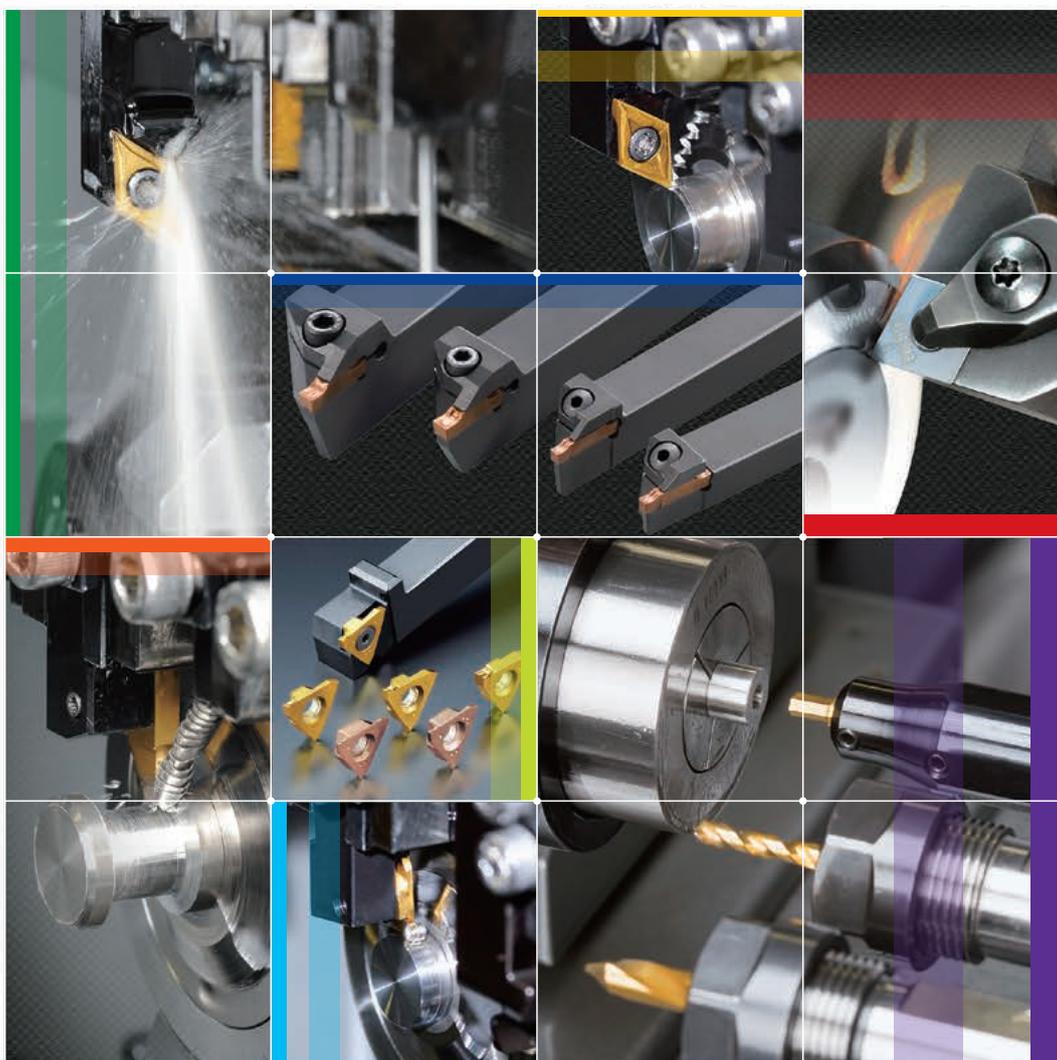


Cutting Tools

GENERAL CATALOG

Vol.4



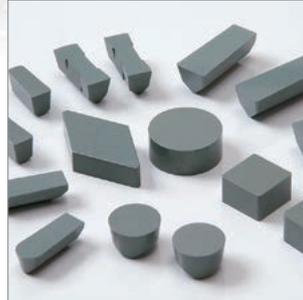
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NTK Technology

Disc and Drum Brakes



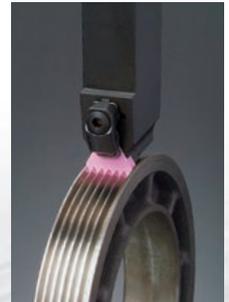
Aerospace Components



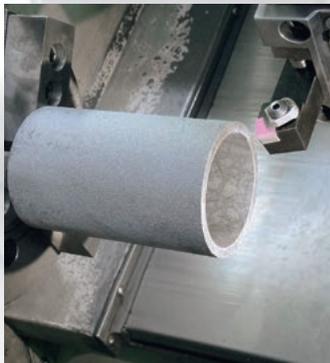
Steel Mill Rolls



Poly - V Pulleys



Cylinder Liners



Hardened Materials



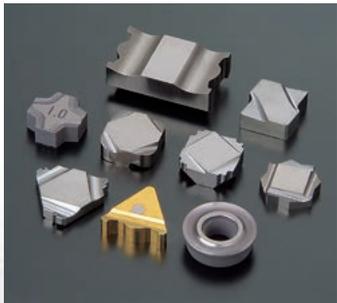
Steel Machining



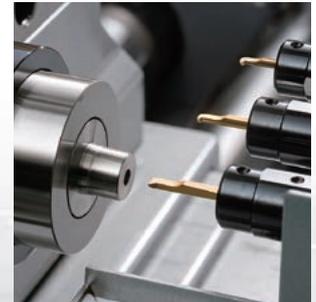
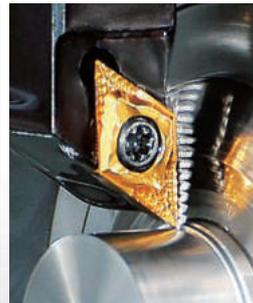
Grooving



Bearing Production



SS Tools for Small Parts Machining



Throw-Away Insert Drills



High Speed Machining of Aluminum



Safety instructions for using ultra hard cutting tools

1. Instructions for using ultra hard cutting tools

As required by the laws concerning Product Liability enforced on July 1, 1996, we place warning or caution labels on the packages of applicable NTK products. However, each tool body itself bears no detailed safety instructions. Therefore, you are requested to read and understand fully the "Safety instructions for the use of carbide cutting tools" before putting any ultra hard tool materials into use. In addition, we request all relevant staff and operators fully understand these safety instructions prior to use.

2. Basic characteristics of ultra hard tool materials

2-1. Meaning and classifications of terms used in this leaflet

Ultra hard tool materials: The collective name for materials used as cutting tools, including carbides, cermets, ceramics, CBN and diamond (PCD) sintered materials.

Carbide: Tool materials where the main component is WC (Tungsten Carbide)

Ultra hard materials: The collective name for materials used as ultra hard tools. Also used as a convenient way of referring to carbides under a narrower definition.

Ultra hard tools: The collective name for tools using ultra hard tool materials.

2-2. Physical properties

Appearance: Varies depending on the material. Example: gray, black or gold

Odour: No odour

Hardness: Cemented carbide: HV500 up to 3,000 kg/mm²

Specific gravity: Carbide: 9 up to 19

2-3. Constituents

Carbide, nitride, carbo-nitride, or oxidized materials of W, Ti, Al, Ta, B or the like; some contain metallic components such as Co, Ni, Cr and/or Mo.

3. Precautions for handling ultra hard tool materials

- *One of the properties specific to these materials is high hardness, another is brittleness. Therefore, shock loads or impacts, or excessive clamping of these materials may result in breakage or other damage.
- *As the specific gravity (density) of these materials is very high, a large component made up of these materials or such products in large quantity should be handled with care.
- *Ultra hard materials are different in their thermal expansion ratio from metals. These products are prone to thermal shock and subsequent breakage when subjected to sudden increase or decrease in temperature.
- *As cutting oil, lubricant and general moisture may corrode ultra hard materials and affect their strength, pay extra attention to storing them in good conditions.

4. Precautions for processing ultra hard tools

- *The strength of ultra hard tools may be significantly lowered depending on the surface condition. Always use diamond grinding wheels for finish machining.
- *Dust is produced when ultra hard tools are ground. Install appropriate ventilation/disposal equipment and wear protective gear such as masks, as inhalation of such dust may be hazardous to health. If such dust contacts your skin or comes into contact with your eyes, flush well with flowing water.
- *After the grinding of ultra hard tools or brazed tools, the waste coolant contains components of heavy metals. Be sure to dispose of such waste liquid properly.
- *After re-grinding ultra hard tools, check that they are free of cracks or damage before use.
- *When ultra hard material or products made of ultra hard material is marked with lasers or an electric pen, cracking may occur to the marked area. Do not mark in areas where stress is applied during use.
- *Processing ultra hard material by electric discharge may cause residual cracks on the surface, resulting in lower strength. Thus, remove any cracks completely by grinding as required.
- *Be careful when brazing ultra hard material. If the temperature is lower or higher than the melting point of the brazing material, the insert may not be permanently fixed.

■ Precautions for Safe Use of Cutting Tools

Applicable Products	Possible Risks	Safety Measures
General Cutting Tools	◎Contact with a sharp cutting edge with bare hands may result in injury.	*Use protective gear such as protective gloves when taking the tool out of packaging and installing into the machine.
	◎Misuse or using under inappropriate conditions may cause the cutting tool to break and/or shatter into pieces, resulting in personal injury.	*Use protective equipment, machine guarding and/or protective glasses. *Use within the range of recommended conditions. Please refer to the instruction manual and catalogue.
	◎Sudden increase in cutting resistance due to sudden impact load or excessive wear may cause the cutting tool to break and/or shatter into pieces, resulting in personal injury.	*Use protective gear such as protective gloves when taking the tool out of packaging and installing into the machine.
	◎High-temperature chips may be produced and long chips may be ejected, resulting in injury and/or burns.	*Use protective equipment, machine guarding and/or protective glasses. *Before removing chips, always stop the machine. Wear protective gloves and use proper equipment for chip removal.
	◎The tool and material/work being cut can become very hot. Touching them immediately after use may cause burns.	*Use protective gear such as protective gloves.
	◎Sparks, heat generation due to breakage and/or chips during cutting may cause fire.	*Do not use the machine and tools in locations where there are risks of ignition or explosion. *When using water-insoluble cutting oil, fire prevention measures must be implemented.
	◎Out of balance machine set ups when used at a high-speed, may cause insert breakage due to excess vibration or chatter, resulting in injury.	*Use protective equipment, machine guarding and/or protective glasses. *Perform a trial-run beforehand to make sure the setup is stable, free of chatter, vibration and abnormal noise.
	◎Touching burrs and flashes on machined work may result in personal injury.	*Use adequate hand protection.
Throw-Away Type Tools (With indexable insert)	◎Inappropriately clamped inserts and/or components may become detached from the machine during cutting, resulting in injury.	*Before installing the insert, clean the seating surface and clamping components so that they are free of debris. *Use the wrench supplied to install the insert and check that the insert and components are securely clamped. Do not use any inserts or components other than the items specified.
	◎Excessively tightening with a device such as a pipe extension may cause the insert and/or components to break or detach due to over clamping.	*Do not use tightening devices such as pipe extensions to obtain further torque. Always use the supplied wrench.
	◎At a high speeds inserts and/or components may lose clamping pressure due to the loosening effect of centrifugal force. This is very dangerous. Always ensure secure clamping systems and check regularly.	*Use within the range the recommended conditions. Please refer to the instruction manual and catalogue.
Cutters and Rotational Tools	◎As cutters have sharp cutting edges, contact with bare hands may result in injury.	*Use protective equipment such as protective gloves.
	◎Imbalance or eccentric rotation may cause the tool to break due to vibration or chatter, resulting in potential injury.	*Use at a rotational speed within the recommended conditions. *To prevent eccentric rotation and vibration due to worn bearings, regularly check the machine rotor/rotating parts for the accuracy and balance and adjust as required.
Drills	◎Extra care should be taken when through hole drilling as chips may be ejected at high speed as the drill breaks through the workpiece.	*Use protective equipment such as machine guards and/or protective glasses. Additional guarding around the chuck and drill may be advisable.
	◎Drill tips of a very small diameter are usually pointed and extremely sharp. Extra care and safety precautions should be taken when handling to avoid puncture wounds.	*Always use precautions and secure safe handling methods. *Wear protective gloves and glasses.
Brazed Inserts / Tools	◎Inserts may break or become, detached due to incorrect brazing.	*Use protective equipment such as machine guards and/or protective glasses. Additional guarding around the chuck and drill may be advisable.
Others	◎It is not advisable to use repeatedly brazed inserts as the braze may progressively weaken.	*Do not use repeatedly brazed inserts as the strength of such inserts is lowered.
	◎Use only for the original and intended purpose. Using outside recommended parameters is very dangerous, causing damages to machines and/or tools.	*Always use and operate as specified, observing the required safety rules and conditions.

Precautions for Safe Use

- This catalogue lists products as of September 2014.
- Please note that specifications of the products listed in this catalogue may be changed without notice due to continuous research & development and product improvements in order to offer even better products.
- This catalogue contains the major features and relevant information on our products. Please contact our sales representatives or dealers for more detailed information.
- Stock Status Symbols
 - : Standard stock available for LH-, RH- and neutral products
 - R : Stock available for only RH-products
 - L : Stock available for only LH-products
 - ★ : Special service stock (Please contact us for stock.)
 - ◎ : Stock available (Time required for delivery: approx. 3 weeks)
 - : Product scheduled to be manufactured on production-to-order basis in the future (Please contact us for stock/availability.)
- No symbol : Not stocked
- Please note that this catalogue was prepared based on products intended mainly for sale in Japan.

● Standard items – per unit

1) Holder Type	Unit of Sales	Notes
Holder main body	1 pcs./case	
Drill holder main body	1 pcs./case	
Cutter main body	1 pcs./case	
2) Part Type	Unit of Sales	Notes
Screw	10 pcs./case	Clamp screw, Clamp bolt, Double screw, Button screw
Spring	10 pcs./case	Spring
Seat	10 pcs./case	Shim seat
Clamp	10 pcs./case	Clamp
Wrench	5 pcs./case	Wrench, bit
Handle	1 pcs./case	Handle with magnet, handle and bit
3) Insert Type	Unit of Sales	Notes
CBN	1 pcs./case	B16 · B22 · B23 · B30 · B36 · B40 · B52 · B5K · B6K
PCD	1 pcs./case	PD1 · PD2
CTPW insert for cutting off	5 pcs./case	CTPW
STICK DUO Super-hardened solid bar. SHAPER DUO	1 pcs./case	SHFS · SHFB · SBFS · SBFB · SBG · SFG · SBT · SSP
Types other than the above	10 pcs./case	
Drilling insert size Y-2 series	2 pcs./case	Drilling insert size Y-2 series
Drilling insert size 3 series and higher	1 pcs./case	Drilling insert size 3 series and higher

*Packaging may vary depending on the product size. For more information on the available units for our products, please contact your nearest dealer or our sales office.

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New front turning tool TFD-AM3 chipbreaker	A9	
New 3D chipbreaker for back turning TBP/TBPA-BM type ...	A10 ~ 13	
Internal coolant type tool holders SPLASH SERIES ...	A14 ~ 23	
STICK DUO series SHAPER DUO	A24 ~ 27	
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New grooving tool SCRUM DUO	A30 ~ 33	
New CBN Lineup NTK EZCUBE B5K/B6K	A34 ~ 37	
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Super low cutting force milling cutter FU-HA MILL	A40 ~ 41	
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NEW

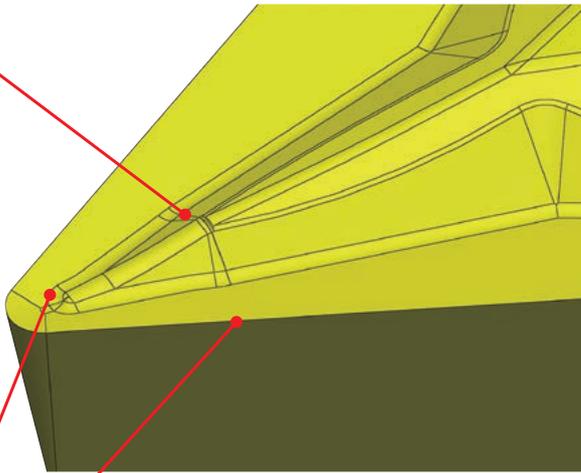
New G class 3D chipbreaker for front turning

"YL" chipbreaker

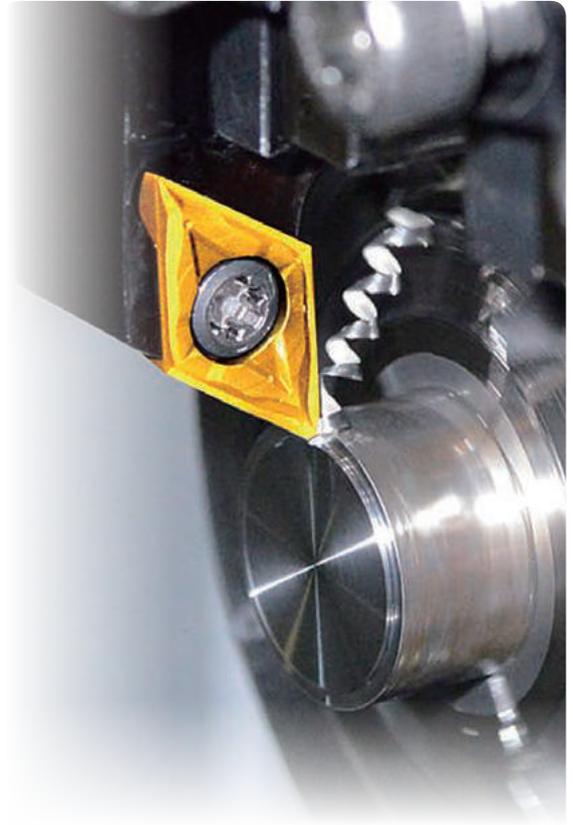
WATCH ON
YouTube

Features

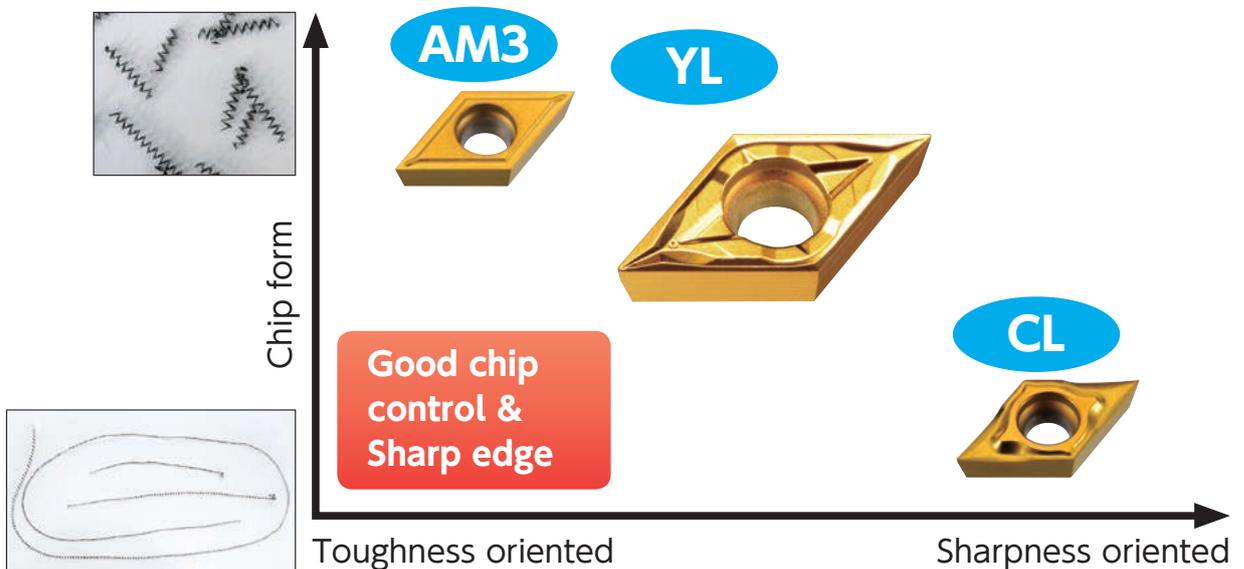
Dot distance from edge is step away per D.O.C.
Helps reduce the cutting force in deep D.O.C.
machining.



Up sharp cutting edge and high
rake angle provides excellent
surface finish !



Front dot controls chips well under light depth
of cut.



New Products

Tool Materials / Selection Guide

PCD, CBN and ceramic

Cermet, PVD-coated Carbide

Micro-grain Carbide, Carbide

Insert Stock List

Outside Machining Toolholders

SS

Grooving Tools

Threading Tools

Shaper

Internal machining tool range

Original Tools for Various Applications

Indexable End Milling Tools

Indexable Drill Inserts

Milling Cutters

Technical Data

Index

Chip control performance

D.O.C. a_p (mm)	Feed rate f (mm/rev)			
	0.03	0.05	0.08	0.1
2.0				
1.0				
0.5				
0.3				

[Cutting condition] Work material : SUS304 $\phi 16$ $V_c = 80\text{m/min}$ WET

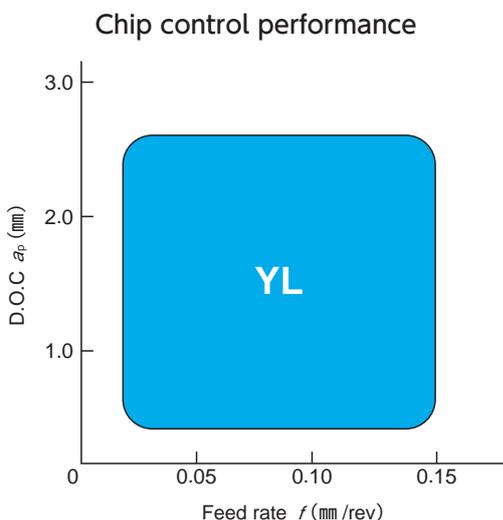
Chatter vibration resistance

D.O.C. a_p (mm)	Feed rate f (mm/rev)			
	YL chipbreaker		Competitor's 3D chipbreaker	
	0.03	0.05	0.03	0.05
3				
2				

[Cutting condition] Work material : SUS304 $\phi 16$
 $V_c = 80\text{m/min}$ $f = 0.05\text{mm/rev}$ $a_p = 2.3\text{mm}$ WET

Stock list

Shape	Part number	Dimensions			PVD coated micrograin carbide			
		I.C.	Thickness	Corner radius	DM4	Stock	TM4	Stock
	CCGT09T301MYL	9.525	3.97	0.08	5922455	●	5922471	●
	09T302MYL			0.18	5922489	●	5922505	●
	09T304MYL			0.38	5922422	●	5922448	●
	DCGT11T301MYL	9.525	3.97	0.08	5922380	●	5922398	●
	11T302MYL			0.18	5922406	●	5922414	●
	11T304MYL			0.38	5922356	●	5922372	●
	VCGT110301MYL	6.35	3.18	0.08	5922307	●	5922315	●
	110302MYL			0.18	5922331	●	5922349	●
	110304MYL			0.38	5922281	●	5922299	●
	VBGT160402FNYL	9.525	4.76	0.2	5919519	●	5922109	●
	160404FNYL			0.4	5919543	●	5922117	●
	160408FNYL			0.8	5919527	●	5922125	●



Work material	: SUS304L	
Cutting speed (m/min)	: 50	
Feed (mm/rev)	: 0.03	
D.O.C. a_p (mm)	: 1.5	
Coolant	: WET	
YL chipbreaker		3000pcs/corner
PVD coated carbide		2000pcs/corner

NTK YL chipbreaker has excellent chip control performance. Compared with conventional tool, NTK YL chipbreaker achieved longer tool life. It resulted in stable machining with high dimensional accuracy.

NEW

GTMH32 type grooving insert

GX chipbreaker

The world's first 3D chipbreaker
for 32 size triangle shaped type insert

WATCH ON
YouTube

New Products

Tool Materials / Selection Guide

PCD, CBN and ceramic

Cermet, PVD-coated Cermet

Micro-grain Carbide, Carbide

Insert Stock List

Outside Machining Toolholders

SS

Grooving Tools

Threading Tools

Shaper

Internal Machining tool range

Original Tools for Various Applications

Indexable End Milling Tools

Indexable Drill Inserts

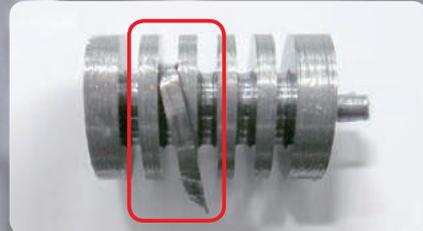
Milling Cutters

Technical Data

Index

- GX Chipbreaker eliminates these issues.
- Solve the problems like chips remain at the bottom of groove and the bird's of chips.

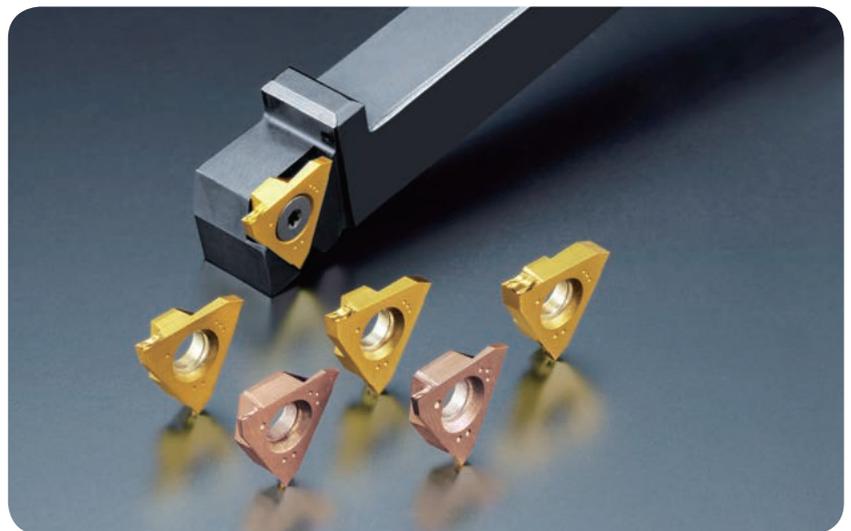
- Typical problems with conventional grooving tools
- Don't you have worries as the following?



Chips remain at the bottom of groove



Bird's nest of chips



※1 NTK adopted the world's first 3D chipbreaker in triangle shaped type insert in 32 size. An internal investigation on 5/26/2014.

Features

1 Center bump and dent design improve chip control !

Helps chip shape curl&control.
Excellent surface finish at grooving.

※ Chipbreaker geometry grooving width 1.5mm~.

※ Chipbreaker geometry grooving width ~1.0mm.

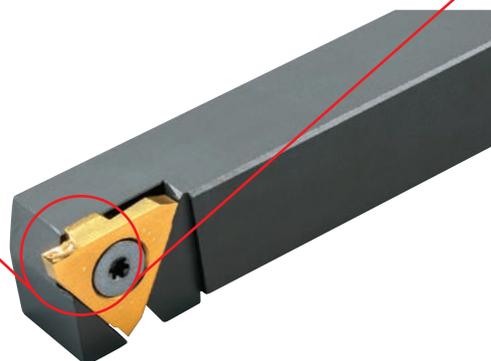


2 Traversing is available !

Chip control performance at side turning improved, (MAX.ap~2.0mm).

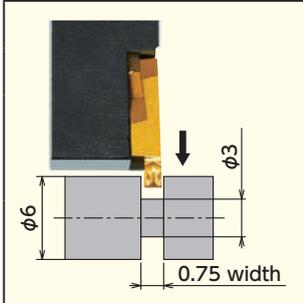
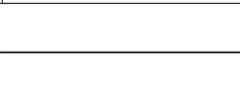
3 Outer periphery polishing offers excellent surface finish !

Sharpness equal to ground chipbreaker !



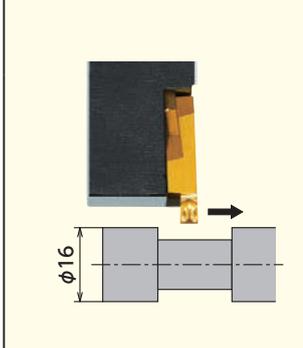
Chip control

Grooving (Assumed snapping grooving)

	GX chipbreaker	Feed (mm /rev) Length : 3mm		
		0.01	0.03	0.05
Conventional insert (ground chipbreaker)				
				

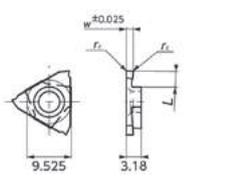
Work material : SUS304 (φ 6⇒φ 3) $v_c=80\text{m/min}$ $a_p=1.5\text{mm}$ Width : 0.75mm

GX chipbreaker surface finish by side turning

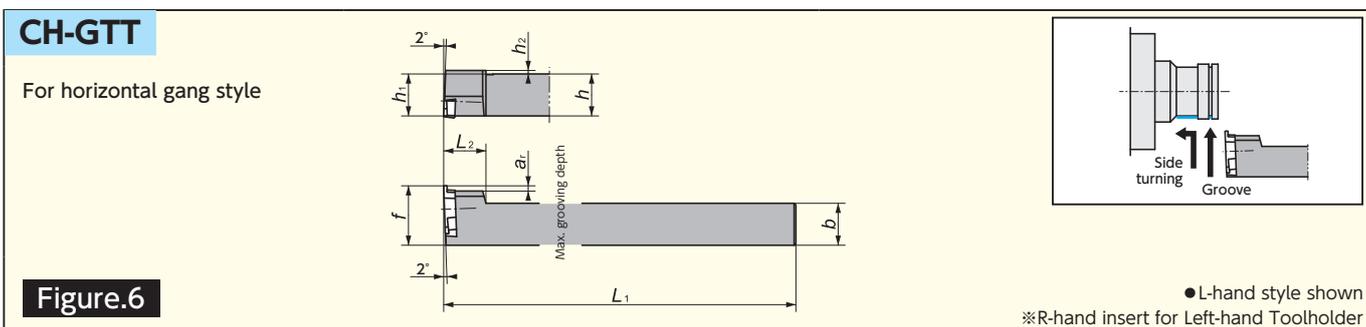
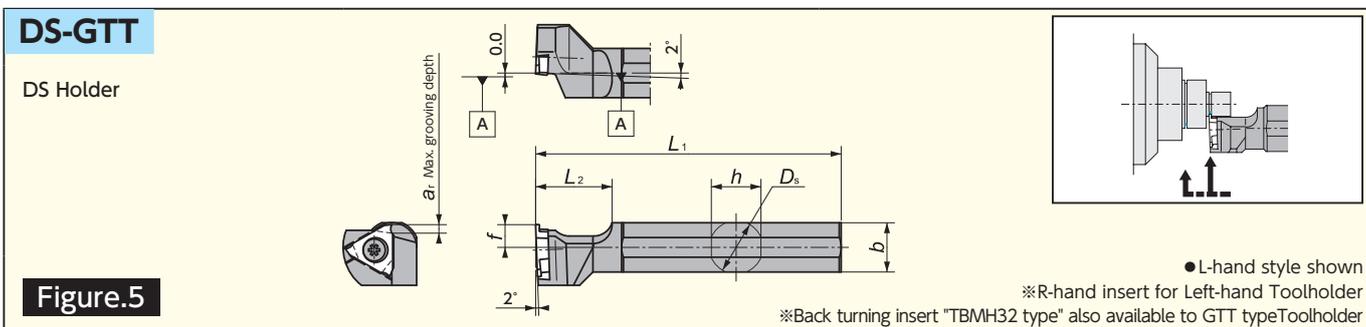
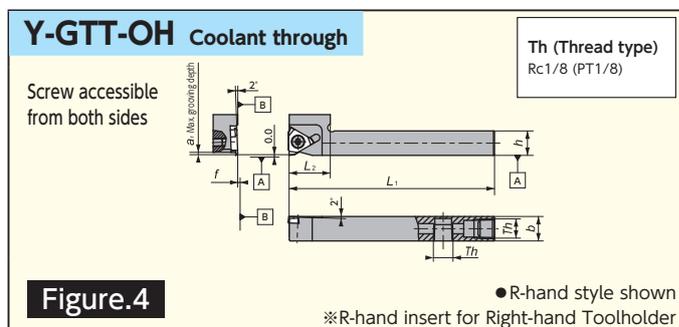
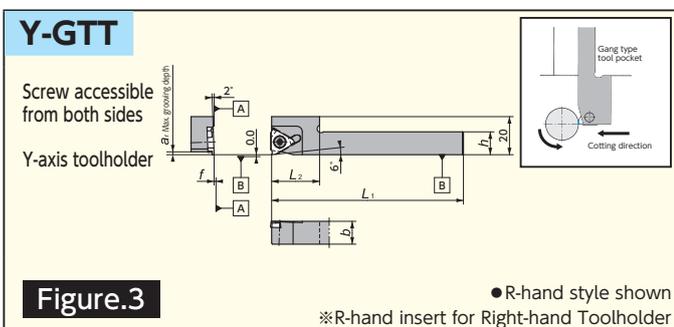
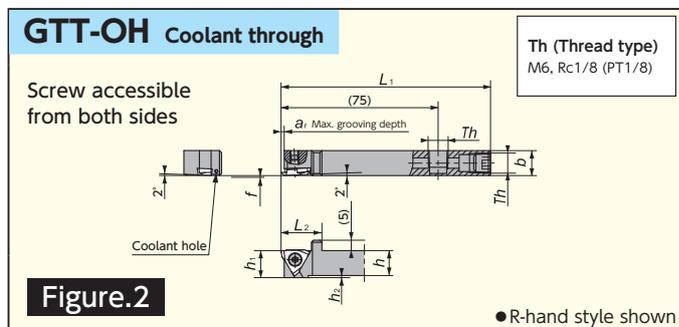
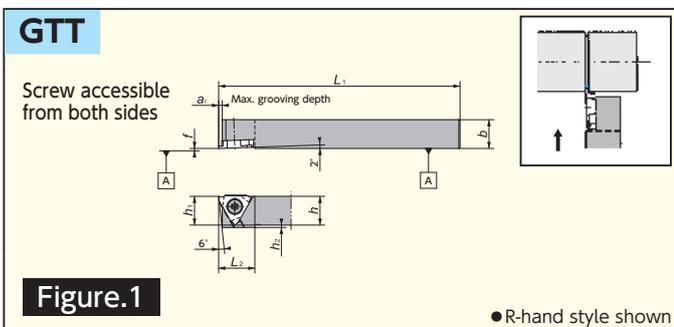
	D.O.C. at side turning (mm)	Surface finish	End face at the groove
	2.0		

Work material : S45C $v_c=80\text{m/min}$ $f=0.05\text{mm/rev}$ WET Insert : DM4GTMH32150RGX Holder : GTTR12K00

Standard Stock Items

Shape	Description	Dimensions (mm)					PVD coated carbide			
		w	L	r _e	Max. groove depth	Traversing	TM4	Stock	DM4	Stock
Traversing available  (Chipbreaker geometry) Front rake angle: 17° Side rake angle: 14° ● R-hand style shown	GTMH32075RGX	0.75	2.0	0.05	1.6	0.75	5910765	●	5910898	●
	095RGX	0.95				1.50	5922224	●	5922216	●
	100RGX	1.00					5910815	●	5910906	●
	100RGX01		5910823	●	5910963	●				
	150RGX	1.50	3.0	0.05	2.7	2.00	5910740	●	5910914	●
	150RGX01						5910849	●	5910971	●
	150RGX02						5910864	●	5910997	●
	200RGX	2.00	3.0	0.05	2.7	2.00	5910732	●	5910930	●
	200RGX01						5910856	●	5910989	●
	200RGX02						5910872	●	5911003	●
	300RGX	3.00	3.0	0.05	2.7	2.00	5910724	●	5910948	●
	300RGX02						5910880	●	5911011	●

Holder



Toolholder Dimensions

Shape	CodeNo.		Toolholder	Stock		dimension (mm)											Width (mm) w	Parts																		
	R	L		R	L	h	b	L ₁	h ₁	f	L ₂	a _r	h ₂	D _s	Th	Screw		Wrench																		
																(A)			(B)																	
Figure.1	5107305	5107313	GTT ^R 08F00	●	●		8	80										CLR-155 (A)	Right-hand : LR-S-4*10PW (A) Left-hand : LR-S-4*5.8 (B)																	
	5608682		0810F00	●		8	10		8			5					LR-S-4*10PW (A)																			
	5107206	5107214	08K00	●	●		8	120												Right-hand : LR-S-4*10PW (A) Left-hand : LR-S-4*5.8 (B)																
	5608690		0810K00	●			10				1.6						0.3 } 3.00																			
	5107321	5107339	10F00	●	●	10	10	80	10				3							LR-S-4*10PW (A)																
	5107222	5107230	10K00	●	●			120														1.45 } 3.00														
	5107347	5107354	12F00	●	●	12	12	80	12				1									LR-S-4*10PW (A)														
	5107248	5107255	12K00	●	●			120																2.5 } 3.00												
	5459896	5551387	16H00	●	●	16	16	100	16															LR-S-4*10PW (A)												
	5173687	5173679	16K00	●	●			120																		0.3 } 3.00										
	5530852	5780317	20K00	●	●	20	20	125	20	0	15		0													LR-S-4*10PW (A)										
	5780309	5780291	25M00	●	●	25	25	150	25																			1.45 } 3.00								
	5107362	5107370	10F15	●	●	10	10	80	10				3															LR-S-4*10PW (A)								
	5107263	5107271	10K15	●	●			120																						2.5 } 3.00						
	5537220	5537147	12F15	●	●	12	12	80	12				1																	LR-S-4*10PW (A)						
	5537246	5537162	12K15	●	●			120																								0.3 } 3.00				
	5537261	5537188	16H15	●	●	16	16	100	16				0																			LR-S-4*10PW (A)				
	5537287	5537204	16K15	●	●			120																										2.5 } 3.00		
	5107388	5107396	10F25	●	●	10	10	80	10				3																					LR-S-4*10PW (A)		
	5107289	5107297	10K25	●	●			120																												0.3 } 3.00
5537238	5537154	12F25	●	●	12	12	80	12				1					LR-S-4*10PW (A)																			
5537253	5537170	12K25	●	●			120												2.5 } 3.00																	
5537279	5537196	16H25	●	●	16	16	100	16				0							LR-S-4*10PW (A)																	
5537295	5537212	16K25	●	●			120																													
Figure.2	5921705		GTT ^R 1012H00-OH	●		10	12	100	10	0	19.5	1.6	1		M6×1	0.3 } 3.00				LR-S-4*10PW (A)	CLR-155 (A)															
	5890157		12H00-OH	●		12		16				0		Rc1/8 (PT1/8)																						
	5921713		16H00-OH	●		16	16																													
Figure.3	5371604		Y-GTT ^R 10S	●		10	10	120		0	20	1.6				0.3 ~ 3.00				LR-S-4*10PW (A)	CLR-155 (A)															
	5371620		12S	●		12	12																													
Figure.4	5911466		Y-GTTR 12H00S-OH	●		12	12	100	12	0	20	1.6			Rc1/8 (PT1/8)	0.3 ~ 3.00				LR-S-4*10PW (A)	CLR-155 (A)															
	5911474		16H00-OH	●		16	16	16		25																										
Figure.5		5348560	DS-GTT ^R 14F	●		13	13	80							14.000	0.3 } 3.00				LR-S-4*9 (B)	RLR-20S (B)															
		5348081	15H	●		15	15	100						15.875																						
		5341532	16X	●		15	15	95						16.000																						
		5278288	19	●		18	18			6	20	1.6		19.050																						
		5278304	20	●		19	19	120						20.000																						
		5324041	22	●		21	21							22.000																						
		5317144	25	●		24	24		10					25.400																						
Figure.6		5659248	CH-GTT ^R 10H00	●		10	10	100	10	15	12	1.5	3			0.3 ~ 3.00				LR-S-4*9 (B)	RLR-20S (B)															
		5659255	12H00	●		12	12	12	17			1																								

GX and conventional insert (ground type) chipbreaker comparison in same cutting condition.

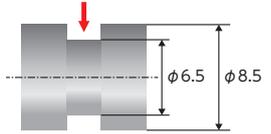
GX chipbreaker	Conventionalr
 <p>No tangled chips</p>	 <p>Tangled chips</p>
Work material : S45C $V_c = 80\text{m/min}$ $f = 0.05\text{mm}$ Insert : -DM4 GTMH32075RGX	

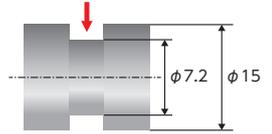
Recommended cutting conditions

Work Material		Free-cutting steel	Carbon steel	Alloy steel	Stainless steel		Titanium alloy
		SUM22 SUM23	S35C S45C	Scr420 SCM435	SUS303 SUS430F	SUS304 SUS440C	6AL-4V-Ti
Recommended Insert grade	1	DM4					
	2	TM4					
Cutting speed V_c (m/min)		50 100 200	50 90 150	50 90 180	40 70 100	50 70 100	
Feed f (mm/rev) ① f at grooving ② f at turning	width (mm)	0.75	① 0.02~0.08 ② 0.01~0.08 (Max.ap 0.75)	① 0.02 ~ 0.07 ② 0.01 ~ 0.08 (Max.ap 0.75)		① 0.02~0.08 ② 0.01~0.08 (Max.ap 0.75)	
		1.0	① 0.02~0.08 ② 0.01~0.08 (Max.ap 1.5)	① 0.02 ~ 0.07 ② 0.01 ~ 0.1 (Max.ap 1.5)			
		1.5	① 0.03~0.08 ② 0.03~0.1 (Max.ap 2.0)	① 0.03 ~ 0.07 ② 0.02 ~ 0.1 (Max.ap 2.0)			
		2.0 ~		① 0.03 ~ 0.2 ② 0.03 ~ 0.1 (Max.ap 2.0)			

※Above cutting condition is for external grooving. For internal grooving, set both cutting speed and feed 20% lower.

Application example

Workmaterial	GX chipbreaker	Competitor PVD coated carbide
SUS440C		
Cutting speed (m/min)	100-130	←
Feed (mm/rev)	0.06	←
Grooving depth (mm)	0.95	←
Coolant	WET	←
 <p>Description -DM4 GTMH32150RGX</p>		
GX chipbreaker	300pcs/corner	
Competitor PVD coated carbide		200pcs/corner
<p>• NTK GX chipbreaker adopted 3D mold chipbreaker. It resulted in good chip control, good surface finish, and high dimensional accuracy. Compared with competitor's, NTK GX chipbreaker achieved 1.5 times longer tool life. (Evaluation from the user)</p>		

Workmaterial	GX chipbreaker	Conventional PVD coated carbide
SUS420F		
Cutting speed (m/min)	80-165	←
Feed (mm/rev)	0.025	←
Grooving depth (mm)	0.3	←
Coolant	WET	←
 <p>Description -DM4 GTMH32075RGX</p>		
GX chipbreaker	Stable machining.	
Competitor PVD coated carbide	 <p>Bird's nest of chips!!</p>	
<p>• Using the current tool, the chip unexpectedly got the bird's nest of chips and defective products have occurred. NTK GX chipbreaker adopted 3D mold chipbreaker. It performed good chip evacuation, prevented from the bird's nest of chips. Stable machining achieved. (Evaluation from the user)</p>		

NEW

New front turning tool

TFD-AM3 chipbreaker

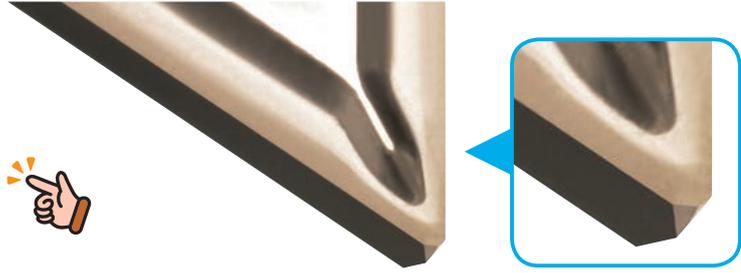
NTK

Wiper Insert

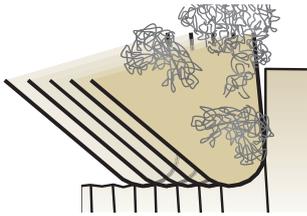
Good surface! 

Good chip control! 

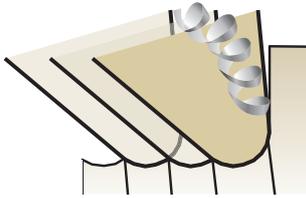
Good inside corner R! 



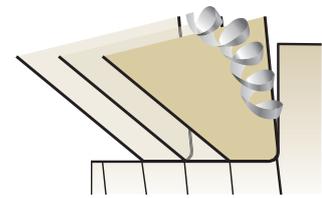
Surface finish in front turning



Unstable chip control at low feed rate to keep surface finish



Bad surface finish at high feed rate to improve chip control

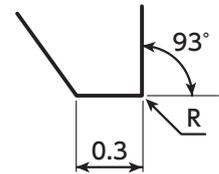


TFD wiper insert offers good chip control and surface finish

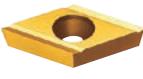
Cutting condition	
Work material	SUS304
Cutting speed	$v_c = 30 \sim 80 \text{ m/min}$
Feed speed	$f = 0.015 \text{ mm/rev}$
Depth of cut	$a_p = 0.15 \text{ mm}$
DT4 TFD11FR05AM3	1500pcs/corner
Conventional tool	700pcs/corner

Surface finish of conventional tool after 500pcs machined was $Ry10.2 \mu\text{m}$, and dimensional change 0.1mm occurred at start of machining.
TFD-AM3 chipbreaker(DT4 grade) achieved stable machining with no dimensional change after 1,000pcs machined. Surface roughness was $Ry2.3 \mu\text{m}$.

Edge design



Stock list

Shape	Part number	Dimensions (mm)			PVD coated micrograin carbide										Carbide					
		I.C.	Thickness	Corner radius	ZM3		QM3		VM1		DT4		KM1							
					R	Stock	L	Stock	R	Stock	R	Stock	R	Stock	R	Stock				
 AM3	TFD11FR05AM3	9.525	3.97	0.05																
	11FR15AM3			0.15																
 S	TFD07F 05	6.35	2.38	0.05	5106893	●	5133277	●	5335278	●	5328927	●								
	07F 15			0.15	5106901	●	5133269	●	5601257	●										
	11FR05	9.525	3.97	0.05	5141908	●			5590716	●	5280169	●								
				0.15	5141932	●			5560198	●										
 U	TFD07FR05U	6.35	2.38	0.05	5141940	●			5601240	●	5290010	●								
	07FR15U			0.15	5141957	●			5601232	●										
	11FR05U1	9.525	3.97	0.05	5141916	●			5601224	●	5290135	●								
				0.15	5141924	●			5528385	●										
 Without chipbreaker	TFD07FR05H	6.35	2.38	0.05															5556295	●
	11FR05H	9.525	3.97	0.05															5556303	●

*Set the toolholder SDJC type (cutting angle 93 degree) when use TFD type insert.

New Products
 Tool Materials / Selection Guide
 PCD, CBN and ceramic
 Cermet
 PVD-coated Cermet
 Micro-grain Carbide, Carbide
 Insert Stock List
 Outside Machining Toolholders
 SS
 Grooving Tools
 Threading Tools
 Shaper
 Internal Machining tool range
 Original Tools for Various Applications
 Indexable End Milling Tools
 Indexable Drill Inserts
 Milling Cutters
 Technical Data
 Index

NEW

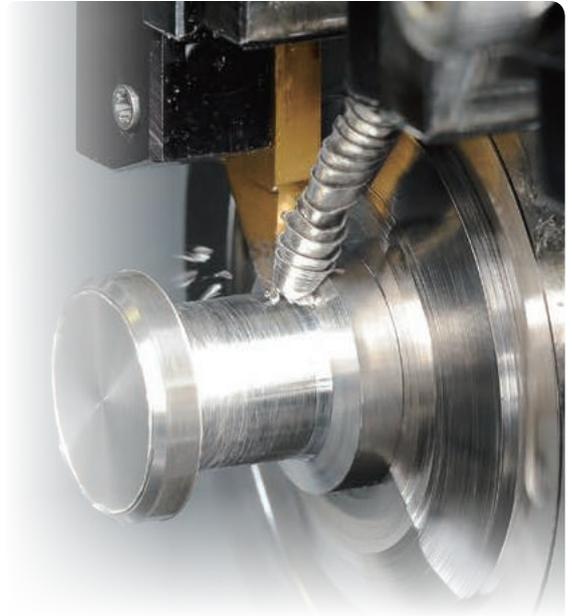
New 3D chipbreaker for back turning

TBP/TBPA-BM type

WATCH ON
YouTube

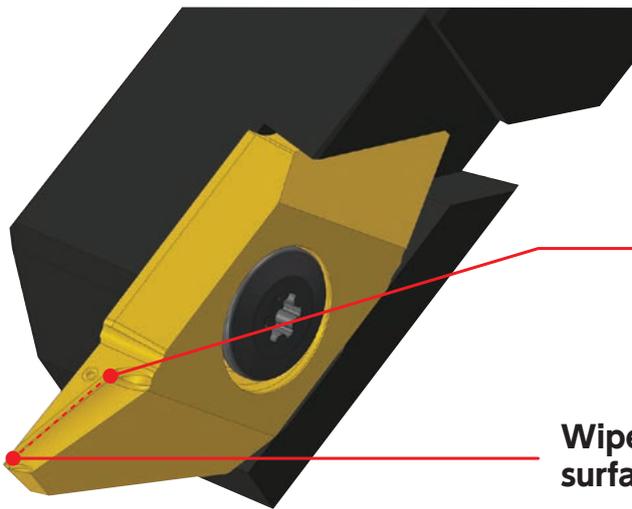
Features

- "Single pass back turning" offers excellent surface finish.
- Up-right type insert and screw clamping offer high rigidity
- Wiper flat on cutting edge offers stable surface finish even under high feed cutting condition.



New BM chipbreaker

PAT.P



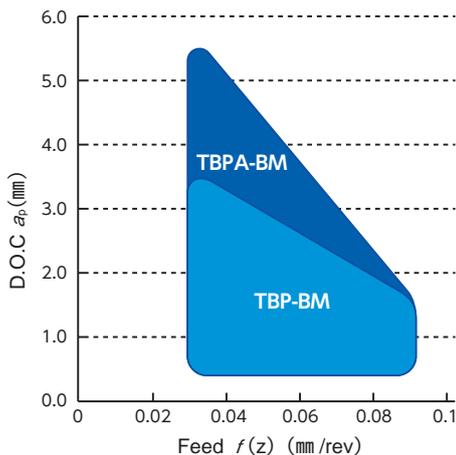
Prevent the rough end face from hitting the chip

Wiper flat on cutting edge offers excellent surface finish

Case study

1Pass	TBP BM chipbreaker		Competitor	
	End face	Diameter	End face	Diameter
Cutting condition : $v_c=80\text{m/min}$ $f(x)=0.02\text{mm/rev}$ $f(z)=0.08\text{mm/rev}$ $a_p=3.0\text{mm}$ WET Work material : SUS304 $\phi 16$ Holder : TBPR12 Insert : TM4 TBP72FR10M-BM				

Applicable chipbreaker range



Recommended cutting conditions

D.O.C	$a_p=0.5 \sim 3.0\text{mm}$ (TBP) $0.5 \sim 5.0\text{mm}$ (TBPA)
Feed	$f(z)=0.05 \sim \text{mm/rev}$
Feed	$f(x)=\text{about } 0.02\text{mm/rev}$
Cutting speed	almost same speed with front turning

Chip control performance

D.O.C a_p (mm)	BM chipbreaker		Competitor	
	0.05	0.08	0.05	0.08
0.5				
3.0				

Good chip control (BM chipbreaker) vs Unstable chip control (Competitor)

Cutting condition : $v_c=80\text{m/min}$ WET
Work material : SUS304 $\phi 16$ Holder : TBPR12 Insert : TM4 TBP72FR10M-BM

Application example

Parts : Shaft Work material : SUS440C	BM chipbreaker	Competitor
Cutting speed (m/min)	65	45
Feed (mm/rev)	0.05	0.03
Depth of cut (mm)	1.0	1.0
BM chipbreaker	1200pcs	
Competitor		500pcs

BM chipbreaker offered about 2.4 times longer tool life compared with competitor tool.

Parts : Stud Work material : SUS430F	BM chipbreaker	Competitor
Cutting speed (m/min)	50	←
Feed (mm/rev)	0.05	←
Depth of cut (mm)	2.0	① Rough (grooving) ② Finish (back turning) end face 0.1/ dia. 0.2
Conventional tooling	① Rough: Grooving ② Finish: Back turning	
Tooling with BM chipbreaker	① Only 1 pass machining ※ No grooving for roughing.	

Conventional back turning required 2 passes machining (Roughing/Finishing) NTK BM chipbreaker achieved reducing C/T and good chip control with only 1 pass. It prevent rough end face from hitting chip, and got the excellent surface finish.

TBP

Applicable insert

<p>(Molded chipbraker Type) TBP72-BM Type</p> <p>●R-hand shown</p>	Part number	Breaker	Length of Blade a	Max. Depth of cut b	Dimensions (mm)		PVD coated micrograin carbide			
					θ	r _e	TM4		DM4	
							R	Stock	R	Stock
	NEW TBP72FR05-BM					0.05	5868310	●	5868401	●
NEW 72FR10M-BM	Provided		3.5	5.3	72°	0.08	5868351	●	5868419	●
NEW 72FR20M-BM						0.18	5868336	●	5868393	●

※See the page H41 as for conventional insert

Holder

<p>TBP</p> <p>Back clamp/ screw clamp</p> <p>Figure.1 ●R-hand shown</p>	<p>Y-TBP</p> <p>Back clamp/ screw clamp</p> <p>☆Select right-hand insert for right-hand holder ●R-hand shown</p> <p>Figure.2</p>	<p>DS-TBP</p> <p>DS holder</p> <p>☆Select right-hand insert for left-hand holder ●L-hand shown</p> <p>Figure.3</p>
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<p>TBP-OH</p> <p>Figure.4 ●R-hand shown</p>	<p>Y-TBP-OH</p> <p>Back clamp/ screw clamp</p> <p>Y axis holder for high pressure coolant</p> <p>☆Select right-hand insert for right-hand holder ●R-hand shown</p> <p>Figure.5</p>
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Fig.	Code No.		Toolholder	Stock		Max. bore Dia. (mm) φD	Dimensions (mm)							Applicable insert	Parts					
	R	L		R	L		D _s	h	b	L ₁	h ₁	h ₂	f		L ₂	L ₃	Screw	Wrench		
Figure.1	5133285	5133293	TBP ^{R/L} 08	●	●	-	-	8	10	120	8	4	3.5	-	5.5	TBP	LRIS-4*10PW (A)	CLR-15S (A)		
	5090436	5090444	10	●	●			10	10	100	10	2								
	5873856		10H	★				12	12	85	12									
	5459771		12GX	●				13	13	120	13	0								
	5090451	5090469	12	●	●			16	16	100	16									
	5090477	5090485	13	●	●			12	12	120	12									
	5459789		16H	●				16	16	100	16									
5270822	5270830	16	●	●			120	16												
Figure.2	5371554		Y-TBP ^{R/L} 10S	●		-	-	10	10	120	-	-	3.5	20	-	TBP	LRIS-4*10PW(A)	CLR-15S (A)		
	5371588		12S	●				12	12											
	5358486		10	■				10	10											
	5371570		10L	■				10	10											
	5371596		12L	■				12	12											
Figure.3	5540414		DS-TBP ^{R/L} 19	●	-	19.050	18	18	120	-	-	11.0	-	5.5	TBP	LRIS-4*10 (B)	LLR-25S -20*65 (B)			
	5540422		20	●	-	20.000	19	19												
	5540430		25	●	-	25.400	24	24										150		
Figure.4	5925722		TBP ^{R/L} 1012H-OH	●		25	10	12	100	10	4	3.5	19	75	TBP	LRIS-4*10PW(A)	CLR-15S (A)			
	5925730		12H-OH	●		25	12	12										2		
	5925748		16H-OH	●		35	16	16										0		0
Figure.5	5699996		Y-TBP ^{R/L} 12HS-OH	●		-	12	12	100	-	-	3.5	20	75	TBP	LRIS-4*12PW (A)	CLR-15S (A)			
	5700000		16H-OH	●		-	16	16												25

TBPA

Applicable insert

Length of Blade		(Molded chipbreaker Type) TBPA70-BM Type ●R-hand shown	Part number	Breaker	Length of Blade a	Max. Depth of cut b	Dimensions (mm)		PVD coated micrograin carbide			
							θ	r _ε	TM4		DM4	
									R	Stock	R	Stock
			NEW TBPA70FR05-BM					0.05	5892583	●	5892591	●
			NEW 70FR10M-BM	Provided	5.5	6.5	70°	0.08	5892567	●	5892575	●
			NEW 70FR20M-BM					0.18	5892542	●	5892559	●

※See the page H43 as for conventional insert

Holder

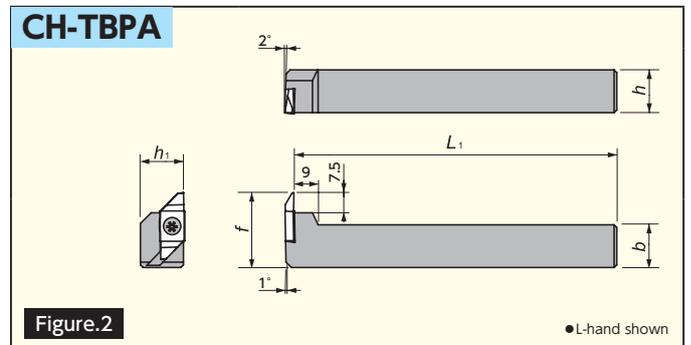
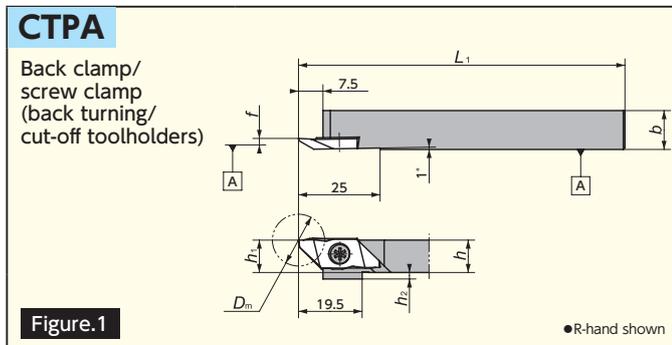


Fig.	Code No.		Toolholder	Stock		Dimensions (mm)						Applicable insert	Parts				
	R	L		R	L	h	b	L ₁	h ₁	f	h ₂		D _m	Screw	Wrench		
Figure.1	5199187	5199153	CTPA R/L 10	●	●	10	10		10		2	TBPA (Back Turning) CTPA (Cut-off)					
	5199195	5199161	12	●	●	12	12	120	12	3.4	0				16	LRIS-4*10PW(A)	CLR-15S(A)
	5199203	5199179	16	●	●	16	16		16							LRIS-4*12PW(A)	
	5459540	5459557	20F	●	●	20	20	80	20							LRIS-4*10(B)	LLR-25S(B)
Figure.2		5884945	CH-TBPA R/L 16		●	16	16		16	28		TBPA (Back Turning)					
		5884952	20		●	20	20	120	20	32						LRIS-4*10(B)	LLR-25S(B)

NEW

Internal coolant type tool holders

SPLASH SERIES

New Products

Tool Materials / Selection Guide

P.C.D., CBN and ceramic

Cermet, PVD-coated Carbide

Micro-grain Carbide, Carbide

Insert Stock List

Outside Machining Toolholders

SS

Grooving Tools

Threading Tools

Shaper

Internal machining tool range

Original Tools for Various Applications

Indexable End Milling Tools

Indexable Drill Inserts

Milling Cutters

Technical Data

Index

Internal Coolant Holders For Major applications

- Front turning (CC/DC style)
- Back turning (TBP style) **NEW**
- Grooving (GTM \circ 32 style)
- Cut off (CTP style) **NEW**
- ID boring (STICK DUO style)



Features

Cooling the edge of insert!

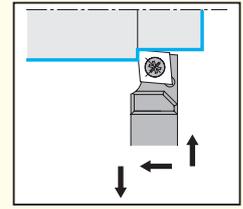
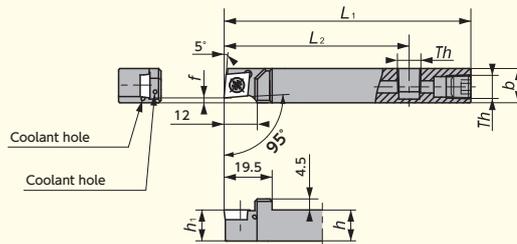
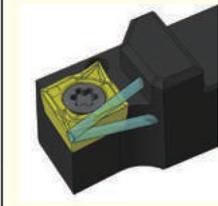


Smooth chip evacuation !
Reduce the chip control problem!

Stock list

For Front turning

SCLC-N-OH



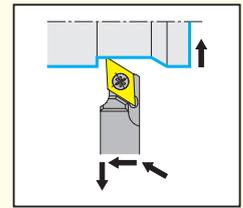
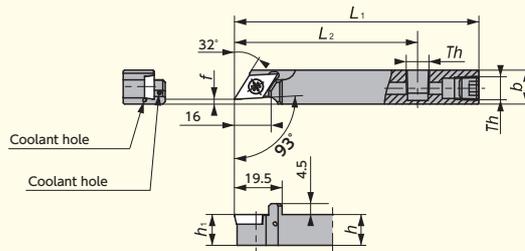
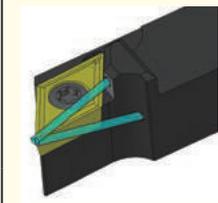
●R-hand shown

Holder dimension • Spare parts

Code No.	Toolholder	Stock	Dimensions (mm)							Applicable insert	Spare parts		
			h	b	L_1	h_1	f	L_2	Th		Clamp screw	Wrench	Screw parts※1
5905740	SCLCR1014F09N-F02OH	●	10	14	80	10	2.0	55	M6×1	CC□□09T3	LRIS-4*10	LLR-25S	SSO606SC
5905732	1214H09N-F02OH	●	12	100	12	75		Rc1/8(PT1/8)	SPR1/8				
5905658	1616H09N-F02OH	●	16	16	100	16							

※1 Wrench for screw parts is not attached. Use commercial 3.0 hexagon wrench and 5.0 hexagon wrench to SSO606SC and SPR1/8 respectively.

SDJC-N-OH



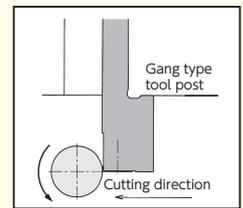
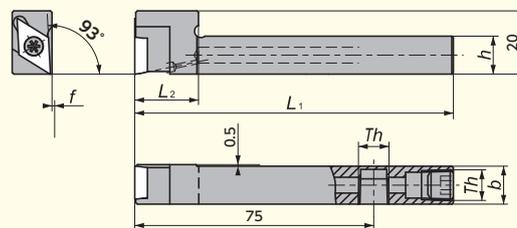
●R-hand shown

Holder dimension • Spare parts

Code No.	Toolholder	Stock	Dimensions (mm)							Applicable insert	Spare parts		
			h	b	L_1	h_1	f	L_2	Th		Clamp screw	Wrench	Screw parts※1
5903208	SDJCR1014F11N-F02OH	●	10	14	80	10	2	55	M6×1	DC□□11T3	LRIS-4*10	LLR-25S	SSO606SC
5886254	1214H11N-F02OH	●	12	100	12	75		Rc1/8(PT1/8)	SPR1/8				
5903216	1616H11N-F02OH	●	16	16	100	16							

※1 Wrench for screw parts is not attached. Use commercial 3.0 hexagon wrench and 5.0 hexagon wrench to SSO606SC and SPR1/8 respectively.

Y-SDJC-OH



●R-hand shown
●Takes Right-hand or Neutral insert

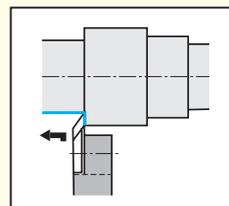
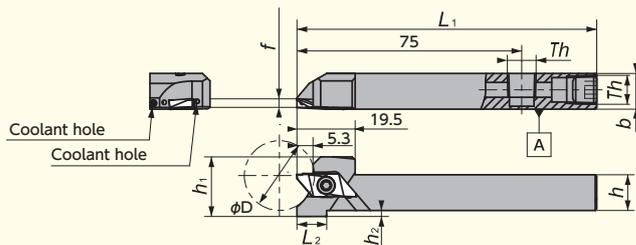
Holder dimension • Spare parts

Code No.	Toolholder	Stock	Dimensions (mm)							Applicable insert	Spare parts		
			h	b	L_1	h_1	f	L_2	Th		Clamp screw	Wrench	Screw parts※1
5910575	Y-SDJCR1212H11S-OH	●	12	12	100	—	0	20	Rc1/8(PT1/8)	DC□□11T3	LRIS-4*10	LLR-25S-20*65	SPR1/8
5910583	1616H11-OH	●	16	16			25						

※1 Wrench for screw parts is not attached. Use commercial 5.0 hexagon wrench

For Back turning

TBP-OH



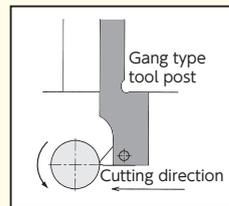
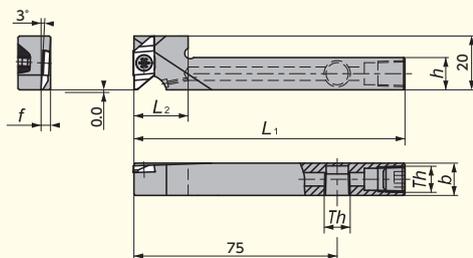
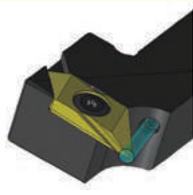
●R-hand shown

Holder dimension • Spare parts

Code No.	Toolholder	Stock	Max. bore Dia. (mm) ϕD	Dimensions (mm)								Applicable insert	Spare parts		
				h	b	L_1	h_1	f	L_2	h_2	Th		Clamp screw	Wrench	Screw parts*1
5925722	TBPR1012H-OH	●	25	10	12	100	10	3.5	19	4	M6 × 1	TBP	LRIS-4*10PW	CLR-15S	SS0606SC
5925730	12H-OH	●	25	12			12		10	2	Rc1/8 (PT1/8)				
5925748	16H-OH	●	35	16			16		0	0					

*1 Wrench for screw parts is not attached. Use commercial 3.0 hexagon wrench and 5.0 hexagon wrench to SS0606SC and SPR1/8 respectively.

Y-TBP-OH



●R-hand shown
●Takes Right-hand Insert

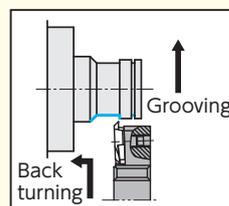
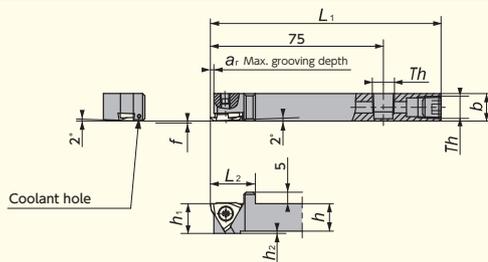
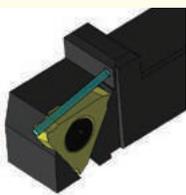
Holder dimension • Spare parts

Code No.	Toolholder	Stock	Dimensions (mm)								Applicable insert	Spare parts		
			h	b	L_1	h_1	f	L_2	h_2	Th		Clamp screw	Wrench	Screw parts*1
5911508	Y-TBPR12HS-OH	●	12	12	100	-	3.5	20	-	Rc1/8 (PT1/8)	TBP	LRIS-4*12PW	CLR-15S	SPR1/8
5911516	16H-OH	●	16	16				25						

*1 Wrench for screw parts is not attached. Use commercial 5.0 hexagon wrench

For Grooving

GTT-OH



●R-hand shown

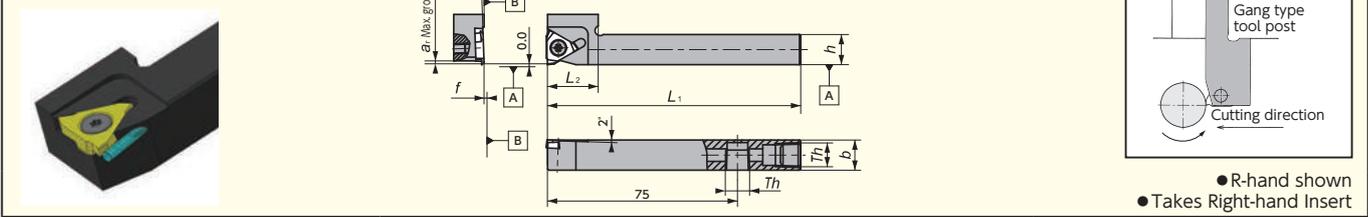
Holder dimension • Spare parts

Code No.	Toolholder	Stock	Dimensions (mm)										Applicable insert	Spare parts		
			h	b	L_1	h_1	f	L_2	a_r	h_2	Th	Clamp screw		Wrench	Screw parts*1	
5921705	GTR1012H00-OH	●	10	12	100	10	0	19.5	1.6	1	M6 × 1	GTM32	LR-5-4*10PW	CLR-15S	SS0606SC	
5890157	12H00-OH	●	12			12				0						Rc1/8 (PT1/8)
5921713	16H00-OH	●	16			16				0						

*1 Wrench for screw parts is not attached. Use commercial 3.0 hexagon wrench and 5.0 hexagon wrench to SS0606SC and SPR1/8 respectively.

For Grooving

Y-GTT-OH



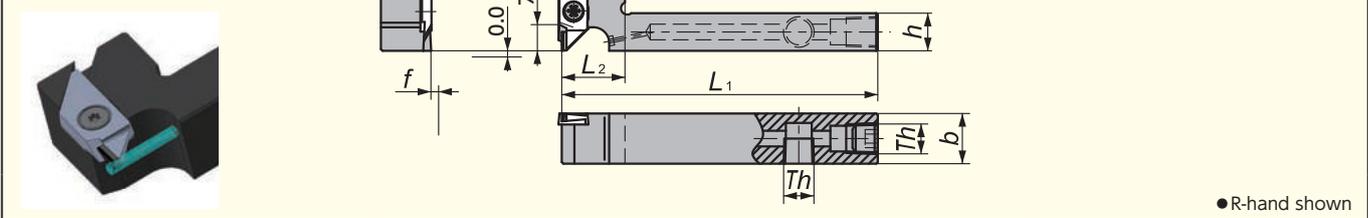
● R-hand shown
● Takes Right-hand Insert

Holder dimension · Spare parts

Code No.	Toolholder	Stock	Dimensions (mm)								Applicable insert	Spare parts			
			h	b	L ₁	h ₁	f	L ₂	a _r	h ₂		Th	Clamp screw	Wrench	Screw parts※1
5911466	Y-GTTR12H00S-OH	●	12	12	100	-	0	20	1.6	-	Rc1/8 (PT1/8)	GTM ₃₂	LR-S-4*10PW	CLR-15S	SPR1/8
5911474	16H00-OH	●	16	16			25								

※1 Wrench for screw parts is not attached. Use commercial 5.0 hexagon wrench

Y-GTPA-OH



● R-hand shown

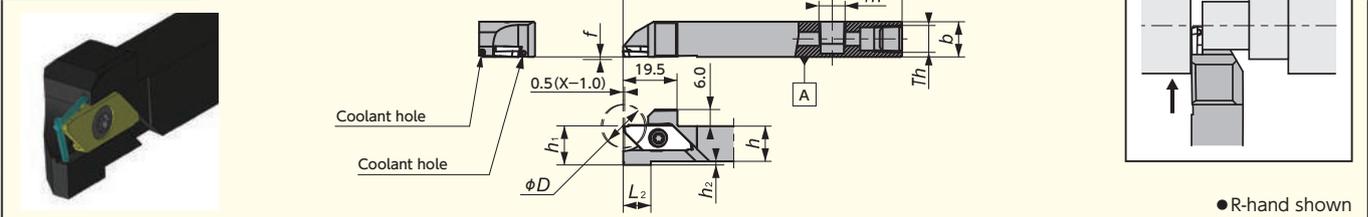
Holder dimension · Spare parts

Code No.	Toolholder	Stock	Dimensions (mm)							Applicable insert	Spare parts		
			h	b	L ₁	h ₁	f	L ₂	Th		Clamp screw	Wrench	Screw parts※1
5911482	Y-GTPAR1216HS-OH	●	12	16	70	-	0.1	20	Rc1/8 (PT1/8)	GTPA	LRIS-4*12PW	CLR-15S	SPR1/8
5911490	1216H-OH	●	16				25						

※1 Wrench for screw parts is not attached. Use commercial 5.0 hexagon wrench

For Cut off

CTP-OH



● R-hand shown

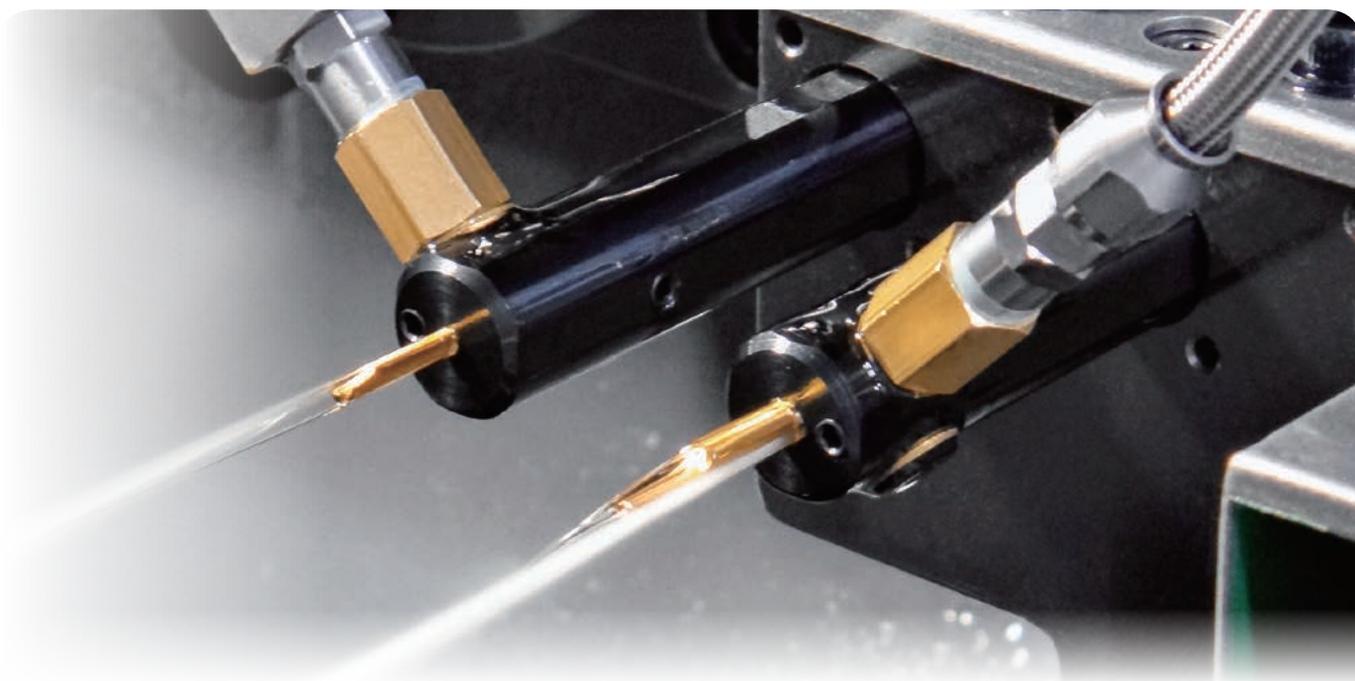
Holder dimension · Spare parts

Code No.	Toolholder	Stock	Max. Cut-off Dia. φD	Dimensions (mm)								Applicable insert	Spare parts		
				R	L	h	b	L ₁	h ₁	h ₂	L ₂		f	Th	Clamp screw
5921853	5921861 CTP _{1012H} -OH	●●	12		10	12	100	10	4	19	0.0	M6×1	LRIS-4*12PW	CLR-15S	SS0606SC
5918651	5918040 12H-OH	●●			12	12	100	12	2	10	0.0	Rc1/8 (PT1/8)			SPR1/8
5921879	5921887 16H-OH	●●			16	16	100	16	0	-	-	Rc1/8 (PT1/8)			SPR1/8

※1 Wrench for screw parts is not attached. Use commercial 3.0 hexagon wrench and 5.0 hexagon wrench to SS0606SC and SPR1/8 respectively.

New Products
Tool Materials / Selection Guide
PCD, CBN and ceramic
Cement
Micro-grain Carbide, Carbide
Insert Stock List
Outside Machining Toolholders
SS
Grooving Tools
Threading Tools
Shaper
Internal Machining tool range
Original Tools for Various Applications
Indexable End Milling Tools
Indexable Drill Inserts
Milling Cutters
Technical Data
Index

Boring bar "STICK DUO SPLASH"

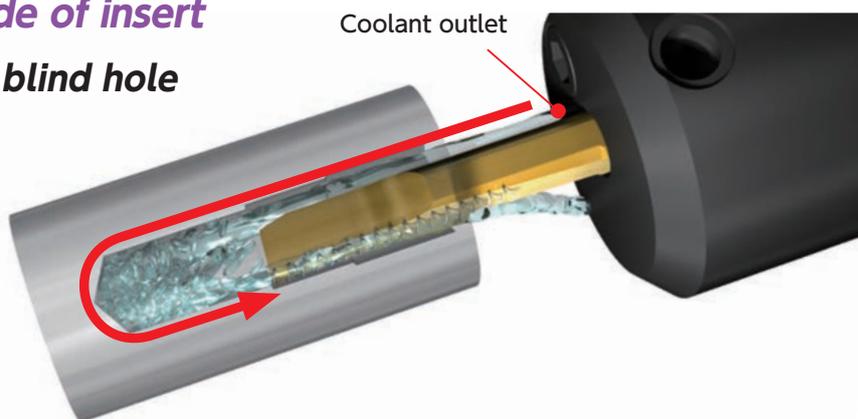


Features

You can select 2 types of coolant outlet

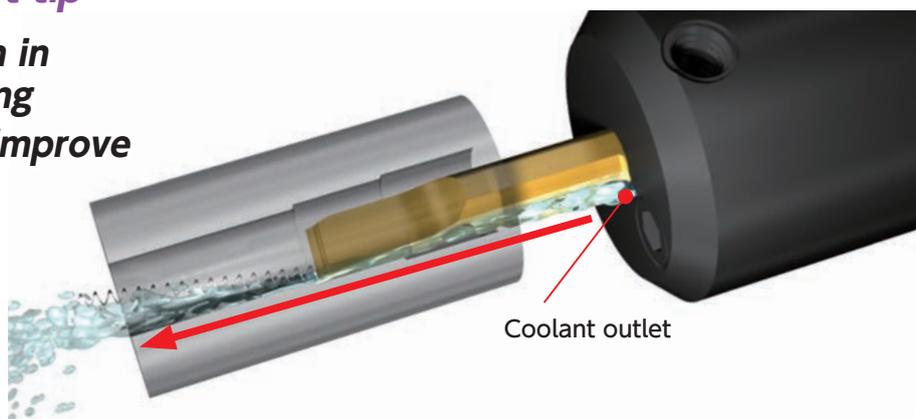
Internal coolant to back side of insert

- Good chip evacuation in blind hole machining



Internal coolant to insert tip

- Good chip evacuation in through-hole machining
- Coolant to insert tip improve the wear resistance



Structure

Connecting coolant horse to front and backside is possible

Designed for using with coolant fed machine
(Round shape of backside holder)

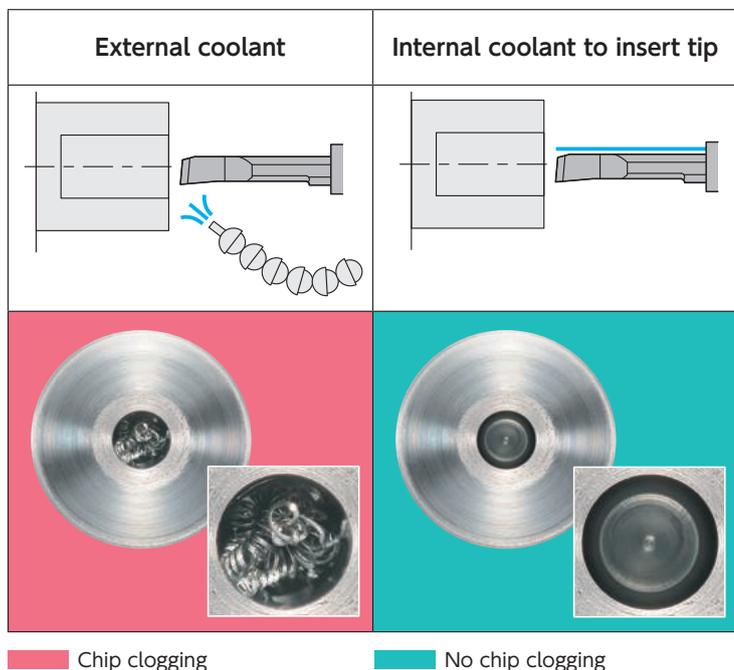


Connecting coolant horse to backside
Screw hole size RC1/8

Adjustable overhang length

Connecting coolant horse for front side M6×1.0screw hole
(Adjusting screw hole size is possible with adapter)

Machined work piece comparison



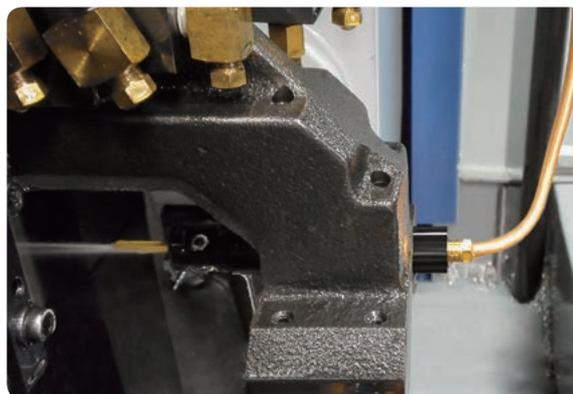
Work material : SCM435
 Insert : SHFS040R005S
 Cutting speed : $v_c=50\text{m/min}$
 D.O.C. : $a_p=0.2$
 Feed : $f=0.02\text{mm/rev}$
 Hole depth : 15mm
 Pilot hole : $\phi 5.1 \times 28\text{L}$
 Coolant pressure : 5MPa

Picture for jointing coolant horse

Frontside jointed



Backside jointed



STICK DUO sleeve (HY-NBH-OH type)

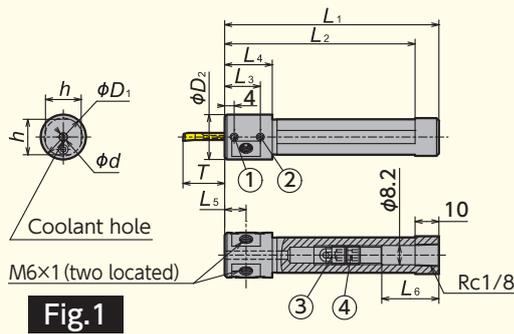


Fig. 1

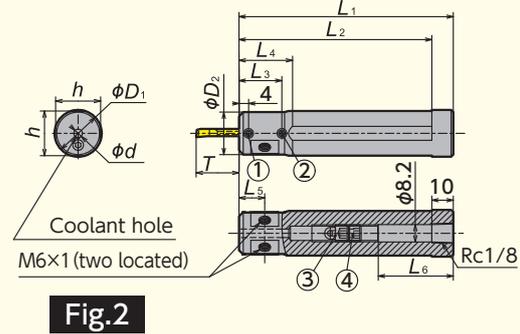
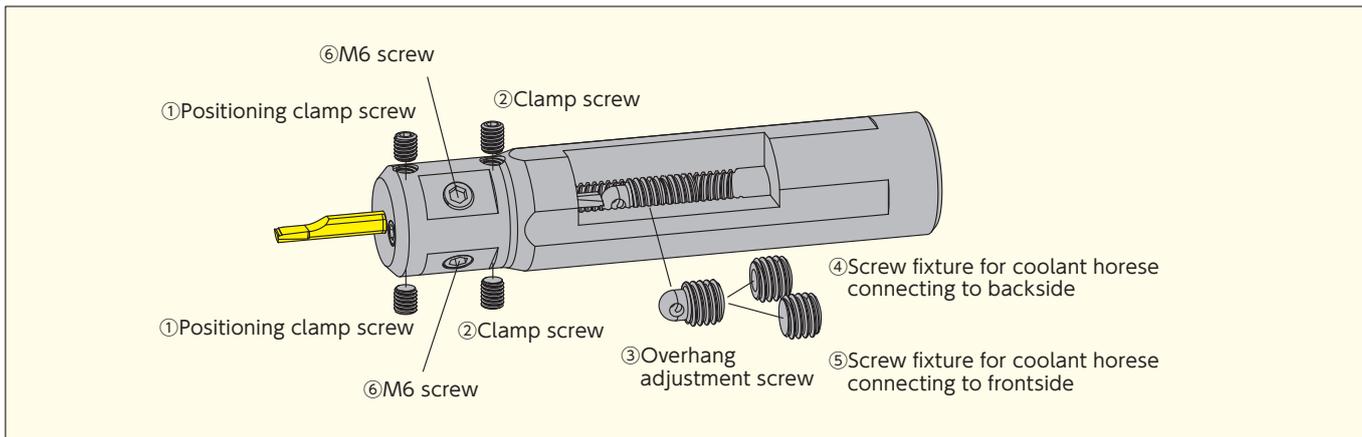


Fig. 2

Shape	Code No.	Stock	Holder number	Dimensions (mm)											Overhang length of bar T (mm)	
				I.D. ϕd	ϕD_1	ϕD_2	h	L_1	L_2	L_3	L_4	L_5	L_6	Min.	Max.	
Fig. 1	5893011	●	HY-NBH02016G-OH	2	16	19	15	90	80	15	19	9.5	29	5	18	
	5893029	●	02516G-OH	2.5									30	6.3	19.5	
	5893037	●	03016G-OH	3									31	7.5	21	
	5893045	●	03516G-OH	3.5						20	24	12	23	8.8	24.5	
	5893052	●	04016G-OH	4									24	10	28	
	5893060	●	05016G-OH	5									16	12.5	35	
Fig. 2	5893078	●	HY-NBH02019J-OH	2	19.05	19.05	18	110	100	15	—	9.5	49	5	18	
	5893086	●	02519J-OH	2.5									50	6.3	19.5	
	5893094	●	03019J-OH	3									51	7.5	21	
	5893102	●	03519J-OH	3.5						20	12	43	8.8	24.5		
	5893136	●	04019J-OH	4								44	10	28		
	5893144	●	05019J-OH	5								36	12.5	35		
	5893151	●	HY-NBH02020J-OH	2	20	20	19	110	100	15	—	9.5	49	5	18	
	5893169	●	02520J-OH	2.5									50	6.3	19.5	
	5893177	●	03020J-OH	3									51	7.5	21	
	5893185	●	03520J-OH	3.5						20	12	43	8.8	24.5		
	5893193	●	04020J-OH	4								44	10	28		
	5893201	●	05020J-OH	5								36	12.5	35		
	5893219	●	HY-NBH02022X-OH	2	22	20	21	120	110	15	25	9.5	59	5	18	
	5893227	●	02522X-OH	2.5									60	6.3	19.5	
	5893235	●	03022X-OH	3									61	7.5	21	
	5893243	●	03522X-OH	3.5						20	12	53	8.8	24.5		
	5893250	●	04022X-OH	4								54	10	28		
	5893268	●	05022X-OH	5								46	12.5	35		
	5893276	●	HY-NBH02025.0K-OH	2	25.0	20	24	125	115	15	25	9.5	64	5	18	
	5893284	●	02525.0K-OH	2.5									65	6.3	19.5	
	5893292	●	03025.0K-OH	3									66	7.5	21	
	5893300	●	03525.0K-OH	3.5						20	12	58	8.8	24.5		
	5893318	●	04025.0K-OH	4								59	10	28		
	5893326	●	05025.0K-OH	5								51	12.5	35		
5893334	●	HY-NBH02025.4K-OH	2	25.4	20	24	125	115	15	25	9.5	64	5	18		
5893367	●	02525.4K-OH	2.5									65	6.3	19.5		
5893375	●	03025.4K-OH	3									66	7.5	21		
5893383	●	03525.4K-OH	3.5						20	12	58	8.8	24.5			
5893391	●	04025.4K-OH	4								59	10	28			
5893409	●	05025.4K-OH	5								51	12.5	35			

Dimension "T" show overhang length of STICKDUO(hyper) bar when attached to sleeve with adjustment screw ③,④.

