50	○	50	50	62.5	80	205	320			
HD01-4D-510-S50	○	51	50	62.5	80	209	325			
HD01-4D-520-S50	○	52	50	62.5	80	213	329			
HD01-4D-530-S50	○	53	50	62.5	80	217	334			
HD01-4D-540-S50	○	54	50	62.5	80	221	338			
HD01-4D-550-S50	○	55	50	62.5	80	226	344			
HD01-4D-560-S50	○	56	50	62.5	80	230	349			
HD01-4D-570-S50	○	57	50	62.5	80	234	353			
HD01-4D-580-S50	○	58	50	62.5	80	238	358			
HD01-4D-590-S50	○	59	50	62.5	70	242	352			
HD01-4D-600-S50	○	60	50	62.5	70	246	357			

●Standing inventory ○Make-to-order

Indexable short hole drilling

HD01 5D Series





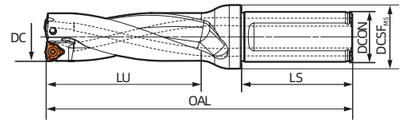
Tool model	Inventory	Dimension (mm)						Applicable inserts	Screw	Wrench
		DC	DCON	$DCSF_{MS}$	LS	LU	OAL			
HD01-5D-160-S20	●	16	20	25	50	83	148	WCMX030204-DX WCMX030208-DX	M25065	HFT08IP
HD01-5D-170-S20	○	17	20	25	50	88	153			
HD01-5D-180-S25	○	18	25	32	56	93	165			
HD01-5D-190-S25	○	19	25	32	56	98	170			
HD01-5D-200-S25	●	20	25	32	56	104	177			
HD01-5D-210-S25	○	21	25	32	56	108	182	WCMX040204-DX WCMX040208-DX	M25065	HFT08IP
HD01-5D-220-S25	○	22	25	32	56	113	187			
HD01-5D-230-S25	○	23	25	32	56	119	194			
HD01-5D-240-S25	○	24	25	32	56	124	199			
HD01-5D-250-S25	●	25	25	32	56	129	205	WCMX050308-DX	M30070	HFT09IP
HD01-5D-260-S32	○	26	32	40	60	133	214			
HD01-5D-270-S32	○	27	32	40	60	138	219			
HD01-5D-280-S32	○	28	32	40	60	143	225			
HD01-5D-290-S32	○	29	32	40	60	149	231			
HD01-5D-300-S32	●	30	32	40	60	154	237			
HD01-5D-310-S40	○	31	40	48	70	159	253	WCMX06T308-DX	M35084	HTT10IP
HD01-5D-320-S40	○	32	40	48	70	164	258			
HD01-5D-330-S40	○	33	40	48	70	169	264			
HD01-5D-340-S40	○	34	40	48	70	175	270			
HD01-5D-350-S40	○	35	40	48	70	180	276			
HD01-5D-360-S40	○	36	40	48	70	185	282			
HD01-5D-370-S40	○	37	40	48	70	189	286			
HD01-5D-380-S40	○	38	40	48	70	194	292			
HD01-5D-390-S40	○	39	40	48	70	200	298			
HD01-5D-400-S40	●	40	40	48	70	205	304	WCMX080412-DX	M40110-076	HTT15IP
HD01-5D-410-S40	○	41	40	48	70	210	310			
HD01-5D-420-S50	○	42	50	62.5	80	215	325			
HD01-5D-430-S50	○	43	50	62.5	80	220	331			

●Standing inventory ○Make-to-order

Indexable short hole drilling

HD01 5D Series





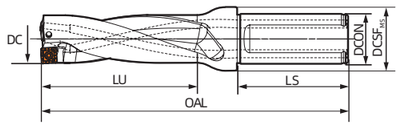
Tool model	Inventory	Dimension (mm)						Applicable inserts	Screw	Wrench
		DC	DCON	$DCSF_{MS}$	LS	LU	OAL			
HD01-5D-440-S50	○	44	50	62.5	80	224	335	WCMX080412-DX	M40110-076	HTT15IP
HD01-5D-450-S50	○	45	50	62.5	80	230	342			
HD01-5D-460-S50	○	46	50	62.5	80	235	348			
HD01-5D-470-S50	○	47	50	62.5	80	240	353			
HD01-5D-480-S50	○	48	50	62.5	80	245	359			
HD01-5D-490-S50	○	49	50	62.5	80	250	364			
HD01-5D-500-S50	○	50	50	62.5	80	255	370			
HD01-5D-510-S50	○	51	50	62.5	80	260	376			
HD01-5D-520-S50	○	52	50	62.5	80	265	381			
HD01-5D-530-S50	○	53	50	62.5	80	270	387			
HD01-5D-540-S50	○	54	50	62.5	80	275	392			
HD01-5D-550-S50	○	55	50	62.5	80	281	399			
HD01-5D-560-S50	○	56	50	62.5	80	286	405			
HD01-5D-570-S50	○	57	50	62.5	80	291	410			
HD01-5D-580-S50	○	58	50	62.5	80	296	416			
HD01-5D-590-S50	○	59	50	62.5	70	301	411			
HD01-5D-600-S50	○	60	50	62.5	70	306	417			

●Standing inventory ○Make-to-order

Indexable short hole drilling

HD02 2D Series





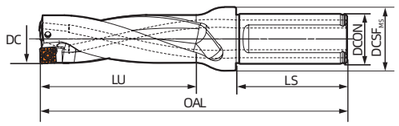
Tool model	Inventory	Dimension (mm)						Applicable inserts	Screw	Wrench
		DC	DCON	$DCSF_{MS}$	LS	LU	OAL			
HD02-2D-140-S20	○	14	20	25	50	31	94	SPMG050204-DX	M20045	HFT06IP
HD02-2D-150-S20	○	15	20	25	50	33	97			
HD02-2D-160-S20	●	16	20	25	50	36	101			
HD02-2D-170-S20	○	17	20	25	50	38	103	SPMG060204-DX	M22055	HFT07IP
HD02-2D-180-S25	○	18	25	32	56	40	112			
HD02-2D-190-S25	○	19	25	32	56	42	114			
HD02-2D-200-S25	●	20	25	32	56	44	117			
HD02-2D-210-S25	○	21	25	32	56	46	120			
HD02-2D-220-S25	○	22	25	32	56	48	122	SPMG07T308-DX	M25072	HFT07IP
HD02-2D-230-S25	○	23	25	32	56	50	125			
HD02-2D-240-S25	○	24	25	32	56	52	127			
HD02-2D-250-S25	●	25	25	32	56	54	130			
HD02-2D-260-S32	○	26	32	40	60	56	137			
HD02-2D-270-S32	○	27	32	40	60	58	139			
HD02-2D-280-S32	○	28	32	40	60	60	142	SPMG090408-DX	M35094	HTT10IP
HD02-2D-290-S32	○	29	32	40	60	62	144			
HD02-2D-300-S32	●	30	32	40	60	64	147			
HD02-2D-310-S40	○	31	40	48	70	66	160			
HD02-2D-320-S40	○	32	40	48	70	68	162			
HD02-2D-330-S40	○	33	40	48	70	70	165			
HD02-2D-340-S40	○	34	40	48	70	73	168	SPMG110408-DX	M40105	HTT15IP
HD02-2D-350-S40	○	35	40	48	70	75	171			
HD02-2D-360-S40	○	36	40	48	70	77	174			
HD02-2D-370-S40	○	37	40	48	70	78	175			
HD02-2D-380-S40	○	38	40	48	70	80	178			
HD02-2D-390-S40	○	39	40	48	70	82	180			
HD02-2D-400-S40	●	40	40	48	70	84	183			
HD02-2D-410-S40	○	41	40	48	70	87	187			

●Standing inventory ○Make-to-order

Indexable short hole drilling

HD02 3D Series





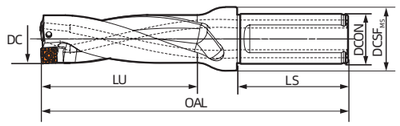
Tool model	Inventory	Dimension (mm)						Applicable inserts	Screw	Wrench
		DC	DCON	$DCSF_{MS}$	LS	LU	OAL			
HD02-3D-140-S20	○	14	20	25	50	45	108	SPMG050204-DX	M20045	HFT06IP
HD02-3D-150-S20	○	15	20	25	50	48	112			
HD02-3D-160-S20	●	16	20	25	50	51	116			
HD02-3D-170-S20	○	17	20	25	50	54	119	SPMG060204-DX	M22055	HFT07IP
HD02-3D-180-S25	○	18	25	32	56	57	129			
HD02-3D-190-S25	○	19	25	32	56	60	132			
HD02-3D-200-S25	●	20	25	32	56	64	137			
HD02-3D-210-S25	○	21	25	32	56	66	140			
HD02-3D-220-S25	○	22	25	32	56	69	143	SPMG07T308-DX	M25072	HFT07IP
HD02-3D-230-S25	○	23	25	32	56	72	147			
HD02-3D-240-S25	○	24	25	32	56	76	151			
HD02-3D-250-S25	●	25	25	32	56	79	155			
HD02-3D-260-S32	○	26	32	40	60	81	162			
HD02-3D-270-S32	○	27	32	40	60	84	165			
HD02-3D-280-S32	○	28	32	40	60	87	169	SPMG090408-DX	M35094	HTT10IP
HD02-3D-290-S32	○	29	32	40	60	90	172			
HD02-3D-300-S32	●	30	32	40	60	94	177			
HD02-3D-310-S40	○	31	40	48	70	97	191			
HD02-3D-320-S40	○	32	40	48	70	100	194			
HD02-3D-330-S40	○	33	40	48	70	103	198			
HD02-3D-340-S40	○	34	40	48	70	106	201	SPMG110408-DX	M40105	HTT15IP
HD02-3D-350-S40	○	35	40	48	70	109	205			
HD02-3D-360-S40	○	36	40	48	70	112	209			
HD02-3D-370-S40	○	37	40	48	70	115	212			
HD02-3D-380-S40	○	38	40	48	70	118	216			
HD02-3D-390-S40	○	39	40	48	70	121	219			
HD02-3D-400-S40	●	40	40	48	70	124	223			
HD02-3D-410-S40	○	41	40	48	70	127	227			

●Standing inventory ○Make-to-order

Indexable short hole drilling

HD02 4D Series





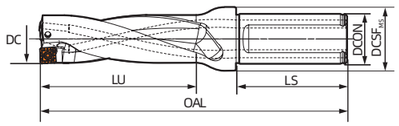
Tool model	Inventory	Dimension (mm)						Applicable inserts	Screw	Wrench
		DC	DCON	DCSF$_{MS}$	LS	LU	OAL			
HD02-4D-140-S20	○	14	20	25	50	59	122	SPMG050204-DX	M20045	HFT06IP
HD02-4D-150-S20	○	15	20	25	50	63	127			
HD02-4D-160-S20	●	16	20	25	50	67	132			
HD02-4D-170-S20	○	17	20	25	50	71	136	SPMG060204-DX	M22055	HFT07IP
HD02-4D-180-S25	○	18	25	32	56	75	147			
HD02-4D-190-S25	○	19	25	32	56	79	151			
HD02-4D-200-S25	●	20	25	32	56	84	157			
HD02-4D-210-S25	○	21	25	32	56	87	161			
HD02-4D-220-S25	○	22	25	32	56	91	165	SPMG07T308-DX	M25072	HFT07IP
HD02-4D-230-S25	○	23	25	32	56	95	170			
HD02-4D-240-S25	○	24	25	32	56	100	175			
HD02-4D-250-S25	●	25	25	32	56	104	180			
HD02-4D-260-S32	○	26	32	40	60	107	188			
HD02-4D-270-S32	○	27	32	40	60	111	192			
HD02-4D-280-S32	○	28	32	40	60	115	197	SPMG090408-DX	M35094	HTT10IP
HD02-4D-290-S32	○	29	32	40	60	119	201			
HD02-4D-300-S32	●	30	32	40	60	124	207			
HD02-4D-310-S40	○	31	40	48	70	128	222			
HD02-4D-320-S40	○	32	40	48	70	132	226			
HD02-4D-330-S40	○	33	40	48	70	136	231			
HD02-4D-340-S40	○	34	40	48	70	140	235	SPMG110408-DX	M40105	HTT15IP
HD02-4D-350-S40	○	35	40	48	70	144	240			
HD02-4D-360-S40	○	36	40	48	70	148	245			
HD02-4D-370-S40	○	37	40	48	70	152	249			
HD02-4D-380-S40	○	38	40	48	70	156	254			
HD02-4D-390-S40	○	39	40	48	70	160	258			
HD02-4D-400-S40	●	40	40	48	70	164	263			
HD02-4D-410-S40	○	41	40	48	70	168	268			

●Standing inventory ○Make-to-order

Indexable short hole drilling

HD02 5D Series

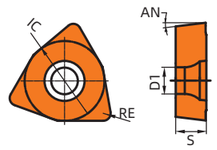




Tool model	Inventory	Dimension (mm)						Applicable inserts	Screw	Wrench
		DC	DCON	DCSF$_{MS}$	LS	LU	OAL			
HD02-5D-140-S20	○	14	20	25	50	73	136	SPMG050204-DX	M20045	HFT06IP
HD02-5D-150-S20	○	15	20	25	50	78	142			
HD02-5D-160-S20	●	16	20	25	50	83	148			
HD02-5D-170-S20	○	17	20	25	50	88	153	SPMG060204-DX	M22055	HFT07IP
HD02-5D-180-S25	○	18	25	32	56	93	165			
HD02-5D-190-S25	○	19	25	32	56	98	170			
HD02-5D-200-S25	●	20	25	32	56	104	177			
HD02-5D-210-S25	○	21	25	32	56	108	182			
HD02-5D-220-S25	○	22	25	32	56	113	187	SPMG07T308-DX	M25072	HFT07IP
HD02-5D-230-S25	○	23	25	32	56	119	194			
HD02-5D-240-S25	○	24	25	32	56	124	199			
HD02-5D-250-S25	●	25	25	32	56	129	205			
HD02-5D-260-S32	○	26	32	40	60	133	214			
HD02-5D-270-S32	○	27	32	40	60	138	219			
HD02-5D-280-S32	○	28	32	40	60	143	225	SPMG090408-DX	M35094	HTT10IP
HD02-5D-290-S32	○	29	32	40	60	149	231			
HD02-5D-300-S32	●	30	32	40	60	154	237			
HD02-5D-310-S40	○	31	40	48	70	159	253			
HD02-5D-320-S40	○	32	40	48	70	164	258			
HD02-5D-330-S40	○	33	40	48	70	169	264			
HD02-5D-340-S40	○	34	40	48	70	175	270	SPMG110408-DX	M40105	HTT15IP
HD02-5D-350-S40	○	35	40	48	70	180	276			
HD02-5D-360-S40	○	36	40	48	70	185	282			
HD02-5D-370-S40	○	37	40	48	70	189	286			
HD02-5D-380-S40	○	38	40	48	70	194	292			
HD02-5D-390-S40	○	39	40	48	70	200	298			
HD02-5D-400-S40	●	40	40	48	70	205	304			
HD02-5D-410-S40	○	41	40	48	70	210	310			

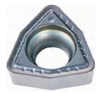
●Standing inventory ○Make-to-order

Indexable short hole drilling insert



Working condition: ● Stable ◕ Average ⌗ Tough

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

Insert shape	Type	Dimension (mm)					CVD			PVD				
		IC	S	RE	D1	AN	HR8115	HR8125	HR8225	HR5110	HR5120	HR5130	HR7125	HR7225
	WCMX030204-DX	5.56	2.38	0.4	2.55	7°	☆				☆	★		
	WCMX030208-DX	5.56	2.38	0.8	2.55	7°	☆				☆	★		
	WCMX040204-DX	6.35	2.38	0.4	2.80	7°	☆				☆	★		
	WCMX040208-DX	6.35	2.38	0.8	2.80	7°	☆				☆	★		
	WCMX050308-DX	7.94	3.18	0.8	3.20	7°	☆				☆	★		
	WCMX06T308-DX	9.525	3.97	0.8	3.70	7°	☆				☆	★		
	WCMX080412-DX	12.70	4.76	1.2	4.30	7°	☆				☆	★		

★ Recommended grade ☆ Available grade

Working condition: ● Stable ◕ Average ⌗ Tough

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

Insert shape	Type	Dimension (mm)					CVD			PVD				
		IC	S	RE	D1	AN	HR8115	HR8125	HR8225	HR5110	HR5120	HR5130	HR7125	HR7225
	SPMG050204-DX	5.00	2.38	0.4	2.25	14°	☆				☆	★		
	SPMG060204-DX	6.00	2.38	0.4	2.61	14°	☆				☆	★		
	SPMG07T308-DX	7.94	3.97	0.8	2.85	15.5°	☆				☆	★		
	SPMG090408-DX	9.80	4.30	0.8	4.05	17.5°	☆				☆	★		
	SPMG110408-DX	11.50	4.80	0.8	4.50	16.5°	☆				☆	★		

★ Recommended grade ☆ Available grade

Recommended cutting parameters for indexable short hole drilling

ISO	Workpiece material			Brinell hardness	Feed rate f_n (mm/r)					
					Cutting speed v_c m/min	Diameter of drill bit (mm)				
						16-20	20-25	25-30	30-35	35-60
P	Unalloyed steel	C≤0.10%		125	70-200	0.04-0.09	0.07-0.11	0.10-0.21	0.18-0.27	0.25-0.35
		0.10<C≤0.25%		125	70-180	0.04-0.09	0.07-0.11	0.10-0.21	0.18-0.27	0.25-0.35
		0.25<C≤0.55%		150	70-150	0.04-0.09	0.07-0.11	0.10-0.21	0.18-0.27	0.25-0.35
		0.55<C≤0.80%		170	70-130	0.04-0.09	0.07-0.11	0.10-0.21	0.18-0.27	0.25-0.35
	High carbon Steel	Carbon tool steel		210	70-130	0.04-0.09	0.07-0.11	0.10-0.21	0.18-0.27	0.25-0.35
	Low-alloyed steel	Unalloyed		180	80-180	0.04-0.08	0.05-0.10	0.08-0.22	0.15-0.28	0.23-0.38
		Quenching and tempering		275	70-150	0.04-0.08	0.05-0.10	0.08-0.22	0.15-0.28	0.23-0.38
		Quenching and tempering		350	70-150	0.04-0.08	0.05-0.10	0.08-0.22	0.15-0.28	0.23-0.38
	High-alloyed steel	Annealing		200	55-110	0.04-0.08	0.05-0.10	0.08-0.22	0.15-0.28	0.23-0.38
		Quenching and tempering		325	55-110	0.04-0.08	0.05-0.10	0.08-0.22	0.15-0.28	0.23-0.38
	Cast steel	Non-alloyed		180	55-110	0.04-0.08	0.05-0.09	0.07-0.20	0.16-0.27	0.22-0.36
		Low alloy (alloy composition < 5%)		200	55-110	0.04-0.08	0.05-0.09	0.07-0.20	0.16-0.27	0.22-0.36
M	Stainless steel	Unquenched/ferrite/martensite		200	80-180	0.04-0.09	0.06-0.11	0.10-0.20	0.17-0.29	0.25-0.38
		Austenite, quenching		200	80-180	0.04-0.09	0.06-0.10	0.10-0.20	0.17-0.29	0.25-0.38
		Austenite, precipitation hardening stainless steel (PH stainless steel)		300	80-180	0.04-0.09	0.06-0.10	0.10-0.20	0.17-0.25	0.21-0.33
		Austenite- ferrite, duplex stainless steel		230	80-180	0.04-0.09	0.06-0.10	0.10-0.20	0.17-0.25	0.21-0.33
K	Malleable cast iron	Ferrite		200	100-200	0.04-0.10	0.10-0.15	0.11-0.22	0.17-0.29	0.25-0.38
		Pearlite		260	100-200	0.04-0.10	0.10-0.15	0.11-0.22	0.17-0.29	0.25-0.38
	Grey cast iron	Low tensile strength		180	120-220	0.04-0.10	0.10-0.15	0.11-0.22	0.17-0.29	0.25-0.38
		High tensile strength/austenite		245	120-220	0.04-0.10	0.10-0.15	0.11-0.22	0.17-0.29	0.25-0.38
	Nodular cast iron	Ferrite		155	100-200	0.04-0.10	0.10-0.15	0.11-0.22	0.17-0.29	0.25-0.38
		Pearlite		265	100-200	0.04-0.10	0.10-0.15	0.11-0.22	0.17-0.29	0.25-0.38
	Compacted graphite iron	GGV (CGI)		230						
N	Wrought aluminum alloy	Non-aging		30	150-300	0.05-0.12	0.09-0.16	0.15-0.23	0.19-0.27	0.21-0.33
		Ageable and aged		100	150-300	0.05-0.12	0.09-0.16	0.15-0.23	0.19-0.27	0.21-0.33
	Foundry aluminum alloy	≤12% silicon, non-aging		75	150-300	0.05-0.12	0.09-0.16	0.15-0.23	0.19-0.27	0.21-0.33
		≤ 12% silicon, ageable and aged		90	150-300	0.05-0.12	0.09-0.16	0.15-0.23	0.19-0.27	0.21-0.33
		> 12% silicon, non-aging		130	150-300	0.05-0.12	0.09-0.16	0.15-0.23	0.19-0.27	0.21-0.33
	Magnesium alloy			70						
	Copper and copper alloy (Bronze/ brass)	Non-alloyed, electrolytic copper		100	150-300	0.05-0.12	0.09-0.16	0.15-0.23	0.19-0.27	0.21-0.33
		Brass, bronze, red brass		90	150-300	0.05-0.12	0.09-0.16	0.15-0.23	0.19-0.27	0.21-0.33
		Copper alloy, short chip		110	150-300	0.05-0.12	0.09-0.16	0.15-0.23	0.19-0.27	0.21-0.33
		Ampco alloy of high strength		300	150-300	0.05-0.12	0.09-0.16	0.15-0.23	0.19-0.27	0.21-0.33
S	Iron-based alloy	Iron-based	Annealing	200	10-55	0.07-0.10	0.09-0.14	0.13-0.20	0.19-0.25	0.23-0.30
			Aged	280	10-55	0.07-0.10	0.09-0.14	0.13-0.20	0.19-0.25	0.23-0.30
		Nickel-based or cobalt-based	Annealing	250	10-55	0.07-0.10	0.09-0.14	0.13-0.20	0.19-0.25	0.23-0.30
			Aged	350	10-55	0.07-0.10	0.09-0.14	0.13-0.20	0.19-0.25	0.23-0.30
			Casting	320	10-55	0.07-0.10	0.09-0.14	0.13-0.20	0.19-0.25	0.23-0.30
	Titanium alloy	Pure titanium		200	30-60	0.07-0.10	0.09-0.14	0.13-0.20	0.19-0.25	0.23-0.30
		α phase alloy		375	30-60	0.07-0.10	0.09-0.14	0.13-0.20	0.19-0.25	0.23-0.30
		α and β phase alloys, aged		375	30-60	0.07-0.10	0.09-0.14	0.13-0.20	0.19-0.25	0.23-0.30
		β phase alloy		410	30-60	0.07-0.10	0.09-0.14	0.13-0.20	0.19-0.25	0.23-0.30

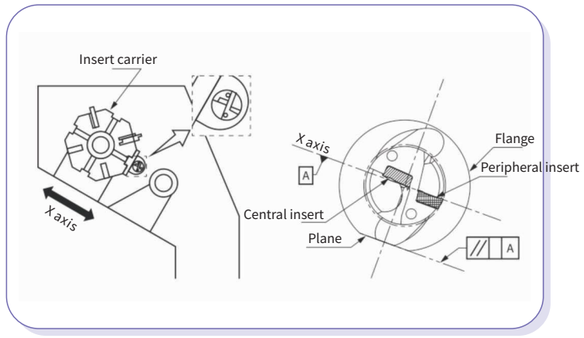
Technical information of indexable short hole drilling tools

Precautions for indexable short hole drilling

1 Precautions for short hole drilling in lathe

I. The peripheral insert is mounted parallel to the X axis of the equipment.

II. The peripheral insert should be mounted towards the operator. With upper and lower turrets on the lathe, if the drill bit needs to be mounted on the lower one, The peripheral insert should face towards the operator.



2 Adjustment method of center height:

The center height of the central insert is about 0.05 mm lower than the center (design state). If the turntable is staggered from the spindle center, the center may be too high or the core may be too low. It is very important to check the center height of the inner insert in order to stabilize the machining.

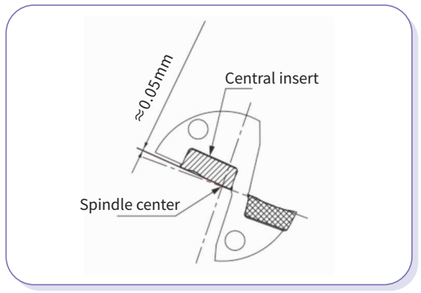


Figure 2
Illustration of center height of the drill bit inner insert

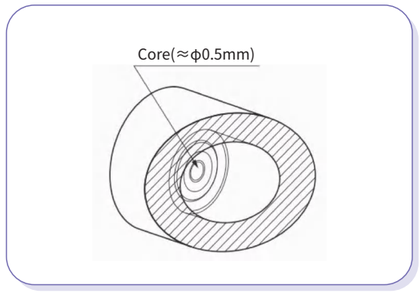


Figure 3
Illustration of core residues in blind hole drilling

Check whether the center height setting of the central insert is proper by the cores remaining in the center of the inner end face of the blind hole. If the diameter of residual cores is about 0.5mm, the center height is correct. If there is no core residue at all or the diameter is over 1mm, the center height needs to be adjusted.

◎The blind holes used for checking is machined by a feed rate below 0.1 mm/rev and a depth of about 10mm.

◎If there is no core residue at all (or it is very small), it is necessary to adjust the center height because the parts around the drill bit center of the inner cutter insert are prone to collapse.

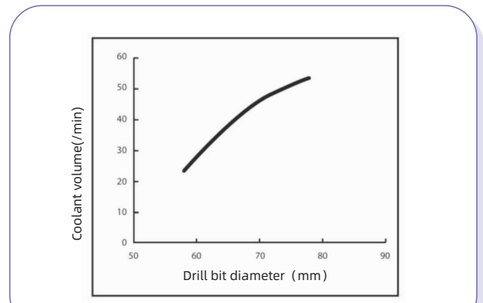
Short hole drilling and recommended countermeasures

1 Countermeasures to drill hole diameter changes

If the hole diameter gradually shrinks or increases toward the bottom, it is often caused by cutting blockage. It is suggested to adjust the cutting parameters, such as increasing cutting speed and reducing feed rate. If the overall hole diameter is too small, it may be caused by plastic deformation of materials. It is recommended to replace a short hole drilling tool with a long one.

2 Can external cooling be used for short hole drilling?

Given the large amount of chips in short hole drilling, external cooling is not recommended considering the machining efficiency. Meanwhile, the cutting pressure of internal cooling should be ensured for longer tool life and better machining performance.



Recommended relationship between drill bit diameter and coolant volume

3 Chip entanglement is highly possible in the cutting process.

When the material to be cut is sticky and the chip is long, the combination of low speed + large feed or high speed + small feed may be used to solve the problem. If chip entanglement is highly possible from the entrance to 10mm while the cutting is stable after 10mm, the entry machining parameters may be adjusted or segmented cutting can be adopted.

At a low speed + large feed, thicker chips are produced, which are easy to break and control.

At a high speed + small feed, thinner chips are produced, and the chip flow direction could be controlled by centrifugal force.

1-10mm can be processed by segment cutting, which can be followed by continuous machining.

4 There is tool vibration in the cutting process.

Tool vibration may be caused by insufficient feed per revolution during the cutting process. The cutting parameters are adjusted as follows:

Increase the feed rate if it is too small.

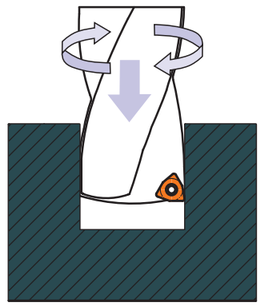
If the feed rate is below f=0.06mm/rev, please increase it to f=0.08-0.12mm/rev.

If the over fast cutting speed causes cutter vibration, decrease to about Vc=100-150m/rev.

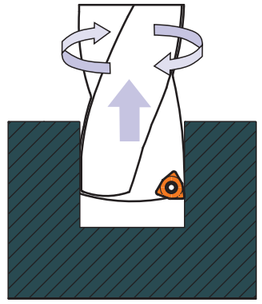
If there are obvious burrs at the drill or the workpiece clamping rigidity is poor, decrease the feed rate to f=0.07-0.08 mm/rev.

5 There are obvious scratches on the surface of the machined hole

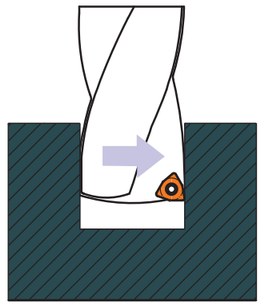
Please change the cutting parameters or optimize the way of returning the insert.