Parts



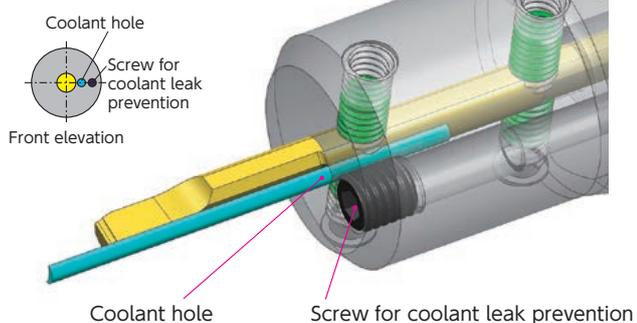
Holder number	Clamp screw		Overhang adjustment			M6 screw	Wrench		
	①	②	③	④*1	⑤*2	⑥	①、②	③、④、⑤	⑥
HY-NBH 020○○-OH									
025○○-OH									
030○○-OH	SS04045FS	SS0406F	SS0811R-OH	SS0806F-OH (Through hole)	SS0806F	SS0605SC	LW-2	LW-4*104	LW-3
035○○-OH									
040○○-OH									
050○○-OH									

- ※1 Select screw ④ to connect coolant hoses to backside
- ※2 Select screw ⑤ to connect coolant hoses to frontside

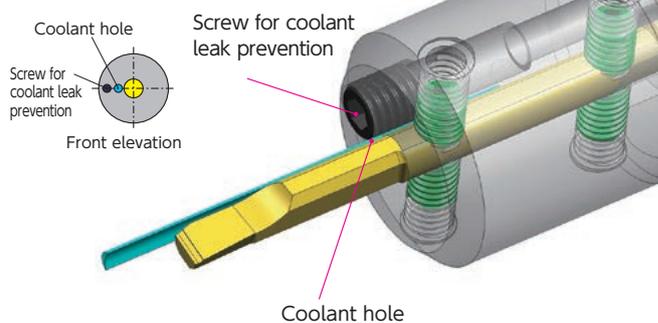
How to set bar in the sleeve when internal coolant to insert tip or to insert backside

By rotating sleeve up side down, you can select the coolant output position
Coolant hole located in screw side for coolant leak prevention. See the following about the details.

① Coolant to insert tip

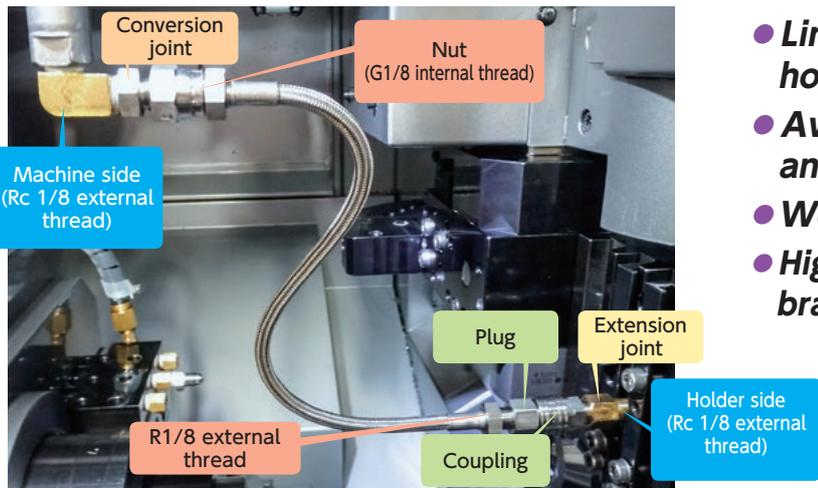


② Coolant to insert backside



Coolant Components

Coolant hose for connecting with R1/8



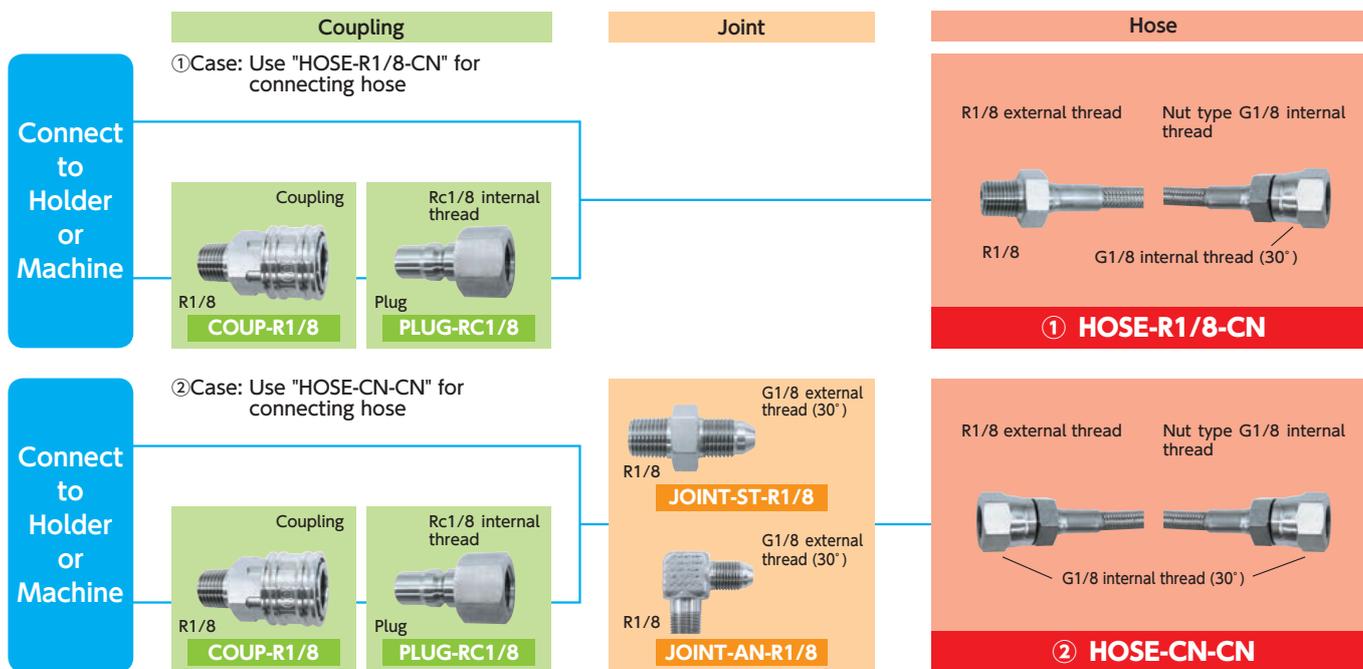
Ex. of connecting ①

- Line up wide range of coolant hose length
- Available for 2 types of coupling and conversion joint
- Working pressure MAX. 20.6 MPa
- High quality flexible stainless steel braided hose

Ex. of connecting ①

Parts	P/N
Conversion joint	JOINT-ST-R1/8
Hose	HOSE-R1/8-CN-400
Plug	PLUG-RC1/8
Coupling	COUP-R1/8
Extension joint	SCJ-R1/8-RC1/8-L

Chart for connecting coolant components



Hose

Shape	Code No.	P/N	Dimensions (mm)	Working pressure MAX. (MPa)	Working pressure MIN. (mm)
			L		
① R1/8 External thread + nut: G1/8 internal thread	5923255	HOSE-R1/8-CN-200	200	20.6	50
	5923263	HOSE-R1/8-CN-250	250		
	5923297	HOSE-R1/8-CN-300	300		
	5923305	HOSE-R1/8-CN-400	400		
	5923313	HOSE-R1/8-CN-500	500		
	5923321	HOSE-R1/8-CN-800	800		
② Both side: nut G1/8 internal thread	5923339	HOSE-CN-CN-200	200	20.6	50
	5923347	HOSE-CN-CN-250	250		
	5923354	HOSE-CN-CN-300	300		
	5923388	HOSE-CN-CN-400	400		
	5923396	HOSE-CN-CN-500	500		
	5923304	HOSE-CN-CN-800	800		

R1/8 External thread
Fix by rotating hoseNut G1/8 internal thread
Fix by rotating nut
(No need to rotate hose)

Conversion / Extension Joint

	Code No.	Stock	Spare parts	Dimensions (mm)						
				T ₁	T ₂	L ₁ ※1	L ₂	B	d	
	5891049	●	SCJ-R1/8-M10-L	R1/8 (PT1/8)	M10×1	16	12	13	4.5	
	5891056	●	1/8-RC1/8-L		Rc1/8 (PT1/8)		15			
	5891064	●	1/8-NPT1/8-L		NPT1/8					
	5892906	●	SCJ-M6-M10	M6×1	M10×1	6	12	2.5		
	5892914	●	SCJ-M6-RC1/8		Rc1/8 (PT1/8)		13			
	5892922	●	SCJ-M6-NPT1/8		NPT1/8					
	5892948	●	SCJ-R1/8-M10		R1/8 (PT1/8)		M10×1		10	12
	5892963	●	SCJ-R1/8-NPT1/8							NPT1/8

※1 To prevent hitting the coolant connecting part of holder from the gang tool post, "L1" dimension length is set longer.
NPT: ANSI/ASME B.1.20...1-1983(National Taper Pipe)

Joint

G1/8 external thread (30°) R1/8
JOINT-ST-R1/8

G1/8 external thread (30°) R1/8
JOINT-AN-R1/8

G1/8 external thread (30°) R1/8
JOINT-ST-R1/8

G1/8 external thread (30°) R1/8
JOINT-AN-R1/8

Coupling

Rc1/8 internal thread Plug **PLUG-RC1/8**

Coupling **COUP-R1/8**

Rc1/8 internal thread Plug **PLUG-RC1/8**

Coupling **COUP-R1/8**

Connect to Holder or Machine

Suitable use of Coupling and Joint

- Detach Hose frequently
⇒ Coupling is suitable
- Less detach Hose
⇒ Joint is suitable

Conversion joint (nut G1/8 internal thread)

Parts	Straight style	L style
P/N	JOINT-ST-R1/8	JOINT-AN-R1/8
Code No.	5918966	5923412
Working pressure MAX.(MPa)	20.6	20.6
Shape		

Coupling

Parts	Plug	Coupling
P/N	PLUG-RC1/8	COUP-R1/8
Code No.	5915491	5915517
Working pressure MAX.(MPa)	7.5	7.5
Shape		

NEW

STICK DUO series

SHAPER DUO

WATCH ON
YouTube

New Products

Tool Materials / Selection Guide

PCD, CBN and ceramic

Cermet, PVD-coated Carbide

Micro-grain Carbide, Carbide

Insert Stock List

Outside Machining Toolholders

SS

Grooving Tools

Threading Tools

Shaper

Internal machining tool range

Original Tools for Various Applications

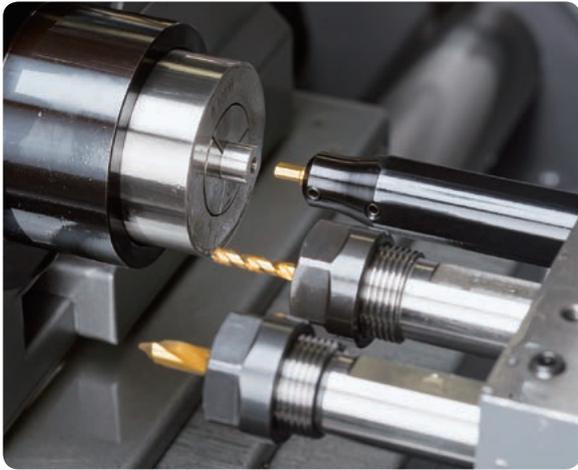
Indexable End Milling Tools

Indexable Drill Inserts

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Technical Data

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Hexagon Socket



Square Socket



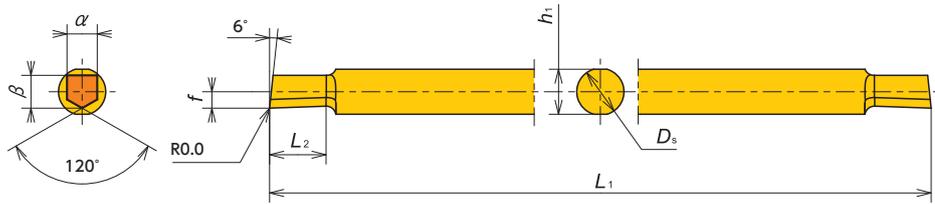
New line-up for square shape hole

Features

- Square and hexagonal hole machining is possible with back spindle of Swiss type lathe!
- Economical with 2 corners cutting edge!
- Easy dimensional correction!

Stock list

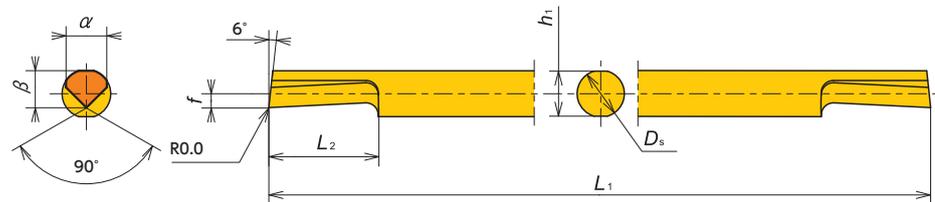
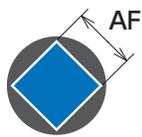
Hexagon Socket



Part number	Base AF (mm)	AF range (mm)	Dimensions (mm)							PVD coated micrograin carbide	
			D _s	L ₁	L ₂	h ₁	α	β	f	TM4	Stock
SSP020N1130H	1.5	1.4 ~ 2.0	φ2	50	3.0	1.8	1.1	0.8	0.4	5885934	●
020N1430H	2.0	1.9 ~ 2.6	φ2		4.0	2.8	1.4	1.1	0.55	5885942	●
030N1940H	3.0	2.4 ~ 3.6	φ3		5.0	3.8	1.9	1.6	0.8	5885959	●
040N2450H	4.0	3.4 ~ 4.6	φ4	60	5.0	3.8	2.4	2.6	1.3	5885967	●
050N3260H	5.0	4.4 ~ 6.2	φ5	70	6.0	4.8	3.2	3.4	1.7	5885975	●
060N42120H	6.0	5.9 ~ 8.2	φ6		12.0	5.6	4.2	4.0	2.0	5873120	●
080N62160H	8.0	7.9 ~ 12.2	φ8		16.0	7.6	6.2	4.7	2.35	5885926	●

※See page L10-11 for sleeve holder.

Square Socket



Part number	Base AF (mm)	AF range (mm)	Dimensions (mm)							PVD coated micrograin carbide		
			D _s	L ₁	L ₂	h ₁	α	β	f	TM4	Stock	
SSP020N1740S	2.0	1.9 ~ 2.3	φ2.0	50	4.0	1.8	1.70	1.60	0.70	5920186	●	
025N1940S	2.5	2.2 ~ 2.6	φ2.5			2.3	1.95	1.80	0.65	5920194	●	
030N2260S	3.0	2.5 ~ 3.0	φ3.0		60	6.0	2.8	2.20		2.05	5920202	●
035N2760S	3.5	2.9 ~ 3.7	φ3.5	8.0			3.3	2.70	2.25	0.60	5920210	●
040N3380S	4.0	3.6 ~ 4.6	φ4.0	70	8.0	3.8	3.35	3.05	1.15	5920228	●	
050N39100S	5.0	4.5 ~ 5.4	φ5.0			10.0	4.8	3.90	3.95	1.55	5920236	●
060N47120S	6.0	5.3 ~ 6.6	φ6.0			80	12.0	5.6	4.75	4.50	1.70	5920244
080N58160S	8.0	6.5 ~ 8.1	φ8.0	16.0	7.6			5.80	5.50	5920251		●

※See page L10-11 for sleeve holder.

Recommended cutting condition

Feed ...F4000~F1000(mm/min) D.O.C.(radial depth) ...0.05~0.01mm

Following machining process is recommended for beautiful surface finish.

1. Roughing at D.O.C.(radial depth) 0.05mm
2. Finishing at D.O.C.(radial depth) 0.01mm for 1-2 times.

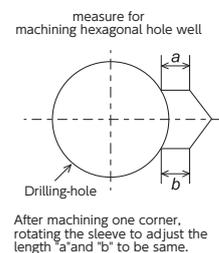
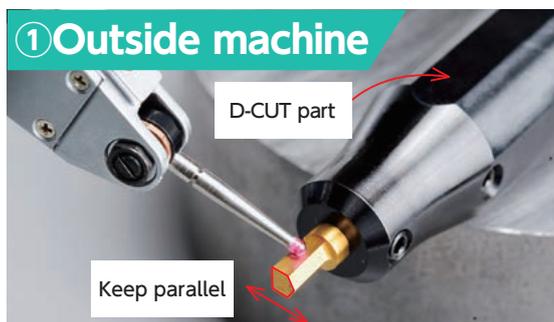
Case study

Hexagonal hole machining	
Work material	: SUS303
Feed (mm/min)	: 2,000
Depth of cut (mm)	: Rough 0.025 / Finish 0.005
Coolant	: WET
NTK : TM4 SSP030N1840H 10,000 pcs/corner	
Competitor : Carbide 300 pcs/corner	
<ul style="list-style-type: none"> • Hexagonal hole machined by competitor's is unstable shape and short tool life. • NTK's achieved the following good result due to the superior grinding tech and "TM4"PVD coating. <ul style="list-style-type: none"> ① stable hexagonal shape and longer tool life ② less dimensional correct ③ good surface finish 	

machining process

- Center drilling**
 - Select dia of center drilling over O.S. length
- Drilling(pilot hole)**
 - Select the dia of drill insert same with hexagonal O.S.
 - Deeper depth of pilot hole is recommended, because burrs is accumulated when machined
- Center drilling(chamfering)**
 - Use the same drill in process ①
 - Machining the process ① and ③ at the same time is also possible.
- Shaping hexagonal hole**
 - Shaping hexagonal hole
 - Shaping hexagonal shape 6 times with 60 degree positioned.
- Drilling finish zero cutting**
 - Finishing with the same drill in the process ②
 - ※In the zero cutting, reduce the cutting condition due to the heavy interrupted machining

How to set insert in the sleeve



SHAPER Programming example

Note : The codes and numbers may vary by machine type. Please contact the machine builder for details.
Programming code example for HEX 3.0mm. **AF : 3.0mm, Depth : 2.7mm, Pilot drill diameter : 3.0mm**

Shaper Main Program

```

☆ : Back spindle stop rotation
☆ : Back spindle index 0° .....①
T0000 (Shaper)
G50 U2.0 .....②
G0 X2.9 Z-2.0 T00 .....③
☆ : Call sub-program (0000①) repeat 14 times .....④
☆ : Call sub-program (0000②) .....⑤

☆Back spindle index 60° .....①
G0 X2.9 Z-2.0
☆ : Call sub-program (0000①) repeat 14 times .....④
☆ : Call sub-program (0000②) .....⑤

☆ : Back spindle index 120° .....①
G0 X2.9 Z-2.0
☆ : Call sub-program (0000①) repeat 14 times .....④
☆ : Call sub-program (0000②) .....⑤

☆ : Back spindle index 180° .....①
G0 X2.9 Z-2.0
☆ : Call sub-program (0000①) repeat 14 times .....④
☆ : Call sub-program (0000②) .....⑤

☆ : Back spindle index 240° .....①
G0 X2.9 Z-2.0
☆ : Call sub-program (0000①) repeat 14 times .....④
☆ : Call sub-program (0000②) .....⑤

☆ : Back spindle index 300° .....①
G0 X2.9 Z-2.0
☆ : Call sub-program (0000①) repeat 14 times .....④
☆ : Call sub-program (0000②) .....⑤

☆ : Release spindle index
G0 Z-10.0
G50 U-2.0
G0 U0 W0 T0
M1
  
```

☆ : Input program for your machinery

- ①=Index the sub-spindle 6 times in 60 degree increments.
 ②=Specify the coordinate system shift command (in X axis direction) for the tool. [2 x f, where f is tool dimension located in catalog].
 • A positive direction shift is recommended for easier programming.
 ③=Execute the positioning of the tool.
 • X position should be 0.1 mm less than pilot drill diameter.
 • Z position should be off-set 2.0 mm from material to achieve program feed rate.

Shaper Sub Program #1

```

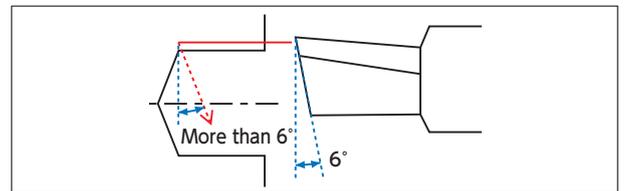
N0000① (Roughing)
G4 U0.02 .....⑥
G98 G1 Z2.7 F3000 .....⑦
G4 U0.02
U-0.2 W-0.018 .....⑧
G4 U0.02
G0 Z-2.0
G4 U0.02
U0.25 .....⑨
M99
  
```

Shaper Sub Program #2

```

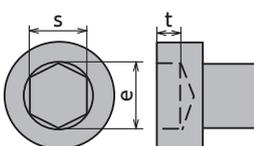
N0000② (Finishing)
G98 G1 X3.61 Z-2.0 F1000 .....⑩
G4 U0.02
Z2.7 F3000
G4 U0.02
U-0.2 W-0.018
G4 U0.02
G0 Z-2.0
M99
  
```

- ④=Go to the Sub-Program #1.
 • Sequence runs 14 times. First cutting point X2.9 and final cutting point X3.6, with 0.05 DOC (for diameter) each time. $(3.6 - 2.9 / 0.05 = 14 \text{ times})$
 ⑤=Go to the Sub-Program #2, for finishing sequence.
 ⑥=Specify dwell time. This allows the program and machine to stay synchronized.
 ⑦=Cut into part 2.7mm. F3000 is recommended feed to be used for most materials; including Titanium Alloy and Stainless Steel.
 ⑧=This code backs off the tool with an angle greater than 6 degrees (10 degrees used in example).



- ⑨=Return the X position + 0.05mm (the DOC for diameter).
 ⑩=Finishing operation with 0.01mm DOC (X 3.61) is recommended for better surface finish.

Reference: Hexagon Socket Specification Extract from JIS B1176



s	Name	1.5	1.5	2	2.5	3	4	5	6	8	10	12
		Max.	1.58	1.58	2.08	2.58	3.08	4.095	5.14	6.14	8.175	10.175
	Min.	1.52	1.52	2.02	2.52	3.02	4.020	5.02	6.02	8.025	10.025	12.032
e	Min.	1.733	1.733	2.303	2.873	3.443	4.583	5.723	6.863	9.149	11.429	13.716
t	Min.	0.7	1	1.1	1.3	2	2.5	3	4	5	6	7
Thread (reference)		M1.6	M2	M2.5	M3	M4	M5	M6	M8	M10	M12	M14

SHAPER Programming example by machine builders

Note : The codes and numbers may vary by machine type. Please contact the machine builder for details.
 Programming code example for HEX 3.0mm. **AF : 3.0mm, Depth : 2.7mm, Pilot drill diameter : 3.0mm**

Program example for CITIZEN machine

```

Shaper Main Program

M25
M78 S0 .....①
T○○○○(Shaper)
G50 U2.0 .....②
G0 X2.9 Z-2.0 T○○ .....③
M98 P2100 L14 .....④
M98 P2200 .....⑤

M78 S60 .....①
G0 X2.9 Z-2.0
M98 P2100 L14
M98 P2200 } 《A》

Repeat 《A》 by S120, S180, S240,
S300 with each 60 degrees

M20
G0 Z-10.0
G50 U-2.0
G0 U0 W0 T0
M1
    
```

Program example for STAR machine

```

Shaper Main Program

M25
T○○○○ (Shaper)
G50 U2.0 .....②
M8
G0 X2.9 Z-2.0 C0 T○○ .....①③
M98 P2100 L14 .....④
M98 P2200 .....⑤

G0 C60.0 .....①
G0 X2.9 Z-2.0
M98 P2100 L14
M98 P2200 } 《A》

Repeat 《A》 by S120, S180, S240,
S300 with each 60 degrees

G0 Z-2.0
G50 U-2.0
G0 T0
G28 W0
M1
    
```

Program example for TSUGAMI machine

```

Shaper Main Program

M105
M150
G28 H0 .....①
M182
T○○○○(Shaper)
G50 U-2.0 .....②
G0 X2.9 Z2.0 T○○ .....③
M98 P2100 L14 .....④
M98 P2200 .....⑤
M183

G0 C60 .....①
M182
G0 X2.9 Z2.0
M98 P2100 L14
M98 P2200 } 《A》
M183

Repeat 《A》 by S120, S180, S240,
S300 with each 60 degrees

M151
G0 Z10.0
G50 U2.0
G0 U0 W0 T0
M1
    
```

Shaper Sub Program #1

```

N2100 (Roughing)
G4 U0.02 .....⑥
G98 G1 Z2.7 F3000 .....⑦
G4 U0.02
U-0.2 W-0.018 .....⑧
G4 U0.02
G0 Z-2.0
G4 U0.02
U0.25 .....⑨
M99
    
```

Shaper Sub Program #1

```

O2100 (Roughing)
G4 U0.02 .....⑥
G98 G1 Z2.7 F3000 .....⑦
G4 U0.02
U-0.2 W-0.018 .....⑧
G4 U0.02
G0 Z-2.0
G4 U0.02
U0.25 .....⑨
M99
    
```

Shaper Sub Program #1

```

O2100 (Roughing)
G4 U0.02 .....⑥
G98 G1 Z-2.7 F3000 .....⑦
G4 U0.02
U-0.2 W0.018 .....⑧
G4 U0.02
G0 Z2.0
G4 U0.02
U0.25 .....⑨
M99
    
```

Shaper Sub Program #2

```

N2200 (Finishing)
G98 G1 X3.61 Z-2.0 F1000 .....⑩
G4 U0.02
Z2.7 F3000
G4 U0.02
U-0.2 W-0.018
G4 U0.02
G0 Z-2.0
M99
    
```

Shaper Sub Program #2

```

O2200 (Finishing)
G98 G1 X3.61 Z-2.0 F1000 .....⑩
G4 U0.02
Z2.7 F3000
G4 U0.02
U-0.2 W-0.018
G4 U0.02
G0 Z-2.0
M99
    
```

Shaper Sub Program #2

```

O2200 (Finishing)
G98 G1 X3.61 Z2.0 F1000 .....⑩
G4 U0.02
Z-2.7 F3000
G4 U0.02
U-0.2 W0.018
G4 U0.02
G0 Z2.0
M99
    
```

- New Products
- Tool Materials / Selection Guide
- PCD, CBN and ceramic
- Cermet
- PVD-coated Carbide
- Micro-grain Carbide, Carbide
- Insert Stock List
- Outside Machining Toolholders
- SS
- Grooving Tools
- Threading Tools
- Shaper
- Internal machining tool range
- Original Tools for Various Applications
- Indexable End Milling Tools
- Indexable Drill Inserts
- Milling Cutters
- Technical Data
- Index

NEW

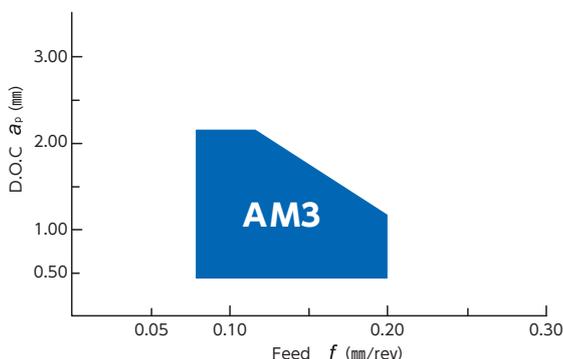
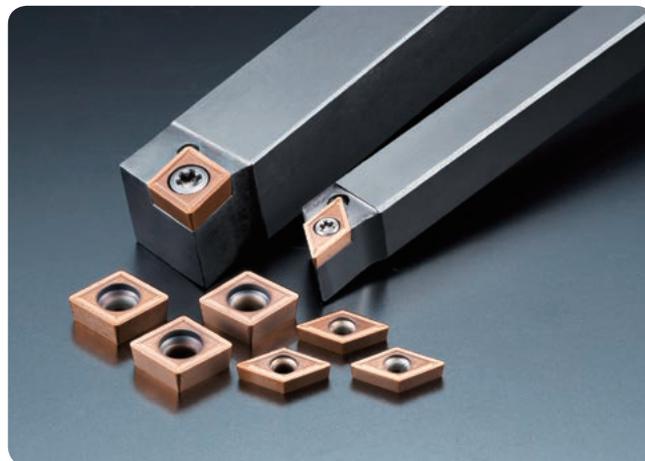
DM4 grade front turning insert with AM3 chipbreaker

Sharpness as if G class !



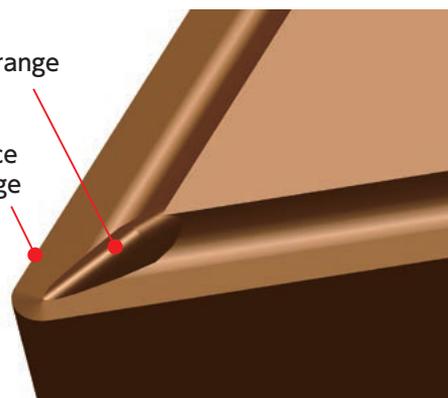
Features

- **M Tolerance but with up sharp cutting edge !**
- **Recommended for stainless steel, hard to cut work material !**
- **Ideal for high speed machining of carbon steel !**
- **Roughing for alloy steel !**
- **Thick coating with both superior oxidation and wear resistance. Excellent adhesion resistance offers stable machining.**



Special dot makes wide range of cutting conditions

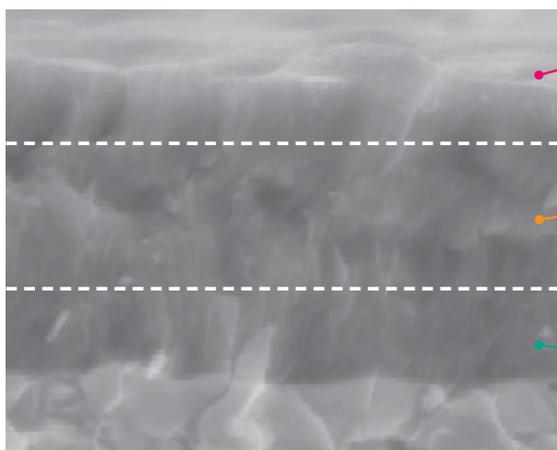
Good cutting performance with up sharp cutting edge



Stock list

Shape	Part number	Dimensions (mm)			PVD coated micrograin carbide	
		I.C.	Thickness	Corner radius	DM4	Stock
 AM3	NEW CCMT060202FNAM3	6.35	2.38	0.2	5882220	●
	060204FNAM3			0.4	5882212	●
	CCMT09T302FNAM3	9.525	3.97	0.2	5882196	●
	09T304FNAM3			0.4	5882188	●
09T308FNAM3	0.8			5882170	●	
 AM3	NEW DCMT070202FNAM3	6.35	2.38	0.2	5882162	●
	070204FNAM3			0.4	5882154	●
	DCMT11T302FNAM3	9.525	3.97	0.2	5882147	●
	11T304FNAM3			0.4	5882139	●
11T308FNAM3	0.8			5882121	●	
 AM3	NEW VCMT110302FNAM3	6.35	3.18	0.2	5901038	●
	110304FNAM3			0.4	5901046	●

Structure



Adhesion resistance layer

TiN Excellent adhesion resistance
Improved peeling resistance compared with other TiAlN coating

Wear resistance layer

TiCN Excellent wear resistance with NTK original coating layer

Oxidization resistance layer

TiAlN Excellent oxidation and wear resistance

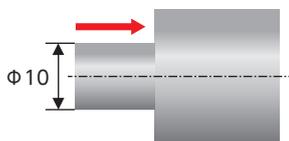
- **Thick coating with both superior oxidation and wear resistance. Excellent adhesion resistance offers stable machining.**

Case study

Front turning with "DM4"

Work material : SUS440C

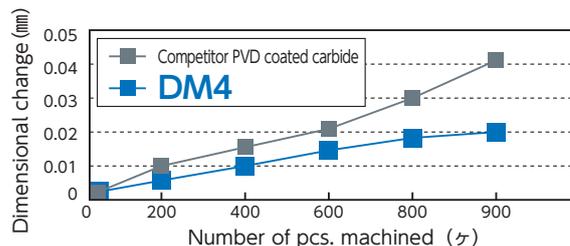
Tooling



Cutting speed (m/min) : 55

Feed (mm/rev) : 0.04

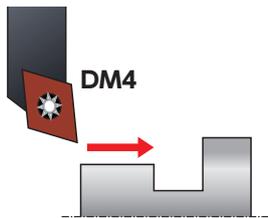
Depth of cut (mm) : 0.4



NTK DM4 improved the dimensional stability. Even after 900 pcs machining, NTK's dimensional change was slightly 0.02mm compared with competitor's 0.041mm.

Surfacefinish and burr comparison

Surfacefinish comparison

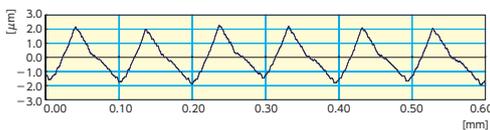
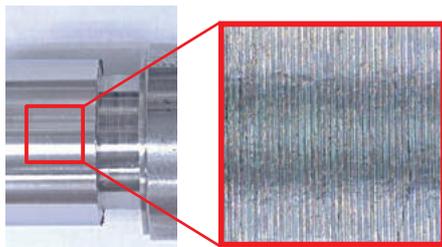


Work material : SUS304

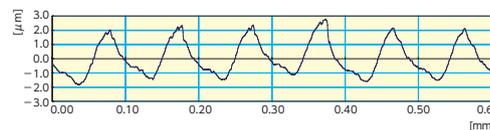
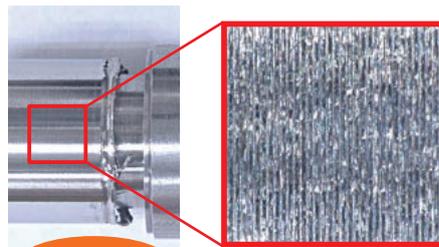
Insert shape : DCMT11T04FNAM3

Cutting condition : $V_c = 80\text{m/min}$
 $f = 0.1\text{mm/rev}$
 $a_p = 0.7\text{mm}$, WET

NTK M class



Competitor M class



NEW

New grooving tool SCRUM DUO

WATCH ON
YouTube

Features



"SCRUM DUO" offers excellent stable machining and longer tool life in grooving and traversing



Wide coverage from small to bigger diameter
Max grooving depth is "20mm"

Traversing

	NTK : GW chipbreaker	Competitor
Chip		
Surface finish		

SCM415 $v_c=150\text{m/min}$ $f=0.1\text{mm/rev}$ $a_p=1.0\text{mm}$ WET
Insert : DM4 GWPG500N04F-GW Holder : GTWPR2525M-5F10

Excellent chip control in traversing process
Excellent shiny surface finish

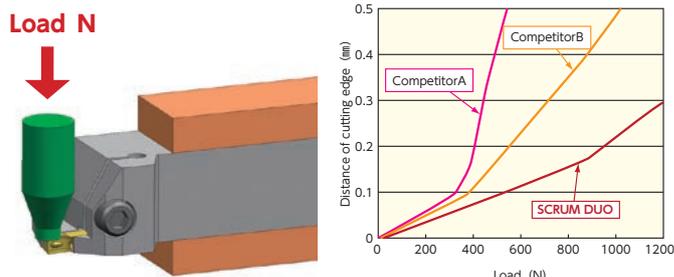
Grooving

	NTK : GW chipbreaker	Competitor
Chip		
Surface finish		

SCM415 $v_c=150\text{m/min}$ $f=0.1\text{mm/rev}$
Grooving depth $a_p=7.0\text{mm}$ No step feed WET
Insert : DM4 GWPG500N04F-GW, Holder : GTWPR2525M-5F10

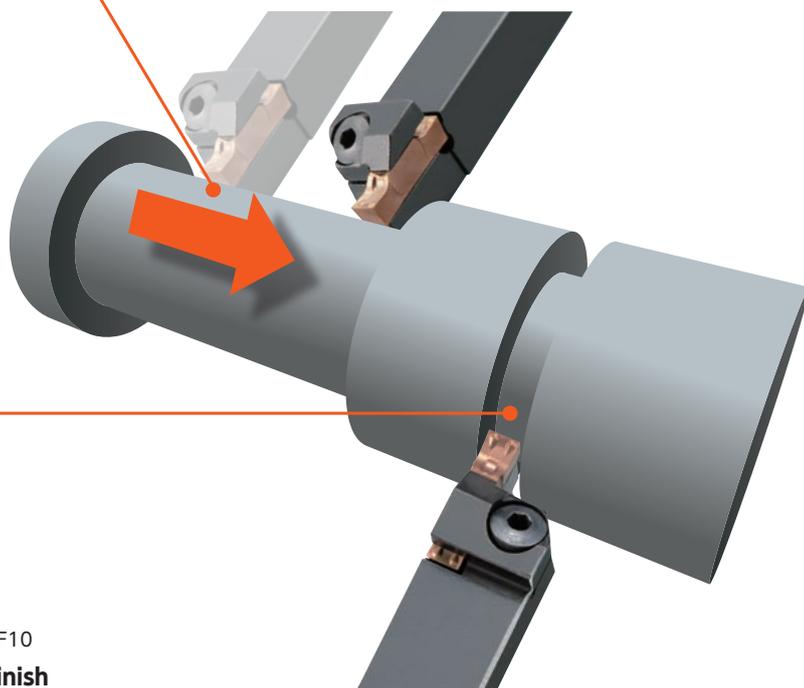
Excellent chip control and excellent shiny surface finish

Toolholders and inserts designed to obtain higher rigidity



SCRUM DUO : GTWPR2525M-5F10

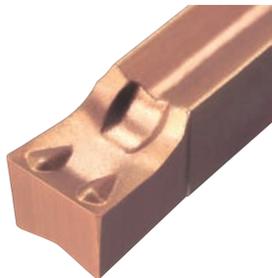
Thanks to the high rigid designed toolholder, it offers the traversing with max depth of cut 3.5mm !



New Products
 Tool Materials / Selection Guide
 PCD, CBN and ceramic
 Cermet
 PVD-coated Carbide
 Micro-grain Carbide, Carbide
 Insert Stock List
 Outside Machining Toolholders
 SS
 Grooving Tools
 Threading Tools
 Shaper
 Internal machining tool range
 Original Tools for Various Applications
 Indexable End Milling Tools
 Indexable Drill Inserts
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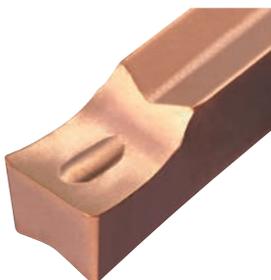
"DM4" and two types chipbreaker offer longer tool life and excellent surface finishing

GW chipbreaker



Multi-purpose chipbreaker utilizing sharpness for better chip control
Traversing is also possible

GV chipbreaker



Super sharp chipbreaker with high-rake angle
Best for the applications requiring low cutting forces

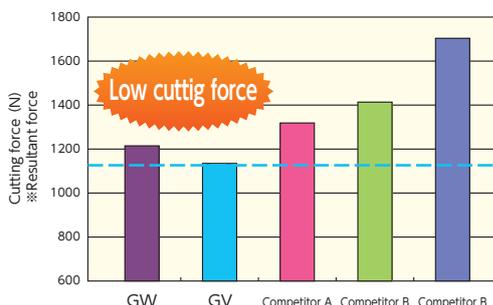
Chip condition (Grooving)

Cutting condition
 $V_c=80\text{m/min}$ $f=0.08\text{mm/rev}$ Width : 5mm WET

	GW chipbreaker	GV chipbreaker
SUS304		
SUS303		
SCM435		

Cutting force (Grooving)

Cutting condition
 $V_c=150\text{m/min}$ $f=0.1\text{mm/rev}$ Width : 5mm WET



Recommended cutting conditions

Application	Work material	Cutting speed (m/min)				Feed (mm/rev)			Depth of cut (mm)
		50	100	150	200	0.05	0.1	0.15	
Grooving 	Free cutting steels	[Range: 50-200]				[Range: 0.05-0.15]			~ 3.5 (mm)
	Carbon steels, Alloy steels	[Range: 50-150]				[Range: 0.05-0.15]			
	Stainless steel	[Range: 50-100]				[Range: 0.05-0.15]			
Traversing 	Free cutting steels	[Range: 50-200]				[Range: 0.05-0.15]			
	Carbon steels, Alloy steels	[Range: 50-150]				[Range: 0.05-0.15]			
	Stainless steel	[Range: 50-100]				[Range: 0.05-0.15]			

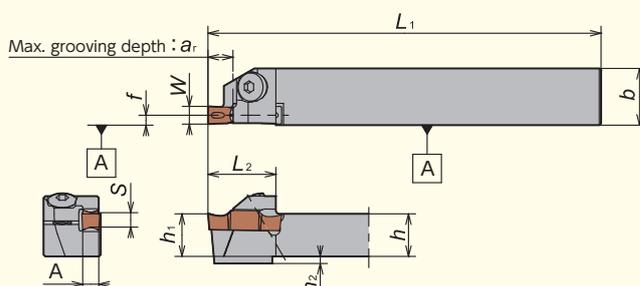
Stock list

Holder

For Swiss lathe (shank size ~ □16)

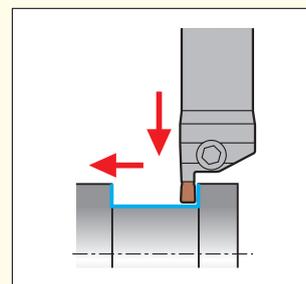
GTWP

Max. Bore dia.



※Recommended fastening torque 3.5[N·m]

●R-hand shown



NEW

NEW

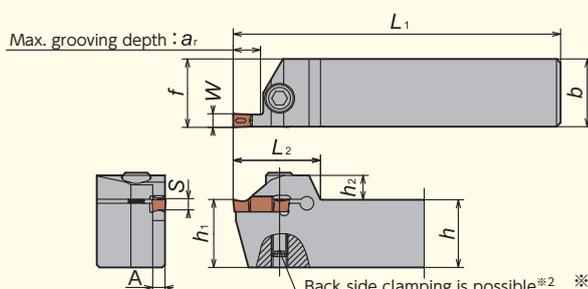
NEW

Code No.		Holder number	Stock		Width W	Max. grooving depth a_r	Dimensions (mm)										Height ^{※1} S	Applicable insert	Spare Parts	
R	L		R	L			h	b	h_1	h_2	f	L_1	L_2	A	Bolt	Wrench				
5875125		GTWP $\frac{1}{2}$ 1016-3D07	●	●	3	7	10	16	12	2	0.3	120	19	2.6	D	GWPO300	AOB-5*14	LW-3S		
5849054	5852280	1216-3D07	●	●		7	12	16	12	0			19.5				22			
5849070	5852306	1616-3D09	●	●		9	16	16	16	0			22				19			
5875133		1016-4E07	●	●	4	7	10	16	12	2	0.3	120	19	3.5	E	GWPO400	AOB-5*14	LW-3S		
5849088	5852314	1216-4E07	●	●		7	12	16	12	0			19.5				22			
5849096	5852322	1616-4E09	●	●		9	16	16	16	0			22				19			
5875141		1016-5F07	●	●	5	7	10	16	12	2	0.3	120	19	4.5	F	GWPO500	AOB-5*14	LW-3S		
5849104	5852355	1216-5F07	●	●		7	12	16	12	0			19.5				22			
5849112	5852371	1616-5F09	●	●		9	16	16	16	0			22				19			
5893565		1020-6G07	●	●	6	7	10		10	2	0.3	120	22	5.3	G	GWPO600	AOB-5*14	LW-3S		
5893573		1220-6G07	●	●		7	12	20	12	0			22.5				25			
5893581	5893599	1620-6G09	●	●		9	16		16	0			25				22			

※1 Please make sure the insert height fit on the toolholder

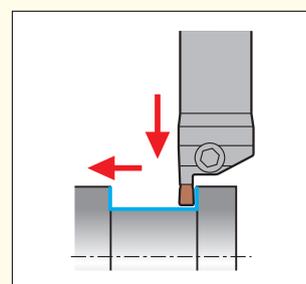
For mutipurpose lathe(shank size □20, □25)

GTWP

Back side clamping is possible^{※2}

※Recommended fastening torque 7.0[N·m]

●R-hand shown



Code No.		Holder number	Stock		Width W	Max. grooving depth a_r	Dimensions (mm)										Height ^{※1} S	Applicable insert	Spare Parts		
R	L		R	L			h	b	h_1	h_2	f	L_1	L_2	A	Bolt	Wrench			Wrench ^{※2}		
5849120	5852397	GTWP $\frac{1}{2}$ 2020K-3D10	●	●	3	10	20	20	20	8	20.2	125	29	2.6	D	GWPO300	CS0520W	LW-4	LW-2.5		
5849138	5852405	2525M-3D10	●	●		25	25	25	9	25.2	150	32	CS0625W				LW-5	LW-3			
5849146	5852421	2020K-3D20	●	●		20	20	20	8	20.2	125	41	CS0520W				LW-4	LW-2.5			
5849153	5852439	2525M-3D20	●	●	4	10	25	25	25	9	25.2	150	44	3.5	E	GWPO400	CS0625W	LW-5	LW-3		
5849161	5852447	2020K-4E10	●	●		20	20	20	8	20.3	125	29	CS0520W				LW-4	LW-2.5			
5849179	5852454	2525M-4E10	●	●		25	25	25	9	25.3	150	32	CS0625W				LW-5	LW-3			
5849187	5852470	2020K-4E20	●	●	5	10	20	20	20	8	20.3	125	41	4.5	F	GWPO500	CS0520W	LW-4	LW-2.5		
5849195	5852488	2525M-4E20	●	●		25	25	25	9	25.3	150	44	CS0625W				LW-5	LW-3			
5849203	5852496	2020K-5F10	●	●		20	20	20	8	20.3	125	29	CS0520W				LW-4	LW-2.5			
5849211	5852512	2525M-5F10	●	●	6	10	25	25	25	9	25.3	150	32	5.3	G	GWPO600	CS0625W	LW-5	LW-3		
5849229	5852520	2020K-5F20	●	●		20	20	20	8	20.3	125	41	CS0520W				LW-4	LW-2.5			
5849237	5852538	2525M-5F20	●	●		25	25	25	9	25.3	150	44	CS0625W				LW-5	LW-3			
5849245	5852546	2020K-6G12	●	●	6	12	20	20	20	8	20.35	125	34	5.3	G	GWPO600	CS0520W	LW-4	LW-2.5		
5849252	5852553	2525M-6G12	●	●		25	25	25	9	25.35	150	37	CS0625W				LW-5	LW-3			
5849260	5852561	2020K-6G25	●	●		20	20	20	8	20.35	125	49	CS0520W				LW-4	LW-2.5			
5849278	5852587	2525M-6G25	●	●	6	25	25	25	9	25.35	150	52	5.3	G	GWPO600	CS0625W	LW-5	LW-3			
			●	●		25	25	25	9	25.35	150	52				CS0625W	LW-5	LW-3			

※1 Please make sure the insert height fit on the toolholder

※2 Wrench for back side clamping is optional

Fur multipurpose lathe(shank size □20)

GKWP

"L" shape type

Back side clamping is possible^{※2}

※ Recommended fastening torque 7.0[N · m]

● L-hand shown

Code No.		Holder number	Stock		Max. grooving depth a _r	Dimensions (mm)										Height ^{※1} S	Applicable insert	Spare Parts		
R	L		R	L		Width W	h	b	h ₁	h ₂	f	L ₁	L ₂	A	Bolt			Wrench	Wrench ^{※2}	
	5893607	GKWP 2020K-3D10	●	3	10	20	20	20	8	32	125	23	2.6	D	GWPO300	CS0520W	LW-4	LW-2.5		
	5893615		●	4																
	5893623		●	5																
	5893631		●	6																

※ 1 Please make sure the insert height fit on the toolholder
 ※ 2 Wrench for back side clamping is optional

Applicable insert

Shape	Part number	Dimensions (mm)					Height ^{※1} S	PVD coated micrograin carbide		
		W		r _e	M	L		DM4	Stock	
		Width	olerance							
<p>• Good sharpness and chip control • Grooving and traversing possible</p> <p>GW (ground chipbreaker)</p>	GWPG300N02D-GW	3.0	±0.025	0.2	2.5	20.6	D	5848023	●	
	300N04D-GW							5848031	●	
	GWPG400N02E-GW	4.0	±0.025	0.2	3.4	20.6	E	5848064	●	
	400N04E-GW							5848072	●	
	400N08E-GW	5.0	±0.025	0.8	4.3	20.6	F	5852868	●	
	GWPG500N02F-GW							5848106	●	
	500N04F-GW	6.0	±0.025	0.4	5.2	25.6	G	5848114	●	
	500N08F-GW							5852876	●	
	GWPG600N02G-GW	6.0	±0.025	0.2	5.2	25.6	G	5848148	●	
	600N04G-GW							5848155	●	
	600N08G-GW			0.8				5852900	●	
	<p>GW (no-ground chipbreaker)</p>	GWPM300N04D-GW	3.0	±0.05	0.4	2.5	20.6	D	5848171	●
		400N04E-GW	4.0			3.4		E	5848197	●
		500N04F-GW	5.0			4.3		F	5848213	●
600N04G-GW		6.0	5.2			G		5848239	●	
<p>• High sharp chip breaker with high-rake angle • Good chip control by chip breaker dot</p> <p>GV (ground chipbreaker)</p>		GWPG300N02D-GV	3.0	±0.025	0.2	2.5	20.6	D	5848262	●
		300N04D-GV							5848270	●
		GWPG400N02E-GV	4.0	±0.025	0.2	4.3	20.6	E	5848353	●
		400N04E-GV							5848361	●
	GWPG500N02F-GV	5.0	±0.025	0.2	4.3	20.6	F	5848395	●	
	500N04F-GV							5848403	●	
	GWPG600N02G-GV	6.0	±0.025	0.2	4.3	25.6	G	5848437	●	
	600N04G-GV							5848445	●	

※ 1 Please make sure the insert height fit on the toolholder

NEW

New CBN Lineup

NTK EZCUBE™ B5K/B6K

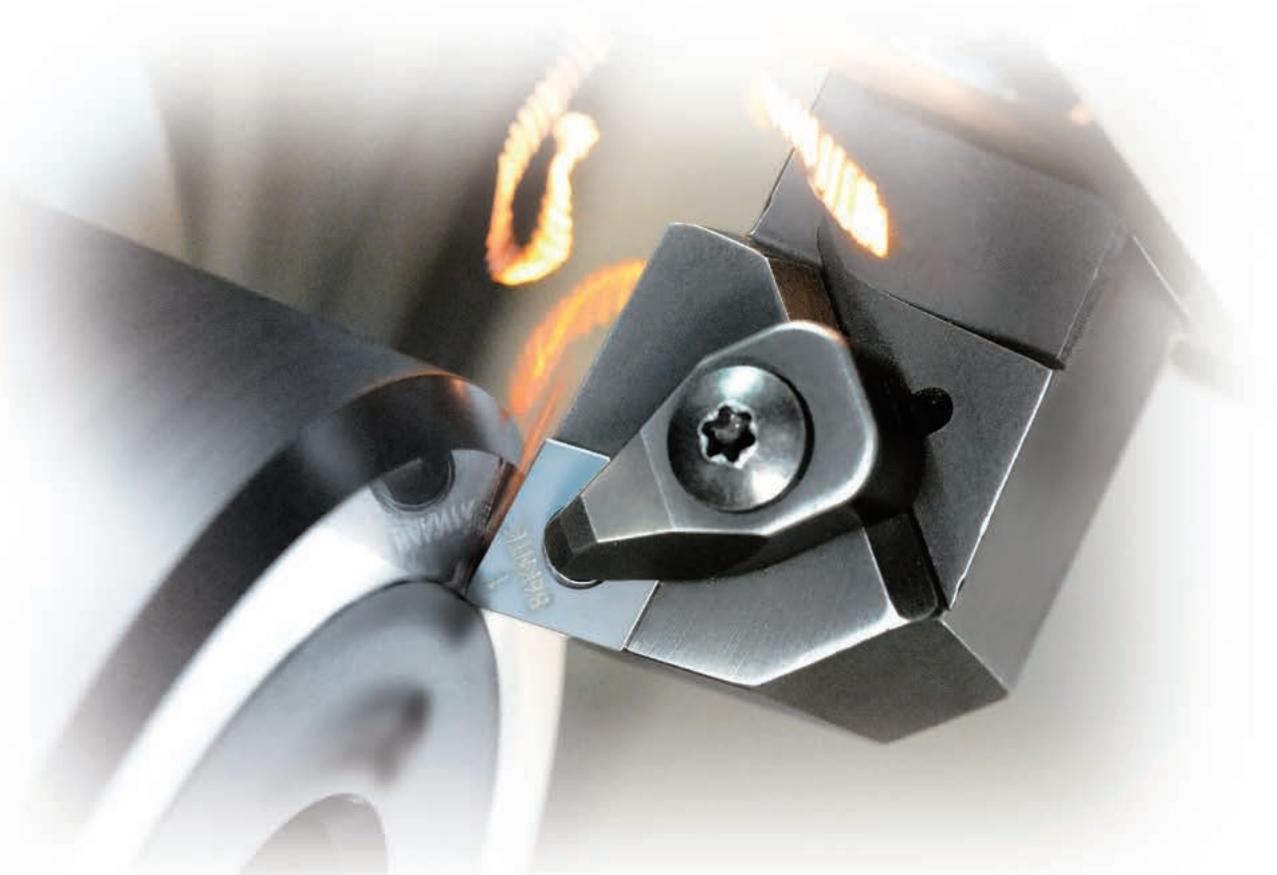
PVD TiCN hard coating Improve wear and oxidation resistance !

B5K

Suitable for continuous to middle-interrupted machining of hardened-steel
 Suitable for finish machining of ductile cast iron

B6K

Suitable for middle to heavy interrupted machining of hardened-steel



Features

- 1** *Suitable for longer tool life of continuous to interrupted machining of hardened-steel
Reduce crater wear and prevent the cutting edge from fracture*
- 2** *Suitable for carburized layer removal
Reduce CBN dissolve with iron in internal (low-hardness layer) machining*

New Products

Tool Materials / Selection Guide

PCD, CBN and ceramic

Cermets, PVD-coated Carbide

Micro-grain Carbide, Carbide

Insert Stock List

Outside Machining Toolholders

SS

Grooving Tools

Threading Tools

Shaper

Internal machining tool range

Original Tools for Various Applications

Indexable End Milling Tools

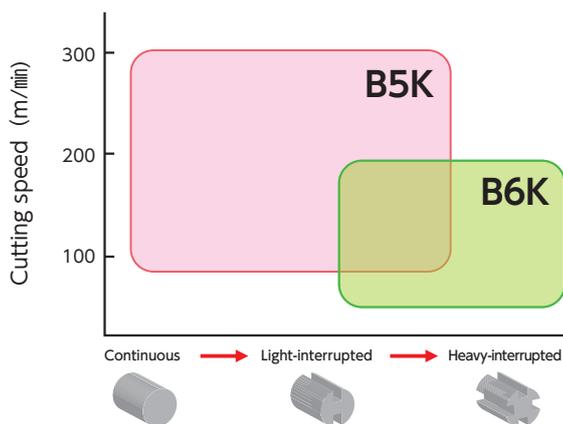
Indexable Drill Inserts

Milling Cutters

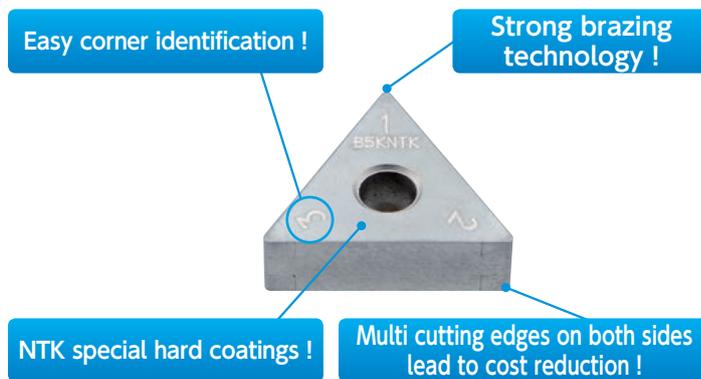
Technical Data

Index

Cutting range



Grade	Main binder	CBN volume	Applications
B5K	TiC base	50%	Hardened steel / continuous to middle-interrupted machining Ductile cast iron / finish machining
B6K	TiCN base	65%	Hardened steel / middle to heavy interrupted machining

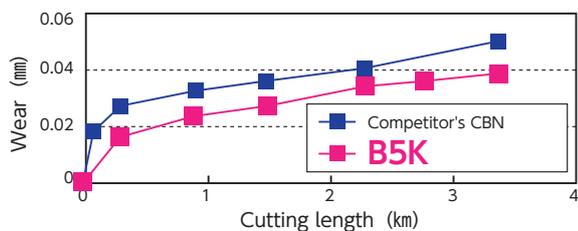


Performance

B5K

Best for continuous to middle-interrupted machining in hardened-steel !

TiCN hard coating offers good wear resistance !



Workmaterial : SCM415 carburized and quenched (64HRC)

Continuous machining

Cutting condition : $v_c=150\text{m/min}$, $f=0.1\text{mm/rev}$, $a_p=0.2\text{mm}$, DRY

• Edge wear comparison

B5K



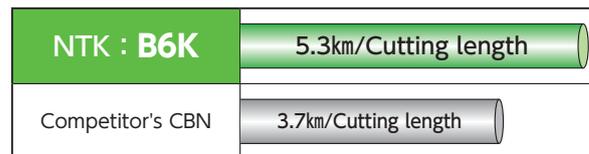
Competitor's CBN



B6K

Best for heavy interrupted machining in hardened-steel !

TiCN hard coating prevent fracture from crater wear !



Workmaterial : SCM415 carburized and quenched (64HRC)

Middle-interrupted machining

Cutting condition : $v_c=80\text{m/min}$, $f=0.1\text{mm/rev}$, $a_p=0.15\sim 0.17\text{mm}$, DRY

• Edge wear comparison

B6K



Competitor's CBN



Description table

Stock list (Negative)

NEW

Shape	Part number	Dimensions (mm)				Non-coated CBN				Coated CBN			
		I.C.	Thickness	R	Cutting edge length	B23	B30	B36	B40	B52	B5K	B6K	
	CNGA120402PQ	12.70	4.76	0.2	2.3				●	●			
	120404S01015			0.4	2.3						●		
	120404S01325			0.4	2.3							●	
	120404PQ			0.4	2.3	●	●	●	●				●
	120408S01015			0.8	2.2							●	
	120408S01325			0.8	2.2								●
	120408PQ			0.8	2.2	●	●	●	●	●			
	20412S01015			1.2	2.7							●	
	120412PQ			1.2	2.7	●	●	●	●				
	120412PQ			12.70	4.76	1.2	2.4		●				
	CNGA120404PQW	12.70	4.76	0.4	2.3				●	●			
	120408PQW			0.8	2.2				●	●			
	120412PQW			1.2	2.7				●	●			
	DNGA150402PQ	12.70	4.76	0.2	2.4				●	●			
	150404S01015			0.4	2.2						●		
	150404S01325			0.4	2.2							●	
	150404PQ			0.4	2.2			●	●	●			
	150408S01015			0.8	1.9							●	
	150408S01325			0.8	1.9								●
	150408PQ			0.8	1.9	●	●	●	●	●			
	150412PQ			1.2	2.6	●	●	●	●				
	150412PQ			12.70	4.76	1.2	2.2		●				
	SNGA120404PE	12.70	4.76	0.4	1.5		●		●				
	120408PE			0.8	1.3		●	●	●				
	120412PE			1.2	1.5	●	●	●	●				
	120412PE			12.70	4.76	1.2	2.5		●				
	TNGA160401PH	9.525	4.76	0.1	2.1					●			
	160402S01015			0.2	2.2						●		
	160402PH			0.2	2.2				●	●			
	160404S01015			0.4	2.0						●		
	160404S01325			0.4	2.0							●	
	160404PH			0.4	2.0			●	●	●	●		
	160404PTFNX※			0.4	2.0			★					
	160408S01015			0.8	1.7							●	
	160408S01325			0.8	1.7								●
	160408PH			0.8	1.7	●	●	●	●	●			
	160408PTFNX※			0.8	1.7			★					
160412PH	1.2	2.3	●	●	●	●							
160412PH	9.525	4.76	1.2	2.0		●							

※-B30 TNGA160404PTFNX
 -B30 TNGA160404PTFNX and -B30TNGA160404PTFNX have 3 cutting-edges.

NEW

Shape	Part number	Dimensions (mm)				Non-coated CBN				Coated CBN			
		I.C.	Thickness	R	Cutting edge length	B23	B30	B36	B40	B52	B5K	B6K	
	VNGA160402PQ	9.525	4.76	0.2	2.6								
	160404S01015			0.4	2.5						●		
	160404S01325			0.4	2.5							●	
	160404PQ			0.4	2.5			●	●	●			
	160408S01015			0.8	1.6							●	
	160408S01325			0.8	1.6								●
	160408PQ			0.8	1.6			●	●	●			
	160412PQ			1.2	2.7								
	160412PQ			9.525	4.76	1.2	2.7						

Stock list (Positive)

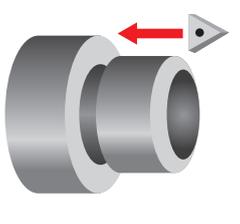
NEW

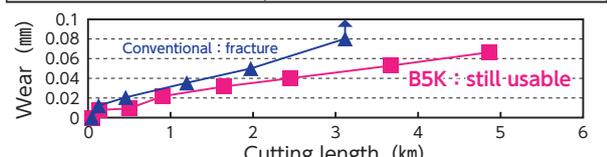
Shape	Part number	Dimensions (mm)				Non-coated CBN				Coated CBN				
		I.C.	Thickness	R	Cutting edge length	B23	B30	B36	B40	B52	B5K	B6K		
	CCGW060204PD	6.35	2.38	0.4	2.3					●				
	09T302PD	9.525	3.97	0.2	2.3				●	●				
	09T304PD			0.4	2.3				●	●				
	09T308PD			0.8	2.2				●	●				
	DCGW070202PD	6.35	2.38	0.2	2.4					●				
	070204PD			0.4	2.2				●	●				
	070208PD			0.8	1.9					●				
	11T302S01015			9.525	3.97	0.2	2.4						●	
	11T302PD					0.2	2.4				●	●		
	11T304S01015					0.4	2.2						●	
	11T304PD					0.4	2.2					●	●	
11T308PD	0.8	1.9					●	●						
	SPGN090304PQ	9.525	3.18	0.4	1.5		●							
	090308PQ			0.8	1.3		●	●						
	TPGN110304PT※1	6.35	3.18	0.4	2.0				●					
	110308PT※1			0.8	1.7				●					
	160304PT			9.525	0.4	2.0				●				
160308PT	0.8	1.7					●							
	TPGW110302PT	6.35	3.18	0.2	2.2					●				
	110304PT※2			0.4	2.0		●			●	●			
	110308PT			0.8	1.7				●	●				
	VBGW110302PD	6.35	3.18	0.2	2.6					●				
	110304PD			0.4	2.5					●				
	160408PD	9.525	4.76	0.8	1.6					●				
	VCGW110304PD			6.35	3.18	0.4	2.5				●	●		
	110308PD					0.8	1.6				●	●		
	160404PD			9.525	4.76	0.4	2.5				●	●		
160408PD	0.8	1.6						●	●					

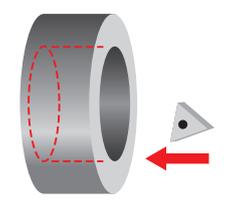
● : Standard stock items
 ● : New standard stock items
 ★ : Standard stock (specific)

Case study of coated CBN

B5K

<p>Work material : SCM415 Carburized and quenched continuous machining</p> <p>Cutting speed (m/min) = 200</p> <p>Feed (mm/rev) = 0.1</p> <p>Depth of cut (mm) = 0.2</p> <p>Coolant : DRY</p>	<p>Tooling</p> 
--	---



<p>Work material : FCD450 Boring</p> <p>Cutting speed (m/min) = 120</p> <p>Feed (mm/rev) = 0.05</p> <p>Depth of cut (mm) = 0.20</p> <p>Coolant : WET</p>	<p>Tooling</p> 
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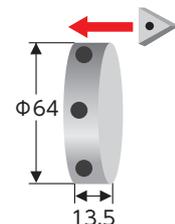
NTK : B5K

300pcs

Conventional

200pcs

B6K

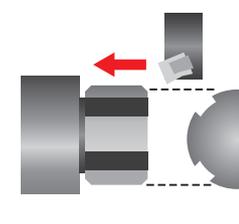
<p>Work material : STKM41 (HRC50) and quenched Interrupted machining</p> <p>Cutting speed (m/min) = 210~220</p> <p>Feed (mm/rev) = 0.08</p> <p>Depth of cut (mm) = 0.20</p> <p>Coolant : WET</p>	<p>Tooling</p> 
--	---

NTK : B6K

700pcs

Conventional

400pcs

<p>Work material : SCM415 Carburized and quenched Interrupted machining</p> <p>Cutting speed (m/min) = 75</p> <p>Feed (mm/rev) = 0.27</p> <p>Depth of cut (mm) = 0.8</p> <p>Coolant : DRY</p>	<p>Tooling</p> 
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NTK : B6K

400pcs

Conventional

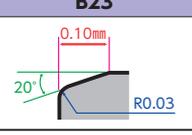
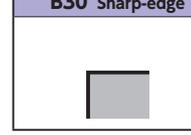
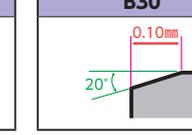
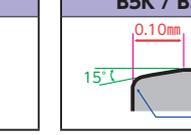
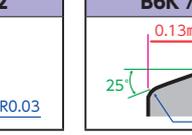
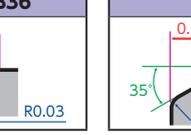
150pcs

Applicable cutting conditions

Work material		Insert grade	Cutting speed (m/min)	Feed (mm / rev)	Depth of cut (mm)	Coolant	
Material	Hardness					DRY	WET
Gray cast iron	HB ~ 280	B23 / B30	Turning 400 ~ 1,000	~ 0.5	~ 2.0	○	●
		B30	Milling 600 ~ 1,500			○	●
Ductile cast iron	HB ~ 330	B5K / B52	Turning 100 ~ 350	~ 0.4	~ 2.0	○	●
Hardened steel	HRC 50 ~ 68	Continuous B5K / B52	100 ~ 300	~ 0.2	~ 0.3	○	●
		Light-interrupted B5K / B36	75 ~ 225	~ 0.3	~ 0.5	●	○
		Middle-interrupted B6K / B36	50 ~ 150	~ 0.2	~ 0.3	●	○
		Heavy-interrupted B6K / B40	50 ~ 150	~ 0.2	~ 0.3	●	○
Sintered alloy	HRC ~ 35	B23 B30 sharp-edge	40 ~ 200	~ 0.5	~ 0.5	○	●
Steel roll	HS ~ 85	B23	20 ~ 140	~ 0.5	~ 2.0	●	○

● First choice ○ Second choice

(Std. Edge preparation)

Roughing of Cast Iron	Sintered alloy	Finishing of Cast Iron	Finishing of Ductile Cast Iron Continuous & light-interrupted Cutting of Hardened Steel	Light-interrupted Cutting of Hardened Steel	Heavy-interrupted Cutting of Hardened Steel
B23	B30 Sharp-edge	B30	B5K / B52	B6K / B36	B40
					
S01020	FNX	T01020	S01015	S01325	S01535

※1 Edge prep. of -B40 TPGN110304PT, 08PT is "S01020 (C=0.10 × 20° + R0.03)"
-B40 TPGN160304PT, 08PT

※2 Edge prep. of -B23 TPGW110304 is "T01535 (C=0.15 × 15°)"

NEW

Super Micro Grain PCD tool

PD2

New Products

Tool Materials / Selection Guide

PCD, CBN and ceramic

Cermet, PVD-coated Cermet

Micro-grain Carbide, Carbide

Insert Stock List

Outside Machining Toolholders

SS

Grooving Tools

Threading Tools

Shaper

Internal Machining tool range

Original Tools for Various Applications

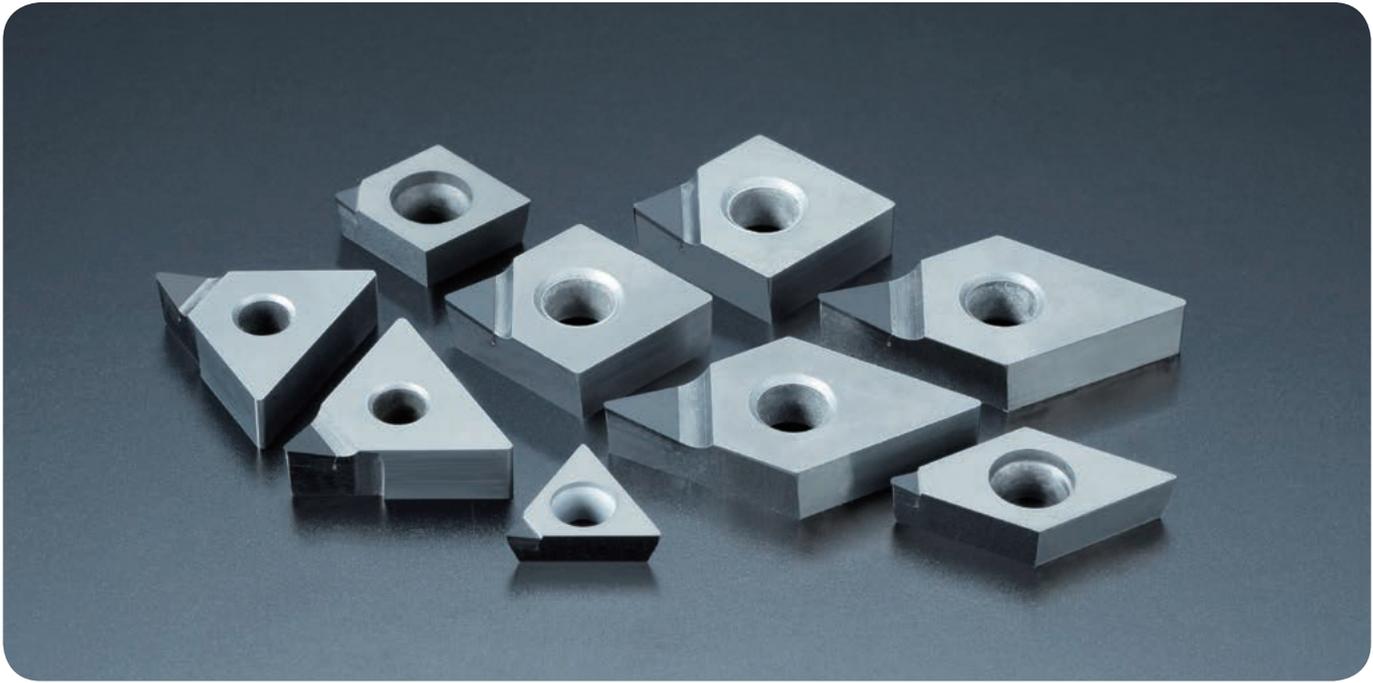
Indexable End Milling Tools

Indexable Drill Inserts

Milling Cutters

Technical Data

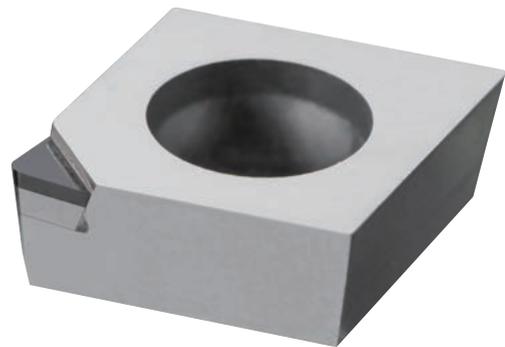
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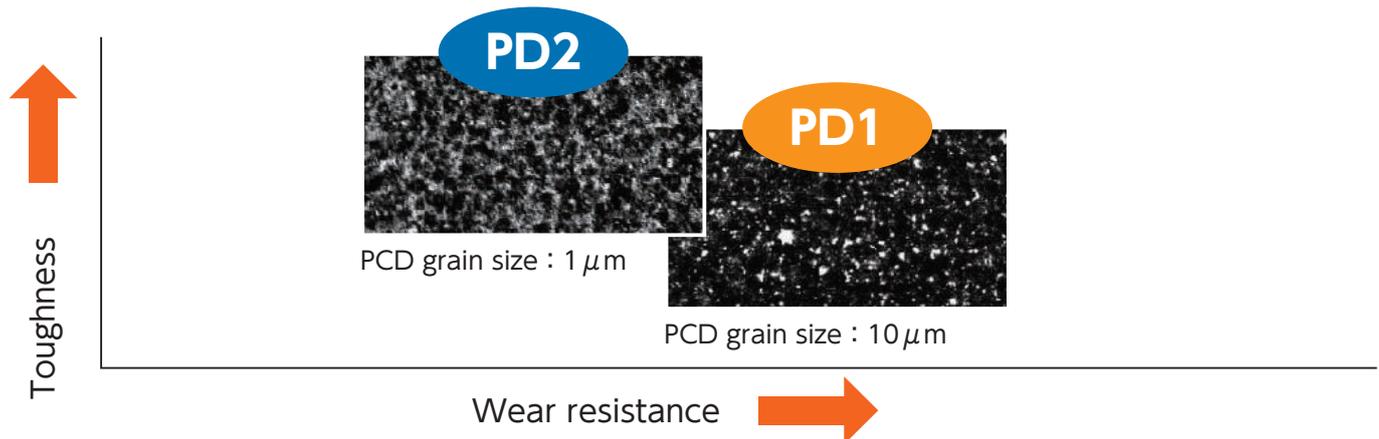
Features

**Good edge-sharpening, adhesion resistance !
Suitable for machining aluminum alloy and brass !!**

- 1 Super micro grain PCD features good edge sharpening, chipping resistance.
- 2 Good chip control due to the high rake angle



Applicable material map



Case study

Spool machining	
Work material : A6061	
Cutting speed (m/min) : 170	
Feed (mm/rev) : 0.06	
Depth of cut (mm) : 0.15	
Coolant : WET	
NTK : PD2	10,000 pcs/corner
Comp. PCD	5,000 pcs/corner
NTK PD2 achieved 2 times longer tool life, and good wear resistance than competitor's PCD	

Spool machining	
Work material : A6061	
Cutting speed (m/min) : 210	
Feed (mm/rev) : 0.07	
Depth of cut (mm) : 0.13	
Coolant : WET	
NTK : PD2	15,000 pcs/corner
Comp. PCD	10,000 pcs/corner
NTK PD2 achieved 1.5 times longer tool life, High rake angle offered stable machining.	

Stock list

Positive type

Shape	Part number	Dimensions (mm)			Super micro grain PCD				
		Cutting length L	I.C.	Thickness	Corner radius R	NEW PD2	Stock		
	CCMT09T302PF	2.3	9.525	9.525	0.2	5860648	●		
	09T304PF				0.4	5860630	●		
	DCMT11T302PF				0.2	5860671	●		
	11T304PF				0.4	5860689	●		
	TPMT090202PF				5.56	2.38	0.2	5860697	●
	090204PF						0.4	5860705	●
	110302PF	6.35	3.97	0.2			5860713	●	
	110304PF			0.4	5860721	●			

Negative type

Shape	Part number	Dimensions (mm)			Super micro grain PCD			
		Cutting length L	I.C.	Thickness	Corner radius R	NEW PD2	Stock	
	CNMX120404PF	3.4	12.7	4.76	0.4	5884044	●	
	120408PF				0.8	5884051	●	
	DNMX150404PF	4.5			0.4	5884036	●	
	150408PF				0.8	5884010	●	
	TNMX160404PF	3.0			9.525	0.4	5884002	●
	160408PF					0.8	5883988	●

NEW

Super low cutting force milling cutter

FU-HA MILL

WATCH ON
YouTube

Features

- **Stable gray cast iron milling with lower cutting force**

- **Maximizes ceramic insert potential and can mill faster than **1,000m/min****

Thanks to lower cutting forces, work piece chipping is reduced
Apply up to A_p 6mm

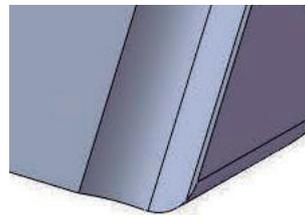
Silicon Nitride grade is the best choice for roughing cast iron with scale. Tool pressure is reduced because of the sharper cutting edge and the ground-in chipbreaker



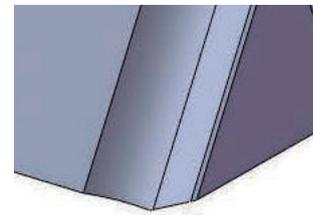
Available cutter dia. $\phi 63$ - $\phi 160$

Very cost efficient with a unique 6 cutting edge design

Thanks to low-cutting resistance, over machine load is avoided



[Radius type]



[Chamfered type]

Two edge preparation are available.
Radius type is good for high feed milling.
Chamfered type is with excellent edge sharpness.

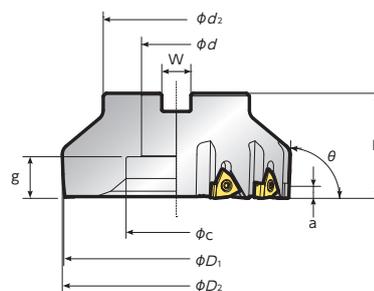
Cutting condition

$v_c=800\text{m/min}$ $f_z=0.10\text{mm/t}$ $a_p=3.0\text{mm}$ $a_e=80.0\text{mm}$

Cycle time reduction with single pass and achieve longer tool life.
Lesser machine horsepower required.



A. R. +5°
R. R. +4°, +7°, +10°



JWNXM type milling body

θ	Code No.	Part number	Stock	No of inserts	Dimensions (mm)										Weight (kg)	Rake angle		Centering location type		
					ϕD_1	ϕD_2	H	a_{*1}	a_{*2}	ϕd_1	W	ϕd_2	ϕc	g		A.R.	R.R.			
88°	5851415	JWNXM063C2200R06	●	6	63	63	50	5.5	4.5	22	10.4	60	18	15.5	0.9	+5	+4	FMC		
	5851423	080A2540R08	●	8	80	80				25.4	9.5		36	15			1.1		+7	
	5851431	100A3175R10	●	10	100	100				31.75	12.7		50	18			1.8		+10	FMA
	5851449	125A3810R12	●	12	125	125				38.1	15.9		80	55			23		3	
	5851456	160A5080R16	●	16	160	160				50.8	19.0		100	72			22		4.9	

*1 Dimension when set the insert [WNX44-C10T01020]
*2 Dimension when set the insert [WNX44-R12T01020]

Parts	
Clamp screw FSI 26-4.0×12-LH 5861935 Sales number 10 pcs / case	Wrench LLR-T15 5701909 Sales number 5 pcs / case

Insert

Shape	Dimensions (mm)	Part number	C or r_{ϵ}	Grade	
		WNX44-C10T01020	C1.0	SX6	●
				SP9	●
		WNX44-R12T01020	R1.2	SX6	●
				SP9	●

● : New standard stock items

Recommended cutting conditions

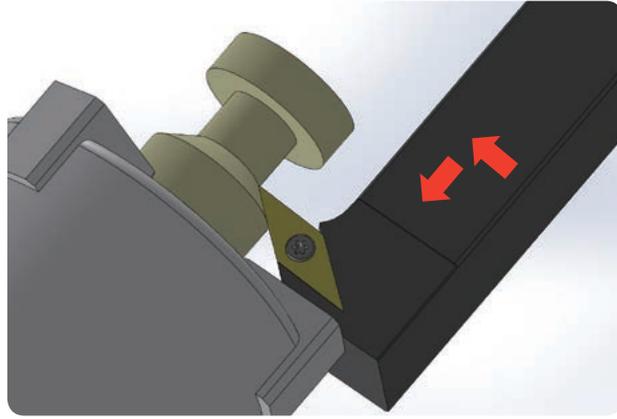
Grade	Work material	Cutting speed (m/min)											Feed (mm / t)					Depth of cut (mm)
		400	500	600	700	800	900	1000	1100	1200	1300	1400	0.05	0.1	0.15	0.2	0.25	
SX6	Gray cast iron				[Red bar with vertical lines]										[Red bar with vertical lines]			~ 6 (mm)
	Ductile cast iron				[Red bar with vertical lines]										[Red bar with vertical lines]			

Case study

Transmission case			● Work material : FC230			
Current tool	NTK					
Holder	Competitor	JWNXM125A3810R12				
Insert	Ceramic insert	SX6 WNX44-R12T01020				
Cutting speed	(m/min)	500				
Feed pertooth	(mm / t)	0.13	←	As for competitor's milling cutter, we needed to change inserts to new ones due to the wear progress and lower clamping force of work material after machining 60 pcs. This was caused by increasing cutting force. NTK NEW Milling cutter "FU-HA MILL" achieved 2 times longer competitor's. Low cutting force avoided the problem occurred by competitor's milling cutter.		
Depth of cut	(mm)	1	←			
Coolant	DRY		←			
Tool life	pcs/coner	60	120			

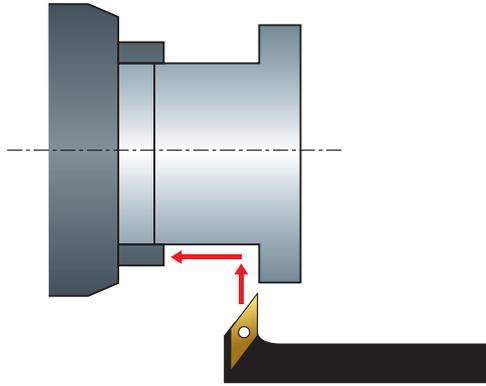
NEW

New toolholder for small lathe



Features

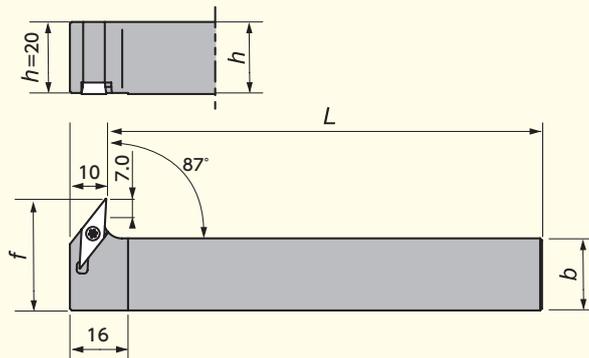
New concept !
End face machining in horizontal tool post type lathe is possible !



Stock list

Holder

CH-SVXCL



Code No.	Tool holder	Stock		Dimensions (mm)				Applicable insert	Spare Parts	
		R	L	h	b	L	f		Clamp screw	Wrench
NEW 5890637	CH-SVXC^RL1616×11		●	16	16	120	27	VC□□1103	LRIS-2.5*7	CLR-15S
NEW 5890645	2020×11		●	20	20		31			

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Tool Materials / Selection Guide

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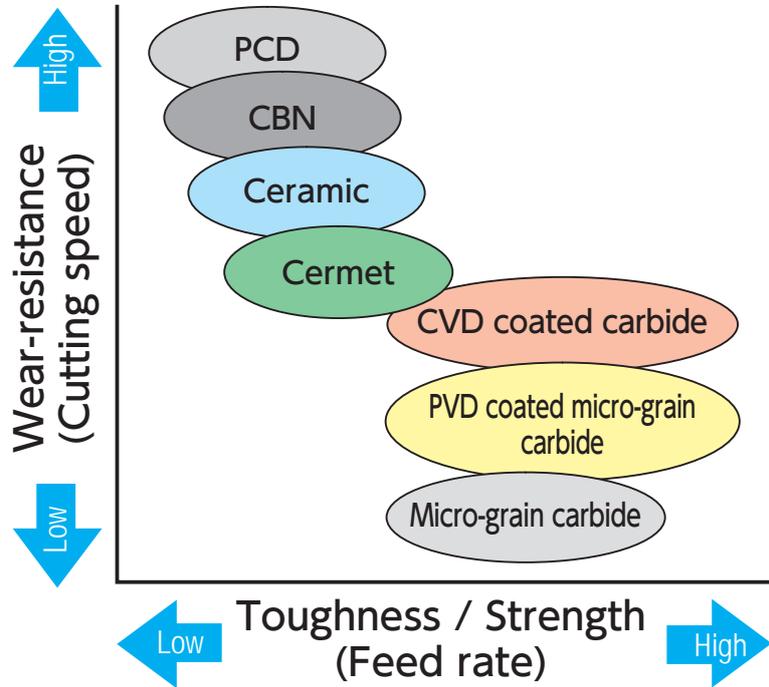
Tool Materials / Selection Guide

NTK Cutting Tools offer a wide range of tool materials, including PCD, CBN, ceramics, cermets and coated carbides, to accommodate various cutting applications.

In the SS Tool series, PCD, cermet and micro-grain ultra-hard carbides are set as the standard materials to meet the requirements of automatic and sliding head machines.

They are especially suited to micro-machining, offering excellent cutting performance and high quality surface finish.

● Material map



PCD	High-speed cutting of non ferrous metals	Polycrystalline diamond PCD PD1, PD2
CBN	High-speed cutting of high hardness materials and cast irons	CBN B22, B23, B30, B36, B40, B52 PVD coated B5K, B6K Solid CBN B16
Ceramic	Highly efficient cutting of high hardness materials and cast irons	Whisker grade Alumina/Titanium carbide grade WA5 WA1, HC2, HC4, HC7, ZC7, HC6 Alumina grade Silicon nitride grade HC1, HW2, SX6, SX7, SX9, SP9
Cermet	Finishing of steels	Cermet T15 High strength cermet N40, C7X PVD coated cermet Q15, Z15, C7Z
CVD coated carbide	General and multi-purpose machining of steels and cast irons	CVD coated carbide CP1 ...Cast iron CP7 ...Steel
PVD coated micro-grain carbide	Precision cutting, Cutting of stainless steel and hard-to-cut materials	PVD coated micro-grain carbide TM4, ZM3, QM3, VM1, DT4, DM4
Micro-grain carbide	Cutting of nonferrous metals and non-metal materials	Micro-grain carbide KM1

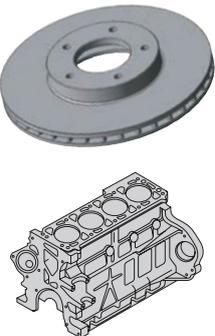
Recommended Types of Materials and Application

	ISO	Ceramic / CBN	PCD	Cermet PVD coated cermet	Carbide PVD coated micro-grain carbide CVD coated carbide	Wear resistance ↑ Toughness ↓	
P Carbon steel Alloy steel	01			C7Z	VM1, CP7, DT4, DM4	 	 TiN coating TiCN coating TiAlN coating Carbide w/o coating
	10			C7Z	VM1, CP7, DT4, DM4		
	20			C7X, T15, Z15, Q15	VM1, CP7, DT4, DM4		
	30			C7X, N40	Q M3, T M4, CP7, DT4, DM4		
	40			C7X, N40	Q M3, T M4, CP7, DT4, DM4		
M Stainless steel Cast steel	01			C7Z	VM1, CP7, DT4, DM4	 	 Whisker-based ceramic Silicon nitride-based ceramic Alumina-based ceramic
	10			C7Z	VM1, CP7, DT4, DM4		
	20			C7X	Q M3, T M4, Z M3, DT4, DM4		
	30			C7X	Q M3, T M4, Z M3, DT4, DM4		
	40			C7X	Q M3, T M4, Z M3, DT4, DM4		
K Cast iron Ductile cast iron	01	HC1, HW2, HC2, HC6, WA1, WA5			CP1	 	 Cermet CBN PCD
	10	HC1, HW2, HC2, HC6, WA1, WA5			CP1		
	20	SX9, SX6, B23, B30, B52			CP1		
	30	SX9, SX6, B16, B23, B30, B52			CP1		
N Aluminum alloy Nonferrous metal			PD2, PD1		KM1	 	
			PD2, PD1		KM1		
S Inconel Hastelloy Waspalloy Rene		WA1, WA5			KM1, Q M3, Z M3	 	
		WA1, WA5			KM1, Q M3, Z M3		
H Very hard material Roll turning		ZC7, HC2, HC4				 	
		ZC7, HC2, HC4					

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Tool Materials / Selection Guide

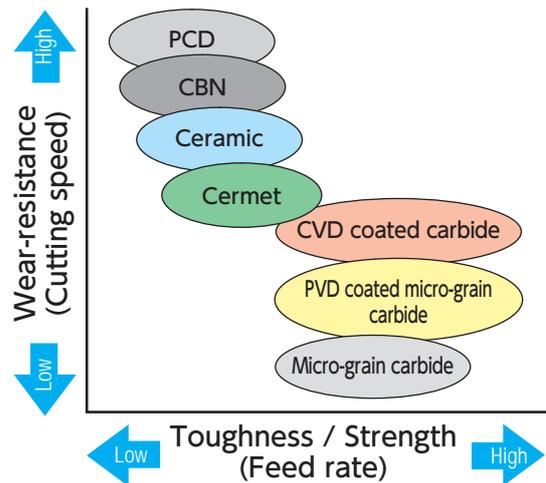
Recommended Types of Materials and Applications : Ceramic and CBN ●First Choice ○Second Choice

Work material	Tool material	Process			Cutting oil					
		Rough-ing	Semi-finishing	Finishing	Continuous	Light interruption	Interruption	Dry	Wet	
Normal cast iron 	Ceramic	SX6	○			○		●	●	
		SX9	○			○		●	●	
		SP9		○		○		●	○	
		HC1/HW2			○	○		●		
		HC2/HC6			○	○		●	●	
		WA1			○	○		●	●	
	ZBC	B23	○			○		○	●	
		B30		○		○		○	●	
B16		○				○	○	●		
Special cast iron 	Ceramic	HW2		○		○		●		
		HC2		○		○		●	○	
Ductile cast iron 	Ceramic	SX9	○			○		●	○	
		SP9	○			○		●	○	
		HC6			○	○		○	●	
	ZBC	B52			○	○		○	●	
Heat-resistant alloy 	Ceramic	SX7/SX9	○			○		○	●	
		WA1/WA5	○			○		○	●	
Hardened material 	Ceramic	HC4/ZC7			○	○			●	
		ZBC	B52		○		○		○	●
	ZBC	B36		○			○		●	●
		B40		○				○	●	○
Rolls 	Ceramic	High-peed steel	WA1/WA5	○			○		●	○
		ZBC	B22/B23/B36		○		○		●	○
	Ceramic	Cast iron	HC2/HC7		○		○		●	○
			ZBC	B22/B30		○		○		●
	Ceramic	Ductile iron	SX9		○		○		●	○
			ZBC	B22/B52		○		○		●

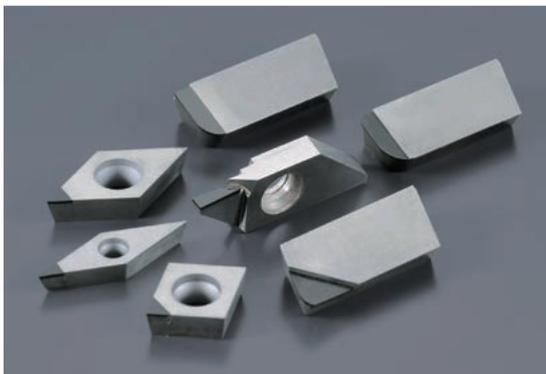
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NTK cutting tools offer a wide range of tool materials, including PCD, CBN, ceramics, cermet and coated carbides, to accommodate various cutting conditions.

For the SS tool series, PCD, cermet, micro-grain carbides are set as the standard materials to meet the requirements of automatic lathes specifically micro-machining, with excellent cutting performance and high quality surface finish.



PCD

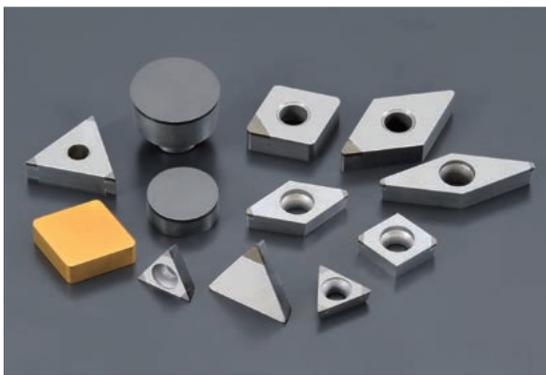


For high-speed cutting of nonferrous metals

As diamond is the hardest and lowest in affinity with nonferrous metals cutting material, its deposition resistance as well as wear resistance is excellent. However, as a tool material, its low toughness and characteristically low chipping resistance posed problems. PCD is the material that solved these problems by sintering micro-grain diamond to make a polycrystalline structure without affecting the diamond-specific characteristics. This material allows you to cut non ferrous metals at a higher speed than carbide cutting tools.

For more information, please go to ... C2

CBN



For high-speed cutting of hardened materials and cast irons

This material is made of CBN (Cubic Boron Nitride) as the base component and a special ceramic binder, giving a high level of hardness at both room and high temperature ranges. One of its superior features is that it causes very little chemical reaction with work piece materials. It is mainly used for machining of materials with high hardness and high-speed cutting of cast iron.

For more information, please go to ... C4

Ceramic

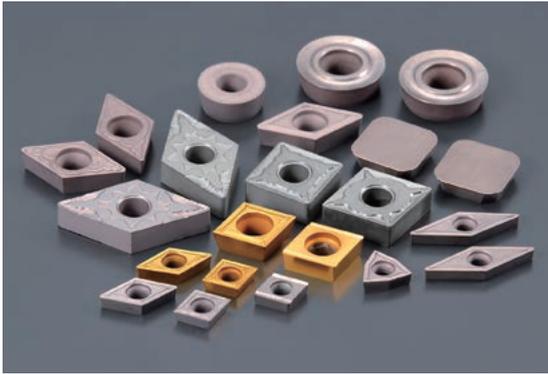


For high-efficiency cutting of high hardness materials and cast irons

Arial Narrow RegulCeramic tools offer high cutting speed and highly efficient machining thanks to their outstanding heat resistance and chemical stability. A wide range of tools in various shapes, made of different types of ceramic including silicon nitride, alumina and whisker series, enables you to achieve high cutting speeds and higher productivity than carbide tools in many applications.

For more information, please go to ... C6

Cermet



For finishing and grooving of steels

Cermet excels in resistance against oxidation and heat resistance when compared with ultra-hard alloy, making higher cutting speed possible. This material allows you to realize high quality finished surfaces, having a low affinity with ferrous materials and excellent deposition resistance.

For more information, please go to ... D2

CVD coated carbide



For general cutting of steels and cast irons

This type of carbides, suitable for cutting steel and cast iron, use carbide as the base material with coating applied by the CVD method for extra wear and heat resistance.

For more information, please go to ... E7

PVD coated micro-grain carbide



For precision cutting and general machining of hard-to-cut materials including stainless steel

The carbides in this grade has been developed by reducing the size of the WC hard grains, which are the main component of cemented carbide, to approximately 1μ . By coating such carbide by the PVD method with TiN, TiCN, or TiAlN, these materials are the most suitable for precision cutting and cutting of difficult-to-cut materials. Provision of PVD coating on such micro grain carbide offers much improved wear resistance and thermal shock resistance. These carbides are tougher and harder than conventional carbides, with much sharper cutting edges.

For more information, please go to ... E2

Micro-grain carbide



For cutting of non ferrous metals and non metal materials

Using non-coated micro-grain ultra-hard carbide, which provides ultra sharp cutting edges, this type of carbide usually, has a mirror-like polished surface.

This type is the most appropriate tool material for machining of non ferrous metals and resins, where especially sharp cutting edges are required.

For more information, please go to ... E2

Part No. Designation Codes for Inserts and Breakers

① Code for shapes

Classification	Code	Shape	Apex angle (degree)	Symbol
Regular polygons	H	Regular hexagon	120	⊙
	O	Regular octagon	135	⊙
	P	Regular pentagon	108	⊙
	S	Square	90	□
	T	Equilateral triangle	60	△
Rhomboids and equilateral unequal-angles	C	Rhomboids	80	◇
	D		55	
	E		75	
	F		50	
	M		86	
	V		35	
	W		Hexagon	
Rectangles	L	Rectangle	90	□
Parallelograms	A	Parallelograms	85	▱
	B		82	
	K		55	
Circles	R	Circle	—	○

Note: The smaller of the apex angles is used.

③ Codes for accuracy

Code	Diameter of inscribed circle d (mm)	z	Corner height m (mm)
A*	± 0.025	± 0.025	± 0.005
F*	± 0.013		± 0.013
C*	± 0.025		± 0.013
H	± 0.013		± 0.025
E	± 0.025		± 0.025
G	± 0.013	± 0.13	± 0.005
J*	± 0.05 ~ ** ± 0.13	± 0.025	± 0.013
K*			± 0.013
L*			± 0.025
M	± 0.05 ~ ** ± 0.13	± 0.13	± 0.08 ~ **
N		± 0.025	± 0.18
U	± 0.08 ~ ** ± 0.25	± 0.13	± 0.13 ~ ** ± 0.38

Notes: The asterisk (*) indicates that the accuracy range is, basically, applied to inserts equipped with a flat drag. The double asterisk (**) indicates that the accuracy range is determined by the size of the insert.

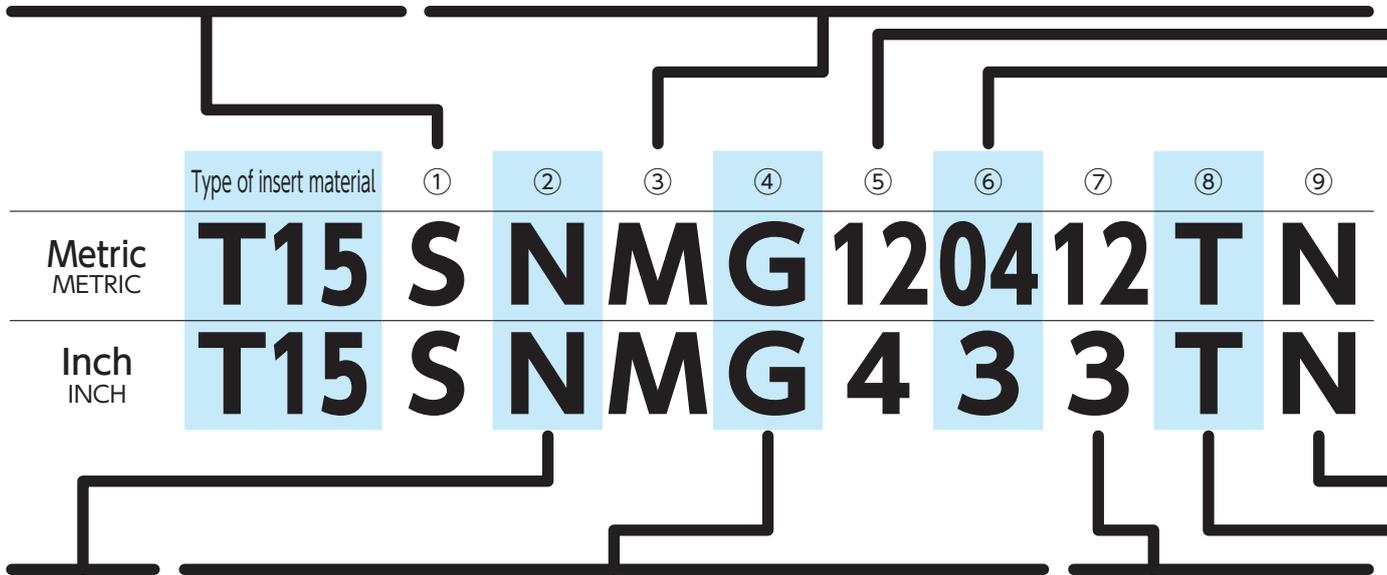
Tolerances for each insert size Except for inserts with 55, 50 or 35 degrees in apex angle

Diameter of inscribed circle d (mm)	Inscribed circle diameter tolerance d		Corner height tolerance m	
	Class J, L, K, M, N	Class U	Class M or N	Class U
6.35 9.525	± 0.05	± 0.08	± 0.08	± 0.13
12.70	± 0.08	± 0.13	± 0.13	± 0.20
15.875 19.05	± 0.10	± 0.18	± 0.15	± 0.27
25.40	± 0.13	± 0.25	± 0.18	± 0.38

The tolerances for class M inserts with 55 degrees in apex angle are as follows

Diameter of inscribed circle d (mm)	Inscribed circle diameter tolerance (mm) d	Corner height tolerance (mm) m
6.35 9.525	± 0.05	± 0.11
12.70	± 0.08	± 0.15
15.875 19.05	± 0.10	± 0.18

Note: The accuracy range of "m" can be spread for inserts with apex angles smaller than 55 degrees.



② Codes for relief angles

Relief angle (degree)	Code
3	A
5	B
7	C
15	D
20	E
25	F
30	G
0	N
11	P
Other relief angles	O

Note: The relief angle must be that of the major cutting edge.

④ Codes for grooved holes

For normal series					
Code	Provision of holes	Shape of hole	Chipbreaker	Pattern	
N	No	—	None		
R			Single-sided		
F			Double-sided		
A	Yes	Cylindrical	None		
M			Single-sided		
G			Double-sided		
W			Partially cylindrical	None	
T			Single-sided: 40 - 60 deg	Single-sided	
Q			Double-sided: 40 - 60 deg	Double-sided	
U	Partially cylindrical	None			
B	Partially cylindrical	Single-sided: 70 - 90 deg	None		
H			Single-sided		
C	Partially cylindrical	Double-sided: 70 - 90 deg	None		
J			Double-sided		
X	—	—	—	—	

Note: Only the normal series is to be used for the metric system. Always use code X for scalene inserts. However, X must not be used for inserts of shapes not defined in the table (1) above.

⑦ Codes for corner radii

For corner R		
Corner-R nominal value (mm)	Inch system	Metric system
Sharp corner		
r _ε : 0.2	Y	02
0.4	1	04
0.8	2	08
1.2	3	12
1.6	4	16
2.0	5	20
2.4	6	24
3.2	8	32
Other radii		X
For circular inserts	0	00*
		M0*

Notes: "00" (double zero) is used for insert circle diameter indicated in inches. "M0" is used for insert circle diameter indicated in millimeters.

⑤ Codes for cutting edge lengths or for inscribed circle diameters ⑥ Codes for thickness

Diameter of inscribed circle d (mm)	Inch system		Metric system														
	Normal series	Small-size series	Shapes														
			H	O	P	S	T	C	D	E	F	M	V	W	R		
3.97	—	5					06			T3							
4.76	—	6					08			04							
5.56	—	7					05	09	05	06	05	07	05	09	03		
6.35	2	(8)	03	02	04	06	11	06	07	06	08	06	11	04	06		
7.94	—	0	04	03	05	07	13	08	09	08	10	07	13	05	07		
9.525	3	—	05	04	07	09	16	09	11	09	12	09	16	06	09		
12.70	4	—	07	05	09	12	22	12	15	13	16	12	22	08	12		
15.875	5	—	09	06	11	15	27	16	19	16	20	15	27	10	15		
19.05	6	—	11	07	13	19	33	19	23	19	24	19	33	13	19		
25.40	8	—	14	10	18	25	44	25	31	26	33	25	44	17	25		
31.75	0	—	18	13	23	31	54	32	38	32	41	31	54	21	31		

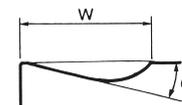
Thickness S (mm)	Inch system		Metric system
	Inscribed circle series		
	Normal series	Small-size series	
1.59	—	2	01
2.38	—	3	02
3.18	2	4	03
3.97	—	5	T3
4.76	3	6	04
5.56	—	—	05
6.35	4	—	06
7.94	5	—	07
9.52	6	—	09
12.70	8	—	12

⑩	⑪
●	G
●	G

⑪ Codes for chipbreaker shapes

Parallel-honing type (mm)

Code	W	θ°
A	1.0	14
B	1.5	14
C	2.2	14
D	2.8	10
E	3.5	10



⑧ Codes for major cutting edges

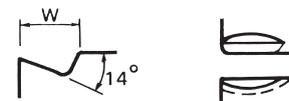
Without honing (Tool nose processing)	F
Angular honing	T
Round honing	E
Angular honing + round honing	S
Special honing	K
Special honing + round honing	P

⑨ Codes for left/right handed inserts

Type	Code
Right-handed	R
Left-handed	L
Not specified	N

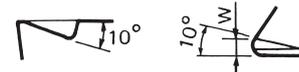
Type N (Double-positive type) (mm)

Code	W
N1	1.5
N2	2.2



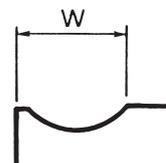
Type P (Angle type) (mm)

Code	W
P1	0.9
P2	1.25

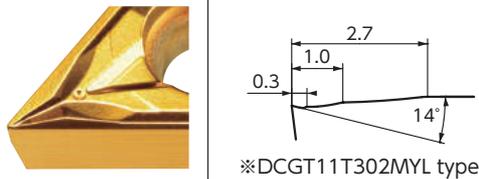
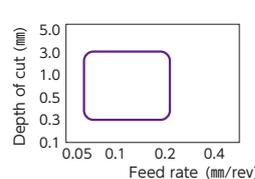
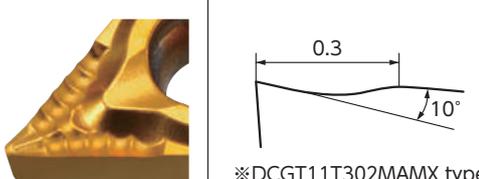
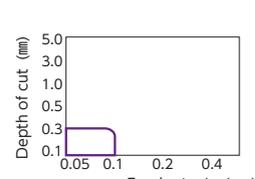
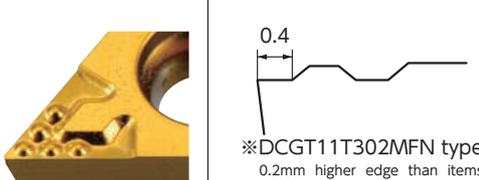
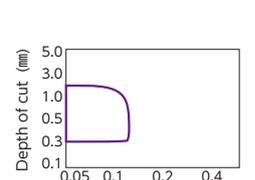
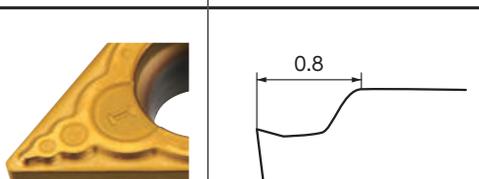
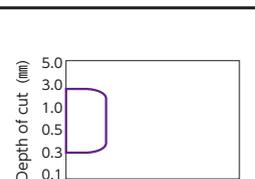
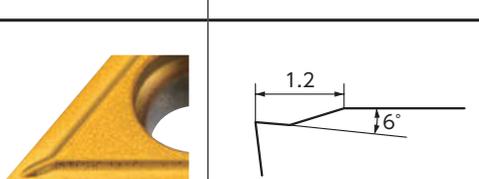
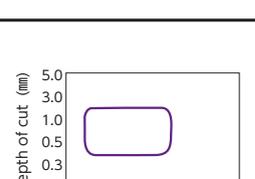
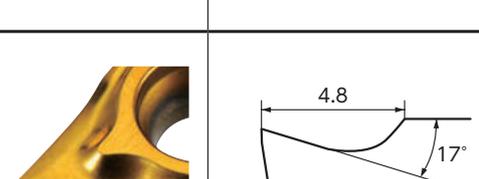
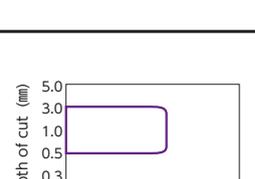
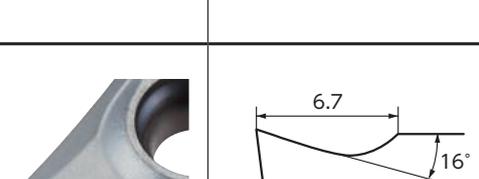
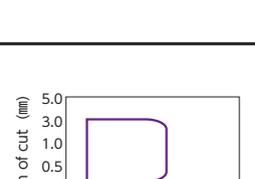


Full-arc embossed type (mm)

Code	W
F	1.5
G	2.2
H	2.8

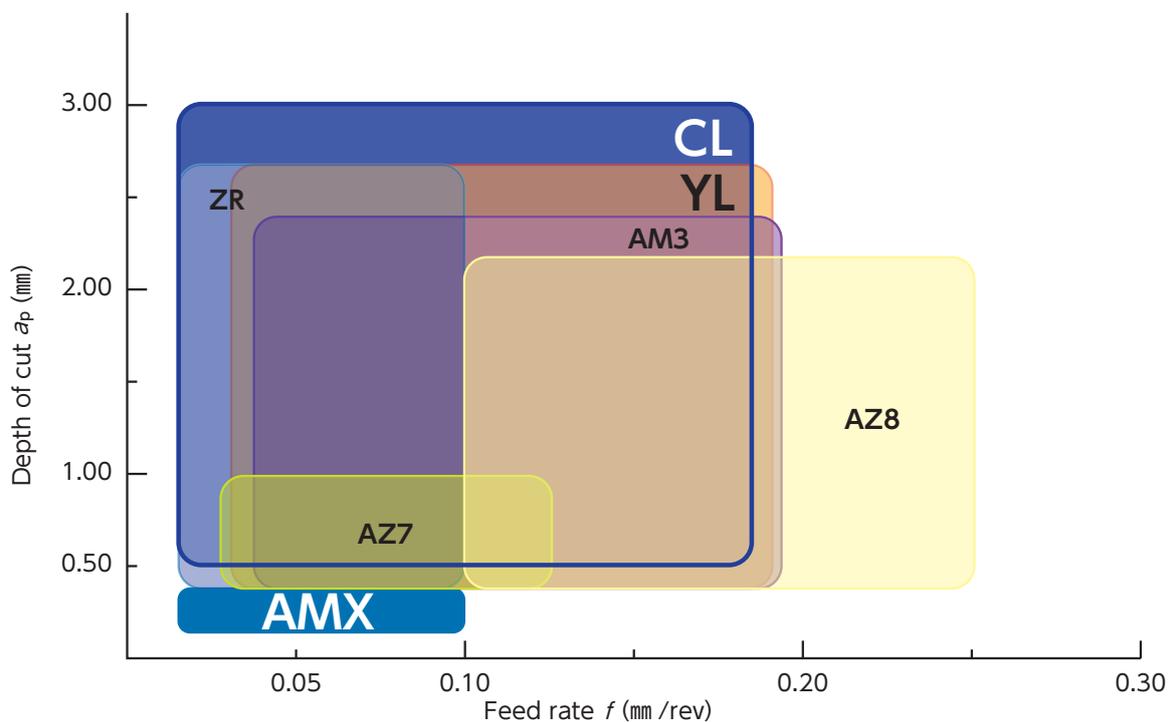


Positive-type molded inserts with chipbreaker

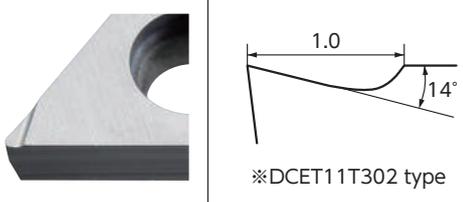
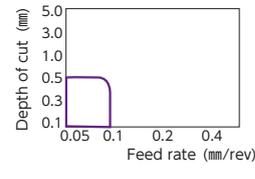
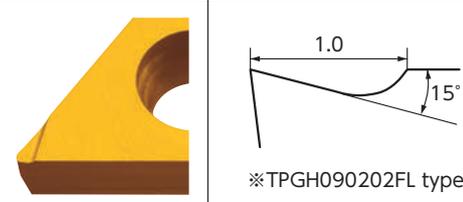
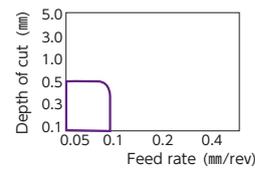
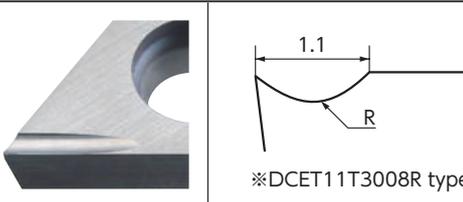
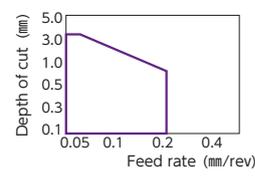
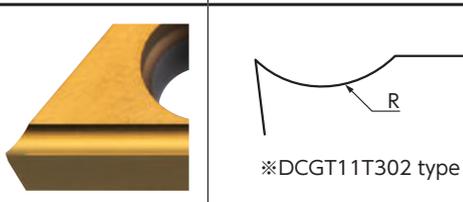
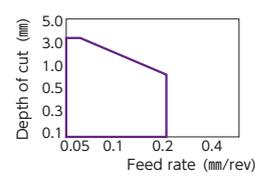
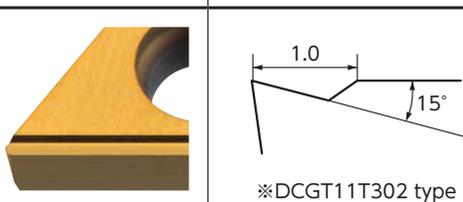
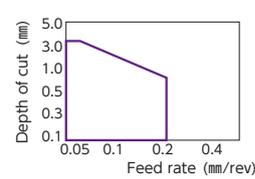
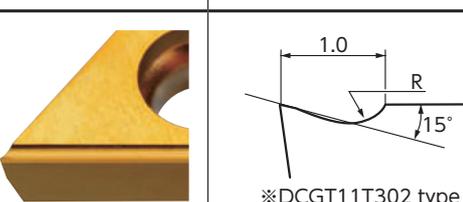
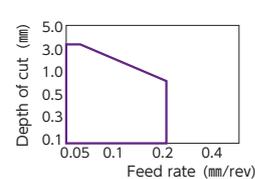
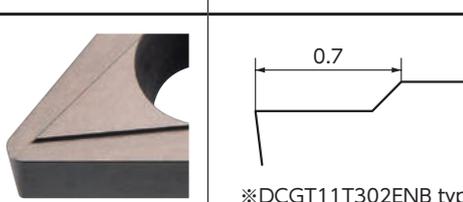
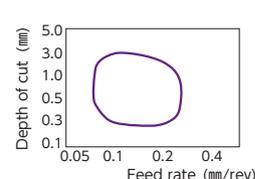
Product Name	Breaker shape / cross-section	Features and applications	Range of chip-control
NEW YL	 ※DCGT11T302MYL type	<ul style="list-style-type: none"> ●Great combination of sharpness and toughness ●Covers extremely wide range ●Excellent chip control 	
NEW AMX	 ※DCGT11T302MAMX type	<ul style="list-style-type: none"> ●Excellent chip control under light depth of cut 	
AZ7	 ※DCGT11T302MFN type 0.2mm higher edge than items with FN	<ul style="list-style-type: none"> ●Excellent chip control from low feed and low cutting depth range 	
ZR	 ※DCMT11T302 type	<ul style="list-style-type: none"> ●Covers a wide range of depth of cut under high-speed and low-feed conditions 	
AM3	 ※DCGT11T302 type	<ul style="list-style-type: none"> ●Versatile chipbreaker with both sharp cutting edge and good chip control 	
CL	 ※DCGT11T302M type	<ul style="list-style-type: none"> ●Remarkable cutting performance with the double-positive shape ●Controls chips over a wide ranges ●Upgraded version from the 1L chipbreaker 	
1L	 ※DCGT11T302FN type	<ul style="list-style-type: none"> ●Double-positive type with low resistance and high cutting performance ●Offering both strength of cutting edge and excellent cutting performance in combination with QM3 	

Positive-type molded inserts with chipbreaker

Product Name	Breaker shape / cross-section	Features and applications	Range of chip-control
AZ8	<p>※DCMT11T302 type</p>	<ul style="list-style-type: none"> ●CVD-coated versatile chipbreaker with its high cutting performance 	
FG	<p>※TPGH110304 type</p>	<ul style="list-style-type: none"> ●Chipbreaker for boring ●Possible to evacuate chips forward even in a low-cutting depth range ●First-rate cutting performance with the high rake angle <p>Direction of chip flow</p>	
AF1	<p>※CCGT09T302ENB type</p>	<ul style="list-style-type: none"> ●Produces remarkable surfaces in semi-finishing of steels 	
AM5	<p>※CPGH060202FN type</p>	<ul style="list-style-type: none"> ●Chipbreaker for boring ●Provides both good cutting performance and chip control 	



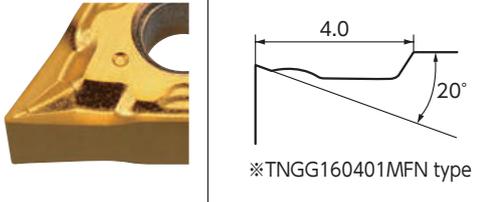
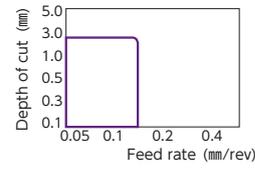
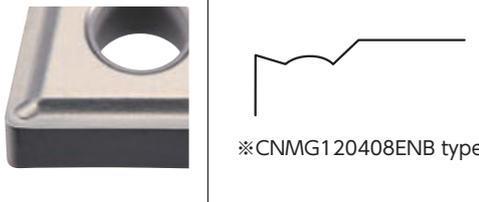
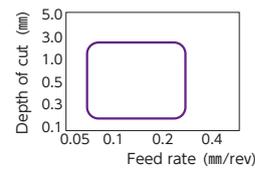
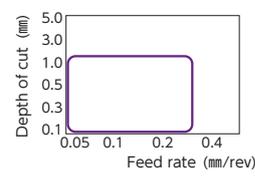
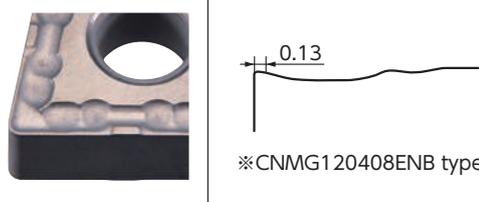
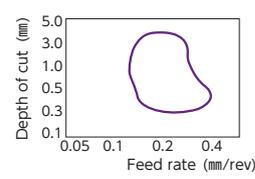
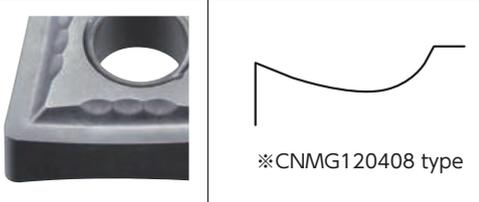
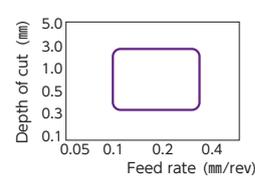
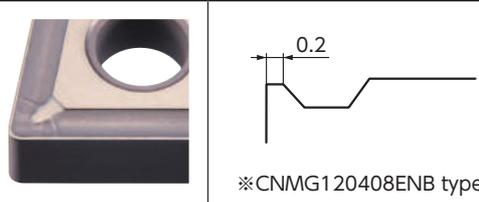
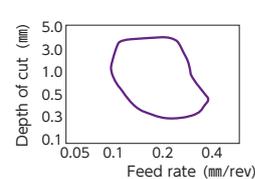
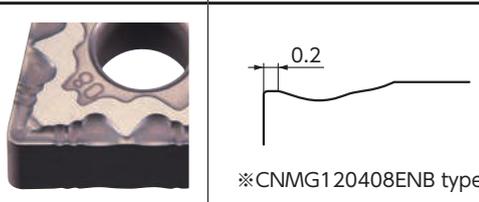
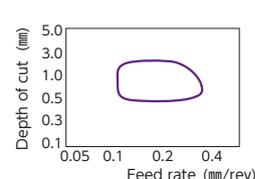
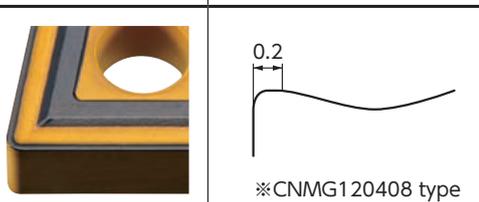
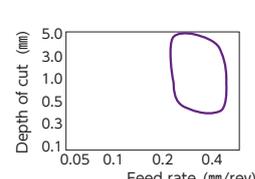
Positive-type inserts with ground chipbreaker

Product Name	Breaker shape / cross-section	Features and applications	Range of chip-control
KHG	 <p>※DCET11T302 type</p>	<ul style="list-style-type: none"> ●Controls the chip flow in the finishing range ●Suitable for ultra-precision machining with a honed cutting edge ●Dimensional tolerance of the cutting edge nose radius is ± 0.01. 	
K	 <p>※TPGH090202FL type</p>	<ul style="list-style-type: none"> ●Controls chips well in finishing applications ●First-rate cutting performance with the high rake angle 	
UHG	 <p>※DCET11T3008R type</p>	<ul style="list-style-type: none"> ●Offers excellent cutting performance and wide ranging chip control 	
U · U1	 <p>※DCGT11T302 type</p>	<ul style="list-style-type: none"> ●Cuts remarkably well with a high rake angle; this also helps prevent work hardening 	
S	 <p>※DCGT11T302 type</p>	<ul style="list-style-type: none"> ●Standard chipbreaker for low feed range, providing both good cutting performance and chip control 	
AT	 <p>※DCGT11T302 type</p>	<ul style="list-style-type: none"> ●Excels in deposition resistance and ensures dimensional accuracy ●Excellent performance for machining of small diameter workpiece and low carbon steel 	
FM	 <p>※DCGT11T302ENB type</p>	<ul style="list-style-type: none"> ●A step chipbreaker where the entire side surface is honed 	

Positive-type inserts with ground chipbreaker

Product Name	Breaker shape / cross-section	Features and applications	Range of chip-control	
F05	<p>※TPGH060102F type</p>	<ul style="list-style-type: none"> ●Chipbreaker exclusive for boring, and evacuating chips forward ●Performs remarkably well especially in blind hole boring 		
F1	<p>※TPGH110302F type</p>			
B1	<p>※TCGH060102FV type</p>	<ul style="list-style-type: none"> ●Enables stable machining when boring with a high strength cutting edge and excellent cutting performance 		
B2	<p>※TPGH090202FV type</p>			
B3	<p>※TPGH090202F type</p>			
A	<p>※CPGH080202 type</p>		<ul style="list-style-type: none"> ●Strengthened edge and good chip control/hardening ●General-purpose chipbreaker 	
A1	<p>※CPGH040102 type</p>			
A2	<p>※ERGHT30102F type</p>	<ul style="list-style-type: none"> ●Good at controlling chips for both boring and face cutting ●Excellent cutting performance with the high rake angle 		

Negative-type molded inserts with chipbreaker

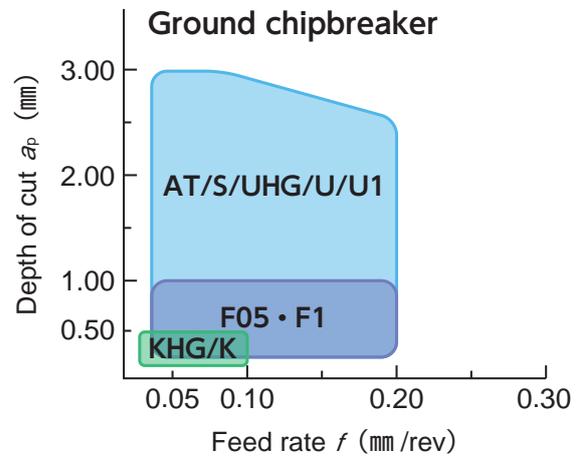
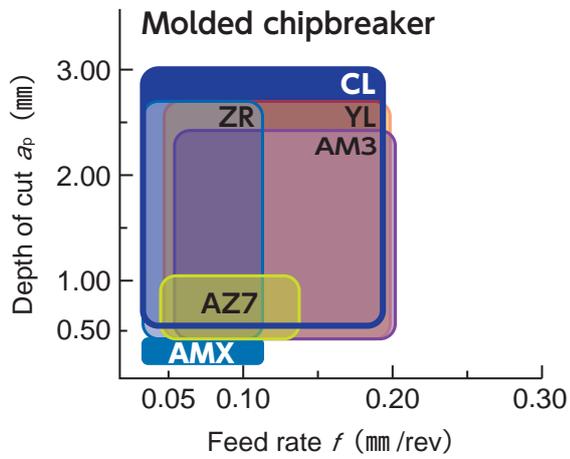
Product Name	Breaker shape / cross-section	Features and applications	Range of chip-control
UL	 <p>※TNGG160401MFN type</p>	<ul style="list-style-type: none"> ●Has sharpness equal to positive insert ●Excellent chip control under wide range of cutting condition 	
ZF1	 <p>※CNMG120408ENB type</p>	<ul style="list-style-type: none"> ●Chipbreaker that produces very small chip length in the finishing range 	
WM	 <p>※CNMG120404EN type</p>	<ul style="list-style-type: none"> ●Chipbreaker with remarkable chip control in the low feed range 	
ZW1	 <p>※CNMG120408ENB type</p>	<ul style="list-style-type: none"> ●Versatile chipbreaker with remarkable chip control performance in a wide range 	
ZP	 <p>※CNMG120408 type</p>	<ul style="list-style-type: none"> ●Provides outstanding cutting performance with the combination of the double-positive rake and the sharp cutting edge ●Enables low-resistance machining even with a high cutting depth 	
Z5	 <p>※CNMG120408ENB type</p>	<ul style="list-style-type: none"> ●High strength insert ●Suitable for high loaded interrupted machining 	
WV	 <p>※CNMG120408ENB type</p>	<ul style="list-style-type: none"> ●Offers the advantages of both high strength of cutting edge and chip control 	
G	 <p>※CNMG120408 type</p>	<ul style="list-style-type: none"> ●Chipbreaker for roughing excellent in machining stability with strong cutting edge 	

Negative-type inserts with ground chipbreaker

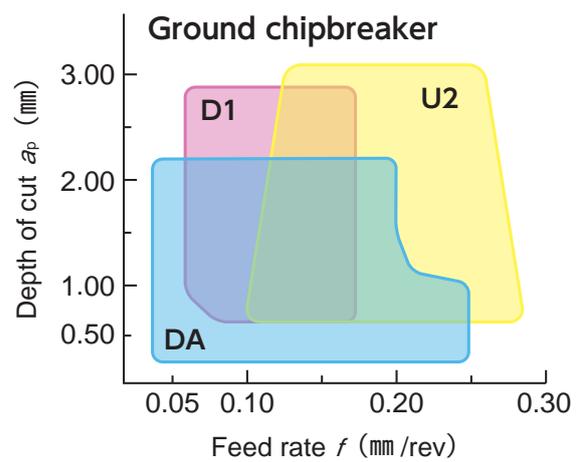
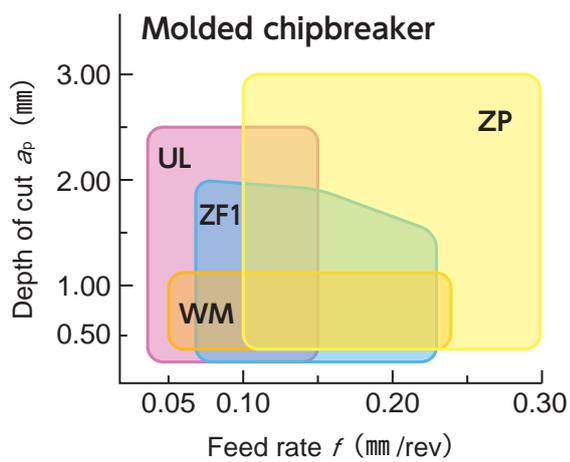
Product Name	Breaker shape / cross-section	Features and applications	Range of chip-control
DA	<p>※TNGG160401F type</p>	<ul style="list-style-type: none"> ●Chipbreaker for finishing that controls the chip 	
D1	<p>※TNEG160402F type</p>		
N1	<p>※TNGG160402T type</p>	<ul style="list-style-type: none"> ●Double-positive shape with the large raise angle cutting ed ●Excellent chip control 	
U2	<p>※TNGG160402F type</p>	<ul style="list-style-type: none"> ●Cuts remarkably well with a high rake angle and this also works to prevent the material being cut from becoming hardened or burred 	
B	<p>※TNGG110304T type</p>	<ul style="list-style-type: none"> ●General-purpose chipbreaker with high performance in both sharp cutting and chip control 	
C	<p>※TNGG160402F type</p>		

New Products
Tool Materials/ Selection Guide
PCD, CBN and ceramic
Cermet, PVD-coated Carbide
Micro-grain Carbide, Carbide
Insert Stock List
Outside Machining Toolholders
SS
Grooving Tools
Threading Tools
Shaper
Internal machining tool range
Original Tools for Various Applications
Indexable End Milling Tools
Indexable Drill Inserts
Milling Cutters
Technical Data
Index

Positive-type inserts



Negative-type inserts



C

PCD, CBN and Ceramic

● PCD	C2
● CBN	C4
● Ceramic	C6

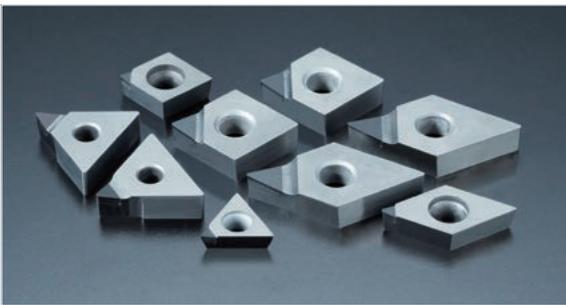
Diamond sintered body, PCD



Diamond excels in deposition resistance with its low affinity and has excellent wear resistance with high hardness. But it also has a problem with fracture resistance due to lack of toughness. PCD is the material solving that problem without losing original characteristics of diamond by sintering fine grain diamond and generating polycrystallization. It enables much higher speed machining of nonferrous metals compared to carbide.

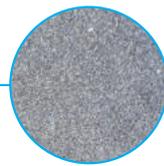
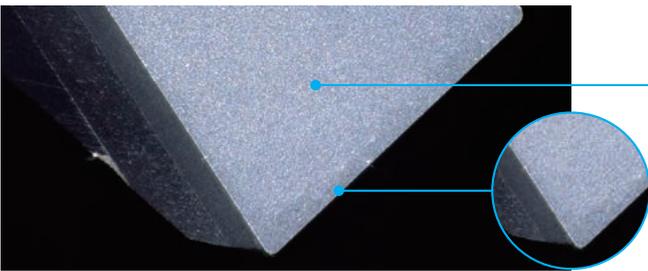
PD1/PD2

For high speed machining of nonferrous metals!



Features

- Elevated cutting speeds when compared to carbide
- Recommended for cutting of aluminum and copper alloys with excellent deposition resistance
- Incorporates a very sharp cutting edge condition
- Pre-grinding and cutting-off types added in addition to the current milling cutter types



- Uses strictly selected diamond grains, the hardest of all material types
- Further improved strength by polycrystallizing dense diamond micro grains
- Excellent deposition resistance thanks to a lower affinity to nonferrous materials

- Sharp cutting edge attained
- Enables high precision and stable machining by control of potential built-up edge

Main applications for cutting: aluminum alloys, brass, copper alloys, graphite, ceramic compact, plastics

[Recommended cutting conditions]

Work material	Cutting speed (m/min)	Feed rate (mm /rev)	Cutting oil
aluminum alloy	Turning : ~ 350 Milling : ~ 4000	Turning : ~ 0.12mm /rev Milling : ~ 0.20mm /t	WET
Copper alloy	Turning : ~ 200 Milling : ~ 1000		

[Actual machining examples]

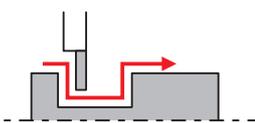
Machining of spool • Work material : A6063		
	Conventional cutting tool	NTK
Material grade	Competitor's brazed carbide grade cutting tool	PD1
Cutting speed (m/min)	100	200
Feed rate (mm/rev)	0.02	0.06
Cutting oil	WET	←
Machining method	Grooving (5) followed by profiling of the grooves	Single stroke
Life (pcs./corner)	1,000	10,000
Technical Data	<p>PD1</p>	
Index	<p>Shorter cycle time due to single pass machining. PD1 produces an excellent surface finish without deposition, higher efficiency and prolonged life resulted.</p>	

Machining of spool		
Material grade	: A6061	
Cutting speed (m/min)	: 170	
Feed rate (mm/rev)	: 0.06	
Depth of cut (mm)	: 0.15	
Cutting oil	: WET	
NTK : PD2	10,000 pcs./corner	
Competitor's PCD product	5,000 pcs./corner	
<p>PD2, excellent in wear resistance, achieved twice the life of competitor's product.</p>		

[Actual machining examples]

Machining of spool ● Work material : A6063		
	Conventional cutting tool	NTK
Material grade	Competitor's brazed carbide grade cutting tool	PD1
Cutting speed (m/min)	100	200
Feed rate (mm/rev)	0.02	0.06
Cutting oil	WET	←
Machining method	Grooving (5) followed by profiling of the grooves	Single stroke
Life (pcs./corner)	1,000	10,000

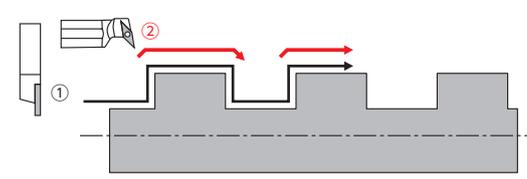
PD1



Shorter cycle time due to single pass machining. PD1 produces an excellent surface finish without deposition, higher efficiency and prolonged life resulted.

Machining of spool ● Work material : A6061		
	①Roughing	②Finishing
Material grade	PD1 GTPA25FRN01	PD1 VCMW110302
Cutting speed (m/min)	200	200
Feed rate (mm/rev)	0.1	0.05
Depth of cut (mm)	~ 5	0.2
Life (pcs.)	Roughing 30,000	Finishing 30,000

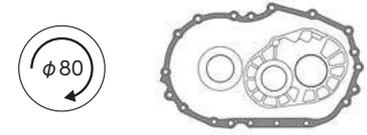
PD1



With GTPA type for roughing, higher efficiency was made possible. High precision was achieved because of the use of DS holder and VCMW insert for finishing reduced cutting forces and material stress.

Machining of transmission case ● Work material : ADC12 die-cast ● Machine : Vertical type machining center		
	Conventional cutting tool	NTK
Material grade	Competitor's PCD	PD1
Cutter specification	80×6 cutting edges	φ80×6 cutting edges
Cutting speed (m/min)	Rough : 700 Finish : 2,000	Rough : 1,500 Finish : 2,000
Revolution (min ⁻¹)	Rough : 2,785 Finish : 7,958	Rough : 5,971 Finish : 7,958
Feed rate (mm/t)	Rough : 0.17 Finish : 0.08	Rough : 0.15 Finish : 0.08
Table feed rate (mm/min)	Rough : 2,785 Finish : 3,979	Rough : 7,165 Finish : 5,305
Depth of cut (mm)	Rough : 2.0 Finish : 0.5	←
Cutting oil	Internal lubrication	←
Life (pcs./corner)	10,000	15,000

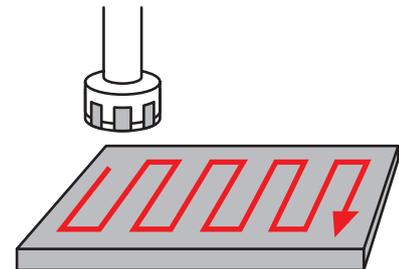
PD1



The cycle time was shortened by 10 seconds for roughing and by 3 seconds for finishing. Also, the life was 1.5 times longer.

Cutting of acrylic plate ● Work material : acryl		
	Conventional cutting tool	NTK
Material grade	Competitor's PCD (4 cutting edges)	PD1 (φ80×6 cutting edges)
Cutting speed (m/min)	750	600
Feed rate (mm/t)	0.016	←
Table feed rate (mm/min)	800	1200
Depth of cut (mm)	0.1	←
Cutting oil	DRY	←

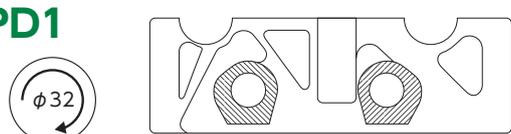
PD1



With this cutter, the surface finish was excellent and the cycle time for the following process was improved. The cutting efficiency was improved due to the 6 cutting edges.

Cutting of rocker shaft holder ● Work material: ADC12 aluminum		
	Conventional cutting tool	NTK
Material grade	Competitor's PCD	PD1
Cutter specification	φ32×2 cutting edges	φ32×4 cutting edges
Cutting speed (m/min)	600	800
Revolution (min ⁻¹)	6,000	8,000
Feed rate (mm/t)	0.025	0.05
Table feed rate (mm/min)	300	1,600
Depth of cut (mm)	MAX1.0	←
Cutting oil	WET (through coolant)	←
Life (pcs./corner)	8,000	15,000

PD1

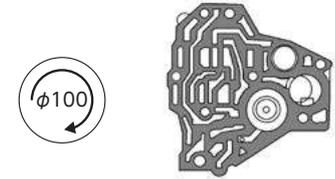


The finish of the machined surface: 1.5S

The cycle time was reduced by 3 minutes.

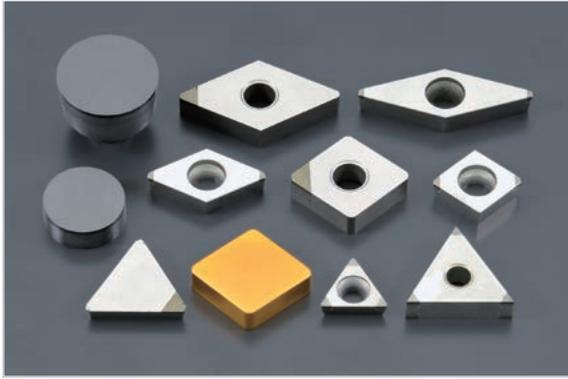
Cutting of automatic transmission component ● Work material : ADC12 die-cast		
	Conventional cutting tool	NTK
Material grade	Competitor's PCD	PD1
Cutter specification	φ100×6 cutting edges	φ100×8 cutting edges
Cutting speed (m/min)	2,513	←
Revolution (min ⁻¹)	8,000	←
Feed rate (mm/t)	0.05	←
Table feed rate (mm/min)	2,400	3,200
Depth of cut (mm)	0.2	←
Cutting oil	WET	←
Life (pcs./corner)	2,000	10,000

PD1



The life was significantly prolonged with improved workpiece stability.

High-pressure sintered compact



CBN grade inserts are composed mainly of CBN (Cubic Boron Nitride) particles with a special ceramic binder. The material has excellent cutting material properties including high hardness at normal and highly elevated temperatures, little chemical reactions with work materials, making it a material suitable for cutting tools

CBN inserts can be used for machining of cemented materials and high speed machining of cast iron

B16

Best for high efficiency machining of cast iron !



[Actual machining examples]

Rough cutting of disc brake	
Work material : FC250	B16
Cutting speed (m/min) = 1,000	
Feed rate (mm/rev) = 0.7	
Depth of cut (mm) = 1.0	
Cutting oil : WET	
NTK : B16	800 pcs./corner
Competitor's CBN product	650 pcs./corner
B16 produced tool life of 1.2 times the competitor's product.	

Features

- Solid CBN with multiple corners available
- Arial Bold Italic
- The coating allows easy checking of used cutting edges

Material grade	Main binder	CBN content	Major application
B16	TiN coating + special ceramic	82%	Roughing and finishing of normal cast iron at high speed/rolling rolls

B22

Best for machining of rolls of high hardness !



Features

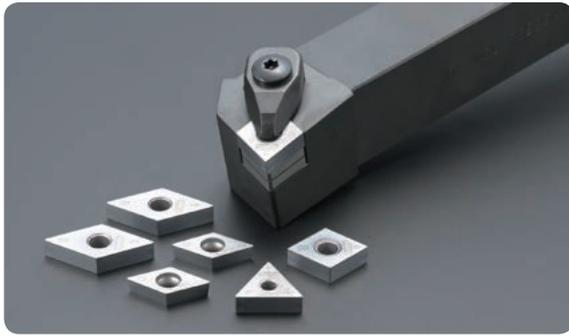
- Top layer of CBN with a carbide base offering multiple cutting edges
- High hardness due to the use of the special binder

Material grade	Main binder	CBN content	Major application
B22	TiN-base	80%	Turning of very hard rolls

Machining of roll	
Work material : High chrome cast iron	B22
Cutting speed (m/min) = 60	
Feed rate (mm/rev) = 0.2	
Depth of cut (mm) = 2.0	
Cutting oil : WET	
NTK : B22	2 passes
Competitor's CBN product	1 pass
B22 produces twice the life of the competitor product.	

EZ CUBE

CBN inserts offer high performance, low price and versatility !



Features

- Seven grades available for different component materials
- Large range for various applications
- Multiple corners on both insert sides contributes to cost reduction



NEW CBN (Cubic Boron Nitride)

• NTK *EZCUBE*™ / EZ CUBE

Material grade	Main binder	CBN content	Major application
B23	Ti-base	90%	High-speed semi roughing of cast iron/sintered alloys
B30	Ti-base	95%	High-speed finishing of cast iron
B36	TiCN-base	65%	semi-interrupted to interrupted machining of hardened materials
B40	TiN-base	65%	Interrupted machining of highly hardened materials
B52	TiC-base	50%	Finishing of ductile cast iron and continuous machining of highly hardened materials
B5K*	TiC-base	50%	Continuous to semi-interrupted machining of hardened steels Finishing of ductile cast iron
B6K*	TiCN-base	65%	Semi-interrupted to interrupted machining of hardened steels

※PVD coating CBN

[Actual machining examples]

Interrupted boring of continuous-velocity universal joint

Work material: S55C (HRC62) **B40**

Cutting speed (m/min) = 110

Feed rate (mm / rev) = 0.14

Depth of cut (mm) = 0.15

Cutting oil : DRY

NTK : B40 2,300 pcs./corner

Competitor's CBN product 1,500 pcs./corner

B40 grade inserts showed a prolonged life without chipping in the interrupted boring operation.

Arial Narrow Bolg

Work material : FCD600 **B52**

Cutting speed (m/min) = 350~400

Feed rate (mm / rev) = 0.08

Depth of cut (mm) = 0.2

Cutting oil : WET

NTK : B52 60 pcs./corner

Competitor's CBN product 30 pcs./corner

The life of B52 grade inserts was twice that of the competitor product.

Cutting of outer side of oil pump housing

Work material : FC250 **B23**

Cutting speed (m/min) = 250

Feed rate (mm / rev) = 0.2

Depth of cut (mm) = 2.0

Cutting oil : WET

NTK : B23 210 pcs./corner

Competitor's CBN product 70 pcs./corner

The life of B23 grade inserts was 3 times as long as the competitor's product.

Continuous boring on cylinder block

Work material : FC material **B30**

Cutting speed (m/min) = 800

Feed rate (mm / rev) = 0.3

Depth of cut (mm) = 0.1

Cutting oil : WET

NTK : B30 800 pcs./corner

Competitor's CBN product 500 pcs./corner

The life of B30 grade inserts was 1.6 times as long as the competitor's product.

※The recommended cutting conditions for individual CBN grades are described in page A37.



NTK Ceramic Tools ensure highly efficient machining with their superior high temperature hardness, heat resistance and chemical stability

NTK offers various types of ceramic tool material (silicon-nitride-base, alumina-base and whisker-base) in many different shapes to meet the respective requirements of applications for higher efficiency and at higher cutting speeds



● Alumina-based Ceramics (White ceramics)

Can be used for high-speed finishing of normal cast iron thanks to its excellent wear resistance



● Silicon nitride-based ceramics

Best for high-speed roughing of normal cast iron
Machining up to $V_c = 1,000\text{m/min}$ is possible



● Alumina TiC-based ceramics (Black ceramics)

The toughness of this type is improved by adding TiC
Can be used for semi-finishing to finishing for normal cast iron and hardened materials

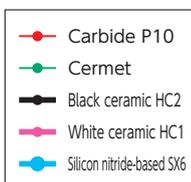


● Whisker-based ceramics

Wear resistance and fracture resistance are strengthened by adding SiC whisker
First choice for machining of heat-resistant alloys and rolls made of cemented materials

■ Advantages of ceramic cutting tools①

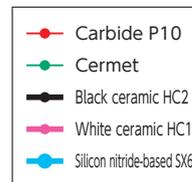
The material retains high hardness even at elevated temperatures !!



Excellent wear resistance at high cutting speeds !

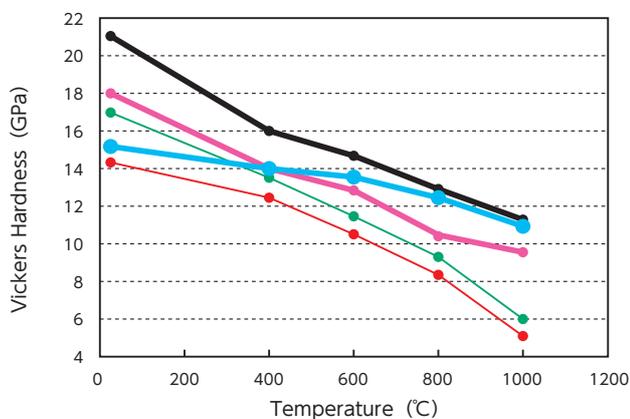
■ Advantages of ceramic cutting tools②

Material breaking strength is not greatly affected by high temperature conditions !!

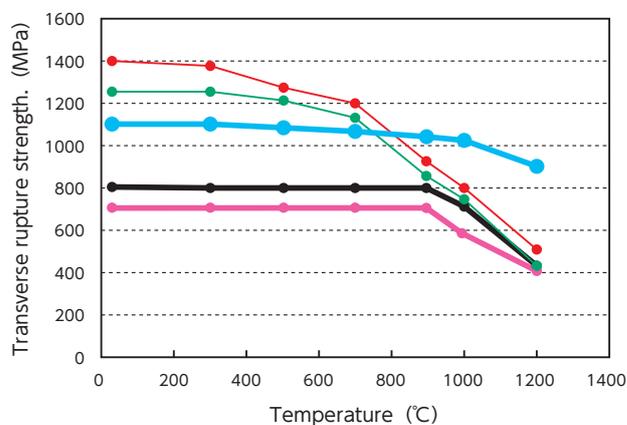


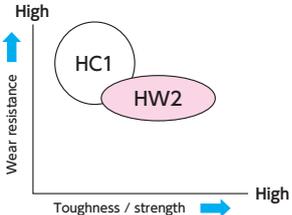
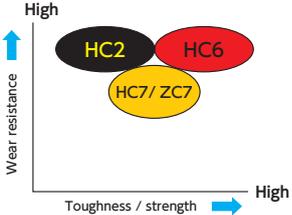
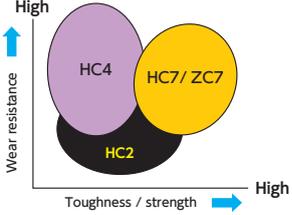
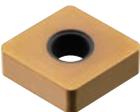
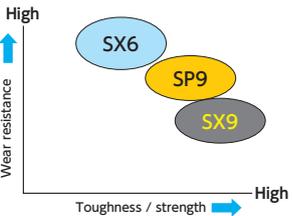
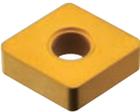
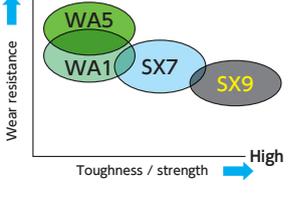
Stable machining is possible in the high speed range

[Hardness at high temperature by tool material]



[Breaking strength at high temperature by tool material]



	Material code name / Coating	Applications / Features	Physical properties*						Applications and ceramic property map
			Density g/cm ³	Hardness HRA	Transverse intensity MPa	Young's modulus GPa	Thermal expansion coefficient X10 ⁻⁶ /K	Therma conductivity W/m·K	
White ceramics Alumina - based ceramics	HC1  Al ₂ O ₃	<ul style="list-style-type: none"> Semi-finishing to finishing and grooving of cast iron Tube Scarfing 	4.0	94.0	700	400	7.8	17	[Normal cast iron, Finishing, DRY, White ceramics] 
	HW2  Al ₂ O ₃	<ul style="list-style-type: none"> Semi-finishing to finishing of cast iron Cylinder Liner machining Excellent fracture resistance 	4.1	94.0	750	390	7.8	19	
Black ceramics Alumina + TiC-based ceramics	HC2  Al ₂ O ₃ +TiC	<ul style="list-style-type: none"> Semi-finishing to finishing of cast iron 	4.3	94.5	800	420	7.9	21	[Normal cast iron, Finishing, WET, Black ceramics] 
	HC4  Al ₂ O ₃ +TiC	<ul style="list-style-type: none"> Cutting of hardened materials 	4.6	95.5	1,000	420	7.8	25	
	HC6  TiC+Al ₂ O ₃	<ul style="list-style-type: none"> Semi-finishing to finishing of ductile cast iron Semi-finishing to finishing of cast iron with coolant 	4.7	94.0	800	450	7.6	29	
	HC7  Al ₂ O ₃ +TiC	<ul style="list-style-type: none"> Cutting of hardened materials (removal of carburized layer) ※Substitute for HC5 	4.6	95.0	1,100	420	7.9	23	[Cutting of hardened materials] 
	ZC7  Al ₂ O ₃ +TiC TiN coat	<ul style="list-style-type: none"> Recommended for cutting of hardened materials (removal of carburized layer) 	4.6	95.0	1,100	420	7.9	23	
Silicon nitride - based ceramics	SX6  Si ₃ N ₄	<ul style="list-style-type: none"> Normal cast iron turning Normal cast iron milling Resistance to insert flank wear ※Substitute for SX1 	3.2	93.5	1,200	320	3.0	50	[Cutting of normal cast iron / Roughing] 
	SX7  Si ₃ N ₄	<ul style="list-style-type: none"> Heat resistant alloy turning Heat resistant alloy milling High wear resistance 	3.3	93.0	900	290	3.4	11	
	SX9  Si ₃ N ₄	<ul style="list-style-type: none"> Heat resistant alloy turning Rough turning of normal cast iron High fracture resistance 	3.3	93.5	1,200	330	3.0	15	
	SP9  Si ₃ N ₄ TiN+Al ₂ O ₃ coat	<ul style="list-style-type: none"> Heat resistant alloy turning Rough turning of normal cast iron ※Substitute for SP2 Special edge treatment for lower cutting forces + high precision cutting with coated inserts 	3.3	93.5	1,200	330	3.0	15	[Heat-resistant alloy / Roughing] 
WA1  Al ₂ O ₃ +SiC	<ul style="list-style-type: none"> Heat resistant alloy turning High efficiency cutting of normal cast iron 	3.7	94.5	1,200	400	7.6	35		
WA5  Al ₂ O ₃ +SiC	<ul style="list-style-type: none"> Heat resistant alloy turning High efficiency cutting of normal cast iron High fracture resistance 	3.8	94.5	1,200	400	7.7	35		

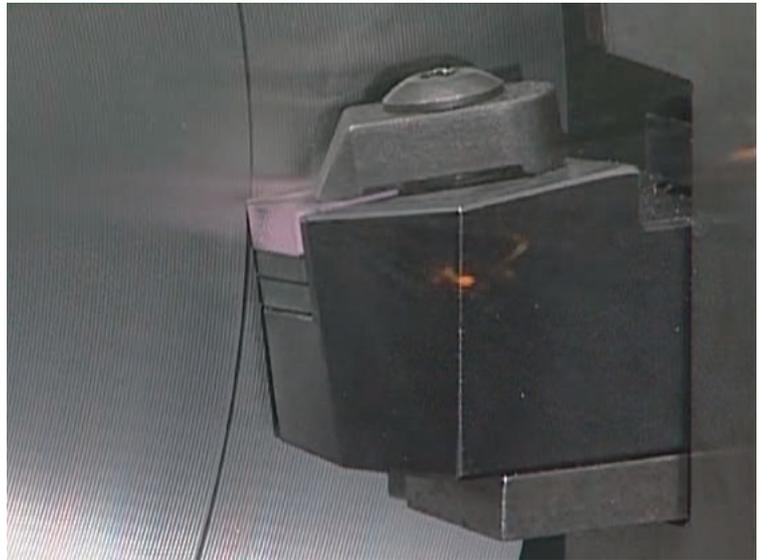
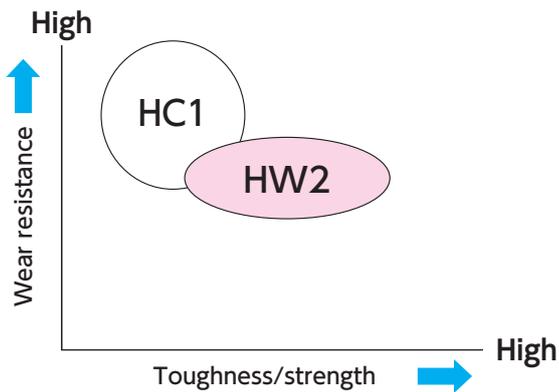
※ For coated products, the values of the base material are indicated.

Alumina-based ceramics (White ceramics)



- Characterized by high oxidation resistance as well as deposition resistance, these ceramics utilise alumina that is thermally and chemically stable. They are best suited for high-speed cutting applications where the temperature at the edges may become high

[Normal cast iron, Finishing, Dry cutting, White ceramic]

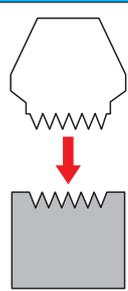


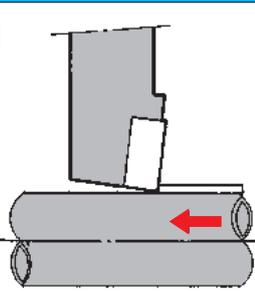
HC1 Ideal material for high-speed finishing of cast iron !



Features

- Outstanding wear resistance for high-speed cutting of cast iron, especially semi-finishing or finishing without coolant
- Most suitable for high-speed and high-temperature cutting thanks to the high heat resistance, using high-purity alumina as the main component
- Usable even for finishing of special cast iron and for tube scarfing

Pulley machining	
Work material : FC250	HC1
Cutting speed (m/min) = 500	
Feed rate (mm /rev) = 0.15→0.10→0.05	
Cutting oil : DRY	
NTK : HC1	600 pcs./corner
Competitor's black ceramic	300 pcs./corner
HC1 achieved double the tool life of the competitor product.	

Tube Scarfing	
Work material : SPHT4	HC1
Cutting speed (m/min) = 70	
Depth of cut (mm) = 3.0	
Cutting width (mm) = 5.0	
Cutting oil : DRY	
NTK : HC1	70 min./corner
Competitor's black ceramic	30 min./corner
With its outstanding wear resistance characteristic, HC1 produced double the competitors tool life.	

HW2

Highly tough alumina-based ceramic tool !



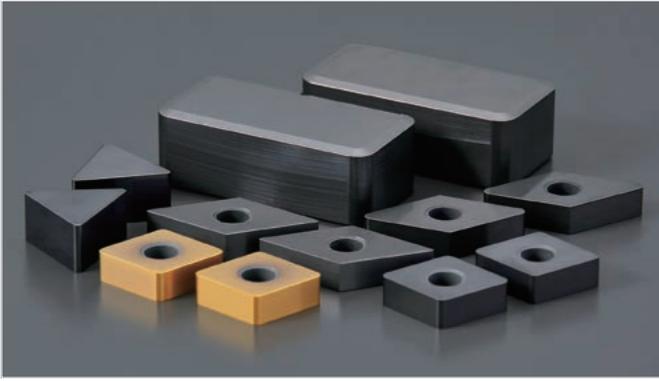
Features

- Exhibits high strength and high toughness through the addition of zirconium to high purity alumina
- Suitable for semi-interrupted finishing applications for normal cast iron and roughing and finishing of special cast iron (such as lining materials)

Brake Disc machining	
Work material : FC250	
Cutting speed (m/min) = 359	
Feed rate (mm/rev) = 0.3	
Depth of cut (mm) = 0.5	
Cutting oil : DRY	
NTK : HW2	130 pcs./corner
Competitor's black ceramic	65 pcs./corner
HW2 achieved twice the tool life of the competitor's product, due to its superior strength.	

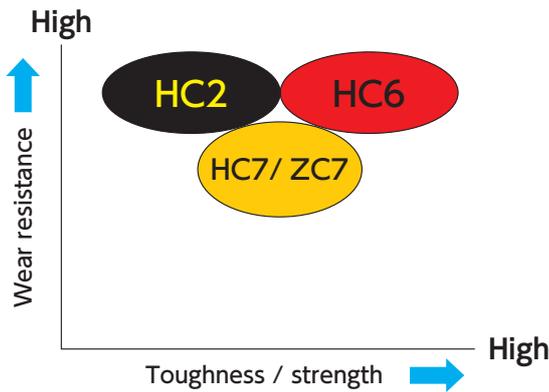
Cylinder liner machining	
Work material : special cast iron	
Cutting speed (m/min) = 600	
Feed rate (mm/rev) = 0.32	
Depth of cut (mm) = 3.0	
Cutting oil : DRY	
NTK : HW2	70 pcs./corner
Competitor's black ceramic	30 pcs./corner
HW2 produced finished surfaces of excellent quality in addition to the life being double that of the competitor's product.	

Alumina TiC-based ceramics (Black ceramics)

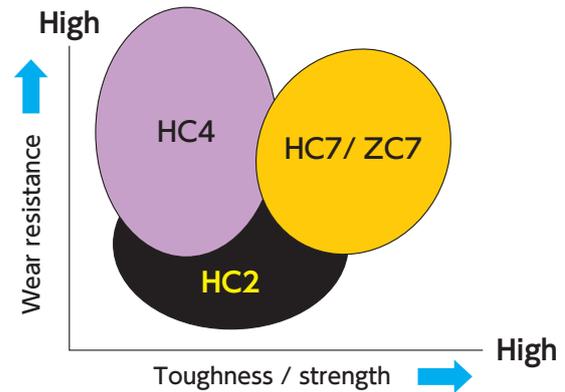


This material group are alumina TiC-based ceramics strengthened by adding hard carbide to high-purity alumina. These tool materials exhibit excellent performance in high-speed finishing of cast iron, applications under either WET or DRY cutting, or even in partially interrupted machining, having improved hardness and strength. Excellent at finishing of hardened materials due to the high hardness and low plasticity in high temperature ranges.

[Normal cast iron, Finishing, WET, Black ceramic]



[Machining of hardened materials]



HC2

The standard tool material for machining cast iron and hardened materials !



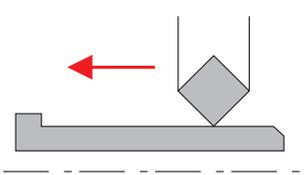
Features

- **Excellent performance in machining of cast iron and hardened materials thanks to its high hardness and low plasticity in high temperature ranges**

Machining of lining material • Work material : FC material

	Conventional cutting tool	NTK
Material grade	Competitor's carbide	HC2
Cutting speed (m/min)	400	600
Feed rate (mm /rev)	0.50	←
Depth of cut (mm)	0.70	←
Cutting oil	DRY	←
Life (pcs./corner)	40	110

HC2

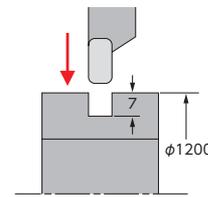


HC2 produced 1.35 times higher machining efficiency and almost 3 times the tool life of the competitor's product.

Machining of roller bearing • Work material : SNCM (HRC58)

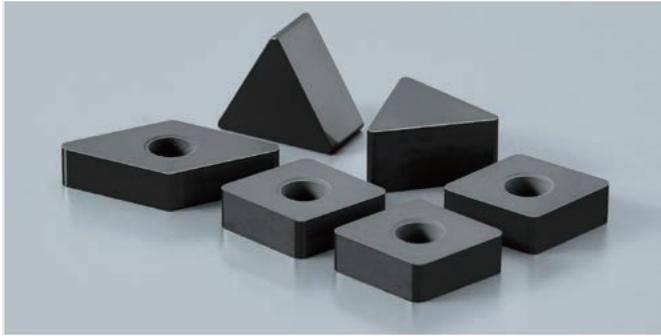
	Conventional cutting tool	NTK
Material grade	Competitor's carbide	HC2
Cutting speed (m/min)	23	112
Feed rate (mm /rev)	0.06	0.06
Cutting oil	DRY	←
Life (No. of grooves)	4	6

HC2



HC2 produced approximately twice the machining efficiency and 1.5 times longer tool life than the competitor's product.

HC4 For machining of hardened materials!



Features

- Performs remarkably well as a material exclusively for hardened materials, having improved hardness and strength, by the introduction of micro grains also facilitating a higher melting point

Cutting of side gear	
Work material : Case carburizing steel	
Hardness : HRC63	
Cutting speed (m/min) = 121	
Feed rate (mm /rev) = 0.03 ~ 0.04	
Depth of cut (mm) = 0.15	
Cutting oil : DRY	
NTK : HC4	60 pcs./corner
Competitor's black ceramic	30 pcs./corner
HC4, excellent in wear resistance, achieved twice the life of the competitor's product.	

ZC7 For machining of hardened parts with varying levels of hardness!



Features

- Covers a wide range of hardened materials (HRC45 - 60)
- ZC7 coated with TiN provided as standard stocked product
- Inserts are available with both wiper facets and chipbreakers to further improve machining efficiency

Gear cutting	
Work material : Case carburizing steel	
Cutting speed = 200m/min	
Feed rate = 0.20mm /rev	
Depth of cut = 0.70mm	
Cutting oil : DRY	
NTK : ZC7 (w/ 4 corners)	
Competitor's CBN (w/ 2 corners)	50 pcs./corner
ZC7 realized significant cost reduction, through longer tool life as compared with the competitor's CBN product.	

For technical data of machining hardened steels, please go to page Q2

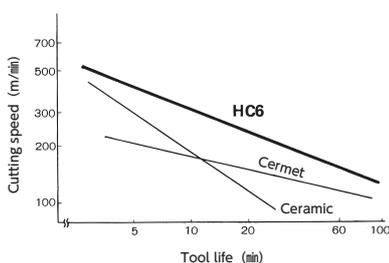
HC6 For machining of ductile cast iron!



Features

- World's first TiC-based ceramic put into practical use
- Ideal for semi-finishing and finishing of ductile cast iron at low to high-speed levels
- Also produces excellent dimension stability in machining of cast iron under WET cutting conditions

■ Cutting performance : V-T curve



Cutting conditions
 Work material : FCD550(HB240 ~ 260)
 Insert : SNGN120408
 Depth of cut : 0.5mm
 Feed rate : 0.2mm /rev
 Reference life : Amount of VB wear = 0.4mm

Gear cutting ● Work material : Equivalent to FCD450 + copper alloy		
	Conventional cutting tool	NTK
Material grade	Competitor's cermet	HC6
Cutting speed (m/min)	300	←
Feed rate (mm /rev)	0.05	←
Depth of cut (mm)	0.5	←
Cutting oil	WET	←
Life (pcs/corner)	20	50

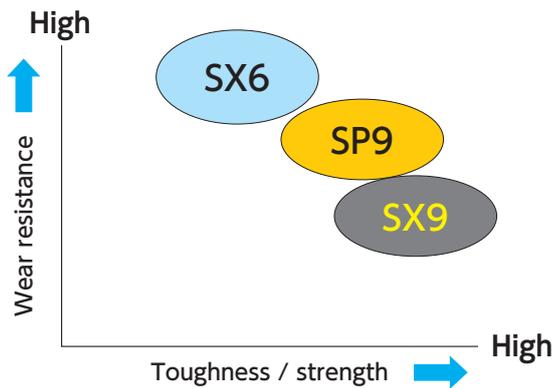
HC6 produced remarkably long life, less dimensional variations and better wear resistance compared with the competitor's product.

Silicon nitride-based ceramics

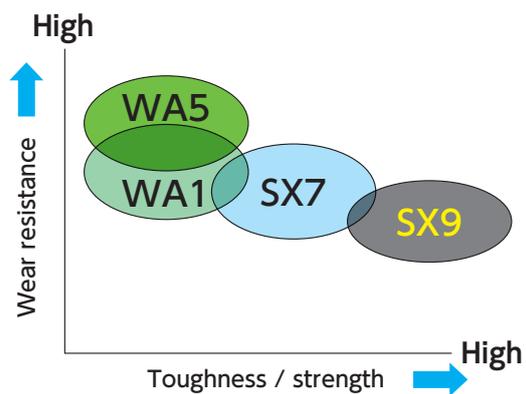


The silicon nitride-based ceramics have approximately twice the fracture toughness of alumina-based, having high fracture resistance equal to some carbide tools. These grades allow for efficient machining in high speed ranges where traditional ceramic tools were not able to perform well, including milling of cast iron and interrupted cutting in poor surface conditions.