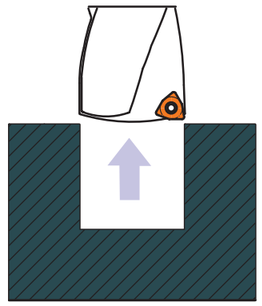
① Rotate to return the insert



② After machining, retract 0.5mm and then return the insert



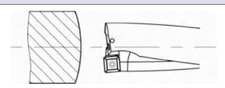
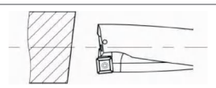
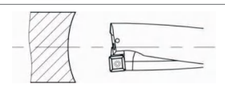
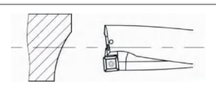
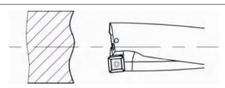
③ Return the insert eccentrically

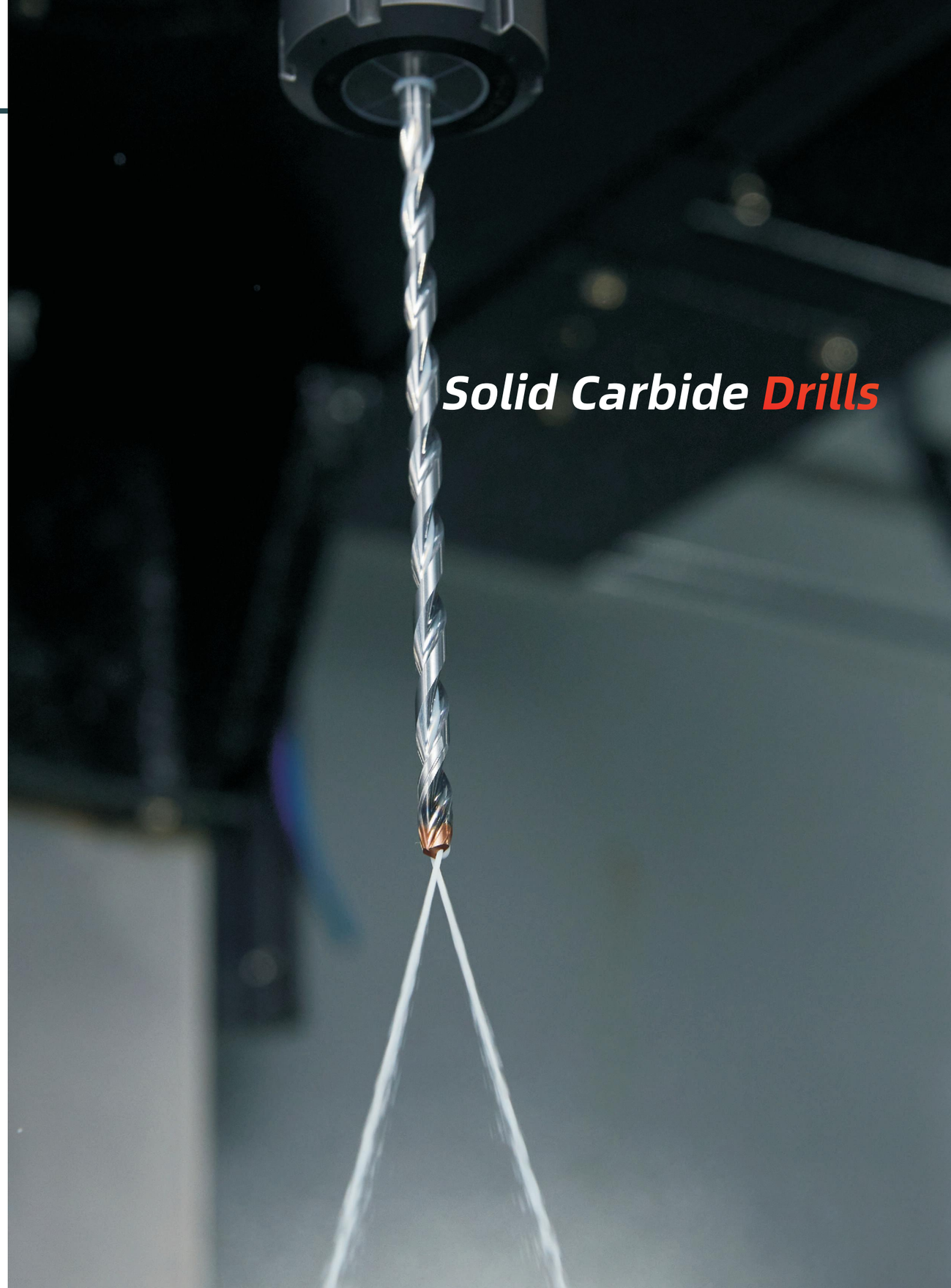


④ Return the insert directly

Drilling means and measures of drill bits

Drilling bit is a key factor for successful drilling. One way to ensure good quality of the hole is to ensure that the drilling surface of the workpiece is perpendicular to the central axis of the drill bit. In addition, the indexable short hole drilling may also be used to process convex, concave, inclined and irregular drilling surfaces by adjusting the feed rate.

Workpiece surface	Solutions
	The normal feed rate can be adopted for convex surface, because its machining conditions are relatively good, and the drilling core can contact the workpiece first as expected.
	The surface of the drilling part is inclined, so the cutting edge is subjected to uneven load, which will cause premature wear of the cutting edge. If the angle of the inclined surface exceeds 2°, decrease the feed rate to 1/3 of the recommended value.
	Usually, the drill bit axis deviates from the center when drilling into a concave surface, for which the feed rate is reduced to 1/3 of the recommended value.
	When drilling an asymmetric curved surface, the drill bit may deviate from the center. So its feed rate should be smaller than that of drilling a concave surface.
	A danger of insert collapse may occur when drilling into irregular surfaces, so the feed rate must be reduced at the beginning of drilling. This may also occur when the drill bit drills through the material, so the feed must also be reduced.



Selection guidance of solid carbide drills

Tool outline drawing

Tool type

BD03 Series



Product specification drawing

Helical angle, coating, insert diameter tolerance, etc.

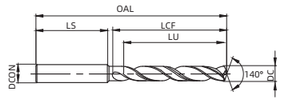


Figure 1

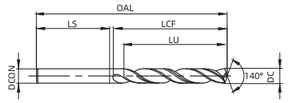


Figure 2



Specs	Dimension (mm)						Pattern	Inventory
	DC	DCON	OAL	LCF	LS	LU		
BD03A1650	16.50	18.00	123	73	48	45.2	Figure 1	●
BD03A1690	16.90	18.00	123	73	48	44.6	Figure 1	○
BD03A1700	17.00	18.00	123	73	48	44.4	Figure 1	●
BD03A1750	17.50	18.00	123	73	48	43.6	Figure 1	●
BD03A1755	17.55	18.00	123	73	48	43.5	Figure 1	○
BD03A1790	17.90	18.00	123	73	48	42.9	Figure 1	○
BD03A1800	18.00	18.00	123	73	48	42.7	Figure 2	●
BD03A1830	18.30	20.00	131	79	50	48.2	Figure 1	○
BD03A1850	18.50	20.00	131	79	50	47.9	Figure 1	●
BD03A1890	18.90	20.00	131	79	50	47.2	Figure 1	○
BD03A1900	19.00	20.00	131	79	50	47.0	Figure 1	●
BD03A1930	19.30	20.00	131	79	50	46.5	Figure 1	○
BD03A1950	19.50	20.00	131	79	50	46.2	Figure 1	●
BD03A1955	19.55	20.00	131	79	50	46.1	Figure 1	○
BD03A1990	19.90	20.00	131	79	50	45.5	Figure 1	○
BD03A2000	20.00	20.00	131	79	50	45.4	Figure 2	●

●Standing inventory ○Make-to-order

Product order number

Basic dimension

Pattern

Inventory

P			M	K	N		S		H		
Carbon steel	Alloy steel	High-alloyed steel	Stainless steel	Cast iron	Non-ferrous alloy	Aluminum alloy	High-temp alloy	Titanium alloy	<54HRC	54—60HRC	≥60HRC

✹ Fit well ⁂ Applicable

Range of workpiece materials

Code key of solid carbide drilling tools

BD	03	C	A	1000
①	②	③	④	⑤

① Product series	
BD	Economical
XD	Deep hole type

② Length series (length-diameter ratio)	
03	3×D Series
05	5×D Series
08	8×D Series
12	12×D Series
20	20×D Series
30	30×D Series

③ Cooling method	
C	Internal cooling
Default	External cooling

④ Shank form	
A	Straight shank (DIN 6535HA)
B	Whistle notch shank (DIN 6535HE)

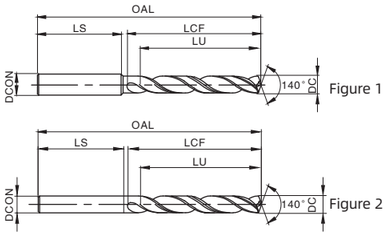
⑤ Diameter	
0300	3mm
0600	6mm
1000	10mm
1200	12mm
1600	16mm
2000	20mm



Solid carbide drill

BD03 Series





BD Series | 3×D | m7 | 140° | h6

Specs	Dimension (mm)						Pattern	Inventory
	DC	DCON	OAL	LCF	LS	LU		
BD03A0300	3.00	6.00	62	20	36	15.0	Figure 1	●
BD03A0310	3.10	6.00	62	20	36	14.8	Figure 1	●
BD03A0317	3.17	6.00	62	20	36	14.7	Figure 1	○
BD03A0320	3.20	6.00	62	20	36	14.6	Figure 1	●
BD03A0325	3.25	6.00	62	20	36	14.5	Figure 1	○
BD03A0330	3.30	6.00	62	20	36	14.4	Figure 1	●
BD03A0340	3.40	6.00	62	20	36	14.3	Figure 1	●
BD03A0350	3.50	6.00	62	20	36	14.1	Figure 1	●
BD03A0357	3.57	6.00	62	20	36	14.0	Figure 1	○
BD03A0360	3.60	6.00	62	20	36	13.9	Figure 1	●
BD03A0370	3.70	6.00	62	20	36	13.8	Figure 1	●
BD03A0380	3.80	6.00	66	24	36	17.6	Figure 1	●
BD03A0390	3.90	6.00	66	24	36	17.4	Figure 1	●
BD03A0397	3.97	6.00	66	24	36	17.3	Figure 1	○
BD03A0400	4.00	6.00	66	24	36	17.3	Figure 1	●
BD03A0410	4.10	6.00	66	24	36	17.1	Figure 1	●
BD03A0420	4.20	6.00	66	24	36	16.9	Figure 1	●
BD03A0430	4.30	6.00	66	24	36	16.8	Figure 1	●
BD03A0437	4.37	6.00	66	24	36	16.6	Figure 1	○
BD03A0440	4.40	6.00	66	24	36	16.6	Figure 1	●
BD03A0445	4.45	6.00	66	24	36	16.5	Figure 1	○
BD03A0450	4.50	6.00	66	24	36	16.4	Figure 1	●
BD03A0460	4.60	6.00	66	24	36	16.3	Figure 1	●
BD03A0465	4.65	6.00	66	24	36	16.2	Figure 1	○
BD03A0470	4.70	6.00	66	24	36	16.1	Figure 1	●
BD03A0476	4.76	6.00	66	28	36	20.0	Figure 1	○
BD03A0480	4.80	6.00	66	28	36	19.9	Figure 1	●
BD03A0490	4.90	6.00	66	28	36	19.8	Figure 1	●

●Standing inventory ○Make-to-order

BD03 Series

Specs	Dimension (mm)						Pattern	Inventory
	DC	DCON	OAL	LCF	LS	LU		
BD03A0500	5.00	6.00	66	28	36	19.6	Figure 1	●
BD03A0510	5.10	6.00	66	28	36	19.4	Figure 1	●
BD03A0516	5.16	6.00	66	28	36	19.3	Figure 1	○
BD03A0520	5.20	6.00	66	28	36	19.3	Figure 1	●
BD03A0530	5.30	6.00	66	28	36	19.1	Figure 1	●
BD03A0540	5.40	6.00	66	28	36	18.9	Figure 1	●
BD03A0550	5.50	6.00	66	28	36	18.7	Figure 1	●
BD03A0555	5.55	6.00	66	28	36	18.7	Figure 1	○
BD03A0556	5.56	6.00	66	28	36	18.6	Figure 1	●
BD03A0560	5.60	6.00	66	28	36	18.6	Figure 1	●
BD03A0565	5.65	6.00	66	28	36	18.5	Figure 1	●
BD03A0570	5.70	6.00	66	28	36	18.4	Figure 1	●
BD03A0575	5.75	6.00	66	28	36	18.3	Figure 1	○
BD03A0580	5.80	6.00	66	28	36	18.2	Figure 1	●
BD03A0590	5.90	6.00	66	28	36	18.1	Figure 1	●
BD03A0595	5.95	6.00	66	28	36	18.0	Figure 1	○
BD03A0600	6.00	6.00	66	28	36	17.9	Figure 2	●
BD03A0610	6.10	8.00	79	34	36	23.7	Figure 1	●
BD03A0620	6.20	8.00	79	34	36	23.6	Figure 1	●
BD03A0630	6.30	8.00	79	34	36	23.4	Figure 1	●
BD03A0635	6.35	8.00	79	34	36	23.3	Figure 1	○
BD03A0640	6.40	8.00	79	34	36	23.2	Figure 1	●
BD03A0650	6.50	8.00	79	34	36	23.1	Figure 1	●
BD03A0660	6.60	8.00	79	34	36	22.9	Figure 1	●
BD03A0670	6.70	8.00	79	34	36	22.7	Figure 1	●
BD03A0675	6.75	8.00	79	34	36	22.6	Figure 1	○
BD03A0680	6.80	8.00	79	34	36	22.6	Figure 1	●
BD03A0690	6.90	8.00	79	34	36	22.4	Figure 1	●
BD03A0700	7.00	8.00	79	34	36	22.2	Figure 1	●

●Standing inventory ○Make-to-order

P			M	K	N		S		H		
Carbon steel	Alloy steel	High-alloyed steel	Stainless steel	Cast iron	Non-ferrous alloy	Aluminum alloy	High-temp alloy	Titanium alloy	<54HRC	54—60HRC	≥60HRC
☀	☀	☀	☀	☼			☼	☼			

☀ Fit well ☼ Applicable

BD03 Series



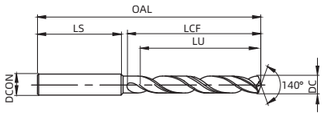


Figure 1

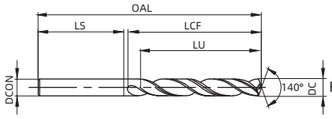


Figure 2

BD Series | 3×D | m7 | 140° | h6

Specs	Dimension (mm)						Pattern	Inventory
	DC	DCON	OAL	LCF	LS	LU		
BD03A0710	7.10	8.00	79	41	36	29.1	Figure 1	●
BD03A0714	7.14	8.00	79	41	36	29.0	Figure 1	○
BD03A0720	7.20	8.00	79	41	36	28.9	Figure 1	●
BD03A0730	7.30	8.00	79	41	36	28.7	Figure 1	●
BD03A0740	7.40	8.00	79	41	36	28.6	Figure 1	●
BD03A0745	7.45	8.00	79	41	36	28.5	Figure 1	○
BD03A0750	7.50	8.00	79	41	36	28.4	Figure 1	●
BD03A0754	7.54	8.00	79	41	36	28.3	Figure 1	○
BD03A0760	7.60	8.00	79	41	36	28.2	Figure 1	●
BD03A0765	7.65	8.00	79	41	36	28.1	Figure 1	○
BD03A0770	7.70	8.00	79	41	36	28.0	Figure 1	●
BD03A0780	7.80	8.00	79	41	36	27.9	Figure 1	●
BD03A0790	7.90	8.00	79	41	36	27.7	Figure 1	●
BD03A0794	7.94	8.00	79	41	36	27.6	Figure 1	○
BD03A0800	8.00	8.00	79	41	36	27.5	Figure 2	●
BD03A0810	8.10	10.00	89	47	40	33.4	Figure 1	●
BD03A0820	8.20	10.00	89	47	40	33.2	Figure 1	●
BD03A0830	8.30	10.00	89	47	40	33.0	Figure 1	●
BD03A0833	8.33	10.00	89	47	40	33.0	Figure 1	○
BD03A0840	8.40	10.00	89	47	40	32.9	Figure 1	●
BD03A0850	8.50	10.00	89	47	40	32.7	Figure 1	●
BD03A0855	8.55	10.00	89	47	40	32.6	Figure 1	○
BD03A0860	8.60	10.00	89	47	40	32.5	Figure 1	●
BD03A0870	8.70	10.00	89	47	40	32.4	Figure 1	●
BD03A0873	8.73	10.00	89	47	40	32.3	Figure 1	○
BD03A0880	8.80	10.00	89	47	40	32.2	Figure 1	●
BD03A0890	8.90	10.00	89	47	40	32.0	Figure 1	●
BD03A0900	9.00	10.00	89	47	40	31.9	Figure 1	●

●Standing inventory ○Make-to-order

BD03 Series

Specs	Dimension (mm)						Pattern	Inventory
	DC	DCON	OAL	LCF	LS	LU		
BD03A0905	9.05	10.00	89	47	40	31.8	Figure 1	○
BD03A0910	9.10	10.00	89	47	40	31.7	Figure 1	●
BD03A0913	9.13	10.00	89	47	40	31.6	Figure 1	○
BD03A0920	9.20	10.00	89	47	40	31.5	Figure 1	●
BD03A0925	9.25	10.00	89	47	40	31.4	Figure 1	○
BD03A0930	9.30	10.00	89	47	40	31.4	Figure 1	●
BD03A0940	9.40	10.00	89	47	40	31.2	Figure 1	●
BD03A0950	9.50	10.00	89	47	40	31.0	Figure 1	●
BD03A0952	9.52	10.00	89	47	40	31.0	Figure 1	○
BD03A0955	9.55	10.00	89	47	40	30.9	Figure 1	○
BD03A0960	9.60	10.00	89	47	40	30.9	Figure 1	●
BD03A0970	9.70	10.00	89	47	40	30.7	Figure 1	●
BD03A0980	9.80	10.00	89	47	40	30.5	Figure 1	●
BD03A0990	9.90	10.00	89	47	40	30.3	Figure 1	●
BD03A0992	9.92	10.00	89	47	40	30.3	Figure 1	○
BD03A1000	10.00	10.00	89	47	40	30.2	Figure 2	●
BD03A1010	10.10	12.00	102	55	45	38.0	Figure 1	●
BD03A1020	10.20	12.00	102	55	45	37.8	Figure 1	●
BD03A1030	10.30	12.00	102	55	45	37.7	Figure 1	●
BD03A1032	10.32	12.00	102	55	45	37.6	Figure 1	○
BD03A1040	10.40	12.00	102	55	45	37.5	Figure 1	●
BD03A1050	10.50	12.00	102	55	45	37.3	Figure 1	●
BD03A1060	10.60	12.00	102	55	45	37.2	Figure 1	●
BD03A1070	10.70	12.00	102	55	45	37.0	Figure 1	●
BD03A1072	10.72	12.00	102	55	45	37.0	Figure 1	○
BD03A1080	10.80	12.00	102	55	45	36.8	Figure 1	●
BD03A1090	10.90	12.00	102	55	45	36.7	Figure 1	●
BD03A1100	11.00	12.00	102	55	45	36.5	Figure 1	●
BD03A1110	11.10	12.00	102	55	45	36.3	Figure 1	●

●Standing inventory ○Make-to-order

P			M	K	N		S		H		
Carbon steel	Alloy steel	High-alloyed steel	Stainless steel	Cast iron	Non-ferrous alloy	Aluminum alloy	High-temp alloy	Titanium alloy	<54HRC	54—60HRC	≥60HRC
☀	☀	☀	☀	☼			☼	☼			

☀ Fit well ☼ Applicable

BD03 Series



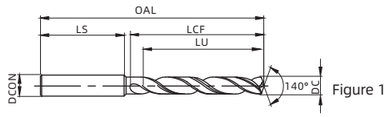


Figure 1

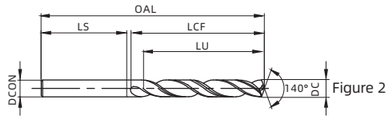


Figure 2

BD Series | 3×D | m7 | 140° | h6

Specs	Dimension (mm)						Pattern	Inventory
	DC	DCON	OAL	LCF	LS	LU		
BD03A1111	11.11	12.00	102	55	45	36.3	Figure 1	●
BD03A1120	11.20	12.00	102	55	45	36.2	Figure 1	●
BD03A1130	11.30	12.00	102	55	45	36.0	Figure 1	●
BD03A1140	11.40	12.00	102	55	45	35.8	Figure 1	●
BD03A1150	11.50	12.00	102	55	45	35.7	Figure 1	●
BD03A1151	11.51	12.00	102	55	45	35.6	Figure 1	○
BD03A1155	11.55	12.00	102	55	45	35.6	Figure 1	○
BD03A1160	11.60	12.00	102	55	45	35.5	Figure 1	●
BD03A1170	11.70	12.00	102	55	45	35.3	Figure 1	●
BD03A1180	11.80	12.00	102	55	45	35.2	Figure 1	●
BD03A1190	11.90	12.00	102	55	45	35.0	Figure 1	●
BD03A1191	11.91	12.00	102	55	45	35.0	Figure 1	○
BD03A1200	12.00	12.00	102	55	45	34.8	Figure 2	●
BD03A1210	12.10	14.00	107	60	45	39.6	Figure 1	○
BD03A1220	12.20	14.00	107	60	45	39.5	Figure 1	○
BD03A1230	12.30	14.00	107	60	45	39.3	Figure 1	○
BD03A1240	12.40	14.00	107	60	45	39.1	Figure 1	○
BD03A1250	12.50	14.00	107	60	45	39.0	Figure 1	●
BD03A1260	12.60	14.00	107	60	45	38.8	Figure 1	○
BD03A1270	12.70	14.00	107	60	45	38.6	Figure 1	○
BD03A1280	12.80	14.00	107	60	45	38.5	Figure 1	○
BD03A1290	12.90	14.00	107	60	45	38.3	Figure 1	○
BD03A1300	13.00	14.00	107	60	45	38.1	Figure 1	●
BD03A1310	13.10	14.00	107	60	45	38.0	Figure 1	○
BD03A1320	13.20	14.00	107	60	45	37.8	Figure 1	○
BD03A1330	13.30	14.00	107	60	45	37.6	Figure 1	○
BD03A1340	13.40	14.00	107	60	45	37.5	Figure 1	○
BD03A1350	13.50	14.00	107	60	45	37.3	Figure 1	●

●Standing inventory ○Make-to-order

BD03 Series

Specs	Dimension (mm)						Pattern	Inventory
	DC	DCON	OAL	LCF	LS	LU		
BD03A1355	13.55	14.00	107	60	45	37.2	Figure 1	○
BD03A1360	13.60	14.00	107	60	45	37.1	Figure 1	○
BD03A1370	13.70	14.00	107	60	45	37.0	Figure 1	○
BD03A1380	13.80	14.00	107	60	45	36.8	Figure 1	○
BD03A1390	13.90	14.00	107	60	45	36.6	Figure 1	○
BD03A1400	14.00	14.00	107	60	45	36.5	Figure 2	●
BD03A1410	14.10	16.00	115	65	48	41.3	Figure 1	○
BD03A1420	14.20	16.00	115	65	48	41.1	Figure 1	○
BD03A1429	14.29	16.00	115	65	48	41.0	Figure 1	○
BD03A1430	14.30	16.00	115	65	48	40.9	Figure 1	○
BD03A1440	14.40	16.00	115	65	48	40.8	Figure 1	○
BD03A1450	14.50	16.00	115	65	48	40.6	Figure 1	●
BD03A1460	14.60	16.00	115	65	48	40.4	Figure 1	○
BD03A1470	14.70	16.00	115	65	48	40.3	Figure 1	○
BD03A1480	14.80	16.00	115	65	48	40.1	Figure 1	○
BD03A1490	14.90	16.00	115	65	48	39.9	Figure 1	○
BD03A1500	15.00	16.00	115	65	48	39.8	Figure 1	●
BD03A1510	15.10	16.00	115	65	48	39.6	Figure 1	○
BD03A1520	15.20	16.00	115	65	48	39.4	Figure 1	○
BD03A1530	15.30	16.00	115	65	48	39.3	Figure 1	○
BD03A1540	15.40	16.00	115	65	48	39.1	Figure 1	○
BD03A1550	15.50	16.00	115	65	48	38.9	Figure 1	●
BD03A1555	15.55	16.00	115	65	48	38.8	Figure 1	○
BD03A1560	15.60	16.00	115	65	48	38.8	Figure 1	○
BD03A1570	15.70	16.00	115	65	48	38.6	Figure 1	○
BD03A1580	15.80	16.00	115	65	48	38.4	Figure 1	○
BD03A1587	15.87	16.00	115	65	48	38.3	Figure 1	○
BD03A1590	15.90	16.00	115	65	48	38.3	Figure 1	○
BD03A1600	16.00	16.00	115	65	48	38.1	Figure 2	●

●Standing inventory ○Make-to-order

P			M	K	N		S		H		
Carbon steel	Alloy steel	High-alloyed steel	Stainless steel	Cast iron	Non-ferrous alloy	Aluminum alloy	High-temp alloy	Titanium alloy	<54HRC	54—60HRC	≥60HRC
☀	☀	☀	☀	☼			☼	☼			

☀ Fit well ☼ Applicable

BD03 Series



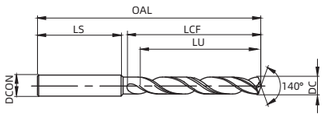


Figure 1

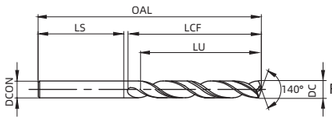


Figure 2



Specs	Dimension (mm)						Pattern	Inventory
	DC	DCON	OAL	LCF	LS	LU		
BD03A1650	16.50	18.00	123	73	48	45.2	Figure 1	●
BD03A1690	16.90	18.00	123	73	48	44.6	Figure 1	○
BD03A1700	17.00	18.00	123	73	48	44.4	Figure 1	●
BD03A1750	17.50	18.00	123	73	48	43.6	Figure 1	●
BD03A1755	17.55	18.00	123	73	48	43.5	Figure 1	○
BD03A1790	17.90	18.00	123	73	48	42.9	Figure 1	○
BD03A1800	18.00	18.00	123	73	48	42.7	Figure 2	●
BD03A1830	18.30	20.00	131	79	50	48.2	Figure 1	○
BD03A1850	18.50	20.00	131	79	50	47.9	Figure 1	●
BD03A1890	18.90	20.00	131	79	50	47.2	Figure 1	○
BD03A1900	19.00	20.00	131	79	50	47.0	Figure 1	●
BD03A1930	19.30	20.00	131	79	50	46.5	Figure 1	○
BD03A1950	19.50	20.00	131	79	50	46.2	Figure 1	●
BD03A1955	19.55	20.00	131	79	50	46.1	Figure 1	○
BD03A1990	19.90	20.00	131	79	50	45.5	Figure 1	○
BD03A2000	20.00	20.00	131	79	50	45.4	Figure 2	●

●Standing inventory ○Make-to-order

P			M	K	N		S		H		
Carbon steel	Alloy steel	High-alloyed steel	Stainless steel	Cast iron	Non-ferrous alloy	Aluminum alloy	High-temp alloy	Titanium alloy	<54HRC	54—60HRC	≥60HRC
✹	✹	✹	✹	✲			✲	✲			

✹ Fit well ✲ Applicable

Cutting speed recommendations - BD03 Series

Workpiece material		Strength (N/mm^2)	Hardness (HB/HRC)	Cutting speed (m/min)		
				Minimum /min	Optimal /opt	Maximum /max
P	Carbon steel	< 600	< 230	80	90	100
	Alloy steel	< 1200	< 350	60	70	80
	High-alloyed steel and tool steel	< 1400	< 380	50	60	70
M	Austenite and ferrite stainless steel	< 680	<220	30	40	50
	Martensite stainless steel	< 820	< 240	30	40	50
K	Gray cast iron	-	< 280	160	180	200
	Nodular cast iron	-	< 320	120	140	160
N	Non-ferrous alloy	< 250	< 110	-	-	-
	Aluminum alloy	< 530	< 130	-	-	-
S	Iron-based, nickel-based and cobalt-based high-temp alloy	< 3300	< 350	15	25	35
	Titanium alloy	<2100	< 400	20	30	40
H	High hardness steel	-	< 54HRC	-	-	-
	High hardness steel	-	52-60HRC	-	-	-
	High hardness steel	-	> 60 HRC	-	-	-

Recommended feed rate - BD03 Series

Feed per revolution f_n(mm/r)											
Workpiece material		Φ2~ Φ2.5	Φ2.5 ~Φ3	Φ3 ~Φ4	Φ4 ~Φ5	Φ5 ~Φ6	Φ6 ~Φ8	Φ8 ~Φ10	Φ10 ~Φ12	Φ12 ~Φ16	Φ16 ~Φ20
P	Carbon steel	0.100	0.125	0.160	0.160	0.200	0.250	0.315	0.315	0.400	0.500
	Alloy steel	0.080	0.100	0.125	0.125	0.160	0.200	0.250	0.250	0.315	0.400
	High-alloyed steel and tool steel	0.063	0.080	0.100	0.100	0.125	0.160	0.200	0.200	0.250	0.315
M	Austenite and ferrite stainless steel	0.050	0.063	0.080	0.080	0.100	0.125	0.160	0.160	0.200	0.250
	Martensite stainless steel	0.040	0.050	0.063	0.063	0.080	0.100	0.125	0.125	0.160	0.200
K	Gray cast iron	0.160	0.160	0.200	0.250	0.315	0.315	0.400	0.500	0.630	0.630
	Nodular cast iron	0.125	0.160	0.200	0.200	0.250	0.315	0.400	0.400	0.500	0.630
N	Non-ferrous alloy	-	-	-	-	-	-	-	-	-	-
	Aluminum alloy	-	-	-	-	-	-	-	-	-	-
S	Iron-based, nickel-based and cobalt-based high-temp alloy	0.050	0.063	0.080	0.080	0.080	0.125	0.160	0.160	0.200	0.250
	Titanium alloy	0.040	0.050	0.063	0.063	0.080	0.100	0.125	0.125	0.160	0.200
H	High hardness steel	-	-	-	-	-	-	-	-	-	-
	High hardness steel	-	-	-	-	-	-	-	-	-	-
	High hardness steel	-	-	-	-	-	-	-	-	-	-

Solid carbide drill

BD03C Series



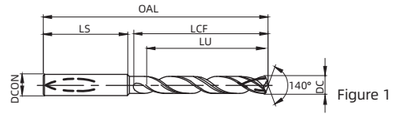


Figure 1

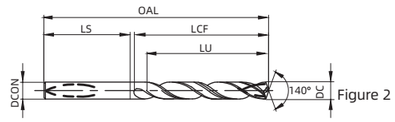


Figure 2

BD Series | 3×D | m7 | 140° | h6

Specs	Dimension (mm)						Pattern	Inventory
	DC	DCON	OAL	LCF	LS	LU		
BD03CA0300	3.00	6.00	62	20	36	15.0	Figure 1	●
BD03CA0310	3.10	6.00	62	20	36	14.8	Figure 1	●
BD03CA0317	3.17	6.00	62	20	36	14.7	Figure 1	○
BD03CA0320	3.20	6.00	62	20	36	14.6	Figure 1	●
BD03CA0325	3.25	6.00	62	20	36	14.5	Figure 1	○
BD03CA0330	3.30	6.00	62	20	36	14.4	Figure 1	●
BD03CA0340	3.40	6.00	62	20	36	14.3	Figure 1	●
BD03CA0350	3.50	6.00	62	20	36	14.1	Figure 1	●
BD03CA0357	3.57	6.00	62	20	36	14.0	Figure 1	○
BD03CA0360	3.60	6.00	62	20	36	13.9	Figure 1	●
BD03CA0370	3.70	6.00	62	20	36	13.8	Figure 1	●
BD03CA0380	3.80	6.00	66	24	36	17.6	Figure 1	●
BD03CA0390	3.90	6.00	66	24	36	17.4	Figure 1	●
BD03CA0397	3.97	6.00	66	24	36	17.3	Figure 1	○
BD03CA0400	4.00	6.00	66	24	36	17.3	Figure 1	●
BD03CA0410	4.10	6.00	66	24	36	17.1	Figure 1	●
BD03CA0420	4.20	6.00	66	24	36	16.9	Figure 1	●
BD03CA0430	4.30	6.00	66	24	36	16.8	Figure 1	●
BD03CA0437	4.37	6.00	66	24	36	16.6	Figure 1	○
BD03CA0440	4.40	6.00	66	24	36	16.6	Figure 1	●
BD03CA0445	4.45	6.00	66	24	36	16.5	Figure 1	○
BD03CA0450	4.50	6.00	66	24	36	16.4	Figure 1	●
BD03CA0460	4.60	6.00	66	24	36	16.3	Figure 1	●
BD03CA0465	4.65	6.00	66	24	36	16.2	Figure 1	○
BD03CA0470	4.70	6.00	66	24	36	16.1	Figure 1	●
BD03CA0476	4.76	6.00	66	28	36	20.0	Figure 1	○
BD03CA0480	4.80	6.00	66	28	36	19.9	Figure 1	●
BD03CA0490	4.90	6.00	66	28	36	19.8	Figure 1	●