[Normal cast iron, Roughing]

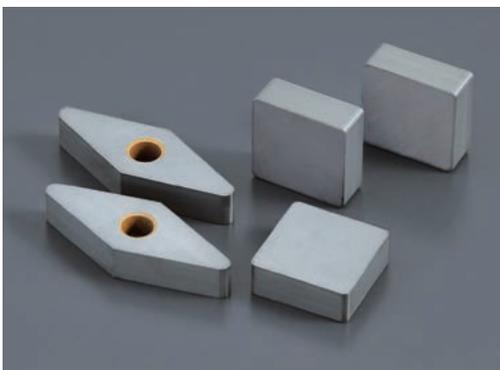


[High Temperature Alloy, Roughing]



SX6

The latest tool material for machining of cast iron through rough surface conditions!



Features

- **Outstanding boundary wear resistance**
- **Outstanding thermal shock resistance enabling stable WET machining and milling**
- **Possible to machine at high efficiency and at high speed over 1,200 m/min**

Material	Work material	Application	Cutting speed	Feed rate
SX6	FC150 ~ 300	Turning	~ 1,200 (m/min)	~ 0.7 (mm /rev)
		Milling	~ 1,000 (m/min)	~ 0.3 (mm /t)

Disc brake machining with coolant

Work material : FC150	
Cutting speed (m/min) = 1,100	
Feed rate (mm/rev) = 0.5	
Depth of cut (mm) = 2.0~3.0	
Cutting oil : WET	
NTK : SX6	75 pcs./corner
Competitor's silicon nitride-based ceramic	50 pcs./corner
SX6 produced 1.5 times longer life than the competitor's silicon nitride-base ceramic product.	

Interrupted roughing with coolant of stator housing

Work material : FC300	
Cutting speed (m/min) = 350	
Feed rate (mm/rev) = 0.35	
Depth of cut (mm) = 2.5	
Cutting oil : WET	
NTK : SX6	70 pcs./corner
Competitor's silicon nitride-based ceramic	50 pcs./corner
SX6 achieved stable machining in the interrupted operations without any insert chipping.	

SX7

Best for high speed machining for high temperature alloy!



Features

- **Better notching resistance compared to Whisker ceramics**
- **No more ramping machining needed to resist notching wear like Whisker ceramics require**
- **Better flank wear resistance compared to general SiAlON ceramics enables machining in same speed range with Whisker ceramics**
- **Excellent heat resistance allows for milling in such high speed as 1,000 m/min, which greatly reduces machining time compared to carbide**



Semi-rough machining of turbine disc ● Work material : Inco 718

	Current Whisker Ceramic RPGX120700	NTK SX7
Material	Whisker Ceramic	SX7
Dimension	RPGX120700	←
Cutting speed (m/min)	240	←
Feed rate (mm/rev)	0.15	←
Depth of cut (mm)	1.50	←
Cutting oil	WET	←
Life (mm/corner) (min)	7.0	←

Competitor's Whisker Ceramic

SX7

SX7, excellent in notching resistance, controlled insert chipping, on the other hand competitor's Whisker ceramic could not.

Combustion case milling ● Work material : Inco 718

	Current Carbide	NTK SX7
Material	Carbide	SX7
Dimension	APKT type	RPGN120400
Cutter	φ40-3 edges	φ40-3 edges
Cutting speed (m/min)	36	1000
Revolution (min ⁻¹)	287	7961
Feed rate (mm/tooth)	0.60	0.12
Depth of cut (mm)	0.80	0.80
Coolant	WET	DRY
Efficiency (m/min)	517	2866
Removal Volume (cc/min)	21	115
Life (mm/corner) (cc)	620	620
Cycle time (min)	30	5.4

SX7 achieved about 6 times the working efficiency of competitor's carbide.

SX9

For cost reduction in heat-resistant alloy applications !



Features

- **Heat resistance and fracture resistance improved greatly thanks to our own manufacturing method producing needle type grain structure**
- **Allows for machining of heat-resistant alloys including inonel, waspalloy and stellite**
- **Significantly cost-effective compared with whisker-based ceramic**

[Actual machining example : Heat resistant alloy]

Machining of aircraft component after rough skin removal

Work material : Inconel 718	
Cutting speed(m/min)=180	
Feed rate(mm/rev)=0.2	
Depth of cut(mm)=~0.6	
Cutting oil : WET	

NTK : SX9 2 pcs./corner

Competitor's whisker-based ceramic tool 1 pcs./corner

SX9 exhibited a significant advantage in terms of cost, reduction, the life was twice that of the competitor's whisker-based tool.

SP9

Best for interrupted machining and low-speed machining of cast iron !



Features

- **Improved fracture resistance in interrupted machining by the use of a highly tough material**
- **Outstanding dimensional stability by controlling the temperature increase during machining thanks to the minimum condition of the cutting edge**
- **Longer life for lower speed ranges, such as 300 m/min, due to the coating**

Brake disc machining ● Work material : FC material

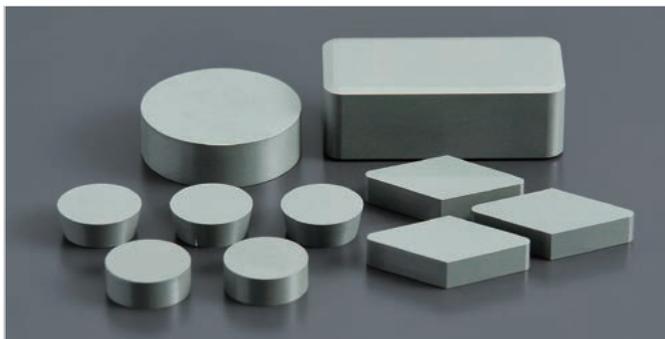
	Conventional cutting tool	NTK
Material grade	Competitor's silicon nitride-based ceramic	SP9
Cutting speed (m/min)	550	←
Feed rate (mm/rev)	0.4	←
Cutting oil	DRY	←
Life (pcs./corner)	80	120

SP9

SP9 controlled the major flank boundary wear better than the competitor's silicon nitride-based ceramic tool. "Chipping" was also well controlled due to less cutting resistance from the minimal edge condition.

New Products
Tool Materials / Selection Guide
PCD, CBN and ceramic
Cement
Micro-grain Carbide, Carbide
Insert Stock List
Outside Machining Toolholders
SS
Grooving Tools
Threading Tools
Shaper
Internal machining tool range
Original Tools for Various Applications
Indexable End Milling Tools
Indexable Drill Inserts
Milling Cutters
Technical Data
Index

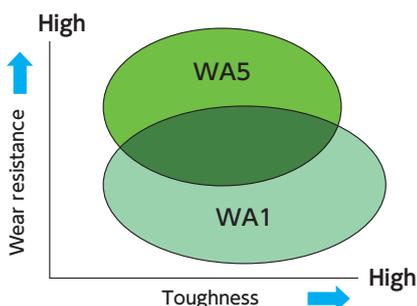
Whisker-based ceramics



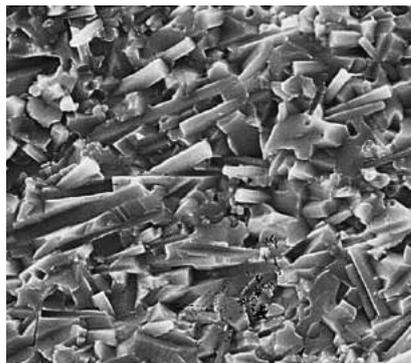
This material grade realize a higher level of wear resistance, toughness and flaking resistance by adding SiC whiskers to alumina, the major component

This grade enables high speed and high feed in cutting normal cast iron, heat-resistant alloys and hardened rolls, with its excellent thermal shock resistance

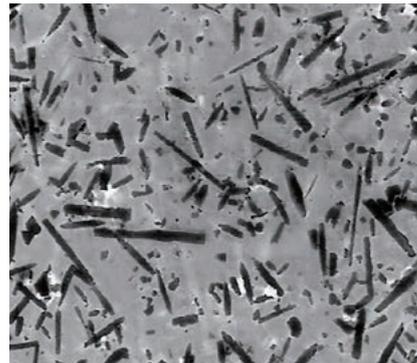
[Heat-resistant alloy]



[Photo of WA1 structure]



[Photo of WA5 structure]



WA5

A new generation for machining of heat-resistant alloys !



Features

- **New material grade for machining of heat-resistant alloys including inconel and waspaloy**
- **Improved wear resistance and flaking resistance by optimizing the amount of whisker content**

[External profiling of heat-resistant alloy with WA5]

Machining of jet engine component ● Work material : Inconel 718		
	Conventional cutting tool	NTK
Material	Competitor's whisker-based ceramic	WA5
Cutting speed (m/min)	200	←
Feed rate (mm/rev)	0.10	←
Depth of cut (mm)	0.30	←
Cutting oil	WET	←
Life (mm/corner)	80	←
Criterion for end of life	Wear marks on the processed surface	Replacement by specified qty of work pieces
WA5 achieved stable machining compared with the competitor's product.		

Machining of jet engine turbine disc ● Work material : Inconel 718		
	Conventional cutting tool	NTK
Material	Competitor's whisker-based ceramic	WA5
Cutting speed (m/min)	400	←
Feed rate (mm/rev)	0.15	←
Depth of cut (mm)	0.25 ~ 0.75	←
Cutting oil	WET	←
Life (mm/corner)	2	4
WA5 produced twice the tool life of the competitor's product.		

WA1

Ultra high-speed machining of heat-resistant alloys and cast iron !



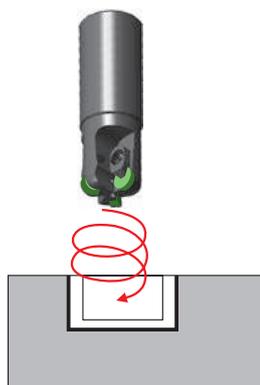
Features

- **Excellent thermal shock resistance enables to machine high temperature alloy with high speed $v_c = \sim 500\text{m/min}$**
- **Superior wear resistance allows high speed cutting $v_c = \sim 1,000\text{m/min}$ on cast iron.**
- **Wet machining is feasible by high thermal shock resistance**

[Actual machining example : Gas turbine material]

Case machining		● Work material : Inconel 718
	Conventional cutting tool	NTK
Material grade	Competitor's carbide end mill cutter	WA1
Holder	Solid	RPIW125E125R03
Cutting speed (m/min)	50	800
Feed rate (mm /edge)	0.14	0.10
Depth of cut (mm)	2	←
Cutting oil	WET	DRY
Life (mm /corner)	1 pass = 60 min.	1 pass = 2 min.

WA1

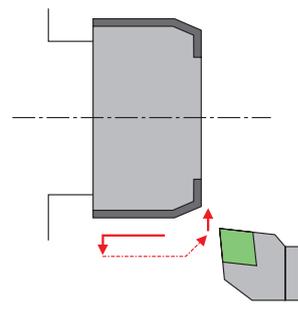


WA1 gave 1.6 times better machining efficiency than the competitor's product.

[Semi-finishing of planetary gear]

Machining of planetary gear		● Work material : FCD700
	Conventional cutting tool	NTK
Material grade	Competitor's carbide	WA1
Cutting speed (m/min)	100	300
Feed rate (mm /rev)	0.4	←
Depth of cut (mm)	1.5	←
Cutting oil	DRY	←
Life (mm /corner)	45	100

WA1

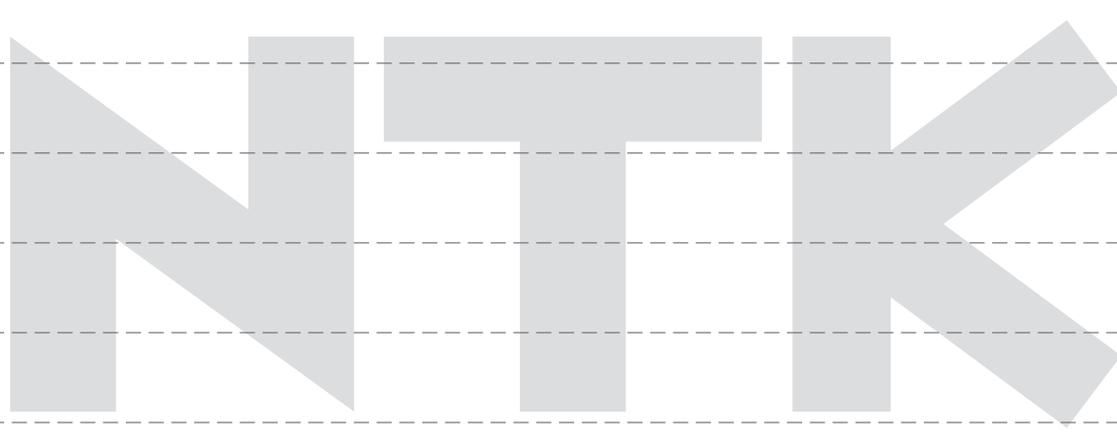


WA1 produced better machining efficiency when compared to the competitor's product.

For technical data of machining heat-resistant alloys with ceramic cutting tools, please go to page Q4

MEMO

New Products	
Tool Materials / Selection Guide	
PCD, CBN and ceramic	
Cermet, PVD-coated Carbide	
Micro-grain Carbide, Carbide	
Insert Stock List	
Outside Machining Toolholders	
SS	
Grooving Tools	
Threading Tools	
Shaper	
Internal machining tool range	
Original Tools for Various Applications	
Indexable End Milling Tools	
Indexable Drill Inserts	
Milling Cutters	
Technical Data	
Index	



D

Cermet, PVD-coated Cermet

Index

Technical
Data

Milling
Cutters

Indexable
Drill Inserts

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Milling Tools

Original Tools for
Various Applications

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Insert
Stock List

Micro-grain
Carbide, Carbide

Cermet
PVD-coated Cermet

PCD, CBN
and ceramic

Tool Materials /
Selection Guide

New
Products

Cermet, PVD-coated Cermet

Cermet Series



Cermet is a tool material composed mainly of TiC (Titanium Carbide) and TiN (Titanium Nitride). The name, cermet, is derived from the words CERAMIC and METAL (representing carbide). As the name suggests, cutting performance is also in the mid-range of ceramic's and carbide's. The advantages of this material grade are that high-quality and excellent surface finishes can be achieved allied with elevated cutting speeds

Features

High quality surface finish

The main components, TiC and TiN, have good deposition resistance as they are low in affinity with work materials. Thus, machining with these grades allows for a high degree of surface finish over extended periods of cut

Features

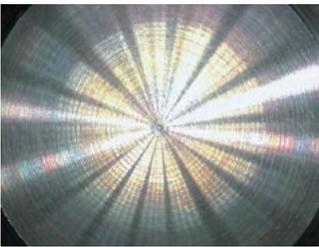
High cutting speed

The main components, TiC and TiN, are more resistant to wear and oxidation at high temperature than WC (tungsten carbide), the main component of carbide tools. Because of this, cermet grades are less reactive with work materials, allowing for stable machining at high speed

This grade has improved wear resistance by coating the cermet with TiN or TiCN. Since the coating layer does not contain any binder components, the original wear resistance of the titanium compound delivers excellent performance, enabling the tool life to be

Features

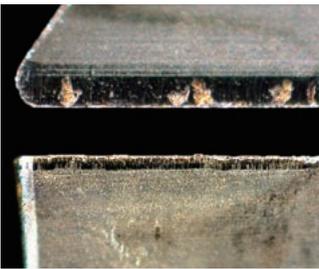
Highly wear- and deposition-resistant due to the PVD coat providing high hardness and surface smoothness



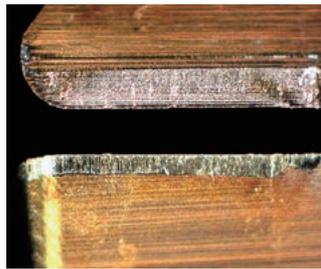
Surface finished with cermet



Surface finished with carbide



Cermet



Carbide

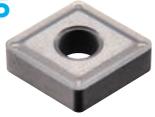
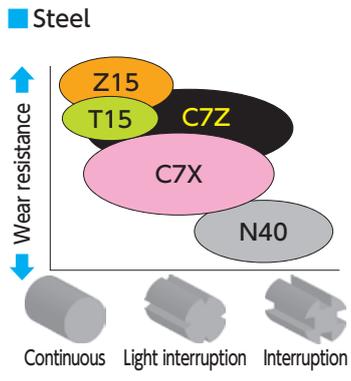
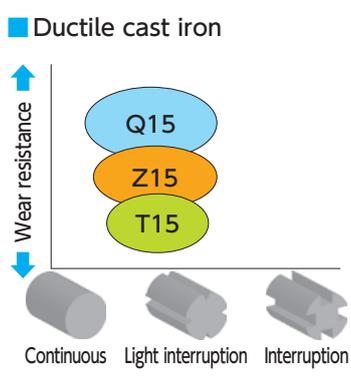
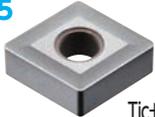
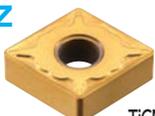
PVD-coated cermet series



Smooth coating layer offers excellent deposition resistance

Outstanding coating adhesion

[Types, applications and features of tool materials]

Material code name / Coating	Applications / Features	Physical properties**						[Applications and ceramic property map]
		Density g/cm ³	Hardness HRA	Transverse intensity GPa	Young's modulus GPa	Thermal expansion coefficient X10 ⁻⁶ /K	Thermal conductivity W/m·K	
T15  TiCN base	<ul style="list-style-type: none"> Semi-finishing and finishing of steel Finishing of ductile cast iron 	6.3	92.5	1,700	450	8.4	21	<div style="display: flex; flex-direction: column;"> <div style="margin-bottom: 20px;"> <p>Steel</p>  </div> <div> <p>Ductile cast iron</p>  </div> </div>
Q15  TiC+TiN + TiCN coat	<ul style="list-style-type: none"> Finishing of ductile cast iron at high speed 	6.3	92.5	1,700	450	8.4	21	
Z15  TiC+TiN + TiN coat	<ul style="list-style-type: none"> Semi-finishing and finishing of steel Finishing of ductile cast iron 	6.3	92.5	1,700	450	8.4	21	
C7X  TiCN base	<ul style="list-style-type: none"> Semi-finishing and finishing of steel Grooving of steel Bearing machining 	7.0	91.5	1,800	440	8.2	31	
C7Z  TiCN base + TiN coat	<ul style="list-style-type: none"> Semi-finishing and finishing of steel Grooving of steel Bearing machining 	7.0	91.5	1,800	440	8.2	31	
N40  TiN base	<ul style="list-style-type: none"> General cutting of steel Grooving of steel 	5.9	91.5	1,900	450	8.9	42	

**For products with coating, the values of the base material are indicated.

[Applications and application areas of cermets]

	General steel (Carbon / Alloy steel) and soft steel			
	Machining processes			
		Finishing to light duty	Semi-roughing	Roughing
	—	P01 P10	P20	P30
Cermets		T15		C7X · N40
PVD coated cermets		Q15	Z15	C7Z

Stainless steel		
Machining processes		
Finishing to light duty	Semi-roughing	
P01	P10	P20
T15		
Z15	Q15	

Normal cast iron and ductile cast iron		
Machining processes		
Finishing	Light duty cutting	
K01	K10	K20
T15		
Q15	Z15	

T15 Well balanced between wear resistance and fracture resistance !



Features

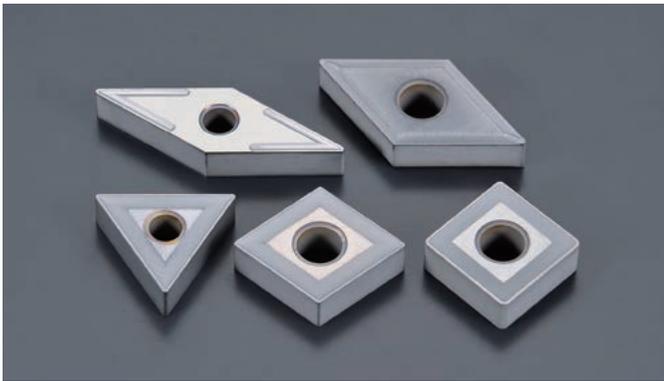
- Well balanced between wear resistance and fracture resistance
- Covers a wide range of steel cutting, from medium cutting to finishing of steel

Crank shaft machining ● Work material : S50C		
	Conventional tool	NTK
Material	Competitor's cermet	T15
Cutting speed (m/min)	75	←
Feed rate (mm/rev)	0.05	←
Depth of cut (mm)	0.25	←
Cutting oil	WET	←
Life (pcs./corner)	60	100

T15

T15 gave 1.7 times the tool life of the competitor's product.

Q15 Cermet grade for high-speed finishing of ductile cast iron !



Features

- Further improved wear resistance and fracture resistance from the TiCN-based coating
- The recommended grade for finishing of ductile cast iron at high speed

Differential case machining ● Work material : FCD550		
	Conventional tool	NTK
Material	Competitor's cermet	Q15
Cutting speed (m/min)	160	←
Feed rate (mm/rev)	0.10	←
Depth of cut (mm)	0.2	←
Cutting oil	WET	←
Life (pcs./corner)	20	35

Q15

Q15 produced 1.7 times longer tool life than the competitor's product.

Z15 Combining the advantages of wear resistance and fracture resistance !



Features

- Further improved wear resistance and fracture resistance from TiN-based coating
- Suitable for finishing of ductile cast iron in addition to medium cutting and finishing of steel

Connecting rod machining ● Work material : Sintered alloy		
	Conventional tool	NTK
Material	Competitor's cermet	Z15
Cutting speed (m/min)	180	←
Feed rate (mm/rev)	0.35	←
Depth of cut (mm)	0.5	←
Cutting oil	WET	←
Life (pcs./corner)	100	300

Z15

Z15 produced 3 times longer tool life than the competitor's product, with excellent surface finish and dimensional accuracy. Z15 proved its wear resistance in cutting sintered alloy and chipping resistance in interrupted cutting.

C7X High-strength cermet grade that offers remarkable machining stability !

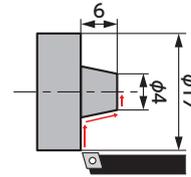


Features

- Overcomes the traditional weakness of conventional cermet grades with improved thermal shock resistance
- Performs well especially for grooving and bearing machining

Seat spring machining ● Work material : SUJ2		
	Conventional tool	NTK
Material	Competitor's cermet	C7X
Cutting speed (m/min)	130	←
Feed rate (mm/rev)	0.05	←
Depth of cut (mm)	0.3	←
Cutting oil	WET	←
Life (pcs./corner)	1,400	2,000

C7X



C7X controlled the progress of wear better than the competitor's product, giving extended tool life with an excellent surface finish

C7Z Combining the advantages of thermal shock resistance and fracture resistance !

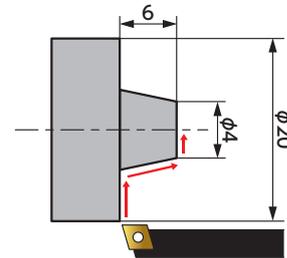


Features

- Achieved further improved wear resistance and thermal shock resistance with a TiN-based coating
- Performs well especially in grooving and bearing machining
- The recommended grade for high-efficiency machining of steel

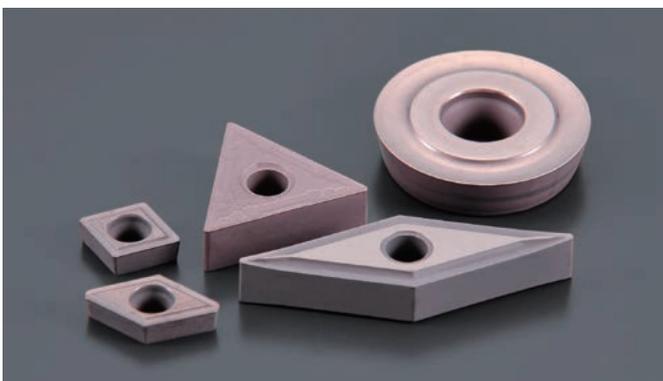
Spring machining ● Work material : SUJ2		
	Conventional tool	NTK
Material	Competitor's cermet	C7Z
Cutting speed (m/min)	130	←
Feed rate (mm/rev)	0.05	←
Depth of cut (mm)	0.3	←
Cutting oil	WET	←
Life (pcs./corner)	1,200	1,600

C7Z



C7Z produced longer tool life and better dimensional accuracy on finished surfaces than the competitor's product.

N40 Highly tough cermet grade with excellent fracture resistance !

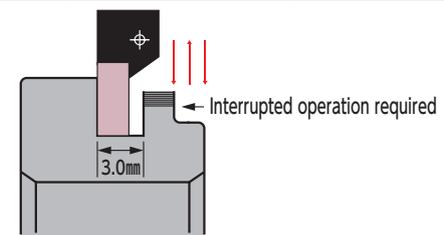


Features

- Allows for stable machining with longer tool life thanks to its excellent fracture resistance

Gear machining ● Work material : SCr420H		
	Conventional tool	NTK
Material	Competitor's cermet	N40
Cutting speed (m/min)	110	←
Feed rate (mm/rev)	0.09	←
Cutting oil	WET	←
Life (pcs./corner)	200	300

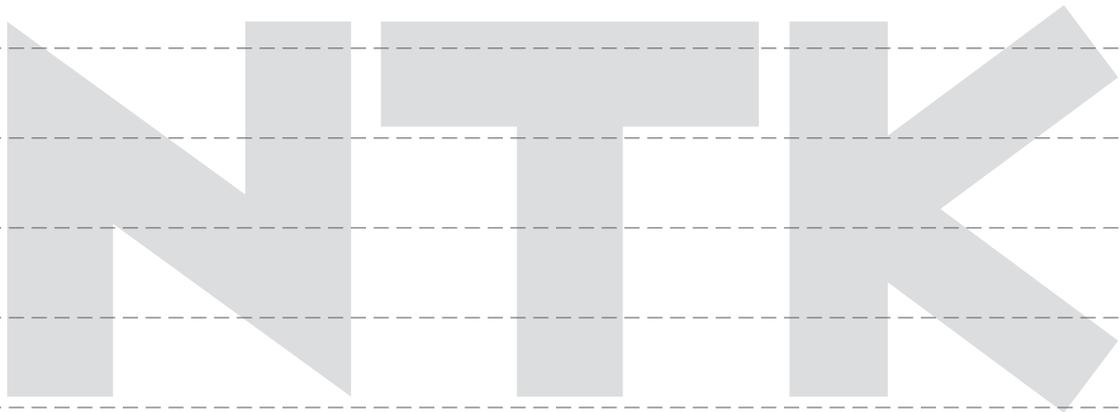
N40



N40's high toughness enabled very low rates of breakage, allied with excellent chip control and burr free machining.

MEMO

New Products
Tool Materials / Selection Guide
PCD, CBN and ceramic
Cermet, PVD-coated Carbide
Micro-grain Carbide, Carbide
Insert Stock List
Outside Machining Toolholders
SS
Grooving Tools
Threading Tools
Shaper
Internal machining tool range
Original Tools for Various Applications
Indexable End Milling Tools
Indexable Drill Inserts
Milling Cutters
Technical Data
Index



Micro-grain Carbide and PVD-coated Carbide

Micro-grain Carbide and PVD-coated Carbide



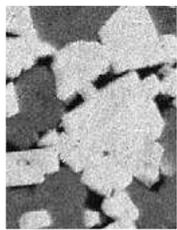
Precision machining and machining of hard-to-cut stainless materials

These material grades use WC micro grain carbide, the hard layer of which is granulated to a micro size $1\ \mu\text{m}$, as the base material. Furthermore, the base material is coated by the PVD method with TiN, TiCN, and/or TiAlN. Thus, the materials are suitable for precision machining and machining of materials that are difficult to cut. Inserts of these grades are tougher and harder than carbide, exhibiting precision sharp cutting edges. They even have higher toughness and sharper cutting edges than those materials with ultra micro-grain carbide, exhibiting excellent wear resistance and thermal crack resistance.

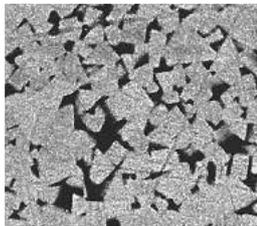
The result of a long development period aimed at improving carbides

The NTK carbide grade series perform very stably under a wide variety of conditions, using micro-grain carbide well balanced between wear resistance and chipping resistance, as the base material.

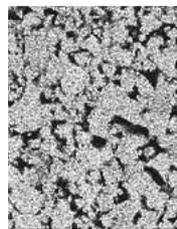
Carbide grade



General carbide structure

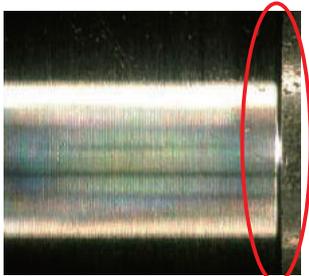


Micro-grain carbide structure



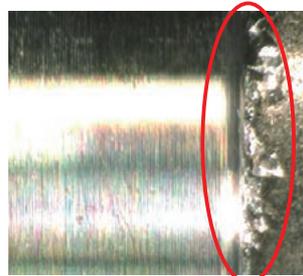
Super micro-grain carbide structure

Features Superior cutting performance



W/o burrs

Machined with our insert having a sharp cutting edge



Burrs caused

Machined with a competitor's product having a honed cutting edge

Long-time pursuit of better cutting performance

NTK takes pride in its carbide grade series for their outstanding cutting performance attained with honed and ultra sharp cutting edges. This outstanding cutting performance allows for better burr control, lower cutting forces, stabilized dimensions, improved work hardening control and more (grinding grade inserts).

Features Solutions by pin-point analysis of various concerns



Build-up edge



Chipping / fracture



Wear on flank

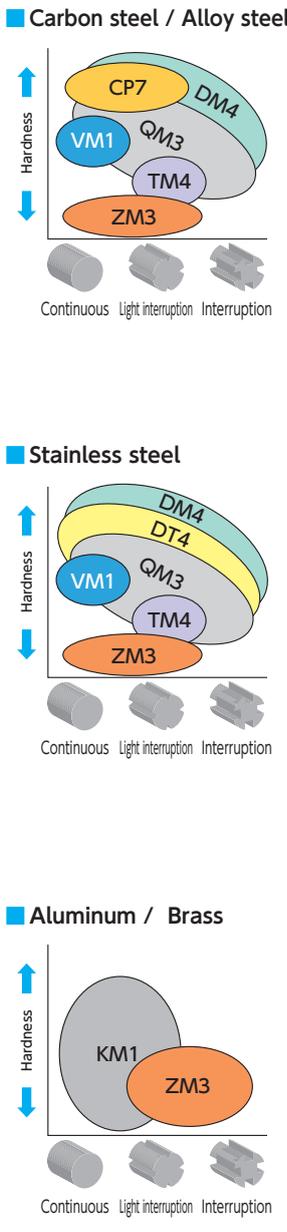
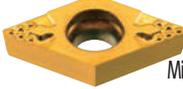
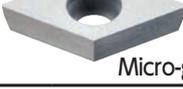
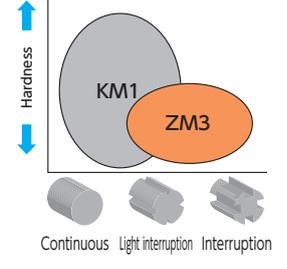
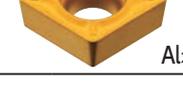


Wear on face

Long-time research on insert tool life

While the forms of damages showing on cutting edges vary depending on the machining process and the work material, there are various types of coating that control such damages to prolong the tool life. The NTK carbide series offer a wide variety of coated material grades which have been greatly improved in their resistance characteristics, including wear, fracture, deposition, oxidation and the likes, by the original technologies developed by the company.

[Types, applications and features of tool materials]

	Material code name / Appearance	Applications / Features	Physical properties**						Applications and ceramic property map
			Density g/cm ³	Hardness HRA	Transverse intensity MPa	Young's modulus GPa	Thermal expansion coefficient X10 ⁻⁶ /K	Thermal conductivity W/m·K	
PVD coating	TM4  Micro-grain carbide + Thin film TiN-TiCN coat	<ul style="list-style-type: none"> Machining of stainless steel and steel (Excels in deposition resistance and sharp cutting, with focus on wear resistance) 	14.4	91.0	3000	580	5.8	63	
	ZM3  Micro-grain carbide + Thick film TiN coat	<ul style="list-style-type: none"> Machining of soft steel and stainless steel (free cutting type) (Focus on deposition resistance) 	14.4	91.0	3000	580	5.8	63	
	QM3  Micro-grain carbide + Thick film TiCN coat	<ul style="list-style-type: none"> Machining of stainless steel and steel (For interrupted machining) (Focus on wear and fracture resistance) 	14.4	91.0	3000	580	5.8	63	
	VM1  Micro-grain carbide + Thin film TiCN coat	<ul style="list-style-type: none"> Machining of free cutting type steel (For high precision machining, with sharp cutting edge) 	14.8	92.0	2500	640	5.7	84	
	DT4  Thin film TiAlN coat	<ul style="list-style-type: none"> Micro-grain carbide + Thin film TiAlN coat Machining of stainless steel (hard-to-cut type) (Focus on oxidation and deposition resistance with sharp cutting edge) 	14.4	91.0	3000	580	5.8	63	
	DM4  Thick film TiAlN coat	<ul style="list-style-type: none"> Micro-grain carbide + Thick film TiAlN coat Machining of stainless steel (hard-to-cut type) (Focus on oxidation, deposition and wear resistance) 	14.4	91.0	3000	580	5.8	63	
Non-coat	KM1  Micro-grain carbide	<ul style="list-style-type: none"> Machining of nonferrous metals such as aluminum and brass, and non-metal materials 	14.8	92.0	2500	640	5.7	84	
CVD coating	CP1  Carbide + Thick film Al ₂ O ₃ -TiCN coat	<ul style="list-style-type: none"> High-speed machining of cast iron and ductile cast iron 	14.9	92.0	2400	640	—	—	
	CP7  Carbide + Thick film Al ₂ O ₃ -TiCN coat	<ul style="list-style-type: none"> Roughing and semi-finishing of steel 	13.8	90.1	2200	580	—	—	

**For products with coating, the values of the base material are indicated.

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DT4/DM4

Challenge Hard-to-cut materials !

● For ultra-precision machining DT4



● For high efficient machining DM4



Features

- For longer tool life, high efficiency and high precision when machining of hard-to-cut materials
- DT4...Thin coating with excellent oxidation resistance
Superior sharp cutting edge
- DM4...Thick coating with both superior oxidation and wear resistance
Excellent adhesion resistance offers stable machining



[Actual machining examples]

Machining of automotive part	
Work material : S20C	
Cutting speed (m/min)=180	
Feed rate (mm/rev)=0.05	
Depth of cut (mm)=~0.15	
Cutting oil : WET	
NTK : DT4	1,000 pcs./corner
Competitor's TiAlN coated carbide	500 pcs./corner
DT4 achieved twice longer tool life and better surface finish than competitor's product.	

Machining of housing part	
Work material : S15C	
Cutting speed (m/min)=180	
Feed rate (mm/rev)=0.02	
Depth of cut (mm)=~1.0	
Cutting oil : WET	
NTK : DM4	4,500 pcs./corner
Competitor's coated carbide	1,500 pcs./corner
DM4 achieved much longer tool life than competitor's product as well as burr-free.	

TM1/TM4

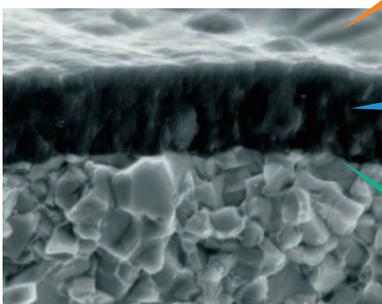
The standard for the next generation of material grades for inserts on automatic lathes !



Features

- Produce excellent machined surfaces by deposition-resistant coating
- Stable machining with coatings that firmly adhere to the base material
- Superior cutting performance for machining of hard-to-cut materials such as stainless steel

● Structure of the coat



Excellent deposition resistance

Hard layer excels in deposition resistance.

Excellent wear resistance

Hard layer highly resistant to wear is used as the middle layer

Excellent adhesion

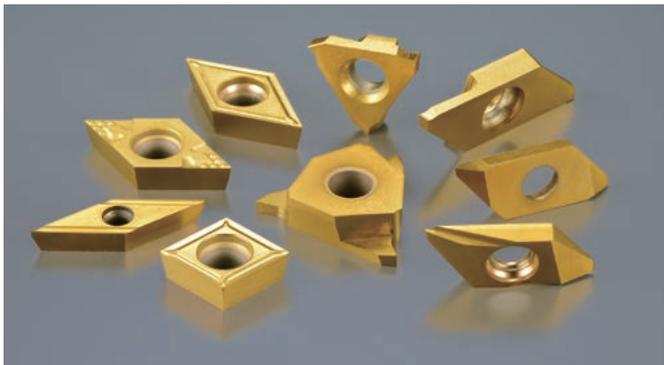
Hard layer excels in adhesion, used as the top surface of the base material

[Actual machining example]

Machining of automotive part	
Work material : SUS304	
Cutting speed (m/min)=80	
Feed rate (mm/rev)=0.02	
Depth of cut (mm)=~1.2	
Cutting oil : WET	
NTK : TM4	950 pcs./corner
Competitor's PVD product	500 pcs./corner
TM4 produced 1.9 times the tool life of the competitor's product, making the insert stable for longer due to its remarkable fracture resistance.	

ZM3

The best selling grade for automatic lathes !



[Actual machining examples]

Machining of electronic components	
Work material : SUS304	
Cutting speed (m/min)=100	
Feed rate (mm /rev)=0.02	
Depth of cut (mm)=0.2	
Cutting oil : WET	
NTK : ZM3	1,300 pcs./corner
Competitor's PVD coated carbide	1,000 pcs./corner
ZM3 grade inserts was able to keep the required surface finish for 1.3 times longer. The deposition resistance allows for longer tool life.	

Features

- Exhibits outstanding deposition resistance and cutting performance due to the company's original TiN coating
- Stabilizes machining dimensions thanks to the coating firmly adhering to the base material
- A wide range of cutting tools in various types available for automatic lathes

Case machining	
Work material : S10C	
Cutting speed (m/min)=100	
Feed rate (mm /rev)=0.12	
Depth of cut (mm)=0.3 ~ 0.4	
Cutting oil : WET	
NTK : ZM3	6,000 or more pcs./corner
Competitor's PVD coated carbide	150 pcs./corner
ZM3 gave stable dimensions with the outstanding deposition resistance and the tool life was 40 times longer than the competitor's product.	

QM3

Superb wear resistance and fracture resistance for interrupted machining !



[Actual machining examples]

Flange machining	
Work material : S50C	
Cutting speed (m/min)=156	
Feed rate (mm /rev)=0.33	
Depth of cut (mm)=1.5	
Cutting oil : WET	
NTK : QM3	120 pcs./corner
Competitor's CVD coated carbide	45 pcs./corner
QM3 with the Z5 chipbreaker produced 2.5 times longer life than the competitor's conventional product which also struggled for repeatability.	

Features

- Highly resistant to fracture thanks to the good combination of tough and strong base material + special TiCN coating
- Resistant to mechanical wear, exhibiting high wear resistance especially in low-speed range
- Stable for interrupted machining of steel

Spindle machining	
Work material : SCM435	
Cutting speed (m/min)=100	
Feed rate (mm /rev)=0.03	
Depth of cut (mm)=~0.2	
Cutting oil : WET	
NTK : QM3	600 pcs./corner
Competitor's PVD coated carbide	300 pcs./corner
QM3 achieved stable surface finish and component dimensions, with the life twice as long as the competitor's product. The wear resistance of the QM3 was excellent.	

VM1 High-accuracy machining of small-diameters !



[Actual machining examples]

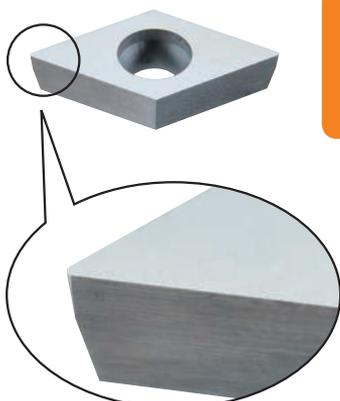
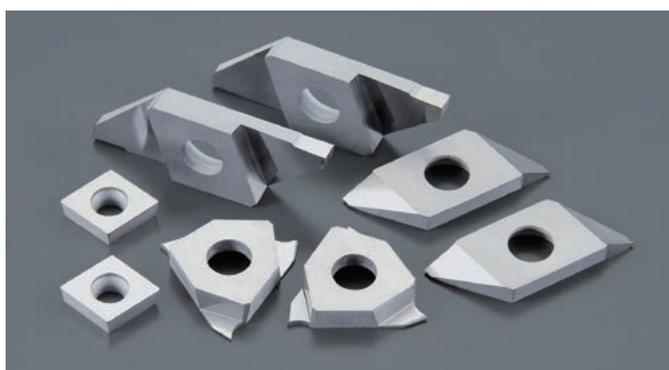
Machining of electronic component	
Work material : SF20T	
Cutting speed (m/min) = 400	
Feed rate (mm/rev) = 0.01	
Depth of cut (mm) = 0.1	
Machining length (mm) = 15	
Cutting oil : WET	
NTK : VM1	600 pcs./corner
Competitor's PVD coated carbide	100 pcs./corner
VM1 continued to exhibit outstanding dimensional stability even after machining 600 pieces.	

Features

- Offers the advantages of both wear resistance and remarkable cutting performance with the thin film TiCN coating
- The recommended material grade for machining of free cutting steels (SUM materials)
- For high-precision machining with longer tool life even in the high-speed machining range

Plug machining	
Work material : SUM24L	
Cutting speed (m/min) = 140	
Feed rate (mm/rev) = 0.015	
Depth of cut (mm) = 0.1	
Cutting oil : WET	
NTK : VM1	
Competitor's PVD coated carbide	150 pcs./corner
VM1 produced 5 times longer tool life than the competitor's product, giving stable surface finish and machining dimensions.	

KM1 Longer tool life even for machining of hard-to-cut materials !



Suitable for machining of aluminum, brass and resins

- Sharp edge
- Mirror-like honing

Features

- Allows very sharp cutting edges with non-coated micro-grain carbide
- Exhibits excellent deposition resistance because of mirror-like honed surface.
- A wide range of cutting tools in various types available for automatic lathes

[Actual machining examples]

Spool machining	
Work material : A5056	
Cutting speed (m/min) = 90~170	
Feed rate (mm/rev) = 0.04	
Depth of cut (mm) = 0.5~5.0	
Cutting oil : WET	
NTK : KM1	
Competitor's PVD coated carbide	200 pcs.
With the competitor's product, finishing was carried out after 3 rough grooving operations, often resulting in insert fracture caused by chip jamming. In this case, more than 3 minutes per cycle was required. By contrast, NTK's KM1 enabled single pass machining, reducing the cycle time to 1 minute and 50 seconds.	

CVD-coated Carbide

CP1 Material grade for roughing of cast iron and ductile cast iron !

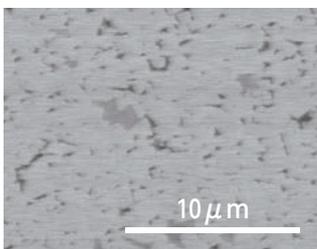


Features

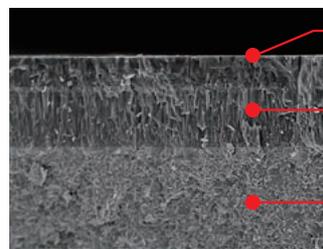
- High wear resistance achieved by laminating thick film TiCN layer and Al₂O₃ layer as the coating; Used for cast iron cutting even in high-speed range
- Excellent deposition resistance due to the company's original insert face treatment to make the mirror finish
- Can be also used for machining of ductile cast iron

● Construction of coating

Photo of structure (COMP) x 5,000



Film structure



Coating of highly smooth micro-grain Al₂O₃
 Coating of micro-grain columnar TiCN
 Base material : ultra-hard carbide

Equivalent to HRA 91.3 Young's modulus : 640 GPa

[Actual machining example]

Machining of motor component • Work material : FCD450

CP1

	Conventional tool Competitor's PVD-coated carbide	NTK CP1
Material		
Cutting speed (m/min)	100	200
Feed rate (mm/rev)	0.12	←
Depth of cut (mm)	1.0	←
Cutting oil	WET	←
Life (pcs./corner)	5	20

CP1 achieved a higher efficiency than the competitor's insert.

CP7 For roughing at high speed in steel machining !



Features

- High wear resistance and fracture resistance achieved by multi-layer coating of the base material by CVD method; used for a wide range of cutting conditions
- Recommended for high-speed machining of alloy steel and general steels
- Best for machining of automotive components on automatic lathes

[Actual machining examples]

Machining of automotive component

Work material : SUM24

Cutting speed (m/min)=160

Feed rate (mm/rev)=0.05

Depth of cut=1.5×2pass

Cutting oil : WET

NTK : CP7 3,000 pcs./corner

Competitor's coated carbide 2,000 pcs./corner

CP7 giving good economy and achieved the life set, achieving 1.5 times longer tool life than the competitor's product and allowing for more stable machining.

Finishing of face and outside of small pin

Work material : SUJ2

Cutting speed (m/min)=90

Feed rate (mm/rev)=0.15

Depth of cut (mm)=0.5

Cutting oil : WET

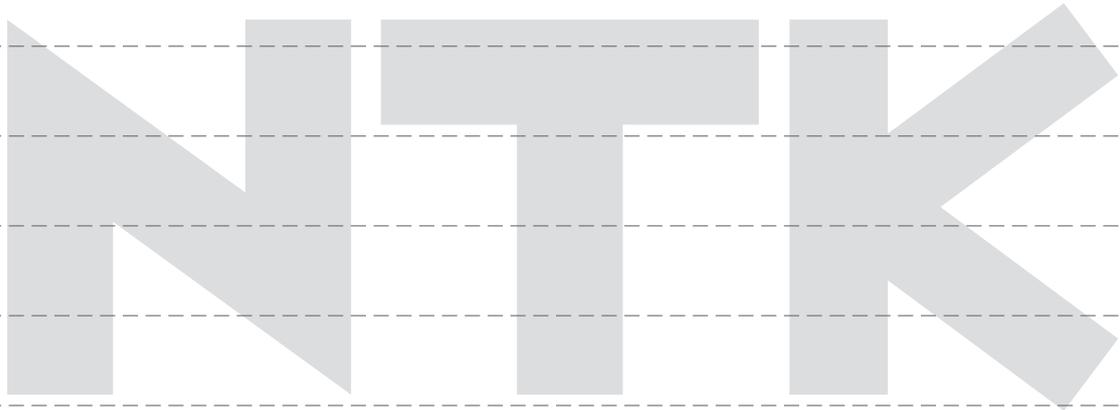
NTK : CP7 10,000 pcs./corner

Competitor's coated carbide 3,500 pcs./corner

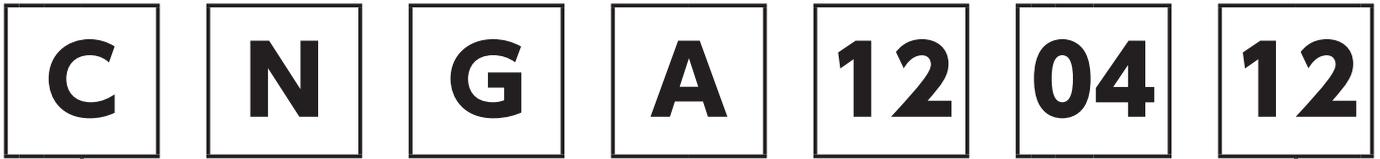
CP7 achieved longer tool life approximately 3 times longer than the competitor's coated carbide product; Used for a wide range of machining conditions.

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Part No. for Ceramic and CBN insert / Specifications of cutting edge treatment



Part No. Designation Code for Inserts → Refer to page B8.

① Codes for major cutting edges

Cutting edge treatment : Chamfering or honing of the cutting edge in order to strengthen the edge or to adjust the cutting performance

	Code	Shape
Sharp edge	F	
Round honing	E	
Angular grinding	T	
Angular grinding + round honing	Z	
	S	
2-step chamfering + round honing	P	

Cutting performance ↑

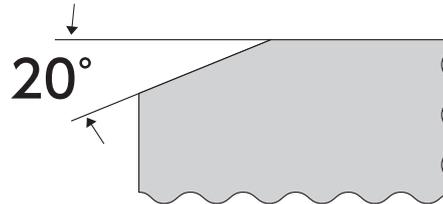
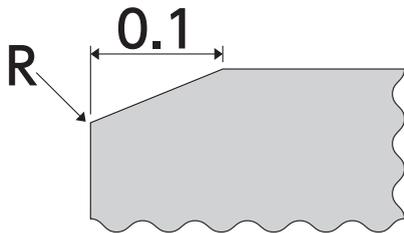
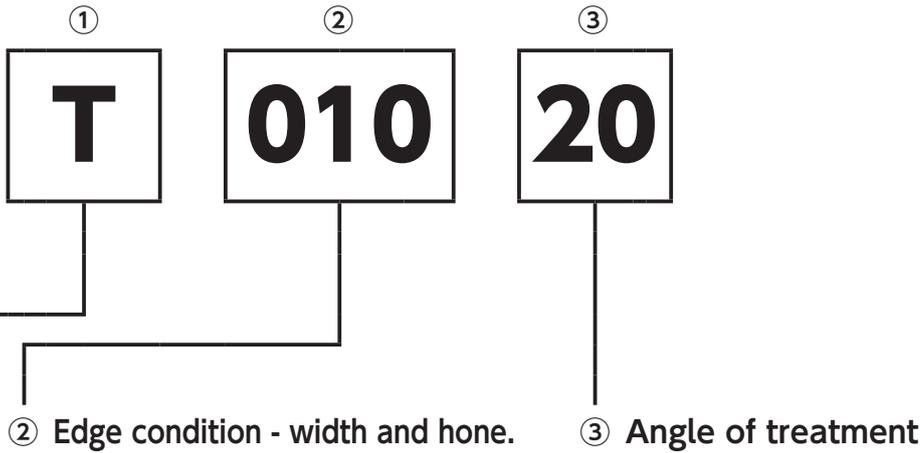
Strength of cutting edge ↓

Negative type

Positive type



For Machining
Mill rolls



Codes for cutting edges and the shapes

Code	Shape of the cutting edge
E002	Round honing with R = 0.02
E004	Round honing with R = 0.04
E007	Round honing with R = 0.07
EX0004	Round honing with R = 0.02
S01015	Chamfering 0.10 mm x 15 deg. + round honing with R = 0.04 (*R0.03)
S01020	Chamfering 0.10 mm x 20 deg. + round honing with R = 0.04 (*R0.03)
S01325	Chamfering 0.13 mm x 25 deg. + round honing with R = 0.04 (*R0.03)
S01535	Chamfering 0.15 mm x 35 deg. + round honing with R = 0.04 (*R0.03)
S02025	Chamfering 0.20 mm x 25 deg. + round honing with R = 0.04 (*R0.03)
T00320	Chamfering 0.03 mm x 20 deg.
T00520	Chamfering 0.05 mm x 20 deg.
T00525	Chamfering 0.05 mm x 25 deg.
T00820	Chamfering 0.08 mm x 20 deg.
T01020	Chamfering 0.10 mm x 20 deg.
T01025	Chamfering 0.10 mm x 25 deg.
T01525	Chamfering 0.15 mm x 25 deg.
T02020	Chamfering 0.20 mm x 20 deg.
T02025	Chamfering 0.20 mm x 25 deg.
Z01015	Chamfering 0.10 mm x 15 deg. + round honing with R = 0.02
Z01025	Chamfering 0.10 mm x 25 deg. + round honing with R = 0.02
Z01030	Chamfering 0.10 mm x 30 deg. + round honing with R = 0.02
Z01520	Chamfering 0.15 mm x 20 deg. + round honing with R = 0.02
Z02025	Chamfering 0.20 mm x 25 deg. + round honing with R = 0.02

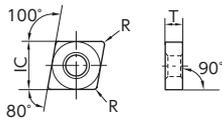
*CBN=R0.03

Ceramic inserts

(80 degree Rhombic Negative type)

Part No.	Inscribed circle	Thickness
CN_1204_	12.7	4.76

Example code	Cutting edge treatment specification
S02025	Chamfering 0.20 mm x 25 deg. + honing R0.04
T01025	Chamfering 0.10 mm x 25 deg.
Z02025	Chamfering 0.20 mm x 25 deg. + honing R0.02



Steel																		
Stainless steel																		
Cast iron	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Nonferrous metal																		
Heat-resistant alloy																		
Hardend material																		

● : First choice
● : Second choice

Shape	Part No.	(Previous Part No.)	Nose Radius	Alumina-based ceramic grade							Silicon nitride-based ceramic grade				Whisker-based ceramic grade		For applicable holder, see pages:	
				HC1	HW2	HC2	HC4	HC6	ZC7	SX6	SX7	SX9	SP9	WA1	WA5			
	CNGA120404S02025	CNGA431-SNF	0.4						●									
	120404T01025	431-TN	0.4						●									
	120404T01525	431-TNE	0.4															
	120404Z02025	431-ZNF	0.4				●											
	120408S02025	432-SNF	0.8						●									
	120408T00520	—	0.8										●				●	
	120408T01020	—	0.8											●			●	
	120408T01025	432-TN	0.8			●		●	●									
	120408T01525	432-TNE	0.8															
	120408T02020	—	0.8							●								
	120408T02025	432-TNF	0.8										●					
	120408Z02025	432-ZNF	0.8				●											
	120412S02025	433-SNF	1.2						●									
	120412T00520	—	1.2										●				●	
	120412T01020	—	1.2											●			●	
	120412T01025	433-TN	1.2	●		●		●	●									
	120412T01525	433-TNE	1.2															
	120412T02020	—	1.2							●								
	120412T02025	433-TNF	1.2										●					
	120416T00520	—	1.6										●				●	
120416T01020	—	1.6											●					
120416T02020	—	1.6							●									
120416T02025	434-TNF	1.6										●						
CNMA120408T02025	CNMA432-TNF	0.8																
120412T02025	433-TNF	1.2																
	CNGA120408WLT01025	CNGA432WL-TN	0.8									●						
Wiper	120412WLT01025	433WL-TN	1.2									●						
	CNGG120408Z01030AG	CNGG432-ZNCGAG	0.8									●						
with chipbreaker	120412Z01030AG	433-ZNCGAG	1.2									●						

G7
G9
L41

G7
L41

G7
G9
L41

● : Standard stock ● : New standard stock ■ : Scheduled to be produced by order

Part No.	Inscribed circle	Thickness
CN_1204	12.7	4.76
CN_1207	12.7	7.94
CN_1607	15.875	7.94

Example code	Cutting edge treatment specification
S02025	Chamfering 0.20 mm x 25 deg. + honing R0.04
T01025	Chamfering 0.10 mm x 25 deg.
Z02025	Chamfering 0.20 mm x 25 deg. + honing R0.02

Shape	Part No.	(Previous Part No.)	Nose Radius	Alumina-based ceramic grade						Silicon nitride-based ceramic grade				Whisker-based ceramic grade	For applicable holder, see pages:			
				HC1	HW2	HC2	HC4	HC6	ZC7	SX6	SX7	SX9	SP9			WA1	WA5	
	CNGN120404T01025	CNGN431-TN	0.4			●		●										
	120408S02025	432-SNF	0.8						●									
	120408T00520	—	0.8									●		●				
	120408T00820	—	0.8												●			
	120408T01020	—	0.8										●	●				
	120408T01025	432-TN	0.8			●		●	●									
	120408T02020	—	0.8							●								
	120408T02025	432-TNF	0.8	●								●		●				
	120408Z02025	432-ZNF	0.8				●											
	120412S02025	433-SNF	1.2							●								
	120412T00520	—	1.2										●		●			
	120412T00820	—	1.2													●		
	120412T01020	—	1.2											●	●			
	120412T01025	433-TN	1.2	●		●		●	●						●			
	120412T02020	—	1.2							●								
	120412T02025	433-TNF	1.2	●									●		●			
	120412Z02025	433-ZNF	1.2				●											
	120416T00520	—	1.6												●			
	120416T02020	—	1.6							●								
	120416T01020	—	1.6											●				
	120416T02025	434-TNF	1.6										●					
	120420T01025	435-TN	2.0						●									
	CNMN120412T02025	CNMN433-TNF	1.2															
	120416T02025	434-TNF	1.6															
CNGN120708T00520	—	0.8												●				
120708T02025	CNGN452-TN	0.8			●													
120712T02025	453-TN	1.2			●													
CNGN160716T00520	—	1.6												●				
	CNGX120712T02025	—	1.2										●				G7	
	120716T02025	—	1.6										●				L41	

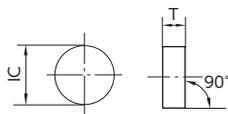
● : Standard stock ● : New standard stock ■ : Scheduled to be produced by order

New Products
Tool Materials / Selection Guide
PCD, CBN and ceramic
Carbide / PVD-coated Carbide
Micro-grain Carbide, Carbide
Insert Stock List
Outside Machining Toolholders
SS
Grooving Tools
Threading Tools
Shaper
Internal Machining tool range
Original Tools for Various Applications
Indexable End Milling Tools
Indexable Drill Inserts
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<Round Negative type>

Part No.	Inscribed circle	Thickness
RN_1204	12.7	4.76
RN_1207	12.7	7.94
RN_1507	15.875	7.94
RN_1907	19.05	7.94
RN_2507	25.4	7.94

Example code	Cutting edge treatment specification
E007	Honing R0.07
S02025	Chamfering 0.20 mm x 25 deg. + honing R0.04
T01025	Chamfering 0.10 mm x 25 deg.
Z02025	Chamfering 0.20 mm x 25 deg. + honing R0.02



Material	Alumina-based ceramic grade	Silicon nitride-based ceramic grade	Whisker-based ceramic grade	Legend
Steel				● : First choice ● : Second choice
Stainless steel				
Cast iron	●	●	●	
Nonferrous metal				
Heat-resistant alloy				
Hardend material	●	●	●	

Shape	Part No.	(Previous Part No.)	Nose Radius	Alumina-based ceramic grade						Silicon nitride-based ceramic grade				Whisker-based ceramic grade	For applicable holder, see pages:		
				HC1	HW2	HC2	HC4	HC6	ZC7	SX6	SX7	SX9	SP9	WA1		WA5	
	RNGN120400S02025	RNGN430-SNF	—						●							G14 P28	
	120400T00520	—	—											●			
	120400T00820	—	—												●		
	120400T00525	430-TNB	—									●		●			
	120400T01020	—	—									●		●			
	120400T01025	430-TN	—			●			●								
	120400T02020	—	—						●								
	120400T02025	430-TNF	—									●					
	120400Z02025	430-ZNF	—				●										
	RNGN120700E002	—	—	—									●				
	120700E004	—	—	—								●					
	120700E007	RNGN450-ENC	—			●											
	120700S02025	450-SNF	—						●								
	120700T00520	—	—									●		●			
	120700T00525	450-TNB	—									●		●			
	120700T00820	—	—								●				●		
	120700T01020	—	—											●			
	120700T02025	450-TN	—			●			●								
	120700Z01520	—	—											●			
	120700Z02025	450-ZNF	—				●										
	RNGN150700T00520	—	—	—								●				—	
	150700T00525	RNGN550-TNB	—									●		●			
	150700T00820	—	—												●		
	RNGN190700T00520	—	—	—								●					
	190700T00525	RNGN650-TNB	—									●					
	190700T00820	—	—												●		
	190700T01020	—	—											●			
	RNGN250700T00520	—	—	—								●		●			
250700T00820	—	—	—											●			

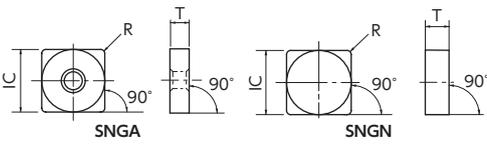
● : Standard stock ● : New standard stock ■ : Scheduled to be produced by order

Ceramic inserts

Part No.	Inscribed circle	Thickness
SN 0903	9.525	3.18
SN 0904	9.525	4.76
SN 1204	12.7	4.76
SN 1207	12.7	7.94

Part No.	Inscribed circle	Thickness
SN 1507	15.875	7.94
SN 1906	19.05	6.35
SN 1907	19.05	7.94

<90 degree Square Negative type>



Material	Alumina-based ceramic grade	Silicon nitride-based ceramic grade	Whisker-based ceramic grade
Steel			
Stainless steel			
Cast iron	●	●	●
Nonferrous metal	●	●	●
Heat-resistant alloy	●	●	●
Hardend material	●	●	●

● : First choice
● : Second choice

Shape	Part No.	(Previous Part No.)	Nose Radius	Alumina-based ceramic grade						Silicon nitride-based ceramic grade				Whisker-based ceramic grade		For applicable holder, see pages:	
				HC1	HW2	HC2	HC4	HC6	ZC7	SX6	SX7	SX9	SP9	WA1	WA5		
	SNGA120408S02025	SNGA432-SNF	0.8														G17 G19 L43
	120408T01025	432-TN	0.8							●							
	120408T01525	432-TNE	0.8														
	120408T02020	—	0.8								●						
	120408T02025	432-TNF	0.8														
	120412S02025	433-SNF	1.2							●							
	120412T01020	—	1.2														
	120412T01025	433-TN	1.2							●							
	120412T01525	433-TNE	1.2														
	120412T02020	—	1.2								●						
	120412T02025	433-TNF	1.2														
	120416T02020	—	1.6								●						
	120416T02025	434-TNF	1.6														
	SNMA120408T02025	SNMA432-TNF	0.8														
120412T02025	433-TNF	1.2															
	SNGN090308T01025	SNGN322-TN	0.8			●											G17 G19 G21 L43 P23
	090316T01025	324-TN	1.6	●		●											
	SNGN090408T01025	SNGN332-TN	0.8			●											
	SNGN120404T01025	SNGN431-TN	0.4			●											
	120408S02025	432-SNF	0.8							●							
	120408T00520	—	0.8											●			
	120408T00820	—	0.8												●		
	120408T01020	—	0.8											●			
	120408T01025	432-TN	0.8	●		●		●	●					●			
	120408T02020	—	0.8								●						
	120408T02025	432-TNF	0.8									●					
	120408Z02025	432-ZNF	0.8				●										
	120412S02025	433-SNF	1.2							●							
	120412T00520	—	1.2											●			
120412T00820	—	—												●			
120412T01020	—	1.2										●	●				

● : Standard stock ● : New standard stock ■ : Scheduled to be produced by order

Example code	Cutting edge treatment specification
S02025	Chamfering 0.20 mm x 25 deg. + honing R0.04
T01025	Chamfering 0.10 mm x 25 deg.
Z02025	Chamfering 0.20 mm x 25 deg. + honing R0.02

Shape	Part No.	(Previous Part No.)	Nose Radius	Alumina-based ceramic grade							Silicon nitride-based ceramic grade				Whisker-based ceramic grade		For applicable holder, see pages:	
				HC1	HW2	HC2	HC4	HC6	ZC7	SX6	SX7	SX9	SP9	WA1	WA5			
	SNGN120412T01025	SNGN433-TN	1.2	●		●		●	●							●		G17 G19 G21 L43 P23
	120412T02020	—	1.2							●					●			
	120412T02025	433-TNF	1.2									●						
	120412Z02025	433-ZNF	1.2				●											
	120416S02025	434-SNF	1.6						●									
	120416T00520	—	1.6												●			
	120416T01020	—	1.6											●	●			
	120416T01025	434-TN	1.6	●		●		●	●						●			
	120416T02020	—	1.6							●								
	120416T02025	434-TNF	1.6									●						
	120416Z02025	434-ZNF	1.6				●											
	120420T01025	435-TN	2			●		●										
	120420T01020	—	2											●				
	120420T02020	—	2							●								
	120420T02025	435-TNF	2	●											●			
	120424T01025	436-TN	2.4			●												
	120424T02020	—	2.4							●								
	120424T02025	436-TNF	2.4															
	SNMN120412T02025	SNMN433-TNF	1.2															
	120420T02025	435-TNF	2															
	SNGN120708T02025	SNGN452-TN	0.8	●		●												
	120712S02025	453-SNF	1.2			●												
	120712T02025	453-TN	1.2			●												
	120716T02025	454-TN	1.6		●													
SNMN120720S02025	SNMN455-SNF	2	■															
SNGN150716T02025	SNGN554-TN	1.6												●				
SNGN190616T00525	SNGN644-TNB	1.6										●						
SNGN190724T00525	SNGN656-TNB	2.4										●						
190724T02020	—	2.4												■				
	SNGX120712T02025	—	1.2											●		G17 L43		
	120716T02025	—	1.6											●				

● : Standard stock ● : New standard stock ■ : Scheduled to be produced by order

New Products
 Tool Materials / Selection Guide
 PCD, CBN and ceramic
 Cermet
 Micro-grain Carbide, Carbide
 Insert Stock List
 Outside Machining Toolholders
 SS
 Grooving Tools
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 Shaper
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Ceramic inserts

<60 degree Triangle Negative type>

Part No.	Inscribed circle	Thickness
TN_1103	6.35	3.18
TN_1603	9.525	3.18
TN_1604	9.525	4.76

Part No.	Inscribed circle	Thickness
TN_1607	9.525	7.94
TN_2204	12.7	4.76
TN_2207	12.7	7.94

Shape	Part No.	(Previous Part No.)	Nose Radius	Alumina-based ceramic grade							Silicon nitride-based ceramic grade				Whisker-based ceramic grade		For applicable holder, see pages:	
				HC1	HW2	HC2	HC4	HC6	ZC7	SX6	SX7	SX9	SP9	WA1	WA5			
	TNGA160404S02025	TNGA331-SNF	0.4						●									G23 G25 H31
	160404T01025	331-TN	0.4						●									
	160404T01525	331-TNE	0.4															
	160404Z02025	331-ZNF	0.4				●											
	160408S02025	332-SNF	0.8						●									
	160408T01025	332-TN	0.8		●			●	●									
	160408T01525	332-TNE	0.8															
	160408T02020	—	0.8							●								
	160408T02025	332-TNF	0.8									●						
	160408Z02025	332-ZNF	0.8				●											
	160412S02025	333-SNF	1.2						●									
	160412T01025	333-TN	1.2			●		●	●									
	160412T01525	333-TNE	1.2															
	160412T02020	—	1.2							●								
	160412T02025	333-TNF	1.2									●						
160416T02025	334-TNF	1.6									●							
TNMA160408T02025	TNMA332-TNF	0.8																
	TNGN110308T00525	TNGN222-TN	0.8			●												G23 G24 G25
	TNGN160304T01025	TNGN321-TN	0.4			●												
	TNGN160404T01025	TNGN331-TN	0.4			●												
	160404Z02025	331-ZNF	0.4				●											
	160408S02025	332-SNF	0.8						●									
	160408T00820	—	0.8													●		
	160408T01020	—	0.8										●		●			
	160408T01025	332-TN	0.8	●		●		●	●						●			
	160408T02020	—	0.8							●								
	160408T02025	332-TNF	0.8									●						
	160408Z02025	332-ZNF	0.8				●											
	160412S02025	333-SNF	0.8						●									
	160412T00820	—	1.2													●		
	160412T01020	—	1.2										●					
	160412T01025	333-TN	1.2	●		●		●	●						●			
160412T02020	—	1.2							●									
160412T02025	333-TNF	1.2									●							
160412Z02025	333-ZNF	1.2				●												

● : Standard stock ● : New standard stock ■ : Scheduled to be produced by order

Negative type

Positive type

G

D

F

R

S

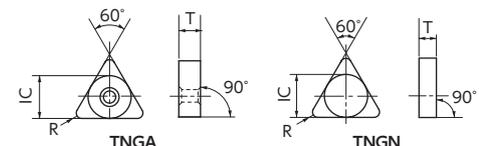
T

V

W

For Machining Mill tools

Example code	Cutting edge treatment specification
S02025	Chamfering 0.20 mm x 25 deg. + honing R0.04
T01025	Chamfering 0.10 mm x 25 deg.
Z02025	Chamfering 0.20 mm x 25 deg. + honing R0.02

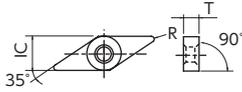
Shape	Part No.	(Previous Part No.)	Nose Radius	Alumina-based ceramic grade							Silicon nitride-based ceramic grade				Whisker-based ceramic grade	For applicable holder, see pages:
				HC1	HW2	HC2	HC4	HC6	ZC7	SX6	SX7	SX9	SP9	WA1	WA5	
	TNGN160416T01020	—	1.6													G23 G24 G25
	160416T01025	TNGN334-TN	1.6	●	●	●										
	160416T02020	—	1.6						●							
	160416T02025	334-TNF	1.6							●						
	160420T01025	335-TN	1.6	●		●										
	160420T02020	—	2						●							
	160420T02025	335-TNF	2													
	TNGN160708T02025	TNGN352-TN	0.8			●										
	160712T02025	353-TN	1.2			●										
	TNGN220408T00520	—	0.8											■		
	220416T00520	—	1.6											●		
	TNGN220716T00520	—	1.6											●		
TNMN160412T02025	TNMN333-TNF	1.2														
 with chipbreaker	TNGG160408Z01030AG	TNGG332-ZNCGAG	0.8						●						G23 G25 H31	
	160412Z01030AG	333-ZNCGAG	1.2						●							

● : Standard stock ● : New standard stock ■ : Scheduled to be produced by order

- New Products
- Tool Materials / Selection Guide
- PCD, CBN and ceramic
- Carbide / Carbide / PVD-coated Carbide
- Micro-grain Carbide
- Insert Stock List
- Outside Machining Toolholders
- SS
- Grooving Tools
- Threading Tools
- Shaper
- Internal Machining tool range
- Original Tools for Various Applications
- Indexable End Milling Tools
- Indexable Drill Inserts
- Milling Cutters
- Technical Data
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Ceramic inserts

<35 degree Rhombic Negative type>



Part No.	Inscribed circle	Thickness
VN_1604_	9.525	4.76
VN_2204_	12.7	4.76

Example code	Cutting edge treatment specification
S02025	Chamfering 0.20 mm x 25 deg. + honing R0.04
T01025	Chamfering 0.10 mm x 25 deg.
Z02025	Chamfering 0.20 mm x 25 deg. + honing R0.02

	Steel	Stainless steel	Cast iron	Nonferrous metal	Heat-resistant alloy	Hardend material																
			●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●

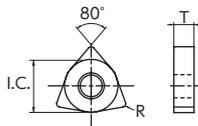
● : First choice
● : Second choice

Shape	Part No.	(Previous Part No.)	Nose Radius	Alumina-based ceramic grade							Silicon nitride-based ceramic grade				Whisker-based ceramic grade		For applicable holder, see pages:							
				HC1	HW2	HC2	HC4	HC6	ZC7	SX6	SX7	SX9	SP9	WA1	WA5									
	VNGA160404S02025	VNGA331-SNF	0.4							●														
	160404T01020	—	0.4								●													
	160404T01025	331-TN	0.4			●			●	●														
	160404T01525	331-TNE	0.4																					
	160404Z02025	331-ZNF	0.4				●																	
	160408S02025	332-SNF	0.8							●														
	160408T00520	—	0.8								●													
	160408T01020	—	0.8									●												
	160408T01025	332-TN	0.8			●			●	●														
	160408T01525	332-TNE	0.8																					
	160408Z02025	332-ZNF	0.8				●																	
	160412S02025	333-SNF	1.2							●														
	160412T01020	—	1.2								●													
	160412T01025	333-TN	1.2							●														
	160412T01525	333-TNE	1.2																					
	160412T02025	333-TNF	1.2																					
	160412Z02025	333-ZNF	1.2				●																	
VNMA160412T02025	VNMA333-TNF	1.2																						
VNGA220424T01020	—	2.4																						

G27

● : Standard stock ● : New standard stock ■ : Scheduled to be produced by order

<80 degree Hexagon Negative type>



Part No.	Inscribed circle	Thickness
WN_0804_	12.7	4.76

Example code	Cutting edge treatment specification
T00520	Chamfering 0.05 mm x 20 deg.

	Steel	Stainless steel	Cast iron	Nonferrous metal	Heat-resistant alloy	Hardend material																	
			●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●

● : First choice
● : Second choice

Shape	Part No.	(Previous Part No.)	Nose Radius	Alumina-based ceramic grade							Silicon nitride-based ceramic grade				Whisker-based ceramic grade		For applicable holder, see pages:								
				HC1	HW2	HC2	HC4	HC6	ZC7	SX6	SX7	SX9	SP9	WA1	WA5										
	WNGA080408T00520	—	0.8																						
	080408T01020	—	0.8																						
	080408T02020	—	0.8																						
	080408T02025	WNGA432-TNF	0.8																						
	080412T00520	—	1.2																						
	080412T01020	—	1.2																						
	080412T02020	—	1.2																						
	080412T02025	433-TNF	1.2																						
	080416T02020	—	1.6																						
	080416T02025	434-TNF	1.6																						

G28
L44

● : Standard stock ● : New standard stock ■ : Scheduled to be produced by order

<Round Positive type>

Part No.	Inscribed circle	Thickness	Relief angle
RP_0602_	6.35	2.38	11°
RP_0903_	9.525	3.18	11°
RP_1204_	12.70	4.76	11°

Example code	Cutting edge treatment specification
T00520	Chamfering 0.05 mm x 20 deg.

Shape	Part No.	(Previous Part No.)	Nose Radius	Alumina-based ceramic grade							Silicon nitride-based ceramic grade				Whisker-based ceramic grade		For applicable holder, see pages:	
				HC1	HW2	HC2	HC4	HC6	ZC7	SX6	SX7	SX9	SP9	WA1	WA5			
	RPGN060200T00520	—	—														●	P28 P29
	RPGN090300T00520	—	—														●	
	RPGN120400E004	—	—									●						
	120400EX0004	—	—										●					
	120400T00520	—	—														●	
	120400T00525	RPGN430-TNB	—	—										●				
	120400T00820	—	—	—									●					
	120400T01020	—	—	—										●			●	

● : Standard stock ● : New standard stock ■ : Scheduled to be produced by order

<90 degree Square Positive type>

Part No.	Inscribed circle	Thickness	Relief angle
SP_0903_	9.525	3.18	11°
SP_1203_	12.7	3.18	11°
SP_1204_	12.7	4.76	11°

Example code	Cutting edge treatment specification
T01025	Chamfering 0.10 mm x 25 deg.

Shape	Part No.	(Previous Part No.)	Nose Radius	Alumina-based ceramic grade							Silicon nitride-based ceramic grade				Whisker-based ceramic grade		For applicable holder, see pages:	
				HC1	HW2	HC2	HC4	HC6	ZC7	SX6	SX7	SX9	SP9	WA1	WA5			
	SPGN090308T01025	SPGN322-TN	0.8			●												—
	SPGN120308T01025	SPGN422-TN	0.8			●												
	SPGN120408T01025	SPGN432-TN	0.8			●												
	120412T01025	433-TN	1.2			●												

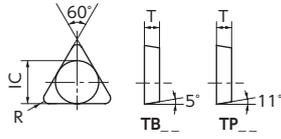
● : Standard stock ● : New standard stock ■ : Scheduled to be produced by order

Ceramic inserts

Part No.	Inscribed circle	Thickness	Relief angle
TB_0601_	3.97	1.59	5°
TP_0902_	5.56	2.38	11°
TP_1103_	6.35	3.18	11°
TP_1603_	9.525	3.18	11°
TP_2204_	12.7	4.76	11°

Example code	Cutting edge treatment specification
T01025	Chamfering 0.10 mm x 25 deg.
Z02025	Chamfering 0.20 mm x 25 deg. + honing R0.02

<60 degree Triangle Positive type>



Material	Steel	Stainless steel	Cast iron	Nonferrous metal	Heat-resistant alloy	Hardend material
● : First choice						
● : Second choice						

Shape	Part No.	(Previous Part No.)	Nose Radius	Alumina-based ceramic grade						Silicon nitride-based ceramic grade				Whisker-based ceramic grade		For applicable holder, see pages:
				HC1	HW2	HC2	HC4	HC6	ZC7	SX6	SX7	SX9	SP9	WA1	WA5	
	TBGN060104T00525	TBGE521-TN	0.4			●										—
	060108T00525	522-TN	0.8			●										
	TPGN090204T00525	TPGE731-TN	0.4			●										
	090208T00525	732-TN	0.8			●										
	TPGN110304T00525	TPGN221-TN	0.4			●										
	110304T01025	221-TNC	0.4							●						
	110308T00525	222-TN	0.8			●										
	110308T01025	222-TNC	0.8							●						
	TPGN160304T01025	TPGN321-TN	0.4			●				●						
	160304Z01025	321-ZNC	0.4				●									
	160308T01025	322-TN	0.8			●		●	●							
	160308Z01025	322-ZNC	0.8				●									
	160312T01025	323-TN	1.2		●											
	TPGN220408T01025	TPGN432-TN	0.8													

● : Standard stock ● : New standard stock ■ : Scheduled to be produced by order

Negative type

Positive type



For Machining Mill tools

(For Machining Mill Rolls and Heat-Resistant Alloys) ※For details of insert measurement, please go to page M4 to M5.

				Steel														
				Stainless steel														● : First choice ● : Second choice
				Cast iron	●	●	●	●	●	●	●	●	●	●	●	●	●	
				Nonferrous metal														
				Heat-resistant alloy														
				Hardend material														
Shape	Part No.	(Previous Part No.)	Nose Radius	Alumina-based ceramic grade							Silicon nitride-based ceramic grade				Whisker-based ceramic grade		For applicable holder, see pages:	
				HC1	HW2	HC2	HC4	HC6	ZC7	SX6	SX7	SX9	SP9	WA1	WA5			
	CDH22PN	—	—			●												
	CDH33PN	—	—			●												
	CDH42PN	—	—															
	CDH43PN	—	—															
	CDH53PN	—	—															
	RCGX060400T00520	—	—												●	●		
	RCGX060700T00520	—	—												●	●		
	RCGX0608PN	—	—															
	RCGX090700T00520	—	—										●		●	●		
	090700T01020	—	—												●	●		
	090700T00820	—	—													●		
	RCGX0908PN	—	—				●											
	0908TNB	—	—										●		●	●		
	RCGX120700T00520	—	—												●	●		
	120700T00820	—	—													●		
	120700T01020	—	—													●		
120700Z01520	—	—													●			
RCGX1208PN	—	—				●												
1208TNB	—	—										●		●	●			
	RPGX060400T00520	—	—												●	●		
	RPGX090700T00520	—	—												●	●		
	090700T00820	—	—													●		
	RPGX0908TNB	—	—										●		●	●		
	RPGX120700T00520	—	—												●	●		
	120700T01020	—	—													●		
120700T00820	—	—													●			
RPGX1208TNB	—	—										●		●	●			
	RCGY090603TNB	—	—												●	●		
	RCGY120603TNB	—	—												●	●		
	RBGX16SPN	—	—			●									●	●		
	16SSN2	—	—												●	●		
	16S	—	—															
	RBGX20SPN	—	—			●												
	20SSN3	—	—															
20S	—	—																
RBGX26SPN	—	—			●													
26SSN3	—	—													●	●		
	LNM6688PNX8	—	3.2													●	●	
	6688SN2	—	3.2													●	●	
	6688PN9	—	3.2															
	VGW4125-2EX0001	—	0.8												●	●		
	4125-REX0001	—	fullR												●	●		
	VGW4156-2EX0001	—	0.8												●	●		
	4156-REX0001	—	fullR												●	●		
	VGW4187-2EX0001	—	0.8												●	●		
	4187-REX0001	—	fullR												●	●		
	VGW6250-2EX0001	—	0.8												●	●		
	6250-REX0001	—	fullR												●	●		
VGW8375-2EX0001	—	0.8												●	●			
8375-REX0001	—	fullR												●	●			

● : Standard stock ● : New standard stock ■ : Scheduled to be produced by order

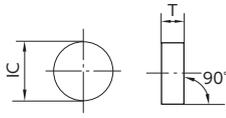
G29
M4

New Products
Tool Materials / Selection Guide
PCD, CBN and ceramic
Cermet
Micro-grain Carbide, Carbide
Insert Stock List
Outside Machining Toolholders
SS
Grooving Tools
Threading Tools
Shaper
Internal machining tool range
Original Tools for Various Applications
Indexable End Milling Tools
Indexable Milling Inserts
Indexable Drill Inserts
Milling Cutters
Technical Data
Index

<Round Negative type>

Grade	Code	Cutting edge treatment specification
B 23	S01020	Chamfering 0.10 mm x 20 deg. + round honing R0.03
B 30	T01020	Chamfering 0.10 mm x 20 deg.
B6K/B36	S01325	Chamfering 0.13 mm x 25 deg. + round honing R0.03
B 40	S01535	Chamfering 0.15 mm x 35 deg. + round honing R0.03
B5K/B52	S01015	Chamfering 0.10 mm x 15 deg. + round honing R0.03

Part No.	Inscribed circle	Thickness
RN_1203	12.7	3.18
RN_1204	12.7	4.76

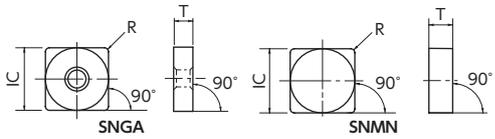


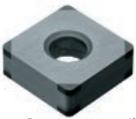
Shape	Part No.	Inch system	Cutting edge spec. code	Nose Radius	Steel										PCD grade	For applicable holder, see pages:
					PVD-coated CBN grade			CBN				PCD grade				
					B16	B5K	B6K	B22	B23	B30	B36	B40	B52	PD1	PD2	
 (top full-face CBN)	RNGN120400S	RNGN430S	Z01015	—						●						G14 P28
 (Solid CBN)	RNMN120300STN	RNMN420STN	T01025	—	●											—
	RNMN120400STN	RNMN430STN	T01025	—	●											G14 P28

● : Standard stock ● : New standard stock

<90 degree Square Negative type>

Part No.	Inscribed circle	Thickness
SN_0903	9.525	3.18
SN_1203	12.7	3.18
SN_1204	12.7	4.76



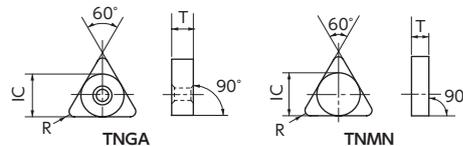
Shape	Part No.	Inch system	Cutting edge spec. code	Nose Radius	Steel										PCD grade	For applicable holder, see pages:
					PVD-coated CBN grade			CBN				PCD grade				
					B16	B5K	B6K	B22	B23	B30	B36	B40	B52	PD1	PD2	
 8 corners available	SNGA120404PE	—	S01535	0.4												G17 G19 L43
	120404PE	—	T01020	0.4						●						
	SNGA120408PE	—	S01015	0.8						●			●			
	120408PE	SNGA432PE	S01325	0.8						●						
	120408PE	—	S01535	0.8								●				
	SNGA120412PE	—	S01015	1.2										●		
	120412PE	—	S01020	1.2						●						
	120412PE	—	S01535	1.2									●			
	120412PE	—	T01020	1.2							●					
	SNMA120412PE	SNMA433PE	S01325	1.2							●					
 (Solid CBN)	SNMN090308STNB	SNMN322STNB	T00525	0.8	●											G17 G19 G21 L43 P23
	090312STN	323STN	T01025	1.2	●											
	SNMN120308STN	SNMN422STN	T01025	0.8	●											
	120312STN	423STN	T01025	1.2	●											
	SNMN120408STN	SNMN432STN	T01025	0.8	●											
	120412STNF	433STNF	T02025	1.2	●											

● : Standard stock ● : New standard stock ★ : Standard stock (Specified)

<60 degree Triangle Negative type>

Grade	Code	Cutting edge treatment specification
B 23	S01020	Chamfering 0.10 mm x 20 deg. + round honing R0.03
B 30	T01020	Chamfering 0.10 mm x 20 deg.
B6K/B36	S01325	Chamfering 0.13 mm x 25 deg. + round honing R0.03
B 40	S01535	Chamfering 0.15 mm x 35 deg. + round honing R0.03
B5K/B52	S01015	Chamfering 0.10 mm x 15 deg. + round honing R0.03

Part No.	Inscribed circle	Thickness
TN_1103_	6.35	3.18
TN_1604_	9.525	4.76

Shape	Part No.	Inch system	Cutting edge spec. code	Nose Radius	Steel										PCD grade	For applicable holder, see pages:	
					PVD-coated CBN grade			CBN				PCD grade					
					B16	B5K	B6K	B22	B23	B30	B36	B40	B52	PD1	PD2		
					Stainless steel Cast iron Nonferrous metal Heat-resistant alloy Hardend material												
																	
																	
 6 corners available	TNGA160401PH	—	S01015	0.1													
	160402PH	—	S01015	0.2													
	160402PH	—	S01535	0.2													
	160402S01015	—	S01015	0.2	●												
	16040PTFNX※	—	Sharp edge	0.4						★							
	160404PH	—	S01015	0.4													
	160404PH	TNGA331PH	S01325	0.4													
	160404PH	—	S01535	0.4													
	160404PH	—	T01020	0.4													
	160404S01015	—	S01015	0.4	●												
	160404S01325	—	S01325	0.4	●												
	160408PTFNX※	—	Sharp edge	0.8						★							
	160408PH	—	S01015	0.8													
	160408PH	—	S01020	0.8													
	160408PH	TNGA332PH	S01325	0.8													
	160408PH	—	S01535	0.8													
	160408PH	—	T01020	0.8													
	160408S01015	—	S01015	0.8	●												
	160408S01325	—	S01325	0.8	●												
	160412PH	—	S01015	1.2													
160412PH	—	S01020	1.2														
160412PH	—	S01535	1.2														
160412PH	—	T01020	1.2														
TNMA160412PH	TNMA333PH	S01325	1.2														
 1 corner available	TNMX160404PF	—	Sharp edge	0.4												●	
	160408PF	—	10°	0.8												●	
 (Solid CBN)	TNMN110312STNC	TNMN223STNC	Chamfering	1.2	●												
	TNMN160408STN	TNMN332STN	0.1×25°	0.8	●												
	160412STNF	333STNF	0.2×25°	1.2	●												

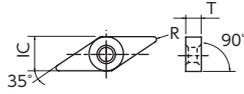
※TNGA160404PTFNX and TNGA160408PTFNX have 3 cutting edges.

● : Standard stock ● : New standard stock ★ : Standard stock (Specified)

<35 degree Rhombic Negative type>

Grade	Code	Cutting edge treatment specification
B 23	S01020	Chamfering 0.10 mm x 20 deg. + round honing R0.03
B 30	T01020	Chamfering 0.10 mm x 20 deg.
B6K/B36	S01325	Chamfering 0.13 mm x 25 deg. + round honing R0.03
B 40	S01535	Chamfering 0.15 mm x 35 deg. + round honing R0.03
B5K/B52	S01015	Chamfering 0.10 mm x 15 deg. + round honing R0.03

Part No.	Inscribed circle	Thickness
VN_1604_	9.525	4.76

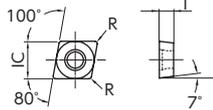


Shape	Part No.	Inch system	Cutting edge spec. code	Nose Radius	Material										For applicable holder, see pages:	
					Steel		Cast iron		Nonferrous metal		Heat-resistant alloy		Hardend material			PCD grade
					Stainless steel	Cast iron	Nonferrous metal	Heat-resistant alloy	Hardend material	PD1	PD2					
					B16	B5K	B6K	B22	B23	B30	B36	B40	B52			
<p>4 corners available</p>	VNGA160402PQ	—	S01535	0.2												
	160404PQ	—	S01015	0.4												
	160404PQ	VNGA331PQ	—	S01325	0.4											
	160404PQ	—	—	S01535	0.4											
	160404PQ	—	—	T01020	0.4											
	160404S01015	—	—	S01015	0.4		●									
	160404S01325	—	—	S01325	0.4			●								
	160408PQ	—	—	S01015	0.8											
	160408PQ	VNGA332PQ	—	S01325	0.8											
	160408PQ	—	—	S01535	0.8											
	160408S01015	—	—	S01015	0.8		●									
	160408S01325	—	—	S01325	0.8			●								
	160412PQ	—	—	S01535	1.2											

● : Standard stock ● : New standard stock

<80 degree Rhombic Positive type>

Part No.	Inscribed circle	Thickness	Relief angle
CC_0602_	6.35	2.38	7°
CC_09T3_	9.525	3.97	7°



Shape	Part No.	Inch system	Cutting edge spec. code	Nose Radius	Material										For applicable holder, see pages:	
					Steel		Cast iron		Nonferrous metal		Heat-resistant alloy		Hardend material			PCD grade
					Stainless steel	Cast iron	Nonferrous metal	Heat-resistant alloy	Hardend material	PD1	PD2					
					B16	B5K	B6K	B22	B23	B30	B36	B40	B52			
<p>2 corners available</p>	CCGW060204PD	—	S01015	0.4												
	CCGW09T302PD	—	S01015	0.2												
	09T302PD	—	S01535	0.2												
	09T304PD	—	S01015	0.4												
	09T304PD	—	—	S01535	0.4											
	09T308PD	—	—	S01015	0.8											
	09T308PD	—	—	S01535	0.8											
<p>1 corner available</p>	CCMW09T301	—	Sharp edge	0.1												
	09T302	—	Sharp edge	0.2												
	09T304	—	Sharp edge	0.4												
	09T308	—	Sharp edge	0.8												
<p>1 corner available</p>	CCMT09T302PF	—	Sharp edge	0.2												
	09T304PF	—	Sharp edge rake angle 10°	0.4												

● : Standard stock ● : New standard stock

Grade	Code	Cutting edge treatment specification
B 23	S01020	Chamfering 0.10 mm x 20 deg. + round honing R0.03
B 30	T01020	Chamfering 0.10 mm x 20 deg.
B6K/B36	S01325	Chamfering 0.13 mm x 25 deg. + round honing R0.03
B 40	S01535	Chamfering 0.15 mm x 35 deg. + round honing R0.03
B5K/B52	S01015	Chamfering 0.10 mm x 15 deg. + round honing R0.03

Part No.	Inscribed circle	Thickness	Relief angle
DC_0702	6.35	2.38	7°
DC_11T3	9.525	3.97	7°

<55 degree Rhombic Positive type>

Shape	Part No.	Inch system	Cutting edge spec. code	Nose Radius	Steel										For applicable holder, see pages:		
					PVD-coated CBN grade			CBN				PCD grade					
					B16	B5K	B6K	B22	B23	B30	B36	B40	B52	PD1	PD2		
 <p>2 corners available</p>	DCGW070202PD	—	S01015	0.2												H13 H19 H21	
	070204PD	—	S01015	0.4													
	070204PD	—	S01535	0.4													
	070208PD	—	S01015	0.8													
	DCGW11T302PD	—	S01015	0.2													
	11T302PD	—	S01535	0.2													
	11T302S01015	—	S01015	0.2	●												
	11T304PD	—	S01015	0.4													
	11T304PD	—	S01535	0.4													
	11T304S01015	—	S01015	0.4	●												
 <p>1 corner available</p>	DCMW11T301	—	Sharp edge	0.1											H13 H19 H21		
	11T302	—	Sharp edge	0.2													
	11T304	—	Sharp edge	0.4													
	11T308	—	Sharp edge	0.8													
 <p>1 corner available</p>	DCMT11T302PF	—	Sharp edge	0.2										●	H13 H19 H21		
	11T304PF	—	Sharp edge rake angle 10°	0.4												●	

● : Standard stock ● : New standard stock

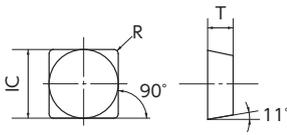
<For Machining Mill Rolls and Heat-Resistant Alloys> *For details of insert measurement, please go to page M5.

Shape	Part No.	Inch system	Cutting edge spec. code	Nose Radius	Steel										For applicable holder, see pages:		
					PVD-coated CBN grade			CBN				PCD grade					
					B16	B5K	B6K	B22	B23	B30	B36	B40	B52	PD1	PD2		
	RBGX16SPN	—		—												H13 H19 H21	
	16SSN2	—		—													
	16S	—		—					●								
	RBGX20SPN	—		—													
	20SSN3	—		—													
	20S	—		—					●								
	RBGX26SPN	—		—												H13 H19 H21	
	26SSN3	—		—													

● : Standard stock ● : New standard stock

<90 degree Square Positive type>

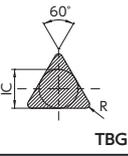
Part No.	Inscribed circle	Thickness	Relief angle
SP_0903_	9.525	3.18	11°

Shape	Part No.	Inch system	Cutting edge spec. code	Nose Radius	PVD-coated CBN grade								PCD grade	For applicable holder, see pages:		
					B16	B5K	B6K	B22	B23	B30	B36	B40			B52	PD1
 4 corners available	SPGN090304PQ	—	S01020	0.4												—
	SPGN090308PQ	—	S01020	0.8												
	090308PQ	—	T01020	0.8												

● : Standard stock ● : New standard stock

<60 degree Triangle Positive type>

Grade	Code	Cutting edge treatment specification	Part No.	Inscribed circle	Thickness	Relief angle
B 23	S01020	Chamfering 0.10 mm x 20 deg. + round honing R0.03	TB_0601_	3.97	1.59	5°
B 30	T01020	Chamfering 0.10 mm x 20 deg.	TP_0902_	5.56	2.38	11°
B6K/B36	S01325	Chamfering 0.13 mm x 25 deg. + round honing R0.03	TP_1103_	6.35	3.18	11°
B 40	S01535	Chamfering 0.15 mm x 35 deg. + round honing R0.03	TP_1603_	9.525	3.18	11°
B5K/B52	S01015	Chamfering 0.10 mm x 15 deg. + round honing R0.03				

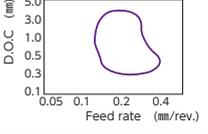
Shape	Part No.	Inch system	Cutting edge spec. code	Nose Radius	PVD-coated CBN grade								PCD grade	For applicable holder, see pages:	
					B16	B5K	B6K	B22	B23	B30	B36	B40			B52
 3 corners available	TBGN060102SSNCD	—	S01015	0.2											—
	060104SSNCD	—	S01015	0.4											
	060108SSNCD	—	S01015	0.8											
 *1 3 corners available	TPGN110304PT	—	S01020	0.4											—
	110308PT	—	S01020	0.8											
	TPGN160304PT	—	S01020	0.4											
	160308PT	—	S01020	0.8											
 3 corners available	TPGW110302PT	—	S01015	0.2											L38 L39 L40
	110304PT	—	S01015	0.4											
	110304PT	—	S01535	0.4											
	110304PT	—	T01515 *2	0.4											
	110308PT	—	S01015	0.8											
	110308PT	—	S01535	0.8											
 1 corner available	TPMT090202PF	—	Sharp edge rake angle 10°	0.2											● : Standard stock ● : New standard stock ★ : Standard stock (Specified)
	090204PF	—		0.4											
	TPMT110302PF	—		0.2											
	110304PF	—		0.4											

*1 Edge preparation of -B40 TPGN type is "S01020 (chamfer 0.10mm x 20° + R0.03)".
 *2 Edge preparation of -B23 TPGW110304PT is "T01515 (chamfer 0.15mm x 15°)".

● : Standard stock ● : New standard stock ★ : Standard stock (Specified)

<80 degree Rhombic Negative type>

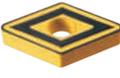
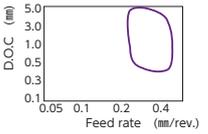
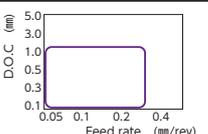
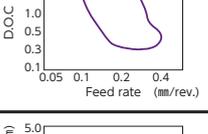
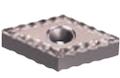
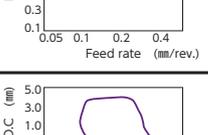
Part No.	Inscribed circle	Thickness
CN_1204	12.7	4.76

Shape	Part No.	Inch system	Nose Radius	Material Compatibility											For applicable holder, see pages:	Chipbreaker applicable range			
				Steel	Stainless steel	Cast iron	Nonferrous metal	Heat-resistant alloy	Hardend material	Cermet grade	PVD cermet grade	PVD-coated micro-grain carbide grade					CoD-coated carbide grade	Carbide grade	
				T15	C7X	N40	Q15	C7Z	ZM3	QM3	VM1	TM4	DT4	DM4	CP1	CP7	KM1		
 ZW1	CNMG120408ENBZW1	CNMG432-ENB-ZW1	0.8	●	●	●	●	●	●	●	●	●	●	●	●	●	●	G7 H32	
	120412ENBZW1	433-ENB-ZW1	1.2	●	●	●	●	●	●	●	●	●	●	●	●	●	●		
 without chipbreaker	CNGA120408TN	CNGA432-TN	0.8	●	●	●	●	●	●	●	●	●	●	●	●	●	G7 H32	—	
	120412TN	433-TN	1.2	●	●	●	●	●	●	●	●	●	●	●	●	●			
	CNMA120408TN	CNMA432-TN	0.8	●	●	●	●	●	●	●	●	●	●	●	●	●			

● : Standard stock ● : New standard stock ■ : Scheduled to be produced by order ★ : Standard stock (Specified)

<55 degree Rhombic Negative type>

Part No.	Inscribed circle	Thickness
DN_1504	12.7	4.76
DN_1506	12.7	6.35

Shape	Part No.	Inch system	Nose Radius	Material Compatibility											For applicable holder, see pages:	Chipbreaker applicable range			
				Steel	Stainless steel	Cast iron	Nonferrous metal	Heat-resistant alloy	Hardend material	Cermet grade	PVD cermet grade	PVD-coated micro-grain carbide grade					CoD-coated carbide grade	Carbide grade	
				T15	C7X	N40	Q15	C7Z	ZM3	QM3	VM1	TM4	DT4	DM4	CP1	CP7	KM1		
 G	DNMG150404G	DNMG431-G	0.4	●	●	●	●	●	●	●	●	●	●	●	●	●	G11 H33		
	150408G	432-G	0.8	●	●	●	●	●	●	●	●	●	●	●	●	●			
	150412G	433-G	1.2	●	●	●	●	●	●	●	●	●	●	●	●	●			
 G	DNMG150404ENBG	DNMG431-ENB-G	0.4	●	●	●	●	●	●	●	●	●	●	●	●	●	G11 H33		
	150404TNG	431-TN--G	0.4	●	●	●	●	●	●	●	●	●	●	●	●	●			
	150408TNG	432-TN--G	0.8	●	●	●	●	●	●	●	●	●	●	●	●	●			
 WM	DNMG150404ENWM	DNMG431-EN--WM	0.4	●	●	●	●	●	●	●	●	●	●	●	●	●	G11 H33		
	150408ENWM	432-EN--WM	0.8	●	●	●	●	●	●	●	●	●	●	●	●	●			
 WR	DNMG150408ENBWR	DNMG432-ENB-WR	0.8	●	●	●	●	●	●	●	●	●	●	●	●	●	G11 H33		
	150412ENBWR	433-ENB-WR	1.2	●	●	●	●	●	●	●	●	●	●	●	●	●			
 WV	DNMG150408ENWV	DNMG432-EN--WV	0.8	●	●	●	●	●	●	●	●	●	●	●	●	●	G11 H33		
 Z5	DNMG150408TNBZ5	DNMG432-TNB-Z5	0.8	●	●	●	●	●	●	●	●	●	●	●	●	●			

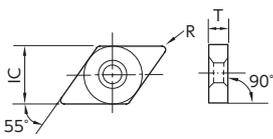
● : Standard stock ● : New standard stock ■ : Scheduled to be produced by order ★ : Standard stock (Specified)

New Products
Tool Materials / Selection Guide
PCD, CBN and ceramic
Cermet
Micro-grain Carbide, Carbide
Insert Stock List
Outside Machining Toolholders
SS
Grooving Tools
Threading Tools
Shaper
Internal Machining tool range
Original Tools for Various Applications
Indexable End Milling Tools
Indexable Drill Inserts
Milling Cutters
Technical Data
Index

Cermet and Carbide inserts

<55 degree Rhombic Negative type>

Part No.	Inscribed circle	Thickness
DN_1504	12.7	4.76
DN_1506	12.7	6.35



	Steel	Stainless steel	Cast iron	Nonferrous metal	Heat-resistant alloy	Hardend material
T15	●	●	●	●	●	●
C7X	●	●	●	●	●	●
N40	●	●	●	●	●	●
Q15	●	●	●	●	●	●
C7Z	●	●	●	●	●	●
ZM3	●	●	●	●	●	●
QM3	●	●	●	●	●	●
VM1	●	●	●	●	●	●
TM4	●	●	●	●	●	●
DT4	●	●	●	●	●	●
DM4	●	●	●	●	●	●
CP1	●	●	●	●	●	●
CP7	●	●	●	●	●	●
KM1	●	●	●	●	●	●

● : First choice
● : Second choice

Shape	Part No.	Inch system	Nose Radius	Cermet grade		PVD cermet grade	PVD-coated micro-grain carbide grade				CVD-coated carbide grade	Carbide grade	For applicable holder, see pages:	Chipbreaker applicable range
				T15	C7X	N40	Q15	C7Z	ZM3	QM3	VM1			
	DNMG150404ENBZF1	DNMG431-ENB-ZF1	0.4	●	●	●								 D.O.C (mm) vs Feed rate (mm/rev)
	150408ENBZF1	432-ENB-ZF1	0.8	●	●	●								
	DNMG150604ENBZF1	DNMG441-ENB-ZF1	0.4	●	●	●								
	150608ENBZF1	442-ENB-ZF1	0.8	●	●	●								
	DNGG150404FNZP	DNGG431-FN--ZP	0.4				●	●					 D.O.C (mm) vs Feed rate (mm/rev)	
	150408FNZP	432-FN--ZP	0.8				●	●						
	DNMG150404ENBZW1	DNMG431-ENB-ZW1	0.4		●								G11 H33 D.O.C (mm) vs Feed rate (mm/rev)	
	150408ENBZW1	432-ENB-ZW1	0.8		●									
	DNMG150608ENBZW1	DNMG442-ENB-ZW1	0.8	●	●									
	DNGG150404T ^R /LN1	DNGG431-T ^R /--N1	0.4	R									 D.O.C (mm) vs Feed rate (mm/rev)	
	DNGA150412TN	DNGA433-TN	1.2	●									—	

● : Standard stock ● : New standard stock ■ : Scheduled to be produced by order ★ : Standard stock (Specified)

<Round Negative type>

Part No.	Inscribed circle	Thickness
RN_0903	9.525	3.18
RN_1204	12.7	6.35



	Steel	Stainless steel	Cast iron	Nonferrous metal	Heat-resistant alloy	Hardend material
T15	●	●	●	●	●	●
C7X	●	●	●	●	●	●
N40	●	●	●	●	●	●
Q15	●	●	●	●	●	●
C7Z	●	●	●	●	●	●
ZM3	●	●	●	●	●	●
QM3	●	●	●	●	●	●
VM1	●	●	●	●	●	●
TM4	●	●	●	●	●	●
DT4	●	●	●	●	●	●
DM4	●	●	●	●	●	●
CP1	●	●	●	●	●	●
CP7	●	●	●	●	●	●
KM1	●	●	●	●	●	●

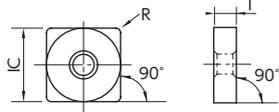
● : First choice
● : Second choice

Shape	Part No.	Inch system	Nose Radius	Cermet grade		PVD cermet grade	PVD-coated micro-grain carbide grade				CVD-coated carbide grade	Carbide grade	For applicable holder, see pages:	Chipbreaker applicable range
				T15	C7X	N40	Q15	C7Z	ZM3	QM3	VM1			
	RNMG090300ENBF	RNMG320-ENB-F	—		●									G15 D.O.C (mm) vs Feed rate (mm/rev)
	RNMG120400ENBG	RNMG430-ENB-G	—		●									

● : Standard stock ● : New standard stock ■ : Scheduled to be produced by order ★ : Standard stock (Specified)

Part No.	Inscribed circle	Thickness
SN_0903	9.525	3.18
SN_1204	12.7	4.76

<90 degree Square Negative type>



Material	Steel	Stainless steel	Cast iron	Nonferrous metal	Heat-resistant alloy	Hardend material
●	●	●	●	●	●	●
●	●	●	●	●	●	●
●	●	●	●	●	●	●
●	●	●	●	●	●	●
●	●	●	●	●	●	●
●	●	●	●	●	●	●

● : First choice
● : Second choice

Shape	Part No.	Inch system	Nose Radius	Cermet grade		PVD cermet grade		PVD-coated micro-grain carbide grade				CVD-coated carbide grade		For applicable holder, see pages:	Chipbreaker applicable range
				T15	C7X	N40	Q15	C7Z	ZM3	QM3	VM1	TM4	DT4		
G	SNMG120408G	SNMG432-G	0.8												
	SNMG120412G	SNMG433-G	1.2												
	SNMG120416G	SNMG434-G	1.6												
G	SNMG090308ENBG	SNMG322-ENB-G	0.8		●										
	SNMG120408ENBG	SNMG432-ENB-G	0.8	●	●										
	SNMG120412ENBG	SNMG433-ENB-G	1.2		●										
	SNMG120416ENBG	SNMG434-ENB-G	1.6		●										
	SNMG120408TNG	SNMG432-TN-G	0.8			●									
	SNMG120412TNG	SNMG433-TN-G	1.2			●									
WM	SNMG120408ENWM	SNMG432-EN--WM	0.8		●		●								
WR	SNMG120408ENBWR	SNMG432-ENB-WR	0.8		●										
Z5	SNMG120408ENBZ5	SNMG432-ENB-Z5	0.8		●										
	SNMG120408TNBZ5	SNMG432-TNB-Z5	0.8					●		●					
ZF1	SNMG120408ENBZF1	SNMG432-ENB-ZF1	0.8	●	●										
	SNMG120412ENBZF1	SNMG433-ENB-ZF1	1.2	●											
ZP	SNMG120408ENBZP	SNMG432-ENB-ZP	0.8	●											
ZW1	SNMG120408ENBZW1	SNMG432-ENB-ZW1	0.8		●										
	SNMG120412ENBZW1	SNMG433-ENB-ZW1	1.2		●										
B R-hand shown	SNGG090304T ^R / _L B	SNGG321-T ^R / _L --B	0.4	L											
	SNGG090308T ^R / _L B	SNGG322-T ^R / _L --B	0.8	●											
	SNGG120404T ^R / _L B	SNGG431-T ^R / _L --B	0.4	●											

G17
G19
L43

● : Standard stock ● : New standard stock ■ : Scheduled to be produced by order ★ : Standard stock (Specified)

New Products
Tool Materials / Selection Guide
PCD, CBN and ceramic
Cermet
Micro-grain Carbide, Carbide
Insert Stock List
Outside Machining Toolholders
SS
Grooving Tools
Threading Tools
Shaper
Internal machining tool range
Original Tools for Various Applications
Indexable End Milling Tools
Indexable Drill Inserts
Milling Cutters
Technical Data
Index

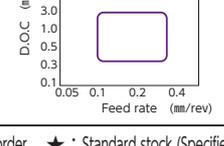
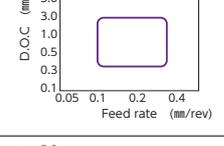
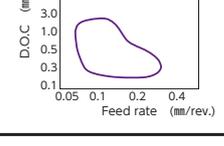
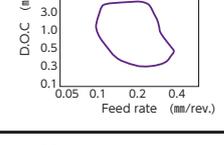
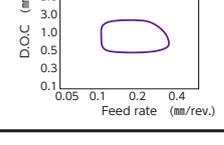
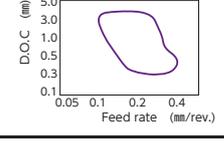
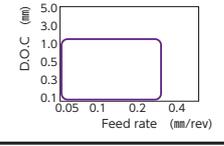
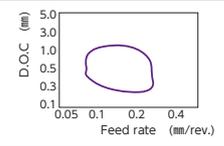
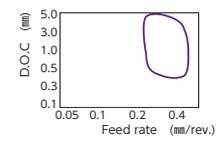
<60 degree Triangle Negative type>

Part No.	Inscribed circle	Thickness
TN_1604	9.525	4.76
TN_2204	12.7	4.76

Shape	Part No.	Inch system	Nose Radius	Material Compatibility											For applicable holder, see pages:	Chipbreaker applicable range			
				Steel	Stainless steel	Cast iron	Nonferrous metal	Heat-resistant alloy	Hardend material	Cermet grade	PVD cermet grade	PVD-coated micro-grain carbide grade					CVD-coated carbide grade	Carbide grade	
				T15	C7X	N40	Q15	C7Z	ZM3	QM3	VM1	TM4	DT4	DM4	CP1	CP7	KM1		
	TNMG160408G	TNMG332-G	0.8	●	●	●	●	●	●	●	●	●	●	●	●	●	●		
	160412G	333-G	1.2																
	TNMG160404ENBG	TNMG331-ENB-G	0.4	●	●														
	160412ENBG	333-ENB-G	1.2			●													
	160404TNG	331-TN-G	0.4				●												
	160408TNG	332-TN-G	0.8					●											
	160412TNG	333-TN-G	1.2						●										
	TNMG220412ENBG	TNMG433-ENB-G	1.2				●												
	TNGG160404ENBR1	TNGG331-ENB-R1	0.4																
	160408ENBR1	332-ENB-R1	0.8	●															
	TNMG160404ENWM	TNMG331-EN-WM	0.4		●			●											
	160408ENWM	332-EN-WM	0.8		●			●											
	TNMG160408ENBWR	TNMG332-ENB-WR	0.8				●												
	TNMG160408ENWV	TNMG332-EN-WV	0.8		●			●											
	TNMG160408ENBZ5	TNMG332-ENB-Z5	0.8			●													
	160404TNBZ5	331-TNB-Z5	0.4						●					●					
	160408TNBZ5	332-TNB-Z5	0.8						●					●					
	TNMG160404ENBZF1	TNMG331-ENB-ZF1	0.4			●	●												
	160408ENBZF1	332-ENB-ZF1	0.8	●	●	●													
	160412ENBZF1	333-ENB-ZF1	1.2	●															
	TNMG160404ENBZP	TNMG331-ENB-ZP	0.4	●															
	160408ENBZP	332-ENB-ZP	0.8	●															
	TNMG220408ENBZP	TNMG432-ENB-ZP	0.8	●															
	TNGG160402FNZP	TNGG33Y-FN-ZP	0.2						●	●				●					
	160404FNZP	331-FN-ZP	0.4						●	●				●					
	160408FNZP	332-FN-ZP	0.8						●	●				●					

● : First choice
● : Second choice

G23
H13
H31



● : Standard stock ● : New standard stock ■ : Scheduled to be produced by order ★ : Standard stock (Specified)

<35 degree Rhombic Negative type>

Part No.	Inscribed circle	Thickness
VN_1604	9.525	4.76

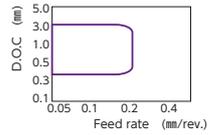
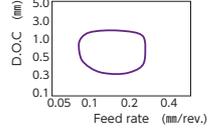
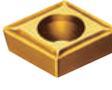
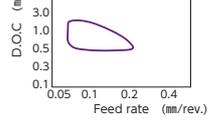
Shape	Part No.	Inch system	Nose Radius	Material Compatibility											For applicable holder, see pages:	Chipbreaker applicable range			
				Steel		Stainless steel		Cast iron		Nonferrous metal		Heat-resistant alloy		Hardend material					
				●	●	●	●	●	●	●	●	●	●	●			●	●	
				T15	C7X	N40	Q15	C7Z	ZM3	QM3	VM1	TM4	DT4	DM4	CP1	CP7	KM1		
				Cermet grade		PVD cermet grade		PVD-coated micro-grain carbide grade				CVD-coated carbide grade		Cermet grade					

Shape	Part No.	Inch system	Nose Radius	T15	C7X	N40	Q15	C7Z	ZM3	QM3	VM1	TM4	DT4	DM4	CP1	CP7	KM1	Holder	Chipbreaker applicable range
AM1	VNMG160404ENAM1	VNMG331-EN--AM1	0.4	●				●										G27	
	160408ENAM1	332-EN--AM1	0.8	●				●											
	160404ENBAM1	331-ENB-AM1	0.4	●	●	●													
	160408ENBAM1	332-ENB-AM1	0.8	●	●	●													
	160404TNBAM1	331-TNB-AM1	0.4							●				●					
	160408TNBAM1	332-TNB-AM1	0.8							●				●					
G	VNMG160404G	VNMG331-G	0.4												●			G27	
	160408G	332-G	0.8												●				
	160412G	333-G	1.2												●				
WM	VNMG160408ENWM	VNMG332-EN--WM	0.8	●				●										G27	
ZF1	VNMG160404ENBZF1	VNMG331-ENB-ZF1	0.4		●													G27	
ZP	VNMM160404ENBZP	VNMM331-ENB-ZP	0.4	●														G27	
	VNGG160402FNZP	VNGG33Y-FN--ZP	0.2							●				●					
	160404FNZP	331-FN--ZP	0.4							●				●					
	160408FNZP	332-FN--ZP	0.8							●				●					

● : Standard stock ● : New standard stock ■ : Scheduled to be produced by order ★ : Standard stock (Specified)

<80 degree Rhombic Positive type>

Part No.	Inscribed circle	Thickness	Relief angle
CC_0602	6.35	2.38	7°
CC_09T3	9.525	3.97	7°

Shape	Part No.	Inch system	Nose Radius	Material Compatibility											For applicable holder, see pages:	Chipbreaker applicable range			
				Steel	Stainless steel	Cast iron	Nonferrous metal	Heat-resistant alloy	Hardend material	Cermet grade	PVD cermet grade	PVD-coated micro-grain carbide grade					CVD-coated carbide grade	Carbide grade	
				T15	C7X	N40	Q15	C7Z	ZM3	QM3	VM1	TM4	DT4	DM3	CP1	CP7	KM1		
	CCGT060202FN1L		0.2	●	●	●	●	●	●	●	●	●	●	●	●	●	●		
	CCGT09T304FN1L		0.4						●	●	●	●	●	●	●	●			
	CCGT09T302ENBAF1		0.2	●															
	09T304ENBAF1		0.4	●															
	09T308ENBAF1		0.8	●															
	CCGT060200FNAM3		0.03										●	●					
	060202FNAM3		0.2						●	●									
	060204FNAM3		0.4						●	●									
	060201FNXAM3		0.1	●															
	060202FNXAM3		0.2	●															
	060201MFNAM3		*0.08							●									
	060202MFNAM3		*0.18							●				●					
	060204MFNAM3		*0.38							★				●					
	CCGT09T300FNAM3		0.03								●	●	●						
	09T302FNAM3		0.2							●	●								
	09T304FNAM3		0.4							●	●								
	09T301FNXAM3		0.1	●															
	09T302FNXAM3		0.2	●															
	09T304FNXAM3		0.4	●															
	09T301MFNAM3		*0.08							●	●	●	●						
	09T302MFNAM3		*0.18							●	●	●	●						
	09T304MFNAM3		*0.38							●	●	●	●						
		CCMT060202ENBAM3		0.2	●				●										
		060204ENBAM3		0.4	●				●										
		060202FNAM3		0.2											●				
060204FNAM3			0.4											●					
CCMT09T302ENBAM3			0.2	●				●											
09T304ENBAM3			0.4	●				●											
09T308ENBAM3			0.8	●				●											
09T312ENBAM3			1.2	●				●											
09T302FNAM3			0.2												●				
09T304FNAM3			0.4												●				
09T308FNAM3		0.8												●					
	CCMT060204ENBAM5		0.4		●														
	CCMT09T304ENBAM5		0.4		●														
	09T308ENBAM5		0.8		●														

*Inserts having 01M, 02M or 04M as the R code can be used for machining when the component drawing specifies that the radius is less than R=0.1, R=0.2 or R=0.4 respectively.

● : Standard stock ● : New standard stock ■ : Scheduled to be produced by order ★ : Standard stock (Specified)

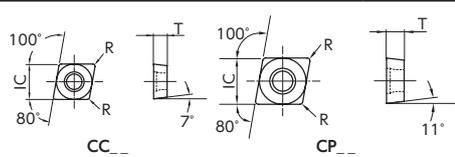
- New Products
- Tool Materials / Selection Guide
- PCD, CBN and ceramic
- Cermet
- Micro-grain Carbide, Carbide
- Insert Stock List
- Outside Machining Toolholders
- SS
- Grooving Tools
- Threading Tools
- Shaper
- Internal Machining tool range
- Original Tools for Various Applications
- Indexable End Milling Tools
- Indexable Drill Inserts
- Milling Cutters
- Technical Data
- Index

Cermet and Carbide inserts

Cermet and Carbide inserts

Part No.	Inscribed circle	Thickness	Relief angle
CC_0602	6.35	2.38	7°
CC_09T3	9.525	3.97	7°

<80 degree Rhombic Positive type>



Steel	●
Stainless steel	●
Cast iron	●
Nonferrous metal	●
Heat-resistant alloy	●
Hardend material	●

● : First choice
● : Second choice

Shape	Part No.	Inch system	Nose Radius	Cermet grade		PVD cermet grade	PVD-coated micro-grain carbide grade					CVD-coated carbide grade	For applicable holder, see pages:	Chipbreaker applicable range		
				T15	C7X	N40	Q15	C7Z	ZM3	QM3	VM1	TM4			DT4	DM3
 AZ7 ※	CCGT060200FNAZ7		0.03													
	060201MFNAZ7		*0.08													
	060202MFNAZ7		*0.18													
	CCGT09T300FNAZ7		0.03													
	09T301MFNAZ7		*0.08													
	09T302MFNAZ7		*0.18													
	09T304MFNAZ7		*0.38													
	CCGT060200AZ7		0.03													
	060201MAZ7		*0.08													
	060202MAZ7		*0.18													
 AZ8	CCMT060202ENAAZ8		0.2													
	060204ENBAZ8		0.4													
	060208ENBAZ8		0.8													
	CCMT09T302ENAAZ8		0.2													
 ZR	09T304ENBAZ8		0.4													
	09T308ENBAZ8		0.8													
	CCMT060202ENBZR		0.2	●		●										
	060204ENBZR		0.4	●		●										
	CCMT09T302ENAZR		0.2													
	09T304ENAZR		0.4													
09T308ENAZR		0.8														
09T302ENBZR		0.2	●		●											
 F1 R-hand shown	09T304ENBZR		0.4	●		●										
	09T308ENBZR		0.8	●		●										
	CCGT060201F ^R / _L F1		0.1													
	060202F ^R / _L F1		0.2													
060204F ^R / _L F1		0.4														
CCGT09T302F ^R / _L F1		0.2														
 FM	09T304F ^R / _L F1		0.4													
	09T308F ^R / _L F1		0.8													
 CCGT060202ENBFM			0.2	●												
	060204ENBFM		0.4	●												
 KHG	CCET0602005 ^R / _L KHG		0.05													
	0602008 ^R / _L KHG		0.08													
	0602018 ^R / _L KHG		0.18													
	060202 ^R / _L KHG		0.2													
	CCET09T3005 ^R / _L KHG		0.05													
	09T3008 ^R / _L KHG		0.08													
	09T3018 ^R / _L KHG		0.18													
09T302 ^R / _L KHG		0.2														

H17
L36

* Inserts having 01M, 02M or 04M as the R code can be used for machining when the component drawing specifies that the radius is less than R=0.1, R=0.2 or R=0.4 respectively.
 ※ AZ7 chipbreaker was redesigned with 0.2mm higher cutting edge height than conventional ones, which has FN in the item numbers.

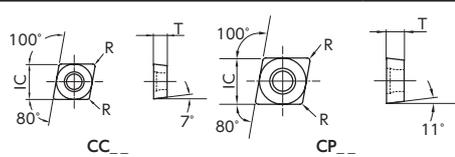
● : Standard stock ● : New standard stock ■ : Scheduled to be produced by order ★ : Standard stock (Specified)

Cermet and Carbide inserts

<80 degree Rhombic Positive type>

Part No.	Inscribed circle	Thickness	Relief angle
CP_0401	4.76	1.59	11°
CP_0602	6.35	2.38	11°

Part No.	Inscribed circle	Thickness	Relief angle
CP_0802	7.94	2.38	11°
CP_0903	9.525	3.18	11°



Material	CP_0401	CP_0602	CP_0802	CP_0903
Steel	●	●	●	●
Stainless steel	●	●	●	●
Cast iron	●	●	●	●
Nonferrous metal	●	●	●	●
Heat-resistant alloy	●	●	●	●
Hardend material	●	●	●	●

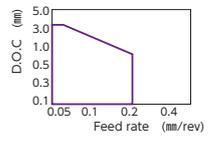
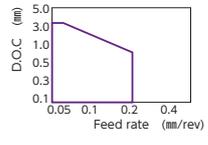
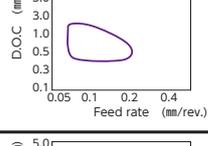
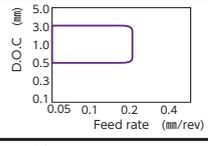
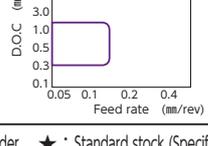
● : First choice
● : Second choice

Shape	Part No.	Inch system	Nose Radius	Cermet grade		PVD cermet grade	PVD-coated micro-grain carbide grade				CVD-coated carbide grade	For applicable holder, see pages:	Chipbreaker applicable range
				T15	C7X	N40	Q15	C7Z	ZM3	QM3	VM1		
 AM5	CPGH060202ENBAM5	CPGP83Y-ENB-AM5	0.2		●								 D.O.C (mm) vs Feed rate (mm/rev)
	CPGH080202ENBAM5	CPGP03Y-ENB-AM5	0.2		●								
	CPGH090302ENBAM5	CPGM32Y-ENB-AM5	0.2	●									
	090304ENBAM5	321-ENB-AM5	0.4	●									
	090308ENBAM5	322-ENB-AM5	0.8	●									
	CPGH060202FNAM5	CPGP83Y-FN--AM5	0.2			●			●				
	CPGH080202FNAM5	CPGP03Y-FN--AM5	0.2					●		●			
	CPGH090302FNAM5	CPGM32Y-FN--AM5	0.2					●		●			
	090304FNAM5	321-FN--AM5	0.4					●		●			
	090308FNAM5	322-FN--AM5	0.8					●		●			
 A · A1 L-hand shown	CPGH040102F ^{R/L} A1	CPGP62Y-F ^{R/L} --A1	0.2					L	L			L36 L37 D.O.C (mm) vs Feed rate (mm/rev)	
	040104F ^{R/L} A1	621-F ^{R/L} --A1	0.4					L	L				
	CPGH060202F ^{R/L} A	CPGP83Y-F ^{R/L} --A	0.2					L	L				
	060204F ^{R/L} A	831-F ^{R/L} --A	0.4					L	L				
	CPGH080202F ^{R/L} A	CPGP03Y-F ^{R/L} --A	0.2					L	L				
	080204F ^{R/L} A	031-F ^{R/L} --A	0.4					L	L				
	CPGH040102T ^{R/L} A1	CPGP62Y-T ^{R/L} --A1	0.2	L	L								
	040104T ^{R/L} A1	621-T ^{R/L} --A1	0.4	L	L								
 F1 R-hand shown	CPGH040101F ^{R/L} F1		0.1							R		 D.O.C (mm) vs Feed rate (mm/rev)	
	040102F ^{R/L} F1		0.2							R			
	040104F ^{R/L} F1		0.4							R			
	CPGH060202F ^{R/L} F1		0.2							R			
 S L-hand shown	CPGH040102 ^{R/L} S		0.2							L		 D.O.C (mm) vs Feed rate (mm/rev)	
	040104 ^{R/L} S		0.4							L			
 B L-hand shown	CPMH090304T ^{R/L} B	CPMM321-T ^{R/L} --B	0.4	L								 D.O.C (mm) vs Feed rate (mm/rev)	
	090308T ^{R/L} B	322-T ^{R/L} --B	0.8	L									
 without chipbreaker	CPGB080204TN	CPGD031-TN	0.4	●									

*Inserts having 01M, 02M or 04M as the R code can be used for machining when the component drawing specifies that the radius is less than R=0.1, R=0.2 or R=0.4 respectively. ● : Standard stock ● : New standard stock ■ : Scheduled to be produced by order ★ : Standard stock (Specified)

<55 degree Rhombic Positive type>

Part No.	Inscribed circle	Thickness	Relief angle
DC_0702	6.35	2.38	7°
DC_11T3	9.525	3.97	7°
DP_0702	6.35	2.38	11°

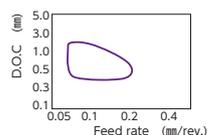
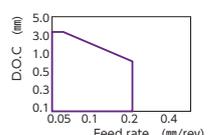
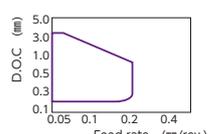
Shape	Part No.	Inch system	Nose Radius	Material											Cermet grade	PVD cermet grade	PVD-coated micro-grain carbide grade	CVD-coated carbide grade	Carbide grade	For applicable holder, see pages:	Chipbreaker applicable range								
				Steel	Stainless steel	Cast iron	Nonferrous metal	Heat-resistant alloy	Hardend material	T15	C7X	N40	Q15	C7Z								ZM3	QM3	VM1	TM4	DM4	CP1	CP7	KM1
				●	●	●	●	●	●	●	●	●	●	●								●	●	●	●	●	●	●	●
 <p>S R-hand shown</p>	DCGT070200 $\frac{R}{4}$ S		0.03	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●								
	070201 $\frac{R}{4}$ S		0.1		●																								
	070202 $\frac{R}{4}$ S		0.2	●																									
	070204 $\frac{R}{4}$ S		0.4																										
	070201M $\frac{R}{4}$ S		*0.08																										
	070202M $\frac{R}{4}$ S		*0.18																										
	DCGT11T300 $\frac{R}{4}$ S		0.03																										
	11T301 $\frac{R}{4}$ S		0.1																										
	11T302 $\frac{R}{4}$ S		0.2																										
	11T304 $\frac{R}{4}$ S		0.4																										
	11T301M $\frac{R}{4}$ S		*0.08																										
	11T302M $\frac{R}{4}$ S		*0.18																										
	11T304M $\frac{R}{4}$ S		*0.38																										
	DCMT070201T $\frac{R}{4}$ AS		0.1		●																								
	070202T $\frac{R}{4}$ AS		0.2		●																								
070204T $\frac{R}{4}$ AS		0.4		●																									
DCMT11T301T $\frac{R}{4}$ AS		0.1		●																									
11T302T $\frac{R}{4}$ AS		0.2		●																									
11T304T $\frac{R}{4}$ AS		0.4		●																									
 <p>U · U1 R-hand shown</p>	DCGT070200 $\frac{R}{4}$ U		0.03																										
	070201 $\frac{R}{4}$ U		0.1																										
	070202 $\frac{R}{4}$ U		0.2																										
	DCGT11T300 $\frac{R}{4}$ U1		0.03																										
	11T301 $\frac{R}{4}$ U1		0.1																										
	11T302 $\frac{R}{4}$ U1		0.2																										
 <p>without chipbreaker</p>	DCGW070200FN		0.03																										
	070201FN		0.1																										
	070200H		0.03																										
	070201H		0.1																										
	070202H		0.2																										
	07020V		0.0																										
	DCGW11T300FN		0.03																										
	11T301FN		0.1																										
	11T300H		0.03																										
	11T301H		0.1																										
 <p>AM3</p>	DPGT070204FNXAM3		0.4		●																								
 <p>CL ※2</p>	DCGT070201MCL		*0.08																										
	070202MCL		*0.18																										
	DCGT11T301MCL		*0.08																										
	11T302MCL		*0.18																										
 <p>NEW YL</p>	DCGT11T301MYL		0.08																										
	11T302MYL		0.18																										
	11T304MYL		0.38																										

* Inserts having 01M, 02M or 04M as the R code can be used for machining when the component drawing specifies that the radius is less than R=0.1, R=0.2 or R=0.4 respectively.
 ※2 The specifications of CL chipbreaker are slightly different from the above dimensions, but it has no problem for machining.

● : Standard stock ● : New standard stock ■ : Scheduled to be produced by order ★ : Standard stock (Specified)

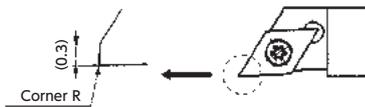
<TFD with Wiper edge>

Part No.	Inscribed circle	Thickness	Relief angle
TFD_07	6.35	2.38	7°
TFD_11	9.525	3.97	7°

Shape	Part No.	Inch system	Nose Radius	Material Compatibility											For applicable holder, see pages:	Chipbreaker applicable range								
				Steel	Stainless steel	Cast iron	Nonferrous metal	Heat-resistant alloy	Hardend material	T15	C7X	N40	Q15	C7Z			ZM3	QM3	VM1	TM4	DT4	DM3	CP1	CP7
 AM3	TFD11FR05AM3		0.05	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●		
	11FR15AM3		0.15																					
 S ※ R-hand shown	TFD07F ^R L05		0.05								●	R	R											
	07F ^R L15		0.15								●	R												
	TFD11FR05		0.05								R	R	R											
	11FR15		0.15								R	R												
 U · U1 ※ R-hand shown	TFD07FR05U		0.05								R	R	R											
	07FR15U		0.15								R	R												
	TFD11FR05U1		0.05								R	R	R											
	11FR15U1		0.15								R	R												
 without chipbreaker	TFD07FR05H 		0.05																				R	—
	TFD11FR05H 		0.05																				R	

● : Standard stock ● : New standard stock ■ : Scheduled to be produced by order ★ : Standard stock (Specified)

◆ TFD features



※TFD insert has same shape with DCGT insert.

It is designed to have a 0.3mm flat on the cutting on the toolholders.

※The flat ensures a superior surface even when feed rates are increased.

※TFD insert can be used on the toolholders with 93 degree cutting angle.

<75 degree Rhombic Positive type>

Part No.	Inscribed circle	Thickness	Relief angle
ER_T301	3.97	1.59	9°

Shape	Part No.	Inch system	Nose Radius	Material Compatibility											For applicable holder, see pages:	Chipbreaker applicable range			
				Steel	Stainless steel	Cast iron	Nonferrous metal	Heat-resistant alloy	Hardend material	Cermet grade	PVD cermet grade	PVD-coated micro-grain carbide grade	CVD-coated carbide grade	Carbide grade					
				T15	C7X	N40	Q15	C7Z	ZM3	QM3	VM1	TM4	DT4	DM4	CP1	CP7	KM1		
 A2 R-hand shown	ERGHT30102F ^{R/L} A2	ERGP52Y-F ^{R/L} --A2	0.2	●	●					●	●						L35 		
	30104F ^{R/L} A2	521-F ^{R/L} --A2	0.4							L		R							
 F1 ※ R-hand shown	ERGHT30101F ^{R/L} F1	—	0.1									R							
	30102F ^{R/L} F1	—	0.2									R							
	30104F ^{R/L} F1	—	0.4									R							

※F1, F05, FG chipbreakers : Right hand inserts are for right hand toolholders to evacuate chips backward.

● : Standard stock ● : New standard stock ■ : Scheduled to be produced by order ★ : Standard stock (Specified)

<Round Positive type>

Part No.	Inscribed circle	Thickness	Relief angle
RC_1204	12.7	4.76	7°
RP_0602	6.00	2.38	11°
RP_0802	8.00	2.38	11°
RP_10T2	10.00	2.78	11°

Part No.	Inscribed circle	Thickness	Relief angle
RP_1203	12.7	3.18	11°
RP_1604	16.00	4.76	11°
RP_2004	20.00	4.76	11°

Shape	Part No.	Inch system	Nose Radius	Material Compatibility											For applicable holder, see pages:	Chipbreaker applicable range			
				Steel	Stainless steel	Cast iron	Nonferrous metal	Heat-resistant alloy	Hardend material	Cermet grade	PVD cermet grade	PVD-coated micro-grain carbide grade	CVD-coated carbide grade	Carbide grade					
				T15	C7X	N40	Q15	C7Z	ZM3	QM3	VM1	TM4	DT4	DM4	CP1	CP7	KM1		
 GM	RCMX1204M0ENBGM	RCMX43M0ENB-GM	—	●	●												G15 		
	 GB	RCMX1204M0GB	RCMX43M0-GB	—	●	●													M16
RPMT0602M0GB			—	●	●														
RPMT0802M0GB			—	●	●														
RPMT10T2M0GB			—	●	●														
RPMT1203M0GB			—	●	●														
RPMT1604M0GB			—	●	●												M14		
RPMT2004M0GB			—	●	●												M16		
RPMX1203M0GB		—	●	●												M15			

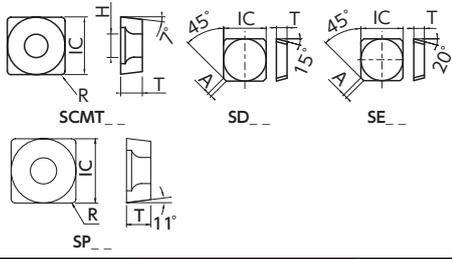
● : Standard stock ● : New standard stock ■ : Scheduled to be produced by order ★ : Standard stock (Specified)

Cermet and Carbide inserts

<90 degree Square Positive type>

Part No.	Inscribed circle	Thickness	Relief angle
SC_09T3	9.525	3.97	7°
SD_0602	6.35	2.38	15°
SP_0903	9.525	2.38	11°

Part No.	Inscribed circle	Thickness	Relief angle
SP_1203	12.7	3.18	11°
SP_1204	12.7	4.76	11°
SP_1904	19.05	4.76	11°
SE_1203	12.7	3.18	20°



Material	T15	C7X	N40	Q15	C7Z	ZM3	QM3	VM1	TM4	DT4	DM4	CP1	CP7	KM1
Steel	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Stainless steel	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Cast iron	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Nonferrous metal	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Heat-resistant alloy	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Hardend material	●	●	●	●	●	●	●	●	●	●	●	●	●	●

● : First choice
● : Second choice

Shape	Part No.	Inch system	Nose Radius	Cermet grade													For applicable holder, see pages:	Chipbreaker applicable range	
				T15	C7X	N40	Q15	C7Z	ZM3	QM3	VM1	TM4	DT4	DM4	CP1	CP7			KM1
AM5	SCMT09T308ENBAM5		0.8			●												—	
without chipbreaker	SDEW060202FN		0.2							●								—	—
AF1	SPGR090308ENBAF1	SPGR322-ENB-AF1	0.8	●														—	
	SPGR120308ENBAF1	SPGR422-ENB-AF1	0.8	●															
QZ	SPGR090308ENBQZ	SPGR322-ENB-QZ	0.8			●												—	
H1 L-hand shown	SPMH090324TR/LBH1	SPMH326-TR/LB-H1	2.4	L														M17	—
	SPMH090332TR/LAH1	SPMH328-TR/LA-H1	3.2	L															—
H2 L-hand shown	SPMR120440TR/LH2	SPMR4310TR/L--H2	4.0	L															—
without chipbreaker	SPGN090304TN	SPGN321-TN	0.4	●														—	—
	SPGN090308TN	SPGN322-TN	0.8	●															—
	SPGN120304TN	SPGN421-TN	0.4																—
	SPGN120308TN	SPGN422-TN	0.8	●															—
	SPMN120440TN	SPMN4310TN	4.0	■															—
	SPMN190408TN	SPMN632-TN	0.8		●													—	—
without chipbreaker	SDKN1203AEN	SDK42AEN	—		●													—	—
	SDKN1504AETN	SDK53A	—		■														—
	SEKN1203AFN	SEK42AFN	—		●														—

● : Standard stock ● : New standard stock ■ : Scheduled to be produced by order ★ : Standard stock (Specified)

<60 degree Triangle Positive type>

Part No.	Inscribed circle	Thickness	Relief angle
TB_0601	3.97	1.59	5°
TC_0601	3.97	1.59	7°
TC_0902	5.56	2.38	7°

Part No.	Inscribed circle	Thickness	Relief angle
TC_1102	6.35	2.38	7°
TC_16T3	9.525	3.97	7°

Shape	Part No.	Inch system	Nose Radius	Material											For applicable holder, see pages:	Chipbreaker applicable range			
				Steel	Stainless steel	Cast iron	Nonferrous metal	Heat-resistant alloy	Hardend material	Cermet grade	PVD cermet grade	PVD-coated micro-grain carbide grade	CVD-coated carbide grade	Carbide grade					
				T15	C7X	N40	Q15	C7Z	ZM3	QM3	VM1	TM4	DT4	DM4	CP1	CP7	KM1		
	TBGN060108TN	TBGE522-TN	0.8	●	●	●	●	●	●	●	●	●	●	●	●	●	●	—	—
	TCGT110202FNXAM3		0.2	●	●	●	●	●	●	●	●	●	●	●	●	●	—		
	TCGT16T304ENBAM3		0.4	●	●	●	●	●	●	●	●	●	●	●	●	●	H28		
	TCMT110204ENBAM3		0.4	●	●	●	●	●	●	●	●	●	●	●	●	●			
	TCMT16T308ENBAM5		0.8	●	●	●	●	●	●	●	●	●	●	●	●	●	—		
	TCGH060102F^{R/L}K		0.2																
L-hand shown	060104F^{R/L}K		0.4																
	TCGH060102F^{R/L}B1	TCGP52Y-F^{R/L}--B1	0.2							L									
	060104F^{R/L}B1	521-F^{R/L}--B1	0.4							L									L38
	060102T^{R/L}B1	52Y-T^{R/L}--B1	0.2	●															L39
L-hand shown	060104T^{R/L}B1	521-T^{R/L}--B1	0.4	L															L40
	TCGH060101F^{R/L}F05	TCGP521CF^{R/L}--F05	0.1										R						
	060102F^{R/L}F05	52Y-F^{R/L}--F05	0.2						●				R	●					
	060104F^{R/L}F05	521-F^{R/L}--F05	0.4							R			R	R					
	060102T^{R/L}F05	52Y-T^{R/L}--F05	0.2	●															
R-hand shown	060104T^{R/L}F05	521-T^{R/L}--F05	0.4	●						R									
	TCGT090201^{R/L}S		0.1		R					R			●						
	090202^{R/L}S		0.2		●					R									H28
R-hand shown	TCGT110201^{R/L}S		0.1							R			●						
	TCGT090201^{R/L}U		0.1							R									
R-hand shown	090202^{R/L}U		0.2							R									

※F1, F05, FG chipbreakers : Right hand inserts are for right hand toolholders to evacuate chips backward.

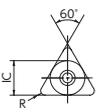
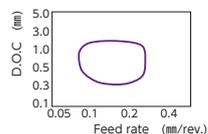
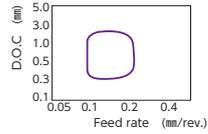
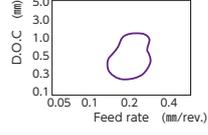
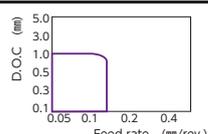
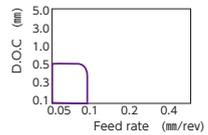
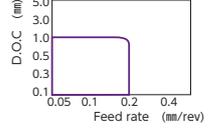
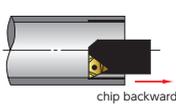
● : Standard stock ● : New standard stock ■ : Scheduled to be produced by order ★ : Standard stock (Specified)

Cermet and Carbide inserts

<60 degree Triangle Positive type>

Part No.	Inscribed circle	Thickness	Relief angle
TC_0601	3.97	1.59	7°
TC_0902	5.56	2.38	7°
TC_1102	6.35	2.38	7°

Part No.	Inscribed circle	Thickness	Relief angle
TP_0802	4.76	2.38	11°
TP_0902	5.56	2.38	11°
TP_1103	6.35	3.18	11°
TP_1603	9.525	3.18	11°

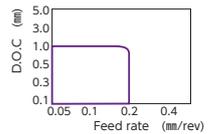
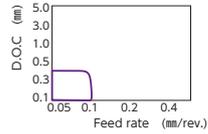
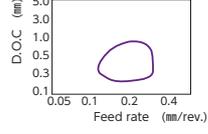
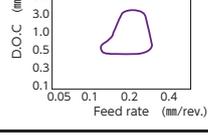
Shape	Part No.	Inch system	Nose Radius	Material Compatibility											For applicable holder, see pages:	Chipbreaker applicable range			
				Steel	Stainless steel	Cast iron	Nonferrous metal	Heat-resistant alloy	Hardend material	Cermet grade	PVD cermet grade	PVD-coated micro-grain carbide grade	CVD-coated carbide grade	Carbide grade					
				T15	C7X	N40	Q15	C7Z	ZM3	QM3	VM1	TM4	DT4	DM4	CP1	CP7	KM1		
 TC_0601 without chipbreaker	TCGB060102TN	TCGD52Y-TN	0.2	●	●	●	●	●	●	●	●	●	●	●	●	●	●	L38	—
	060104TN	521-TN	0.4	●	●	●	●	●	●	●	●	●	●	●	●	●	●	L39	
	TCGW06T108FN		0.8					●										L40	
	TCGW090200FN		0.03					●											
	090201FN		0.1					●										H28	
	TCGW110200FN		0.03					●											
 AF1	TPGR110304ENBAF1	TPGR221-ENB-AF1	0.4	●													—		
	110308ENBAF1	222-ENB-AF1	0.8	●															
	TPGR160304ENBAF1	TPGR321-ENB-AF1	0.4	●															
	160308ENBAF1	322-ENB-AF1	0.8	●															
 AK	TPGH110304ENBAK	TPGH221-ENB-AK	0.4		●												L38		
																	L40		
 B R-hand shown	TPGR160304TRB	TPGR321-TRB	0.4	L													—		
 B2 · B3 L-hand shown	TPGH090202FRB2	TPGP73Y-FRB2	0.2						L	L									
	090204FRB2	731-FRB2	0.4						L	L									
	090208FRB2	732-FRB2	0.8						L	L									
	090204TRB2	731-TRB2	0.4	L															
	TPGH080202FRB3	TPGP63Y-FRB3	0.2						L	L									
	080204FRB3	631-FRB3	0.4						L	L									
 K L-hand shown	TPGH090202FRK		0.2									L							
	090204FRK		0.4									L							
	090208FRK		0.8									L							
 F1 ※ R-hand shown	TPGH080202FRF1	TPGP63Y-FRF1	0.2						R	R	R						 		
	080204FRF1	631-FRF1	0.4						R	R	R								
	TPGH090201FRF1	TPGP731CFRF1	0.1								R								
	090202FRF1	73Y-FRF1	0.2						R	R	R								
	090204FRF1	731-FRF1	0.4						R	R	R								
	090208FRF1	732-FRF1	0.8						R	R	R								
	TPGH110302FRF1	TPGH22Y-FRF1	0.2						R	R	R								
110304FRF1	221-FRF1	0.4						R	R	R									
110308FRF1	222-FRF1	0.8						R	R	R									

※F1, F05, FG chipbreakers : Right hand inserts are for right hand toolholders to evacuate chips backward. ● : Standard stock ● : New standard stock ■ : Scheduled to be produced by order ★ : Standard stock (Specified)

<60 degree Triangle Positive type>

Part No.	Inscribed circle	Thickness	Relief angle
TP_0802	4.76	2.38	11°
TP_0902	5.56	2.38	11°
TP_1103	6.35	3.18	11°

Part No.	Inscribed circle	Thickness	Relief angle
TP_1603	9.525	3.18	11°
TP_2204	12.70	4.76	11°
TE_2204	12.70	4.76	20°

Shape	Part No.	Inch system	Nose Radius	Cermet grade		PVD cermet grade		PVD-coated micro-grain carbide grade				CVD-coated carbide grade		For applicable holder, see pages:	Chipbreaker applicable range
				T15	C7X	N40	Q15	C7Z	ZM3	QM3	VM1	TM4	DT4		
 <p>F1 ※ R-hand shown</p>	TPGH080202T ^{R/L} F1	TPGP63Y-T ^{R/L} --F1	0.2	R		R									 <p>chip backward</p>
	080204T ^{R/L} F1	631-T ^{R/L} --F1	0.4	R		R									
	TPGH090202T ^{R/L} F1	TPGP73Y-T ^{R/L} --F1	0.2	R		R									
	090204T ^{R/L} F1	731-T ^{R/L} --F1	0.4	R		R									
	TPGH110302T ^{R/L} F1	TPGH22Y-T ^{R/L} --F1	0.2	R		R									
	110304T ^{R/L} F1	221-T ^{R/L} --F1	0.4	R		R									
 <p>FG ※ R-hand shown</p>	TPGH090202 ^{R/L} FG		0.2			R			R						
	090204 ^{R/L} FG		0.4			R			R						
 <p>P2 L-hand shown</p>	TPGR090204T ^{R/L} P2	TPGS731-T ^{R/L} --P2	0.4	L											
 <p>C R-hand shown</p>	TPGR160304T ^{R/L} C	TPGR321-T ^{R/L} --C	0.4	L											
 <p>without chipbreaker</p>	TPGB080202TN	TPGD63Y-TN	0.2	●											
	080204TN	631-TN	0.4	●											
	TPGB090202TN	TPGD73Y-TN	0.2	●											
	090204TN	731-TN	0.4	●											
 <p>without chipbreaker</p>	TPGN090204TN	TPGE731-TN	0.4	●											
	TPGN110304TN	TPGN221-TN	0.4	●											
	110308TN	222-TN	0.8	● ●											
	TPGN160304TN	TPGN321-TN	0.4	●											
	160308TN	322-TN	0.8	●											
 <p>without chipbreaker</p>	TPKN1603PDTR	TPK32PR	—	●											
	TPKN2204PDTR	TPK43PR	—	●											
 <p>without chipbreaker</p>	TEEN2204PFTR	TEE43PR	—	●											

※F1, F05, FG chipbreakers : Right hand inserts are for right hand toolholders to evacuate chips backward.

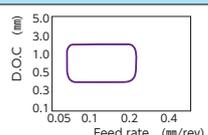
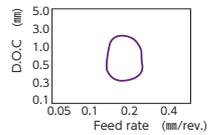
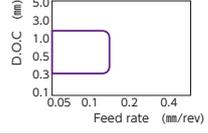
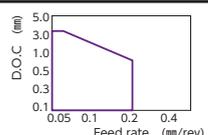
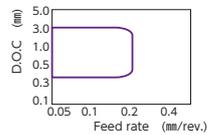
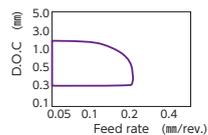
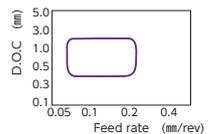
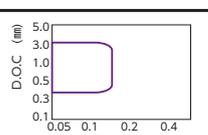
● : Standard stock ● : New standard stock ■ : Scheduled to be produced by order ★ : Standard stock (Specified)

- New Products
- Tool Materials / Selection Guide
- PCD, CBN and ceramic
- Cermet
- Micro-grain Carbide, Carbide
- Insert Stock List
- Outside Machining Toolholders
- SS
- Grooving Tools
- Threading Tools
- Shaper
- Internal machining tool range
- Original Tools for Various Applications
- Indexable End Milling Tools
- Indexable Drill Inserts
- Milling Cutters
- Technical Data
- Index

<35 degree Rhombic Positive type>

Part No.	Inscribed circle	Thickness	Relief angle
VB_1102	6.35	2.38	5°
VB_1103	6.35	3.18	5°
VB_1604	9.525	4.76	5°

Part No.	Inscribed circle	Thickness	Relief angle
VC_1102	6.35	2.38	7°
VC_1103	6.35	3.18	7°
VC_1303	7.94	3.18	7°

Shape	Part No.	Inch system	Nose Radius	Material Compatibility										For applicable holder, see pages:	Chipbreaker applicable range			
				Steel	Stainless steel	Cast iron	Nonferrous metal	Heat-resistant alloy	Hardend material	Cermet grade	PVD cermet grade	PVD-coated micro-grain carbide grade	CVD-coated carbide grade			Carbide grade		
				T15	C7X	N40	Q15	C7Z	ZM3	QM3	VM1	TM4	DM4	CP1	CP7	KM1		
 AM3	VBGT110204FNXAM3		0.4	●	●	●	●	●	●	●	●	●	●	●	●	●	—	
	VBGT110302FNXAM3		0.2	●	●	●	●	●	●	●	●	●	●	●	●	●		
	VBMT160404ENBAM3	VBMT331-ENB-AM3	0.4	●	●	●	●	●	●	●	●	●	●	●	●	●		
 GA	VBGT160404ENBGA	VBGT331-ENB-GA	0.4	●	●	●	●	●	●	●	●	●	●	●	●	—		
	160412ENBGA	333-ENB-GA	1.2	●	●	●	●	●	●	●	●	●	●	●	●			
NEW  YL	VBGT160402FNYL		0.2									●	●			—		
	160404FNYL		0.4									●	●					
	160408FNYL		0.8									●	●					
 UHG R-hand shown	VCET1103008 ^{R/L} UHG		0.08													H23 H25		
 1L	VCGT110202FN1L		0.2					●								H23		
 AZ7	VCGT110300FNAZ7		0.03					■	■	■						H23 H25		
	110301MFNAZ7		*0.08					■	■	■								
	110302MFNAZ7		*0.18					■	■	■								
	110304MFNAZ7		*0.38					■	■	■								
	VCGT110300AZ7		0.03					●	●	●								
	110301MAZ7		*0.08					●	●	●								
	110302MFZ7		*0.18					●	●	●								
 AM3	VCGT110300FNAM3		0.03								●					H23 H25		
	110301FNAM3		0.1					●	●	●								
	110302FNAM3		0.2					●	●	●								
	110302FNXAM3		0.2	●														
	110304FNXAM3		0.4	●														
	110301MFNAM3		*0.08					●	●	●	●							
	110302MFNAM3		*0.18					●	●	●	●							
	110304MFNAM3		*0.38					●	●	●	●							
 2M R-hand shown	VCGT130300F ^{R/L} 2M		0.03					●								H23		
	130301F ^{R/L} 2M		0.1					●										

* Inserts having 01M, 02M or 04M as the R code can be used for machining when the component drawing specifies that the radius is less than R=0.1, R=0.2 or R=0.4 respectively.
 ※ AZ7 chipbreaker was redesigned with 0.2mm higher cutting edge height than conventional ones, which has FN in the item numbers.

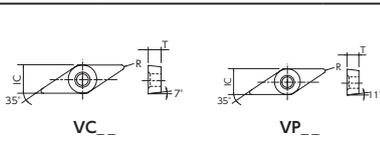
● : Standard stock ● : New standard stock ■ : Scheduled to be produced by order ★ : Standard stock (Specified)

Cermet and Carbide inserts

<35 degree Rhombic Positive type>

Part No.	Inscribed circle	Thickness	Relief angle
VC_1103	6.35	3.18	7°

Part No.	Inscribed circle	Thickness	Relief angle
VP_0802	4.76	2.38	11°
VP_1103	6.35	3.18	11°



Material	VC	VP
Steel	●	●
Stainless steel	●	●
Cast iron	●	●
Nonferrous metal	●	●
Heat-resistant alloy	●	●
Hardend material	●	●

● : First choice
● : Second choice

Shape	Part No.	Inch system	Nose Radius	Cermet grade		PVD cermet grade	PVD-coated micro-grain carbide grade				CVD-coated carbide grade		For applicable holder, see pages:	Chipbreaker applicable range
				T15	C7X	N40	Q15	C7Z	ZM3	QM3	VM1	TM4		
 U R-hand shown	VCGT110300 ^R / _L U		0.03											
	110301 ^R / _L U		0.1											
	110302 ^R / _L U		0.2											
	110301M ^R / _L U		*0.08											
	110302M ^R / _L U		*0.18											
 S R-hand shown	VCMT110301T ^R / _L AS		0.1	●		●								
	110302T ^R / _L AS		0.2	●		●								
	110304T ^R / _L AS		0.4	●		●								
 without chipbreaker	VCGW110300H		0.03									●		
	110301H		0.1									●		
	110302H		0.2									●		
 CL ※2	VCGT110301MCL		*0.08						●	●				
	110302MCL		*0.18						●	●				
 YL	VCGT110301MYL		0.08						●	●				
	110302MYL		0.18						●	●				
	110304MYL		0.38						●	●				
 KHG R-hand shown	VPET0802005 ^R / _L KHG		0.05						●	R				
	0802008 ^R / _L KHG		0.08						●	R	R			
	0802018 ^R / _L KHG		0.18						●	R				
	080202 ^R / _L KHG		0.2						●	R				
	VPET1103005 ^R / _L KHG		0.05						●	R				
	1103008 ^R / _L KHG		0.08						●	R				
 UHG R-hand shown	VPET0802008 ^R / _L UHG		0.08							●				
	VPET1103008 ^R / _L UHG		0.08											
	1103018 ^R / _L UHG		0.18											
 AM3	VPGT110300FNAM3		0.03						●	●				
	110301MFNAM3		*0.08						●	●	●			
	110302MFNAM3		*0.18						●	●	●			

H23
H25

H27

* Inserts having 01M, 02M or 04M as the R code can be used for machining when the component drawing specifies that the radius is less than R=0.1, R=0.2 or R=0.4 respectively.
 ※2 The specifications of CL chipbreaker are slightly different from the above dimensions, but it has no problem for machining.

● : Standard stock ● : New standard stock ■ : Scheduled to be produced by order ★ : Standard stock (Specified)

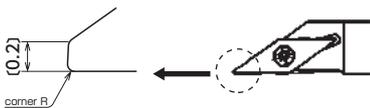
<TFV with Wiper edge>

Part No.	Inscribed circle	Thickness	Relief angle
TFV_11	6.35	3.18	7°

Shape	Part No.	Inch system	Nose Radius	Material Compatibility											For applicable holder, see pages:	Chipbreaker applicable range				
				Cermet grade			PVD cermet grade		PVD-coated micro-grain carbide grade				CVD-coated carbide grade				Carbide grade			
				T15	C7X	N40	Q15	C7Z	ZM3	QM3	VM1	TM4	DT4	DM4			CP1	CP7	KM1	
<p>TFV (VC_)</p>				Steel	●	●	●	●	●	●	●	●	●	●	●	●	●	●	● : First choice ● : Second choice	H23 H25
				Stainless steel	●	●	●	●	●	●	●	●	●	●	●	●	●			
				Cast iron	●	●	●	●	●	●	●	●	●	●	●	●	●			
				Nonferrous metal	●	●	●	●	●	●	●	●	●	●	●	●	●			
				Heat-resistant alloy	●	●	●	●	●	●	●	●	●	●	●	●	●			
				Hardend material	●	●	●	●	●	●	●	●	●	●	●	●	●			
	TFV11FR05U 11FR10U		0.05 0.10							●	●						H23 H25	—		
	TFV11FR05SX 11FR10SX		0.05 0.10							●	●									

● : Standard stock ● : New standard stock ■ : Scheduled to be produced by order ★ : Standard stock (Specified)

◆TFV features



- ※TFV has same shape with VCGT.
- It is designed to have a 0.2mm flat on the cutting on the toolholders.
- ※The flat ensures a superior surface even when feed rates are increased.
- ※TFV insert can be used on the toolholders with 91 degree cutting angle.

<80 degree Hexagon Positive type>

Part No.	Inscribed circle	Thickness	Relief angle
WC_0402	6.35	2.38	7°

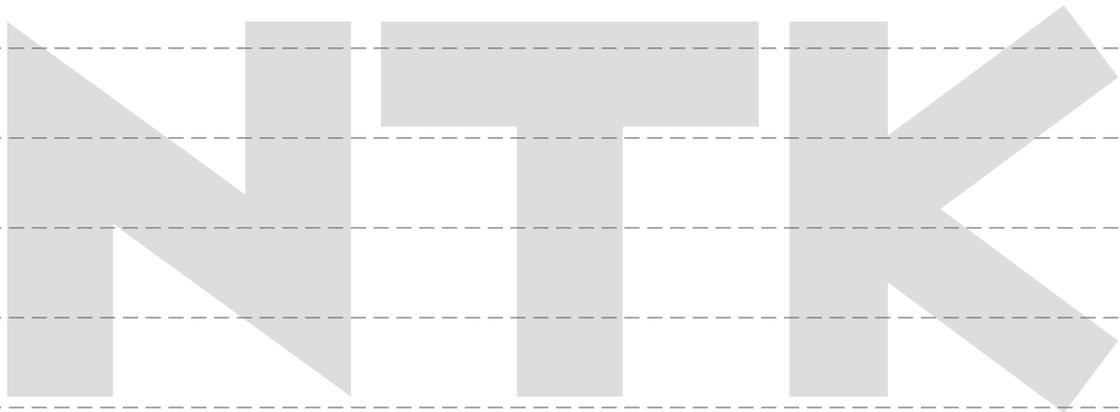
Shape	Part No.	Inch system	Nose Radius	Material Compatibility											For applicable holder, see pages:	Chipbreaker applicable range				
				Cermet grade			PVD cermet grade		PVD-coated micro-grain carbide grade				CVD-coated carbide grade				Carbide grade			
				T15	C7X	N40	Q15	C7Z	ZM3	QM3	VM1	TM4	DT4	DM4			CP1	CP7	KM1	
<p>WC_</p>				Steel	●	●	●	●	●	●	●	●	●	●	●	●	●	●	● : First choice ● : Second choice	
				Stainless steel	●	●	●	●	●	●	●	●	●	●	●	●	●			
				Cast iron	●	●	●	●	●	●	●	●	●	●	●	●	●			
				Nonferrous metal	●	●	●	●	●	●	●	●	●	●	●	●	●			
				Heat-resistant alloy	●	●	●	●	●	●	●	●	●	●	●	●	●			
				Hardend material	●	●	●	●	●	●	●	●	●	●	●	●	●			
	WCGT040201FNXAM3 AM3		0.1															H23 H25	—	

* Inserts having 01M, 02M or 04M as the R code can be used for machining when the component drawing specifies that the radius is less than R=0.1, R=0.2 or R=0.4 respectively.

● : Standard stock ● : New standard stock ■ : Scheduled to be produced by order ★ : Standard stock (Specified)

MEMO

New Products
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PCD, CBN and ceramic
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Micro-grain Carbide, Carbide
Insert Stock List
Outside Machining Toolholders
SS
Grooving Tools
Threading Tools
Shaper
Internal machining tool range
Original Tools for Various Applications
Indexable End Milling Tools
Indexable Drill Inserts
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G

Outside Machining Toolholders

- For 80° Rhombic CN type inserts G6
- For 55° Rhombic DN type inserts G10
- For Round RN type inserts G14
- For Square SN type inserts G16
- For Triangle TN type inserts G22
- For 35° Rhombic VN type inserts G26
- For 80° Hexagon WN type inserts G28
- For Machining Mill Rolls and Heat-Resistant Alloys .. G29

Outside Diameter Machining Toolholders

Chart for selecting NTK outside diameter machining toolholders

Application		Facing	Outside machining/Facing		Outside machining		
Lead Angle/Insert shape		75° CN□□Insert	95° CN□□Insert	95° WN□□Insert	75° CN□□Insert	75° TN□□Insert	75° SN□□Insert
Tooling illustration							
Tooling for ceramic or CBN inserts	Double clamp W Series		WCLN type ...G6	WWLM type ...G28 WWLN-2 type ...G28	WCBN type ...G8		
	Clamp-on T Series		TCLN type ...G6		TCBN type ...G8		
	Dimple clamp H Series		HCLN type ...G6				
	Clamp-on C Series	CCKN type ...G8	C31/CCLN type ...G6		CCBN type ...G8	C23 type ...G24	C11 type ...G18 C16 type ...G18
Tooling for general inserts	Lever locking P Series		PCLN type ...G6				PSBN type ...G18

Application		Outside/Profiling/Necking		Special machining		Outside/Chamfering
Lead Angle/Insert shape		107.5° DN□□Insert	117.5° VN□□Insert	Round R □□□		45° SN□□Insert
Tooling illustration						
Tooling for ceramic or CBN inserts	Double clamp W Series	WDHN type ...G12	WVPN type ...G26			WSDN type ...G16
	Clamp-on T Series					TSDN type ...G16
	Dimple clamp H Series	HDHN type ...G12	HVPN type ...G26			HSDN type ...G16
	Clamp-on C Series			C54/CRDN type ...G14	C55/CRGN type ...G14	C14 type/CSDN type ...G16
Tooling for general inserts	Lever locking P Series			PRGN type ...G15 PRGC type ...G15	PRXC type ...G15	PSDN type ...G16

NTK offers the following toolholder types classified by the lead angle, insert shape and clamping system:

Please select toolholders suitable for your machining application. For more information, please contact your nearest NTK dealer or sales branch.

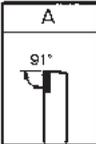
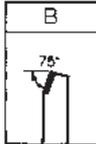
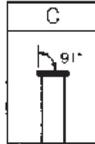
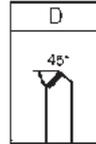
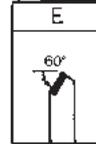
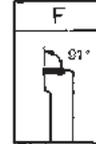
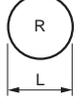
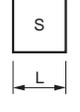
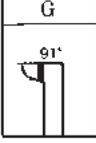
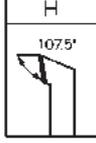
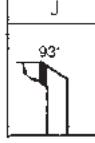
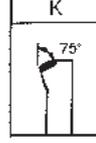
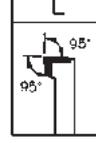
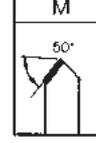
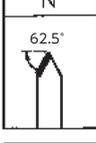
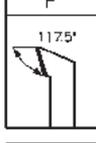
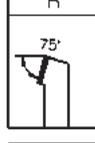
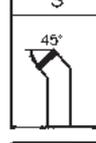
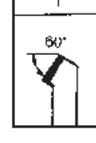
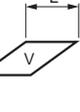
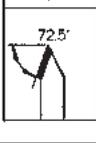
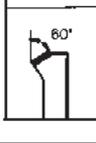
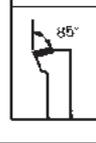
Outside machining				Outside machining/Profiling	Outside machining/Profiling/Necking
60° SN□□Insert	60° TN□□Insert	85° SN□□Insert	91° TN□□Insert	93° DN□□Insert	93° VN□□Insert
			WTGN type ... G22	WDJN type... G10	WVJN type... G26
			TTGN type... G22		
				HDJN type... G10	HVJN type... G26
C13 type... G18	C24 type... G24	CSHN type... G18	C21 type... G22 C22 type... G22	CDJN type... G10	
				PDJN type... G10	

Outside machining/Facing/Chamfering				Outside machining/Profiling	
75° SN□□Insert	85° SN□□Insert	45° SN□□Insert	91° TN□□Insert	72.5° VN□□Insert	62.5° DN□□Insert
		WSSN type... G16	WTFN type... G25	WVVN type ... G26	WDNN type ... G12
		TSSN type... G16	TTFN type... G25		
		HSSN type... G16		HVVN type... G26	HDNN type... G12
C15 type... G20	C17 type... G20	C12/CSSN type ... G16	C25 type... G25		

Identification system of toolholders

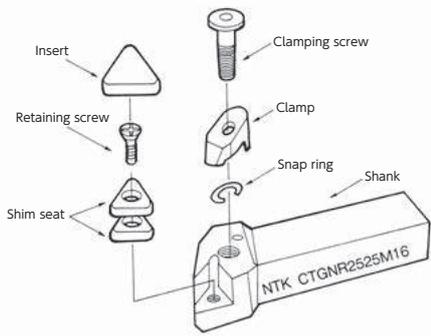
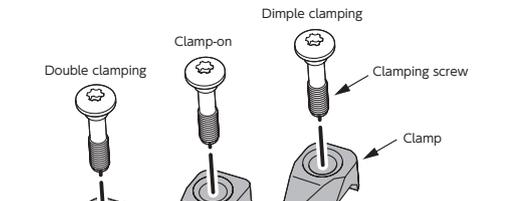
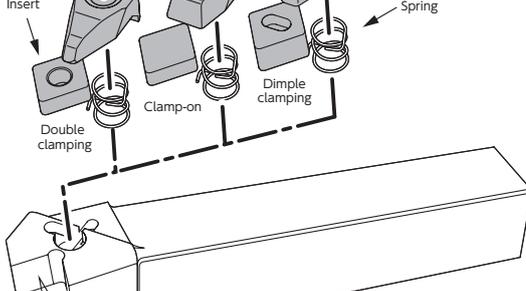
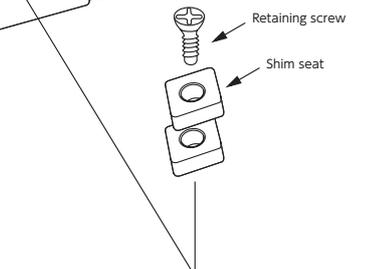
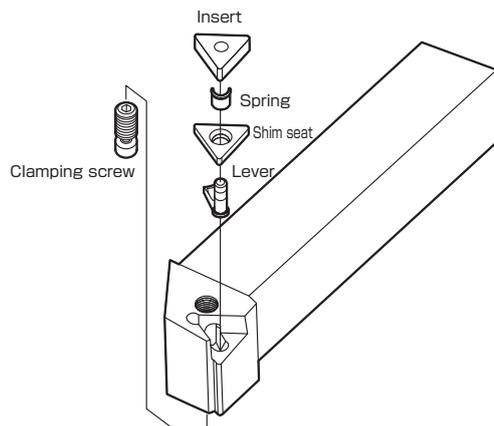
C : Clamp-on type (C type)	 T : Triangle	R : Right hand L : Left hand N : Neutral (Common for R and L)	Shank height indicated in "mm"	Shank width indicated in "mm"	Any ID symbol or number
P : Pin-lock type (P type)	 S : Square				
S : Screw-on type (Screw type)	 C : 80° rhombic				
W : Double clamping type (W type)	 D : 55° rhombic				
T : Clamp-on type (T type)	 V : 35° rhombic				
H : Dimple clamping type (H type)	 R : Round				
Clamping method	Insert shape	Hand of tool	Shank height	Shank width	Other ID data

C C L N R 25 25 M 12

Tool style or lead angle						Relief angle of the insert	Overall length (mm)	Insert size (cutting edge length)
							F: 80 H: 100 K: 125 L: 140 M: 150 N: 160 P: 170 Q: 180 R: 200 S: 250	 
								
								 
		X 特殊刃刃						

• The dimensions and specifications may be changed due to design improvement without notice.

Structures and Features of NTK Toolholders for Outside Machining

Series	Structure	Features
C type : Clamp-on		<ul style="list-style-type: none"> ● Secures the insert with high clamping force ● Excellent in indexing accuracy ● Suitable for heavy-duty applications including interrupted cut machining ● Clamping system for ceramic cutting tools
W type : Double clamping		<ul style="list-style-type: none"> ● Three different clamping methods can be utilized by a simple clamp change
T type : Clamp-on		<ul style="list-style-type: none"> ● Best for ceramic tools, with stronger and more accurate clamping with the improved clamp system ● Prevents insert breakage by optimizing the clamping force ● Allows for highly accurate machining with highly repeatable accuracy
H type : Dimple clamping		<ul style="list-style-type: none"> ● Inserts can be easily changed as clamping is possible from the front and back of the tool
P type : Lever lock		<ul style="list-style-type: none"> ● General-purpose toolholder ● Allows for smooth chip control without fouling any clamping mechanism ● For inserts of all material grades however not recommended for ceramics

Outside machining/Facing

C31 type/CCLN type

Clamp-on

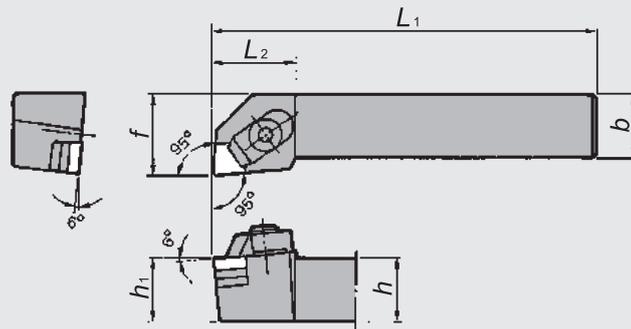


Figure-1

●Right-hand shown.

PCLN type

Lever lock

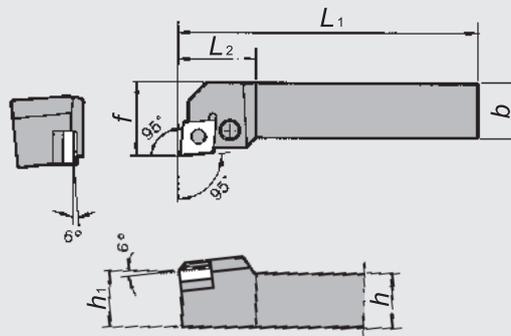


Figure-2

●Right-hand shown.

Multi-clamp holder

TCLN type

Clamp-on

WCLN type

Double clamping

HCLN type

Dimple clamping

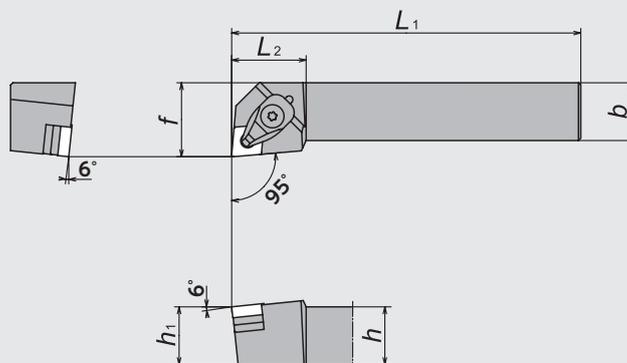


Figure-3

●Right-hand shown.