●Standing inventory ○Make-to-order

BD03C Series

Specs	Dimension (mm)						Pattern	Inventory
	DC	DCON	OAL	LCF	LS	LU		
BD03CA0500	5.00	6.00	66	28	36	19.6	Figure 1	●
BD03CA0510	5.10	6.00	66	28	36	19.4	Figure 1	●
BD03CA0516	5.16	6.00	66	28	36	19.3	Figure 1	○
BD03CA0520	5.20	6.00	66	28	36	19.3	Figure 1	●
BD03CA0530	5.30	6.00	66	28	36	19.1	Figure 1	●
BD03CA0540	5.40	6.00	66	28	36	18.9	Figure 1	●
BD03CA0550	5.50	6.00	66	28	36	18.7	Figure 1	●
BD03CA0555	5.55	6.00	66	28	36	18.7	Figure 1	○
BD03CA0556	5.56	6.00	66	28	36	18.6	Figure 1	●
BD03CA0560	5.60	6.00	66	28	36	18.6	Figure 1	●
BD03CA0565	5.65	6.00	66	28	36	18.5	Figure 1	●
BD03CA0570	5.70	6.00	66	28	36	18.4	Figure 1	●
BD03CA0575	5.75	6.00	66	28	36	18.3	Figure 1	○
BD03CA0580	5.80	6.00	66	28	36	18.2	Figure 1	●
BD03CA0590	5.90	6.00	66	28	36	18.1	Figure 1	●
BD03CA0595	5.95	6.00	66	28	36	18.0	Figure 2	○
BD03CA0600	6.00	6.00	66	28	36	17.9	Figure 1	●
BD03CA0610	6.10	8.00	79	34	36	23.7	Figure 1	●
BD03CA0620	6.20	8.00	79	34	36	23.6	Figure 1	●
BD03CA0630	6.30	8.00	79	34	36	23.4	Figure 1	●
BD03CA0635	6.35	8.00	79	34	36	23.3	Figure 1	○
BD03CA0640	6.40	8.00	79	34	36	23.2	Figure 1	●
BD03CA0650	6.50	8.00	79	34	36	23.1	Figure 1	●
BD03CA0660	6.60	8.00	79	34	36	22.9	Figure 1	●
BD03CA0670	6.70	8.00	79	34	36	22.7	Figure 1	●
BD03CA0675	6.75	8.00	79	34	36	22.6	Figure 1	○
BD03CA0680	6.80	8.00	79	34	36	22.6	Figure 1	●
BD03CA0690	6.90	8.00	79	34	36	22.4	Figure 1	●
BD03CA0700	7.00	8.00	79	34	36	22.2	Figure 1	●

●Standing inventory ○Make-to-order

P			M	K	N		S		H		
Carbon steel	Alloy steel	High-alloyed steel	Stainless steel	Cast iron	Non-ferrous alloy	Aluminum alloy	High-temp alloy	Titanium alloy	<54HRC	54—60HRC	≥60HRC
☀	☀	☀	☀	☼			☼	☼			

☀ Fit well ☼ Applicable

BD03C Series



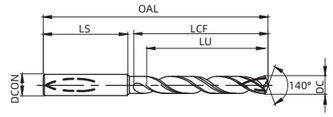


Figure 1

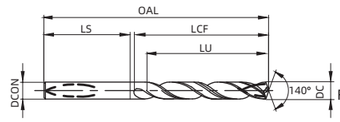


Figure 2

BD Series | 3×D | m7 | 140° | h6

Specs	Dimension (mm)						Pattern	Inventory
	DC	DCON	OAL	LCF	LS	LU		
BD03CA0710	7.10	8.00	79	41	36	29.1	Figure 1	●
BD03CA0714	7.14	8.00	79	41	36	29.0	Figure 1	○
BD03CA0720	7.20	8.00	79	41	36	28.9	Figure 1	●
BD03CA0730	7.30	8.00	79	41	36	28.7	Figure 1	●
BD03CA0740	7.40	8.00	79	41	36	28.6	Figure 1	●
BD03CA0745	7.45	8.00	79	41	36	28.5	Figure 1	○
BD03CA0750	7.50	8.00	79	41	36	28.4	Figure 1	●
BD03CA0754	7.54	8.00	79	41	36	28.3	Figure 1	○
BD03CA0760	7.60	8.00	79	41	36	28.2	Figure 1	●
BD03CA0765	7.65	8.00	79	41	36	28.1	Figure 1	○
BD03CA0770	7.70	8.00	79	41	36	28.0	Figure 1	●
BD03CA0780	7.80	8.00	79	41	36	27.9	Figure 1	●
BD03CA0790	7.90	8.00	79	41	36	27.7	Figure 1	●
BD03CA0794	7.94	8.00	79	41	36	27.6	Figure 1	○
BD03CA0800	8.00	8.00	79	41	36	27.5	Figure 2	●
BD03CA0810	8.10	10.00	89	47	40	33.4	Figure 1	●
BD03CA0820	8.20	10.00	89	47	40	33.2	Figure 1	●
BD03CA0830	8.30	10.00	89	47	40	33.0	Figure 1	●
BD03CA0833	8.33	10.00	89	47	40	33.0	Figure 1	○
BD03CA0840	8.40	10.00	89	47	40	32.9	Figure 1	●
BD03CA0850	8.50	10.00	89	47	40	32.7	Figure 1	●
BD03CA0855	8.55	10.00	89	47	40	32.6	Figure 1	○
BD03CA0860	8.60	10.00	89	47	40	32.5	Figure 1	●
BD03CA0870	8.70	10.00	89	47	40	32.4	Figure 1	●
BD03CA0873	8.73	10.00	89	47	40	32.3	Figure 1	○
BD03CA0880	8.80	10.00	89	47	40	32.2	Figure 1	●
BD03CA0890	8.90	10.00	89	47	40	32.0	Figure 1	●
BD03CA0900	9.00	10.00	89	47	40	31.9	Figure 1	●

●Standing inventory ○Make-to-order

BD03C Series

Specs	Dimension (mm)						Pattern	Inventory
	DC	DCON	OAL	LCF	LS	LU		
BD03CA0905	9.05	10.00	89	47	40	31.8	Figure 1	○
BD03CA0910	9.10	10.00	89	47	40	31.7	Figure 1	●
BD03CA0913	9.13	10.00	89	47	40	31.6	Figure 1	○
BD03CA0920	9.20	10.00	89	47	40	31.5	Figure 1	●
BD03CA0925	9.25	10.00	89	47	40	31.4	Figure 1	○
BD03CA0930	9.30	10.00	89	47	40	31.4	Figure 1	●
BD03CA0940	9.40	10.00	89	47	40	31.2	Figure 1	●
BD03CA0950	9.50	10.00	89	47	40	31.0	Figure 1	●
BD03CA0952	9.52	10.00	89	47	40	31.0	Figure 1	○
BD03CA0955	9.55	10.00	89	47	40	30.9	Figure 1	○
BD03CA0960	9.60	10.00	89	47	40	30.9	Figure 1	●
BD03CA0970	9.70	10.00	89	47	40	30.7	Figure 1	●
BD03CA0980	9.80	10.00	89	47	40	30.5	Figure 1	●
BD03CA0990	9.90	10.00	89	47	40	30.3	Figure 1	●
BD03CA0992	9.92	10.00	89	47	40	30.3	Figure 1	○
BD03CA1000	10.00	10.00	89	47	40	30.2	Figure 2	●
BD03CA1010	10.10	12.00	102	55	45	38.0	Figure 1	●
BD03CA1020	10.20	12.00	102	55	45	37.8	Figure 1	●
BD03CA1030	10.30	12.00	102	55	45	37.7	Figure 1	●
BD03CA1032	10.32	12.00	102	55	45	37.6	Figure 1	○
BD03CA1040	10.40	12.00	102	55	45	37.5	Figure 1	●
BD03CA1050	10.50	12.00	102	55	45	37.3	Figure 1	●
BD03CA1060	10.60	12.00	102	55	45	37.2	Figure 1	●
BD03CA1070	10.70	12.00	102	55	45	37.0	Figure 1	●
BD03CA1072	10.72	12.00	102	55	45	37.0	Figure 1	○
BD03CA1080	10.80	12.00	102	55	45	36.8	Figure 1	●
BD03CA1090	10.90	12.00	102	55	45	36.7	Figure 1	●
BD03CA1100	11.00	12.00	102	55	45	36.5	Figure 1	●
BD03CA1110	11.10	12.00	102	55	45	36.3	Figure 1	●

●Standing inventory ○Make-to-order

P			M	K	N		S		H		
Carbon steel	Alloy steel	High-alloyed steel	Stainless steel	Cast iron	Non-ferrous alloy	Aluminum alloy	High-temp alloy	Titanium alloy	<54HRC	54—60HRC	≥60HRC
☀	☀	☀	☀	☼			☼	☼			

☀ Fit well ☼ Applicable

BD03C Series



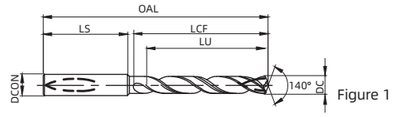


Figure 1

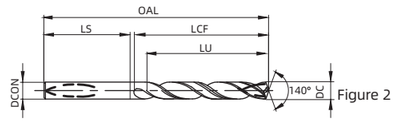


Figure 2

BD Series | 3×D | m7 | 140° | h6

Specs	Dimension (mm)						Pattern	Inventory
	DC	DCON	OAL	LCF	LS	LU		
BD03CA1111	11.11	12.00	102	55	45	36.3	Figure 1	●
BD03CA1120	11.20	12.00	102	55	45	36.2	Figure 1	●
BD03CA1130	11.30	12.00	102	55	45	36.0	Figure 1	●
BD03CA1140	11.40	12.00	102	55	45	35.8	Figure 1	●
BD03CA1150	11.50	12.00	102	55	45	35.7	Figure 1	●
BD03CA1151	11.51	12.00	102	55	45	35.6	Figure 1	○
BD03CA1155	11.55	12.00	102	55	45	35.6	Figure 1	○
BD03CA1160	11.60	12.00	102	55	45	35.5	Figure 1	●
BD03CA1170	11.70	12.00	102	55	45	35.3	Figure 1	●
BD03CA1180	11.80	12.00	102	55	45	35.2	Figure 1	●
BD03CA1190	11.90	12.00	102	55	45	35.0	Figure 1	●
BD03CA1191	11.91	12.00	102	55	45	35.0	Figure 1	○
BD03CA1200	12.00	12.00	102	55	45	34.8	Figure 2	●
BD03CA1210	12.10	14.00	107	60	45	39.6	Figure 1	○
BD03CA1220	12.20	14.00	107	60	45	39.5	Figure 1	○
BD03CA1230	12.30	14.00	107	60	45	39.3	Figure 1	○
BD03CA1240	12.40	14.00	107	60	45	39.1	Figure 1	○
BD03CA1250	12.50	14.00	107	60	45	39.0	Figure 1	●
BD03CA1260	12.60	14.00	107	60	45	38.8	Figure 1	○
BD03CA1270	12.70	14.00	107	60	45	38.6	Figure 1	○
BD03CA1280	12.80	14.00	107	60	45	38.5	Figure 1	○
BD03CA1290	12.90	14.00	107	60	45	38.3	Figure 1	○
BD03CA1300	13.00	14.00	107	60	45	38.1	Figure 1	●
BD03CA1310	13.10	14.00	107	60	45	38.0	Figure 1	○
BD03CA1320	13.20	14.00	107	60	45	37.8	Figure 1	○
BD03CA1330	13.30	14.00	107	60	45	37.6	Figure 1	○
BD03CA1340	13.40	14.00	107	60	45	37.5	Figure 1	○
BD03CA1350	13.50	14.00	107	60	45	37.3	Figure 1	●

●Standing inventory ○Make-to-order

BD03C Series

Specs	Dimension (mm)						Pattern	Inventory
	DC	DCON	OAL	LCF	LS	LU		
BD03CA1355	13.55	14.00	107	60	45	37.2	Figure 1	○
BD03CA1360	13.60	14.00	107	60	45	37.1	Figure 1	○
BD03CA1370	13.70	14.00	107	60	45	37.0	Figure 1	○
BD03CA1380	13.80	14.00	107	60	45	36.8	Figure 1	○
BD03CA1390	13.90	14.00	107	60	45	36.6	Figure 1	○
BD03CA1400	14.00	14.00	107	60	45	36.5	Figure 2	●
BD03CA1410	14.10	16.00	115	65	48	41.3	Figure 1	○
BD03CA1420	14.20	16.00	115	65	48	41.1	Figure 1	○
BD03CA1429	14.29	16.00	115	65	48	41.0	Figure 1	○
BD03CA1430	14.30	16.00	115	65	48	40.9	Figure 1	○
BD03CA1440	14.40	16.00	115	65	48	40.8	Figure 1	○
BD03CA1450	14.50	16.00	115	65	48	40.6	Figure 1	●
BD03CA1460	14.60	16.00	115	65	48	40.4	Figure 1	○
BD03CA1470	14.70	16.00	115	65	48	40.3	Figure 1	○
BD03CA1480	14.80	16.00	115	65	48	40.1	Figure 1	○
BD03CA1490	14.90	16.00	115	65	48	39.9	Figure 1	○
BD03CA1500	15.00	16.00	115	65	48	39.8	Figure 1	●
BD03CA1510	15.10	16.00	115	65	48	39.6	Figure 1	○
BD03CA1520	15.20	16.00	115	65	48	39.4	Figure 1	○
BD03CA1530	15.30	16.00	115	65	48	39.3	Figure 1	○
BD03CA1540	15.40	16.00	115	65	48	39.1	Figure 1	○
BD03CA1550	15.50	16.00	115	65	48	38.9	Figure 1	●
BD03CA1555	15.55	16.00	115	65	48	38.8	Figure 1	○
BD03CA1560	15.60	16.00	115	65	48	38.8	Figure 1	○
BD03CA1570	15.70	16.00	115	65	48	38.6	Figure 1	○
BD03CA1580	15.80	16.00	115	65	48	38.4	Figure 1	○
BD03CA1587	15.87	16.00	115	65	48	38.3	Figure 1	○
BD03CA1590	15.90	16.00	115	65	48	38.3	Figure 1	○
BD03CA1600	16.00	16.00	115	65	48	38.1	Figure 2	●

●Standing inventory ○Make-to-order

P			M	K	N		S		H		
Carbon steel	Alloy steel	High-alloyed steel	Stainless steel	Cast iron	Non-ferrous alloy	Aluminum alloy	High-temp alloy	Titanium alloy	<54HRC	54—60HRC	≥60HRC
☀	☀	☀	☀	☼			☼	☼			

☀ Fit well ☼ Applicable

BD03C Series



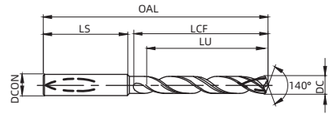


Figure 1

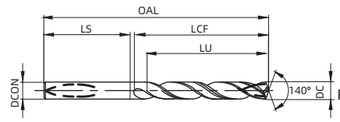


Figure 2

BD Series | 3×D | m7 | 140° | h6

Specs	Dimension (mm)						Pattern	Inventory
	DC	DCON	OAL	LCF	LS	LU		
BD03CA1650	16.50	18.00	123	73	48	45.2	Figure 1	●
BD03CA1690	16.90	18.00	123	73	48	44.6	Figure 1	○
BD03CA1700	17.00	18.00	123	73	48	44.4	Figure 1	●
BD03CA1750	17.50	18.00	123	73	48	43.6	Figure 1	●
BD03CA1755	17.55	18.00	123	73	48	43.5	Figure 1	○
BD03CA1790	17.90	18.00	123	73	48	42.9	Figure 1	○
BD03CA1800	18.00	18.00	123	73	48	42.7	Figure 2	●
BD03CA1830	18.30	20.00	131	79	50	48.2	Figure 1	○
BD03CA1850	18.50	20.00	131	79	50	47.9	Figure 1	●
BD03CA1890	18.90	20.00	131	79	50	47.2	Figure 1	○
BD03CA1900	19.00	20.00	131	79	50	47.0	Figure 1	●
BD03CA1930	19.30	20.00	131	79	50	46.5	Figure 1	○
BD03CA1950	19.50	20.00	131	79	50	46.2	Figure 1	●
BD03CA1955	19.55	20.00	131	79	50	46.1	Figure 1	○
BD03CA1990	19.90	20.00	131	79	50	45.5	Figure 1	○
BD03CA2000	20.00	20.00	131	79	50	45.4	Figure 2	●

●Standing inventory ○Make-to-order

P			M	K	N		S		H		
Carbon steel	Alloy steel	High-alloyed steel	Stainless steel	Cast iron	Non-ferrous alloy	Aluminum alloy	High-temp alloy	Titanium alloy	<54HRC	54—60HRC	≥60HRC
✹	✹	✹	✹	☼			☼	☼			

✹ Fit well ☼ Applicable

Cutting speed recommendations——BD03C Series

Workpiece material		Strength (N/mm^2)	Hardness (HB/HRC)	Cutting speed (m/min)		
				Minimum /min	Optimal /opt	Maximum /max
P	Carbon steel	< 600	< 230	100	110	120
	Alloy steel	< 1200	< 350	80	90	100
	High-alloyed steel and tool steel	< 1400	< 380	60	70	80
M	Austenite and ferrite stainless steel	< 680	<220	40	50	60
	Martensite stainless steel	< 820	< 240	40	50	60
K	Gray cast iron	-	< 280	180	200	220
	Nodular cast iron	-	< 320	140	160	180
N	Non-ferrous alloy	< 250	< 110	-	-	-
	Aluminum alloy	< 530	< 130	-	-	-
S	Iron-based, nickel-based and cobalt-based high-temp alloy	< 3300	< 350	20	30	40
	Titanium alloy	<2100	< 400	30	40	50
H	High hardness steel	-	< 54HRC	-	-	-
	High hardness steel	-	52-60HRC	-	-	-
	High hardness steel	-	> 60 HRC	-	-	-

Recommended feed rate ——BD03C Series

Feed per revolution f_n(mm/r)											
Workpiece material		Φ2~ Φ2.5	Φ2.5 ~Φ3	Φ3 ~Φ4	Φ4 ~Φ5	Φ5 ~Φ6	Φ6 ~Φ8	Φ8 ~Φ10	Φ10 ~Φ12	Φ12 ~Φ16	Φ16 ~Φ20
P	Carbon steel	0.100	0.125	0.160	0.160	0.200	0.250	0.315	0.315	0.400	0.500
	Alloy steel	0.080	0.100	0.125	0.125	0.160	0.200	0.250	0.250	0.315	0.400
	High-alloyed steel and tool steel	0.063	0.080	0.100	0.100	0.125	0.160	0.200	0.200	0.250	0.315
M	Austenite and ferrite stainless steel	0.050	0.063	0.080	0.080	0.100	0.125	0.160	0.160	0.200	0.250
	Martensite stainless steel	0.040	0.050	0.063	0.063	0.080	0.100	0.125	0.125	0.160	0.200
K	Gray cast iron	0.160	0.160	0.200	0.250	0.315	0.315	0.400	0.500	0.630	0.630
	Nodular cast iron	0.125	0.160	0.200	0.200	0.250	0.315	0.400	0.400	0.500	0.630
N	Non-ferrous alloy	-	-	-	-	-	-	-	-	-	-
	Aluminum alloy	-	-	-	-	-	-	-	-	-	-
S	Iron-based, nickel-based and cobalt-based high-temp alloy	0.050	0.063	0.080	0.080	0.080	0.125	0.160	0.160	0.200	0.250
	Titanium alloy	0.040	0.050	0.063	0.063	0.080	0.100	0.125	0.125	0.160	0.200
H	High hardness steel	-	-	-	-	-	-	-	-	-	-
	High hardness steel	-	-	-	-	-	-	-	-	-	-
	High hardness steel	-	-	-	-	-	-	-	-	-	-

Solid carbide drill

BD05 Series



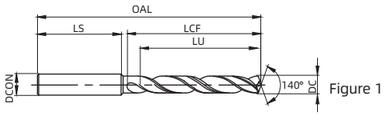


Figure 1

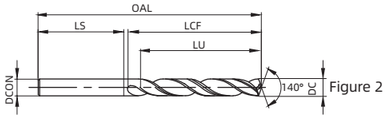


Figure 2

BD Series | 5×D | m7 | 140° | h6

Specs	Dimension (mm)						Pattern	Inventory
	DC	DCON	OAL	LCF	LS	LU		
BD05A0300	3.00	6.00	66	28	36	23.0	Figure 1	●
BD05A0310	3.10	6.00	66	28	36	22.8	Figure 1	●
BD05A0317	3.17	6.00	66	28	36	22.7	Figure 1	○
BD05A0320	3.20	6.00	66	28	36	22.6	Figure 1	●
BD05A0325	3.25	6.00	66	28	36	22.5	Figure 1	○
BD05A0330	3.30	6.00	66	28	36	22.4	Figure 1	●
BD05A0340	3.40	6.00	66	28	36	22.3	Figure 1	●
BD05A0350	3.50	6.00	66	28	36	22.1	Figure 1	●
BD05A0357	3.57	6.00	66	28	36	22.0	Figure 1	○
BD05A0360	3.60	6.00	66	28	36	21.9	Figure 1	●
BD05A0370	3.70	6.00	66	28	36	21.8	Figure 1	●
BD05A0380	3.80	6.00	74	36	36	29.6	Figure 1	●
BD05A0390	3.90	6.00	74	36	36	29.4	Figure 1	●
BD05A0397	3.97	6.00	74	36	36	29.3	Figure 1	○
BD05A0400	4.00	6.00	74	36	36	29.3	Figure 1	●
BD05A0410	4.10	6.00	74	36	36	29.1	Figure 1	●
BD05A0420	4.20	6.00	74	36	36	28.9	Figure 1	●
BD05A0430	4.30	6.00	74	36	36	28.8	Figure 1	●
BD05A0437	4.37	6.00	74	36	36	28.6	Figure 1	○
BD05A0440	4.40	6.00	74	36	36	28.6	Figure 1	●
BD05A0450	4.50	6.00	74	36	36	28.4	Figure 1	○
BD05A0460	4.60	6.00	74	36	36	28.3	Figure 1	●
BD05A0465	4.65	6.00	74	36	36	28.2	Figure 1	●
BD05A0470	4.70	6.00	74	36	36	28.1	Figure 1	○
BD05A0476	4.76	6.00	82	44	36	36.0	Figure 1	●
BD05A0480	4.80	6.00	82	44	36	35.9	Figure 1	○
BD05A0490	4.90	6.00	82	44	36	35.8	Figure 1	●
BD05A0500	5.00	6.00	82	44	36	35.6	Figure 1	●

●Standing inventory ○Make-to-order

BD05 Series

Specs	Dimension (mm)						Pattern	Inventory
	DC	DCON	OAL	LCF	LS	LU		
BD05A0510	5.10	6.00	82	44	36	35.4	Figure 1	●
BD05A0516	5.16	6.00	82	44	36	35.3	Figure 1	●
BD05A0520	5.20	6.00	82	44	36	35.3	Figure 1	○
BD05A0530	5.30	6.00	82	44	36	35.1	Figure 1	●
BD05A0540	5.40	6.00	82	44	36	34.9	Figure 1	●
BD05A0550	5.50	6.00	82	44	36	34.7	Figure 1	●
BD05A0555	5.55	6.00	82	44	36	34.7	Figure 1	●
BD05A0560	5.60	6.00	82	44	36	34.6	Figure 1	○
BD05A0570	5.70	6.00	82	44	36	34.4	Figure 1	●
BD05A0580	5.80	6.00	82	44	36	34.2	Figure 1	●
BD05A0590	5.90	6.00	82	44	36	34.1	Figure 1	●
BD05A0595	5.95	6.00	82	44	36	34.0	Figure 1	●
BD05A0600	6.00	6.00	82	44	36	33.9	Figure 2	○
BD05A0610	6.10	8.00	91	53	36	42.7	Figure 1	●
BD05A0620	6.20	8.00	91	53	36	42.6	Figure 1	●
BD05A0630	6.30	8.00	91	53	36	42.4	Figure 1	○
BD05A0635	6.35	8.00	91	53	36	42.3	Figure 1	●
BD05A0640	6.40	8.00	91	53	36	42.2	Figure 1	●
BD05A0650	6.50	8.00	91	53	36	42.1	Figure 1	●
BD05A0653	6.53	8.00	91	53	36	42.0	Figure 1	●
BD05A0660	6.60	8.00	91	53	36	41.9	Figure 1	○
BD05A0670	6.70	8.00	91	53	36	41.7	Figure 1	●
BD05A0675	6.75	8.00	91	53	36	41.6	Figure 1	●
BD05A0680	6.80	8.00	91	53	36	41.6	Figure 1	●
BD05A0690	6.90	8.00	91	53	36	41.4	Figure 1	●
BD05A0700	7.00	8.00	91	53	36	41.2	Figure 1	○
BD05A0710	7.10	8.00	91	53	36	41.1	Figure 1	●
BD05A0714	7.14	8.00	91	53	36	41.0	Figure 1	●
BD05A0720	7.20	8.00	91	53	36	40.9	Figure 1	●

●Standing inventory ○Make-to-order

P			M	K	N		S		H		
Carbon steel	Alloy steel	High-alloyed steel	Stainless steel	Cast iron	Non-ferrous alloy	Aluminum alloy	High-temp alloy	Titanium alloy	<54HRC	54—60HRC	≥60HRC
☀	☀	☀	☀	☼			☼	☼			

☀ Fit well ☼ Applicable

BD05 Series



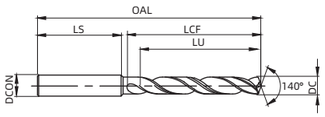


Figure 1

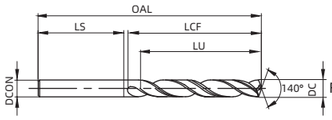


Figure 2

BD Series | 5×D | m7 | 140° | h6

Specs	Dimension (mm)						Pattern	Inventory
	DC	DCON	OAL	LCF	LS	LU		
BD05A0730	7.30	8.00	91	53	36	40.7	Figure 1	●
BD05A0740	7.40	8.00	91	53	36	40.6	Figure 1	○
BD05A0750	7.50	8.00	91	53	36	40.4	Figure 1	●
BD05A0754	7.54	8.00	91	53	36	40.3	Figure 1	●
BD05A0760	7.60	8.00	91	53	36	40.2	Figure 1	●
BD05A0770	7.70	8.00	91	53	36	40.0	Figure 1	○
BD05A0780	7.80	8.00	91	53	36	39.9	Figure 1	●
BD05A0790	7.90	8.00	91	53	36	39.7	Figure 1	○
BD05A0794	7.94	8.00	91	53	36	39.6	Figure 1	●
BD05A0800	8.00	8.00	91	53	36	39.5	Figure 2	○
BD05A0810	8.10	10.00	103	61	40	47.4	Figure 1	●
BD05A0820	8.20	10.00	103	61	40	47.2	Figure 1	●
BD05A0830	8.30	10.00	103	61	40	47.0	Figure 1	●
BD05A0833	8.33	10.00	103	61	40	47.0	Figure 1	○
BD05A0840	8.40	10.00	103	61	40	46.9	Figure 1	●
BD05A0850	8.50	10.00	103	61	40	46.7	Figure 1	●
BD05A0860	8.60	10.00	103	61	40	46.5	Figure 1	●
BD05A0870	8.70	10.00	103	61	40	46.4	Figure 1	●
BD05A0873	8.73	10.00	103	61	40	46.3	Figure 1	○
BD05A0880	8.80	10.00	103	61	40	46.2	Figure 1	●
BD05A0890	8.90	10.00	103	61	40	46.0	Figure 1	●
BD05A0900	9.00	10.00	103	61	40	45.9	Figure 1	○
BD05A0910	9.10	10.00	103	61	40	45.7	Figure 1	●
BD05A0913	9.13	10.00	103	61	40	45.6	Figure 1	●
BD05A0920	9.20	10.00	103	61	40	45.5	Figure 1	○
BD05A0925	9.25	10.00	103	61	40	45.4	Figure 1	●
BD05A0930	9.30	10.00	103	61	40	45.4	Figure 1	●
BD05A0940	9.40	10.00	103	61	40	45.2	Figure 1	●

●Standing inventory ○Make-to-order

BD05 Series

Specs	Dimension (mm)						Pattern	Inventory
	DC	DCON	OAL	LCF	LS	LU		
BD05A0950	9.50	10.00	103	61	40	45.0	Figure 1	○
BD05A0952	9.52	10.00	103	61	40	45.0	Figure 1	●
BD05A0960	9.60	10.00	103	61	40	44.9	Figure 1	○
BD05A0970	9.70	10.00	103	61	40	44.7	Figure 1	●
BD05A0980	9.80	10.00	103	61	40	44.5	Figure 1	○
BD05A0990	9.90	10.00	103	61	40	44.3	Figure 1	●
BD05A0992	9.92	10.00	103	61	40	44.3	Figure 1	●
BD05A1000	10.00	10.00	103	61	40	44.2	Figure 2	●
BD05A1010	10.10	12.00	118	71	45	54.0	Figure 1	○
BD05A1020	10.20	12.00	118	71	45	53.8	Figure 1	○
BD05A1030	10.30	12.00	118	71	45	53.7	Figure 1	●
BD05A1032	10.32	12.00	118	71	45	53.6	Figure 1	●
BD05A1040	10.40	12.00	118	71	45	53.5	Figure 1	●
BD05A1050	10.50	12.00	118	71	45	53.3	Figure 1	●
BD05A1060	10.60	12.00	118	71	45	53.2	Figure 1	○
BD05A1070	10.70	12.00	118	71	45	53.0	Figure 1	●
BD05A1072	10.72	12.00	118	71	45	53.0	Figure 1	●
BD05A1080	10.80	12.00	118	71	45	52.8	Figure 1	●
BD05A1090	10.90	12.00	118	71	45	52.7	Figure 1	●
BD05A1100	11.00	12.00	118	71	45	52.5	Figure 1	○
BD05A1110	11.10	12.00	118	71	45	52.3	Figure 1	●
BD05A1111	11.11	12.00	118	71	45	52.3	Figure 1	●
BD05A1120	11.20	12.00	118	71	45	52.2	Figure 1	●
BD05A1130	11.30	12.00	118	71	45	52.0	Figure 1	●
BD05A1140	11.40	12.00	118	71	45	51.8	Figure 1	○
BD05A1150	11.50	12.00	118	71	45	51.7	Figure 1	●
BD05A1160	11.60	12.00	118	71	45	51.5	Figure 1	●
BD05A1170	11.70	12.00	118	71	45	51.3	Figure 1	●
BD05A1180	11.80	12.00	118	71	45	51.2	Figure 1	●