New Products
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■ Dimensions of toolholders and the parts

Shape	Code No.		Toolholder Part No.	Stock		Dimensions (mm)						Clamp	Shim seat	Clamping screw	Retaining screw	Wrench	Snap ring
	R	L		R	L	h	b	L ₁	h ₁	f	L ₂						
Figure-1		5538293	C31 $\frac{R}{L}$ - 33	●	●	19	19	140	19	25	32	CC08M* (CC08W)	ACN422	BS0829W	M3 * 12	LW-4	SR08
			-34			25	19	160	25	25	32			BS0835W			
	5538301	5538319	-44	●	●	25	25	160	25	32	32						
	5601422	5601430	-45	●	●	32	25	160	32	32	32						
	5700315	5700299	CCLN $\frac{R}{L}$ 3225P12	●	●	32	25	170	32	32	32						
Figure-2	5321997	5322003	PCLN $\frac{R}{L}$ 2020K43	●	●	20	20	125	20	25	28	—	LSC42	Lever	Clamping screw	LW-3	Spring
	5322011	5322029	2525M43	●	●	25	25	150	25	32	28			LCL4	LCS4		LSP4

※CC08W clamp incorporates a hard carbide facing to eliminate excessive wear from the chip flow.
 ※For other shank sizes, please contact us for more information.

■ Dimensions of toolholders and the parts/ Multi-clamp holder

Shape	Code No.		Toolholder Part No.	Stock		Dimensions (mm)						Clamp	Shim seat	Clamping screw	Retaining screw	Wrench	Shim wrench	Spring							
	R	L		R	L	h	b	L ₁	h ₁	f	L ₂														
Figure-3	5701610	5701628	TCLN $\frac{R}{L}$ 2525M12	●	●	25	25	150	25	32	32	TC6CN Clamp-on	ACN423	AOS-6 *30W* screw-able from both ends	FSS15- 3.0*12	LLR-T20	LLR-T10	ASGL6-D							
	5701131	5701636	3225P12	●	●	32	25	170	32	32	32														
			3232P12			32	32	170	32	39	32														
		5682570	5682588	WCN $\frac{R}{L}$ 2525M12	●	●	25	25	150	25	32	32							DC6CN Double clamping						
		5682604	5682612	3225P12	●	●	32	25	170	32	32	32													
				3232P12			32	32	170	32	39	32													
		5701149	5701156	HCLN $\frac{R}{L}$ 2525M12	●	●	25	25	150	25	32	32							HC6CN Dimple clamping						
		5701875	5701883	3225P12	●	●	32	25	170	32	32	32													
			3232P12			32	32	170	32	39	32														

※AOS-6*30WH is an option for hexagonal hole type screw.

■ Applicable inserts

	Toolholder Part No.	Applicable insert	Listed on pages
Figure-1	C31 $\frac{R}{L}$...* CCLN $\frac{R}{L}$ 12 *	CN□N1204 (1207)	F5
Figure-2	PCLN $\frac{R}{L}$... 43	CN□A1204 CN□G1204	F4 • 16 • 24 • 25
Figure-3	TCLN $\frac{R}{L}$... 12 *	CN□N1204 (1207)	F5
	WCN $\frac{R}{L}$... 12 *	CN□A1204 (1207) CN□G1204 (1207)	F4 • 16 • 24 • 25
	HCLN $\frac{R}{L}$... 12	CN□X1207	F5

※A holder having the dimension "h" of 25 or greater comes with two shim seats. An insert "7.94-mm thick" can be also mounted by removing one of the shim seats.

Multi-clamp holder
 Just changing the clamps enables the holder to clamp pin type, flat or dimple style inserts.

Outside machining/Facing

CCBN type

Clamp-on

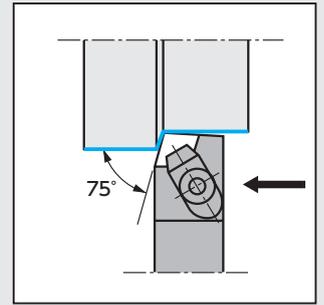
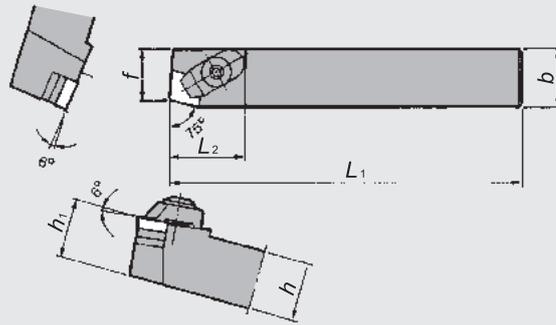


Figure-1

● Right-hand shown.

CCKN type

Clamp-on

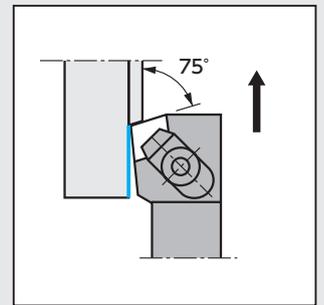
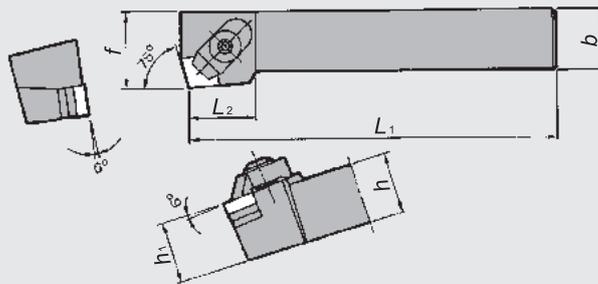


Figure-2

● Right-hand shown.

Multi-clamp holder

TCCBN type

Clamp-on

WCBBN type

Double clamping

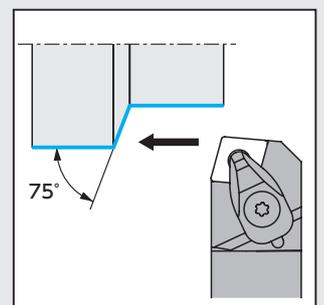
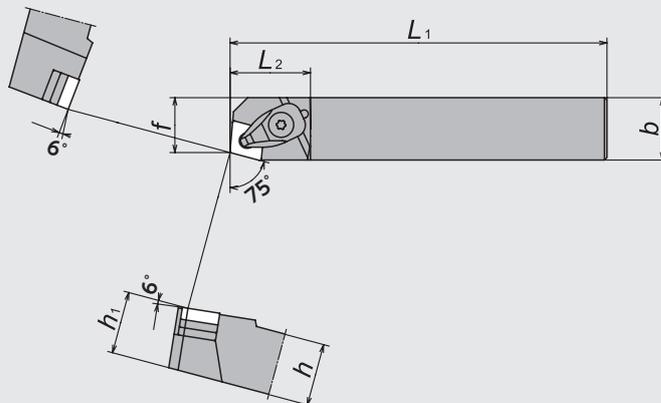


Figure-3

● Right-hand shown.

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■ Dimensions of toolholders and the parts

Shape	コードNo.		Toolholder Part No.	Stock		Dimensions (mm)						Clamp	Shim seat	Clamping screw	Retaining screw	Wrench	Snap ring
	R	L		R	L	h	b	L ₁	h ₁	f	L ₂						
Figure-1	5830617		CCBN[®] 2525M12	●		25	25	150	25	22	32	CC08M* (CC08W)	ACN422	BS0835W	M3 * 12	LW-4	SR08
Figure-2	5613690		CCKN[®] 2525M12	●		25	25	150	25	32	30						

※CC08W clamp incorporates a hard carbide facing to eliminate excessive wear from the chip flow.
 ※For other shank sizes, please contact us for more information.

■ Dimensions of toolholders and the parts/ Multi-clamp holder

Shape	Code No.		Toolholder Part No.	Stock		Dimensions (mm)						Clamp	Shim seat	Clamping screw	Retaining screw	Wrench	Shim wrench	Spring
	R	L		R	L	h	b	L ₁	h ₁	f	L ₂							
Figure-3	5701644	5701651	TCBN[®] 2525M12	●	●	25	25	150	25	22	32	TC6CN Clamp-on	ACN423	AOS-6 *30W* screw-able from both ends	FSS15- 3.0 * 12	LLR-T20	LLR-T10	ASGL6-D
			3225P12			32	25	170	32	22	32							
			3232P12			32	32	170	32	29	32							
	5682620	5682638	WCBN[®] 2525M12	●	●	25	25	150	25	22	32	DC6CN Double clamping						
		3225P12			32	25	170	32	22	32								
		3232P12			32	32	170	32	29	32								

※AOS-6*30WH is an option for hexagonal hole type screw.

■ Applicable inserts

	Toolholder Part No.	Applicable insert	Listed on pages
Figure-1	CCBN[®] 2525M12	CN□N1204 (1207) 	F5
Figure-2	CCKN[®] 2525M12	CN□N1204 (1207) 	F5
Figure-3	TCBN[®] ...12	CN□N1204 (1207) 	F5
	WCBN[®] ...12	CN□A1204 (1207)  CN□G1204 (1207)	F4 • 16 • 24 • 25

Multi-clamp holder

Just changing the clamps enables the holder to clamp pin type, flat or dimple style inserts.

※A holder having the dimension "h" of 25 or greater comes with two shim seats. An insert "7.94-mm thick" can be also mounted by removing one of the shim seats.

Outside machining/Profiling

CDJN type

Clamp-on

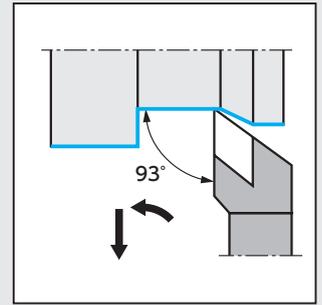
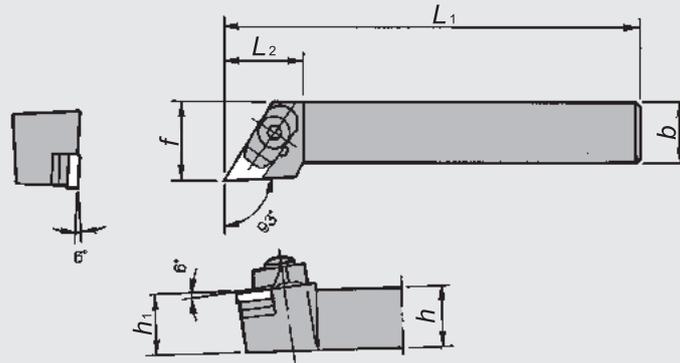


Figure-1

● Right-hand shown.

PDJN type

Lever lock

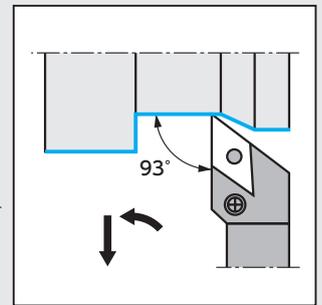
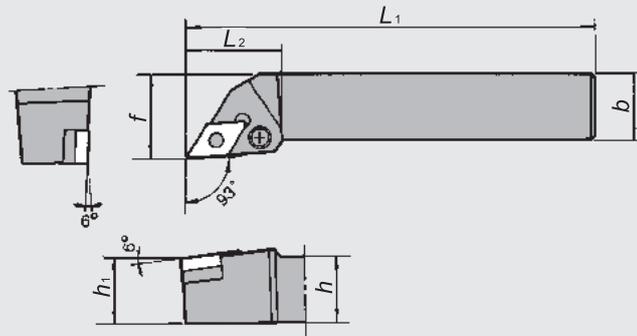


Figure-2

● Right-hand shown.

Multi-clamp holder

WDJN type

Double clamping

HDJN type

Dimple clamping

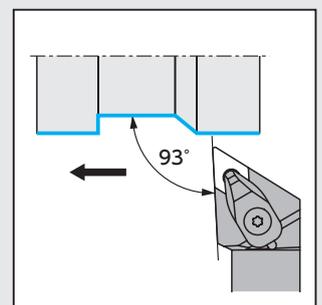
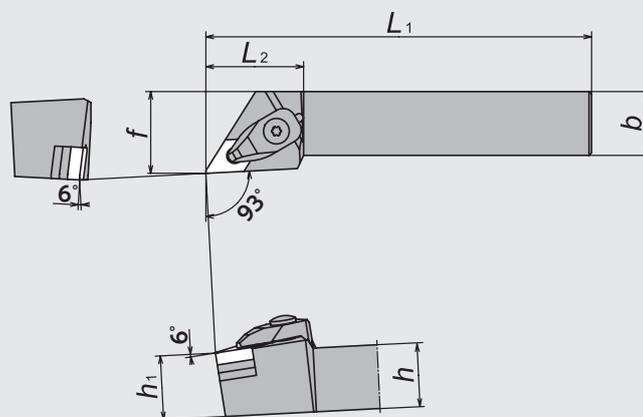


Figure-3

● Right-hand shown.

■ Dimensions of toolholders and the parts

Shape	Code No.		Toolholder Part No.	Stock		Dimensions (mm)						Clamp	Shim seat	Clamping screw	Retaining screw	Wrench	Snap ring
	R	L		R	L	h	b	L ₁	h ₁	f	L ₂						
Figure-1			CDJN 1/2 2525M15			25	25	150	25	32	32		ADN422	BS0835W	M3 * 12	LW-4	SR08
			3225P15			32	25	170	32	32	32						
Figure-2	5682463		PDJN 1/2 2525M43	●		25	25	150	25	32	32	—	LSD42	Lever	Clamping screw	LW-3	Spring

※CC08W clamp incorporates a hard carbide facing to eliminate excessive wear from the chip flow.
 ※For other shank sizes, please contact us for more information.

■ Dimensions of toolholders and the parts/ Multi-clamp holder

Shape	Code No.		Toolholder Part No.	Stock		Dimensions (mm)						Clamp	Shim seat	Clamping screw	Retaining screw	Wrench	Shim wrench	Spring
	R	L		R	L	h	b	L ₁	h ₁	f	L ₂							
Figure-3	5682729	5682737	WDJN 1/2 2525M15	●	●	25	25	150	25	32	38		ADN423	AOS-6 * 30W* screw-able from both ends	FSS15-3.0 * 12	LLR-T20	LLR-T10	ASGL6-D
	5682745	5682752	3225P15	●	●	32	25	170	32	32	38							
			3232P15			32	32	170	32	32	38							
	5701263	5701271	HDJN 1/2 2525M15	●	●	25	25	150	25	32	38							
	5701289	5701297	3225P15	●	●	32	25	170	32	32	38							
			3232P15			32	32	170	32	39	38							

※AOS-6*30WH is an option for hexagonal hole type screw.

■ Applicable inserts

	Toolholder Part No.	Applicable insert	Listed on pages
Figure-1	CDJN 1/2 ...15*	DN□N1504 (1507)	F6
Figure-2	PDLN 1/2 ...43	DN□A DN□G1504	F6 · 17 · 25 · 26
Figure-3	WDJN 1/2 ...15*	DN□A1504 (1507) DN□G (1507)	F6 · 17 · 25 · 26
	HDJN 1/2 ...15	DN□X1507	F6

※A holder having the dimension "h" of 25 or greater comes with two shim seats. An insert "7.94-mm thick" can be also mounted by removing one of the shim seats.

Multi-clamp holder

Just changing the clamps enables the holder to clamp pin type, flat or dimple style inserts.

Outside machining/Profiling

Multi-clamp holder

WDHN type

Double clamping

HDHN type

Dimple clamping

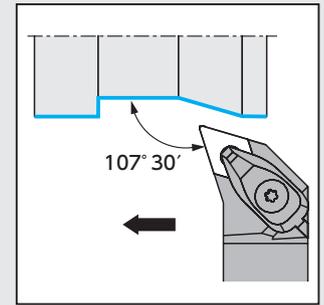
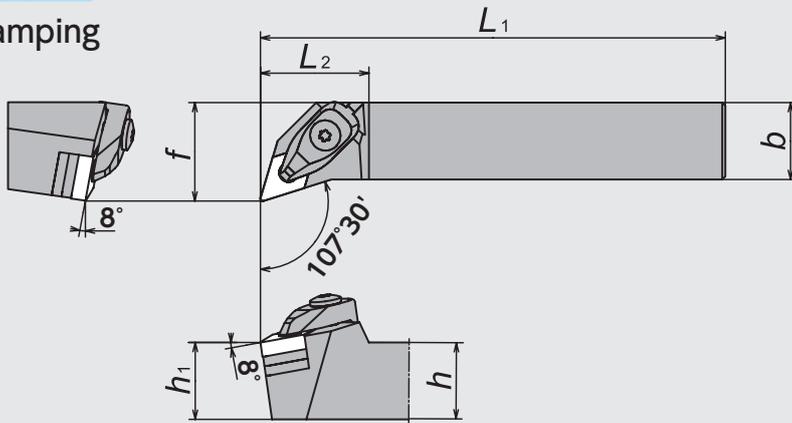


Figure-1

● Right-hand shown.

WDNN type

Double clamping

HDNN type

Dimple clamping

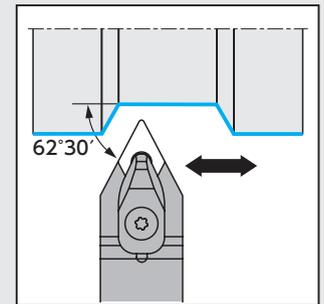
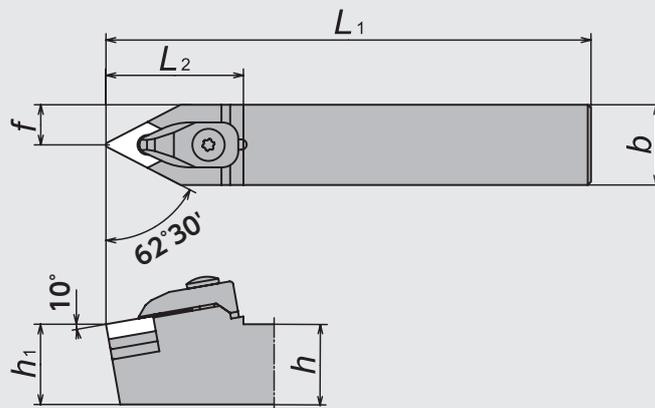


Figure-2

■ Dimensions of toolholders and the parts/ Multi-clamp holder

Shape	Code No.		Toolholder Part No.	Stock		Dimensions (mm)						Clamp	Shim seat	Clamping screw	Retaining screw	Wrench	Shim wrench	Snap ring
	R	L		R	L	h	b	L ₁	h ₁	f	L ₂							
Figure-1	5682778	5682786	WDHN [®] L2525M15	●	●	25	25	150	25	32	35	DC6DN Double clamping	ADN423	AOS-6 *30W*	FSS15- 3.0*12	LLR-T20	LLR-T10	ASGL6-D
			3225P15			32	25	170	32	32	35							
			3232P15			32	32	170	32	39	35							
	5701313	5701321	HDHN [®] L2525M15	●	●	25	25	150	25	32	35	HC6DN Dimple clamping						
			3225P15			32	25	170	32	32	35							
			3232P15			32	32	170	32	39	35							
Figure-2	5682760		WDNNN2525M15	●		25	25	150	25	12.5	42.5	DC6DN Double clamping	ADN423	AOS-6 *30W* screw-able from both ends	FSS15- 3.0*12	LLR-T20	LLR-T10	ASGL6-D
			3225P15			32	25	170	32	12.5	42.5							
			3232P15			32	32	170	32	16.0	42.5							
	5701305		HDNNN2525M15	●		25	25	150	25	12.5	42.5	HC6DN Dimple clamping						
			3225P15			32	25	170	32	12.5	42.5							
			3232P15			32	32	170	32	16	42.5							

※AOS-6*30WH is an option for hexagonal hole type screw.

■ Applicable inserts

	Toolholder Part No.	Applicable insert	Listed on pages
Figure-1	WDHN [®] L...15*	DN□A1504 (1507)	 F6 • 17 • 25 • 26
	HDHN [®] L...15	DN□X1507	 F6
Figure-2	WDNNN...15*	DN□A1504 (1507)	 F6 • 17 • 25 • 26
	HDNNN...15	DN□X1507	 F6

Multi-clamp holder

Just changing the clamps enables the holder to clamp pin type, flat or dimple style inserts.

※A holder having the dimension "h" of 25 or greater comes with two shim seats. An insert "7.94-mm thick" can be also mounted by removing one of the shim seats.

Outside machining/Profiling

C54 type/CRDN type

Clamp-on

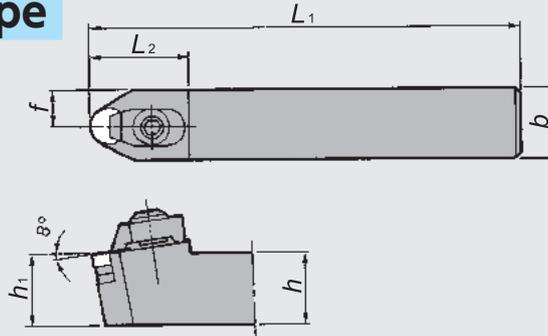
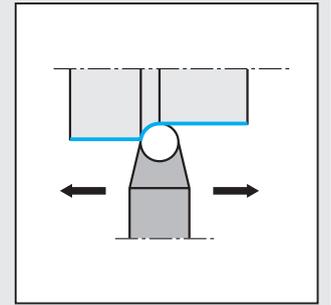


Figure-1



C55 type/CRGN type

Clamp-on

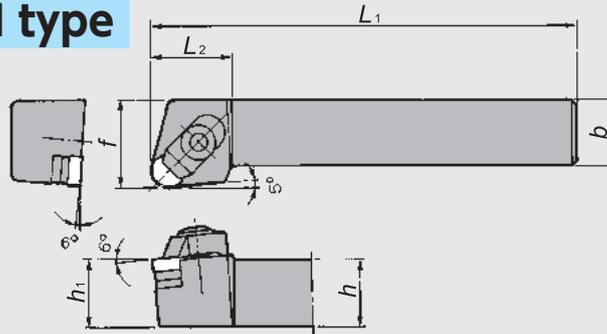
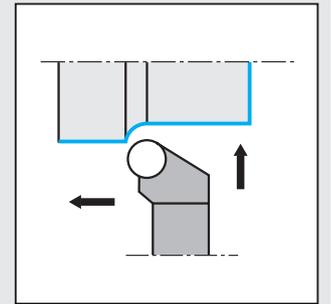


Figure-2



● Right-hand shown.

Dimensions of toolholders and the parts

Shape	Code No.		Toolholder Part No.	Stock		Dimensions (mm)						Clamp	Shim seat	Clamping screw	Retaining screw	Wrench	Shim wrench
	R	L		R	L	h	b	L ₁	h ₁	f	L ₂						
Figure-1		5538392	C54M-44	●		25	25	160	25	12.5	33	CC08M	ARN42	BS0835W	M3 * 12	LW-4	SR08
		5700323	CRDNN2525M12	●		25	25	150	25	12.5	34						
		5700331	3225P12	●		32	25	170	32	12.5	34						
Figure-2		5538400	C55^RL-33	●		19	19	140	19	28	30	CC08M	ARN42	BS0829W	M3 * 12	LW-4	SR08
		5573027	-44	●	●	25	25	160	25	30	30						
		5768221	-45	●		32	25	160	32	30	30						
		5829395	CRGN^RL3225P12	●		32	25	170	32	32	30						

Applicable inserts

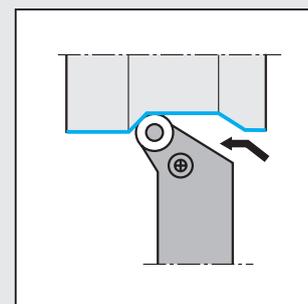
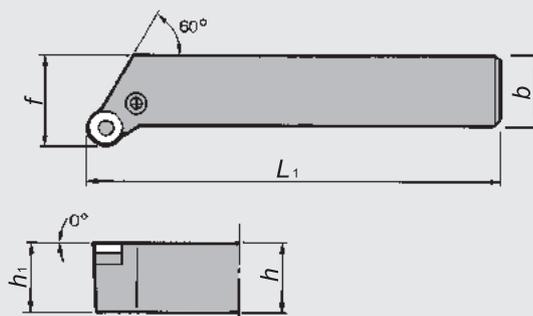
	Toolholder Part No.	Applicable insert	Listed on pages
Figure-1	C54M-...	RN□N1204 (1207)	F7 • 18
	CRDNN...12		
Figure-2	C55 ^R L-...	RN□N1204 (1207)	F7 • 18
	CRGN ^R L...-12		

*A holder having the dimension "h" of 25 or greater comes with two shim seats. An insert "7.94-mm thick" can be also mounted by removing one of the shim seats.

Outside machining/Profiling

PRGC type

Lever lock

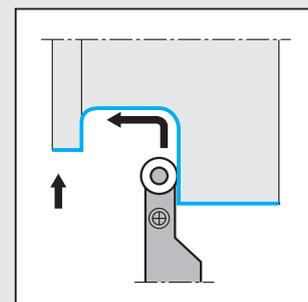
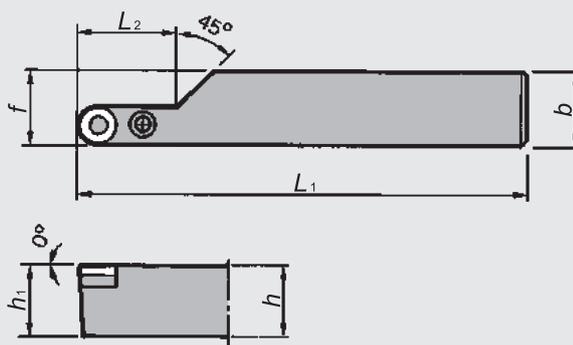


●Right-hand shown.

Figure-1

PRXC type

Lever lock

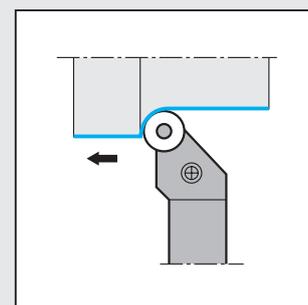
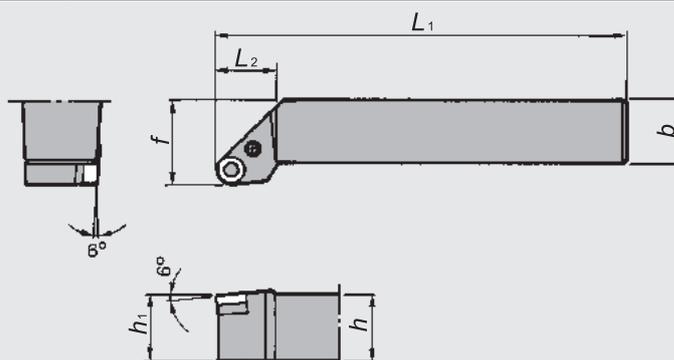


●Right-hand shown.

Figure-2

PRGN type

Lever lock



●Right-hand shown.

Figure-3

Dimensions of toolholders and the parts

Shape	Code No.		Toolholder Part No.	Stock		Dimensions (mm)						Shim seat	Lever	Clamping screw	Spring	Wrench
	R	L		R	L	h	b	L ₁	h ₁	f	L ₂					
Figure-1			PRGC ^{R/L} 2020K10			20	20	125	20	25		LSR32C	LCL3C	LCS2	LSP3	LW-2
			2525M12			25	25	150	25	32		LSR42C	LCL4C	LCS3		LW-2.5
Figure-2			PRXC ^{R/L} 2020K10			20	20	125	20	20.5	25	LSR32C	LCL3C	LCS2	LSP3	LW-2
			2525M12			25	25	150	25	25.7	30	LSR42C	LCL4C	LCS3		LW-2.5
Figure-3			PRGN ^{R/L} 2525M43			25	25	150	25	32	32	LSR42	LCL4	LCS4	LSP4	LW-3

Applicable inserts

	Toolholder Part No.	Applicable insert	Listed on pages
Figure-1	PRGC ^{R/L} ...10	RCMX32M0GM	F41
	PRGC ^{R/L} ...12	RCMX43M0GM	
Figure-2	PRXC ^{R/L} ...10	RCMX32M0GM	
	PRXC ^{R/L} ...12	RCMX43M0GM	
Figure-3	PRGN ^{R/L} ...43	RNMG430G	F26

Outside machining/Facing

C14 type/CSDN type

Clamp-on

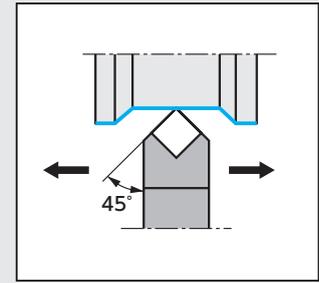
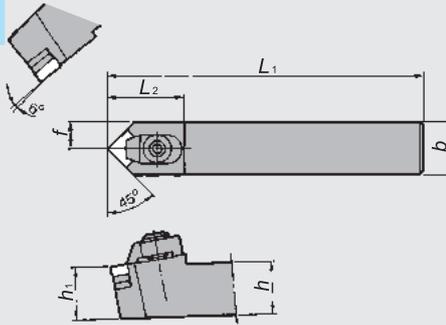
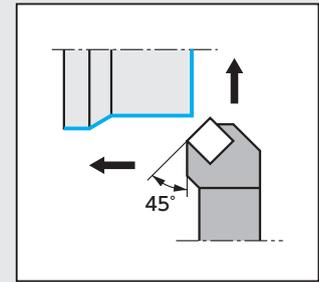
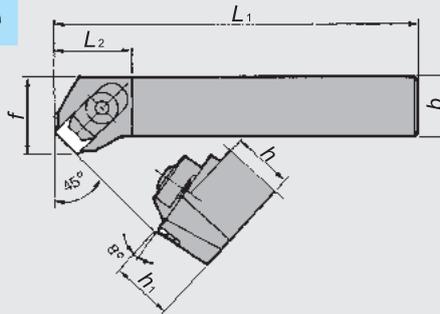


Figure-1

C12 type/CSSN type

Clamp-on



● Right-hand shown.

Figure-2

PSDN type

Lever lock

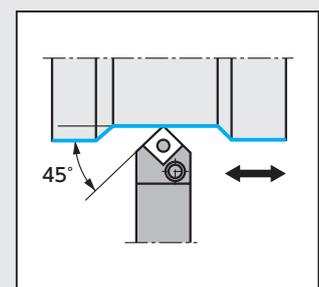
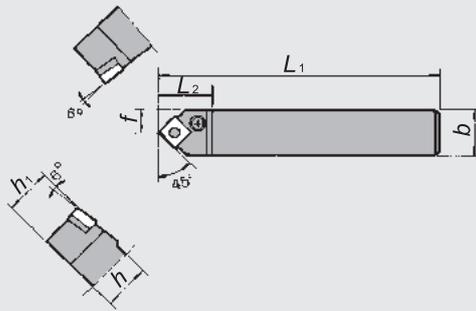
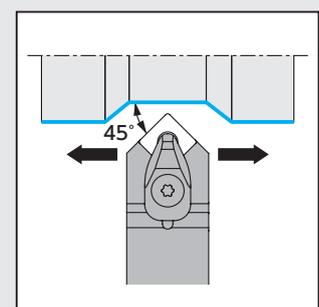
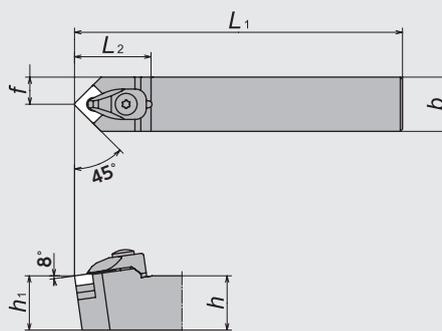


Figure-3

Multi-clamp holder

TSDN type

Clamp-on



WSDN type

Double clamping

HSDN type

Dimple clamping

Figure-4

TSSN type

Clamp-on

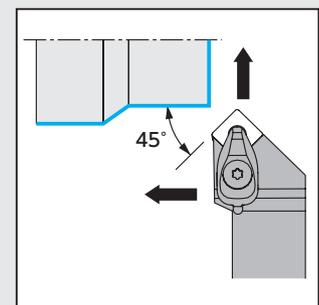
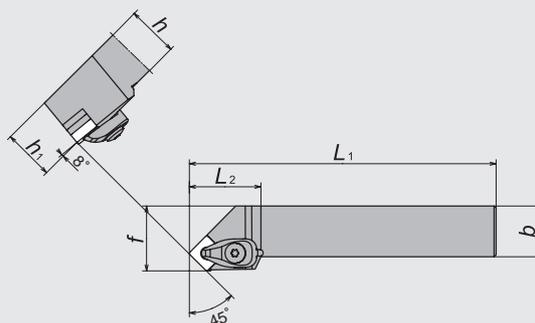
WSSN type

Double clamping

HSSN type

Dimple clamping

Figure-5



● Right-hand shown.

■ Dimensions of toolholders and the parts

Shape	Code No.		Toolholder Part No.	Stock		Dimensions (mm)						Clamp	Shim seat	Clamping screw	Retaining screw	Wrench	Snap ring	
	R	L		R	L	h	b	L ₁	h ₁	f	L ₂							
Figure-1	5538327		C14M-33	●		19	19	140	19	9.5	35	CC08M* (CC08W)	ASN423	BS0829W	M3 * 12	LW-4	SR08	
	5538335		-34	●		25	19	160	25	9.5	35			BS0835W				
	5538343		-44	●		25	25	160	25	12.5	35							
	5638036		-45	●		32	25	160	32	12.5	35							
	5700349		CSDNN2525M12	●		25	25	150	25	12.5	35							
Figure-2	5538178	5538186	C12^R/_L-33	●	●	19	19	140	19	27	28	CC08MS* (CC08WS)	ASN423	BS0829W	M3 * 12	LW-4	SR08	
	5538194	5538202	-44	●	●	25	25	160	25	35	31			CC08M* (CC08W)				BS0835W
	5620869	5637277	-45	●	●	32	25	160	32	35	31							
		5700448	CSSN^R/_L2525M12	●		25	25	150	25	32	31							
		5857172	3225P12	●		32	25	170	32	32	31							
Figure-3	5523451		PSDNN2020K43	●		20	20	125	20	10	30	—	LSS42		Lever	Clamping screw	LW-3	
	5764006		2525M43	●		25	25	150	25	12.5	30			LCL4	LCS4	LSP4		

※CC08W clamp incorporates a hard carbide facing to eliminate excessive wear from the chip flow.
 ※For other shank sizes, please contact us for more information.

■ Dimensions of toolholders and the parts / Multi-clamp holder

Shape	Code No.		Toolholder Part No.	Stock		Dimensions (mm)						Clamp	Shim seat	Clamping screw	Retaining screw	Wrench	Shim Wrench	Spring							
	R	L		R	L	h	b	L ₁	h ₁	f	L ₂														
Figure-4	5701784		TSDNN2525M12	●		25	25	150	25	12.5	35	TC6CN Clamp-on	ASN423	AOS-6 *30W* screw-able from both ends	FSS15- 3.0*12	LLR-T20	LLR-T10	ASGL6-D							
	5701792		3225P12	●		32	25	170	32	12.5	35														
			3232P12			32	32	170	32	16	35														
	Figure-5	5682935		WSDNN2525M12	●		25	25	150	25	12.5	35							DC6CN Double clamping	ASN423	AOS-6 *30W* screw-able from both ends	FSS15- 3.0*12	LLR-T20	LLR-T10	ASGL6-D
		5682943		3225P12	●		32	25	170	32	12.5	35													
				3232P12			32	32	170	32	16.0	35													
		5701503		HSDNN2525M12	●		25	25	150	25	12.5	35													
5701511		3225P12	●		32	25	170	32	12.5	35															
		3232P12			32	32	170	32	16	35															
Figure-5	5701768	5701776	TSSN^R/_L2525M12	●	●	25	25	150	25	32	35	TC6CN Clamp-on	ASN423	AOS-6 *30W* screw-able from both ends	FSS15- 3.0*12	LLR-T20	LLR-T10	ASGL6-D							
			3225P12			32	25	170	32	32	35														
			3232P12			32	32	170	32	39	35														
	Figure-5	5682901	5682919	WSSN^R/_L2525M12	●	●	25	25	150	25	32	35							DC6CN Double clamping	ASN423	AOS-6 *30W* screw-able from both ends	FSS15- 3.0*12	LLR-T20	LLR-T10	ASGL6-D
				3225P12			32	25	170	32	32	35													
				3232P12			32	32	170	32	39	35													
		5701487	5701495	HSSN^R/_L2525M12	●	●	25	25	150	25	32	35													
		3225P12			32	25	170	32	32	35															
		3232P12			32	32	170	32	39	35															

※AOS-6*30WH is an option for hexagonal hole type screw.

■ Applicable inserts

	Toolholder Part No.	Applicable insert	Listed on pages
Figure-1	C14M-...* CSDNN...12*	SN□N1204 (1207)	F8 ~ 9 • 18 • 28
Figure-2	C12^R/_L-...* CSSN^R/_L...12*	SN□A SN□G1204	F8 • 18 • 27~28
Figure-3	PSDNN...12	SN□A SN□G1204	F8 • 18 • 27~28

Multi-Clamp holder
 Just changing the clamps enables the holder to clamp pin type, flat or dimple style inserts.

	Toolholder Part No.	Applicable insert	Listed on pages
Figure-4	TSDNN...12*	SN□N1204 (1207)	F8 ~ 9 • 18 • 28
	WSDNN...12*	SN□A SN□G1204 (1207)	F8 • 18 • 27~28
	HSDNN...12	SN□X1207	F9
Figure-5	TSDNN...12*	SN□N1204 (1207)	F8 ~ 9 • 18 • 28
	WSDNN...12*	SN□A SN□G1204 (1207)	F8 • 18 • 27~28
	HSDNN...12	SN□X1207	F9

※A holder having the dimension "h" of 25 or greater comes with two shim seats. An insert "7.94-mm thick" can be also mounted by removing one of the shim seats.

Outside machining

C13 type

Clamp-on

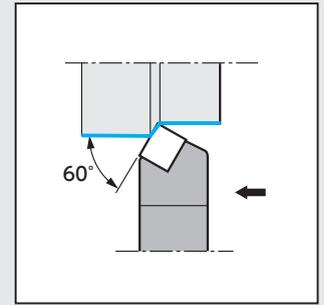
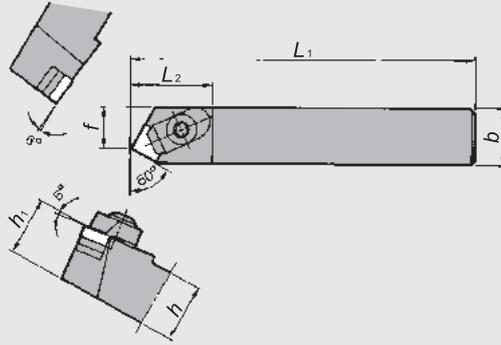


Figure-1

● Right-hand shown.

C11 type

Clamp-on

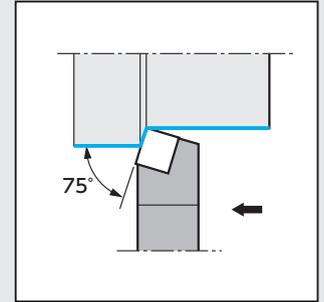
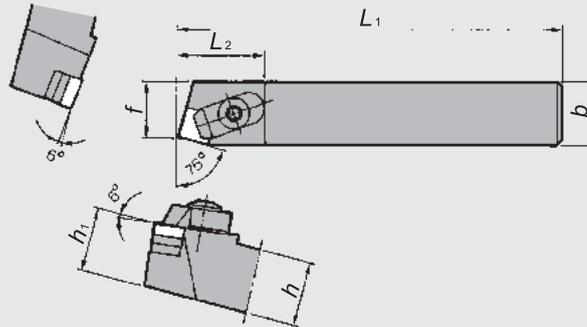


Figure-2

● Right-hand shown.

C16 type

Clamp-on

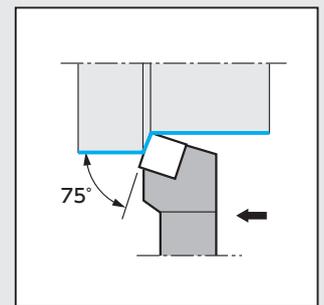
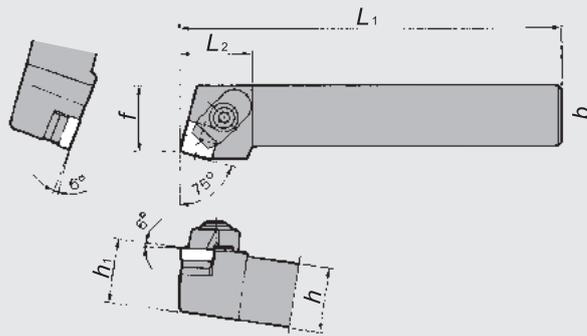


Figure-3

● Right-hand shown.

CSHN type

Clamp-on

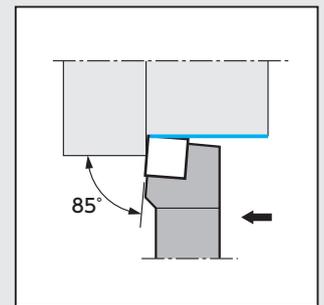
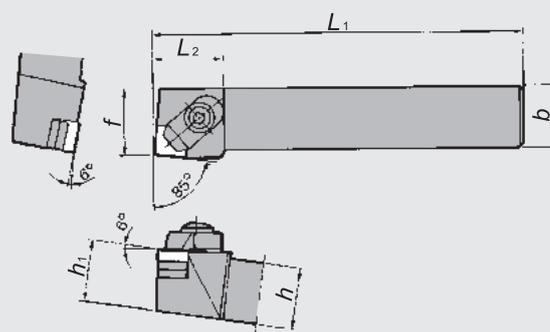


Figure-4

● Right-hand shown.

PSBN type

Lever lock

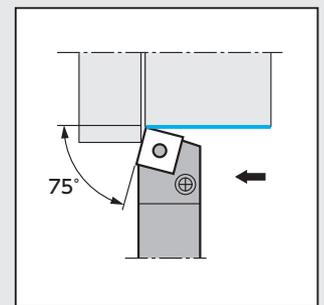
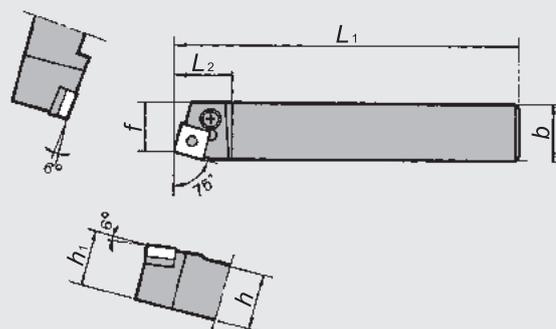


Figure-5

● Right-hand shown.

■ Dimensions of toolholders and the parts

Shape	Code No.		Toolholder Part No.	Stock		Dimensions (mm)						Clamp	Shim seat	Clamping screw	Retaining screw	Wrench	Snap ring
	R	L		R	L	h	b	L ₁	h ₁	f	L ₂						
Figure-1	5538244	5538251	C13^R┘-33	●	●	19	19	140	19	12.5	35	CC08M* (CC08W)	ASN423	BS0829W	M3 * 12	LW-4	SR08
	5538269		-34	●		25	19	160	25	12.5	35			BS0835W			
	5538277	5538285	-44	●	●	25	25	160	25	18.5	35						
	5684816	5802863	-45	●	●	32	25	160	32	18.5	35						
Figure-2	5538608	5538616	C11^R┘-33	●	●	19	19	140	19	15.5	34	CC08M* (CC08W)	ASN423	BS0829W	M3 * 12	LW-4	SR08
	5538624		-34	●		25	19	160	25	15.5	34			BS0835W			
	5538632	5538640	-44	●	●	25	25	160	25	21.5	34						
	5778170	5710876	-45	●	●	32	25	160	32	21.5	34						
Figure-3	5538350	5538368	C16^R┘-33	●	●	19	19	140	19	22	32	CC08M* (CC08W)	ASN423	BS0829W	M3 * 12	LW-4	SR08
	5538376	5538384	-44	●	●	25	25	160	25	25	25			BS0835W			
	5684824	5746862	-45	●	●	32	25	160	32	25	25						
Figure-4	5692488	5692470	CSHN^R┘2525M12	●	●	25	25	150	25	27	30	CC08M* (CC08W)	ASN423	BS0835W	M3 * 12	LW-4	SR08
Figure-5	5934518	5934492	PSBN^R┘2020K43	●	●	20	20	125	20	17	28	—	LSS42	Lever	Clamping screw	LW-3	Spring
																	
														LCL4	LCS4		LSP4

※CC08W clamp incorporates a hard carbide facing to eliminate excessive wear from the chip flow.
 ※For other shank sizes, please contact us for more information.

■ Applicable inserts

	Toolholder Part No.	Applicable insert	Listed on pages
Figure-1	C13 ...*	SN□N1204 (1207) 	F8 ~ 9 • 18 • 28
Figure-2	C11 ...*		
Figure-3	C16 ...*		
Figure-4	CSHN ...*12*		
Figure-5	PSBN ...*43	SN□A1204 SN□G1204 	F8 • 18 • 27 ~ 28

※A holder having the dimension "h" of 25 or greater comes with two shim seats. An insert "7.94-mm thick" can be also mounted by removing one of the shim seats.

Facing

C15 type

Clamp-on

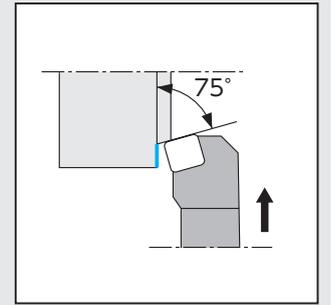
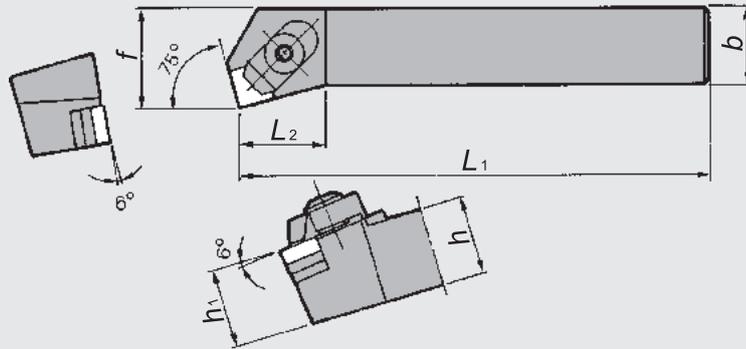


Figure-1

● Right-hand shown.

C17 type

Clamp-on

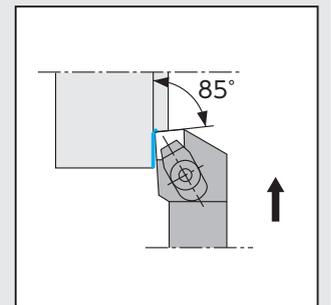
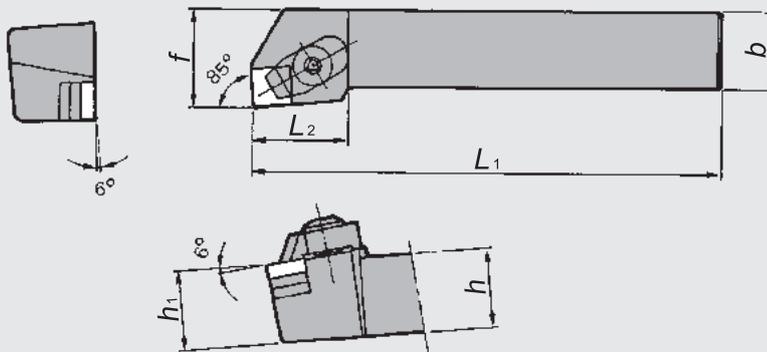


Figure-2

● Right-hand shown.

■ Dimensions of toolholders and the parts

Shape	Code No.		Toolholder Part No.	Stock		Dimensions (mm)						Clamp	Shim seat	Clamping screw	Retaining screw	Wrench	Snap ring
	R	L		R	L	h	b	L ₁	h ₁	f	L ₂						
Figure-1	5566070	5538210	C15^R_L-33	●	●	19	19	140	19	25	29	CC08M* (CC08W)	ASN423	BS0829W	M3 * 12	LW-4	SR08
		5538228	-34		●	25	19	160	25	25	29			BS0835W			
	5538236	5576863	-44	●	●	25	25	160	25	31	28						
	5802848	5759865	-45	●	●	32	25	160	32	31	28						
Figure-2	5538145		C17^R_L-33	●		19	19	140	19	24	30	CC08M* (CC08W)	ASN423	BS0829W	M3 * 12	LW-4	SR08
	5538152	5538160	-44	●	●	25	25	160	25	30	30			BS0835W			
	5755400	5743281	-45	●	●	32	25	160	32	30	30						

※CC08W clamp incorporates a hard carbide facing to eliminate excessive wear from the chip flow.
 ※For other shank sizes, please contact us for more information.

■ Applicable inserts

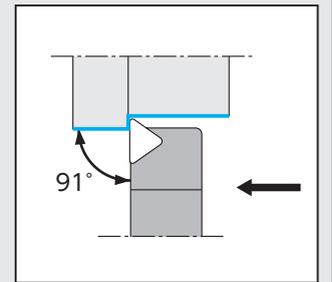
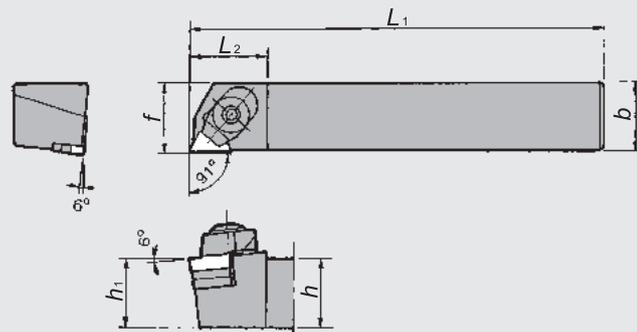
	Toolholder Part No.	Applicable insert		Listed on pages
Figure-1	C15... *	SN□N1204 (1207)		F8 ~ 9 • 18 • 28
Figure-2	C17... *			

※A holder having the dimension "h" of 25 or greater comes with two shim seats. An insert "7.94-mm thick" can be also mounted by removing one of the shim seats.

Outside machining

C21 type

Clamp-on

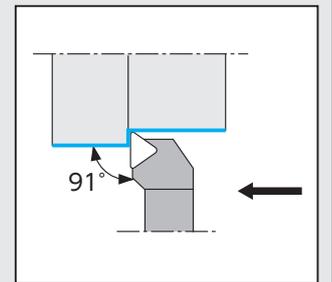
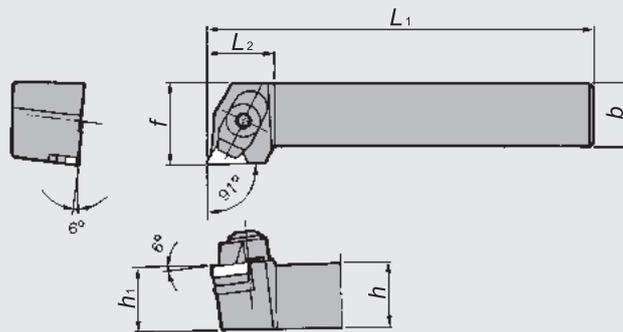


● Right-hand shown.

Figure-1

C22 type

Clamp-on



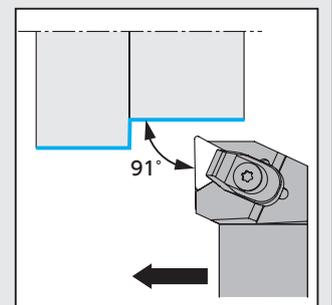
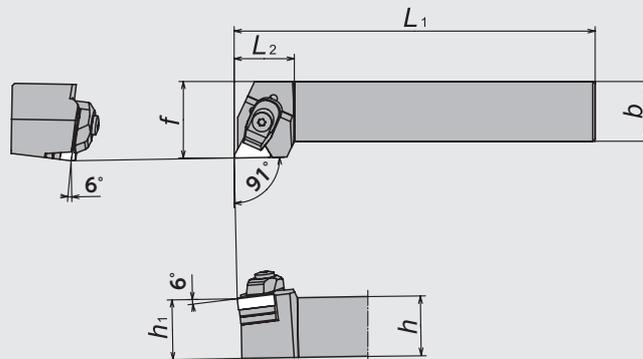
● Right-hand shown.

Figure-2

Multi-clamp holder

TTGN type

Clamp-on



● Right-hand shown.

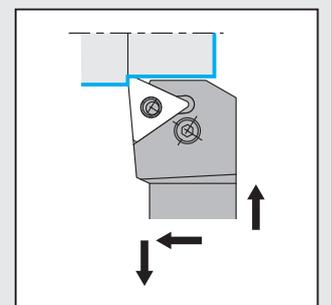
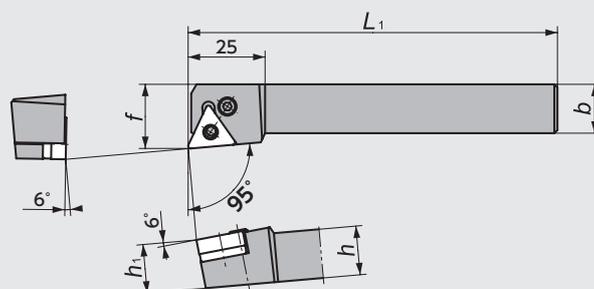
WTGN type

Double clamping

Figure-3

PTLN type

Lever lock



● Right-hand shown.

Figure-4

■ Dimensions of toolholders and the parts

Shape	Code No.		Toolholder Part No.	Stock		Dimensions (mm)						Clamp	Shim seat	Clamping screw	Retaining screw	Wrench	Snap ring
	R	L		R	L	h	b	L ₁	h ₁	f	L ₂						
Figure-1	5538426		C21^RL-33	●		19	19	140	19	19	28	CC08MS* (CC08WS)	ATN323	BS0829W	M3 * 12	LW-4	SR08
		5538434	-34		●	25	19	160	25	19	28			BS0835W			
	5538442	5538459	-44	●	●	25	25	160	25	25	28						
	5760558	5650411	-45	●	●	32	25	160	32	25	28						
Figure-2	5538467	5538475	C22^RL-33	●	●	19	19	140	19	25	25	CC08MS* (CC08WS)	ATN323	BS0829W	M3 * 12	LW-4	SR08
		5538483	-34	●		25	19	160	25	25	25			BS0835W			
	5538491	5538509	-44	●	●	25	25	160	25	30	25						
	5695630	5692231	-45	●	●	32	25	160	32	30	25						
Figure-4	5552336	5552344	PTLN^RL2020L33	●	●	20	20	140	20	25	25	—	LST317	Lever	Clamping screw	LW-2.5	Spring
														LCL3	LCS3		LSP3

※CC08W clamp incorporates a hard carbide facing to eliminate excessive wear from the chip flow.
 ※For other shank sizes, please contact us for more information.

■ Dimensions of toolholder and the parts/ Multi-clamp holder

Shape	Code No.		Toolholder Part No.	Stock		Dimensions (mm)						Clamp	Shim seat	Clamping screw	Retaining screw	Wrench	Shim wrench	Snap ring
	R	L		R	L	h	b	L ₁	h ₁	f	L ₂							
Figure-3	5701826	5701834	TTGN^RL2525M16	●	●	25	25	150	25	32	25	TC5TN Clamp-on	ATN 323	AOS-5 *26W* screw-able from both ends	FSS15- 3.0 * 12	LLR-T15	LLR-T10	ASGL5-D
			3225P16			32	25	170	32	32	25							
			3232P16			32	32	170	32	39	25							
	5682976	5682984	WTGN^RL2525M16	●	●	25	25	150	25	32	25	DC5TN Double clamping						
			3225P16			32	25	170	32	32	25							
			3232P16			32	32	170	32	39	25							

AOS-5*26WH is an option for hexagonal hole type screw.

■ Applicable inserts

	Toolholder Part No.	Applicable insert	Listed on pages
Figure-1	C21...*	TN□N1604 (1607)	F10 ~ 11 • 19
Figure-2	C22...*		
Figure-3	TTGN^RL...16*	TN□N1604 (1607)	F10 ~ 11 • 19
	WTGN^RL...16*	TN□A1604 (1607)	F10 ~ 11 • 19 • 29 • 30

※A holder having the dimension "h" of 25 or greater comes with two shim seats. An insert "7.94-mm thick" can be also mounted by removing one of the shim seats.

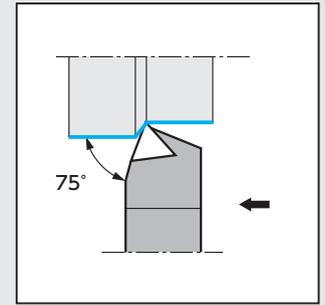
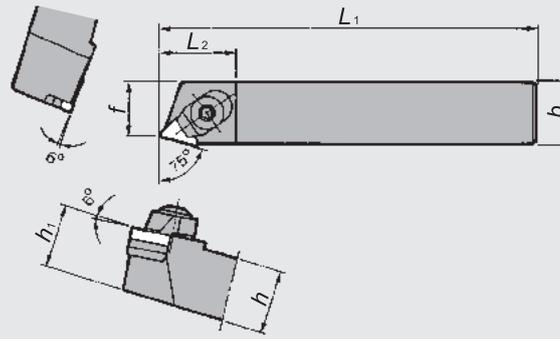
Multi-clamp holder

Just changing the clamps enables the holder to clamp pin type, flat or dimple style inserts.

Outside machining

C23 type

Clamp-on

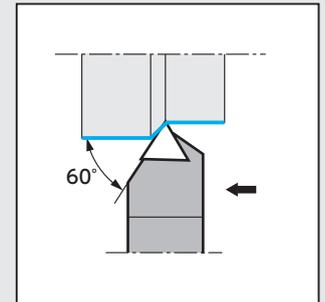
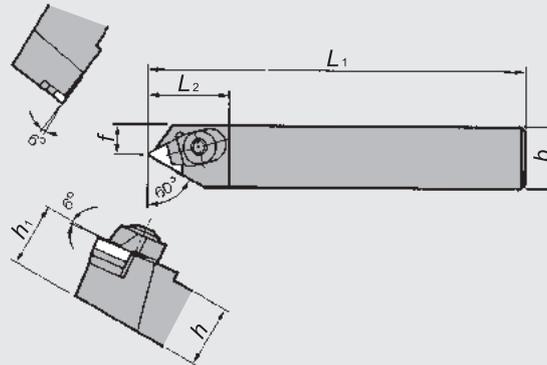


● Right-hand shown.

Figure-1

C24 type

Clamp-on



● Right-hand shown.

Figure-2

Dimensions of toolholders and the parts

Shape	Code No.		Toolholder Part No.	Stock		Dimensions (mm)						Clamp	Shim seat	Clamping screw	Retaining screw	Wrench	Snap ring
	R	L		R	L	h	b	L ₁	h ₁	f	L ₂						
Figure-1	5538541		C23^RL-33	●		19	19	140	19	14.5	30	CC08MS* (CC08WS)	ATN323	BS0829W	M3 * 12	LW-4	SR08
	5576939	5538558	-44	●	●	25	25	160	25	20.5	30	BS0835W					
Figure-2	5538517		C24^RL-34	●		25	19	160	25	10.5	32	CC08MS* (CC08WS)	ATN323	BS0829W	M3 * 12	LW-4	SR08
	5538525	5538533	-44	●	●	25	25	160	25	16.5	32	BS0835W					

※CC08W clamp incorporates a hard carbide facing to eliminate excessive wear from the chip flow.
 ※For other shank sizes, please contact us for more information.

Applicable inserts

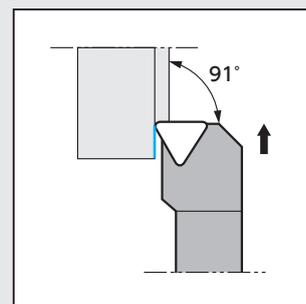
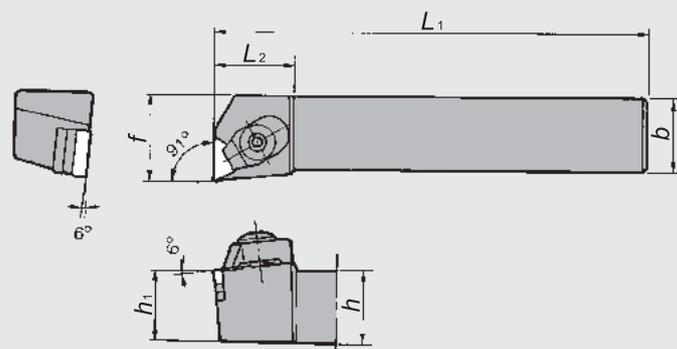
	Toolholder Part No.	Applicable insert	Listed on pages
Figure-1	C23...	 TN□N1604 (1607)	F10 ~ 11 • 19
Figure-2	C24...		

※A holder having the dimension "h" of 25 or greater comes with two shim seats. An insert "7.94-mm thick" can be also mounted by removing one of the shim seats.

Facing

C25 type

Clamp-on



● Right-hand shown.

Figure-1

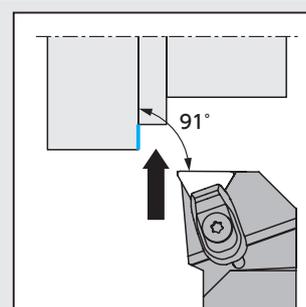
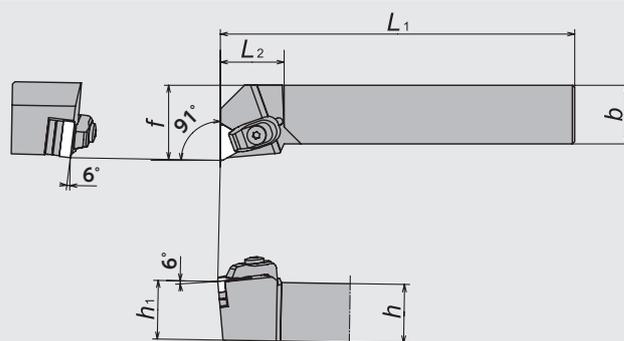
Multi-clamp holder

TTFN type

Clamp-on

WTFN type

Double clamping



● Right-hand shown.

Figure-2

Dimensions of toolholders and the parts

Shape	Code No.		Toolholder Part No.	Stock		Dimensions (mm)						Clamp	Shim seat	Clamping screw	Retaining screw	Wrench	Snap ring
	R	L		R	L	h	b	L ₁	h ₁	f	L ₂						
Figure-1	5538566	5538574	C25^{R/L}-33	●	●	19	19	140	19	25	25	CC08MS* (CC08WS)	ATN323	BS0829W	M3 * 12	LW-4	SR08
	5576954		-34	●		25	19	160	25	25	25						
	5538582	5538590	-44	●	●	25	25	160	25	30	28						
	5720875		-45	●		32	25	160	32	30	28						

※CC08W clamp incorporates a hard carbide facing to eliminate excessive wear from the chip flow.
 ※For other shank sizes, please contact us for more information.

Dimensions of toolholders and the parts/ Multi-clamp holder

Shape	Code No.		Toolholder Part No.	Stock		Dimensions (mm)						Clamp	Shim seat	Clamping screw	Retaining screw	Wrench	Shim	Snap ring
	R	L		R	L	h	b	L ₁	h ₁	f	L ₂							
Figure-2	5701859	5701867	TTFN^{R/L}-2525M16	●	●	25	25	150	25	32	27	TC5TN Clamp-on	ATN 323	AOS-5 *26W* screw-able from both ends	FSS15- 3.0*12	LLR-T15	LLR-T10	ASGL5-D
			3225P16			32	25	170	32	32	27							
			3232P16			32	32	170	32	39	27							
	5682992	5683008	WTFN^{R/L}-2525M16	●	●	25	25	150	25	32	27	DC5TN Double clamping	ATN 323	AOS-5 *26W* screw-able from both ends	FSS15- 3.0*12	LLR-T15	LLR-T10	ASGL5-D
		3225P16			32	25	170	32	32	27								
		3232P16			32	32	170	32	39	27								

AOS-5*26WH is an option for hexagonal hole type screw.

Applicable inserts

	Toolholder Part No.	Applicable insert	Listed on pages
Figure-1	C25 ...	TN□N1604(1607)	F10 ~ 11 • 19
Figure-2	TTFN ...-16	TN□N1604(1607)	F10 ~ 11 • 19
	WTFN ...-16	TN□A1604(1607)	F10 ~ 11 • 19 • 29 • 30

Multi-clamp holder

Just changing the clamps enables the holder to clamp pin type, flat or dimple style inserts.

※A holder having the dimension "h" of 25 or greater comes with two shim seats. An insert "7.94-mm thick" can be also mounted by removing one of the shim seats.

Outside machining

Multi-clamp holder

WVJN type

Double clamping

HVJN type

Dimple clamping

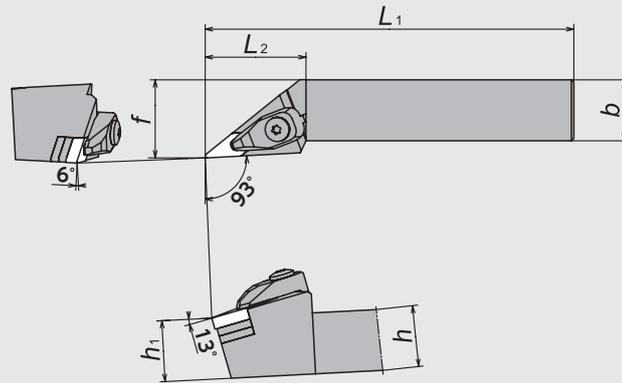


Figure-1

● Right-hand shown.

WVPN type

Double clamping

HVPN type

Dimple clamping

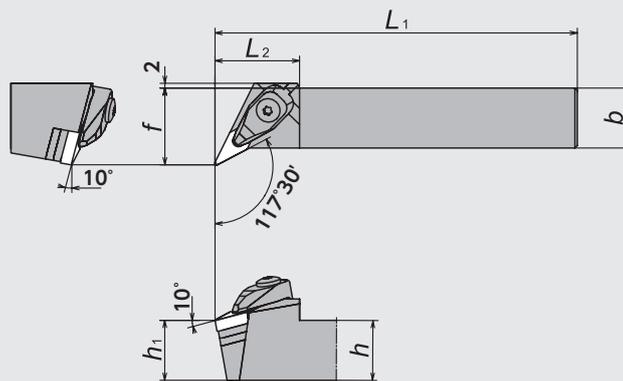


Figure-2

● Right-hand shown.

WVVN type

Double clamping

HVVN type

Dimple clamping

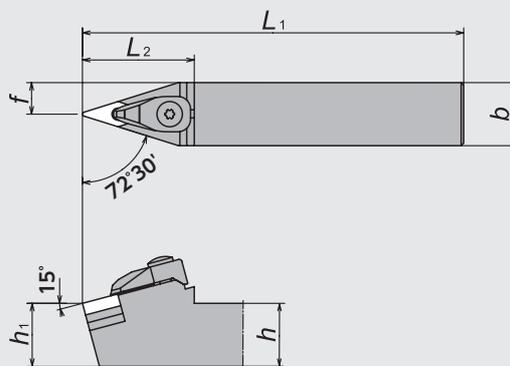


Figure-3

■ Dimensions of toolholders and the parts/ Multi-clamp holder

Shape	Code No.		Toolholder Part No.	Stock		Dimensions (mm)						Clamp	Shim seat	Clamping screw	Retaining screw	Wrench	Shim wrench	Snap ring
	R	L		R	L	h	b	L ₁	h ₁	f	L ₂							
Figure-1	5682828	5682836	WVJN ₁ 2525M16	●	●	25	25	150	25	32	41	DC6VN Double clamping	AVN 323	AOS-6 *30W** screw-able from both ends	FSS15- 3.0*12	LLR-T20	LLR-T10	ASGL6-D
	5682844	5682851	3225P16	●	●	32	25	170	32	32	41							
			3232P16			32	32	170	32	39	41							
	5701396	5701412	HVJN ₁ 2525M16	●	●	25	25	150	25	32	41	HC6VN Dimple clamping						
	5701420	5701438	3225P16	●	●	32	25	170	32	32	41							
		3232P16			32	32	170	32	39	41								
Figure-2	5682885	5682893	WVPN ₁ 2525M16	●	●	25	25	150	25	32	35	DC6VN Double clamping	AVN 323	AOS-6 *30W** screw-able from both ends	FSS15- 3.0*12	LLR-T20	LLR-T10	ASGL6-D
			3225P16			32	25	170	32	32	35							
			3232P16			32	32	170	32	32	35							
	5701461	5701479	HVPN ₁ 2525M16	●	●	25	25	150	25	32	35	HC6VN Dimple clamping						
			3225P16			32	25	170	32	32	35							
		3232P16			32	32	170	32	39	35								
Figure-3	5682877		WVVNN 2525M16	●		25	25	150	25	12.5	44	DC6VN Double clamping	AVN 323	AOS-6 *30W** screw-able from both ends	FSS15- 3.0*12	LLR-T20	LLR-T10	ASGL6-D
			3225P16			32	25	170	32	12.5	44							
			3232P16			32	32	170	32	16	44							
	5701453		HVVNN 2525M16	●		25	25	150	25	12.5	44	HC6VN Dimple clamping						
			3225P16			32	25	170	32	12.5	44							
		3232P16			32	32	170	32	16	44								

**AOS-6*30WH is an option for hexagonal hole type screw.

■ Applicable inserts

	Toolholder Part No.	Applicable insert	Listed on pages
Figure-1	WVJN ₁ ...*	VN□A1604(1607) VN□□1604	 F12 • 20 • 31
	HVJN ₁ ...	VNGX1607	 —
Figure-2	WVPN ₁ ...*	VN□A1604(1607) VN□□1604	 F12 • 20 • 31
	HVPN ₁ ...	VNGX1607	 —
Figure-3	WVNN ₁ ...*	VN□A1604(1607) VN□□1604	 F12 • 20 • 31
	HVNN ₁ ...	VNGX1607	 —

Multi-clamp holder

Just changing the clamps enables the holder to clamp pin type, flat or dimple style inserts.

*A holder having the dimension "h" of 25 or greater comes with two shim seats. An insert "7.94-mm thick" can be also mounted by removing one of the shim seats.

Outside machining/Facing

Multi-clamp holder

WWLN type

Double clamping

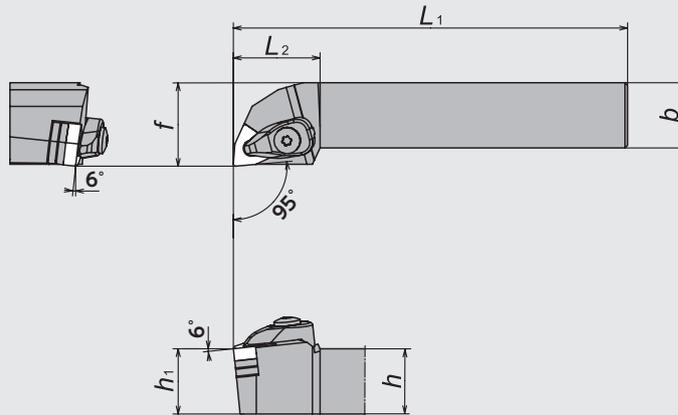


Figure-1

● Right-hand shown.

WWLN-2 type

Double clamping

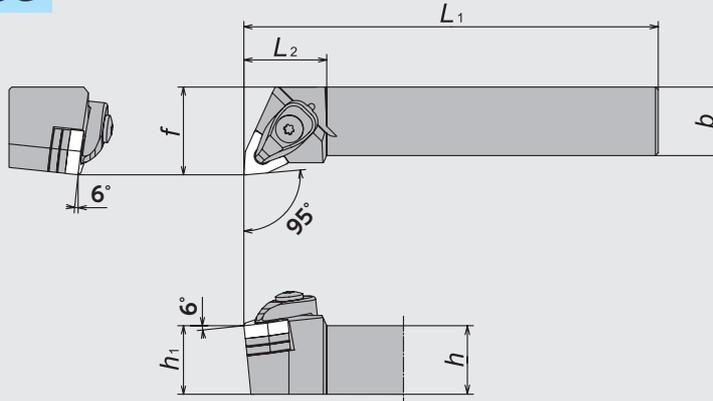


Figure-2

● Right-hand shown.

Dimensions of toolholders and the parts/ NEW Multi-clamp holder

Shape	Code No.		Toolholder Part No.	Stock		Dimensions (mm)						Clamp	Shim seat	Clamping screw	Retaining screw	Wrench	Shim wrench	Spring
	R	L		R	L	h	b	L ₁	h ₁	f	L ₂							
Figure-1	5683016	5683024	WWLN [®] /2525M08	●	●	25	25	150	25	32	33	DC6CN Double clamping	AWN423-W	AOS-6 * 30W screw-able from both ends	FSS15- 3.0 * 12	LLR-T20	LLR-T10	ASGL6-D
			3225P08			32	25	170	32	32	33							
			3232P08			32	32	170	32	40	33							
Figure-2	5701578	5701586	WWLN [®] /2525M08-2	●	●	25	25	150	25	32	30	DC6CN Double clamping	AWN423-W	AOS-6 * 30W screw-able from both ends	FSS15- 3.0 * 12	LLR-T20	LLR-T10	ASGL6-D
			3225P08-2			32	25	170	32	32	30							
			3232P08-2			32	32	170	32	40	30							

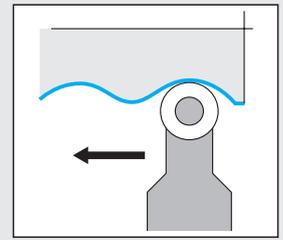
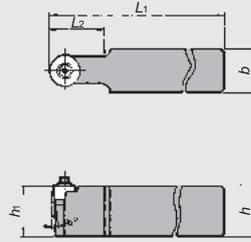
Applicable inserts

	Toolholder Part No.	Applicable insert	Listed on pages
Figure-1	WWLN [®] /...	WN□A0804	F12 • 32
Figure-2	WWLN [®] /...-2	WN□G0804	

※A holder having the dimension "h" of 25 or greater comes with two shim seats. An insert "7.94-mm thick" can be also mounted by removing one of the shim seats.

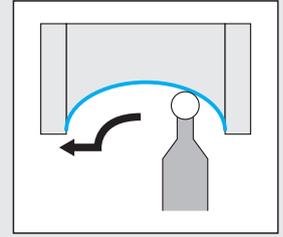
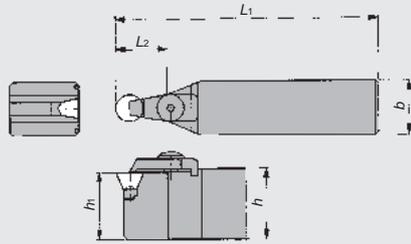
HRCD type

Figure-1



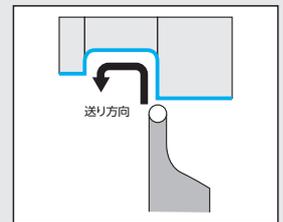
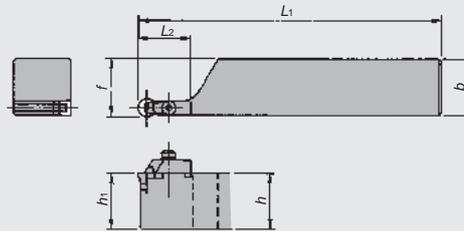
CRDC type

Figure-2



CRXC type

Figure-3



●Right-hand shown.

Dimensions of toolholders

Shape	Code No.			Toolholder Part No.	Stock			Dimensions (mm)					Applicable insert			
	R	N	L		R	N	L	h	b	L ₁	h ₁	f			L ₂	
Figure-1		5454921		HRCD-22	●			50	50	300	50	—	30		CDH22	
		5144274			●										50	CDH33
		5454947													80	CDH42
		5844113													80	CDH43
															100	CDH53
Figure-2		5720750		CRDCN2525M06				25	25	150	25	20		※RCGX/RPGX0607(08)		
		5478706												20	※RCGX/RPGX0907(08)	
		5691613												20	※RCGX/RPGX1207(08)	
		5911557			●									20	※RCGX/RPGX0607(08)	
		5829528			●	32	170							32	25	※RCGX/RPGX0907(08)
		5829510			●											25
	5634241					32	30	RCGX/RPGX1510								
Figure-3	5981469			CRXC ³ 3232P09Y	●			32	32	170	32	32.7		RCGY090603		
	5981188				●									38	RCGY120603	

※Both of thickness 07&08 can be used.

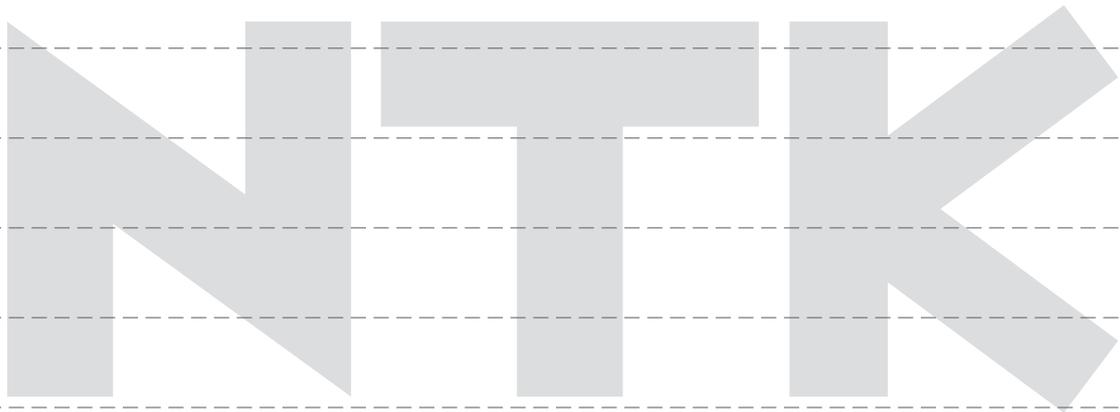
※Applicable inserts detail → F15・M5

Parts

Parts	Cap screw	Clamping screw	Washer	Shim seat	Retaining screw	Spring	Clamp	Spring pin	Wrench
Toolholder Part No.									
HRCD-22	CS0316		W120	HACDH22 (A)					LW-2.5
HRCD-33	CS0625		W110	HACDH33 (A)					LW-5
HRCD-42	1/4-20UNC*11/4		W106	HACDH42 (A)					LWU-4
HRCD-43	1/4-20UNC*11/2			HACDH43 (A)					
HRCD-53	3/8-16UNC*11/2		W107	HACDH53 (A)					LWU-5
CRDCN3225P06		BS0520	WS-5	HARCGX06 (C)			HC35KR-4099	—	LW-3
CRDCN3225P09		BS0625	WS-6	HARCGX0908V (D)			HC35KR-6075	2*8AW	LW-4
CRDCN3225P12				HARCGX1208V (D)			HC35KR-6076	2.5*8AW	
CRXCR3232P09Y	CS0425		WS-4	HAR09Y (B)	M2*8	ASGL4	CRN4		LW-3
CRXCR3232P12Y	CS0525		WS-5	HAR12Y (B)	M3*8	ASGL5	CRN5		LW-4

MEMO

New Products
Tool Materials / Selection Guide
PCD, CBN and ceramic
Cermet, PVD-coated Carbide
Micro-grain Carbide, Carbide
Insert Stock List
Outside Machining Toolholders
SS
Grooving Tools
Threading Tools
Shaper
Internal machining tool range
Original Tools for Various Applications
Indexable End Milling Tools
Indexable Drill Inserts
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SS Tool Range

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H75

New Products

Tool Materials / Selection Guide

PCD, CBN and ceramic

Cermet, PVD-coated Cermet

Micro-grain Carbide, Carbide

Insert Stock List

Outside Machining Toolholders

SS

Grooving Tools

Threading Tools

Shaper

Internal Machining tool range

Original Tools for Various Applications

Indexable End Milling Tools

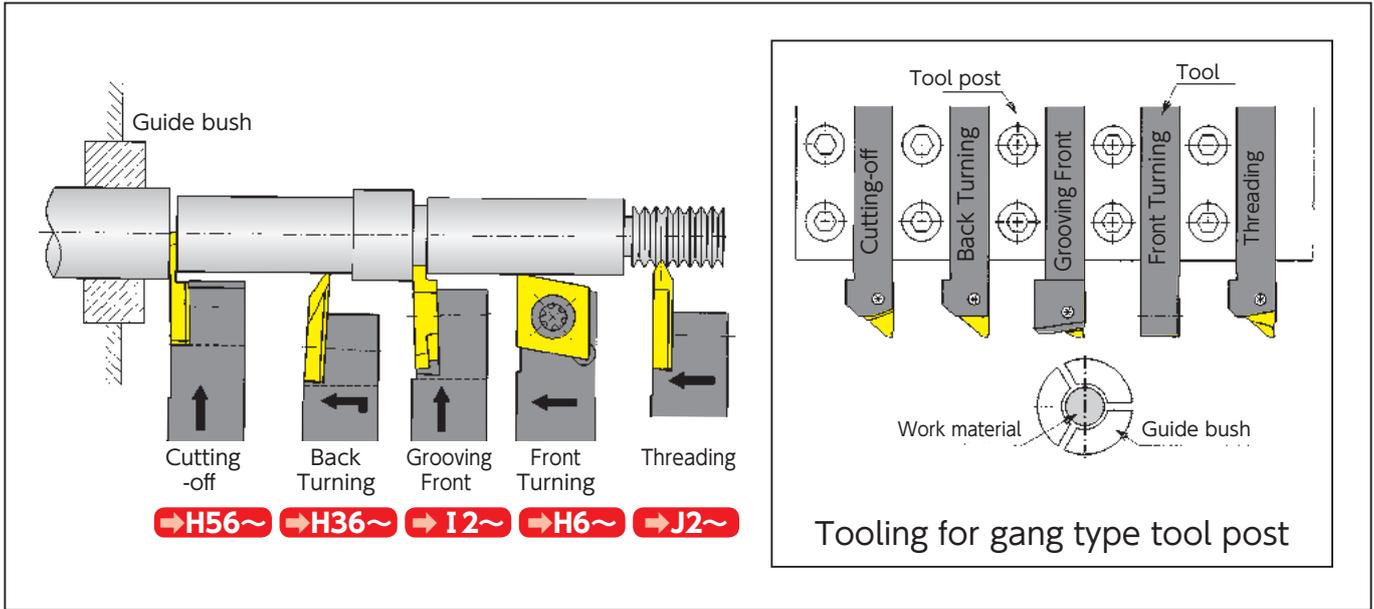
Indexable Drill Inserts

Milling Cutters

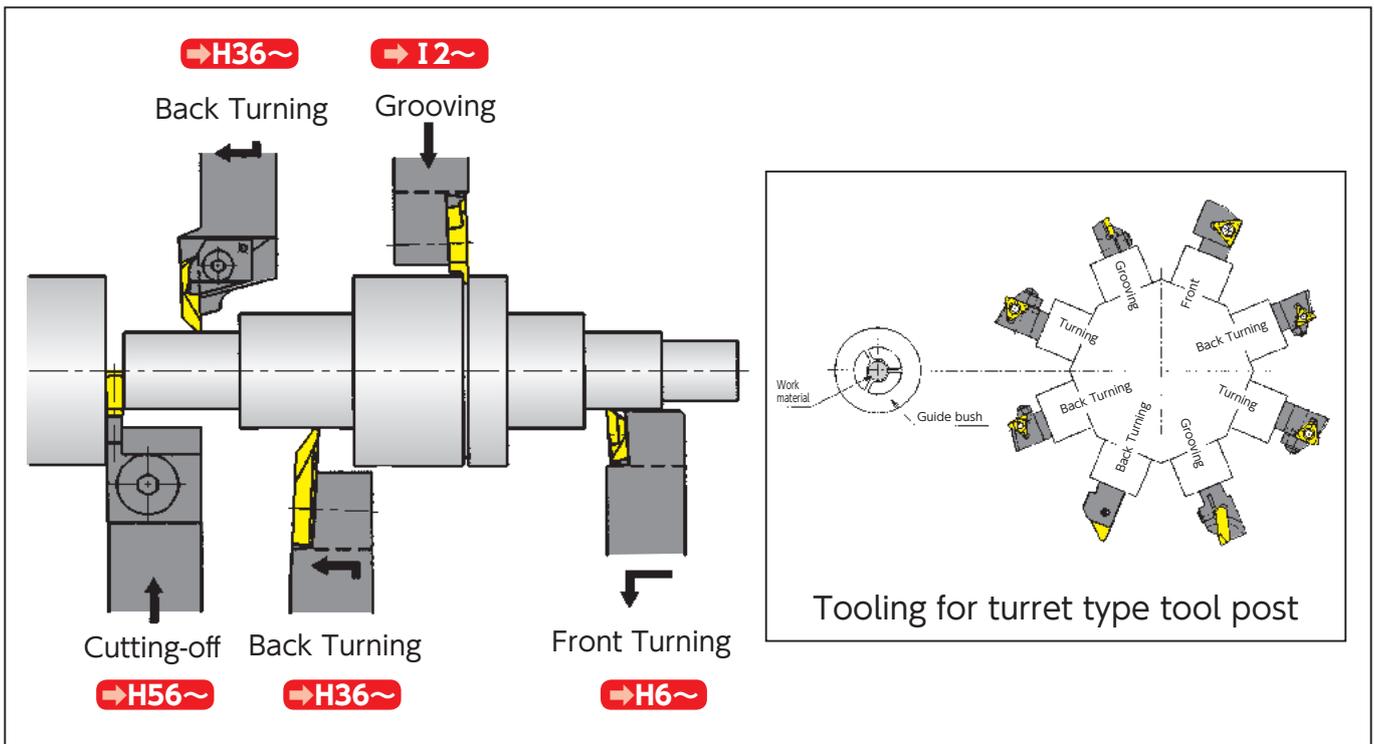
Technical Data

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Tooling example for a small CNC automatic lathe (gang type)

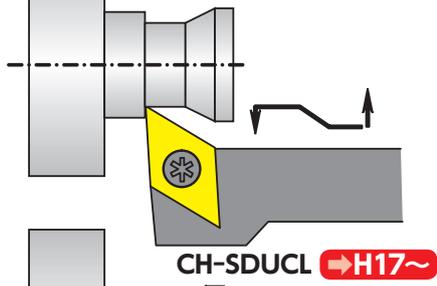
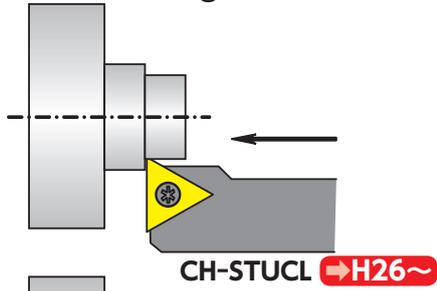


Tooling example for a small CNC automatic lathe (turret type)

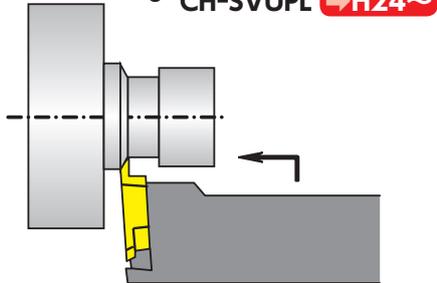


Tooling example for a small CNC automatic lathe (gang type)

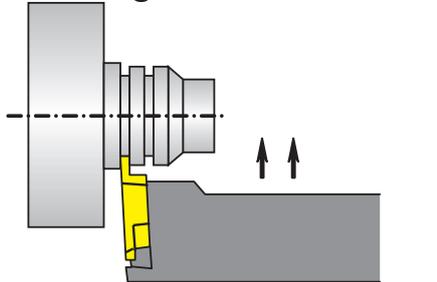
Front Turning



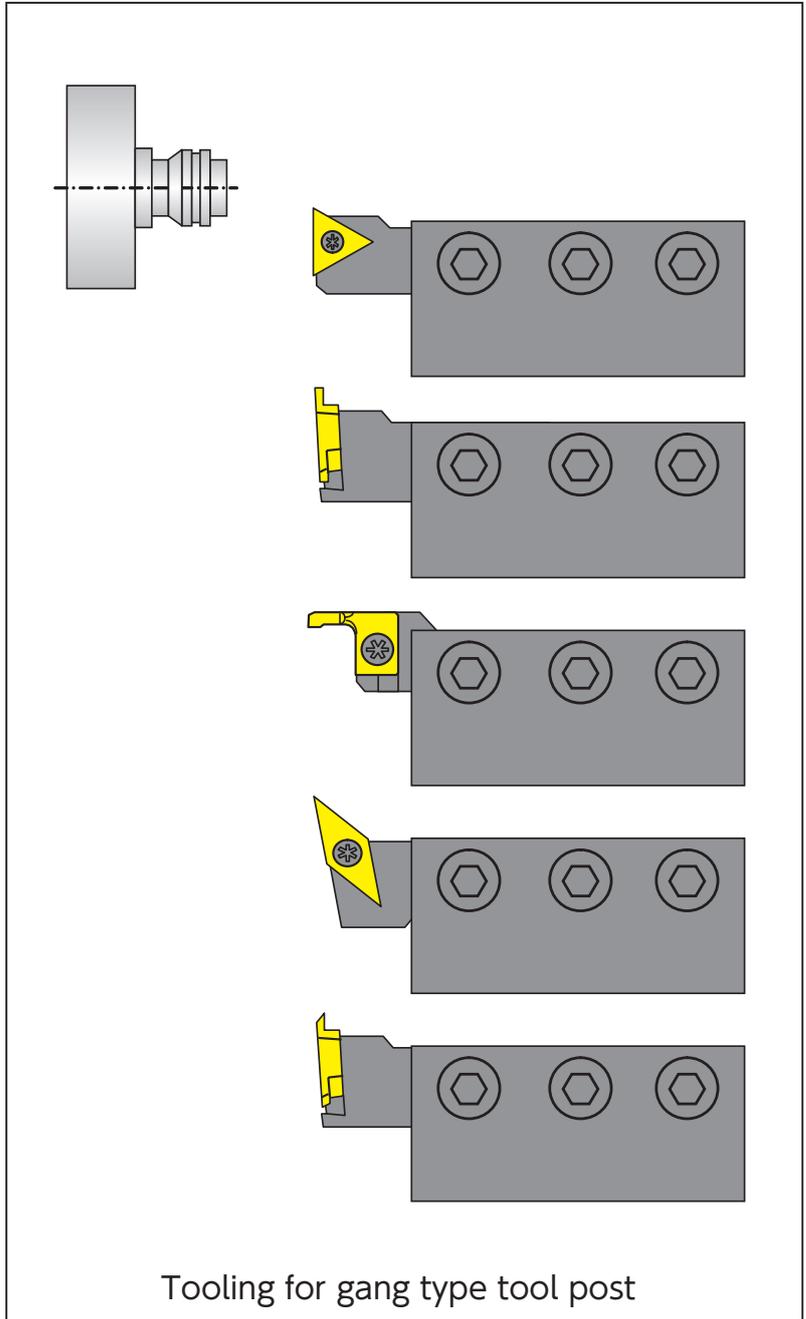
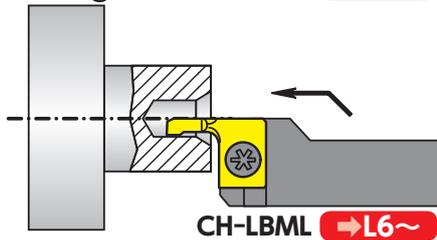
Back Turning



Grooving

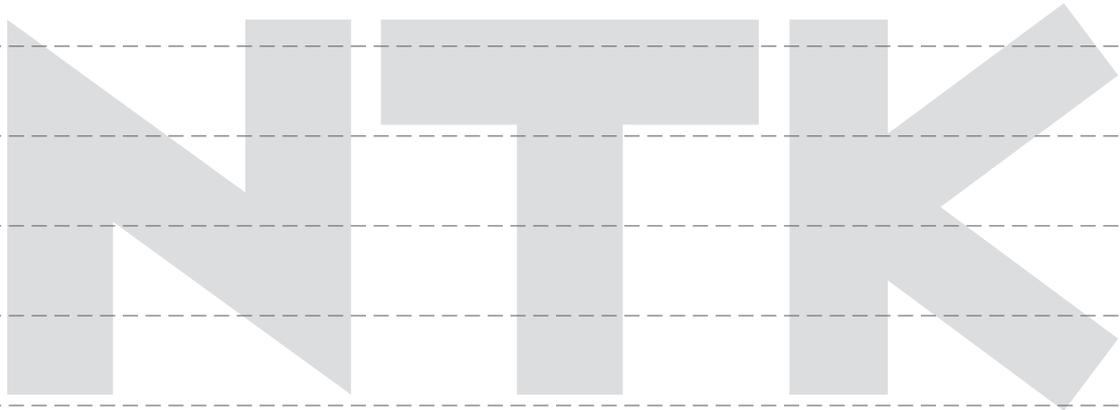


Boring



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New Products	
Tool Materials / Selection Guide	
PCD, CBN and ceramic	
Cermet, PVD-coated Carbide	
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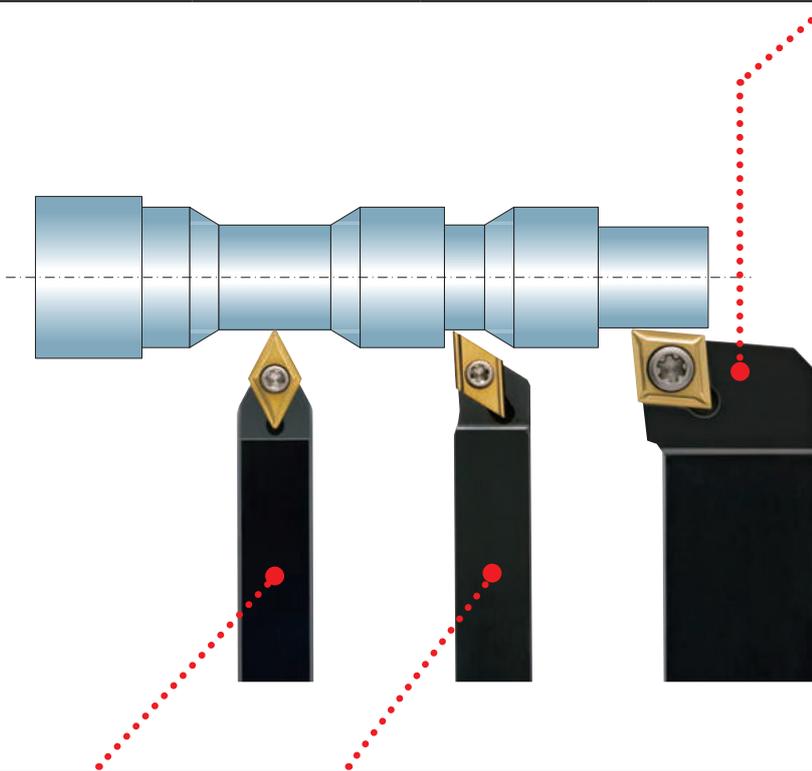
SS Tools for Front Turning

- Selection guide for front turning tools H6
- Guidance for Front Turning H9
- List of front turning holders and applicable inserts H14



NTK SS Tools Selection guide for front turning tools

SCAC-N type	SCLC-N type	SCLC-N-F type	SCLC type	NEW SCLC-OH type	DS-SCLL type
⇒H16	⇒H16	⇒H16	⇒H16	⇒H16	⇒H16
Applicable insert : CC□□					
Shank size : □8 ~ □12	Shank size : □8 ~ □16	Shank size : □10 ~ □12	Shank size : □20	Shank size : □10 ~ □16	Shank dia. : φ14 ~ φ25.4
				SPLASH BAR	Center height adjustable ⇒H13,17



PCLN (-N) type
⇒H32
Applicable insert : CN□□
Shank size : □16

TFT type
⇒H29
Applicable insert : TF33
Shank size : □10 ~ □20

SDNC type	SDJC (-N) type	NEW SDJC-OH type	SDJC-N-F type	SDXC-N type	SDQC type
⇒H19	⇒H18	⇒H18	⇒H18	⇒H18	⇒H18
Applicable insert : DC□□					
Shank size : □8 ~ □20	Shank size : □8 ~ □20	Shank size : □10 ~ □16	Shank size : □10 ~ □12	Shank size : □10 ~ □16	Shank size : □10 ~ □20
For Y-axis type ⇒H21	For Y-axis type ⇒H20	SPLASH BAR			

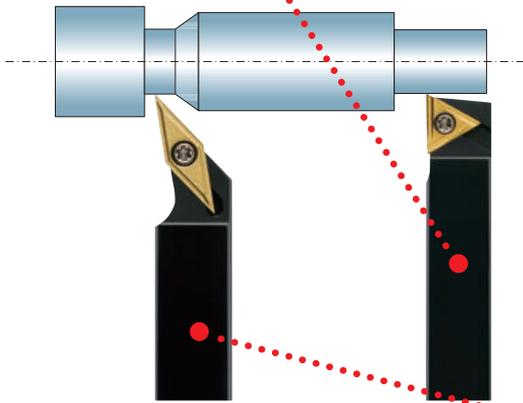
CH-SDUC type	DS-SDU type	DS-SDX type
⇒H19	⇒H20	⇒H20
Applicable insert : DC□□	Applicable insert : DC□□	Applicable insert : DC□□
Shank size : □10 ~ □12	Shank dia. : φ14 ~ φ25.4	Shank dia. : φ19.05 ~ φ25
	Center height adjustable ⇒H13,21	

PDJN (-N) type
⇒H33
Applicable insert : DN□□
Shank size : □16 ~ □25

STAC-N type	CH-STUC type
⇒H28	⇒H28
Applicable insert : TC□□	Applicable insert : TC□□
Shank size : □8 ~ □12	Shank size : □10 ~ □12

PTXN-N type	DS-PTX type
⇒H30	⇒H30
Applicable insert : TN□□16	Applicable insert : TN□□16
Shank size : □10 ~ □20	Shank dia. : φ19.05 ~ φ25.4
	Center height adjustable... ⇒H13,30

PTAN-N type	PTLN type
⇒H30	⇒H30
Applicable insert : TN□□16	Applicable insert : TN□□16
Shank size : □16	Shank size : □20



CSV type
⇒H14
Applicable insert : CSV□
Shank size : □7 ~ □12

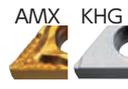
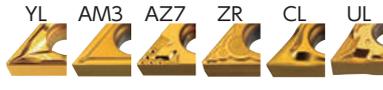
SVAC(-N) type	SVJC-N type	SVXC-N type	SVQC type
⇒H22	⇒H23	⇒H23	⇒H24
Applicable insert : VC□□			
Shank size : □10 ~ □20	Shank size : □10 ~ □16	Shank size : □10 ~ □12	Shank size : □20

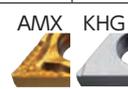
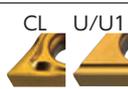
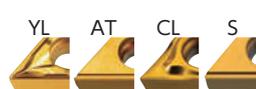
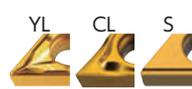
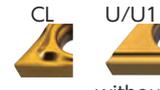
SVAC(-N)W type
⇒H22
Applicable insert : VCGT13
Shank size : □10 ~ □20

SVVC-N type	DS-SVX type	SVXP-N type	SVQP-N type
⇒H24	⇒H24	⇒H26	⇒H26
Applicable insert : VC□□	Applicable insert : VC□□	Applicable insert : VP□□	Applicable insert : VP□□
Shank size : □10 ~ □20	Shank dia. : φ14 ~ φ25.4	Shank size : □10 ~ □12	Shank size : □10 ~ □16

DS-SVVP type	CH-SVUP type	DS-SVXP type
⇒H26	⇒H26	⇒H27
Applicable insert : VP□□	Applicable insert : VP□□	Applicable insert : VP□□
Shank dia. : φ16.0 ~ φ25.4	Shank size : □10 ~ □12	Shank dia. : φ19.05 ~ φ25.4
Center height adjustable... ⇒H13,26		

Front Turning Tools Recommended Insert Grade and Cutting Conditions

Work Material		Free cutting Steels	Carbon Steels	Alloy Steels	Free cutting Steels Stainless
JIS Common Grade		SUM22 SUM23 SUM24	S35C S45C	SCr420 SCM435	SUS303 SUS430F
Insert Grade	First Choice Second Choice	DM4 DT4 VM1 ZM3	DT4 QM3 VM1 C7Z		DT4 TM4 ZM3
Cutting Speed v_c (m/min)		50 — 100 — 200	Carbide C7Z	50 — 90 — 150 120 — 150 — 250	50 — 90 — 180
Recommended chipbreaker feed speed f (mm/rev)	Precise Finishing				
		0.02 — 0.03 — 0.05	0.01 — 0.03 — 0.04		
	Finishing				
		0.03 — 0.05 — 0.08	0.02 — 0.05 — 0.08		
Middle Cutting					
	0.04 — 0.08 — 0.12	0.03 — 0.06 — 0.10			

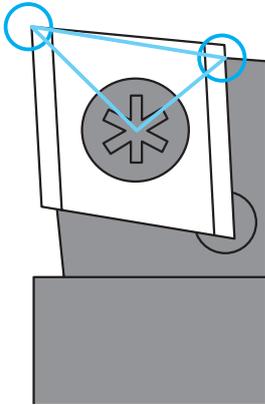
Work Material		Hard-to-cut Stainless steels	Titanium(Alloy)	Aluminum Alloy
JIS Common Grade		SUS304 SUS440C	6AL-4V-Ti	A5056 A6061
Insert Grade	First Choice Second Choice	DM4 QM3 DT4 TM4	DT4 TM4	PD1 KM1
Cutting Speed v_c (m/min)		40 — 70 — 100	50 — 70 — 100	PD1 100 — 200 — 350 KM1 50 — 100 — 200
Recommended chipbreaker feed speed f (mm/rev)	Precise Finishing			
		0.01 — 0.02 — 0.03	0.02 — 0.03 — 0.05	
	Finishing			
		0.02 — 0.04 — 0.06	0.03 — 0.06 — 0.08	
Middle Cutting				
	0.03 — 0.05 — 0.08	0.04 — 0.08 — 0.12		

※Please refer to Technical Information **Q52** for detailed recommendation.

■ Guidance for front turning

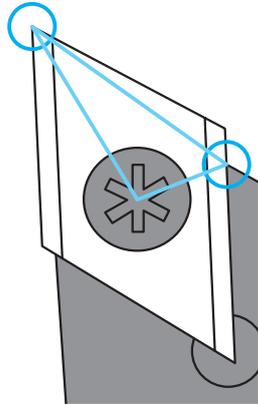
● Selecting the insert shape based on the clamping force

CC type 80°



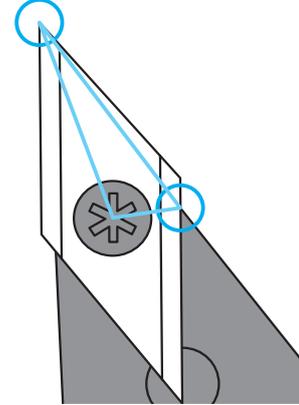
The insert is held securely as clamping/retaining area occurs close to the cutting edge.

DC type 55°



The clamping strength is slightly lower because the cutting point is further from the clamping/retaining area than that of the C type.

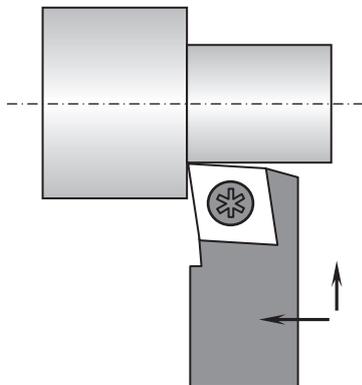
VC type 35°



The insert may tend to move when under large cutting forces as the cutting point is quite distant from the clamping/retaining area.

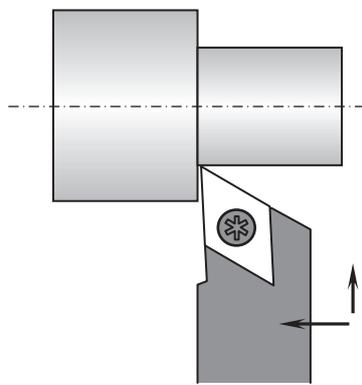
● Selecting the insert shape based on dimensional accuracy and chip control

SCLCR →H16



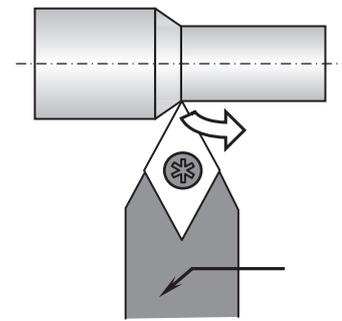
With the insert firmly clamped, the dimensional accuracy is excellent.

SDJCR →H18



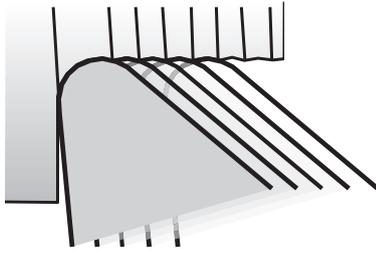
With clearance for the chip flow, finished surfaces are not damaged. Also, coolant is supplied evenly to allow easy chip control.

SDNCN →H19

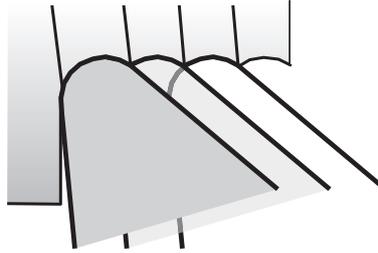


The chips flow away from the work piece reducing trapping of chips around the tool or work piece.

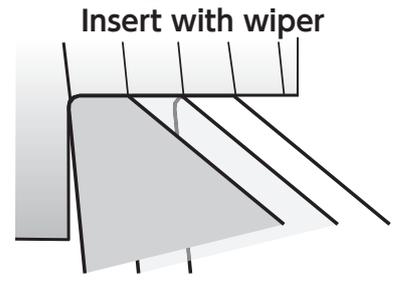
Surface roughness obtained from front turning



If the feed rate is lowered in order to maintain a certain surface finish, the chip control may become less well controlled in addition wear may increase and cycle time lengthened.



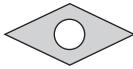
Increased feed rates may well have a positive effect on chip control but this must be balanced with the surface finish required.



Inserts with a wiper facet the possibility of obtaining much improved surface finish while retaining good chip control.

Wiper Insert Range

TFD →F40



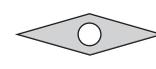
Applicable holder: SDJC type

TFT →F46



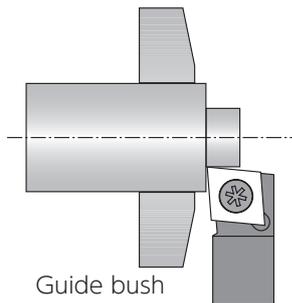
Applicable holder: STAC type

TFV →F49



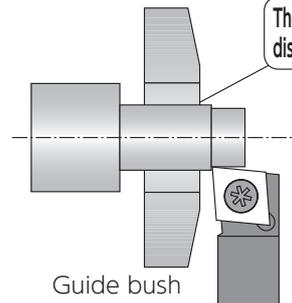
Applicable holder: SVAC type

Roughing and finishing on an automatic lathe



Guide bush

Usually roughing and finishing are carried out in a single pass on an automatic lathe.

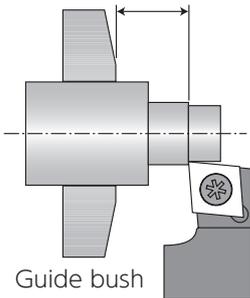


Guide bush

The work piece becomes dislocated from the guide bush.

When the distance to be cut is relatively long, roughing and finishing is not appropriate. But using our shift holder or drill sleeve holder makes the roughing and finishing operations possible in a single pass.

Shift holder



Guide bush

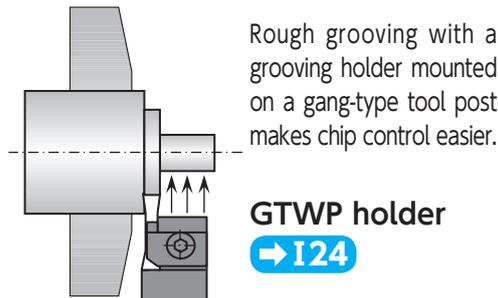
A holder with the cutting point shifted allows the work piece to be retained in the guide bush, meaning the component can be finish machined.

Chip control is improved by the easy access of coolant.

SCLC-N-F type →H16

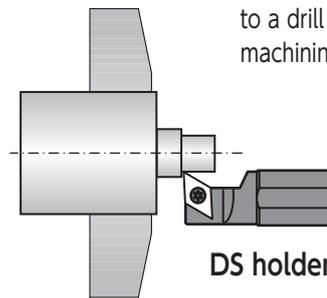
SDJC-N-F type →H18

Combination of a grooving tool and DS holder



Rough grooving with a grooving holder mounted on a gang-type tool post makes chip control easier.

GTWP holder
→I24



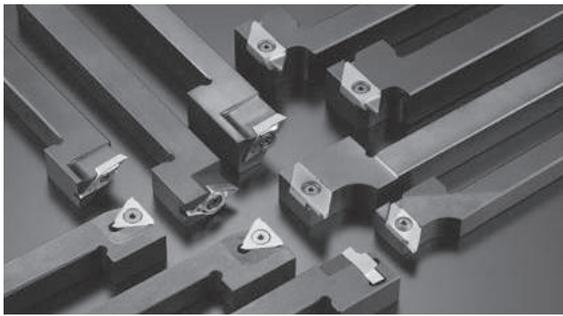
DS holder

A front turning holder installed to a drill sleeve allows for finish machining.

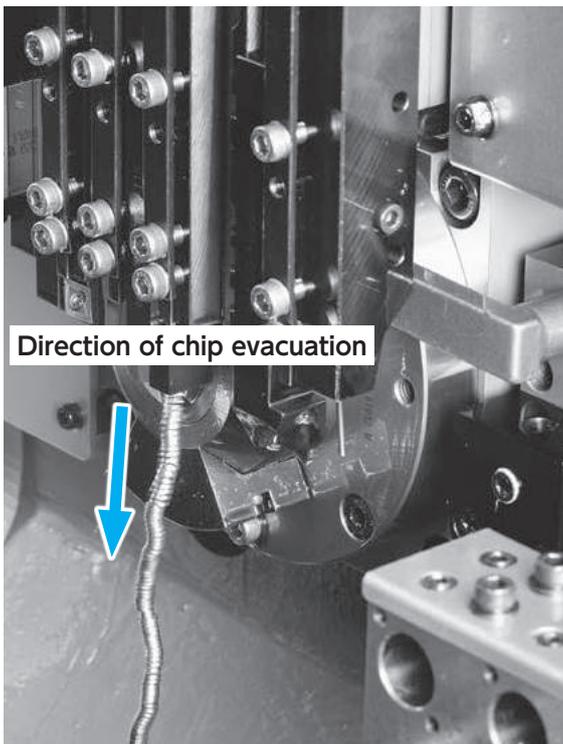
→H13 →H24
→H16 →H26
→H17 →H27
→H20 →H30

■ To solve chip control problems for automatic CNC lathes with a gang type tool post

● Chip control by using Y-axis holders



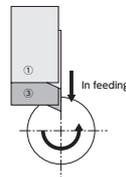
“Tool holders by utilizing the tool change control axis (Y-axis) of automatic CNC lathes with a gang type tool post. Solves chip control problems by gravity evacuation.”



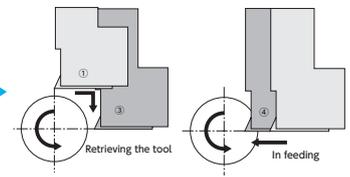
Direction of chip evacuation

● Machining concept

Standard machining



Machining with Y-axis holders



Programming example

```
①T300 ...Calling the tool
②G0 X11.0 Z0 T3 ...Positioning the tool
③G1 X8.0 F0.08 ...Cutting depth: 8.0 mm
⑤Z5.0 F0.05 ...Cutting length: 5.0 mm
⑥X11.0
⑦G0 X11.0
```

Generally, for OD machining, the tool is called and positioned before the system starts the cutting operation. The direction of cut along the work diameter is the “X axis”.

Programming example

```
①T300 ...Calling the tool
②G0 Y11.0 T3
③X0 ...Positioning the tool
④G1 Y8.0 F0.08 ...Cutting depth: 8.0 mm
⑤Z5.0 F0.05 ...Cutting length: 5.0 mm
⑥Y11.0
⑦G0 X11.0
```

With a Y-axis holder, the tool is called for position (1). Then, at position (3) for the system to start the cutting operation. The tool start cutting from this position. The direction of cut along the work diameter is the “Y axis”.

Note) In the actual programme, it is necessary to compensate for the tool length □ for the Y axis either with the tool data or on the program.

● Lineup

■ Front turning

Y-SDJC type
Y-SDJC-OH type

93°

→H20

Y-SDNC type

72° 30'

→H21

■ Multi-functional

Y-GTPA type
Y-GTPA-OH type

→I27

■ Back turning

Y-TBPR type
Y-TBPR-OH type

→H42

■ Grooving/Back turning

Y-GTTR type
Y-GTTR-OH type

Back turning also possible by mounting a TBMH insert

→H52

※Before using Y-axis holders, please read and understand “Important notes for using Y-axis holders” on page H88.

※When impossible to install Y-axis holder, use of DS holders or holders for gang type tool post (CH-type) is recommended.

DS Holders with adjustable center height



Features

Adjustment of center height is simple with a wrench.
Setting time is reduced.

1 Turn a screw

1 Adjust centerline height easily

Eliminate center boss on end faces
Provides constant OD dimension
Adjust easily in machine

Patented

2 Adjustment wedge goes down

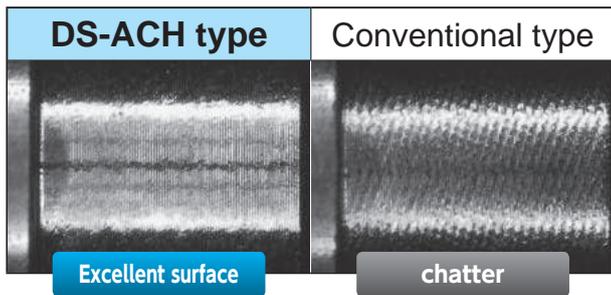


3 Holder warps to bring cutting edge up

Range of centerline height adjustment
0 ~ 0.2mm

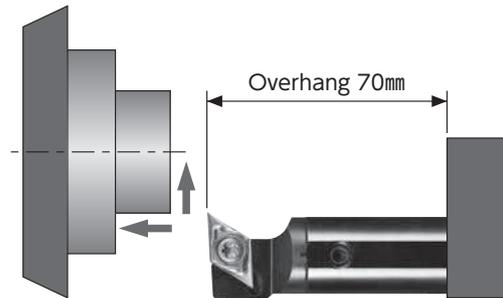
2 Optimized design reduces vibration

Improved chatter resistance.



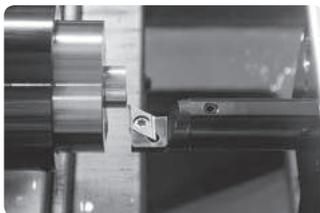
SUS304

Work material : SUS304
Holder : DS-SDUL19-11-ACH
Insert : TM4 DCGT11T302MCL
Cutting conditio : $v_c=75$ m/min, $f=0.05$ mm/rev, $a_p=2.0$ mm

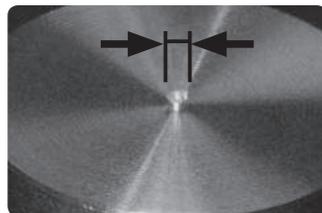


How to use

*For center height adjustment only.(Loosen wedge screw before making any adjustment.)



Install the holder slightly below centerline and take a facing test cut loosen the clamping wedge



Measure the diameter of the center boss



Raise the center height by the radius of the boss.
Adjustment references are available in the tool case



Re-machine the end face

Check if further adjustment is required

※Adjustment instructions are supplied in the tool case

DS-SCL-ACH type		Code No.	Toolholder Part No.	Stock	Dimensions (mm)						Applicable insert
					L	D_s	h	b	L_1	f	
				5833694	DS-SCLL16F-09-ACH	●	16.00	15.5	15.5	80	6.0
5833702	DS-SCLL19-09-ACH			●	19.05	18.0	18.0	120			
5833710	DS-SCLL20-09-ACH			●	20.00	19.0	19.0				
5833728	DS-SCLL22-09-ACH			●	22.00	21.0	21.0				
5833736	DS-SCLL25-09-ACH			●	25.40	24.0	24.0		150		

DS-SDU-ACH type		Code No.	Toolholder Part No.	Stock	Dimensions (mm)						Applicable insert
					L	D_s	h	b	L_1	f	
		<ul style="list-style-type: none"> ● Left-hand type shown. Note) Use a R-hand or neutral type insert. 		5805635	DS-SDUL16F-11-ACH	●	16.00	15.5	15.5	80	10
5805627	DS-SDUL19-11-ACH			●	19.05	18.0	18.0	120			
5799614	DS-SDUL20-11-ACH			●	20.00	19.0	19.0				
5799622	DS-SDUL22-11-ACH			●	22.00	21.0	21.0				
5799648	DS-SDUL25-11-ACH			●	25.40	24.0	24.0		150		

DS-SVVP-ACH type		Code No.	Toolholder Part No.	Stock	Dimensions (mm)						Applicable insert
					D_s	h	b	L_1	f		
				5805643	DS-SVVPN16-11-ACH	●	16.00	15.5	15.5	120	—
5799655	DS-SVVPN19-11-ACH			●	19.05	18.0	18.0				
5799663	DS-SVVPN20-11-ACH			●	20.00	19.0	19.0				
5799671	DS-SVVPN22-11-ACH			●	22.00	21.0	21.0				
5807524	DS-SVVPN25-11-ACH			●	25.40	24.0	24.0	150			

DS-PTX-ACH type		Code No.	Toolholder Part No.	Stock	Dimensions (mm)						Applicable insert
					L	D_s	h	b	L_1	f	
		<ul style="list-style-type: none"> ● Left-hand type shown. Note) Use a R-hand or neutral type insert. 		5805650	DS-PTXL16-33-ACH	●	16.00	15.5	15.5	120	11
5799689	DS-PTXL19-33-ACH			●	19.05	18.0	18.0				
5799697	DS-PTXL20-33-ACH			●	20.00	19.0	19.0				
5799705	DS-PTXL22-33-ACH			●	22.00	21.0	21.0				
5799713	DS-PTXL25-33-ACH			●	25.40	24.0	24.0	150	13		

CSV type

For radial type tool post

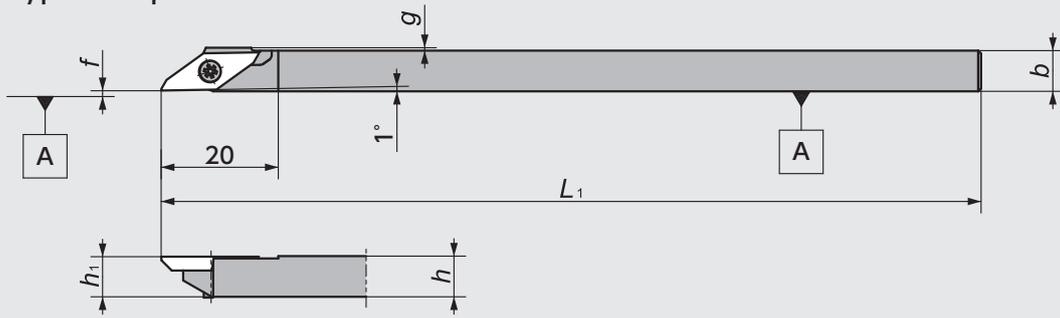


Figure-1

● Right-hand type shown.

CSV-NC/CSV-NC-F type

For gang type tool post

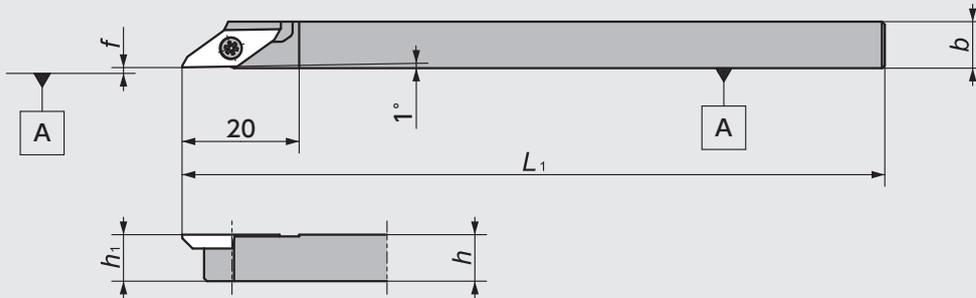


Figure-2

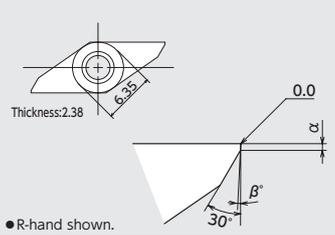
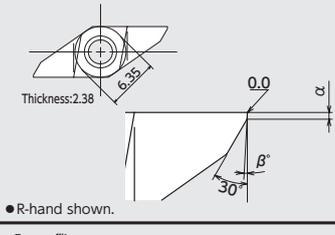
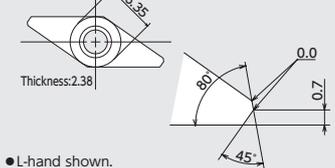
● Right-hand type shown.
● The tool offset of the CSVR/L08NC-F is small.

☆ CSV toolholder is interchangeable tool. All CSV type inserts can be used (back turning, grooving, threading) on the same holder. (H80-83 for more information)

Holder dimensions

Shape	Code No.		Toolholder Part No.	Stock		Dimensions (mm)						Applicable insert 	Parts		
	R	L		R	L	h	b	L ₁	h ₁	f	g		Clamping screw 	Wrench 	
Figure-1	5492962		CSV^{R/L}07GX	●				85				0.5	CSVF (See the table below)	LRIS-2.5*7	CLR-15S
	5303169	5303193	07	●	●	7	7	140	7						
	5492954		08GX	●				85							
	5303151	5303201	08	●	●	8	8	140	8						
	5303136		095	●		9.5	9.5		9.5						
	5303144	5303177	10	●	●	10	10	140	10						
	5474770		12GX	●				85							
	5327929		12	●		12	12	140	12						
Figure-2	5514062	5514070	CSV^{R/L}08NC	●	●							0.1	CSVF (See the table below)	LRIS-2.5*7	CLR-15S
	5789615		08NC-F	●		8	8	120	8						
	5563010		10GXNC	●				85							
	5477492	5477542	10NC	●	●	10	10		10						
	5477534	5477500	12NC	●	●	12	12	120	12						

Applicable inserts

Shape	Part No.	Chip-breaker	Dimensions (mm)		PVD-coated micro-grain carbides											
			Max. machining depth	Cutting edge ($\alpha \times \beta^\circ$)	ZM3			VM1			DT4					
					R	Stock	L	Stock	R	Stock	L	Stock	R	Stock		
 <p>● R-hand shown.</p>	CSVF11F^{R/L}V	None	—	0.3 × 5°					5303516	●	5303557	●				
	11F^{R/L}V-A							5358858	●							
	11F^{R/L}V-M						5436019	●		5386248	●	5386255	●	NEW 5850235	●	
	11F^{R/L}V-C								5358577	●						
 <p>● R-hand shown.</p>	CSVF11F^{R/L}VB	Provided	3.00	0.3 × 5°					5313168	●	5313150	●				
	11F^{R/L}VB-A							5358692	●							
	11F^{R/L}VB-M						5436001	●		5386263	●	5386271	●	NEW 5850243	●	
	11F^{R/L}VB-C								5358700	●						
<p>—For profiling—</p>  <p>● L-hand shown.</p>	CSVF11F^{R/L}VX	None	—										5358866	●		

※ Each angle shown indicates the value when the insert is set into the holder.

New Products
 Tool Materials / Selection Guide
 PCD, CBN and ceramic
 Cermet
 PVD-coated Cermet
 Micro-grain Carbide, Carbide
 Insert Stock List
 Outside Machining Toolholders
 SS
 Grooving Tools
 Threading Tools
 Shaper
 Internal machining tool range
 Original Tools for Various Applications
 Indexable End Milling Tools
 Indexable Drill Inserts
 Milling Cutters
 Technical Data
 Index

SCAC-N type

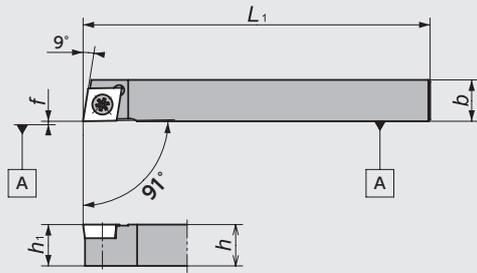
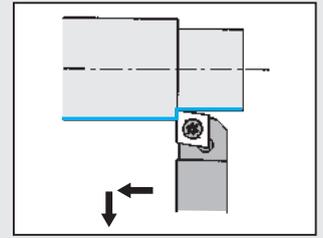


Figure-1



● Right-hand type shown.

SCLC-N type

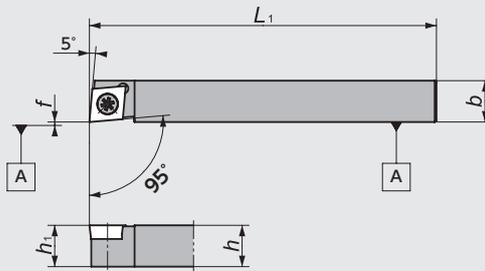
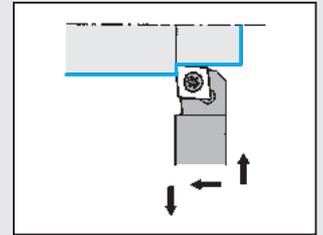


Figure-2



● Right-hand type shown.

SCLC-N-F type

Shift holder

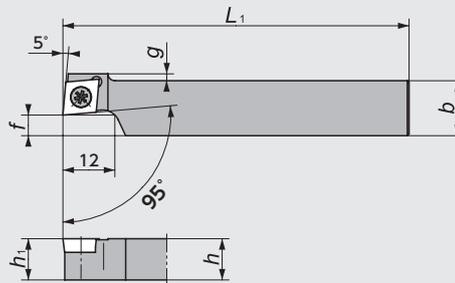
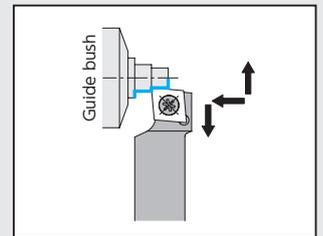


Figure-3



● Right-hand type shown.

SCLC type

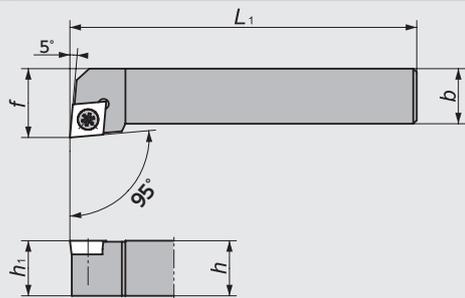
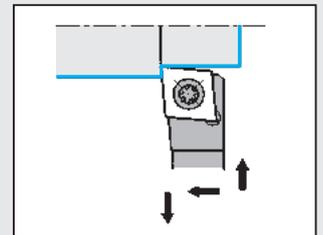


Figure-4



● Right-hand type shown.

SCLC-OH type

SPLASH BAR **NEW**

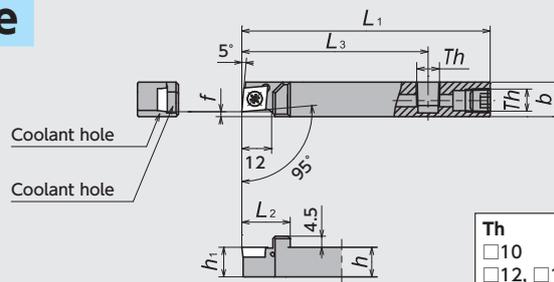
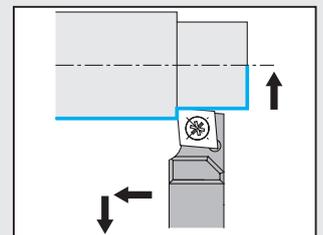


Figure-5

Th	
□10	: M6×1
□12, □16	: Rc1/8 (PT1/8)



● Right-hand type shown.

DS-SCL type

DS holder

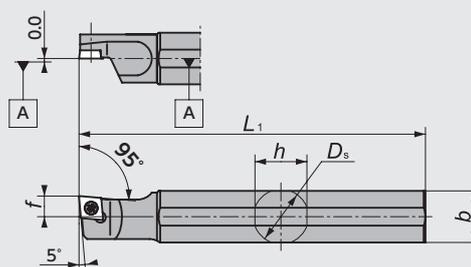
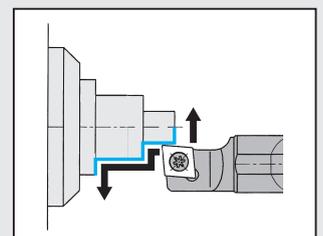


Figure-6



● Left-hand type shown.

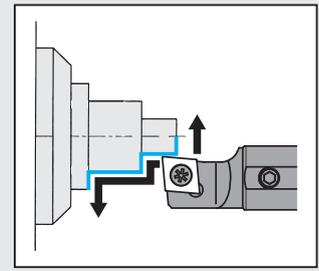
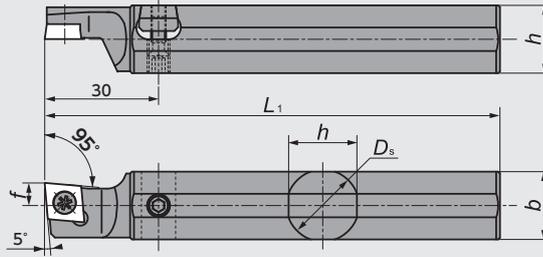
Note) Use a R-hand or neutral type insert.

DS-SCLL-ACH type

DS holder with adjustable centerline height

(Parts)

Shank	Wedge	screw for wedge
φ16	ACH-W18 (5805601)	WS060415-003 (5795539)
φ19.05		
φ20	ACH-W24 (5805619)	WS060419-004 (5799226)
φ22		
φ25.4		



● Left-hand type shown.

Figure-7

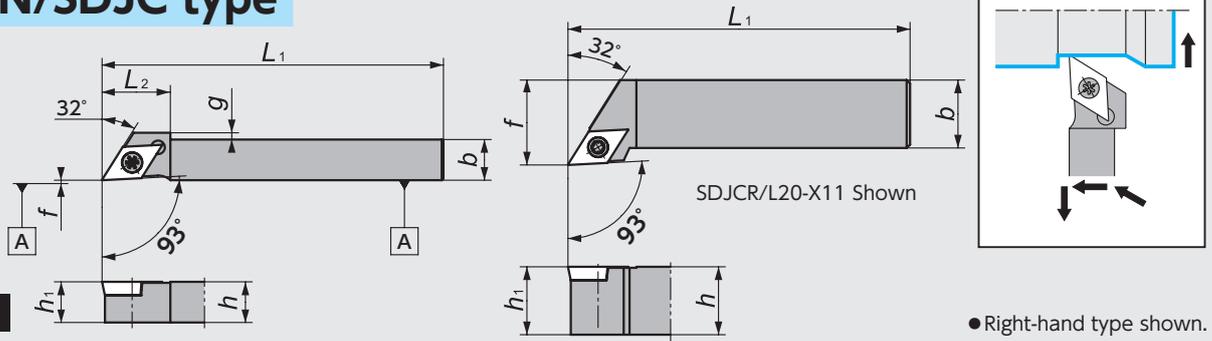
Holder dimensions

Shape	Code No.		Toolholder Part No.	Stock		Dimensions (mm)						Applicable insert	Parts		
	R	L		R	L	D _s	h	b	L ₁	h ₁	f		h ₂	Clamping screw	Wrench
Figure-1	5137013	5137922	SCAC ^{R/L} 0808X06N	●	●		8	8	120	8			CC0602 F20-33~35	LRIS-2.5*7	CLR-15S (A)
	5119060	5137914	1010X06N	●	●		10	10	120	10					
	5459847		1212GX09N	●			12	12	85	12	0.0				
	5137088	5137906	1212X09N	●	●		12	12	120	12					
Figure-2	5137021	5137898	SCLC ^{R/L} 0808X06N	●	●		8	8	120	8			CC0602 F20-33~35	LRIS-2.5*7	CLR-15S (A)
	5122171	5137880	1010X06N	●	●		10	10	120	10					
	5873872		1010H09N	●			10	10	100	10					
	5152889	5152897	1010X09N	●	●		10	10	120	10	0.0				
	5459839	5459821	1212GX09N	●	●		12	12	85	12					
	5137039	5137872	1212X09N	●	●		12	12	120	12					
Figure-3	5700240	5700257	SCLC ^{R/L} 1015X09N-F05	●	■		10	15	120	10	5	2	CC09T3 F20-33~35	LRIS-4*10	LLR-25S (B)
	5700265	5700273	1020X09N-F10	●	■		10	20	120	10	10	2			
	5700364	5700372	1218X09N-F06	●	■		12	18	120	12	6	0			
	5700380	5700398	1224X09N-F12	●	■		12	24	120	12	12	0			
Figure-4	5744719	5884911	SCLC ^{R/L} 20-X09	●	●		20	20	120	20	24.0		CC09T3 F20-33~35	LRIS-4*10	LLR-25S (B)
Figure-5	5905740		SCLC ^{R/L} 1014F09N-F02OH	●			10	14	80	10	2		CC09T3 F20-33~35	LRIS-4*10	LLR-25S (B)
	5905732		SCLC ^{R/L} 1214H09N-F02OH	●			12	14	100	12	2				
	5905658		SCLC ^{R/L} 1616H09N-F02OH	●			16	16	100	16	2				
Figure-6		5602636	DS-SCL ^{R/L} 14F-06	●		14.000	13	13	80				CC0602 F20-33~35	LRIS-2.5*7	CLR-15S (A)
		5486923	15H-06	●		15.875		15	100						
		5601703	16F-06*	●		16.000			80						
		5338876	19-06	●		19.050	18	18	120						
		5520630	20X-06	●		20.000	19	19	95						
		5388608	20-06	●											
		5484936	22-06	●		22.000	21	21	120						
		5520689	25-06MET	●		25.000		24							
		5486691	25-06	●		25.400			150						
		5601729	14F-09	●		14.000	13	13	80		6.0				
		5486931	15H-09	●		15.875		15	100						
		5601711	16F-09*	●		16.000			80						
		5563168	19GX-09	●		19.050	18	18	85						
		5338884	19-09	●		19.050	18	18	120						
		5520655	20X-09	●		20.000	19	19	95						
		5374699	20-09	●											
	5401096	22-09	●		22.000	21	21	120							
	5520671	25-09MET	●		25.000		24								
	5486709	25-09	●		25.400			150							
Figure-7		5833694	DS-SCL ^{R/L} 16F-09-ACH*	●		16.00	15.5	15.5	80				CC09T3 F20-33~35	LRIS-4*8	LLR-25S -20*65 (B)
		5833702	19-09-ACH	●		19.05	18.0	18.0							
		5833710	20-09-ACH	●		20.00	19.0	19.0	120		6.0				
		5833728	22-09-ACH	●		22.00	21.0	21.0							
		5833736	25-09-ACH	●		25.40	24.0	24.0	150						

*Please select φ 16 shank holder When using DS-Sleeve. Details of DS-Sleeve → H91

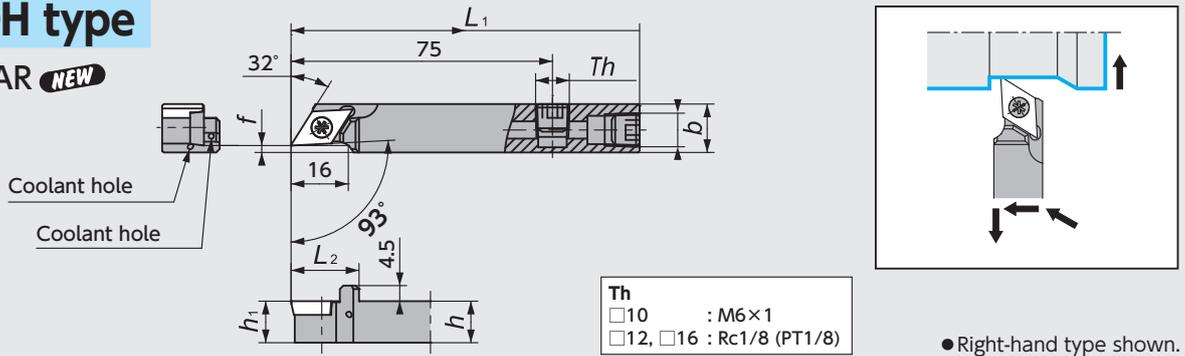
New Products
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 Micro-grain Carbide, Carbide
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 SS
 Grooving Tools
 Threading Tools
 Shaper
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 Indexable End Milling Tools
 Indexable Drill Inserts
 Milling Cutters
 Technical Data
 Index

SDJC-N/SDJC type



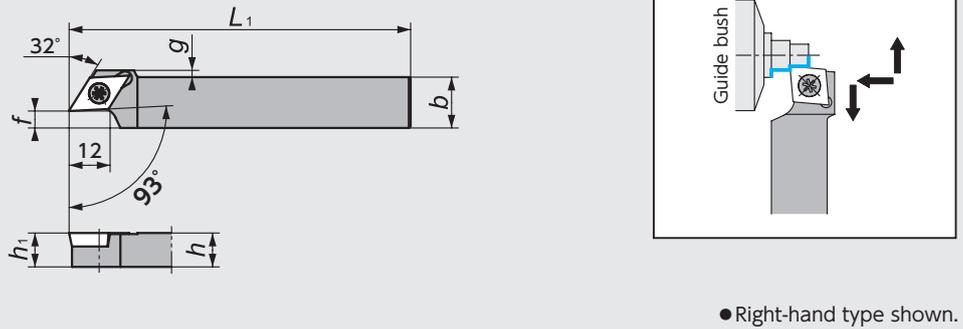
SDJC-OH type

SPLASH BAR **NEW**

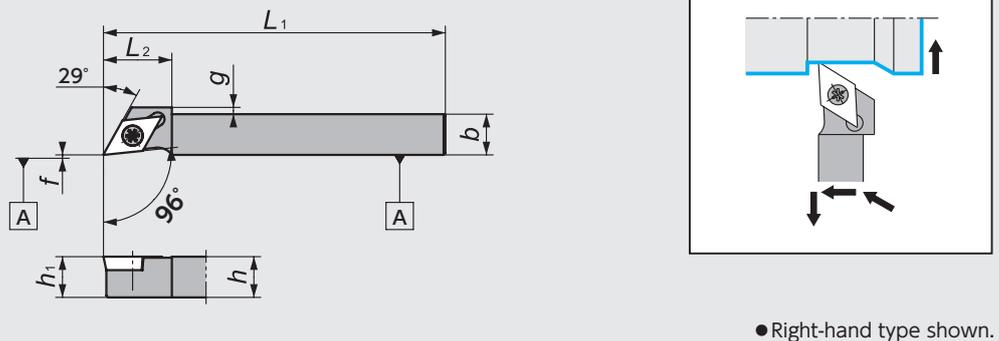


SDJC-N-F type

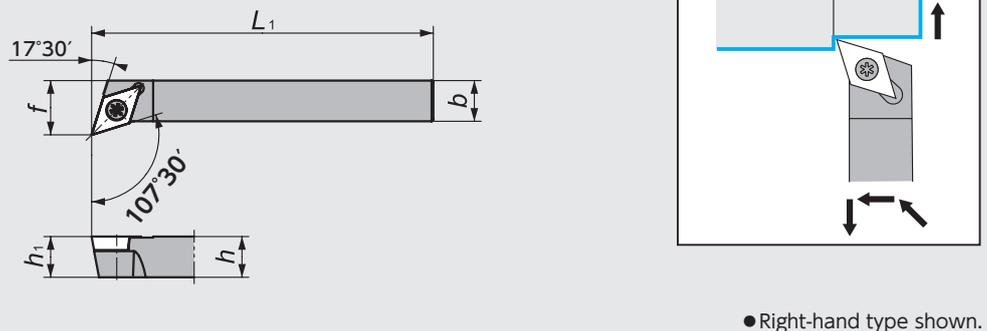
Shift holder



SDXC-N type



SDQC type



SDNC type

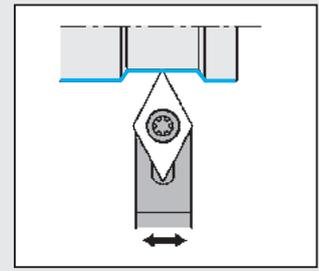
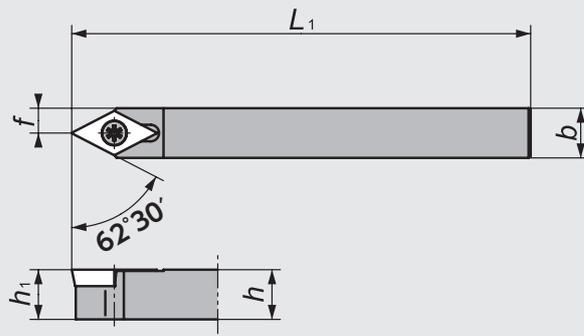
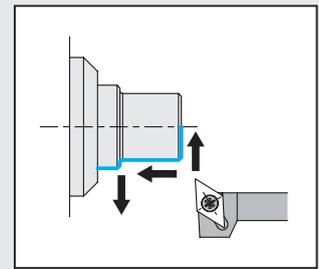
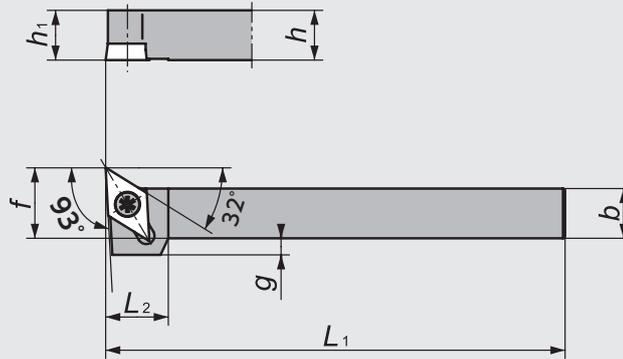


Figure-6

CH-SDUC type

For opposed gang tool post



● Left-hand type shown.

Figure-7

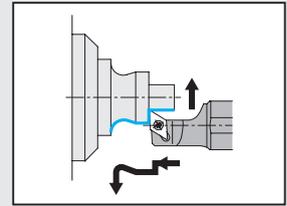
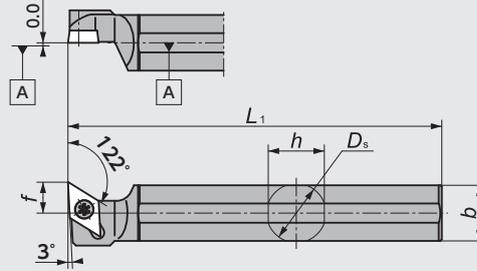
Holder dimensions

Shape	Code No.		Toolholder Part No.	Stock		Dimensions (mm)							Applicable insert	Parts				
	R	L		R	L	h	b	L ₁	h ₁	f	L ₂	g		Clamping screw	Wrench			
Figure-1	5137047	5137864	SDJC ^{R/L} 0808X07N	●	●	8	8	120	8	0	-	0	19	2	DC [□] 0702 F21•37~39 TFD07 F40	LRIS-2.5*7	CLR-15S (A)	
	5502125		1010GX07N	●		10	10	85	10									
	5120464	5137856	1010X07N	●	●			120										
	5873880		1010H11N	●				100										
	5152863	5153234	1010X11N	●	●	12	12	12	12									
	5122155		1210X11N	●														
	5459813	5473681	1212GX11N	●	●													85
	5593215		1216GX11N	●														16
	5122163	5137849	1212X11N	●	●	16	12	12	12									
	5180583	5180609	1616X11N	●	●													16
5744743	5852793	20-X11	●	●	20					20	20	25.0	-					
Figure-2	5903208		SDJC ^{R/L} 1014F11N-F02OH	●		10	14	80	10	2	19.5	-	-	DC [□] 11T3 F21•37~39 TFD11 F40	LRIS-4*10	LLR-25S (B)		
	5886254		1214H11N-F02OH*	●		12	100	12										
	5903216		1616H11N-F02OH	●		16	16	10										
Figure-3	5700588	5700570	SDJC ^{R/L} 1015X07N-F05	●	■	10	15	120	10	5	-	0	19	2	DC [□] 0702 F21•37~39 TFD07 F40	LRIS-2.5*7	CLR-15S (A)	
	5700562	5700554	1020X07N-F10	●	■					20								
	5700547	5700539	1015X11N-F05	●	■					15								
	5700521	5700513	1020X11N-F10	●	■					20								
	5700505	5700497	1218X11N-F06	●	■					18								
	5700471	5700463	1224X11N-F12	●	■					24								
Figure-4	5525449		SDXC ^{R/L} 1010X11N	●		10	10	120	10	0	20	3	-	0	DC [□] 11T3 F21•37~39	LRIS-4*10	LLR-25S (B)	
	5553169		1016X11N	●														16
	5525456		1212X11N	●														12
	5553177		1216X11N	●														16
	5525464		1616X11N	●														16
Figure-5	5743711	5743752	SDQC ^{R/L} 10-X07	●	●	10	10	120	10	12	-	-	-	DC [□] 0702 F21•37~39	LRIS-2.5*7	CLR-15S (A)		
	5743729	5743760	12-X11	●	●												12	12
	5743737	5747332	16-X11	●	●												16	16
	5743745		20-X11	●													20	20
Figure-6	5742184		SDNCN08-X07	●		8	8	120	8	4	-	-	-	DC [□] 0702 F21•37~39	LRIS-2.5*7	CLR-15S (A)		
	5742192		N10-X07	●													10	10
	5742200		N12-X11	●													12	12
	5742218		N16-X11	●													16	16
	5742226		N20-X11	●													20	20
Figure-7		5659222	CH-SDUC ^{R/L} 1010H11	●		10	10	100	10	15	15	6	4	DC [□] 11T3 F21•37~39	LRIS-4*10PW	CLR-15S (A)		
		5659230	1212H11	●													12	12

*For details of SPLASH BAR "SDJCR1214H11N-F02OH", please refer to page A14

DS-SDU type

DS holder



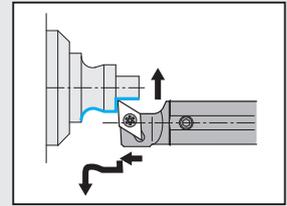
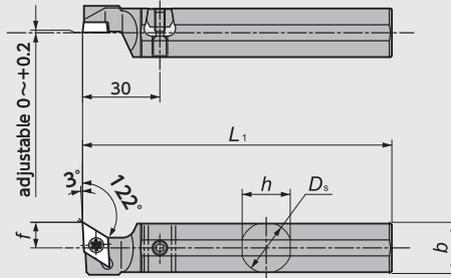
☆Use a R-hand or neutral type insert.
●Left-hand type shown.

Figure-1

DS-SDU-ACH type

DS holder with adjustable centerline height
(Parts)

shank	wedge	screw for wedge
φ16	ACH-W18 (5805601)	WS060415-003 (5795539)
φ19.05		
φ20		
φ22	ACH-W24 (5805619)	WS060419-004 (5799226)
φ25.4		

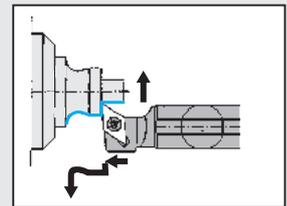
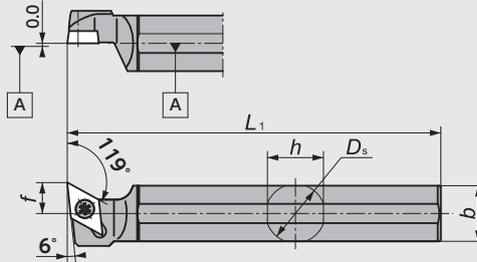


☆Use a R-hand or neutral type insert.
●Left-hand type shown.

Figure-2

DS-SDX type

DS holder

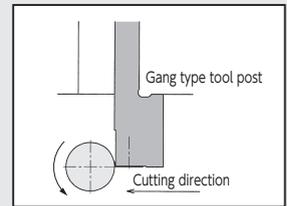
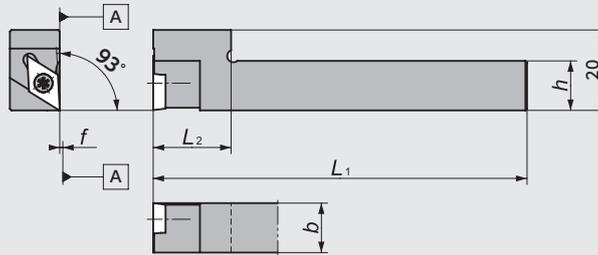


☆Use a R-hand or neutral type insert.
●Left-hand type shown.

Figure-3

Y-SDJC type

Y-axis holder

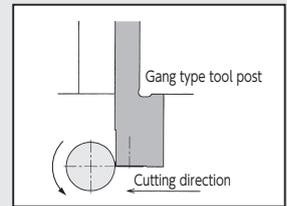
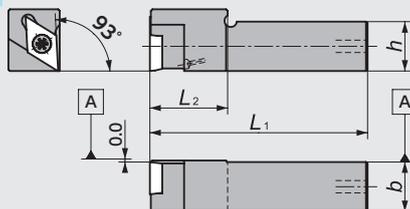


☆Use a R-hand insert for R-hand holder.
●Right-hand type shown.

Figure-4

Y-SDJC-OH type

For high-pressure coolant Y-axis

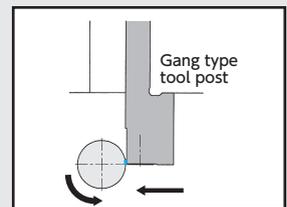
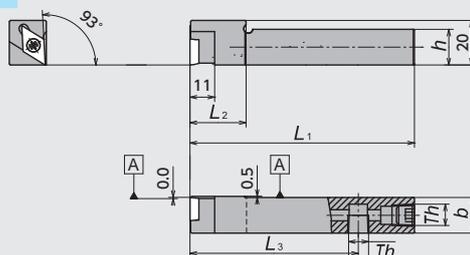


●Right-hand type shown.

Figure-5

Y-SDJC-OH type

SPLASH BAR **NEW**



☆Use a R-hand insert for R-hand holder.
●Right-hand type shown.

Figure-6

Th
□12, □16 : Rc1/8 (PT1/8)

Y-SDNC type

Y-axis holder

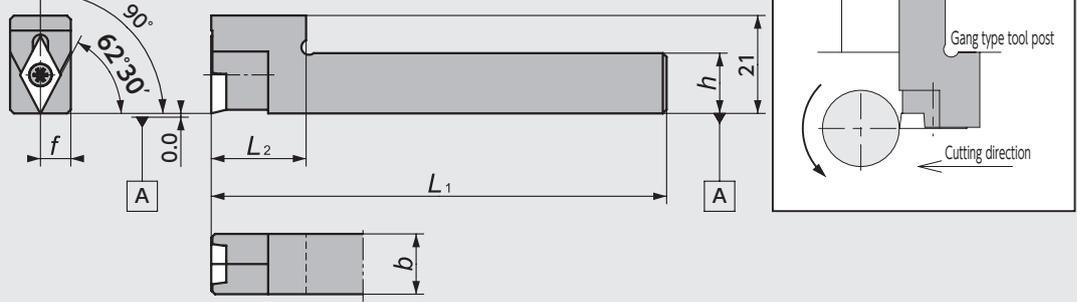


Figure-7

Holder dimensions

Shape	Code No.		Toolholder Part No.	Stock		Dimensions (mm)						Applicable insert	Parts		
	R	L		R	L	D_s	h	b	L_1	h_1	f		L_2	Clamping screw	Wrench
Figure-1		5348545	DS-SDU ^R _L 14F-07	●		14.000	13.0	13	80					LRIS-2.5*7	CLR-15S (A)
		5348107	15H-07	●		15.875			100						
		5520598	16F-07*	●		16.000	15.0	15	80						
		5341516	16X-07*	●		16.000			95						
		5278247	19-07	●		19.050	18.0	18	120						
		5520606	20X-07	●		20.000	19.0	19	95						
		5278239	20-07	●		20.000			120						
		5330758	22-07	●		22.000	21.0	21	120						
		5601745	14F-11	●		14.000	13.0	13	80						
		5601737	16F-11*	●		16.000	15.0	15	80	10.0					
		5278262	19-11	●		19.050	18.0	18	120						
		5572730	19-11SPL	●		19.050	18.0	18	160	11.0					
		5520614	20X-11	●		20.000	19.0	19	95						
		5278254	20-11	●		20.000	19.0	19	120						
		5324025	22-11	●		22.000	21.0	21	120		10.0				
	5638606	23-11-007	★		23.000	22.0	22	70							
	5483417	25-11MET	●		25.000			120							
	5317136	25-11	●		25.400	24.0	24	150							
	5713581	25-11SPL	●		25.400			150		12.5					
	5805635	DS-SDU ^R _L 16F-11-ACH*	●		16.000	15.5	15	80							
Figure-2		5805627	19-11-ACH	●		19.050	18.0	18	120		10.0			LRIS-4*10	LLR-25S -20*65 (B)
		5799614	20-11-ACH	●		20.000	19.0	19	120						
		5799622	22-11-ACH	●		22.000	21.0	21	120						
		5799648	25-11-ACH	●		25.400	24.0	24	150						
Figure-3		5462429	DS-SDX ^R _L 19-11	●		19.050	18.0	18	120					LRIS-4*10	LLR-25S (B)
		5520622	20X-11	●		20.000	19.0	19	95		10.0				
		5462437	20-11	●		20.000	19.0	19	120						
		5520697	25-11MET	●		25.000	24.0	24	120						
Figure-4		5371646	Y-SDJC ^R _L 10-07S	●			10.0	10						LRIS-2.5*7	CLR-15S (A)
		5371661	12-07S	●			12.0	12							
		5926001	10-11S	●			10.0	10				20		LRIS-4*10	LLR-25S -20*65 (B)
		5600671	12-11S	●			12.0	16							
		5890025	16-11S	●			16.0	16							
		5358437	Y-SDJCR10-07	■			10.0	10	120		0.0			LRIS-2.5*7	CLR-15S (A)
		5358429	12-07	■			12.0	12				25			
		5371653	10-07L	■			10.0	10				30			
		5371679	12-07L	■			12.0	12							
		5377742	10-11L	■			10.0	16				20		LRIS-4*10	LLR-25S-20*65 (B)
	5926001	10-11S	●			10.0	16								
Figure-5		5699970	Y-SDJC ^R _L 12-11SOH	■			12.0	12	70			20		LRIS-4*10	LLR-25S -20*65 (B)
		5699988	16-11OH	■			16.0	16				25			
Figure-6		5910575	Y-SDJC ^R _L 1212H11S-OH	●			12	12	100			20		LRIS-4*8	LLR-25S
		5910583	1616H11-OH	●			16	16				25			
Figure-7		5479191	Y-SDNCN12-11S	●			12.0	12	120		6.0	20		LRIS-4*10	LLR-25S-20*65 (B)
		5485875	N16-11S	●			16.0	16			8.0				

*Please select $\phi 16$ shank holder When using DS-Sleeve. Details of DS-Sleeve [↔ H91](#)

■ For TFD-type, insert with wiper facet at the cutting edge, please refer to page F40

SVAC-N type

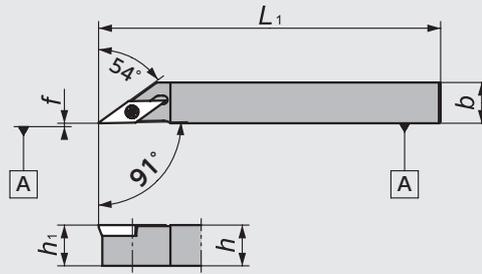
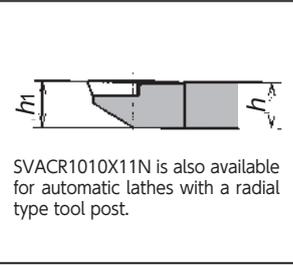


Figure-1



SVACR1010X11N is also available for automatic lathes with a radial type tool post.

● Right-hand type shown.

SVAC-N-1L type

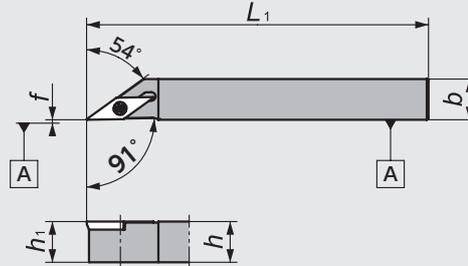
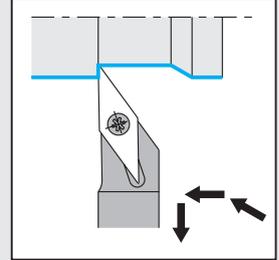


Figure-2



● Right-hand type shown.

SVAC-NW type

For double-edged cutting tool

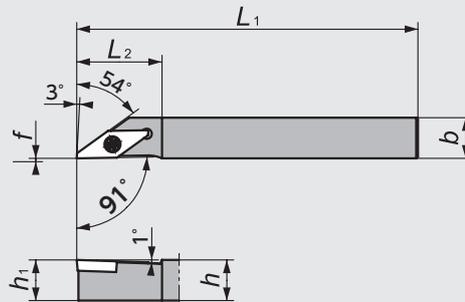
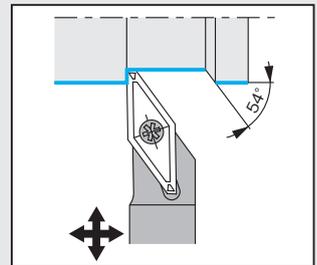


Figure-3



● Right-hand type shown.

SVAC type

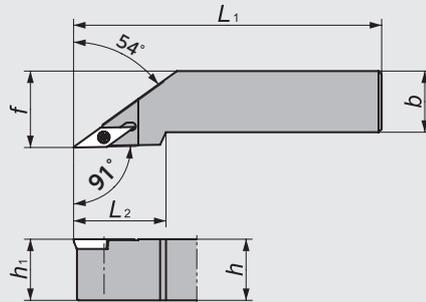
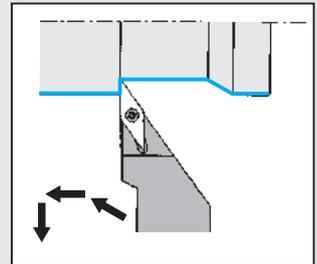


Figure-4



● Right-hand type shown.

SVAC-W type

For double-edged cutting tool

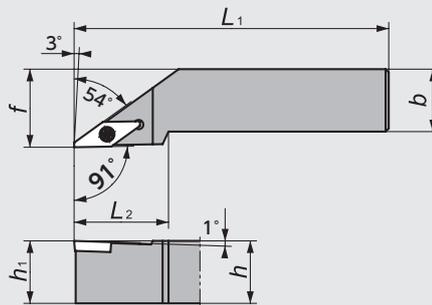
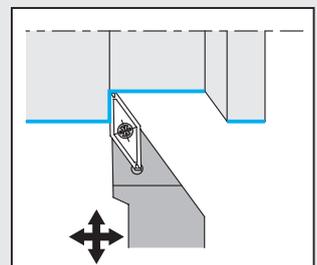


Figure-5



● Right-hand type shown.

SVJC-N type

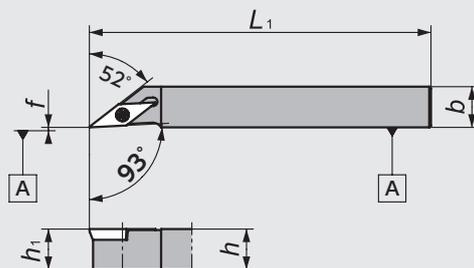
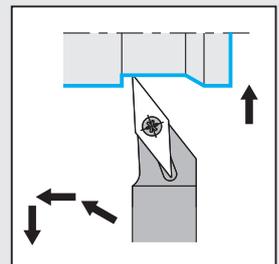


Figure-6



● Right-hand type shown.

SVXC-N type

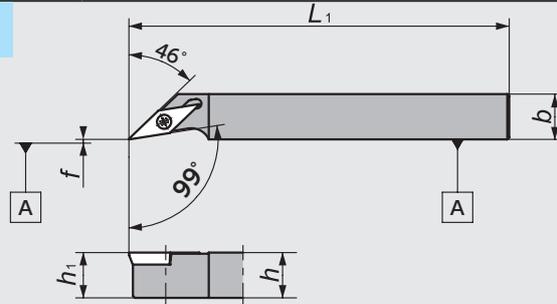
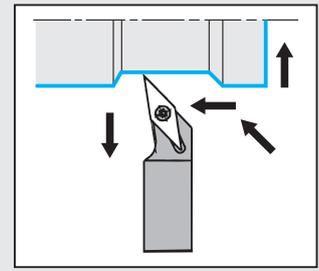


Figure-7



● Right-hand type shown.

Y-SVXCL type

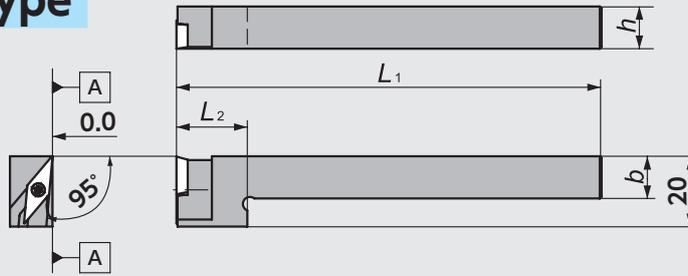
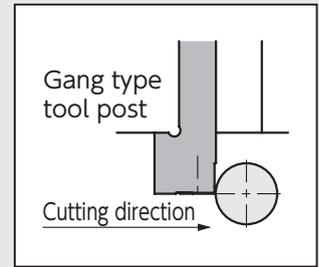


Figure-8



● Left-hand type shown.

Holder dimensions

Shape	Code No.		Toolholder Part No.	Stock		Dimensions (mm)						Applicable insert	Parts	
	R	L		R	L	h	b	L ₁	h ₁	f	L ₂		Clamping screw	Wrench
Figure-1	5304043	5304092	SVAC ^{R/L} 1010X11N	●	●	10	10	120	10	0.0	—	VC ^{□□□} 1103 F23·47~48 TFV11 F49	LRIS-2.5*7	CLR-15S (A)
	5304050	5304076	1212X11N	●	●	12	12		12					
	5304068		1616X11N	●		16	16		16					
Figure-2	5473053	5473038	SVAC ^{R/L} 1010X11N-1L	●	●	10	10	120	10	0.0	—	VCGT1102 F47	LRIS-2.5*7	CLR-15S (A)
	5473061	5473046	1212X11N-1L	●	●	12	12		12					
Figure-3	5401724	5401708	SVAC ^{R/L} 1010L13NW	●	●	10	10	140	10	0.0	25	VCGT1303 F47~48	LRIS-3*8	RLR-20S (B)
	5401732	5401716	1212L13NW	●	●	12	12		12					
	5401740	5431077	1616M13NW	●	●	16	16		16					
Figure-4	5744768		SVAC ^{R/L} 20-X11	●		20	20	120	20	25.0	30	VC ^{□□□} 1103 F23·47~48 TFV11 F49	LRIS-2.5*7	CLR-15S (A)
Figure-5	5474549		SVAC ^{R/L} 2020M13W	●		20	20	150	20	25.0	30	VCGT1303 F47~48	LRIS-3*8	RLR-20S (B)
Figure-6	5339940	5517750	SVJC ^{R/L} 1010X11N	●	●	10	10	120	10	0.0	—	VC ^{□□□} 1103 F23·47~48	LRIS-2.5*7	CLR-15S (A)
	5339932	5517768	1212X11N	●	●	12	12		12					
	5339924	5517743	1616X11N	●	●	16	16		16					
Figure-7	5393731	5415815	SVXC ^{R/L} 1210X11N	●	●	10	12	120	10	0.0	—		LRIS-2.5*7	CLR-15S (A)
	5393749		1212X11N	●		12	12		12					
Figure-8		5917182	Y-SVXCL12-11S		●	12	12	120	—	—	20	VC ^{□□□} 1103 F23·47~48	LRIS-2.5*7	CLR-15S (A)

■ For TFV-type, insert with wiper facet at the cutting edge, please refer to page F49

SVQC type

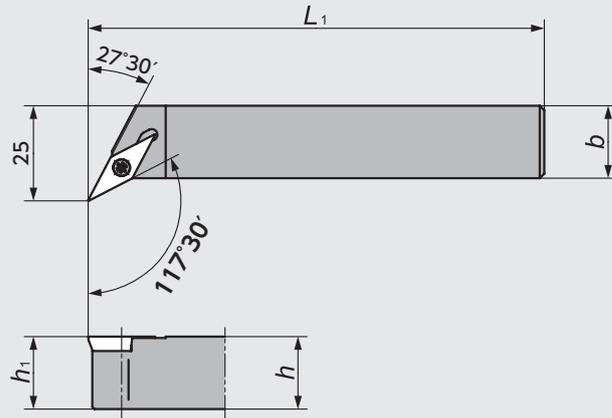


Figure-1

● Right-hand type shown.

SVVC-N type

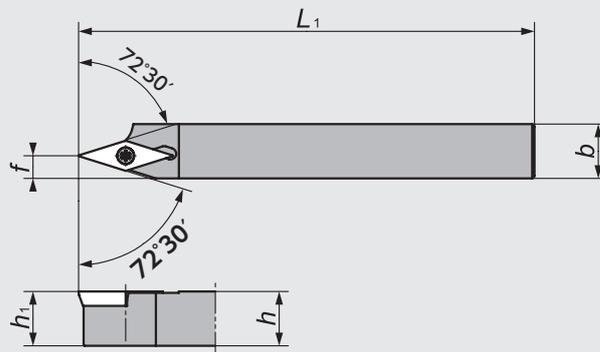


Figure-2

● Right-hand type shown.

SVVC-N type

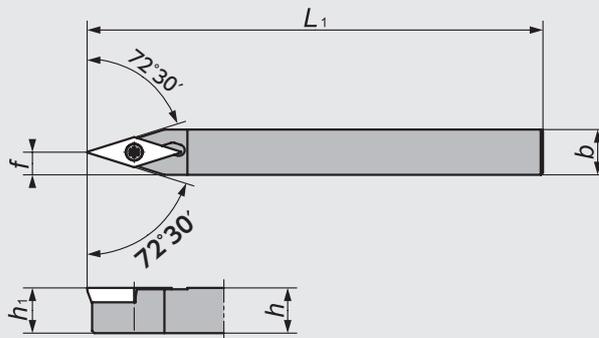


Figure-3



DS-SVX type

DS holder

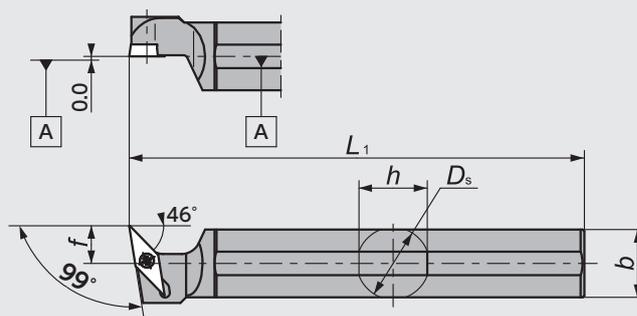


Figure-4

● Left-hand type shown.

Holder dimensions

Shape	Code No.		Toolholder Part No.	Stock		Dimensions (mm)						Applicable insert	Parts	
	R	L		R	L	D_s	h	b	L_1	h_1	f			
Figure-1	5744776		SVQC^{R/L} 20-X11	●		—	20	20	120	20	—	LRIS-2.5*7	CLR-15S	
Figure-2	5523238		SVVC^{R/L} 1212X11N	●		—	12	12	120	12	5	LRIS-2.5*7	CLR-15S	
	5523212		1616X11N	●		—	16	16		16				
Figure-3	5461835		SVVCN1010X11N	●		—	10	10	120	10	5	LRIS-2.5*7	CLR-15S	
	5744792		N20-X11	●		—	20	20		20				10
Figure-4		5601778	DS-SVX^{R/L} 14F-11	●		14.000	13	13	80	10.0	VC□□1103 F47~48	LRIS-2.5*7	CLR-15S	
		5418413	15H-11	●		15.875	15	15						100
		5601752	16F-11*	●		16.000		80						
		5393756	19-11	●		19.050	18	18	120	11.0				
		5572722	19-11SPL	●				160						
		5520663	20X-11	●		20.000	19	19	95	10.0				
		5393764	20-11	●				120						
		5486675	22-11	●		22.000	21	21						
		5486683	25-11	●		25.400	24	24	150					

*Please select $\phi 16$ shank holder When using DS-Sleeve. Details of DS-Sleeve [→ H91](#)

SVXP-N type

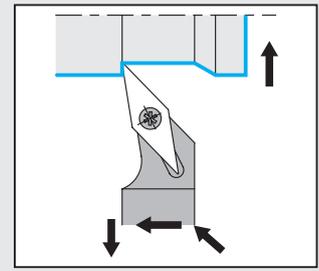
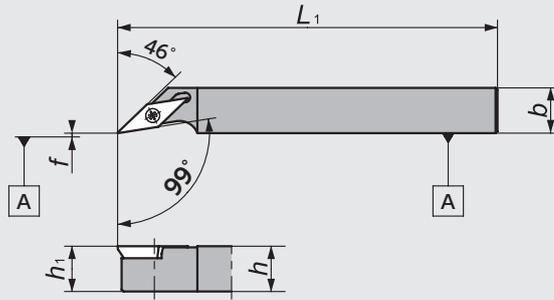


Figure-1

● Right-hand type shown.