●Standing inventory ○Make-to-order

P			M	K	N		S		H		
Carbon steel	Alloy steel	High-alloyed steel	Stainless steel	Cast iron	Non-ferrous alloy	Aluminum alloy	High-temp alloy	Titanium alloy	<54HRC	54—60HRC	≥60HRC
☀	☀	☀	☀	☼			☼	☼			

☀ Fit well ☼ Applicable

BD05 Series



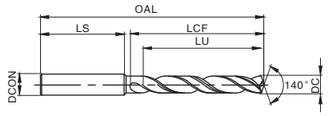


Figure 1

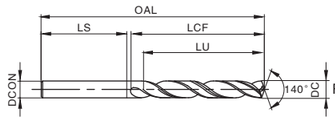


Figure 2



Specs	Dimension (mm)						Pattern	Inventory
	DC	DCON	OAL	LCF	LS	LU		
BD05A1190	11.90	12.00	118	71	45	51.0	Figure 1	●
BD05A1191	11.91	12.00	118	71	45	51.0	Figure 1	●
BD05A1200	12.00	12.00	118	71	45	50.8	Figure 2	●
BD05A1210	12.10	14.00	124	77	45	56.6	Figure 1	●
BD05A1220	12.20	14.00	124	77	45	56.5	Figure 1	●
BD05A1230	12.30	14.00	124	77	45	56.3	Figure 1	○
BD05A1240	12.40	14.00	124	77	45	56.1	Figure 1	○
BD05A1250	12.50	14.00	124	77	45	56.0	Figure 1	●
BD05A1260	12.60	14.00	124	77	45	55.8	Figure 1	●
BD05A1270	12.70	14.00	124	77	45	55.6	Figure 1	●
BD05A1280	12.80	14.00	124	77	45	55.5	Figure 1	●
BD05A1290	12.90	14.00	124	77	45	55.3	Figure 1	○
BD05A1300	13.00	14.00	124	77	45	55.1	Figure 1	●
BD05A1310	13.10	14.00	124	77	45	55.0	Figure 1	○
BD05A1320	13.20	14.00	124	77	45	54.8	Figure 1	○
BD05A1330	13.30	14.00	124	77	45	54.6	Figure 1	○
BD05A1340	13.40	14.00	124	77	45	54.5	Figure 1	○
BD05A1350	13.50	14.00	124	77	45	54.3	Figure 1	●
BD05A1370	13.70	14.00	124	77	45	54.0	Figure 1	○
BD05A1380	13.80	14.00	124	77	45	53.8	Figure 1	○
BD05A1390	13.90	14.00	124	77	45	53.6	Figure 1	○
BD05A1400	14.00	14.00	124	77	45	53.5	Figure 2	○
BD05A1410	14.10	16.00	133	83	48	59.3	Figure 1	●
BD05A1420	14.20	16.00	133	83	48	59.1	Figure 1	○
BD05A1429	14.29	16.00	133	83	48	59.0	Figure 1	○
BD05A1430	14.30	16.00	133	83	48	58.9	Figure 1	○
BD05A1440	14.40	16.00	133	83	48	58.8	Figure 1	○
BD05A1450	14.50	16.00	133	83	48	58.6	Figure 1	●

●Standing inventory ○Make-to-order

BD05 Series

Specs	Dimension (mm)						Pattern	Inventory
	DC	DCON	OAL	LCF	LS	LU		
BD05A1460	14.60	16.00	133	83	48	58.4	Figure 1	○
BD05A1470	14.70	16.00	133	83	48	58.3	Figure 1	○
BD05A1480	14.80	16.00	133	83	48	58.1	Figure 1	○
BD05A1490	14.90	16.00	133	83	48	57.9	Figure 1	○
BD05A1500	15.00	16.00	133	83	48	57.8	Figure 1	○
BD05A1510	15.10	16.00	133	83	48	57.6	Figure 1	●
BD05A1520	15.20	16.00	133	83	48	57.4	Figure 1	○
BD05A1530	15.30	16.00	133	83	48	57.3	Figure 1	○
BD05A1540	15.40	16.00	133	83	48	57.1	Figure 1	○
BD05A1550	15.50	16.00	133	83	48	56.9	Figure 1	○
BD05A1560	15.60	16.00	133	83	48	56.8	Figure 1	○
BD05A1570	15.70	16.00	133	83	48	56.6	Figure 1	●
BD05A1580	15.80	16.00	133	83	48	56.4	Figure 1	○
BD05A1587	15.87	16.00	133	83	48	56.3	Figure 1	○
BD05A1590	15.90	16.00	133	83	48	56.3	Figure 1	○
BD05A1600	16.00	16.00	133	83	48	56.1	Figure 2	○
BD05A1608	16.08	18.00	143	93	48	66.0	Figure 1	●
BD05A1650	16.50	18.00	143	93	48	65.2	Figure 1	○
BD05A1667	16.67	18.00	143	93	48	65.0	Figure 1	○
BD05A1670	16.70	18.00	143	93	48	64.9	Figure 1	○
BD05A1690	16.90	18.00	143	93	48	64.6	Figure 1	○
BD05A1700	17.00	18.00	143	93	48	64.4	Figure 1	●
BD05A1750	17.50	18.00	143	93	48	63.6	Figure 1	○
BD05A1770	17.70	18.00	143	93	48	63.2	Figure 1	○
BD05A1786	17.86	18.00	143	93	48	63.0	Figure 1	○
BD05A1800	18.00	18.00	143	93	48	62.7	Figure 2	○
BD05A1850	18.50	20.00	153	101	50	69.9	Figure 1	○
BD05A1870	18.70	20.00	153	101	50	69.5	Figure 1	○
BD05A1890	18.90	20.00	153	101	50	69.2	Figure 1	●

●Standing inventory ○Make-to-order

P			M	K	N		S		H		
Carbon steel	Alloy steel	High-alloyed steel	Stainless steel	Cast iron	Non-ferrous alloy	Aluminum alloy	High-temp alloy	Titanium alloy	<54HRC	54—60HRC	≥60HRC
☀	☀	☀	☀	☼			☼	☼			

☀ Fit well ☼ Applicable

BD05 Series



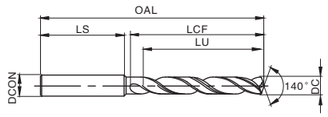


Figure 1

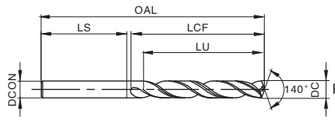


Figure 2



Specs	Dimension (mm)						Pattern	Inventory
	DC	DCON	OAL	LCF	LS	LU		
BD05A1900	19.00	20.00	153	101	50	69.0	Figure 1	●
BD05A1905	19.05	20.00	153	101	50	69.0	Figure 1	○
BD05A1916	19.16	20.00	153	101	50	68.8	Figure 1	○
BD05A1925	19.25	20.00	153	101	50	68.6	Figure 1	○
BD05A1930	19.30	20.00	153	101	50	68.5	Figure 1	○
BD05A1945	19.45	20.00	153	101	50	68.3	Figure 1	○
BD05A1950	19.50	20.00	153	101	50	68.2	Figure 1	●
BD05A1970	19.70	20.00	153	101	50	67.9	Figure 1	○
BD05A1984	19.84	20.00	153	101	50	67.6	Figure 1	○
BD05A2000	20.00	20.00	153	101	50	67.4	Figure 2	●

●Standing inventory ○Make-to-order

P			M	K	N		S		H		
Carbon steel	Alloy steel	High-alloyed steel	Stainless steel	Cast iron	Non-ferrous alloy	Aluminum alloy	High-temp alloy	Titanium alloy	<54HRC	54—60HRC	≥60HRC
✹	✹	✹	✹	☼			☼	☼			

✹ Fit well ☼ Applicable

Cutting speed recommendations——BD05 Series

Workpiece material		Strength (N/mm^2)	Hardness (HB/HRC)	Cutting speed (m/min)		
				Minimum /min	Optimal /opt	Maximum /max
P	Carbon steel	< 600	< 230	80	90	100
	Alloy steel	< 1200	< 350	60	70	80
	High-alloyed steel and tool steel	< 1400	< 380	50	60	70
M	Austenite and ferrite stainless steel	< 680	<220	30	40	50
	Martensite stainless steel	< 820	< 240	30	40	50
K	Gray cast iron	-	< 280	160	180	200
	Nodular cast iron	-	< 320	120	140	160
N	Non-ferrous alloy	< 250	< 110	-	-	-
	Aluminum alloy	< 530	< 130	-	-	-
S		< 3300	< 350	15	25	35
	Titanium alloy	<2100	< 400	20	30	40
H	High hardness steel	-	< 54HRC	-	-	-
	High hardness steel	-	52-60HRC	-	-	-
	High hardness steel	-	> 60 HRC	-	-	-

Recommended feed rate ——BD05 Series

Workpiece material		Feed per revolution f_n(mm/r)									
		Φ2~ Φ2.5	Φ2.5 ~Φ3	Φ3 ~Φ4	Φ4 ~Φ5	Φ5 ~Φ6	Φ6 ~Φ8	Φ8 ~Φ10	Φ10 ~Φ12	Φ12 ~Φ16	Φ16 ~Φ20
P	Carbon steel	0.100	0.125	0.160	0.160	0.200	0.250	0.315	0.315	0.400	0.500
	Alloy steel	0.080	0.100	0.125	0.125	0.160	0.200	0.250	0.250	0.315	0.400
	High-alloyed steel and tool steel	0.063	0.080	0.100	0.100	0.125	0.160	0.200	0.200	0.250	0.315
M	Austenite and ferrite stainless steel	0.050	0.063	0.080	0.080	0.100	0.125	0.160	0.160	0.200	0.250
	Martensite stainless steel	0.040	0.050	0.063	0.063	0.080	0.100	0.125	0.125	0.160	0.200
K	Gray cast iron	0.160	0.160	0.200	0.250	0.315	0.315	0.400	0.500	0.630	0.630
	Nodular cast iron	0.125	0.160	0.200	0.200	0.250	0.315	0.400	0.400	0.500	0.630
N	Non-ferrous alloy	-	-	-	-	-	-	-	-	-	-
	Aluminum alloy	-	-	-	-	-	-	-	-	-	-
S	Iron-based, nickel-based and cobalt-based high-temp alloy	0.050	0.063	0.080	0.080	0.080	0.125	0.160	0.160	0.200	0.250
	Titanium alloy	0.040	0.050	0.063	0.063	0.080	0.100	0.125	0.125	0.160	0.200
H	High hardness steel	-	-	-	-	-	-	-	-	-	-
	High hardness steel	-	-	-	-	-	-	-	-	-	-
	High hardness steel	-	-	-	-	-	-	-	-	-	-

Solid carbide drill

BD05C Series



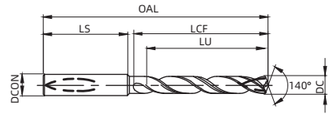


Figure 1

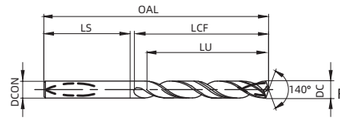


Figure 2



Specs	Dimension (mm)						Pattern	Inventory
	DC	DCON	OAL	LCF	LS	LU		
BD05CA0300	3.00	6.00	66	28	36	23.0	Figure 1	●
BD05CA0310	3.10	6.00	66	28	36	22.8	Figure 1	●
BD05CA0317	3.17	6.00	66	28	36	22.7	Figure 1	○
BD05CA0320	3.20	6.00	66	28	36	22.6	Figure 1	●
BD05CA0325	3.25	6.00	66	28	36	22.5	Figure 1	○
BD05CA0330	3.30	6.00	66	28	36	22.4	Figure 1	●
BD05CA0340	3.40	6.00	66	28	36	22.3	Figure 1	●
BD05CA0350	3.50	6.00	66	28	36	22.1	Figure 1	●
BD05CA0357	3.57	6.00	66	28	36	22.0	Figure 1	○
BD05CA0360	3.60	6.00	66	28	36	21.9	Figure 1	●
BD05CA0370	3.70	6.00	66	28	36	21.8	Figure 1	●
BD05CA0380	3.80	6.00	74	36	36	29.6	Figure 1	●
BD05CA0390	3.90	6.00	74	36	36	29.4	Figure 1	●
BD05CA0397	3.97	6.00	74	36	36	29.3	Figure 1	○
BD05CA0400	4.00	6.00	74	36	36	29.3	Figure 1	●
BD05CA0410	4.10	6.00	74	36	36	29.1	Figure 1	●
BD05CA0420	4.20	6.00	74	36	36	28.9	Figure 1	●
BD05CA0430	4.30	6.00	74	36	36	28.8	Figure 1	●
BD05CA0437	4.37	6.00	74	36	36	28.6	Figure 1	○
BD05CA0440	4.40	6.00	74	36	36	28.6	Figure 1	●
BD05CA0450	4.50	6.00	74	36	36	28.4	Figure 1	○
BD05CA0460	4.60	6.00	74	36	36	28.3	Figure 1	●
BD05CA0465	4.65	6.00	74	36	36	28.2	Figure 1	●
BD05CA0470	4.70	6.00	74	36	36	28.1	Figure 1	○
BD05CA0476	4.76	6.00	82	44	36	36.0	Figure 1	●
BD05CA0480	4.80	6.00	82	44	36	35.9	Figure 1	○
BD05CA0490	4.90	6.00	82	44	36	35.8	Figure 1	●
BD05CA0500	5.00	6.00	82	44	36	35.6	Figure 1	●

●Standing inventory ○Make-to-order

BD05C Series

Specs	Dimension (mm)						Pattern	Inventory
	DC	DCON	OAL	LCF	LS	LU		
BD05CA0510	5.10	6.00	82	44	36	35.4	Figure 1	●
BD05CA0516	5.16	6.00	82	44	36	35.3	Figure 1	●
BD05CA0520	5.20	6.00	82	44	36	35.3	Figure 1	○
BD05CA0530	5.30	6.00	82	44	36	35.1	Figure 1	●
BD05CA0540	5.40	6.00	82	44	36	34.9	Figure 1	●
BD05CA0550	5.50	6.00	82	44	36	34.7	Figure 1	●
BD05CA0555	5.55	6.00	82	44	36	34.7	Figure 1	●
BD05CA0560	5.60	6.00	82	44	36	34.6	Figure 1	○
BD05CA0570	5.70	6.00	82	44	36	34.4	Figure 1	●
BD05CA0580	5.80	6.00	82	44	36	34.2	Figure 1	●
BD05CA0590	5.90	6.00	82	44	36	34.1	Figure 1	●
BD05CA0595	5.95	6.00	82	44	36	34.0	Figure 1	●
BD05CA0600	6.00	6.00	82	44	36	33.9	Figure 2	○
BD05CA0610	6.10	8.00	91	53	36	42.7	Figure 1	●
BD05CA0620	6.20	8.00	91	53	36	42.6	Figure 1	●
BD05CA0630	6.30	8.00	91	53	36	42.4	Figure 1	○
BD05CA0635	6.35	8.00	91	53	36	42.3	Figure 1	●
BD05CA0640	6.40	8.00	91	53	36	42.2	Figure 1	●
BD05CA0650	6.50	8.00	91	53	36	42.1	Figure 1	●
BD05CA0653	6.53	8.00	91	53	36	42.0	Figure 1	●
BD05CA0660	6.60	8.00	91	53	36	41.9	Figure 1	○
BD05CA0670	6.70	8.00	91	53	36	41.7	Figure 1	●
BD05CA0675	6.75	8.00	91	53	36	41.6	Figure 1	●
BD05CA0680	6.80	8.00	91	53	36	41.6	Figure 1	●
BD05CA0690	6.90	8.00	91	53	36	41.4	Figure 1	●
BD05CA0700	7.00	8.00	91	53	36	41.2	Figure 1	○
BD05CA0710	7.10	8.00	91	53	36	41.1	Figure 1	●
BD05CA0714	7.14	8.00	91	53	36	41.0	Figure 1	●
BD05CA0720	7.20	8.00	91	53	36	40.9	Figure 1	●

●Standing inventory ○Make-to-order

P			M	K	N		S		H		
Carbon steel	Alloy steel	High-alloyed steel	Stainless steel	Cast iron	Non-ferrous alloy	Aluminum alloy	High-temp alloy	Titanium alloy	<54HRC	54—60HRC	≥60HRC
☀	☀	☀	☀	☼			☼	☼			

☀ Fit well ☼ Applicable

BD05C Series



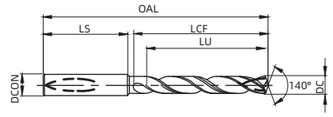


Figure 1

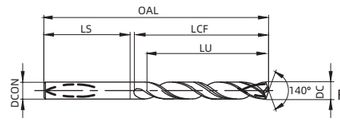


Figure 2

BD Series | 5×D | m7 | 140° | h6

Specs	Dimension (mm)						Pattern	Inventory
	DC	DCON	OAL	LCF	LS	LU		
BD05CA0730	7.30	8.00	91	53	36	40.7	Figure 1	●
BD05CA0740	7.40	8.00	91	53	36	40.6	Figure 1	○
BD05CA0750	7.50	8.00	91	53	36	40.4	Figure 1	●
BD05CA0754	7.54	8.00	91	53	36	40.3	Figure 1	●
BD05CA0760	7.60	8.00	91	53	36	40.2	Figure 1	●
BD05CA0770	7.70	8.00	91	53	36	40.0	Figure 1	○
BD05CA0780	7.80	8.00	91	53	36	39.9	Figure 1	●
BD05CA0790	7.90	8.00	91	53	36	39.7	Figure 1	○
BD05CA0794	7.94	8.00	91	53	36	39.6	Figure 1	●
BD05CA0800	8.00	8.00	91	53	36	39.5	Figure 2	○
BD05CA0810	8.10	10.00	103	61	40	47.4	Figure 1	●
BD05CA0820	8.20	10.00	103	61	40	47.2	Figure 1	●
BD05CA0830	8.30	10.00	103	61	40	47.0	Figure 1	●
BD05CA0833	8.33	10.00	103	61	40	47.0	Figure 1	○
BD05CA0840	8.40	10.00	103	61	40	46.9	Figure 1	●
BD05CA0850	8.50	10.00	103	61	40	46.7	Figure 1	●
BD05CA0860	8.60	10.00	103	61	40	46.5	Figure 1	●
BD05CA0870	8.70	10.00	103	61	40	46.4	Figure 1	●
BD05CA0873	8.73	10.00	103	61	40	46.3	Figure 1	○
BD05CA0880	8.80	10.00	103	61	40	46.2	Figure 1	●
BD05CA0890	8.90	10.00	103	61	40	46.0	Figure 1	●
BD05CA0900	9.00	10.00	103	61	40	45.9	Figure 1	○
BD05CA0910	9.10	10.00	103	61	40	45.7	Figure 1	●
BD05CA0913	9.13	10.00	103	61	40	45.6	Figure 1	●
BD05CA0920	9.20	10.00	103	61	40	45.5	Figure 1	○
BD05CA0925	9.25	10.00	103	61	40	45.4	Figure 1	●
BD05CA0930	9.30	10.00	103	61	40	45.4	Figure 1	●
BD05CA0940	9.40	10.00	103	61	40	45.2	Figure 1	●

●Standing inventory ○Make-to-order

BD05C Series

Specs	Dimension (mm)						Pattern	Inventory
	DC	DCON	OAL	LCF	LS	LU		
BD05CA0950	9.50	10.00	103	61	40	45.0	Figure 1	○
BD05CA0952	9.52	10.00	103	61	40	45.0	Figure 1	●
BD05CA0960	9.60	10.00	103	61	40	44.9	Figure 1	○
BD05CA0970	9.70	10.00	103	61	40	44.7	Figure 1	●
BD05CA0980	9.80	10.00	103	61	40	44.5	Figure 1	○
BD05CA0990	9.90	10.00	103	61	40	44.3	Figure 1	●
BD05CA0992	9.92	10.00	103	61	40	44.3	Figure 1	●
BD05CA1000	10.00	10.00	103	61	40	44.2	Figure 2	●
BD05CA1010	10.10	12.00	118	71	45	54.0	Figure 1	○
BD05CA1020	10.20	12.00	118	71	45	53.8	Figure 1	○
BD05CA1030	10.30	12.00	118	71	45	53.7	Figure 1	●
BD05CA1032	10.32	12.00	118	71	45	53.6	Figure 1	●
BD05CA1040	10.40	12.00	118	71	45	53.5	Figure 1	●
BD05CA1050	10.50	12.00	118	71	45	53.3	Figure 1	●
BD05CA1060	10.60	12.00	118	71	45	53.2	Figure 1	○
BD05CA1070	10.70	12.00	118	71	45	53.0	Figure 1	●
BD05CA1072	10.72	12.00	118	71	45	53.0	Figure 1	●
BD05CA1080	10.80	12.00	118	71	45	52.8	Figure 1	●
BD05CA1090	10.90	12.00	118	71	45	52.7	Figure 1	●
BD05CA1100	11.00	12.00	118	71	45	52.5	Figure 1	○
BD05CA1110	11.10	12.00	118	71	45	52.3	Figure 1	●
BD05CA1111	11.11	12.00	118	71	45	52.3	Figure 1	●
BD05CA1120	11.20	12.00	118	71	45	52.2	Figure 1	●
BD05CA1130	11.30	12.00	118	71	45	52.0	Figure 1	●
BD05CA1140	11.40	12.00	118	71	45	51.8	Figure 1	○
BD05CA1150	11.50	12.00	118	71	45	51.7	Figure 1	●
BD05CA1160	11.60	12.00	118	71	45	51.5	Figure 1	●
BD05CA1170	11.70	12.00	118	71	45	51.3	Figure 1	●
BD05CA1180	11.80	12.00	118	71	45	51.2	Figure 1	●

●Standing inventory ○Make-to-order

P			M	K	N		S		H		
Carbon steel	Alloy steel	High-alloyed steel	Stainless steel	Cast iron	Non-ferrous alloy	Aluminum alloy	High-temp alloy	Titanium alloy	<54HRC	54—60HRC	≥60HRC
☀	☀	☀	☀	☼			☼	☼			

☀ Fit well ☼ Applicable

BD05C Series



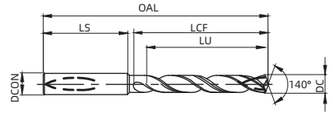


Figure 1

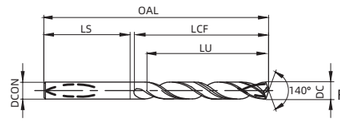


Figure 2

BD Series | 5×D | m7 | 140° | h6

Specs	Dimension (mm)						Pattern	Inventory
	DC	DCON	OAL	LCF	LS	LU		
BD05CA1190	11.90	12.00	118	71	45	51.0	Figure 1	●
BD05CA1191	11.91	12.00	118	71	45	51.0	Figure 1	●
BD05CA1200	12.00	12.00	118	71	45	50.8	Figure 2	●
BD05CA1210	12.10	14.00	124	77	45	56.6	Figure 1	●
BD05CA1220	12.20	14.00	124	77	45	56.5	Figure 1	●
BD05CA1230	12.30	14.00	124	77	45	56.3	Figure 1	○
BD05CA1240	12.40	14.00	124	77	45	56.1	Figure 1	○
BD05CA1250	12.50	14.00	124	77	45	56.0	Figure 1	●
BD05CA1260	12.60	14.00	124	77	45	55.8	Figure 1	●
BD05CA1270	12.70	14.00	124	77	45	55.6	Figure 1	●
BD05CA1280	12.80	14.00	124	77	45	55.5	Figure 1	●
BD05CA1290	12.90	14.00	124	77	45	55.3	Figure 1	○
BD05CA1300	13.00	14.00	124	77	45	55.1	Figure 1	●
BD05CA1310	13.10	14.00	124	77	45	55.0	Figure 1	○
BD05CA1320	13.20	14.00	124	77	45	54.8	Figure 1	○
BD05CA1330	13.30	14.00	124	77	45	54.6	Figure 1	○
BD05CA1340	13.40	14.00	124	77	45	54.5	Figure 1	○
BD05CA1350	13.50	14.00	124	77	45	54.3	Figure 1	●
BD05CA1370	13.70	14.00	124	77	45	54.0	Figure 1	○
BD05CA1380	13.80	14.00	124	77	45	53.8	Figure 1	○
BD05CA1390	13.90	14.00	124	77	45	53.6	Figure 1	○
BD05CA1400	14.00	14.00	124	77	45	53.5	Figure 2	○
BD05CA1410	14.10	16.00	133	83	48	59.3	Figure 1	●
BD05CA1420	14.20	16.00	133	83	48	59.1	Figure 1	○
BD05CA1429	14.29	16.00	133	83	48	59.0	Figure 1	○
BD05CA1430	14.30	16.00	133	83	48	58.9	Figure 1	○
BD05CA1440	14.40	16.00	133	83	48	58.8	Figure 1	○
BD05CA1450	14.50	16.00	133	83	48	58.6	Figure 1	●

●Standing inventory ○Make-to-order

BD05C Series

Specs	Dimension (mm)						Pattern	Inventory
	DC	DCON	OAL	LCF	LS	LU		
BD05CA1460	14.60	16.00	133	83	48	58.4	Figure 1	○
BD05CA1470	14.70	16.00	133	83	48	58.3	Figure 1	○
BD05CA1480	14.80	16.00	133	83	48	58.1	Figure 1	○
BD05CA1490	14.90	16.00	133	83	48	57.9	Figure 1	○
BD05CA1500	15.00	16.00	133	83	48	57.8	Figure 1	○
BD05CA1510	15.10	16.00	133	83	48	57.6	Figure 1	●
BD05CA1520	15.20	16.00	133	83	48	57.4	Figure 1	○
BD05CA1530	15.30	16.00	133	83	48	57.3	Figure 1	○
BD05CA1540	15.40	16.00	133	83	48	57.1	Figure 1	○
BD05CA1550	15.50	16.00	133	83	48	56.9	Figure 1	○
BD05CA1560	15.60	16.00	133	83	48	56.8	Figure 1	○
BD05CA1570	15.70	16.00	133	83	48	56.6	Figure 1	●
BD05CA1580	15.80	16.00	133	83	48	56.4	Figure 1	○
BD05CA1587	15.87	16.00	133	83	48	56.3	Figure 1	○
BD05CA1590	15.90	16.00	133	83	48	56.3	Figure 1	○
BD05CA1600	16.00	16.00	133	83	48	56.1	Figure 2	○
BD05CA1608	16.08	18.00	143	93	48	66.0	Figure 1	●
BD05CA1650	16.50	18.00	143	93	48	65.2	Figure 1	○
BD05CA1667	16.67	18.00	143	93	48	65.0	Figure 1	○
BD05CA1670	16.70	18.00	143	93	48	64.9	Figure 1	○
BD05CA1690	16.90	18.00	143	93	48	64.6	Figure 1	○
BD05CA1700	17.00	18.00	143	93	48	64.4	Figure 1	●
BD05CA1750	17.50	18.00	143	93	48	63.6	Figure 1	○
BD05CA1770	17.70	18.00	143	93	48	63.2	Figure 1	○
BD05CA1786	17.86	18.00	143	93	48	63.0	Figure 1	○
BD05CA1800	18.00	18.00	143	93	48	62.7	Figure 2	○
BD05CA1850	18.50	20.00	153	101	50	69.9	Figure 1	○
BD05CA1870	18.70	20.00	153	101	50	69.5	Figure 1	○
BD05CA1890	18.90	20.00	153	101	50	69.2	Figure 1	●

●Standing inventory ○Make-to-order

P			M	K	N		S		H		
Carbon steel	Alloy steel	High-alloyed steel	Stainless steel	Cast iron	Non-ferrous alloy	Aluminum alloy	High-temp alloy	Titanium alloy	<54HRC	54—60HRC	≥60HRC
☀	☀	☀	☀	☼			☼	☼			

☀ Fit well ☼ Applicable

BD05C Series



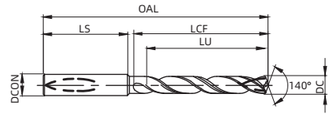


Figure 1

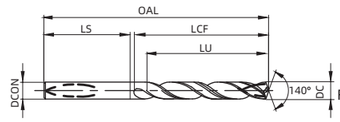


Figure 2

BD Series | 5×D | m7 | 140° | h6

Specs	Dimension (mm)						Pattern	Inventory
	DC	DCON	OAL	LCF	LS	LU		
BD05CA1900	19.00	20.00	153	101	50	69.0	Figure 1	●
BD05CA1905	19.05	20.00	153	101	50	69.0	Figure 1	○
BD05CA1916	19.16	20.00	153	101	50	68.8	Figure 1	○
BD05CA1925	19.25	20.00	153	101	50	68.6	Figure 1	○
BD05CA1930	19.30	20.00	153	101	50	68.5	Figure 1	○
BD05CA1945	19.45	20.00	153	101	50	68.3	Figure 1	○
BD05CA1950	19.50	20.00	153	101	50	68.2	Figure 1	●
BD05CA1970	19.70	20.00	153	101	50	67.9	Figure 1	○
BD05CA1984	19.84	20.00	153	101	50	67.6	Figure 1	○
BD05CA2000	20.00	20.00	153	101	50	67.4	Figure 2	●

●Standing inventory ○Make-to-order

P			M	K	N		S		H		
Carbon steel	Alloy steel	High-alloyed steel	Stainless steel	Cast iron	Non-ferrous alloy	Aluminum alloy	High-temp alloy	Titanium alloy	<54HRC	54—60HRC	≥60HRC
☀	☀	☀	☀	☼			☼	☼			

☀ Fit well ☼ Applicable

Cutting speed recommendations——BD05C Series

Workpiece material		Strength (N/mm^2)	Hardness (HB/HRC)	Cutting speed (m/min)		
				Minimum /min	Optimal /opt	Maximum /max
P	Carbon steel	< 600	< 230	100	110	120
	Alloy steel	< 1200	< 350	80	90	100
	High-alloyed steel and tool steel	< 1400	< 380	60	70	80
M	Austenite and ferrite stainless steel	< 680	<220	40	50	60
	Martensite stainless steel	< 820	< 240	40	50	60
K	Gray cast iron	-	< 280	180	200	220
	Nodular cast iron	-	< 320	140	160	180
N	Non-ferrous alloy	< 250	< 110	-	-	-
	Aluminum alloy	< 530	< 130	-	-	-
S		< 3300	< 350	20	30	40
	Titanium alloy	<2100	< 400	30	40	50
H	High hardness steel	-	< 54HRC	-	-	-
	High hardness steel	-	52-60HRC	-	-	-
	High hardness steel	-	> 60 HRC	-	-	-

Recommended feed rate ——BD05C Series

Workpiece material		Feed per revolution f_n(mm/r)									
		Φ2~ Φ2.5	Φ2.5 ~Φ3	Φ3 ~Φ4	Φ4 ~Φ5	Φ5 ~Φ6	Φ6 ~Φ8	Φ8 ~Φ10	Φ10 ~Φ12	Φ12 ~Φ16	Φ16 ~Φ20
P	Carbon steel	0.100	0.125	0.160	0.160	0.200	0.250	0.315	0.315	0.400	0.500
	Alloy steel	0.080	0.100	0.125	0.125	0.160	0.200	0.250	0.250	0.315	0.400
	High-alloyed steel and tool steel	0.063	0.080	0.100	0.100	0.125	0.160	0.200	0.200	0.250	0.315
M	Austenite and ferrite stainless steel	0.050	0.063	0.080	0.080	0.100	0.125	0.160	0.160	0.200	0.250
	Martensite stainless steel	0.040	0.050	0.063	0.063	0.080	0.100	0.125	0.125	0.160	0.200
K	Gray cast iron	0.160	0.160	0.200	0.250	0.315	0.315	0.400	0.500	0.630	0.630
	Nodular cast iron	0.125	0.160	0.200	0.200	0.250	0.315	0.400	0.400	0.500	0.630
N	Non-ferrous alloy	-	-	-	-	-	-	-	-	-	-
	Aluminum alloy	-	-	-	-	-	-	-	-	-	-
S	Iron-based, nickel-based and cobalt-based high-temp alloy	0.050	0.063	0.080	0.080	0.080	0.125	0.160	0.160	0.200	0.250
	Titanium alloy	0.040	0.050	0.063	0.063	0.080	0.100	0.125	0.125	0.160	0.200
H	High hardness steel	-	-	-	-	-	-	-	-	-	-
	High hardness steel	-	-	-	-	-	-	-	-	-	-
	High hardness steel	-	-	-	-	-	-	-	-	-	-

Solid carbide drill

BD08C Series



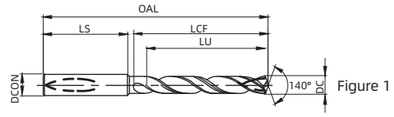


Figure 1

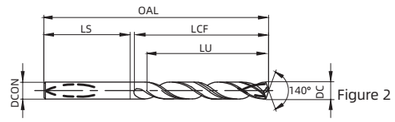


Figure 2

BD Series | 8×D | m7 | 140° | h6

Specs	Dimension (mm)						Pattern	Inventory
	DC	DCON	OAL	LCF	LS	LU		
BD08CA0300	3.00	6.00	70	30	36	25.0	Figure 1	●
BD08CA0310	3.10	6.00	70	30	36	24.8	Figure 1	●
BD08CA0317	3.17	6.00	70	30	36	24.7	Figure 1	○
BD08CA0320	3.20	6.00	70	30	36	24.6	Figure 1	●
BD08CA0325	3.25	6.00	70	30	36	24.5	Figure 1	○
BD08CA0330	3.30	6.00	70	30	36	24.4	Figure 1	●
BD08CA0340	3.40	6.00	75	35.5	36	29.8	Figure 1	●
BD08CA0350	3.50	6.00	75	35.5	36	29.6	Figure 1	●
BD08CA0357	3.57	6.00	75	35.5	36	29.5	Figure 1	○
BD08CA0360	3.60	6.00	75	35.5	36	29.4	Figure 1	●
BD08CA0370	3.70	6.00	75	35.5	36	29.3	Figure 1	●
BD08CA0380	3.80	6.00	75	37.5	36	31.1	Figure 1	●
BD08CA0390	3.90	6.00	75	37.5	36	30.9	Figure 1	●
BD08CA0397	3.97	6.00	75	37.5	36	30.8	Figure 1	○
BD08CA0400	4.00	6.00	75	37.5	36	30.8	Figure 1	●
BD08CA0410	4.10	6.00	75	37.5	36	30.6	Figure 1	●
BD08CA0420	4.20	6.00	75	37.5	36	30.4	Figure 1	●
BD08CA0430	4.30	6.00	85	45	36	37.8	Figure 1	●
BD08CA0437	4.37	6.00	85	45	36	37.6	Figure 1	○
BD08CA0440	4.40	6.00	85	45	36	37.6	Figure 1	●
BD08CA0450	4.50	6.00	85	45	36	37.4	Figure 1	○
BD08CA0460	4.60	6.00	85	45	36	37.3	Figure 1	●
BD08CA0465	4.65	6.00	85	45	36	37.2	Figure 1	●
BD08CA0470	4.70	6.00	85	45	36	37.1	Figure 1	○
BD08CA0476	4.76	6.00	90	50	36	42.0	Figure 1	●
BD08CA0480	4.80	6.00	90	50	36	41.9	Figure 1	○
BD08CA0490	4.90	6.00	90	50	36	41.8	Figure 1	●
BD08CA0500	5.00	6.00	90	50	36	41.6	Figure 1	●

●Standing inventory ○Make-to-order

BD08C Series

Specs	Dimension (mm)						Pattern	Inventory
	DC	DCON	OAL	LCF	LS	LU		
BD08CA0510	5.10	6.00	90	50	36	41.4	Figure 1	●
BD08CA0516	5.16	6.00	90	50	36	41.3	Figure 1	●
BD08CA0520	5.20	6.00	90	50	36	41.3	Figure 1	○
BD08CA0530	5.30	6.00	90	50	36	41.1	Figure 1	●
BD08CA0540	5.40	6.00	97	57	36	47.9	Figure 1	●
BD08CA0550	5.50	6.00	97	57	36	47.7	Figure 1	●
BD08CA0556	5.56	6.00	97	57	36	47.6	Figure 1	●
BD08CA0570	5.70	6.00	97	57	36	47.4	Figure 1	○
BD08CA0580	5.80	6.00	97	57	36	47.2	Figure 1	●
BD08CA0590	5.90	6.00	97	57	36	47.1	Figure 1	●
BD08CA0595	5.95	6.00	97	57	36	47.0	Figure 1	●
BD08CA0600	6.00	6.00	97	57	36	46.9	Figure 2	●
BD08CA0620	6.20	8.00	106	66	36	55.6	Figure 1	○
BD08CA0630	6.30	8.00	106	66	36	55.4	Figure 1	●
BD08CA0635	6.35	8.00	106	66	36	55.3	Figure 1	●
BD08CA0650	6.50	8.00	106	66	36	55.1	Figure 1	○
BD08CA0653	6.53	8.00	106	66	36	55.0	Figure 1	●
BD08CA0660	6.60	8.00	106	66	36	54.9	Figure 1	●
BD08CA0670	6.70	8.00	106	66	36	54.7	Figure 1	●
BD08CA0675	6.75	8.00	106	66	36	54.6	Figure 1	●
BD08CA0680	6.80	8.00	106	66	36	54.6	Figure 1	○
BD08CA0690	6.90	8.00	116	76	36	64.4	Figure 1	●
BD08CA0700	7.00	8.00	116	76	36	64.2	Figure 1	●
BD08CA0710	7.10	8.00	116	76	36	64.1	Figure 1	●
BD08CA0714	7.14	8.00	116	76	36	64.0	Figure 1	●
BD08CA0720	7.20	8.00	116	76	36	63.9	Figure 1	○
BD08CA0730	7.30	8.00	116	76	36	63.7	Figure 1	●
BD08CA0740	7.40	8.00	116	76	36	63.6	Figure 1	●
BD08CA0750	7.50	8.00	116	76	36	63.4	Figure 1	●

●Standing inventory ○Make-to-order

P			M	K	N		S		H		
Carbon steel	Alloy steel	High-alloyed steel	Stainless steel	Cast iron	Non-ferrous alloy	Aluminum alloy	High-temp alloy	Titanium alloy	<54HRC	54—60HRC	≥60HRC
☀	☀	☀	☀	☼			☼	☼			

☀ Fit well ☼ Applicable

BD08C Series



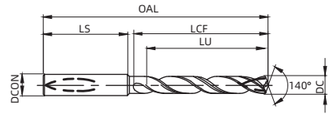


Figure 1

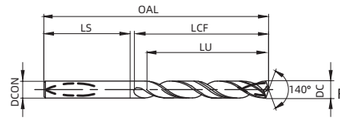


Figure 2

BD Series | 8×D | m7 | 140° | h6

Specs	Dimension (mm)						Pattern	Inventory
	DC	DCON	OAL	LCF	LS	LU		
BD08CA0754	7.54	8.00	116	76	36	63.3	Figure 1	●
BD08CA0760	7.60	8.00	116	76	36	63.2	Figure 1	○
BD08CA0770	7.70	8.00	116	76	36	63.0	Figure 1	●
BD08CA0780	7.80	8.00	116	76	36	62.9	Figure 1	●
BD08CA0794	7.94	8.00	116	76	36	62.6	Figure 1	●
BD08CA0800	8.00	8.00	116	76	36	62.5	Figure 2	○
BD08CA0810	8.10	10.00	131	87	40	73.4	Figure 1	●
BD08CA0820	8.20	10.00	131	87	40	73.2	Figure 1	○
BD08CA0833	8.33	10.00	131	87	40	73.0	Figure 1	●
BD08CA0840	8.40	10.00	131	87	40	72.9	Figure 1	○
BD08CA0850	8.50	10.00	131	87	40	72.7	Figure 1	●
BD08CA0860	8.60	10.00	131	87	40	72.5	Figure 1	●
BD08CA0870	8.70	10.00	131	87	40	72.4	Figure 1	●
BD08CA0873	8.73	10.00	131	87	40	72.3	Figure 1	○
BD08CA0880	8.80	10.00	131	87	40	72.2	Figure 1	●
BD08CA0900	9.00	10.00	131	87	40	71.9	Figure 1	●
BD08CA0910	9.10	10.00	139	95	40	79.7	Figure 1	●
BD08CA0913	9.13	10.00	139	95	40	79.6	Figure 1	●
BD08CA0920	9.20	10.00	139	95	40	79.5	Figure 1	○
BD08CA0930	9.30	10.00	139	95	40	79.4	Figure 1	●
BD08CA0940	9.40	10.00	139	95	40	79.2	Figure 1	●
BD08CA0950	9.50	10.00	139	95	40	79.0	Figure 1	○
BD08CA0952	9.52	10.00	139	95	40	79.0	Figure 1	●
BD08CA0970	9.70	10.00	139	95	40	78.7	Figure 1	●
BD08CA0980	9.80	10.00	139	95	40	78.5	Figure 1	○
BD08CA0990	9.90	10.00	139	95	40	78.3	Figure 1	●
BD08CA0992	9.92	10.00	139	95	40	78.3	Figure 1	●
BD08CA1000	10.00	10.00	139	95	40	78.2	Figure 2	●

●Standing inventory ○Make-to-order

BD08C Series

Specs	Dimension (mm)						Pattern	Inventory
	DC	DCON	OAL	LCF	LS	LU		
BD08CA1020	10.20	12.00	155	106	45	88.8	Figure 1	○
BD08CA1030	10.30	12.00	155	106	45	88.7	Figure 1	●
BD08CA1032	10.32	12.00	155	106	45	88.6	Figure 1	○
BD08CA1050	10.50	12.00	155	106	45	88.3	Figure 1	●
BD08CA1072	10.72	12.00	155	106	45	88.0	Figure 1	○
BD08CA1080	10.80	12.00	155	106	45	87.8	Figure 1	●
BD08CA1100	11.00	12.00	155	106	45	87.5	Figure 1	●
BD08CA1111	11.11	12.00	155	106	45	87.3	Figure 1	●
BD08CA1120	11.20	12.00	163	114	45	95.2	Figure 1	○
BD08CA1150	11.50	12.00	163	114	45	94.7	Figure 1	○
BD08CA1180	11.80	12.00	163	114	45	94.2	Figure 1	●
BD08CA1191	11.91	12.00	163	114	45	94.0	Figure 1	●
BD08CA1200	12.00	12.00	163	114	45	93.8	Figure 2	●
BD08CA1210	12.10	14.00	182	133	45	112.6	Figure 1	●
BD08CA1220	12.20	14.00	182	133	45	112.5	Figure 1	○
BD08CA1230	12.30	14.00	182	133	45	112.3	Figure 1	●
BD08CA1250	12.50	14.00	182	133	45	112.0	Figure 1	●
BD08CA1270	12.70	14.00	182	133	45	111.6	Figure 1	●
BD08CA1300	13.00	14.00	182	133	45	111.1	Figure 1	●
BD08CA1350	13.50	14.00	182	133	45	110.3	Figure 1	○
BD08CA1400	14.00	14.00	182	133	45	109.5	Figure 2	●
BD08CA1410	14.10	16.00	204	152	48	128.3	Figure 1	●
BD08CA1420	14.20	16.00	204	152	48	128.1	Figure 1	●
BD08CA1429	14.29	16.00	204	152	48	128.0	Figure 1	●
BD08CA1450	14.50	16.00	204	152	48	127.6	Figure 1	○
BD08CA1500	15.00	16.00	204	152	48	126.8	Figure 1	●
BD08CA1550	15.50	16.00	204	152	48	125.9	Figure 1	●
BD08CA1587	15.87	16.00	204	152	48	125.3	Figure 1	●
BD08CA1600	16.00	16.00	204	152	48	125.1	Figure 2	●

●Standing inventory ○Make-to-order

P			M	K	N		S		H		
Carbon steel	Alloy steel	High-alloyed steel	Stainless steel	Cast iron	Non-ferrous alloy	Aluminum alloy	High-temp alloy	Titanium alloy	<54HRC	54—60HRC	≥60HRC
☀	☀	☀	☀	☼			☼	☼			

☀ Fit well ☼ Applicable

BD08C Series



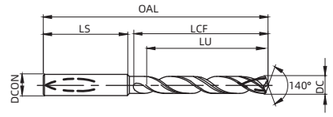


Figure 1

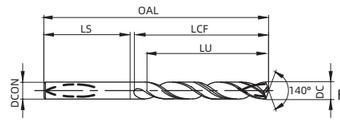


Figure 2

BD Series | 8×D | m7 | 140° | h6

Specs	Dimension (mm)						Pattern	Inventory
	DC	DCON	OAL	LCF	LS	LU		
BD08CA1650	16.50	18.00	223	171	48	143.2	Figure 1	●
BD08CA1667	16.67	18.00	223	171	48	143.0	Figure 1	○
BD08CA1700	17.00	18.00	223	171	48	142.4	Figure 1	○
BD08CA1750	17.50	18.00	223	171	48	141.6	Figure 1	○
BD08CA1800	18.00	18.00	223	171	48	140.7	Figure 2	○
BD08CA1850	18.50	20.00	244	190	50	158.9	Figure 1	○
BD08CA1900	19.00	20.00	244	190	50	158.0	Figure 1	●
BD08CA1905	19.05	20.00	244	190	50	158.0	Figure 1	○
BD08CA1950	19.50	20.00	244	190	50	157.2	Figure 1	○
BD08CA2000	20.00	20.00	244	190	50	156.4	Figure 2	●

●Standing inventory ○Make-to-order

P			M	K	N		S		H		
Carbon steel	Alloy steel	High-alloyed steel	Stainless steel	Cast iron	Non-ferrous alloy	Aluminum alloy	High-temp alloy	Titanium alloy	<54HRC	54—60HRC	≥60HRC
☀	☀	☀	☀	☼			☼	☼			

☀ Fit well ☼ Applicable

Cutting speed recommendations——BD08C Series

Workpiece material		Strength (N/mm^2)	Hardness (HB/HRC)	Cutting speed (m/min)		
				Minimum /min	Optimal /opt	Maximum /max
P	Carbon steel	< 600	< 230	100	110	120
	Alloy steel	< 1200	< 350	80	90	100
	High-alloyed steel and tool steel	< 1400	< 380	60	70	80
M	Austenite and ferrite stainless steel	< 680	<220	40	50	60
	Martensite stainless steel	< 820	< 240	40	50	60
K	Gray cast iron	-	< 280	180	200	220
	Nodular cast iron	-	< 320	140	160	180
N	Non-ferrous alloy	< 250	< 110	-	-	-
	Aluminum alloy	< 530	< 130	-	-	-
S		< 3300	< 350	20	30	40
	Titanium alloy	<2100	< 400	30	40	50
H	High hardness steel	-	< 54HRC	-	-	-
	High hardness steel	-	52-60HRC	-	-	-
	High hardness steel	-	> 60 HRC	-	-	-

Recommended feed rate ——BD08C Series

Workpiece material		Feed per revolution f_n(mm/r)									
		Φ2~ Φ2.5	Φ2.5 ~Φ3	Φ3 ~Φ4	Φ4 ~Φ5	Φ5 ~Φ6	Φ6 ~Φ8	Φ8 ~Φ10	Φ10 ~Φ12	Φ12 ~Φ16	Φ16 ~Φ20
P	Carbon steel	0.100	0.125	0.160	0.160	0.200	0.250	0.315	0.315	0.400	0.500
	Alloy steel	0.080	0.100	0.125	0.125	0.160	0.200	0.250	0.250	0.315	0.400
	High-alloyed steel and tool steel	0.063	0.080	0.100	0.100	0.125	0.160	0.200	0.200	0.250	0.315
M	Austenite and ferrite stainless steel	0.050	0.063	0.080	0.080	0.100	0.125	0.160	0.160	0.200	0.250
	Martensite stainless steel	0.040	0.050	0.063	0.063	0.080	0.100	0.125	0.125	0.160	0.200
K	Gray cast iron	0.160	0.160	0.200	0.250	0.315	0.315	0.400	0.500	0.630	0.630
	Nodular cast iron	0.125	0.160	0.200	0.200	0.250	0.315	0.400	0.400	0.500	0.630
N	Non-ferrous alloy	-	-	-	-	-	-	-	-	-	-
	Aluminum alloy	-	-	-	-	-	-	-	-	-	-
S	Iron-based, nickel-based and cobalt-based high-temp alloy	0.050	0.063	0.080	0.080	0.080	0.125	0.160	0.160	0.200	0.250
	Titanium alloy	0.040	0.050	0.063	0.063	0.080	0.100	0.125	0.125	0.160	0.200
H	High hardness steel	-	-	-	-	-	-	-	-	-	-
	High hardness steel	-	-	-	-	-	-	-	-	-	-
	High hardness steel	-	-	-	-	-	-	-	-	-	-

Solid carbide drill

XD12C Series



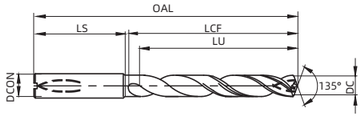


Figure 1

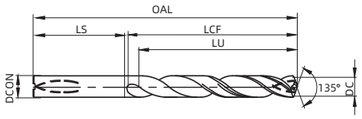


Figure 2

XD Series | 12×D | h7 | 135° | h5

Specs	Dimension (mm)						Pattern	Inventory
	DC	DCON	OAL	LCF	LS	LU		
XD12CA0300	3.00	6	90	50	36	40	Figure 1	●
XD12CA0310	3.10	6	90	50	36	40	Figure 1	○
XD12CA0320	3.20	6	90	50	36	40	Figure 1	○
XD12CA0330	3.30	6	90	50	36	40	Figure 1	○
XD12CA0340	3.40	6	90	50	36	40	Figure 1	○
XD12CA0350	3.50	6	90	50	36	40	Figure 2	○
XD12CA0360	3.60	6	90	50	36	40	Figure 1	○
XD12CA0370	3.70	6	90	50	36	46	Figure 1	○
XD12CA0380	3.80	6	90	50	36	46	Figure 1	○
XD12CA0390	3.90	6	90	50	36	46	Figure 1	○
XD12CA0400	4.00	6	102	64	36	56	Figure 1	●
XD12CA0410	4.10	6	102	64	36	56	Figure 1	○
XD12CA0420	4.20	6	102	64	36	56	Figure 1	○
XD12CA0430	4.30	6	102	64	36	56	Figure 1	○
XD12CA0440	4.40	6	102	64	36	56	Figure 1	○
XD12CA0450	4.50	6	102	64	36	56	Figure 1	●
XD12CA0460	4.60	6	102	64	36	56	Figure 1	○
XD12CA0470	4.70	6	102	64	36	56	Figure 1	○
XD12CA0480	4.80	6	102	64	36	56	Figure 1	○
XD12CA0490	4.90	6	102	64	36	56	Figure 1	○
XD12CA0500	5.00	6	116	78	36	72	Figure 1	●
XD12CA0510	5.10	6	116	78	36	72	Figure 1	○
XD12CA0520	5.20	6	116	78	36	72	Figure 1	○
XD12CA0530	5.30	6	116	78	36	72	Figure 1	○
XD12CA0540	5.40	6	116	78	36	72	Figure 1	○
XD12CA0550	5.50	6	116	78	36	72	Figure 1	●
XD12CA0560	5.60	6	116	78	36	72	Figure 1	○
XD12CA0570	5.70	6	116	78	36	72	Figure 2	○

●Standing inventory ○Make-to-order

XD12C Series

Specs	Dimension (mm)						Pattern	Inventory
	DC	DCON	OAL	LCF	LS	LU		
XD12CA0580	5.80	6	116	78	36	72	Figure 1	○
XD12CA0590	5.90	6	116	78	36	72	Figure 1	○
XD12CA0600	6.00	6	116	78	36	72	Figure 1	●
XD12CA0610	6.10	8	131	93	36	84	Figure 1	○
XD12CA0620	6.20	8	131	93	36	84	Figure 1	○
XD12CA0630	6.30	8	131	93	36	84	Figure 1	○
XD12CA0640	6.40	8	131	93	36	84	Figure 1	○
XD12CA0650	6.50	8	131	93	36	84	Figure 1	●
XD12CA0660	6.60	8	131	93	36	84	Figure 1	○
XD12CA0670	6.70	8	131	93	36	84	Figure 1	○
XD12CA0680	6.80	8	131	93	36	84	Figure 1	○
XD12CA0690	6.90	8	131	93	36	84	Figure 1	○
XD12CA0700	7.00	8	131	93	36	84	Figure 2	●
XD12CA0710	7.10	8	146	108	36	96	Figure 1	○
XD12CA0720	7.20	8	146	108	36	96	Figure 1	○
XD12CA0730	7.30	8	146	108	36	96	Figure 1	○
XD12CA0740	7.40	8	146	108	36	96	Figure 1	○
XD12CA0750	7.50	8	146	108	36	96	Figure 1	●
XD12CA0760	7.60	8	146	108	36	96	Figure 1	○
XD12CA0770	7.70	8	146	108	36	96	Figure 1	○
XD12CA0780	7.80	8	146	108	36	96	Figure 2	○
XD12CA0790	7.90	8	146	108	36	96	Figure 1	○
XD12CA0800	8.00	8	146	108	36	96	Figure 1	●
XD12CA0810	8.10	10	162	120	40	108	Figure 1	○
XD12CA0820	8.20	10	162	120	40	108	Figure 1	○
XD12CA0830	8.30	10	162	120	40	108	Figure 1	○
XD12CA0840	8.40	10	162	120	40	108	Figure 1	○
XD12CA0850	8.50	10	162	120	40	108	Figure 1	●
XD12CA0860	8.60	10	162	120	40	108	Figure 2	○

●Standing inventory ○Make-to-order

P			M	K	N		S		H		
Carbon steel	Alloy steel	High-alloyed steel	Stainless steel	Cast iron	Non-ferrous alloy	Aluminum alloy	High-temp alloy	Titanium alloy	<54HRC	54—60HRC	≥60HRC
☀	☀	☀	☀	☼			☼	☼			

☀ Fit well ☼ Applicable

XD12C Series



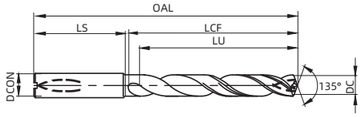


Figure 1

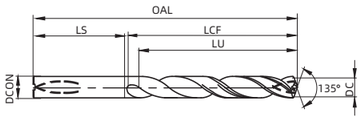


Figure 2

XD Series | 12×D | h7 | 135° | h5

Specs	Dimension (mm)						Pattern	Inventory
	DC	DCON	OAL	LCF	LS	LU		
XD12CA0870	8.70	10	162	120	40	108	Figure 1	○
XD12CA0880	8.80	10	162	120	40	108	Figure 1	○
XD12CA0890	8.90	10	162	120	40	108	Figure 1	○
XD12CA0900	9.00	10	162	120	40	108	Figure 1	●
XD12CA0910	9.10	10	174	132	40	120	Figure 1	○
XD12CA0920	9.20	10	174	132	40	120	Figure 2	○
XD12CA0930	9.30	10	174	132	40	120	Figure 1	○
XD12CA0940	9.40	10	174	132	40	120	Figure 1	○
XD12CA0950	9.50	10	174	132	40	120	Figure 1	●
XD12CA0960	9.60	10	174	132	40	120	Figure 1	○
XD12CA0970	9.70	10	174	132	40	120	Figure 1	○
XD12CA0980	9.80	10	174	132	40	120	Figure 1	○
XD12CA0990	9.90	10	174	132	40	120	Figure 1	○
XD12CA1000	10.00	10	174	132	40	120	Figure 1	●
XD12CA1010	10.10	12	204	156	45	144	Figure 1	○
XD12CA1020	10.20	12	204	156	45	144	Figure 1	○
XD12CA1030	10.30	12	204	156	45	144	Figure 1	○
XD12CA1040	10.40	12	204	156	45	144	Figure 1	○
XD12CA1050	10.50	12	204	156	45	144	Figure 1	●
XD12CA1060	10.60	12	204	156	45	144	Figure 1	○
XD12CA1070	10.70	12	204	156	45	144	Figure 1	○
XD12CA1080	10.80	12	204	156	45	144	Figure 1	○
XD12CA1090	10.90	12	204	156	45	144	Figure 1	○
XD12CA1100	11.00	12	204	156	45	144	Figure 1	●
XD12CA1110	11.10	12	204	156	45	144	Figure 1	○
XD12CA1120	11.20	12	204	156	45	144	Figure 1	○
XD12CA1130	11.30	12	204	156	45	144	Figure 1	○
XD12CA1140	11.40	12	204	156	45	144	Figure 2	○

●Standing inventory ○Make-to-order

XD12C Series

Specs	Dimension (mm)						Pattern	Inventory
	DC	DCON	OAL	LCF	LS	LU		
XD12CA1150	11.50	12	204	156	45	144	Figure 1	●
XD12CA1160	11.60	12	204	156	45	144	Figure 1	○
XD12CA1170	11.70	12	204	156	45	144	Figure 1	○
XD12CA1180	11.80	12	204	156	45	144	Figure 1	○
XD12CA1190	11.90	12	204	156	45	144	Figure 1	○
XD12CA1200	12.00	12	204	156	45	144	Figure 1	●
XD12CA1250	12.50	14	230	182	45	168	Figure 1	●
XD12CA1270	12.70	14	230	182	45	168	Figure 1	○
XD12CA1280	12.80	14	230	182	45	168	Figure 1	○
XD12CA1300	13.00	14	230	182	45	168	Figure 1	○
XD12CA1350	13.50	14	230	182	45	168	Figure 1	●
XD12CA1400	14.00	14	230	182	45	168	Figure 1	●
XD12CA1450	14.50	16	260	208	48	194	Figure 2	○
XD12CA1500	15.00	16	260	208	48	194	Figure 1	○
XD12CA1550	15.50	16	260	208	48	194	Figure 1	○
XD12CA1600	16.00	16	260	208	48	194	Figure 1	○
XD12CA1650	16.50	18	286	234	48	218	Figure 1	○
XD12CA1700	17.00	18	286	234	48	218	Figure 1	○
XD12CA1750	17.50	18	286	234	48	218	Figure 1	○
XD12CA1800	18.00	18	286	234	48	218	Figure 1	○
XD12CA1850	18.50	20	310	258	48	240	Figure 2	○
XD12CA1900	19.00	20	310	258	48	240	Figure 1	○
XD12CA1950	19.50	20	310	258	48	240	Figure 1	○
XD12CA2000	20.00	20	310	258	48	240	Figure 1	○

●Standing inventory ○Make-to-order

P			M	K	N		S		H		
Carbon steel	Alloy steel	High-alloyed steel	Stainless steel	Cast iron	Non-ferrous alloy	Aluminum alloy	High-temp alloy	Titanium alloy	<54HRC	54—60HRC	≥60HRC
☀	☀	☀	☀	☼			☼	☼			

☀ Fit well ☼ Applicable

Cutting speed recommendations——XD12C Series

Workpiece material		Strength (N/mm^2)	Hardness (HB/HRC)	Cutting speed (m/min)		
				Minimum /min	Optimal /opt	Maximum /max
P	Carbon steel	< 600	< 230	60	90	120
	Alloy steel	< 1200	< 350	60	80	120
	High-alloyed steel and tool steel	< 1400	< 380	50	70	80
M	Austenite and ferrite stainless steel	< 680	<220	40	60	80
	Martensite stainless steel	< 820	< 240	40	50	80
K	Gray cast iron	-	< 280	80	120	150
	Nodular cast iron	-	< 320	60	90	120
N	Non-ferrous alloy	< 250	< 110	100	140	180
	Aluminum alloy	< 530	< 130	100	140	180
S		< 3300	< 350	-	-	-
	Titanium alloy	<2100	< 400	-	-	-
H	High hardness steel	-	< 54HRC	-	-	-
	High hardness steel	-	52-60HRC	-	-	-
	High hardness steel	-	> 60 HRC	-	-	-

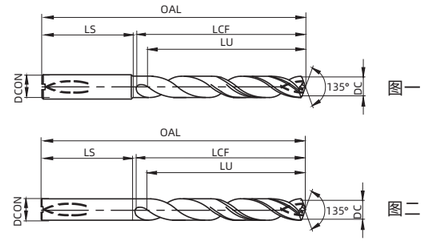
Recommended feed rate——XD12C Series

Workpiece material		Feed per revolution f_n(mm/r)										
		Φ3	Φ4	Φ5	Φ6	Φ8	Φ10	Φ12	Φ14	Φ16	Φ18	Φ20
P	Carbon steel	0.06-0.1	0.08-0.12	0.1-0.14	0.11-0.16	0.13-0.19	0.14-0.22	0.16-0.24	0.18-0.28	0.20-0.3	0.22-0.32	0.25-0.35
	Alloy steel	0.06-0.1	0.08-0.12	0.1-0.14	0.11-0.16	0.13-0.19	0.14-0.22	0.16-0.24	0.18-0.28	0.20-0.3	0.22-0.32	0.25-0.35
	High-alloyed steel and tool steel	0.06-0.1	0.08-0.12	0.1-0.14	0.11-0.16	0.13-0.19	0.14-0.22	0.16-0.24	0.18-0.28	0.20-0.3	0.22-0.32	0.25-0.35
M	Austenite and ferrite stainless steel	0.03-0.07	0.04-0.08	0.05-0.1	0.06-0.12	0.08-0.16	0.1-0.18	0.12-0.2	0.13-0.22	0.14-0.25	0.15-0.28	0.16-0.3
	Martensite stainless steel	0.03-0.07	0.04-0.08	0.05-0.1	0.06-0.12	0.08-0.16	0.1-0.18	0.12-0.2	0.13-0.22	0.14-0.25	0.15-0.28	0.16-0.3
K	Gray cast iron	0.06-0.1	0.08-0.12	0.1-0.14	0.11-0.16	0.13-0.19	0.14-0.22	0.16-0.24	0.18-0.28	0.20-0.30	0.22-0.32	0.25-0.35
	Nodular cast iron	0.06-0.1	0.08-0.12	0.1-0.14	0.11-0.16	0.13-0.19	0.14-0.22	0.16-0.24	0.18-0.28	0.20-0.30	0.22-0.32	0.25-0.35
N	Non-ferrous alloy	0.09-0.12	0.1-0.15	0.1-0.15	0.11-0.16	0.13-0.19	0.14-0.22	0.16-0.25	0.18-0.28	0.25-0.36	0.28-0.38	0.30-0.40
	Aluminum alloy	0.09-0.12	0.1-0.15	0.1-0.15	0.11-0.16	0.13-0.19	0.14-0.22	0.16-0.25	0.18-0.28	0.25-0.36	0.28-0.38	0.30-0.40
S	Iron-based, nickel-based and cobalt-based high-temp alloy	-	-	-	-	-	-	-	-	-	-	-
	Titanium alloy	-	-	-	-	-	-	-	-	-	-	-
H	High hardness steel	-	-	-	-	-	-	-	-	-	-	-
	High hardness steel	-	-	-	-	-	-	-	-	-	-	-
	High hardness steel	-	-	-	-	-	-	-	-	-	-	-

Solid carbide drill

XD20C Series





XD Series | 20×D | h7 | 135° | h5

Specs	Dimension (mm)						Pattern	Inventory
	DC	DCON	OAL	LCF	LS	LU		
XD20CA0300	3.0	6	110	70	36	62	Figure 1	○
XD20CA0310	3.1	6	123	83	36	72	Figure 1	○
XD20CA0320	3.2	6	123	83	36	72	Figure 1	○
XD20CA0330	3.3	6	123	83	36	72	Figure 1	○
XD20CA0340	3.4	6	123	83	36	72	Figure 1	○
XD20CA0350	3.5	6	123	83	36	72	Figure 2	○
XD20CA0360	3.6	6	136	96	36	84	Figure 1	○
XD20CA0370	3.7	6	136	96	36	84	Figure 1	○
XD20CA0380	3.8	6	136	96	36	84	Figure 1	○
XD20CA0390	3.9	6	136	96	36	84	Figure 1	○
XD20CA0400	4.0	6	136	96	36	84	Figure 1	○
XD20CA0410	4.1	6	148	108	36	96	Figure 1	○
XD20CA0420	4.2	6	148	108	36	96	Figure 1	○
XD20CA0430	4.3	6	148	108	36	96	Figure 1	○
XD20CA0440	4.4	6	148	108	36	96	Figure 1	○
XD20CA0450	4.5	6	148	108	36	96	Figure 1	○
XD20CA0460	4.6	6	158	118	36	106	Figure 1	○
XD20CA0470	4.7	6	158	118	36	106	Figure 1	○
XD20CA0480	4.8	6	158	118	36	106	Figure 1	○
XD20CA0490	4.9	6	158	118	36	106	Figure 1	○
XD20CA0500	5.0	6	158	118	36	106	Figure 1	○
XD20CA0510	5.1	6	168	128	36	116	Figure 1	○
XD20CA0520	5.2	6	168	128	36	116	Figure 1	○
XD20CA0530	5.3	6	168	128	36	116	Figure 1	○
XD20CA0540	5.4	6	168	128	36	116	Figure 1	○
XD20CA0550	5.5	6	168	128	36	116	Figure 1	○
XD20CA0560	5.6	6	180	140	36	126	Figure 1	○
XD20CA0570	5.7	6	180	140	36	126	Figure 2	○

●Standing inventory ○Make-to-order

XD20C Series



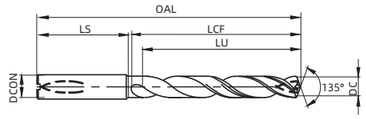


Figure 1

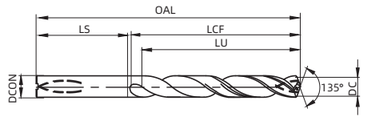


Figure 2



Specs	Dimension (mm)						Pattern	Inventory
	DC	DCON	OAL	LCF	LS	LU		
XD20CA0580	5.8	6	180	140	36	126	Figure 1	○
XD20CA0590	5.9	6	180	140	36	126	Figure 1	○
XD20CA0600	6.0	6	180	140	36	126	Figure 1	○
XD20CA0610	6.1	8	192	150	36	132	Figure 1	○
XD20CA0620	6.2	8	192	150	36	132	Figure 1	○
XD20CA0630	6.3	8	192	150	36	132	Figure 2	○
XD20CA0640	6.4	8	192	150	36	132	Figure 1	○
XD20CA0650	6.5	8	192	150	36	132	Figure 1	○
XD20CA0660	6.6	8	202	162	36	144	Figure 1	○
XD20CA0670	6.7	8	202	162	36	144	Figure 1	○
XD20CA0680	6.8	8	202	162	36	144	Figure 1	○
XD20CA0690	6.9	8	202	162	36	144	Figure 1	○
XD20CA0700	7.0	8	202	162	36	144	Figure 1	○
XD20CA0710	7.1	8	213	173	36	155	Figure 1	○
XD20CA0720	7.2	8	213	173	36	155	Figure 1	○
XD20CA0730	7.3	8	213	173	36	155	Figure 1	○
XD20CA0740	7.4	8	213	173	36	155	Figure 1	○
XD20CA0750	7.5	8	213	173	36	155	Figure 1	○
XD20CA0760	7.6	8	223	183	36	165	Figure 1	○
XD20CA0770	7.7	8	223	183	36	165	Figure 1	○
XD20CA0780	7.8	8	223	183	36	165	Figure 1	○
XD20CA0790	7.9	8	223	183	36	165	Figure 1	○
XD20CA0800	8.0	8	223	183	36	165	Figure 1	○
XD20CA0810	8.1	10	239	195	40	176	Figure 1	○
XD20CA0820	8.2	10	239	195	40	176	Figure 1	○
XD20CA0830	8.3	10	239	195	40	176	Figure 1	○
XD20CA0840	8.4	10	239	195	40	176	Figure 1	○
XD20CA0850	8.5	10	239	195	40	176	Figure 2	○

●Standing inventory ○Make-to-order

XD20C Series

Specs	Dimension (mm)						Pattern	Inventory
	DC	DCON	OAL	LCF	LS	LU		
XD20CA0860	8.6	10	249	205	40	186	Figure 2	○
XD20CA0870	8.7	10	249	205	40	186	Figure 1	○
XD20CA0880	8.8	10	249	205	40	186	Figure 1	○
XD20CA0890	8.9	10	249	205	40	186	Figure 1	○
XD20CA0900	9.0	10	249	205	40	186	Figure 1	○
XD20CA0910	9.1	10	262	218	40	196	Figure 1	○
XD20CA0920	9.2	10	262	218	40	196	Figure 2	○
XD20CA0930	9.3	10	262	218	40	196	Figure 1	○
XD20CA0940	9.4	10	262	218	40	196	Figure 1	○
XD20CA0950	9.5	10	262	218	40	196	Figure 1	○
XD20CA0960	9.6	10	272	228	40	206	Figure 1	○
XD20CA0970	9.7	10	272	228	40	206	Figure 1	○
XD20CA0980	9.8	10	272	228	40	206	Figure 1	○
XD20CA0990	9.9	10	272	228	40	206	Figure 1	○
XD20CA1000	10.0	10	272	228	40	206	Figure 1	○
XD20CA1010	10.1	12	292	242	45	220	Figure 1	○
XD20CA1020	10.2	12	292	242	45	220	Figure 1	○
XD20CA1030	10.3	12	292	242	45	220	Figure 1	○
XD20CA1040	10.4	12	292	242	45	220	Figure 1	○
XD20CA1050	10.5	12	292	242	45	220	Figure 1	○
XD20CA1060	10.6	12	300	250	45	228	Figure 1	○
XD20CA1070	10.7	12	300	250	45	228	Figure 1	○
XD20CA1080	10.8	12	300	250	45	228	Figure 1	○
XD20CA1090	10.9	12	300	250	45	228	Figure 1	○
XD20CA1100	11.0	12	300	250	45	228	Figure 1	○
XD20CA1110	11.1	12	315	265	45	240	Figure 1	○
XD20CA1120	11.2	12	315	265	45	240	Figure 1	○
XD20CA1130	11.3	12	315	265	45	240	Figure 1	○
XD20CA1140	11.4	12	315	265	45	240	Figure 2	○

●Standing inventory ○Make-to-order

P			M	K	N		S		H		
Carbon steel	Alloy steel	High-alloyed steel	Stainless steel	Cast iron	Non-ferrous alloy	Aluminum alloy	High-temp alloy	Titanium alloy	<54HRC	54—60HRC	≥60HRC
☀	☀	☀	☀	☼			☼	☼			

☀ Fit well ☼ Applicable

XD20C Series



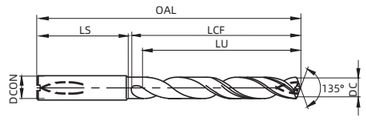


Figure 1

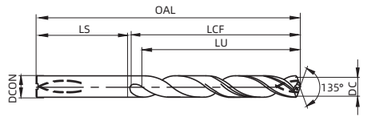


Figure 2

XD Series | 20×D | h7 | 135° | h5

Specs	Dimension (mm)						Pattern	Inventory
	DC	DCON	OAL	LCF	LS	LU		
XD20CA1150	11.5	12	315	265	45	240	Figure 1	○
XD20CA1160	11.6	12	325	275	45	250	Figure 1	○
XD20CA1170	11.7	12	325	275	45	250	Figure 1	○
XD20CA1180	11.8	12	325	275	45	250	Figure 1	○
XD20CA1190	11.9	12	325	275	45	250	Figure 1	○
XD20CA1200	12.0	12	325	275	45	250	Figure 1	○
XD20CA1250	12.5	14	323	275	45	250	Figure 1	○
XD20CA1300	13.0	14	338	290	45	265	Figure 1	○
XD20CA1350	13.5	14	338	290	45	265	Figure 1	○
XD20CA1400	14.0	14	367	318	45	290	Figure 1	○

●Standing inventory ○Make-to-order

P			M	K	N		S		H		
Carbon steel	Alloy steel	High-alloyed steel	Stainless steel	Cast iron	Non-ferrous alloy	Aluminum alloy	High-temp alloy	Titanium alloy	<54HRC	54—60HRC	≥60HRC
✹	✹	✹	✹	✡			✡	✡			

✹ Fit well ✡ Applicable

Cutting speed recommendations——XD20C Series

Workpiece material		Strength (N/mm^2)	Hardness (HB/HRC)	Cutting speed (m/min)		
				Minimum /min	Optimal /opt	Maximum /max
P	Carbon steel	< 600	< 230	50	70	80
	Alloy steel	< 1200	< 350	50	60	80
	High-alloyed steel and tool steel	< 1400	< 380	40	50	60
M	Austenite and ferrite stainless steel	< 680	<220	40	50	60
	Martensite stainless steel	< 820	< 240	40	50	60
K	Gray cast iron	-	< 280	50	60	80
	Nodular cast iron	-	< 320	60	70	80
N	Non-ferrous alloy	< 250	< 110	100	140	180
	Aluminum alloy	< 530	< 130	100	150	180
S		< 3300	< 350	-	-	-
	Titanium alloy	<2100	< 400	-	-	-
H	High hardness steel	-	< 54HRC	-	-	-
	High hardness steel	-	52-60HRC	-	-	-
	High hardness steel	-	> 60 HRC	-	-	-

Recommended feed rate ——XD20C Series

Workpiece material		Feed per revolution f_n(mm/r)							
		Φ3	Φ4	Φ5	Φ6	Φ8	Φ10	Φ12	Φ14
P	Carbon steel	0.06-0.1	0.08-0.12	0.1-0.14	0.11-0.16	0.13-0.19	0.14-0.22	0.16-0.24	0.18-0.28
	Alloy steel	0.06-0.1	0.08-0.12	0.1-0.14	0.11-0.16	0.13-0.19	0.14-0.22	0.16-0.24	0.18-0.28
	High-alloyed steel and tool steel	0.06-0.1	0.08-0.12	0.1-0.14	0.11-0.16	0.13-0.19	0.14-0.22	0.16-0.24	0.18-0.28
M	Austenite and ferrite stainless steel	0.03-0.07	0.04-0.08	0.05-0.1	0.06-0.12	0.08-0.16	0.1-0.18	0.12-0.2	0.13-0.22
	Martensite stainless steel	0.03-0.07	0.04-0.08	0.05-0.1	0.06-0.12	0.08-0.16	0.1-0.18	0.12-0.2	0.13-0.22
K	Gray cast iron	0.06-0.1	0.08-0.12	0.1-0.14	0.11-0.16	0.13-0.19	0.14-0.22	0.16-0.24	0.18-0.28
	Nodular cast iron	0.06-0.1	0.08-0.12	0.1-0.14	0.11-0.16	0.13-0.19	0.14-0.22	0.16-0.24	0.18-0.28
N	Non-ferrous alloy	0.09-0.12	0.1-0.15	0.1-0.15	0.11-0.16	0.13-0.19	0.14-0.22	0.16-0.25	0.18-0.28
	Aluminum alloy	0.09-0.12	0.1-0.15	0.1-0.15	0.11-0.16	0.13-0.19	0.14-0.22	0.16-0.25	0.18-0.28
S	Iron-based, nickel-based and cobalt-based high-temp alloy	-	-	-	-	-	-	-	-
	Titanium alloy	-	-	-	-	-	-	-	-
H	High hardness steel	-	-	-	-	-	-	-	-
	High hardness steel	-	-	-	-	-	-	-	-
	High hardness steel	-	-	-	-	-	-	-	-

Solid carbide drill

XD30C Series



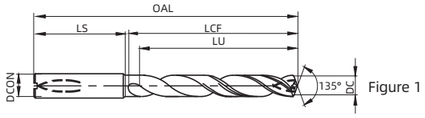


Figure 1

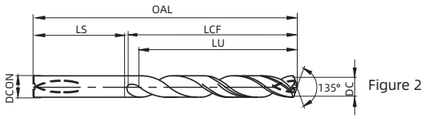


Figure 2



Specs	Dimension (mm)						Pattern	Inventory
	DC	DCON	OAL	LCF	LS	LU		
XD30CA0300	3.0	6	140	100	36	92	Figure 1	○
XD30CA0310	3.1	6	160	120	36	108	Figure 1	○
XD30CA0320	3.2	6	160	120	36	108	Figure 1	○
XD30CA0330	3.3	6	160	120	36	108	Figure 1	○
XD30CA0340	3.4	6	160	120	36	108	Figure 1	○
XD30CA0350	3.5	6	160	120	36	108	Figure 2	○
XD30CA0360	3.6	6	176	136	36	124	Figure 1	○
XD30CA0370	3.7	6	176	136	36	124	Figure 1	○
XD30CA0380	3.8	6	176	136	36	124	Figure 1	○
XD30CA0390	3.9	6	176	136	36	124	Figure 1	○
XD30CA0400	4.0	6	176	136	36	124	Figure 1	○
XD30CA0410	4.1	6	192	152	36	140	Figure 1	○
XD30CA0420	4.2	6	192	152	36	140	Figure 1	○
XD30CA0430	4.3	6	192	152	36	140	Figure 1	○
XD30CA0440	4.4	6	192	152	36	140	Figure 1	○
XD30CA0450	4.5	6	192	152	36	140	Figure 1	○
XD30CA0460	4.6	6	208	168	36	156	Figure 1	○
XD30CA0470	4.7	6	208	168	36	156	Figure 1	○
XD30CA0480	4.8	6	208	168	36	156	Figure 1	○
XD30CA0490	4.9	6	208	168	36	156	Figure 1	○
XD30CA0500	5.0	6	208	168	36	156	Figure 1	○
XD30CA0510	5.1	6	228	188	36	170	Figure 1	○
XD30CA0520	5.2	6	228	188	36	170	Figure 1	○
XD30CA0530	5.3	6	228	188	36	170	Figure 1	○
XD30CA0540	5.4	6	228	188	36	170	Figure 1	○
XD30CA0550	5.5	6	228	188	36	170	Figure 1	○
XD30CA0560	5.6	6	240	200	36	182	Figure 1	○
XD30CA0570	5.7	6	240	200	36	182	Figure 2	○

●Standing inventory ○Make-to-order

XD30C Series

Specs	Dimension (mm)						Pattern	Inventory
	DC	DCON	OAL	LCF	LS	LU		
XD30CA0580	5.8	6	240	200	36	182	Figure 1	○
XD30CA0590	5.9	6	240	200	36	182	Figure 1	○
XD30CA0600	6.0	6	240	200	36	182	Figure 1	○
XD30CA0610	6.1	8	260	220	36	202	Figure 1	○
XD30CA0620	6.2	8	260	220	36	202	Figure 1	○
XD30CA0630	6.3	8	260	220	36	202	Figure 1	○
XD30CA0640	6.4	8	260	220	36	202	Figure 1	○
XD30CA0650	6.5	8	260	220	36	202	Figure 1	○
XD30CA0660	6.6	8	272	232	36	214	Figure 1	○
XD30CA0670	6.7	8	272	232	36	214	Figure 1	○
XD30CA0680	6.8	8	272	232	36	214	Figure 1	○
XD30CA0690	6.9	8	272	232	36	214	Figure 1	○
XD30CA0700	7.0	8	272	232	36	214	Figure 2	○
XD30CA0710	7.1	8	290	250	36	232	Figure 1	○
XD30CA0720	7.2	8	290	250	36	232	Figure 1	○
XD30CA0730	7.3	8	290	250	36	232	Figure 1	○
XD30CA0740	7.4	8	290	250	36	232	Figure 1	○
XD30CA0750	7.5	8	290	250	36	232	Figure 1	○
XD30CA0760	7.6	8	305	265	36	246	Figure 1	○
XD30CA0770	7.7	8	305	265	36	246	Figure 1	○
XD30CA0780	7.8	8	305	265	36	246	Figure 2	○
XD30CA0790	7.9	8	305	265	36	246	Figure 1	○
XD30CA0800	8.0	8	305	265	36	246	Figure 1	○
XD30CA0810	8.1	10	330	285	40	265	Figure 1	○
XD30CA0820	8.2	10	330	285	40	265	Figure 1	○
XD30CA0830	8.3	10	330	285	40	265	Figure 1	○
XD30CA0840	8.4	10	330	285	40	265	Figure 1	○
XD30CA0850	8.5	10	330	285	40	265	Figure 1	○
XD30CA0860	8.6	10	340	295	40	275	Figure 2	○

●Standing inventory ○Make-to-order

P			M	K	N		S		H		
Carbon steel	Alloy steel	High-alloyed steel	Stainless steel	Cast iron	Non-ferrous alloy	Aluminum alloy	High-temp alloy	Titanium alloy	<54HRC	54—60HRC	≥60HRC
☀	☀	☀	☀	☼			☼	☼			

☀ Fit well ☼ Applicable

XD30C Series



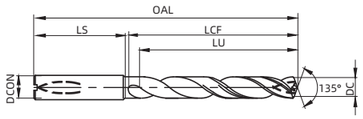


Figure 1

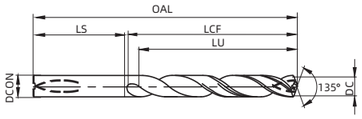


Figure 2

XD Series | 30×D | h7 | 135° | h5

Specs	Dimension (mm)						Pattern	Inventory
	DC	DCON	OAL	LCF	LS	LU		
XD30CA0870	8.7	10	340	295	40	275	图一	○
XD30CA0880	8.8	10	340	295	40	275	图一	○
XD30CA0890	8.9	10	340	295	40	275	图一	○
XD30CA0900	9.0	10	340	295	40	275	图一	○
XD30CA0910	9.1	10	360	315	40	292	图一	○
XD30CA0920	9.2	10	360	315	40	292	图二	○
XD30CA0930	9.3	10	360	315	40	292	图一	○
XD30CA0940	9.4	10	360	315	40	292	图一	○
XD30CA0950	9.5	10	360	315	40	292	图一	○
XD30CA0960	9.6	10	372	328	40	305	图一	○
XD30CA0970	9.7	10	372	328	40	305	图一	○
XD30CA0980	9.8	10	372	328	40	305	图一	○
XD30CA0990	9.9	10	372	328	40	305	图一	○
XD30CA1000	10.0	10	372	328	40	305	图一	○

●Standing inventory ○Make-to-order

P			M	K	N		S		H		
Carbon steel	Alloy steel	High-alloyed steel	Stainless steel	Cast iron	Non-ferrous alloy	Aluminum alloy	High-temp alloy	Titanium alloy	<54HRC	54—60HRC	≥60HRC
✹	✹	✹	✹	☼			☼	☼			

✹ Fit well ☼ Applicable

Cutting speed recommendations——XD30C Series

Workpiece material		Strength (N/mm^2)	Hardness (HB/HRC)	Cutting speed (m/min)		
				Minimum /min	Optimal /opt	Maximum /max
P	Carbon steel	< 600	< 230	50	70	80
	Alloy steel	< 1200	< 350	50	60	80
	High-alloyed steel and tool steel	< 1400	< 380	40	50	60
M	Austenite and ferrite stainless steel	< 680	<220	40	50	60
	Martensite stainless steel	< 820	< 240	40	50	60
K	Gray cast iron	-	< 280	50	60	80
	Nodular cast iron	-	< 320	60	70	80
N	Non-ferrous alloy	< 250	< 110	100	140	180
	Aluminum alloy	< 530	< 130	100	150	180
S		< 3300	< 350	-	-	-
	Titanium alloy	<2100	< 400	-	-	-
H	High hardness steel	-	< 54HRC	-	-	-
	High hardness steel	-	52-60HRC	-	-	-
	High hardness steel	-	> 60 HRC	-	-	-

Recommended feed rate ——XD30C Series

Workpiece material		Feed per revolution f_n(mm/r)					
		Φ3	Φ4	Φ5	Φ6	Φ8	Φ10
P	Carbon steel	0.06-0.1	0.08-0.12	0.1-0.14	0.11-0.16	0.13-0.19	0.14-0.22
	Alloy steel	0.06-0.1	0.08-0.12	0.1-0.14	0.11-0.16	0.13-0.19	0.14-0.22
	High-alloyed steel and tool steel	0.06-0.1	0.08-0.12	0.1-0.14	0.11-0.16	0.13-0.19	0.14-0.22
M	Austenite and ferrite stainless steel	0.03-0.07	0.04-0.08	0.05-0.1	0.06-0.12	0.08-0.16	0.1-0.18
	Martensite stainless steel	0.03-0.07	0.04-0.08	0.05-0.1	0.06-0.12	0.08-0.16	0.1-0.18
K	Gray cast iron	0.06-0.1	0.08-0.12	0.1-0.14	0.11-0.16	0.13-0.19	0.14-0.22
	Nodular cast iron	0.06-0.1	0.08-0.12	0.1-0.14	0.11-0.16	0.13-0.19	0.14-0.22
N	Non-ferrous alloy	0.09-0.12	0.1-0.15	0.1-0.15	0.11-0.16	0.13-0.19	0.14-0.22
	Aluminum alloy	0.09-0.12	0.1-0.15	0.1-0.15	0.11-0.16	0.13-0.19	0.14-0.22
S	Iron-based, nickel-based and cobalt-based high-temp alloy	-	-	-	-	-	-
	Titanium alloy	-	-	-	-	-	-
H	High hardness steel	-	-	-	-	-	-
	High hardness steel	-	-	-	-	-	-
	High hardness steel	-	-	-	-	-	-

Technical information of solid carbide drills

FAQs of hole drilling

	Phenomenon	Causes	Solutions
Hole	Oversize holes	Poor clamping Large run-out around spindle	Select the holder and chuck with high precision Check and adjust after clamping drill
		Asymmetric point angle Large run-out of the drill bit Chisel edge is off center	Regrind the tool Check the accuracy after regrinding
	Low position accuracy	Asymmetric point angle Large run-out of the drill bit Chisel edge is off center Excessive margin abrasion	Select the holder and chuck with high precision Check and adjust after clamping drill
		Poor clamping Large run-out around the spindle Poor workpiece clamping	Select the holder and chuck with high precision Check and adjust after clamping drill
		Excessive feed rate	Reduce the feed rate
		Insufficient supply of cutting fluid	Change the cutting fluid supply method to increase the flow rate
	Irregular hole size	Low re-positioning accuracy of spindle Poor clamping Large run-out around the spindle	Increase the re-positioning accuracy of the machine tool Select the holder and chuck with high precision Check and adjust after clamping drill
		The machined surface is not perpendicular to the feed direction	Adjust the machined surface to be perpendicular to the feed direction
		The center does not align with the axis (lathe)	Carefully adjust it before machining
	Poor linearity Poor perpendicularity	Excessive wear of the tool	Regrind the tool
		Poor accuracy of the center hole	Improve the position accuracy of the center hole
		Asymmetric point angle Large run-out of the drill bit Chisel edge is off-center	Regrind the tool Check the accuracy after regrinding
		Poor rigidity of the drill bit	Improve the drill bit rigidity
		Uneven workpiece surface The center does not align with the axis (lathe)	Adjust the panel to be horizontal or premachine the horizontal plane with center hole

	Phenomenon	Causes	Solutions
Hole	Poor roundness	Asymmetric point angle Large run-out of the drill bit Chisel edge is off-center	Regrind the tool Check the accuracy after grinding
		Poor clamping Large run-out around the spindle Poor workpiece clamping	Select the holder and chuck with high precision Check and adjust after clamping drill
		Too large clearance angle	Regrind the cutting edge
		Poor rigidity of the drill bit	Improve the drill bit rigidity
	Poor surface quality of the machined workpiece	Improper regrinding	Regrind and correct
		Insufficient cutting fluid supply or mismatched model	Change the cutting fluid supply method to increase the flow rate Use the cutting oil with good lubricity
		Poor clamping Large run-out around the spindle	Select the holder and chuck with high precision Calibrating spindle
		Feed rate is too high	Reduce the feed rate
		Excessive wear of the cutting edge Excessive build-up on margin	Regrind the cutting edge Use coated drill bit
		Chip jamming	Reselect a drill bit (chip-hold groove type, helical angle, etc.) Reselect the machining method (Adjust the feed rate, e.g. using step-by-step method)
	Poor cylindricity	Asymmetric point angle Large run-out of the drill bit Chisel edge off-center Excessive abrasion on cutting edge	Regrind the tool Check the accuracy after grinding
		Feed rate is too low	Increase the feed rate

Safety Standards for Cemented Carbide Tools

1. Safety Responsibility

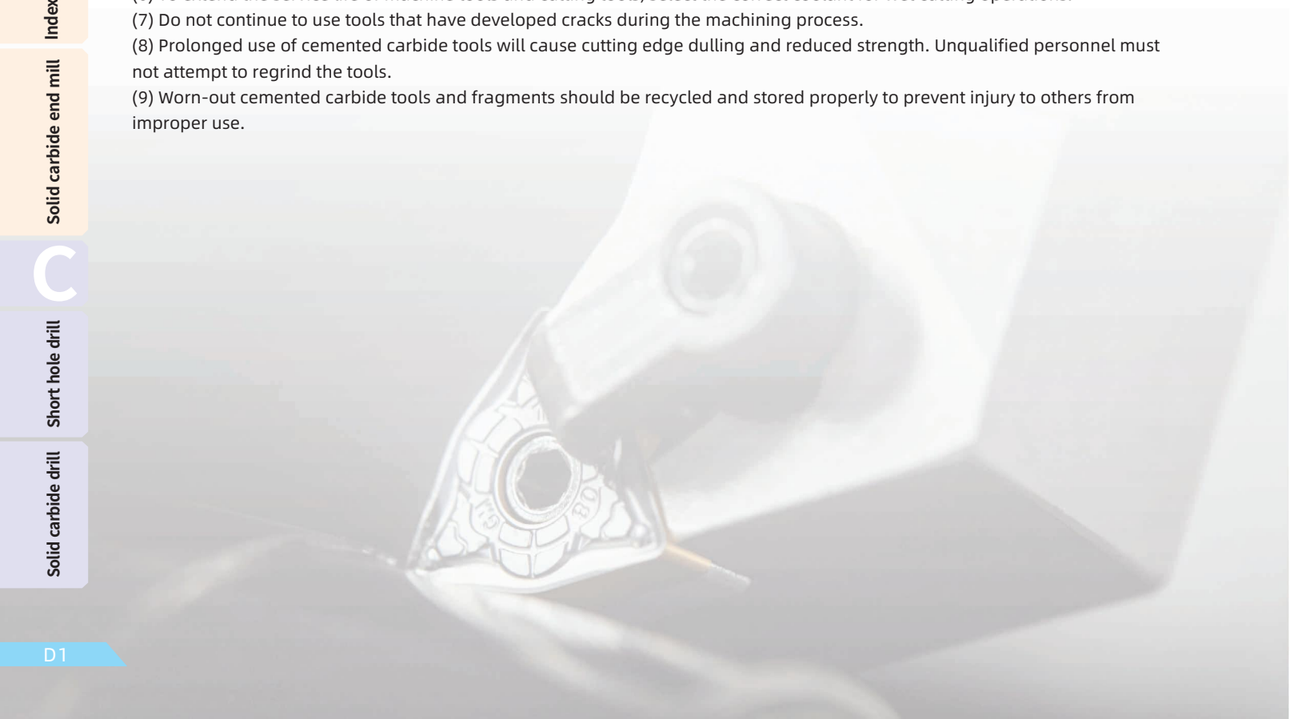
Before using products manufactured by Zhuzhou Huarui Precision Cutting Tools Co., Ltd., necessary safety training must be provided to operators, and the safety precautions on the product packaging must be read carefully. The company shall not bear any legal liability for adverse consequences caused by failure to use and operate in accordance with relevant requirements.

2. Basic Characteristics of Cemented Carbide Tools

Cemented carbide tools are made from a mixture of elements such as W, Co, Ti, Ta, Nb, Si, Al, C, N, O and their compounds through wet grinding, pressing and sintering, followed by a series of subsequent mechanical processing and post-processing treatments. Cemented carbide has excellent chemical stability, high strength and high wear resistance, making it an ideal tool for machining most metallic materials and high-strength non-metallic materials.

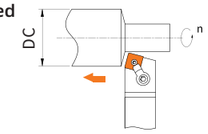
3. Precautions for Using Cemented Carbide Tools

1) Cemented carbide tools have sharp cutting edges. Due to their high hardness, cemented carbide materials are also relatively brittle. They may crack or break under excessive force or localized stress, which could cause injury.
(2) Cemented carbide tools have sharp cutting edges. Chips and fragments are inevitably generated during the cutting process. Operators must wear personal protective equipment (PPE) such as protective clothing and safety goggles.
(3) Cemented carbide is mainly composed of tungsten carbide and cobalt, with a very high density. Handle and store them as heavy objects and handle with care.
(4) Cemented carbide tools should be stored in a dry, non-corrosive atmosphere.
(5) The thermal expansion coefficient of cemented carbide is different from that of steel. Welding should be performed at an appropriate temperature to avoid welding cracks caused by stress concentration.
(6) To extend the service life of machine tools and cutting tools, select the correct coolant for wet cutting operations.
(7) Do not continue to use tools that have developed cracks during the machining process.
(8) Prolonged use of cemented carbide tools will cause cutting edge dulling and reduced strength. Unqualified personnel must not attempt to regrind the tools.
(9) Worn-out cemented carbide tools and fragments should be recycled and stored properly to prevent injury to others from improper use.



Formulas for turning

● **Cutting speed**



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

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

● **Feed rate**

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

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

● **Chip thickness**

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

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

● **Chip width**

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

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

● **Chip cross section**

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

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

● **Cutting force**

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

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

● **Cutting power**

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

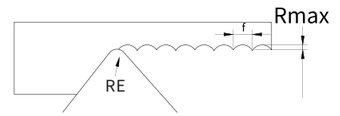
Pmot:Cutting power (KW) Kc:Specific cutting force(N/mm^2)
Vc:Cutting speed (m/min) ap:Cutting depth(mm)
f:Feed pre revolutio(mm/rev) η: Efficient of machine

● **Metal removal rate**

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

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

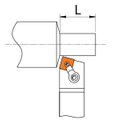
● **Roughness profile depth**



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

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

● **Machining time**



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

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

Formulas for milling

● **Cutting Speed**

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

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

● **Spindle Speed**

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

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

● **Feed Rate**

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

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

● **Feed Per Tooth**

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

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

● **Feed per revolution**

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

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

● **Cutting Time**

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

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

● **Horse Power**

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

Hp: Horse power Pmot: Cutting power (KW)

● **Power Requirement**

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

Pmot: Cutting power (KW) ap: Cutting depth ae: Cutting width
Kc: Sepecific cutting force (N/mm²) η: Machine efficiency rate (0.7-0.95)

● **Medium Chip Thickness**

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

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

● **Feed Force**

Where cutter is positioned centrally

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

Where cutter is positioned eccentrically

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

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

● **Metal Removal Rate**

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

Q: Metal removal rate (cm³/min) ap: Cutting depth ae: Cutting width
Vf: Feed rate (mm/min)

Formulas for drilling

● **Cutting speed**

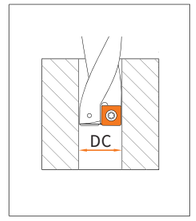
$$Vc = \frac{\pi * Dc * n}{1000} (m/min)$$

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

● **Spindle speed**

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

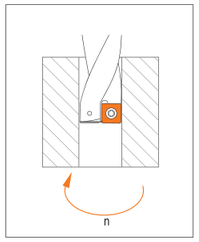
Vc: Cutting speed (m/min) π: ≈ 3.14
Dc: Cutter diameter (mm) n: Spindle speed (rev/min)



● **Feed rate**

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

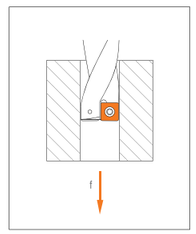
Vf: Feed rate (mm/min) fz: Feed per tooth (mm/z)
n: Spindle speed (rev/min) Z: Number of tooth



● **Feed per revolution**

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

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



● **Feed per revolution**

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

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

● **Metal removal rate**

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

Q: Metal removal rate (cm³/min) Vf: Feed rate (mm/min)
π: ≈ 3.14 Dc: Drilling tool diameter (mm)

● **Horse power**

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

Hp: Horse power Pmot: Cutting power (KW)

● **Power requirment**

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

Pmot: Cutting power (KW) Q: Metal removal rate (cm³/min)
Kc: Sepecific cutting force (N/mm²) η: Machine efficiency rate (0.7-0.95)

● **Torque**

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

Mc: Torque Dc: Drilling tool diameter (mm)
Kc: Sepecific cutting force (N/mm²) f: Feed per revolution (mm/rev)

● **Feed force**

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

Ff: Feed force f: Feed per revolution (mm/rev)
Dc: Drilling tool diameter (mm) Kc: Sepecific cutting force (N/mm²)

● **Chip thickness**

$$h = fz * \sin k (mm)$$

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

Comparison Table Of Cutting Materials

Country Region	Europe	Germany	UK		Sweden	The United States	France	Italy	Spain	Japan
Standard	DIN EN	W.-nr	BS	EN	SS	AISI	AFNOR	UNI	UNE	JIS
	Non-alloyed steel									
	S235JR G2	1.0038	4360 40 C	-	1311	A570.36	E 24-2 Ne	-	-	STKM 12A;C
	S235J2 G3	1.0116	4360 40 B	-	1312	A573-81 65	E 24-U	Fe37-3	-	-
	C15	1.0401	080M15	-	1350	1015	CC12	C15C16	F.111	-
	C22	1.0402	050A20	2C/2D	1450	1020	CC20	C20C21	F.112	-
	C15E	1.1141	080M15	32C	1370	1015	XC12	C16	C15K	S15C
	C25E	1.1158	-	-	-	1025	-	-	-	S25C
	S380N	1.89	4360 55 E	-	2145	A572-60	-	FeE390KG	-	-
	17MnV7	1.087	4360 55 E	-	2142	A572-60	NFA 35-501 E 36	-	-	-
	55Si7	1.0904	250A53	45	2085	9255	55S7	55Si8	56Si7	-
	-	-	-	-	2090	9255	55S7	-	-	-
	C35	1.0501	060A35	-	1550	1035	CC35	C35	F.113	-
	C45	1.0503	080M46	-	1650	1045	CC45	C45	F.114	-
	40Mn4	1.1157	150M36	15	-	1039	35M5	-	-	-
	36MN5	1.1167	-	-	2120	1335	40M5	-	36Mn5	SMn438(H)
	28Mn6	1.117	150M28	14A	-	1330	20M5	C28Mn	-	SCMn1
	C35G	1.1183	060A35	-	1572	1035	XC38TS	C36	-	S35C
	C45E	1.1191	080M46	-	1672	1045	XC42	C45	C45K	S45C
P	C53G	1.1213	060A52	-	1674	1050	XC48TS	C53	-	S50C
	C55	1.0535	070M55	-	1655	1055	-	C55	-	-
	C55E	1.1203	070M55	-	-	1055	XC55	C50	C55K	S55C
	S275J2G3	1.0144	4360 43C	-	1412	A573-81	E 28-3	-	-	SM 400A;B;C
	S355J2G3+C2	1.057	4360 50B	-	2132	-	E36-3	Fe52BFN/Fe52CFN	-	SM490A;B;C;YA;YB
	S355J2G3	1.0841	150 M 19	-	2172	5120	20 MC 5	Fe52	F-431	-
	C60E	1.0601	080A62	43D	-	1060	CC55	C60	-	-
	C60E	1.1221	080A62	43D	1678	1060	XC60	C60	-	S58C
	C101E	1.1274	060 A 96	-	1870	1095	XC 100	-	F-5117	-
	C101u	1.1545	BW 1A	-	1880	W 1	Y105	C36KU	F-5118	SK 3
	C105W1	-	BW2	-	2900	W210	Y120	C120KU	F.515	SUP4
	S340 MGC	1.0961	-	-	-	9262	60SC7	60SiCr8	60SiCr8	-
	11SMn30	1.0715	230M07	-	1912	1213	S250	CF9SMn28	11SMn28	SUM22
	11SMnPb30	1.0718	-	-	1914	12L13	S250Pb	CF9SMnPb28	11SMnPb28	SUM22L
	10SPb20	1.0722	-	-	-	-	10PbF2	CF10SPb20	10SPb20	-
	11SMn37	1.0736	240M07	1B	-	1215	S 300	CF9SMn36	12SMn35	-
	11SMnPb37	1.0737	-	-	1926	12L14	S300Pb	CF9SMnPb36	12SMnP35	-
	35S20	1.0726	212M36	8M	1957	1140	35MF4	-	F210G	-
	GC16E	1.1142	030A04	1A	1325	1115	-	-	-	-
	Low-alloyed steel									
	16Mo3	1.5415	1501-240	-	2912	A204Gr.A	15D3	16Mo3KW	16Mo3	-
	14Ni6	1.5622	-	-	-	A350LF5	16N6	14Ni6	15Ni6	-
	21NiCrMo2	1.6523	805M20	362	2506	8620	20NCD2	20NiCrMo2	20NiCrMo2	SNCM220(H)
	17CrNiMo6	1.6587	820A16	-	-	-	18NCD6	-	14NiCrMo13	-
	15Cr3	1.7015	523M15	-	-	5015	12C3	-	-	SCr415(H)
	55Cr3	1.7176	527A60	48	-	5155	55C3	-	-	SUP9(A)
	15CrMo5	1.7262	-	-	2216	-	12CD4	-	12CrMo4	SCM415(H)

Comparison Table Of Cutting Materials

Country Region	Europe	Germany	UK		Sweden	The United States	France	Italy	Spain	Japan
Standard	DIN EN	W.-nr	BS	EN	SS	AISI	AFNOR	UNI	UNE	JIS
	Low-alloyed steel									
	13CrMo4-5	1.7335	1501-620Gr27	-	-	A182 F11;F12	15CD3.5	14CrMo4 5	14CrMo45	-
							15CD4.5			
	10CrMo9 10	1.738	1501-622 Gr.31;45	-	2218	A182 F.22	12CD9, 10	12CrMo9, 10	TU.H	-
	14MoV6 3	1.7715	1503-660-440	-	-	-	-	-	13MoCrV6	-
	50CoMo4	1.7228	823M30	33	2512	-	-	653M31	-	-
	14NiCr10	1.5732	-	-	-	3415	14NC11	16NiCr11	15NiCr11	SNC415(H)
	14NiCr14	1.6582	655M13; A12	36A	-	3415;3310	12NC15	-	-	SNC815(H)
	16MnCr5	1.7131	(527M20)	-	2511	5115	16MC5	16MnCr5	16MnCr5	-
	34CrMo4	1.722	708A37	19B	2234	4137;4135	35CD4	35CrMo4	34CrMo4	SCM432;SCCRM3
	41CrMo4	1.7223	708M40	19A	2244	4140;4142	42CD4TS	41CrMo4	42CrMo4	SCM 440
	42CrMo4	1.7225	708M40	19A	2244	4140	42CD4	42CrMo4	42CrMo4	SCM440(H)
	14NiCrMo134	1.6657	832M13	36C	-	-	-	15NiCrMo13	14NiCrMo131	-
	31CrMo12	1.8515	722 M 24	-	2240	-	30 CD 12	30CrMo12	F-1712	-
	39CrMoV13 9	1.8523	897M39	40C	-	-	-	36CrMoV12	-	-
	41CrS4	1.7039	524A14	-	2092	L1	-	105WCR 5	-	-
	50NiCr13	1.2721	-	-	2550	L6	55NCV6	-	F-528	-
	45WCrV7	1.2542	BS1	-	2710	S1	-	45WCrV8KU	45WCrSi8	-
P	36CrNiMo4	1.6511	816M40	110	-	9840	40NCD3	38NiCrMo4(KB)	35NiCrMo4	-
	34CrNiMo6	1.3505	817M40	24	2541	4340	35NCD6	35NiCrMo6(KB)	-	-
	34Cr4	1.7033	530A32	18B	-	5132	32C4	34Cr4(KB)	35Cr4	SCr430(H)
	41Cr4	1.7035	530A40	18	-	5140	42C4	41Cr4	42Cr4	SCr440(H)
	32CrMo12	1.7361	722M24	40B	2240	-	30CD12	32CrMo12	F.124.A	-
	51CrV4	1.8159	735A50	47	2230	6150	50CV4	50CrV4	51CrV4	SUP10
	41CrAlMo7	1.8509	905M39	41B	2940	-	40CAD6, 12	41CrAlMo7	41CrAlMo7	-
	100Cr6	1.5752	534A99	31	2258	52100	100C6	100Cr6	F.131	SUJ2
	105WCr6	1.2419	-	-	2140	-	105WC13	10WCr6	105WCr5	SKS31
	-	-	-	-	-	-	-	107WCr5KU	-	SKS2, SKS3
	-	1.2714	-	-	-	L6	55NCDV7	-	F.520.S	SKT4
	100Cr6	1.2067	BL3	-	-	L3	Y100C6	-	100Cr6	-
	16MnCr5	1.7139	-	-	2127	-	-	-	-	-
	16Mo5	1.5423	1503-245-420	-	-	4520	-	16Mo5	16Mo5	-
	40NiCrMo8-4	1.6562	311-Type 7	-	-	8740	-	40NiCrMo2(KB)	40NiCrMo2	SNCM240
	42Cr4	1.7045	-	-	2245	5140	-	-	42Cr4	SCr440
	31NiCrMo14	1.5755	830 M 31	-	2534	-	-	-	F-1270	-
	36NiCr6	1.571	640A35	111A	-	3135	35NC6	-	-	SNC236
	22Mo4	1.5419	605A32	-	2108	8620	-	-	F520.S	-
	25CrMo4	1.7218	1717CDS110	-	2225	4130	25CD4	25CrMo4(KB)	AM26CrMo4	SCM420;SCM430
	-	-	-	-	2223	-	-	-	-	-
	高合金钢									
	X210Cr12	1.208	BD3	-	-	D3	Z200C12	X210Cr13KU	X210Cr12	SKD1
								X250Cr12KU		
	X43Cr13	1.2083	-	-	2314	-	-	-	-	-
	X40CrMoV5 1	1.2344	BH13	-	2242	H13	Z40CDV5	X35CrMoV05KU	X40CrMoV5	SKD61

Comparison Table Of Cutting Materials

Country Region	Europe	Germany	UK		Sweden	The United States	France	Italy	Spain	Japan
Standard	DIN EN	W.-nr	BS	EN	SS	AISI	AFNOR	UNI	UNE	JIS
	Low-alloyed steel									
								X40CrMoV511KU		
	X100CrMoV5 1	1.2363	BA2	-	2260	A2	Z100CDV5	X100CrMoV51KU	X100CrMoV5	SKD12
	X210CrW12	1.2436	-	-	2312	-	-	X215CrW12 1KU	X210CrW12	SKD2
	X30WCrV9 3	1.2581	BH21	-	-	H21	Z30WCV9	X28W09KU	X30WCrV9	SKD5
								X30WCrV9 3KU		
	X165CrMoV 12	1.2601	-	-	2310	-	-	X165CrMoW12KU	X160CrMoV12	-
	X155CrMoV12-1	1.2379	-	-	2736	HNV3	-	-	-	-
	X8Ni9	1.5662	1501-509;510	-	-	ASTM A353	-	X10Ni9	XBNi09	-
	12Ni19	1.568	-	-	-	2515	Z18N5	-	-	-
	S6-5-2	1.3343	4959BA2	-	2715	D3	Z40CSD10	15NiCrMo13	-	SUH3
	-	-	BM 2	-	2722	M 2	Z85WDCV	HS 6-5-2-2	F-5603.	SKH 51
	HS 6-5-2-5	1.3243	BM 35	-	2723	M 35	6-5-2-5	HS 6-5-2-5	F-5613	SKH 55
	HS 2-9-2	1.3348	-	-	2782	M 7	-	HS 2-9-2	F-5607	-
	G-X120Mn12	1.3401	Z120M12	-	2183	L3	Z120M12	XG120Mn12	X120Mn12	SCMnH/1
	Ferrite/martensite stainless steel									
	X10CrAL13	1.4724	403S17	-	-	405	Z10C13	X10CrAl12	F.311	SUS405
	X10CrAL18	1.4742	430S15	60	-	430	Z10CAS18	X8Cr17	F.3113	SUS430
P	X10CrAL2-4	1.4762	-	-	2322	446	Z10CAS24	X16Cr26	-	SUH446
	X1CrMoTi18-2	1.4521	-	-	2326	S44400	-	-	-	-
	X6Cr13	1.4	403S17	-	2301	403	Z6C13	X6Cr13	F.3110	SUS403
	X7Cr14	1.4001	-	-	-	-	-	-	F.8401	-
	X10Cr13	1.4006	410S21	56A	2302	410	Z10C14	X12Cr13	F.3401	SUS410
	X6Cr17	1.4016	430S15	960	2320	430	Z8C17	X8Cr17	F3113	SUS430
	X6CrAL13	1.4002	405S17	-	-	405	Z8CA12	X6CrAl13	-	-
	X20Cr13	1.4021	420S37	-	2303	420	Z20C13	X20Cr13	-	-
	X6CrMo17-1	1.4113	434S17	-	2325	434	Z8CD17.01	X8CrMo17	-	SUS434
	X45CrS9-3-1	1.4718	401S45	52	-	HW3	Z45CS9	X45GrSi8	F322	SUH1
	X85CrMoV18-2	1.4748	443S65	59	-	HNV6	Z80CSN20.02	X80CrSiNi20	F.320B	SUH4
	X20CrMoV12-1	1.4922	-	-	2317	-	-	X20CrMoNi 12 01	-	-
	X12CrS13	1.4005	416 S 21	-	2380	416	Z11CF1	X12 CrS 13	F-3411	SUS 416
	X46Cr13	1.4034	420S45	56D	2304	-	Z40CM	X40Cr14	F.3405	SUS420J2
	X19CrNi17-2	1.4057	431S29	57	2321	431	Z15CNi6.02	X16CrNi16	F.3427	SUS431
	X5CrNiCuNb16-4 X4	1.4542 1.4548	-	-	-	630	Z7CNU17-04	-	-	-
	CrNiMo16-5	1.4418	-	-	2387	-	Z6CND16-04-01	-	-	-
	X14CrMoS17	1.4104	-	-	2383	430F	Z10CF17	X10CrS17	F.3117	SUS430F

Comparison Table Of Cutting Materials

Country Region	Europe	Germany	UK		Sweden	The United States	France	Italy	Spain	Japan
Standard	DIN EN	W.-nr	BS	EN	SS	AISI	AFNOR	UNI	UNE	JIS
	Austenite stainless steel									
	X3CrNiMo13-4	1.4313	425C11	-	2385	CA6-NM	Z4CND13.4M	(G)X6CrNi304	-	SCS5
							Z38C13M			
	X53CrMnNiN21-9	1.4871	349S54	-	-	EV8	Z52CMN21.09	X53CrMnNiN21 9	-	SUH35, SUH36
	X2CrNiN18-10	1.4311	304S62	-	2371	304LN	Z2CN18.10	-	-	SUS304LN
	X2CrNiMoN17-13-3	1.4429	-	-	2375	316LN	Z2CND17.13	-	-	SUS316LN
	X2CrNiMo17-12-2	1.4435	316S13	-	2348	316L	Z2CND17-12	X2CrNiMo1712	-	-
	X2CrNiMo18-14-3	1.4404	316S13	-	2353	316L	Z2CND17.12	X2CrNiMo17 12	-	SCS16, SUS316L
	X3CrNiMo17-3-3	1.4436	316S33	-	2343 2347	316	Z6CND18-12-03	X8CrNiMo1713	-	-
	X2CrNiMo18-15-4	1.4438	317S12	-	2367	317L	Z2CND19.15	X2CrNiMo18 16	-	SUS317L
	X6CrNiNb18-10	1.455	347S17	58F	2338	347	Z6CNNb18.10	X6CrNiNb18 11	F.3552 F.3524	SUS347
	X6CrNiMoTi17-12-2	1.4571	320S17	58J	2350	316Ti	Z6NDT17.12	X6CrNiMoTi17 12	F.3535	-
	X10CrNiMoNb 18-12	1.4583	-	-	-	318	Z6CNDNb17 13B	X6CrNiMoNb17 13	-	-
	X15CrNiSi20-12	1.4828	309S24	-	-	309	Z15CNS20.12	-	-	SUS303
	X2CrNiMoN17-11-2	1.4406	301S21	58C	2370	308	Z1NCDU25.20	-	F.8414	SCS17
	X1CrNiMoCuN20-18-7	1.4547	-	-	2378	S31254	Z1CNDU20-18-06AZ	-	-	-
	X9CrNi18-8	1.431	-	-	2331	301	Z12CN17.07	X12CrNi17 07	F.3517	SUS301
	X7CrNiAL17-7	1.4568 1.4504	316S111	-	-	17-7PH	Z8CNA17-07	X2CrNiMo1712	-	-
M	X2CrNi19-11	1.4306	304S11	-	2352	304L	Z2CN18-10	X2CrNi18 11	-	-
			304S12							
	-	-	304S31	58E	2332 2333	304	Z6CN18.09	X5CrNi18 10	F.3504 F.3541	SUS304
	X5CrNi18-10	1.4301	304S15	58E	2332	304	Z6CN18.09	X5CrNi18 10	F.3551	SUS304
	X5CrNiMo17-2-2	1.4401	316S16	58J	2347	316	Z6CND17.11	X5CrNiMo17 12	F.3543	SUS316
	X6CrNiTi18-10	1.4541	321S12	58B	2337	321	Z6CNT18.10	X10CrNiS 18.09	F.3553 F.3523	SUS321
	X8CrNiS18-9	1.4305	303S21	58M	2346	303	Z10CNF 18.09	X6CrNiTi18 11	F.3508	SUS303
	High quality austenite (Ni>20%) stainless steel									
	G-X40NiCrSi36-18	1.4865	330C11	-	-	-	-	XG50NiCr39 19	-	SCH15
	X1NiCrMoCu25-20-5	1.4539	-	-	2562	UNS V 0890A	Z2 NCDU25-20	-	-	-
	X8CrNi25-21	1.4845	310S24	-	2361	310S	Z12CN25 20	X6CrNi25 20	F.331	SUH310
	X12NiCrSi36 16	1.4864	-	-	-	330	Z12NCS35.16	F-3313	-	SUH330
	X1NiCrMoCu31-27-4	1.4563	-	-	2584	NO8028	Z1NCDU31-27-03	-	-	-
	Duplex (austenite/ferrite) stainless steel									
	X2CrNiN23-4	1.4362	-	-	2376	S31500	-	-	-	-
	X8CrNiMo27-5	-	-	-	2324	S32900	-	-	-	-
	X2CrNiN23-4	-	-	-	2327	S32304	Z2CN23-04AZ	-	-	-
	-	-	-	-	2328	-	-	-	-	-
	X2CrNiMoN22-53	-	-	-	2377	S31803	Z2CND22-05-03	-	-	-

Comparison table of hardness

● Conversion value approximate to brinell hardness of steel

Brinell hardness 3000kgf HB	Rockwell hardness				Vickers hardness 50kgf HV	Shore hardness HS	Tensile strength (Gpa)
	A	B	C	D			
	Scale	Scale	Scale	Scale			
	60kgf	100kgf	150kgf	100kgf			
	brale	1/10in	brale	brale			
	Brale	Ball	Brale	Brale			
	HRA	HRB	HRC	HRD			
—	85.6	—	68.0	76.9	940	97	—
—	85.3	—	67.5	76.5	920	96	—
—	85.0	—	67.0	76.1	900	95	—
767	84.7	—	66.4	75.7	880	93	—
757	84.4	—	65.9	75.3	860	92	—
745	84.1	—	65.3	74.8	840	91	—
733	83.8	—	64.7	74.3	820	90	—
722	83.4	—	64.0	73.8	800	88	—
712	—	—	—	—	—	—	—
710	83.0	—	63.3	73.3	780	87	—
698	82.6	—	62.5	72.6	760	86	—
684	82.2	—	61.8	72.1	740		—
682	82.2	—	61.7	72.0	737	84	—
670	81.8	—	61.0	71.5	720	83	—
656	81.3	—	60.1	70.8	700	—	—
653	81.2	—	60.0	70.7	697	81	—
647	81.1	—	59.7	70.5	690	—	—
638	80.8	—	59.2	70.1	680	80	—
630	80.6	—	58.8	69.8	670	—	—
627	80.5	—	58.7	69.7	667	79	—
601	79.8	—	57.3	68.7	640	77	—
578	79.1	—	56.0	67.7	615	75	—
555	78.4	—	54.7	66.7	591	73	2.06
534	77.8	—	53.5	65.8	569	71	1.98
514	76.9	—	52.1	64.7	547	70	1.89
495	76.3	—	51.0	63.8	528	68	1.82
477	75.6	—	49.6	62.7	508	66	1.73
461	74.9	—	48.5	61.7	491	65	1.67
444	74.2	—	47.1	60.8	472	63	1.59
429	73.4	—	45.7	59.7	455	61	1.51
415	72.8	—	44.5	58.8	440	59	1.46
401	72.0	—	43.1	57.8	425	58	1.39
388	71.4	—	41.8	56.8	410	56	1.33
375	70.6	—	40.4	55.7	396	54	1.26
363	70.0	—	39.1	54.6	383	52	1.22
352	69.3	(110.0)	37.9	53.8	372	51	1.18
341	68.7	(109.0)	36.6	52.8	360	50	1.13
331	68.1	(108.5)	35.5	51.9	350	48	1.10

Comparison table of hardness

● Conversion value approximate to brinell hardness of steel

Brinell hardness 3000kgf HB	Rockwell hardness				Vickers hardness 50kgf HV	Shore hardness HS	Tensile strength (Gpa)
	A	B	C	D			
	Scale	Scale	Scale	Scale			
	60kgf	100kgf	150kgf	100kgf			
	brale	1/10in	brale	brale			
	Brale	Ball	Brale	Brale			
	HRA	HRB	HRC	HRD			
321	67.5	(108.0)	34.3	50.1	339	47	1.06
311	66.9	(107.5)	33.1	50.0	328	46	1.03
302	66.3	(107.0)	32.1	49.3	319	45	1.01
293	65.7	(106.0)	30.8	48.3	309	43	0.97
285	65.3	(105.5)	29.9	47.6	301	—	0.95
277	64.6	(104.5)	28.8	46.7	292	41	0.92
269	64.1	(104.0)	27.6	45.9	284	40	0.89
262	63.6	(103.0)	26.6	45.0	276	39	0.87
255	63.0	(102.0)	25.4	44.2	269	38	0.84
248	62.5	(101.0)	24.2	43.2	261	37	0.82
241	61.8	(100.0)	22.8	42.0	253	36	0.80
235	61.4	99.0	21.7	41.4	247	35	0.78
229	60.8	98.2	20.5	40.5	241	34	0.76
223	—	97.3	(18.8)	—	234	—	—
217	—	96.4	(17.5)	—	228	33	0.73
212	—	95.5	(16.0)	—	222	—	0.71
207	—	94.6	(15.2)	—	218	32	0.69
201	—	93.8	(13.8)	—	212	31	0.68
197	—	92.8	(12.7)	—	207	30	0.66
192	—	91.9	(11.5)	—	202	29	0.64
187	—	90.7	(10.0)	—	196	—	0.62
183	—	90.0	(9.0)	—	192	28	0.62
179	—	89.0	(8.0)	—	188	27	0.60
174	—	87.8	(6.4)	—	182	—	0.59
170	—	86.8	(5.4)	—	178	26	0.57
167	—	86.0	(4.4)	—	175	—	0.56
163	—	85.0	(3.3)	—	171	25	0.55
156	—	82.9	(0.9)	—	163	—	0.52
149	—	80.8	—	—	156	23	0.50
143	—	78.7	—	—	150	22	0.49
137	—	76.4	—	—	143	21	0.46
131	—	74.0	—	—	137	—	0.45
126	—	72.0	—	—	132	20	0.43
121	—	69.8	—	—	127	19	0.41
116	—	67.6	—	—	122	18	0.40
111	—	65.7	—	—	117	15	0.38

1) Values in parentheses are generally not used in this table.
2) The indenters (brales) for Rockwell hardness scales A, C and D are made of diamond.
3) This table is excerpted from the JIS Iron and Steel Handbook (1980).

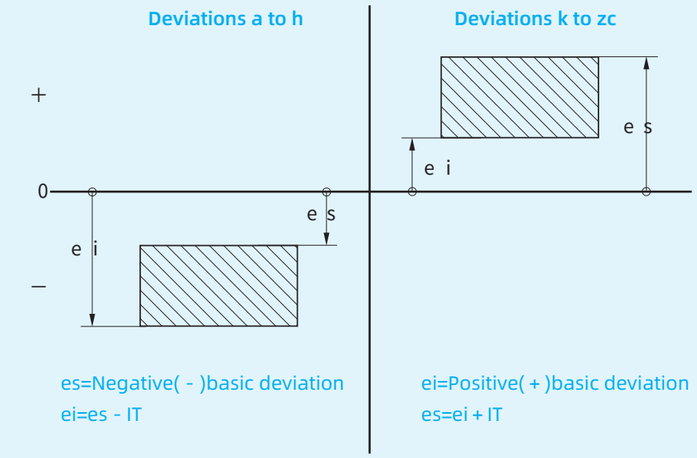
Fit dimension tolerance

Basic dimension mm		Standard tolerance class																	
		IT1	IT2	IT3	IT4	IT5	IT6	IT7	IT8	IT9	IT10	IT11	IT12	IT13	IT14	IT15	IT16	IT17	IT18
>	To	μm											mm						
---	3	0.8	1.2	2	3	4	6	10	14	25	40	60	0.1	0.14	0.25	0.4	0.6	1	1.4
3	6	1	1.5	2.5	4	5	8	12	18	30	48	75	0.12	0.18	0.3	0.48	0.75	1.2	1.8
6	10	1	1.5	2.5	4	6	9	15	22	36	58	90	0.15	0.22	0.36	0.58	0.9	1.5	2.2
10	18	1.2	2	3	5	8	11	18	27	43	70	110	0.18	0.27	0.43	0.7	1.1	1.8	2.7
18	30	1.5	2.5	4	6	9	13	21	33	52	84	130	0.21	0.33	0.52	0.84	1.3	2.1	3.3
30	50	1.5	2.5	4	7	11	16	25	39	62	100	160	0.25	0.39	0.62	1	1.6	2.5	3.9
50	80	2	3	5	8	13	19	30	46	74	120	190	0.3	0.46	0.74	1.2	1.9	3.0	4.6
80	120	2.5	4	6	10	15	22	35	54	87	140	220	0.35	0.54	0.87	1.4	2.2	3.5	5.4
120	180	3.5	5	8	12	18	25	40	63	100	160	250	0.4	0.63	1	1.6	2.5	4	6.3
180	250	4.5	7	10	14	20	29	46	72	115	185	290	0.46	0.72	1.15	1.85	2.9	4.6	7.2
250	315	6	8	12	16	23	32	52	81	130	210	320	0.52	0.81	1.3	2.1	3.2	5.2	8.1
315	400	7	9	13	18	25	36	57	89	140	230	360	0.57	0.89	1.4	2.3	3.6	5.7	8.9
400	500	8	10	15	20	27	40	63	97	155	250	400	0.63	0.97	1.55	2.5	4	6.3	9.7
500	630	9	11	16	22	32	44	70	110	175	280	440	0.7	1.1	1.75	2.8	4.4	7	11
630	800	10	13	18	25	36	50	80	125	200	320	500	0.8	1.25	2	3.2	5	8	12.5
800	1000	11	15	21	28	40	56	90	140	230	360	560	0.9	1.4	2.3	3.6	5.6	9	14
1000	1250	13	18	24	33	47	66	105	165	260	420	660	1.05	1.65	2.6	4.2	6.6	10.5	16.5
1250	1600	15	21	29	39	55	78	125	195	310	500	780	1.25	1.95	3.1	5	7.8	12.5	19.5
1600	2000	18	25	35	46	65	92	150	230	370	600	920	1.5	2.3	3.7	6	9.2	15	23
2000	2500	22	30	41	55	78	110	175	280	440	700	1100	1.75	2.8	4.4	7	11	17.5	28
2500	3150	26	36	50	68	96	135	210	330	540	860	1350	2.1	3.3	5.4	8.6	13.5	21	33

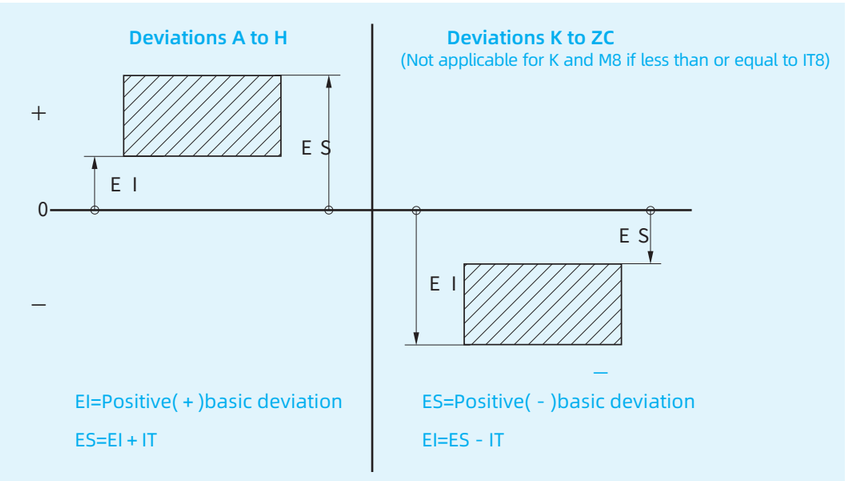
Notice
1. Standard tolerance values from IT1 to IT5 with basic sizes greater than 500mm are on trial.
2. IT4 to IT18 is not applicable if the basic size is less than or equal to 1mm.

Fit dimension tolerance

The lower deviation (ei) and upper deviation (es) of the shaft can be obtained from the basic deviation and standard tolerance (IT) of the shaft.



The lower deviation (EI) and upper deviation (ES) of the hole can be obtained from the basic deviation and standard tolerance (IT) of the hole.



For example:
for a hole with diameter of ϕ3 and tolerance class of H7, it can be found from the Value Table of Hole Basic Deviation that the lower deviation (EI) of tolerance class H within this size range is 0, while the corresponding standard tolerance (IT) of class 7 is 10ϕm, so the upper deviation ES=EI+IT=10ϕm.
Therefore, the fit dimension of this hole is $\phi 3\ ^{+0.01}_{0}$ mm.

Fit dimension tolerance

Basic deviation value of the shaft

Basic dimension mm		Basic deviation value											
		Upper deviation es											
		All standard tolerance classes											
>	To	a	b	c	cd	d	e	ef	f	fg	g	h	js
---	3	-270	-140	-60	-34	-20	-14	-10	-6	-4	-2	0	
3	6	-270	-140	-70	-46	-30	-20	-14	-10	-6	-4	0	
6	10	-280	-150	-80	-56	-40	-25	-18	-13	-8	-5	0	
10	14	-290	-150	-95		-50	-32		-16		-6	0	
14	18												
18	24	-300	-160	-110		-65	-40		-20		-7	0	
24	30												
30	40	-310	-170	-120		-80	-50		-25		-9	0	
40	50	-320	-180	-130									
50	65	-340	-190	-140		-100	-60		-30		-10	0	
65	80	-360	-200	-150									
80	100	-380	-220	-170		-120	-72		-36		-12	0	
100	120	-410	-240	-180									
120	140	-460	-260	-200		-145	-85		-43		-14	0	
140	160	-520	-280	-210									
160	180	-580	-310	-230									
180	200	-660	-340	-240		-170	-100		-50		-15	0	
200	225	-740	-380	-260									
225	250	-820	-420	-280									
250	280	-920	-480	-300		-190	-110		-56		-17	0	
280	315	-1050	-540	-330									
315	355	-1200	-600	-360		-210	-125		-62		-18	0	
355	400	-1350	-680	-400									
400	450	-1500	-760	-440		-230	-135		-68		-20	0	
450	500	-1650	-840	-480									
500	560					-260	-145		-76		-22	0	
560	630												
630	710					-290	-160		-80		-24	0	
710	800												
800	900					-320	-170		-86		-26	0	
900	1000												
1000	1120					-350	-195		-98		-28	0	
1120	1250												
1250	1400					-390	-220		-110		-30	0	
1400	1600												
1600	1800					-430	-240		-120		-32	0	
1800	2000												
2000	2240					-480	-260		-130		-34	0	
2240	2500												
2500	2800					-520	-290		-145		-38	0	
2800	3150												

Deviation=±(ITn/2), in which ITn is the IT value

Notes:
1. The basic deviations a and b are not applicable if the basic size is less than or equal to 1mm.
2. Deviation=±[(ITn-1)/2] if the ITn value is odd from js7 to js11 in the tolerance zone.

Fit dimension tolerance

Basic deviation value of the shaft

Basic deviation value																			
Lower deviation ei																			
IT5 & IT6	IT7	IT8	IT4 & IT7	≤ IT3 >IT7	All standard tolerance classes														
j			k		m	n	p	r	s	t	u	v	x	y	z	zn	zb	zc	
-2	-4	-6	0	0	+2	+4	+6	+10	+14		+18		+20		+26	+32	+40	+60	
-2	-4		+1	0	+4	+8	+12	+15	+19		+23		+28		+35	+42	+50	+80	
-2	-5		+1	0	+6	+10	+15	+19	+23		+28		+34		+42	+52	+67	+97	
-3	-6		+1	0	+7	+12	+18	+23	+28		+33		+40		+50	+64	+90	+130	
												+39	+45		+60	+77	+108	+150	
-4	-8		+2	0	+8	+15	+22	+28	+35		+41	+47	+54	+63	+73	+98	+136	+188	
										+41	+48	+55	+64	+75	+88	+118	+160	+218	
-5	-10		+2	0	+9	+17	+26	+34	+43	+48	+60	+68	+80	+94	+112	+148	+200	+274	
										+54	+70	+81	+97	+114	+136	+180	+242	+325	
-7	-12		+2	0	+11	+20	+32	+41	+53	+66	+87	+102	+122	+144	+172	+226	+300	+405	
								+43	+59	+75	+102	+120	+146	+174	+210	+274	+360	+480	
-9	-15		+3	0	+13	+23	+37	+51	+71	+91	+124	+146	+178	+214	+258	+335	+445	+585	
								+54	+79	+104	+144	+172	+210	+254	+310	+400	+525	+690	
-11	-18		+3	0	+15	+27	+43	+63	+92	+122	+170	+202	+248	+300	+365	+470	+620	+800	
								+65	+100	+134	+190	+228	+280	+340	+415	+535	+700	+900	
								+68	+108	+146	+210	+252	+310	+380	+465	+600	+780	+1000	
-13	-21		+4	0	+17	+31	+50	+77	+122	+166	+236	+284	+350	+425	+520	+670	+880	+1150	
								+80	+130	+180	+258	+310	+385	+470	+575	+740	+960	+1250	
								+84	+140	+196	+284	+340	+425	+520	+640	+820	+1050	+1350	
-16	-26		+4	0	+20	+34	+56	+94	+158	+218	+315	+385	+475	+580	+710	+920	+1200	+1550	
								+98	+170	+240	+350	+425	+525	+650	+790	+1000	+1300	+1700	
-18	-28		+4	0	+21	+37	+62	+108	+190	+268	+390	+475	+590	+730	+900	+1150	+1500	+1900	
								+114	+208	+294	+435	+530	+660	+820	+1000	+1300	+1650	+2100	
-20	-32		+5	0	+23	+40	+68	+126	+232	+330	+490	+595	+740	+920	+1100	+1450	+1850	+2400	
								+132	+252	+360	+540	+660	+820	+1000	+1250	+1600	+2100	+2600	
			0	0	+26	+44	+78	+150	+280	+400	+600								
								+155	+310	+450	+660								
			0	0	+30	+50	+88	+175	+340	+500	+740								
								+185	+380	+560	+840								
			0	0	+34	+56	+100	+210	+430	+620	+940								
								+220	+470	+680	+1050								
			0	0	+40	+66	+120	+250	+520	+780	+1150								
								+260	+580	+840	+1300								
			0	0	+48	+78	+140	+300	+640	+960	+1450								
								+330	+720	+1050	+1600								
			0	0	+58	+92	+170	+370	+820	+1200	+1850								
								+400	+920	+1350	+2000								
			0	0	+68	+110	+195	+440	+1000	+1500	+2300								
								+460	+1100	+1650	+2500								
			0	0	+76	+135	+240	+550	+1250	+1900	+2900								
								+580	+1400	+2100	+3200								

Fit dimension tolerance

● Basic deviation value of the hole

Basic dimension mm		Basic deviation value																			
		Lower deviation EI											Upper deviation ES								
		All standard tolerance classes											IT6	IT7	IT8	≤ IT8	>IT8	≤ IT8	>IT8	≤ IT8	>IT8	≤ IT7
>	To	A	B	C	CD	D	E	EF	F	FG	G	H	JS	J			K		M		N		P To ZC
---	3	+270	+140	+60	+34	+20	+14	+10	+6	+4	+2	0	Deviation=±(IT$_n$/2), in which IT$_n$ is the IT value	+2	+4	+6	0	0	-2	-2	-4	-4	Add a Δ value to the corresponding value greater than IT7
3	6	+270	+140	+70	+46	+30	+20	+14	+10	+6	+4	0		+5	+6	+10	-1+Δ		-4+Δ	-4	-8+Δ	0	
6	10	+280	+150	+80	+56	+40	+25	+18	+13	+8	+5	0		+5	+8	+12	-1+Δ		-6+Δ	-6	-10+Δ	0	
10	14	+290	+150	+95		+50	+32		+16		+6	0		+6	+10	+15	-1+Δ		-7+Δ	-7	-12+Δ	0	
14	18																						
18	24	+300	+160	+110		+65	+40		+20		+7	0		+8	+12	+20	-2+Δ		-8+Δ	-8	-15+Δ	0	
24	30																						
30	40	+310	+170	+120		+80	+50		+25		+9	0		+10	+14	+24	-2+Δ		-9+Δ	-9	-17+Δ	0	
40	50	+320	+180	+130																			
50	65	+340	+190	+140		+100	+60		+30		+10	0		+13	+18	+28	-2+Δ		-11+Δ	-11	-20+Δ	0	
65	80	+360	+200	+150																			
80	100	+380	+220	+170		+120	+72		+36		+12	0		+16	+22	+34	-3+Δ		-13+Δ	-13	-23+Δ	0	
100	120	+410	+240	+180																			
120	140	+460	+260	+200		+145	+85		+43		+14	0		+18	+26	+41	-3+Δ		-15+Δ	-15	-27+Δ	0	
140	160	+520	+280	+210																			
160	180	+580	+310	+230																			
180	200	+660	+340	+240		+170	+100		+50		+15	0		+22	+30	+47	-4+Δ		-17+Δ	-17	-31+Δ	0	
200	225	+740	+380	+260																			
225	260	+820	+420	+280																			
260	280	+920	+480	+300		+190	+110		+56		+17	0		+25	+36	+55	-4+Δ		-20+Δ	-20	-34+Δ	0	
280	315	+1050	+540	+330																			
315	355	+1200	+600	+360		+210	+125		+62		+18	0		+29	+39	+60	-4+Δ		-21+Δ	-21	-37+Δ	0	
355	400	+1350	+680	+400																			
400	450	+1500	+760	+440		+230	+135		+68		+20	0		+33	+43	+66	-5+Δ		-23+Δ	-23	-40+Δ	0	
450	500	+1650	+840	+480																			
500	560					+260	+145		+76		+22	0					0		-26		-44		
560	630																						
630	710					+290	+160		+80		+24	0					0		-30		-50		
710	800																						
800	900					+320	+170		+86		+26	0					0		-34		-56		
900	1000																						
1000	1120					+350	+195		+98		+28	0					0		-40		-66		
1120	1250																						
1250	1400					+390	+220		+110		+30	0					0		-48		-78		
1400	1600																						
1600	1800					+430	+240		+120		+32	0					0		-58		-92		
1800	2000																						
2000	2240					+480	+260		+130		+34	0					0		-68		-110		
2240	2500																						
2500	2800					+520	+290		+145		+38	0					0		-76		-135		
2800	3150																						

Notes:
1. The basic deviation A and B as well as N which is greater than IT8 are not applicable if the basic size is less than or equal to 1mm.
2. Deviation=±[(IT$_n$-1)/2] if the IT$_n$ value is odd from JS7 to JS11 in the tolerance zone.
3. The desired Δvalue can be selected from the right side of the table for K, M, N which is less than or equal to IT8, and P to ZC which is less than or equal to IT7.
For example: K7 in segment 18-30mm: Δ=8 μm, so ES=-2+8=+6 μm
S6 in segment 18-30mm: Δ=4 μm, so ES=-35+4=-31 μm
4) An exceptional circumstance: M5 in segment 250 - 315mm, ES=-9 μm (instead of-11 μm).

Fit dimension tolerance

● Basic deviation value of the hole

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

Comparison table of PVD turning grades

Type	Classification codes		HUAREAL	SANDVIK	KENNAMETAL	ISCAR	MiTSUBiSHi	TUNGALOY	KYOCERA	SUMITOMO	TAEGUTEC	ZCC.CT
	ISO classification	Groups of materials										
CVD turning	P	P10	HR5225 HR1135 HR7215	GC1025 GC1125	KCS10 KCU10 KC5010	IC807	VP10MF MS6015	AH710	PR930 PR1005 PR1025 PR1115 PR1215 PR1425 PR1225	AC1030U ACZ150 AC5025S AC520U		YBG102
		P20	HR5125 HR5225 HR7125 HR7215 HR7225	GC1025 GC1125	KCS10 KCU10 KCU25 KC5010 KC5025	IC807 IC808 IC810	VP10RT VP20RT VP15TF VP20MF	AH120 AH725 AH730 SH725 SH730 J740	PR930 PR1025 PR1115 PR1215 PR1225 PR1625	AC1030U AC5025S AC520U AC530U	TT9020 TT9030	YBG202
		P30	HR5125 HR5225 HR7125 HR7225	GC1025 GC1125	KCU25 KC5025	IC328 IC330 IC830 IC928	VP10RT VP20RT VP15TF VP20MF	AH725 AH7025 AH730 SH725 SH730 GH730 GH330 J740	PR1025 PR1225 PR1535	AC1030U AC530U	TT8020 TT8080 TT9030	YBG202
		P40	HR5125 HR7125	GC1025		IC830		AH120 AH725 AH645		AC1030U	TT8020 TT8080 TT9080	
	M	M10	HR9205 HR7115	GC1115 GC1125	KCS10 KCU10 KC5010	IC807 IC808 IC907 IC908	VP10MF MS6015	AH8005 AH630	PR1025 PR1215 PR1225	AC515S AC5025S AC510U AC520U ACZ150	TT5080	YBG202 YBG205
		M20	HR5125 HR5225 HR7115 HR7125 HR7225	GC1115 GC1125 GC2035	KCS10 KCU10 KCU25 KC5010 KC5025	IC330 IC806 IC808 IC830 IC908 IC330 IC806 IC808 IC830 IC908 IC928	VP10RT VP20RT VP15TF VP20MF	AH8015 AH630 AH120 AH7025 AH725 SH725 SH730	PR930 PR1025 PR1125 PR1215 PR1425 PR1225 PR1515	AC5015S AC5025S AC1030U AC520U	TT5080 TT9080	YBG202 YBG205
		M30	HR5125 HR5225 HR7125 HR7225	GC1125 GC2035	KCU25 KC5025	IC328 IC330 IC830 IC840 IC882	VP10RT VP20RT VP15TF VP20MF MP7035	AH645 AH120 AH725 SH725 SH730 J740	PR1125 PR1535	AC5025S AC6040M AC1030U AC520U AC530U	TT8020 TT8080 TT9020 TT9080	
		M40	HR5125 HR7125	GC2035		IC830 IC928	MP7035	AH645		AC6040M AC1030U AC530U	TT8020 TT8080 TT9020 TT9080	

Comparison table of PVD turning grades

Type	Classification codes		HUAREAL	SANDVIK	KENNAMETAL	ISCAR	MiTSUBiSHi	TUNGALOY	KYOCERA	SUMITOMO	TAEGUTEC	ZCC.CT
	ISO classification	Groups of materials										
CVD turning	K	K10		GC3330 GC3220 K20W K20D K20M K15W	KCS10 KCU10 KC5010	IC810		GH110 AH110	PR905 PR1215	AC1030U AC510U ACZ150		
		K20		GC3330 GC3220 GC3040 K20W K20D GC4230 K20M K15W	KCS10 KCU10 KCU25 KC5010 KC5025		VP10RT VP20RT VP15TF	AH120 AH725 AH730 SH725 SH730 J740	PR905 PR1215	AC1030U AC5025S AC520U AC530U		
		K30		GC3330 GC3040 K20W GC4240 GC4230		IC830 IC908 IC910 IC928	VP10RT VP20RT VP15TF	AH725 AH7025 AH730 SH725 SH730 GH730 GH330 J740		AC1030U AC530U		
	S	S01	HR9205			IC804 IC806	MP9005 VP05RT	AH8005 AH905			PR005S	YBG102
		S10	HR9205 HR9215	GC1105 GC1005 GC1025	KC5010 KC5510 KCU10 KCS10	IC807 IC808 IC907 IC908	MP9005 MP9015 VP10RT	AH8015 AH905 SH730 AH110	PR005S PR015S	AC510U AC5015S	TT9080 TT9030	YBG102 YBG105 YBG202 YBG103
		S20	HR9215	GC1025 GC1125	KC5025 KC5525 KCU25	IC806 IC808 IC908	MP9015 MT9015 VP20RT MP9025	AH8015 AH120 AH725	PR015S PR1535	AC510U AC520U AC5025S	TT8080 TT8020	YBG212 YBG105 YBS103
		S30	HR9215	GC1125		IC3028	MP9025	AH725	PR1535	AC520U		YBG212

Comparison table of PVD milling grades

Type	Classification codes		HUAREAL	SANDVIK	KENNAMETAL	ISCAR	MiTSUBiSHi	TUNGALOY	KYOCERA	SUMITOMO	TAEGUTEC	ZCC.CT
	ISO classification	Groups of materials										
PVD milling	P	P10	HR5110 HR5210	GC1010 GC1025 GC1030	KC5010M KC515M	IC807 IC903		AH120 AH725	PR830 PR1025 PR1225	ACP2500 ACP200	TT2510 TT7080	YBG252
		P20	HR5120 HR5220 HR5130	GC1025 GC1030 GC2030	KC522M KC525M KCSM30 SP6519	IC807 IC808 IC810 IC380 IC330	MP6120 VP15TF	AH120 AH725 AH3135 AH9030 AH3225 AH9130	PR1525 PR830 PR1025 PR1225 PR1230	ACP3000 ACU2500 ACP200 ACP300	TT2510 TT7080 TT8020 TT9030 TT9080	YBG202 YBG205 YBG9320 YBG252
		P30	HR5120 HR5130 HR530 HR7130	GC1030 GC1010 GC2030	KC525M KC530 KC725M KC735M KCPM40 KCSM30 X400	IC328 IC330 IC380 IC830 IC928	MP6120 VP15TF MP6130 VP30RT	AH120 AH725 AH3135 AH130 AH3225 AH9130	PR1230 PR1535	ACP3000 ACU2500 ACP200 ACP300	TT8020 TT8080 TT9030 TT9080	YBG302
		P40	HR7130	GC1030 GC2030	KC725M KC735M KCPM40	IC830	VP30RT	AH120 AH725 AH645		ACP3000 ACU2500 ACP300	TT8020 TT8080 TT9030 TT9080	YBG302
	M	M10	HR5110 HR5120 HR5220	GC1010 GC1030	KC515M SP4019 SP6519	IC807 IC808 IC903 IC907 IC908		AH725	PR1025 PR1225	ACU2500 ACM100 ACK300 ACP300		YBG252
		M20	HR5110 HR5120 HR5220 HR5130	GC1030 GC1040 GC2030 S30T	KC522M KC525M SP4019 SP6519 X700	IC330 IC808 IC830 IC840 IC882 IC908 IC928	VP15TF MP7130 MP7030 VP20RT	AH725 AH3135 AH130 AH6030 AH3225 AH9130	PR1525 PR1025 PR1225	ACU2500 ACK300 ACP300	TT9030 TT9080	YBG202 YBG205 YBG9320 YBG252
		M30	HR5120 HR5130 HR530	GC1040 S30T GC2030	KC522M KC525M KC725M KC735M KCPM40 KCSM30 KCSM40 SC6525 X700	IC328 IC330 IC830 IC840 IC882	VP15TF MP7130 MP7030 VP20RT MP7140	AH3135 AH130 AH9130	PR1535	TT8020 TT8080 TT9030 TT9080	TT8020 TT8080 TT9020 TT9080	YBG302
		M40	HR7130		KC725M KCPM40 KCSM40	IC830 IC928	MP7140 VP30RT	AH140		TT8020 TT8080 TT9030 TT9080	TT8020 TT8080 TT9020 TT9080	YBG302

Comparison table of PVD milling grades

Type	Classification codes		HUAREAL	SANDVIK	KENNAMETAL	ISCAR	MiTSUBiSHi	TUNGALOY	KYOCERA	SUMITOMO	TAEGUTEC	ZCC.CT
	ISO classification	Groups of materials										
PVD milling	K	K10	HR5120 HR5220	GC1010 GC1020	KC514M KC515M KCK20 SP4019	IC810	MP8010	AH110 GH120	PR510 PR905 PR1210	ACK3000 ACU2500	TT6080	YBG102 YBG252
		K20	HR5120	GC1020	KC514M KC520M KC524M KCK20 SP6519	IC808 IC810 IC83	VP15TF VP20RT	AH120 AH9030 AH9130	PR905 PR1210	ACK3000 ACU2500 ACK300	TT6080	YBG152
		K30	HR5130		KC522M KC524M SP6519	IC830 IC810 IC908 IC910 IC928 IC950	VP15TF VP20RT	AH120		ACK3000 ACU2500 ACK300		

Comparison table of CVD turning grades

Type	Classification codes		HUAREAL	SANDVIK	KENNAMETAL	ISCAR	MiTSUBiSHi	TUNGALOY	KYOCERA	SUMITOMO	TAEGUTEC	ZCC.CT
	ISO classification	Groups of materials										
CVD milling	P	P01	HR8105 HR8115	GC4305 GC4315	KCP05B KCPK05 KCK05B KCK15B	IC8005 IC8150 IC428	UE6105	T9205 T9105	CA510 CA5505	AC8015P AC810P	TT8105	
		P10	HR8115	GC4305 GC4415 GC4325	KCP05B KCPK05 KCP10B KCK15B KCK20B	IC5100 IC8150 IC8250 IC9015	UE6105 MC6015 UE6110 MY5015	T9205 T9105 T9215 T9115	CA510 CA515 CA5505 CA5515	AC8015P AC810P	TT8105 TT8115	YBC151 YBC152
		P20	HR8125 HR8225	GC4225 GC4325 GC4425	KCP10B KCP25B KCM15B	IC8150 IC8250 IC8350 IC9015	MC6015 UE6110 MC6025 UE6020 MY5015	T9215 T9115 T9225 T9125	CA025P CA525 CA5515 CA5525 CR9025	AC8025P AC820P	TT5100 TT8125	YBC251 YBC252
		P30	HR8225 HR8135	GC4315 GC4325 GC4335 GC2025	KCP25B KCP30B KCM15B	IC8350 IC8025	MC6025 UE6020 MC6035 UE6035 UH6400	T9225 T9125 T9235 T9135 T6130	CA025P CA525 CA5525 CA530 CA5535 CA9025	AC8035P AC830P AC6030M AC630M	TT8125 T5100	YBC252 YBC351 YBC352
		P40	HR8225 HR8135	GC4325 GC4335	KCP30B KCP40B KCM25B KCM35B	IC8350 IC8025	MC6035 UE6035 UH6400		CA530 CA5535	AC8035P AC830P AC6030M AC630M	TT8135 TT7100	YBC351 YBC352
	M	M10		GC2015 GC1515	KCM15B	IC6015 IC8025 IC8150 IC8250 IC5820	MC7015 US7020	T9235 T9135 T6130	CA6515	AC6020M AC610M	TT9215	
		M20		GC2015 GC2025 GC2020	KCP30B KCP40B KCM15B KCM25B	IC6015 IC6025 IC8320	MC7015 US7020 MC7025	T9215 T9115	CA6525	AC6020M AC6030M AC610M AC630M	TT9225	YBM151 YBM153
		M30		GC2025 GC2020	KCP40B KCM25B KCM35B	IC6025	MC7025 US735	T6120 T9215 T9115		AC6030M AC630M AC8035P AC830P	TT9235	YBM151 YBM251
		M40			KCM35B KCM35		US735	T6130		AC6030M AC630M	TT9235	YB253

Comparison table of CVD turning grades

Type	Classification codes		HUAREAL	SANDVIK	KENNAMETAL	ISCAR	MiTSUBiSHi	TUNGALOY	KYOCERA	SUMITOMO	TAEGUTEC	ZCC.CT
	ISO classification	Groups of materials										
CVD milling	K	K01		GC3210	KCK05B KCK05	IC5005	MC5005 UC5105	T5105	CA310 CA4010 CA4505 CA5505	AC4010K AC405K	TT7005	YBD052
		K10	HR6115 HR6215	GC3210	KCK05B KCK05 KCK15B KCK15	IC5005 IC5010 IC5100	MC5015 UC5115 MY5015	T5105 T515 T5115 T9215	CA310 CA315 CA4010 CA4115 CA4505 CA4515 CA5505	AC4010K AC4015K AC405K AC415K	TT7015	YBD102
		K20	HR6115 HR6215	GC3210 GC3225	KCK15B KCK15 KCK20B KCK20	IC5010 IC8150	MC5015 UC5115 UE6110 MY5115	T515 T5115 T5125 T9215	CA315 CA320 CA4115 CA4120 CA4515	AC4015K AC415K AC420K AC425K AC8025P	TT7015 TT7025	YBD152 YBD252
		K30	HR6115 HR6215	GC3225	KCP05B KCPK05 KCP10B KCP25B KCK20B		UE6110	T5125	CA320			

Comparison table of CVD Milling grades

Type	Classification codes		HUAREAL	SANDVIK	KENNAMETAL	ISCAR	MiTSUBiSHi	TUNGALOY	KYOCERA	SUMITOMO	TAEGUTEC	ZCC.CT
	ISO classification	Groups of materials										
CVD milling	P	P10		GC4220 GC4230 GC3040	KC930M KC935P	IC4100 IC520M IC4050 DT7150 IC5400				ACP2000 ACP100	TT7515	
		P20	HR6130	GC4220 GC4230 GC3040	SC6525 SP6519		F7030 MC7020	T3225		ACP2000 ACP100	TT7515	YBC301 YBC251
		P30	HR6130 HR8140	GC4230 GC3040 GC2040 M30B	MP91M SC6525 KCPK30 X500		F7030 MC7020	T3130 T3225		ACP2000 ACP100	TT7800	YBM351
		P40	HR8140	GC4240 GC4230 GC3040 GC2040 M30B	KCPK30 X500						TT7800	YBC302
	M	M10								ACM200		
		M20		GC2040 GC4230	SC6525		F7030 MC7020	T3225	CA6535	ACM200		YBM251 YBM253
		M30		GC2040 GC4230 GC4240 M30B S40T	SC6525 X500	IC5820	F7030 MC7020	T3225 T3130		ACM200	TT7800	YBM302
		M40		GC2040 M30B S40T GC4240	X500					ACM200	TT7800	
	K	K10			SC3025 KCK15	IC5100	MC5020	T1215 T1115		ACK2000 ACK100 ACK200	TT7515	YBD151
		K20	HR6130	GC3220 K20W	KCK15 SC3025 MP91M	IC5100 DT7150 IC4010 IC4050 IC4100	MC5020	T1215	CA420M	ACK200 ACK200	TT7515	YBD252
		K30	HR6130 HR8140	GC3040	MP91M KCPK30 SC6525							YBD252

Comparison table of cermet grades

Type	Classification codes		HUAREAL	SANDVIK	KENNAMETAL	ISCAR	MiTSUBiSHi	TUNGALOY	KYOCERA	SUMITOMO	TAEGUTEC	ZCC.CT
	ISO classification	Groups of materials										
Cermet	P	P10	HRC10		KT1120	IC20N	NX1010	NS520	TN610	T110A T1000A		
		P20	HRC10	CT5015	KT1120 KT175	IC20N IC75T	NX2525	NS520 NS9530	TN610 TN60	T1200A T1500A	CT3000	YNG151 YNG151C
		P30	HRC10	CT5015	KT125	IC20N IC75T IC30N	NX2525 NX3035	NS9530 NS530 NS730	TN620 TN90	T1200A T1500A	CT3000	
		P40				IC75T IC30N	NX3035 NX4545	NS740		T250A		