SVQP-N type

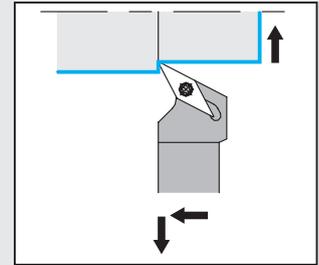
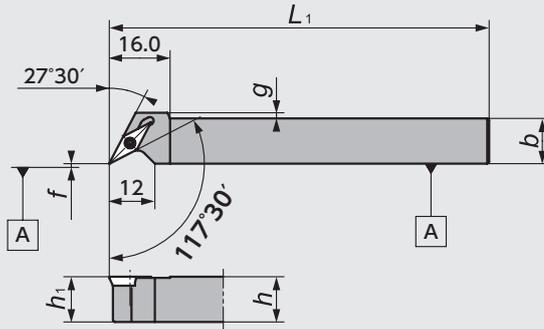


Figure-2

● Right-hand type shown.

CH-SVUP type

For opposed gang tool post

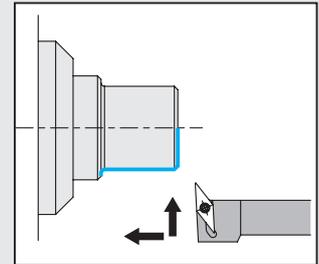
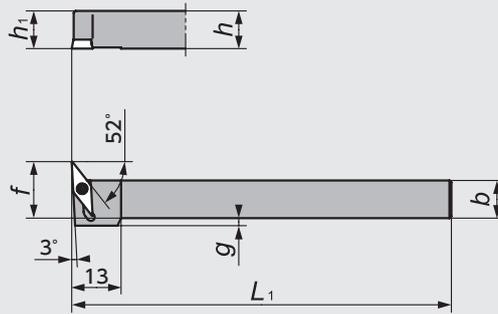


Figure-3

● Left-hand type shown.

DS-SVVP type

DS holder

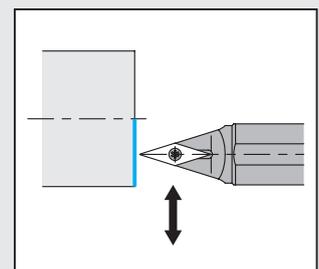
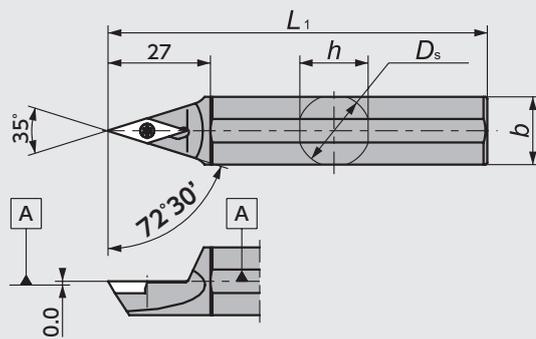


Figure-4

● Neutral type shown.

DS-SVVP-ACH type

DS holder with adjustable centerline height **NEW**

(Parts)

shank	wedge	screw for wedge
φ16		WS060415-003 (5795539)
φ19.05	ACH-W18 (5805601)	
φ20		
φ22		WS060419-004 (5799226)
φ25.4	ACH-W24 (5805619)	

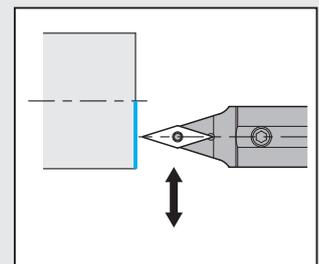
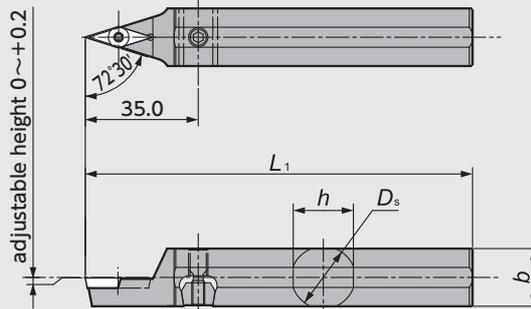


Figure-5

● Neutral type shown.

DS-SVXP type

DS holder

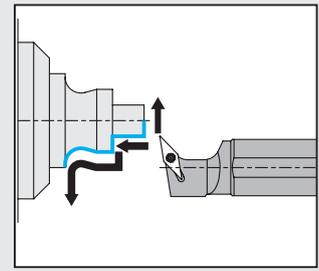
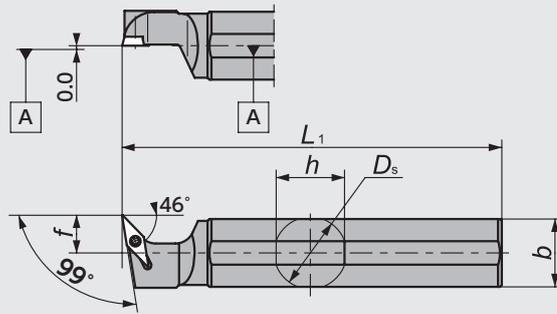


Figure-6

● Left-hand type shown.

Holder dimensions

Shape	Code No.		Toolholder Part No.	Stock		Dimensions (mm)							Applicable insert 	Parts	
	R	L		R	L	D_s	h	b	L_1	h_1	f	g		Clamping screw 	Wrench 
Figure-1	5511506	5511514	SVXP ^{R/L} 1012X11N	●	●	—	10.0	12	120	10	—	—	VP  1103 F48	LRIS-2.5*7	CLR-15S
	5511522	5511548	1212X11N	●	●	—	12.0	12	120	12	0.0	—			
Figure-2	5600622	5600614	SVQP ^{R/L} 1010X08N	●	●	—	10.0	10	—	—	—	3.5	VP  0802 F48	LRIS-2*6	CLR-13S
	5600598	5600606	1212X08N	●	●	—	12.0	12	120	10	0.0	1.5			
	5600580	5600564	1616X08N	●	●	—	16.0	16	—	—	—	—			
Figure-3		5659206	CH-SVUP ^{R/L} 1010H08	●	●	—	10.0	10	100	10	15	2	VP  0802 F48	LRIS-2*6	CLR-13S
		5659214	1212H08	●	●	—	12.0	12	100	12	17	0			
Figure-4	5511555		DS-SVVPN19-11	●	●	—	19.050	18.0	18	120	—	—	VP  1103 F48	LRIS-2.5*7	CLR-15S
	5511563		N22-11	●	●	—	22.00	21.0	21	120	—	—			
Figure-5	NEW 5805643		DS-SVVPN16-11-ACH*	●	●	—	16.000	15.5	15	120	—	—	VP  1103 F48	LRIS-2.5*7	CLR-15S
	NEW 5799655		N19-11-ACH	●	●	—	19.050	18.0	18	120	—	—			
	NEW 5799663		N20-11-ACH	●	●	—	20.000	19.0	19	120	—	—			
	NEW 5799671		N22-11-ACH	●	●	—	22.000	21.0	21	120	—	—			
	NEW 5807524		N25-11-ACH	●	●	—	25.400	24.0	24	150	—	—			
Figure-6		5534003	DS-SVXP ^{R/L} 19-08	●	●	—	19.050	18.0	18	120	—	10	VP  0802 F48	LRIS-2*6	CLR-13S
		5534011	20-08	●	●	—	20.000	19.0	19	120	—	10			
		5600549	22-08	●	●	—	22.000	21.0	21	120	—	10			
		5533997	25-08	●	●	—	25.400	24.0	24	150	—	10			

*Please select $\phi 16$ shank holder When using DS-Sleeve. Details of DS-Sleeve → H91

STAC-N type

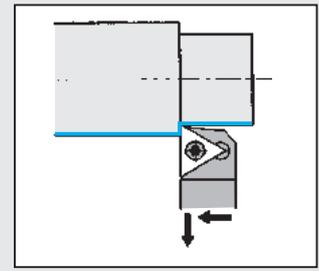
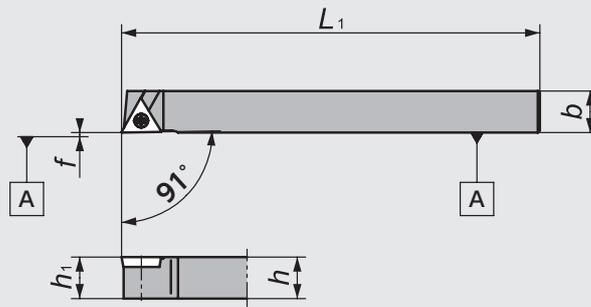


Figure-1

● Right-hand type shown.

CH-STUC type

For opposed gang tool post

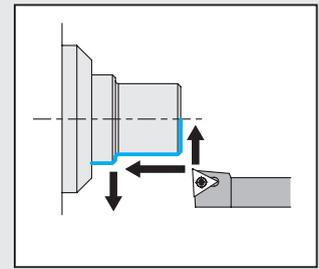
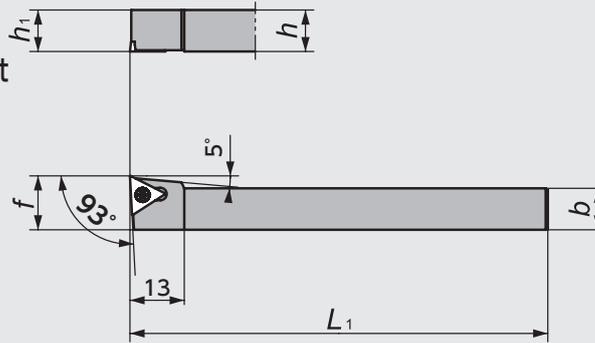


Figure-2

● Left-hand type shown.

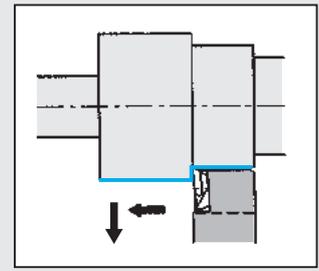
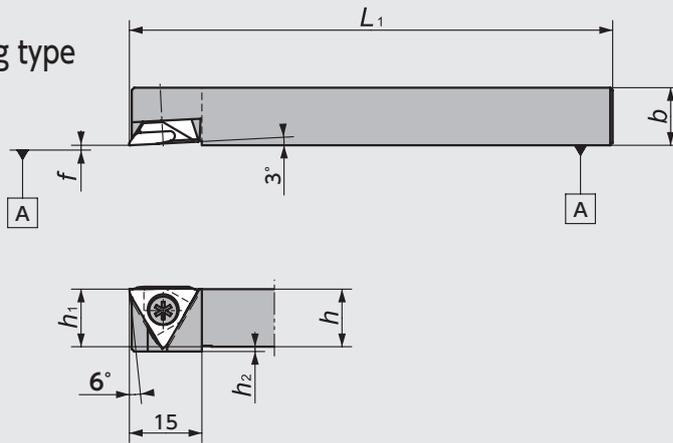
Holder dimensions

Shape	Code No.		Toolholder Part No.	Stock		Dimensions (mm)					Applicable insert	Parts	
	R	L		R	L	h	b	L ₁	h ₁	f		Clamping screw	Wrench
Figure-1	5137005	5137831	STAC [®] L0808X09N	●	■	8	8	120	8	0.0	TC□□0902 F43~44 TFT09 F46	LRIS-2.2*6	CLR-13S
	5137096	5137948	1010X09N	●	●	10	10		10				
	5119078	5137930	1212X11N	●	●	12	12		12				
Figure-2		5659180	CH-STUC [®] L1010H09	●	●	10	10	100	10	13	TC□□0902 F43~44	LRIS-2.2*6	CLR-13S
		5659198	1212H09	●	●	12	12		12				

■ For TFT-type, insert with wiper facet at the cutting edge, please refer to page F46

TFT type

Front/back clamping type



● Right-hand type shown.

Holder dimensions

Code No.		Toolholder Part No.	Stock		Dimensions (mm)						Applicable insert	Parts	
R	L		R	L	h	b	L ₁	h ₁	f	h ₂		Clamping screw	Wrench
5196993		TFT$\frac{1}{4}$ 10	●		10	10	120	10	0.0	3	TF33 (See the table below)	LR-S-4*10PW	CLR-15S
5197025		12	●		12	12		12		1			
5205190		16	●		16	16		16		—			
5562723		20	●		20	20		20		—			

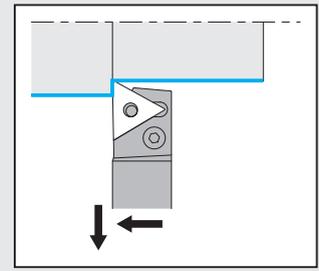
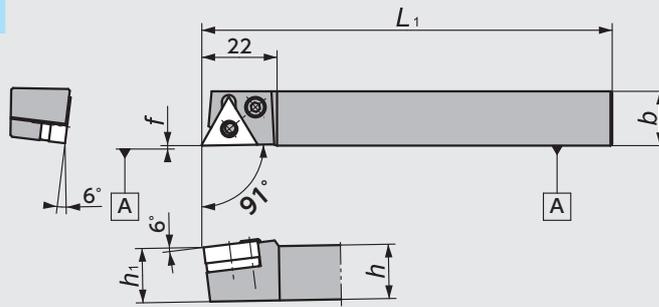
Holder dimensions

TF type

Shape	Part No.	Dimensions (mm)			PVD-coated micro-grain carbides	
		d	s	r _ε	ZM3	Stock
<p>● Right-hand type shown.</p> <p>※The max.depth of cut is 4.0 mm. ☆The angles shown here are the values when the insert is set into the holder.</p>	TF3300R	9.525	4.76	0	5947338	●
	3305R			0.05	5914619	●
	3315R			0.15	5906342	●
	3320R			0.2	5971874	●

PTAN-N type

Lever lock
Front/back clamping type

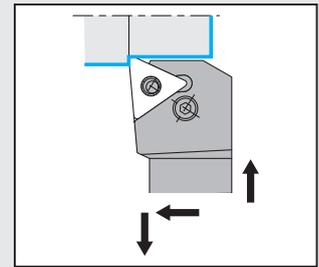
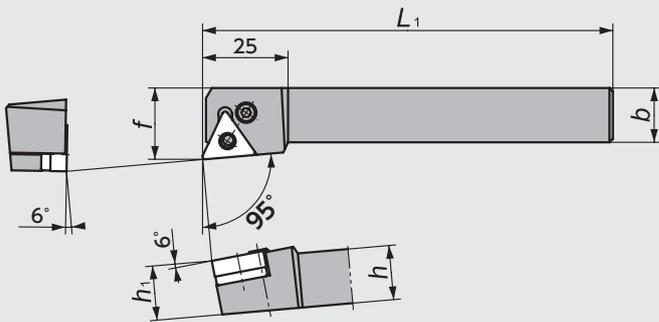


● Right-hand type shown.

Figure-1

PTLN type

Lever lock
Front/back clamping type

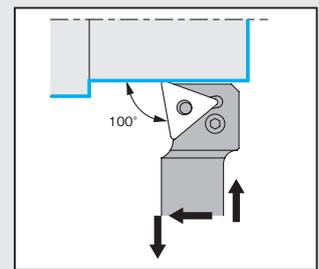
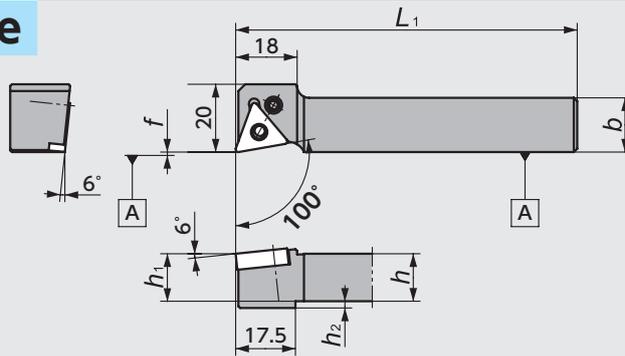


● Right-hand type shown.

Figure-2

PTXN-N type

Lever lock

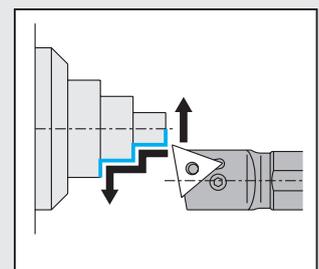
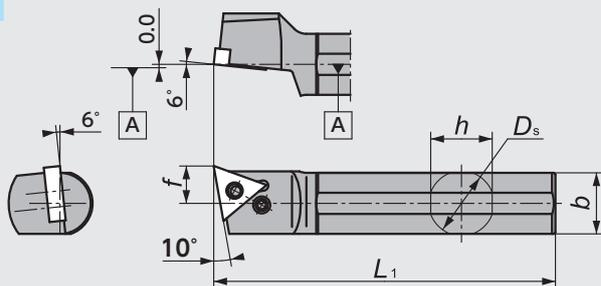


● Right-hand type shown.

Figure-3

DS-PTX type

Lever lock
DS holder



● Left-hand type shown.

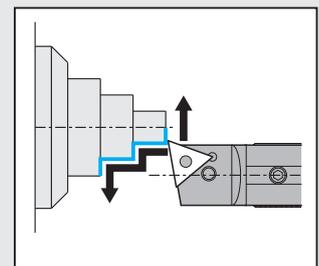
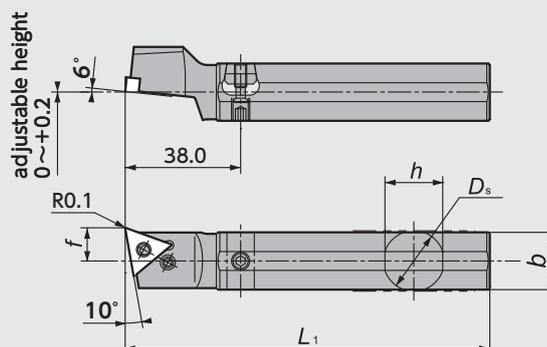
Figure-4

DS-PTX-ACH type

DS holder with adjustable centerline height

(Parts)

shank	wedge	screw for wedge
φ16		WS060415-003 (5795539)
φ19.05	ACH-W18 (5805601)	
φ20		
φ22		WS060419-004 (5799226)
φ25.4	ACH-W24 (5805619)	



● Left-hand type shown.

Figure-5

Holder dimensions

Shape	Code No.		Toolholder Part No.	Stock		Dimensions (mm)								Applicable insert 	Parts				
	R	L		R	L	D _s	h	b	L ₁	h ₁	f	L ₂	h ₂		Shim seat 	Lever 	Clamping screw 	Spring 	Wrench 
Figure-1	5252325		PTAN [®] L 1616X33N	●		—	16.0	16	120	16	0.0	22	—	TN ¹⁶⁰⁴ F19-29~30	LST317	LCL3	LCS3	LSP3	LW-2.5
Figure-2	5552336	5552344	PTLN [®] L 2020L33	●	●	—	20.0	20	140	20	25	25	—	TN ¹⁶⁰⁴ F19-29~30	LST317	LCL3	LCS3	LSP3	LW-2.5
Figure-3	5479860		PTXN [®] L 1016X33N	●		—	10.0			10			2	TN ¹⁶⁰⁴ F19-29~30	LCL33N	LCS33	LW-2		
	5479852		1216X33N	●			12.0	16	12		18								
	5489901		1616X33N	●			16.0		16		0								
	5513965		2020X33N	●			20.0	20	20										
Figure-4		5519707	DS-PTX [®] L 19-33	●		19.050	18.0	18						TN ¹⁶⁰⁴ F19-29~30	LCL33N	LCS33	LW-2		
		5519715	20-33	●		20.000	19.0	19	120	11.0									
	NEW	5591029	22-33	●		22.000	21.0	21		12.0									
		5519699	25M-33	●		25.400	24.0	24	150	13.0									
Figure-5		5805650	DS-PTX [®] L 16-33-ACH [®]	●		16.000	15.5	15						TN ¹⁶⁰⁴ F19-29~30	LCL33N	LCS33	LW-2		
		5799689	19-33-ACH	●		19.050	18.0	18		11.0									
		5799697	20-33-ACH	●		20.000	19.0	19	120										
		5799705	22-33-ACH	●		22.000	21.0	21		12.0									
		5799713	25-33-ACH	●		25.400	24.0	24	150	13.0									

※Please select φ 16 shank holder When using DS-Sleeve. Details of DS-Sleeve → H91

- New Products
- Tool Materials / Selection Guide
- PCD, CBN and ceramic
- Cermet
- Micro-grain Carbide, Carbide
- Insert Stock List
- Outside Machining Toolholders
- SS
- Grooving Tools
- Threading Tools
- Shaper
- Internal machining tool range
- Original Tools for Various Applications
- Indexable End Milling Tools
- Indexable Drill Inserts
- Milling Cutters
- Technical Data
- Index

PCLN-N type

Lever lock
Front/back clamping type

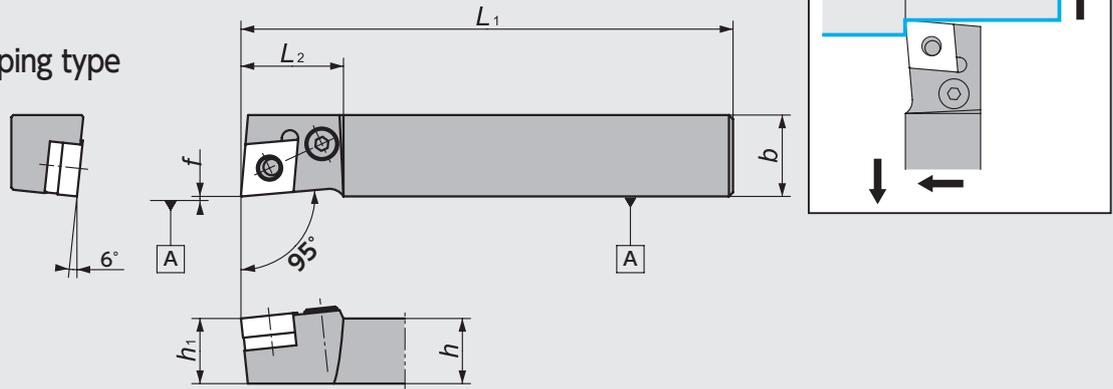


Figure-1

● Right-hand type shown.

PCLN type

Lever lock

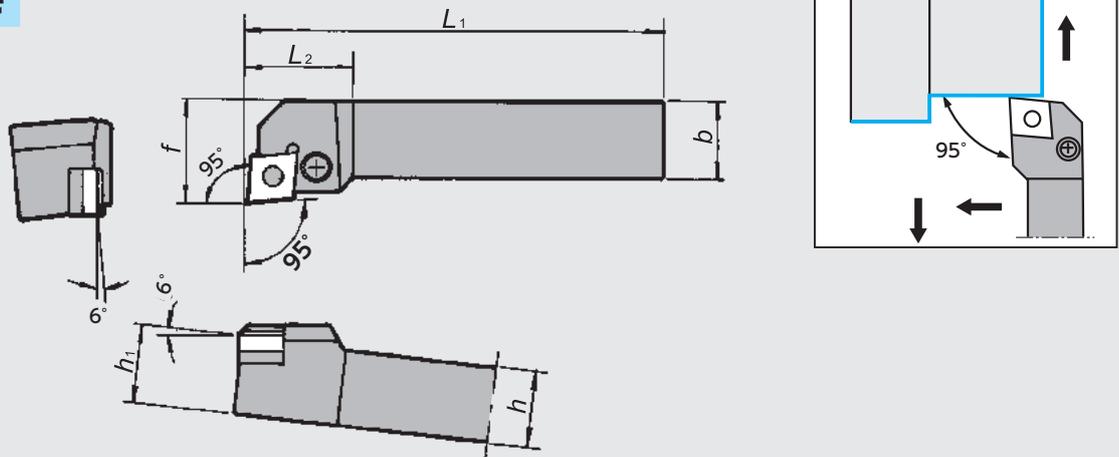


Figure-2

● Right-hand type shown.

Holder dimensions

Shape	Code No.		Toolholder Part No.	Stock		Dimensions (mm)						Applicable insert	Parts				
	R	L		R	L	h	b	L ₁	h ₁	f	L ₂		Shim seat	Lever	Clamping screw	Spring	Wrench
Figure-1	5259056		PCLN [®] /L 1620X43N	●		16	20	120	16	0.0	25	CN [□] 43 F16• 24~25	LSC42	LCL4	LCS4CA	LSP4	LW-3
Figure-2	5321997	5322003	PCLN [®] /L 2020K43	●	●	20	20	125	20	25	28	CN [□] 43 F16• 24~25	LSD42	LCL4	LCS4	LSP4	LW-3
	5322011	5322029	2525M43	●	●	25	25	150	25	32	28						

※For other shank sizes, please contact us for more information.

PDJN-N type

Lever lock
Front/back clamping type

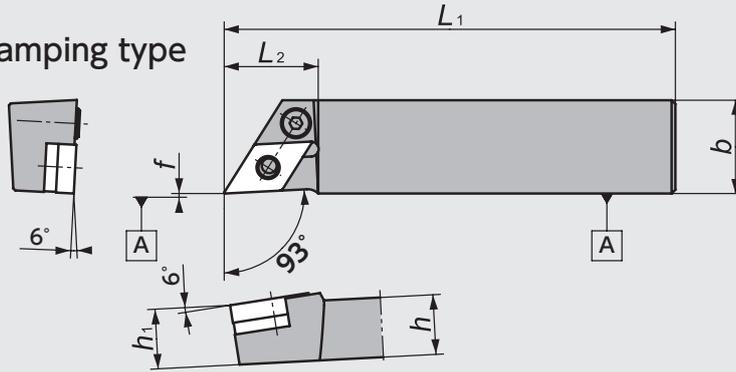


Figure-1

● Right-hand type shown.

PDJN type

Lever lock

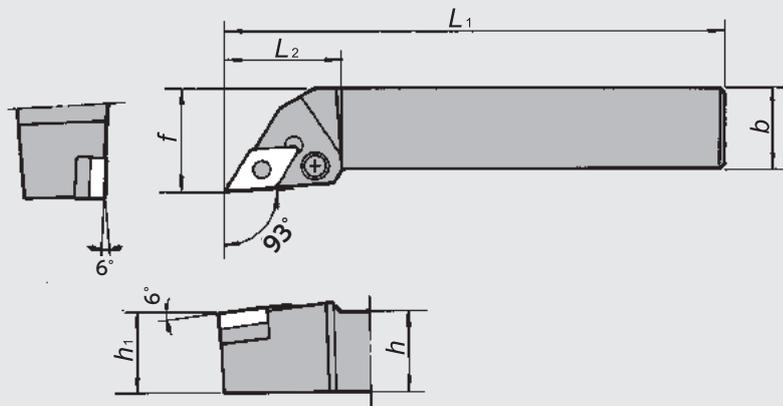


Figure-2

● Right-hand type shown.

Holder dimensions

Shape	Code No.		Toolholder Part No.	Stock		Dimensions (mm)						Applicable insert	Parts				
	R	L		R	L	h	b	L ₁	h ₁	f	L ₂		Shim seat	Lever	Clamping screw	Spring	Wrench
Figure-1	5259072		PDJN _{R/L} 1625X43N	●		16	25	120	16	0.0	25	DN _□ 43 F17• 25~26	LSD42	LCL4	LCS4CA	LSP4	LW-3
Figure-2	NEW 5322037	NEW 5322045	PDJN _{R/L} 2020K43	●	●	20	20	125	20	25	32	DN _□ 43 F17• 25~26	LSD42	LCL4	LCS4	LSP4	LW-3
	5682463		2525M43	●		25	25	150	25	32							

※For other shank sizes, please contact us for more information.

MEMO

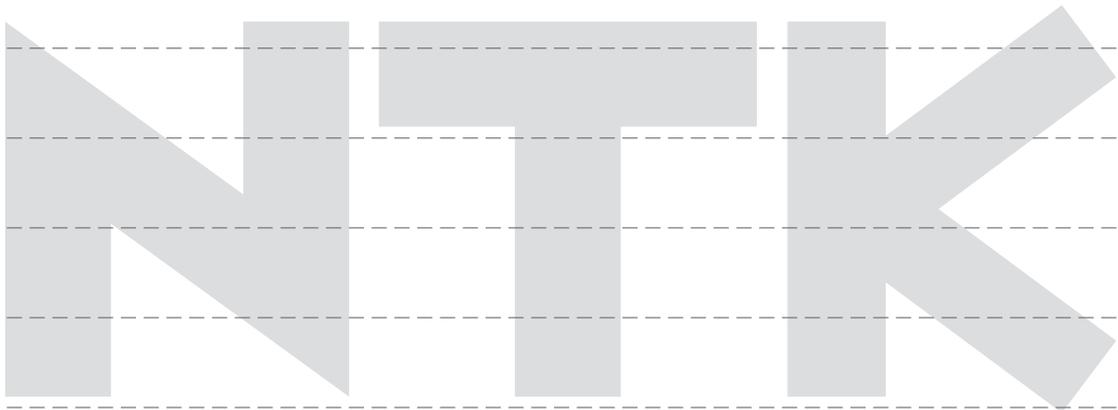
Swiss tooling

SS Tools for Front Turning

SS Tools for Back Turning

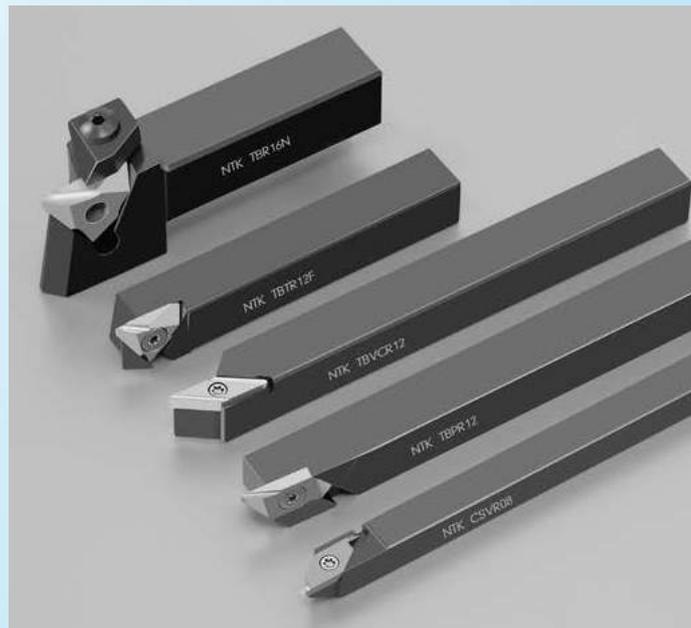
SS Tools for Cutting off

Original Series



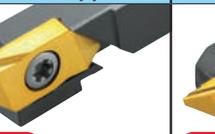
SS Tools for Back Turning

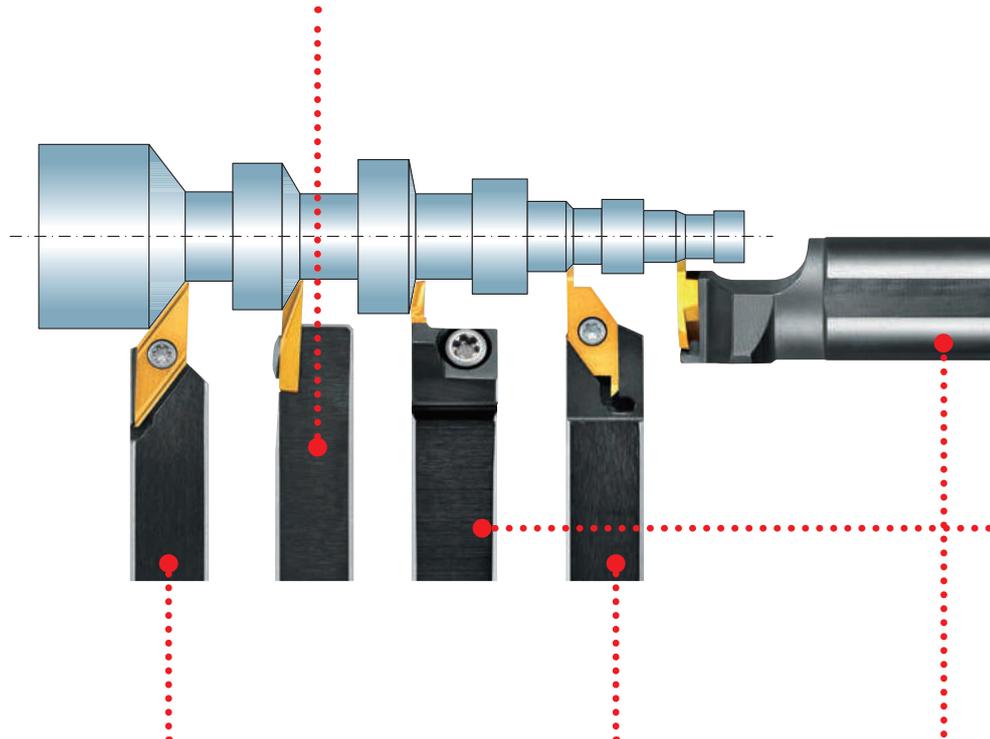
- Selection guide for Back Turning cutting tools ···· H36
- List of Back Turning holders and applicable inserts ···· H40



NTK SS Tools Selection guide for back turning tools

Swiss tooling

TBP type	TBP-OH type	NEW Y-TBP-OH type	DS-TBP type	CTPA type	CTPS type
					
⇒H42	⇒H42	⇒H42	⇒H42	⇒H44	⇒H41
Dimension "a": ~4.8	Dimension "a": ~4.8	Dimension "a": ~4.8	Dimension "a": ~4.8	Dimension "a": ~6.3	Dimension "a": ~5.0
Dimension "b": 5.3	Dimension "b": 5.3	Dimension "b": 5.3	Dimension "b": 5.3	Dimension "b": 5.3/6.8	Dimension "b": 3.5/4.8
Shank size : □8 ~□16	Shank size : □10 ~□16	Shank size : □12 ~□16	Shank size : □19 ~□25.4	Shank size : □10 ~□20	Shank size : □10 ·□12
Applicable insert : TBP□□FR/L	Applicable insert : TBP□□FR/L	Applicable insert : TBP□□FR/L	Applicable insert : TBP□□FR/L	Applicable insert : TBPA□□FR/L	Applicable insert : TBPS□□FR
A wide range of cutting edge shapes and material grades are offered as NTK standards for many and varied applications !					Common holder type

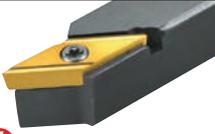


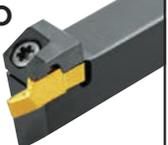
NEW CH-TBPA type

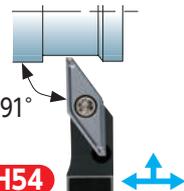
⇒H44
Dimension "a": ~6.3
Dimension "b": 5.3/6.8
Shank size : □16 ·□20
Applicable insert : TBPA□□FR
For end face machining

NEW CH-SVXCL type

⇒H46
Applicable insert : VC□□
Shank size : □16, □20

TBVC type	TB type	CSV type
		
⇒H46	⇒H50	⇒H40
Dimension "a" : ~ 8.3	Dimension "a" : ~ 4.0	Dimension "a" : ~ 1.0
Dimension "b" : 8.3	Dimension "b" : 4.8/8.8	Dimension "b" : 2.0
Shank size : □10 ~□20	Shank size : □8 ~□25	Shank size : □7 ~□12
Applicable insert : TBVC11	Applicable insert : TB□□R/L	Applicable insert : CSVB11
Greater cutting depth via a long cutting edge !	Highly rigid by due to the triangular insert mounted tangentially !	For back turning work pieces of very small diameter !

TBDP type BACK DUO

⇒H49
Dimension "a" : ~ 3.5
Dimension "b" : 5.0
Shank size : □10 ~□20
For Y-axis type... ⇒H49
Applicable insert : TBDP22
Excellent chip control and sharp edge make clean face on flange back.

SVAC(-N)W type	GTT type	GTT-OH type	Y-GTT-OH type	CH-GTT type	DS-GTT type
					
⇒H54	⇒H52	⇒H52	⇒H52	⇒H52	⇒H52
Applicable insert : VCGT13	Dimension "a": ~1.3	Dimension "a": ~1.3	Dimension "a": ~1.3	Dimension "a": ~1.3	Dimension "a": ~1.3
Shank size : □10 ~□20	Dimension "b": 2.7	Dimension "b": 2.7	Dimension "b": 2.7	Dimension "b": 2.7	Dimension "b": 2.7
	Shank size : □8 ~□16	Shank size : □10 ~□16	Shank size : □12 ~□16	Shank dia. : □10 ·□12	Shank dia. : φ14 ~φ25
	Applicable insert : TBMH32	Applicable insert : TBMH32	Applicable insert : TBMH32	Applicable insert : TBMH32	Applicable insert : TBMH32
Use 3-corner inserts for machining for small cutting depth !					

SS Tools for Front Turning

SS Tools for Back Turning

SS Tools for Cutting off

Original Series

Back Turning Tools Recommended Insert Grade and Cutting Conditions

■ CSVB

Work Material	Free cutting Steels	Carbon Steels	Alloy Steels	Free cutting Steels Stainless	Hard-to-cut Stainless steels	Titanium (Alloy)	Aluminum Alloy
JIS Common Grade	SUM22 SUM23 SUM24	S35C S45C	SCr420 SCM435	SUS303 SUS430F	SUS304 SUS440C	6AL-4V-Ti	A5056 A6061
Insert Grade	DT4 VM1	VM1 DT4		DT4 VM1			
Cutting Speed v_c (m/min)	30 60 90				30 50 70		30 60 90
feed speed f (mm/rev)	X-axis 0.01 0.02 0.03 Z-axis 0.01 0.03 0.04						

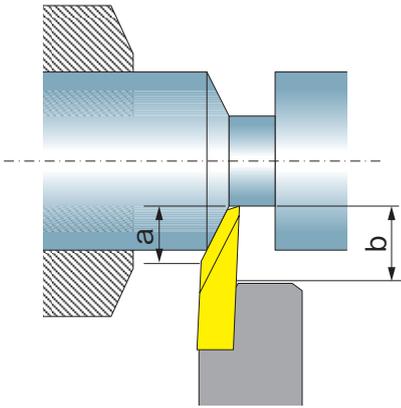
■ TBDP/TBMH/TBP/TBPA/TBPS/TBVS

Work Material	Free cutting Steels	Carbon Steels	Alloy Steels	Free cutting Steels Stainless	Hard-to-cut Stainless steels	Titanium (Alloy)	Aluminum Alloy
JIS Common Grade	SUM22 SUM23 SUM24	S35C S45C	SCr420 SCM435	SUS303 SUS430F	SUS304 SUS440C	6AL-4V-Ti	A5056 A6061
Insert Grade	VM1 ZM3	QM3 · DM4 DT4		DT4 TM4	DT4 QM3 · DM4		PD1 KM1
Cutting Speed v_c (m/min)	50 100	50 90 150			40 70 100		PD1 100 200 350 KM1 50 100 200
feed speed f (mm/rev)	X-axis 0.01 0.02 0.04 Z-axis 0.02 0.04 0.08			X-axis 0.01 0.02 0.03 Z-axis 0.02 0.04 0.06		X-axis 0.01 0.03 0.05 Z-axis 0.02 0.1 0.15	

■ TB32/43

Work Material	Free cutting Steels	Carbon Steels	Alloy Steels	Free cutting Steels Stainless	Hard-to-cut Stainless steels	Titanium (Alloy)	Aluminum Alloy
JIS Common Grade	SUM22 SUM23 SUM24	S35C S45C	SCr420 SCM435	SUS303 SUS430F	SUS304 SUS440C	6AL-4V-Ti	A5056 A6061
Insert Grade	ZM3	ZM3 Z15		ZM3			
Cutting Speed v_c (m/min)	50 100 200	ZM3 50 90 150 Z15 120 180 250			30 50 70		50 100 200
feed speed f (mm/rev)	X-axis 0.01 0.03 0.05 Z-axis 0.04 0.08 0.15				X-axis 0.01 0.03 0.05 Z-axis 0.04 0.05 0.08		X-axis 0.01 0.05 0.07 Z-axis 0.04 0.15 0.25

※Please refer to Technical Information Q54 for detailed recommendation.

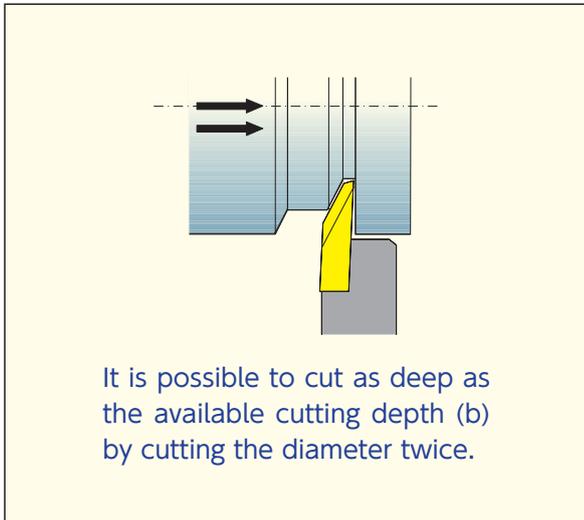


■ Guidelines for max D.O.C $\text{depth of cut} = \text{Effective cutting edge length} \times \text{guide line value}$

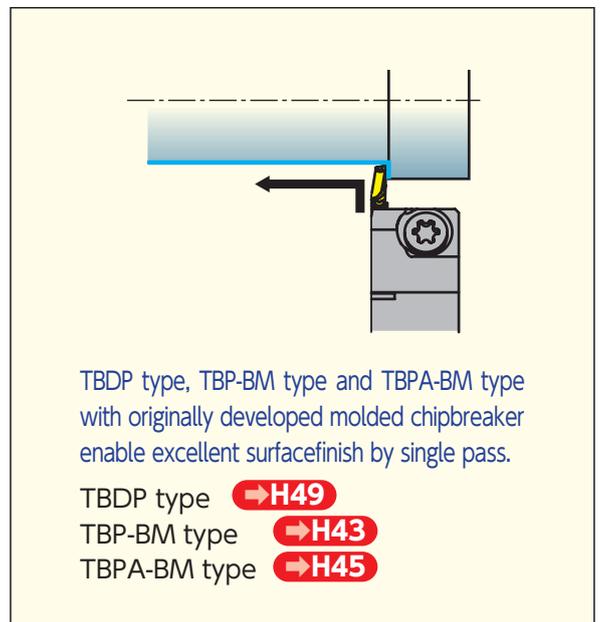
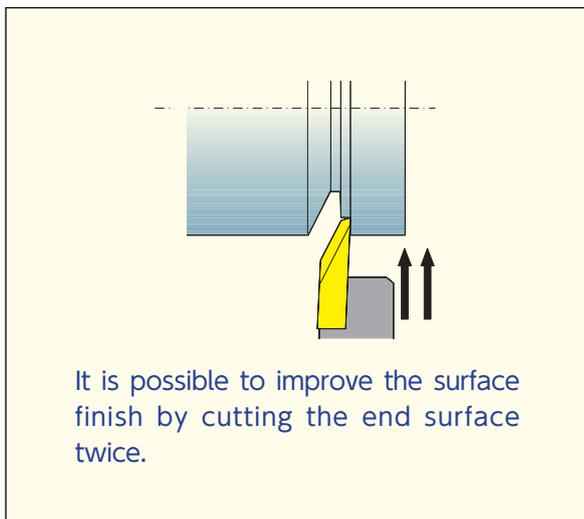
Work material \ Insert grade	Micro-grain carbide ZM3·QM3·VM1·TAS·TM4	Cermet T15·Z15
Steel	0.7	0.5
Stainless steel	0.6	0.4
Nonferrous metals	0.9	0.8
Nonmetal	0.9	0.9

a : Effective length of cutting edge b : Available cutting depth

■ In the case of not enough cutting edge:



■ In the case of bad surface finish:



Finishing

TBP type → **H42**

Prior to finish machining the rough machined raw material must be deburred to enter the guide bush.

TBVCR·F10 → **H46**

The use of an offset tool means the rough machined raw material is not drawn back into the guide bush.

TBDP type → **H49**

Cutting edge is shifted from guide bush by using L-hand holder for TBDP type, available for cutting after roughing without returning workpiece into guide bush.

Necking

When necking is required after back turning of the work piece

- $\theta = 22^\circ$ type
- $\theta = 45^\circ$ type

TBMH type inserts for back turning make it possible.

Insert Part No. : TBMH32 → **H53**

Holder Part Nos. : GTTR
DS-GTTL → **H52**

New Products
Tool Materials / Selection Guide
PCD, CBN and ceramic
Cermet / PVD-coated Cermet
Micro-grain Carbide, Carbide
Insert Stock List
Outside Machining Toolholders
SS
Grooving Tools
Threading Tools
Shaper
Internal Machining tool range
Original Tools for Various Applications
Indexable End Milling Tools
Indexable Drill Inserts
Milling Cutters
Technical Data
Index

CTPS type

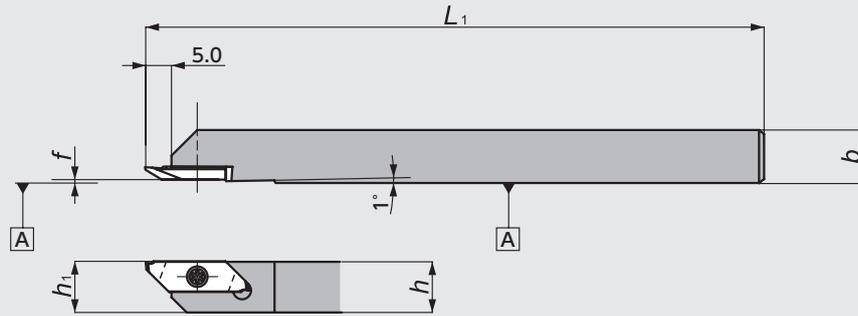


Figure-3

● Right-hand type shown.

Holder dimensions

Shape	Code No.	Toolholder Part No.	Stock	Dimensions (mm)					Applicable insert	Parts	
				<i>h</i>	<i>b</i>	<i>L</i> ₁	<i>h</i> ₁	<i>f</i>		Clamping screw	Wrench
Figure-3	5346572	CTPSR10	●	10	10	120	10	0.0	 TBPS (See the table below)	 LRIS-2.5*7	 CLR-15S
	5397187	R12	●	12	12		12				

☆CTPS toolholder is interchangeable tool. All CTPS type inserts can be used (front turning, back turning, cut-off, threading) on the same holder. (H84-85 for more information)

Applicable insert

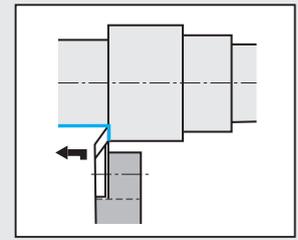
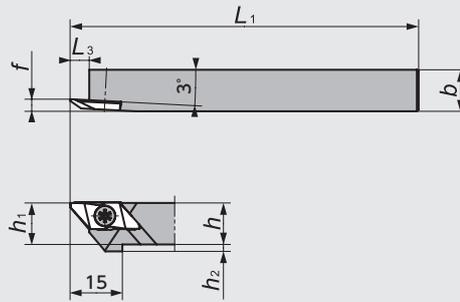
TBPS type

Shape	Part No.	Chip-breaker	Effective length of cutting edge <i>a</i>	Available cutting depth <i>b</i>	Dimensions (mm)		PVD-coated micro-grain carbides			
					θ	<i>r_e</i>	ZM3	Stock	VM1	Stock
(With chipbreaker) 	TBPS60FR00	Provided	3.1	3.5	60°	0.0	5346150	●	5362553	●
	60FR10					0.1	5346168	●	5362561	●
(Without chipbreaker) 	TBPS60FRV	None	4.8	4.8	60°	0.0	5357058	●	5362579	●

※ θ indicates the value when the insert is set into the holder.

TBP type

Front/back clamping type

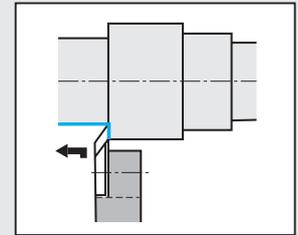
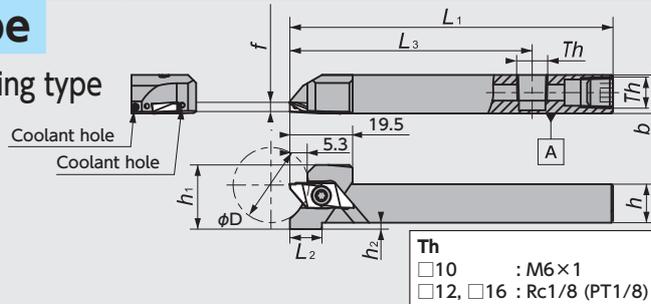


● Right-hand type shown.

Figure-1

TBP-OH type

Front/back clamping type

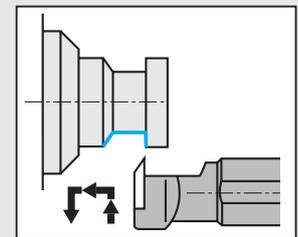
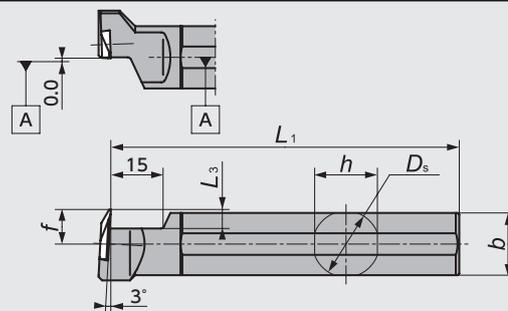


● Right-hand type shown.
☆ Use a R-hand insert for L-hand type holder.

Figure-2

DS-TBP type

DS holder

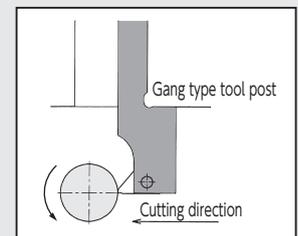
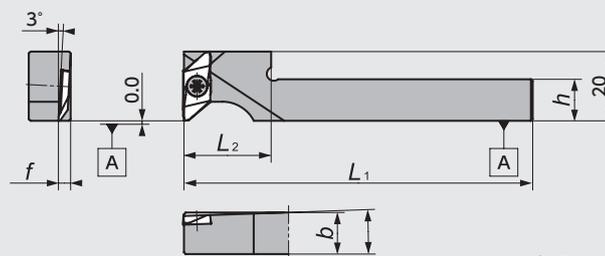


● Left-hand type shown.
☆ Use a R-hand insert for L-hand type holder.

Figure-3

Y-TBP type

Front/back clamping type

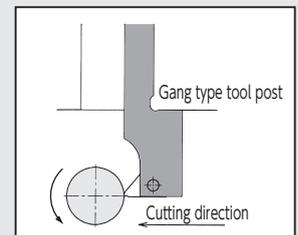
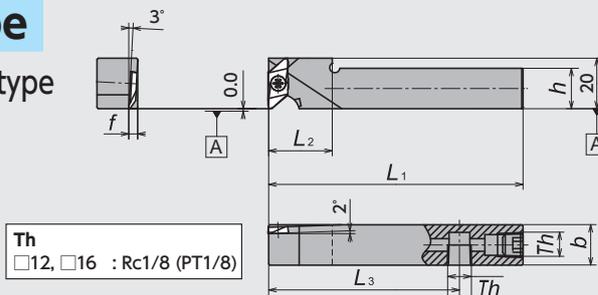


● Right-hand type shown.
☆ Use a R-hand insert for R-hand type holder.

Figure-4

Y-TBP-OH type

Front/back clamping type
SPLASH BAR **NEW**

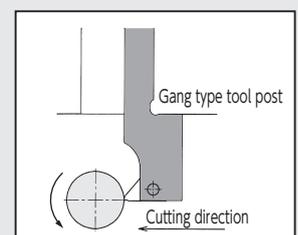
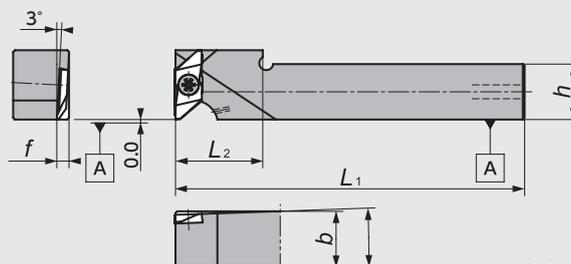


● Right-hand type shown.
☆ Use a R-hand insert for R-hand type holder.

Figure-5

Y-TBP-OH type

Front/back clamping type
For high-pressure coolant Y-axis



● Right-hand type shown.
☆ Use a R-hand insert for R-hand type holder.

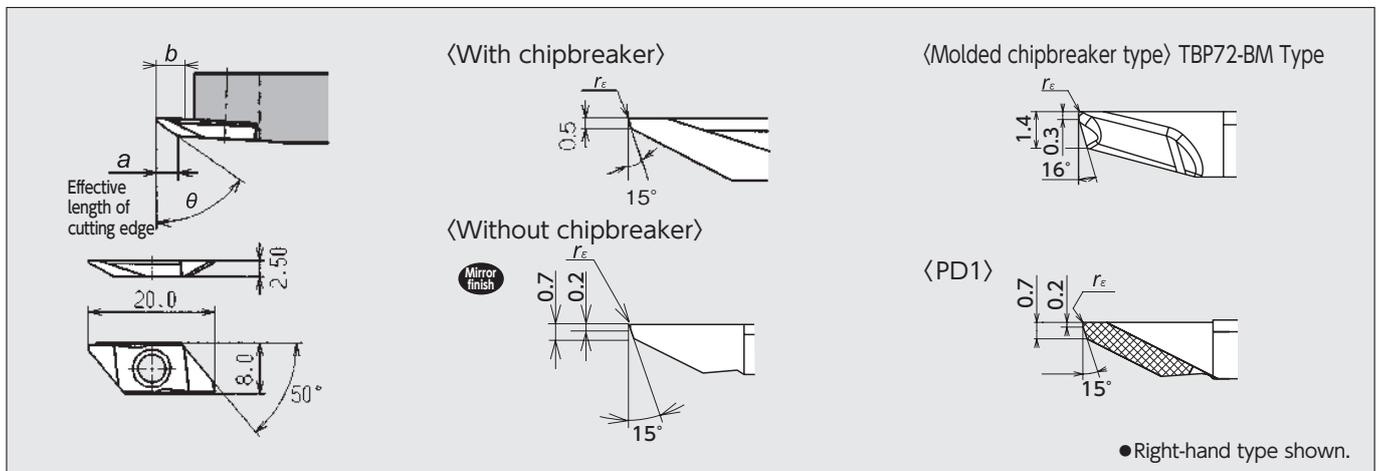
Figure-6

Holder dimensions

Shape	Code No.		Toolholder Part No.	Stock		Max. bore Dia. (mm) ϕD	Dimensions (mm)							Applicable insert	Parts															
	R	L		R	L		D_s	h	b	L_1	h_1	h_2	f		L_2	L_3	Clamping screw	Wrench												
Figure-1	5133285	5133293	TBP $\frac{R}{L}$ 08	●	●	-	-	-	8	10	120	8	4	3.5	-	5.5	TBP (See the table below)	LRIS-4*10PW (A)	CLR-15S (A)											
	5873856		10H	●	●													100		10	2	85	12	0	19	10	75	TBP (See the table below)	LRIS-4*12PW (A)	
	5090436	5090444	10	●	●													120		10	2									
	5459771		12GX	●	●													120		13	0	16	16	100	16	19	10	75	TBP (See the table below)	LRIS-4*12PW (A)
	5090451	5090469	12	●	●													120		13	0									
	5090477	5090485	13	●	■													120		13	0	16	16	100	16	19	10	75	TBP (See the table below)	LRIS-4*12PW (A)
	5459789		16H	●	●													120		13	0									
5270822	5270830	16	●	●	120	13	0	16	16	100	16	19	10	75	TBP (See the table below)	LRIS-4*12PW (A)														
5925722		TBP $\frac{R}{L}$ 1012H-OH	●	●	25	10	12									100	12	2	3.5	10	75	TBP (See the table below)	LRIS-4*10PW	CLR-15S (A)						
Figure-2	5925730		12H-OH	●	●	35	12	12	100	12	2	3.5	10	75	TBP (See the table below)	LRIS-4*12PW	CLR-15S (A)													
	5925748		16H-OH	●	●	35	16	16	100	16	0	0	0	0	TBP (See the table below)	LRIS-4*12PW	CLR-15S (A)													
		5540414	DS-TBP $\frac{R}{L}$ 19	●	●	-	19.050	18	18	120	-	-	11.0	-	5.5	TBP (See the table below)	LRIS-4*10 (B)	LLR-25S -20*65 (B)												
Figure-3		5540422	20	●	●	-	20.000	19	19	120	-	-	13.0	-	5.5	TBP (See the table below)	LRIS-4*10 (B)	LLR-25S -20*65 (B)												
		5540430	25	●	●	-	25.400	24	24	150	-	-	13.0	-	5.5	TBP (See the table below)	LRIS-4*10 (B)	LLR-25S -20*65 (B)												
				●	●	-																								
Figure-4	5371554		Y-TBP $\frac{R}{L}$ 10S	●	●	-	-	10	10	120	-	-	3.5	20	-	TBP (See the table below)	LRIS-4*10PW(A)	CLR-15S (A)												
	5371588		12S	●	●												12		12	25	20									
	5358486		10	■	■												10		10	30	25									
	5371570		10L	■	■												10		10	30	25									
	5371596		12L	■	■												12		12	30	25									
Figure-5	5911508		Y-TBP $\frac{R}{L}$ 12HS-OH	●	●	-	-	12	12	100	-	-	3.5	20	-	TBP (See the table below)	LRIS-4*12PW (A)	CLR-15S (A)												
	5911516		16H-OH	●	●												16	16	25	25										
Figure-6	5699996		Y-TBP $\frac{R}{L}$ 12SOH	■	■	-	-	12	12	70	-	-	3.5	20	-	TBP (See the table below)	LRIS-4*12PW (A)	CLR-15S (A)												
	5700000		16OH	■	■												16	16	25	25										

Applicable insert

TBP type



Part No.	Chip-breaker	Effective length of cutting edge a	Available cutting depth b	Dimensions (mm)		PVD-coated micro-grain carbides												Micro-grain carbide		PCD		Cermet PVD				
				θ	r_e	ZM3		QM3		VM1		TM4		DT4		DM4		KM1		PD1		C7Z				
				R	Stock	L	Stock	R	Stock	R	Stock	L	Stock	R	Stock	R	Stock	R	Stock	R	Stock	R	Stock	R	Stock	
NEW TBP72FR05-BM NEW 72FR10M-BM NEW 72FR20M-BM	Provided	3.5	5.3	72°	0.05																					
					0.08																					
					0.18																					
TBP55F $\frac{R}{L}$ 00 55F $\frac{R}{L}$ 10	Provided	3.0	5.3	55°	0.00	5090378	●	5090360	●																	
					0.10	5090352	●	5090386	●																	
					0.00	5090410	●	5090428	●	5494711	●															
TBP60F $\frac{R}{L}$ 00 60F $\frac{R}{L}$ 05 60F $\frac{R}{L}$ 10 60F $\frac{R}{L}$ 10M 60F $\frac{R}{L}$ 20 60F $\frac{R}{L}$ V	Provided	3.7	5.3	60°	0.05																					
					0.10	5090402	●	5090394	●	5362488	●	5269949	●													
					※0.08				5486964	●	5476403	●														
60F $\frac{R}{L}$ V 60FRV00-P 60F $\frac{R}{L}$ V05 60F $\frac{R}{L}$ V10 60FRV10-P	None	4.8	5.3	60°	0.0	5345715	●																			
					0.00																					
					0.05																					
60F $\frac{R}{L}$ V05 60F $\frac{R}{L}$ V10 60FRV10-P	None	4.8	5.3	60°	0.10	5482690	●																			
					0.10																					
					0.10																					

※ The insert with the nose radius code "10M" can be used for machining if the radius required on the work piece is 0.1 or less.
 ※ θ indicates the value when the insert is set into the holder.

New Products
 Tool Materials / Selection Guide
 PCD, CBN and ceramic
 Cermet
 Micro-grain Carbide, Carbide
 Insert Stock List
 Outside Machining Toolholders
 SS
 Grooving Tools
 Threading Tools
 Shaper
 Internal Machining tool range
 Original Tools for Various Applications
 Indexable End Milling Tools
 Indexable Drill Inserts
 Milling Cutters
 Technical Data
 Index

CTPA type

Front/back clamping type
(For both back turning and cutting-off)

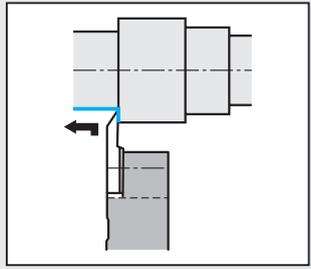
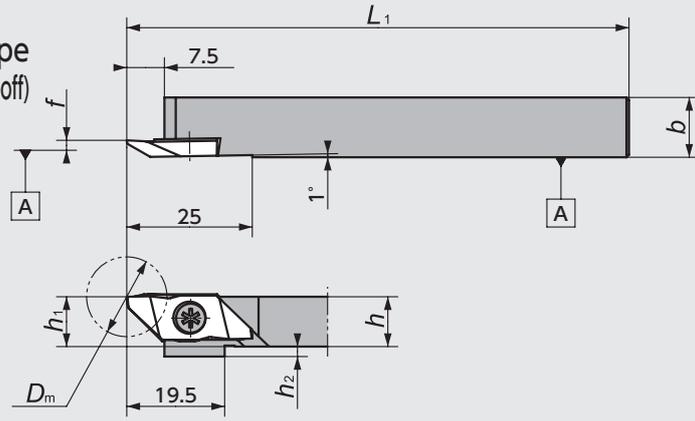


Figure-1

● Right-hand type shown.

Holder dimensions

Shape	Code No.		Toolholder Part No.	Stock		Dimensions (mm)						Applicable insert	Parts			
	R	L		R	L	h	b	L ₁	h ₁	f	h ₂		D _m	Clamping screw	Wrench	
Figure-1	5199187	5199153	CTPA ^{R/L} 10	●	●	10	10	120	10	3.4	0	16	TBPA (post-grinding) H45 CTPA (cutting-off) H68~69	(A)	(B)	(A) (B)
	5199195	5199161	12	●	●	12	12		12					LRIS-4*10PW(A)	CLR-15S (A)	
	5199203	5199179	16	●	●	16	16		16					LRIS-4*12PW(A)		
	5459540	5459557	20F	●	●	20	20	80	20					LRIS-4*10(B)	LLR-25S(B)	

CH-TBPA type

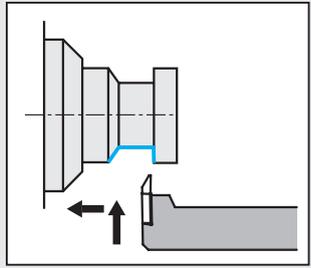
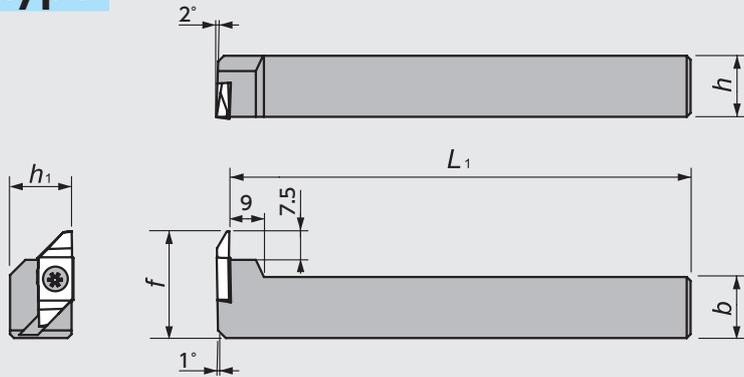


Figure-2

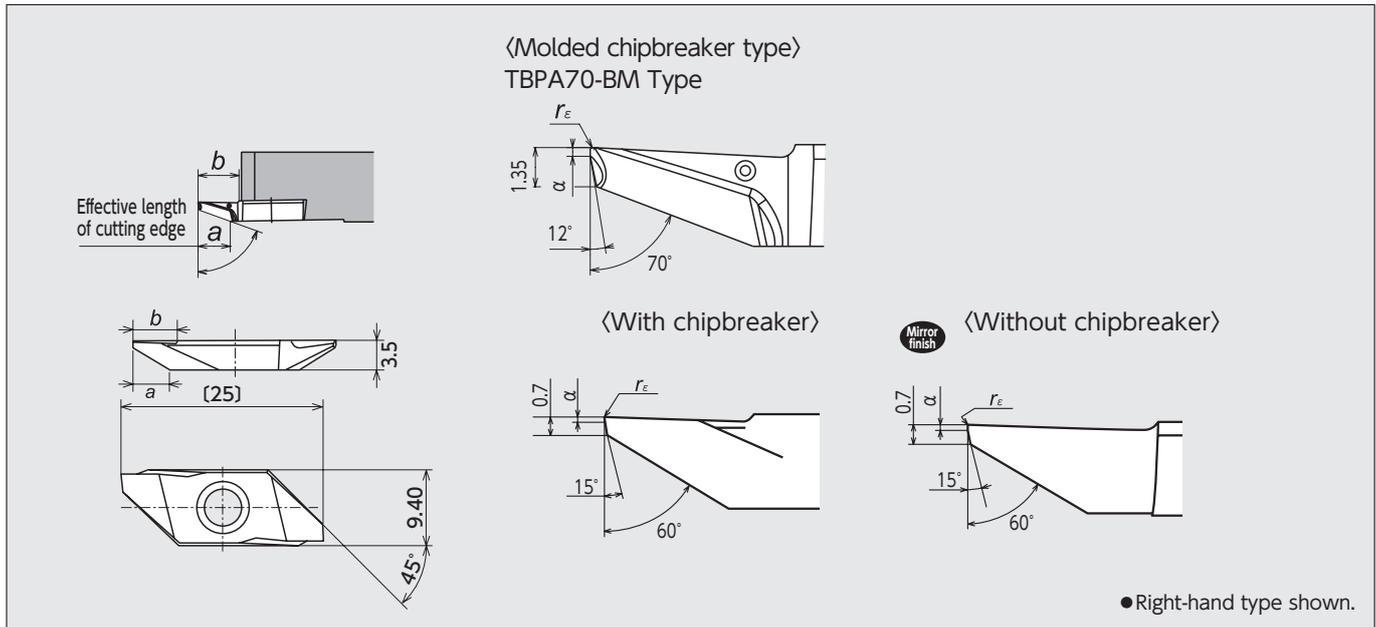
● Left-hand type shown.
☆ Use a R-hand insert for L-hand type holder.

Holder dimensions

Shape	Code No.		Toolholder Part No.	Stock		Dimensions (mm)				Applicable insert	Parts		
	R	L		R	L	h	b	L ₁	h ₁		f	Clamping screw	Wrench
Figure-2	NEW	5884945	CH-TBPA ^{R/L} 16	●		16	16	120	16	28	TBPA □ □ FR H45	LRIS-4*10	LLR-25S
	NEW	5884952	20	●		20	20		20				

Applicable insert

TBPA type



Shape	Chip-breaker	Effective length of cutting edge a	Available cutting depth b	Dimensions (mm)		PVD-coated micro-grain carbides																
				α	r_ϵ	ZM3		QM3		VM1		TM4		DT4		DM4						
						R	Stock	L	Stock	R	Stock	R	Stock	R	Stock	R	Stock	R	Stock			
TBPA70FR05-BM	None	5.5	6.5	0.3	0.05									5892583	●			5892591	●			
70FR10M-BM					0.08									5892567	●				5892575	●		
70FR20M-BM					0.18										5892542	●				5892559	●	
TBPA60F$\frac{R}{L}$VB	Provided	4.5	5.3	0.3	0.2	0.0	5344833	●	5362538	●			5439344	●			5850847	●				
60F$\frac{R}{L}$PB10					0.1	5344858	●	5362520	●			5379151	●									
60F$\frac{R}{L}$10M					*0.08							5486956	●									
60F$\frac{R}{L}$PB10M					*0.18									5476395	●			5850821	●			
60F$\frac{R}{L}$PB20M																		5850839	●			
60F$\frac{R}{L}$V	None	6.3	6.8	0.2	0.0	5344817	●	5362546	●				5439336	●								

SS Tools for Back Turning

TBVC type

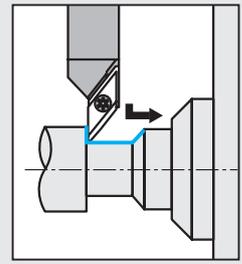
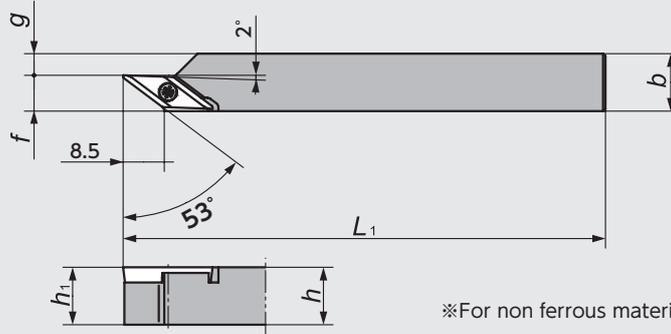


Figure-1

● Right-hand type shown.
※ For non ferrous materials such as aluminum and copper.

TBVC-F10 type

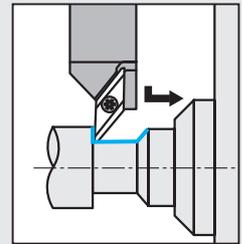
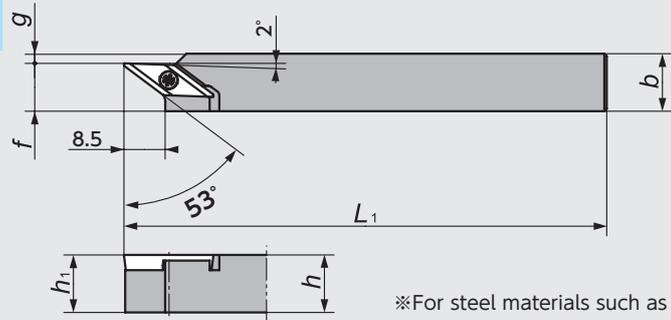


Figure-2

● Right-hand type shown.
※ For steel materials such as stainless steels and carbon steels.

CH-SVXCL type

For opposed gang tool post

NEW

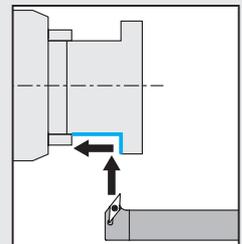
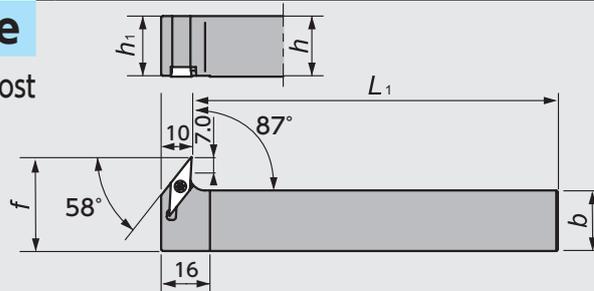


Figure-3

● Left-hand type shown.

Holder dimensions

Shape	Code No.		Toolholder Part No.	Stock		Dimensions (mm)					Applicable insert	Parts		
	R	L		R	L	h	b	L ₁	h ₁	f		g	Clamping screw	Wrench
Figure-1	5204953		TBVC _{R/L} 10	●		10	10		10		2.5	TBVC (See the table below) VCGT1103 F47~48	LRIS-2.5*7	CLR-15S
	5204946		12	●		12	12	120	12	7.5	4.5			
	5204920		16	●		16	16	16			8.5			
Figure-2	5344254		TBVC _{R/L} 10-F10	●		10	10	120	10		0	TBVC (See the table below) VCGT1103 F47~48	LRIS-2.5*7	CLR-15S
	5459797		12GX-F10	●		12	12	85	12		2			
	5344262		12-F10	●		12	12	120			6			
	5459805		16H-F10	●		16	16	100	16		10			
	5344270		16-F10	●		16	16	120						
	5459565		20F-F10	●		20	20	80	20					
Figure-3	5890637		CH-SVXC _{R/L} 1616×11	●		16	16	120	20	27	—	VC□1103 F23•47~48	LRIS-2.5*7	CLR-15S
	5890645		2020×11	●		20	20	120	20	31				

Applicable insert

TBVC type

Shape	Part No.	Dimensions (mm)			PVD-coated micro-grain carbides			
		d	s	r _ε	ZM3	Stock	VM1	Stock
<p>● Right-hand type shown.</p>	TBVC11FR05U	6.35	3.18	0.05	5204870	●		
	11FR10U			0.10	5204888	●	5341763	●
	11FR10S	6.35	3.18	—	5433107	●		

MEMO

NEW

New
Products

Tool Materials /
Selection Guide

PCD, CBN,
and ceramic

Cermet,
PVD-coated Carbide

Micro-grain
Carbide, Carbide

Insert
Stock List

Outside Machining
Toolholders

SS

Grooving
Tools

Threading
Tools

Shaper

Internal Machining
Tool Range

Original Tools for
Various Applications

Indexable End
Milling Tools

Indexable
Drill Inserts

Milling
Cutters

Technical
Data

Index

New Back Turning Tools **BACK DUO**

WATCH ON
YouTube

New item added, "Back duo"! The best tool for back turning!

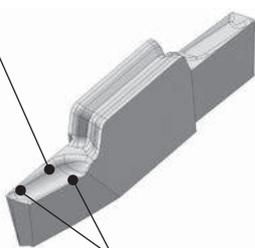
Features

"Single pass back turning" is now possible with newly designed chipbreaker. Possible to reduce cycle time.

1 New 3D chipbreaker

PAT.P

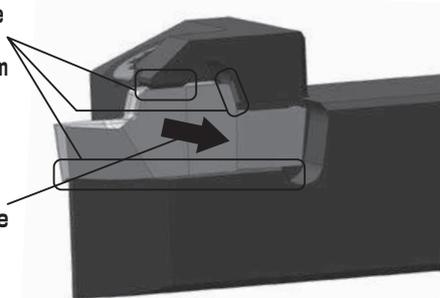
Excellent surface with good chip control



Improved surface finish thanks to wiper flat on cutting edge

2 New clamping system

Stable clamping force from three face contact with V-bottom



Utilizes tool pressure to increase clamping force

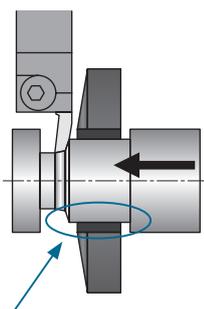
Surface comparison for SUS304

1Pass	BACK DUO		Competitor	
	End face	Diameter	End face	Diameter
<p>Work material : SUS304 Holder : TBDPR12 Insert : TM4 TBDP2201MR Cutting condition : $v_c=80\text{m/min}$ $f(x)=0.02\text{mm/rev}$ $f(z)=0.08\text{mm/rev}$ $a_p=3.0\text{mm}$ WET</p>				

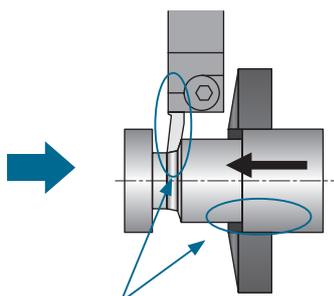
Case study with left-hand toolholder

Finishing with right hand toolholder...

Finishing with left hand toolholder...



Guide bush can't hold work material



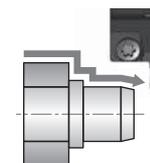
Machining point is apart from guide bush and guide bush can hold work material rigidly

Please select right-hand insert for left-hand toolholder

Case study

Interrupted back turning with "QM3"

Work material : SUS304
 Cutting speed (m/min) : 40 ~ 110
 Feed (mm/rev) : 0.02
 Depth of cut (mm) : 0.1
 Coolant : WET



QM3

1,000pcs/corner

PVD coted carbide

200pcs/corner

Because of interrupted machining of hexagonal shape workmaterial, the conventional tool often caused burr issue at the beginning of cut. "QM3" achieved 5 times longer tool life with the extreme toughness.

BACK DUO

TBDP type

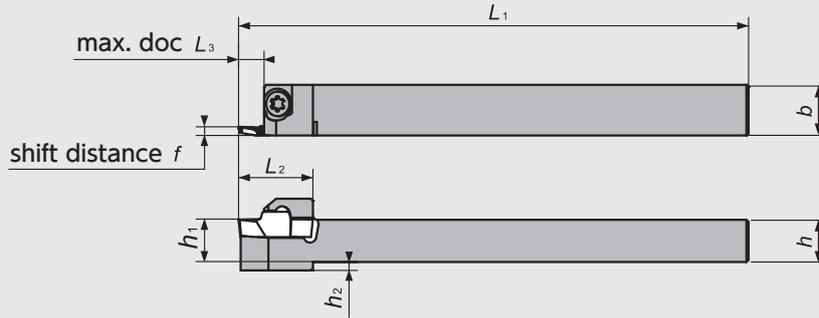


Figure-1

• Right-hand type shown.

Y-TBDP type

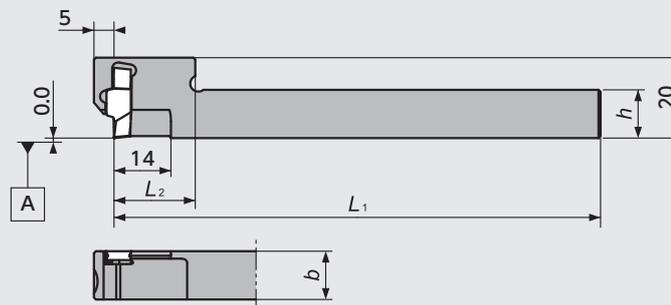


Figure-2

Holder dimensions

Shape	Code No.		Toolholder Part No.	Stock		Dimensions (mm)							Applicable insert	Parts		
	R	L		R	L	h	b	L ₁	h ₁	f	L ₂	L ₃		h ₂	Clamping screw	Wrench
Figure-1	5873864	NEW TBDP ^{R/L} 1012H	●		10	12	100	10			15	3	2	TBDP (See the table below)	LRIS-4 * 12	LLR-25S
	5814678	5837265	●	●												
	5810445	5837273	●	●	12	12	120	12	2.05	18						
	5810452	5837281	●	●	16	16		16		19.5	5	0				
	5842414		●		20	20		20		19.5						
Figure-2	5839139	NEW Y-TBDP ^{R/L} 12S	★		12	12	120	—	2.05	20	5.0	—				

Applicable insert

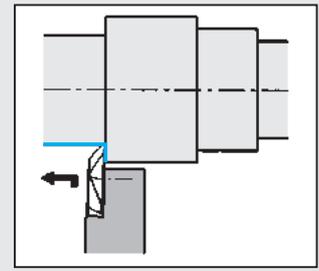
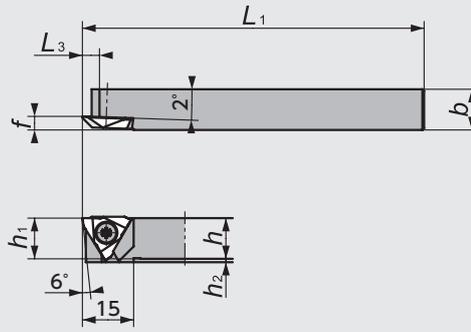
TBDP type

Shape	Part No.	Effective length of cutting edge a	Dimensions (mm)		PVD-coated micro-grain carbides					
			θ	Corner R r _ε	QM3	Stock	TM4	Stock	DM4	Stock
	TBDP22005R	3.5	80	0.05	5833116	●	5810460	●	5877685	●
	2201MR			0.08	5833132	●	5810486	●	5903125	●
	2202MR			0.18	5833140	●	5810577	●	5902408	●

SS Tools for Back Turning

TBT type

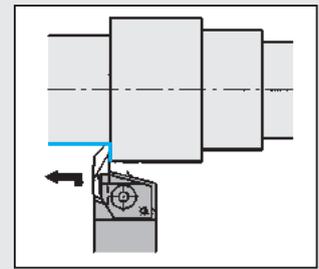
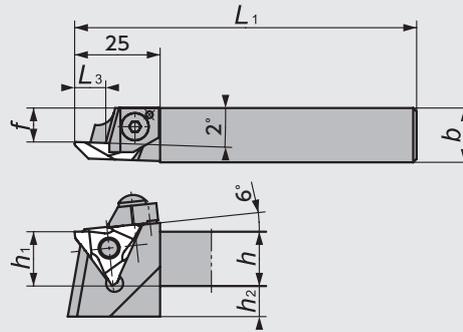
Front/back clamping type



• Right-hand type shown.

Figure-1

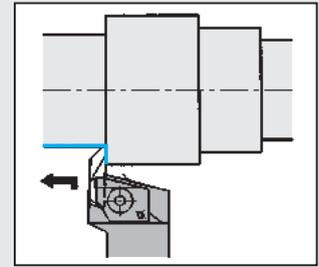
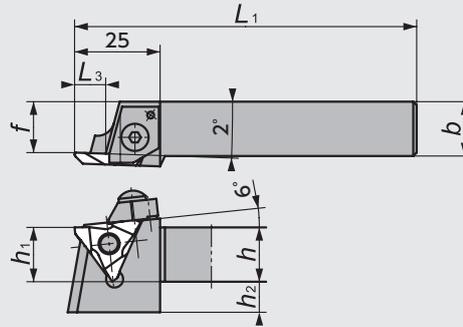
TB-N type



• Right-hand type shown.

Figure-2

TB-F type



• Right-hand type shown.

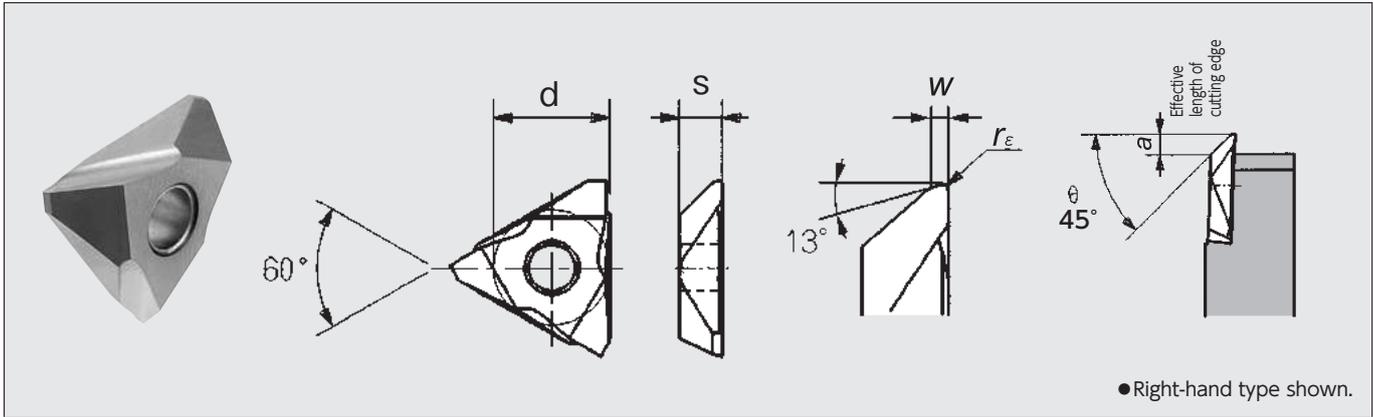
Figure-3

Holder dimensions

Shape	Code No.		Toolholder Part No.	Stock		Dimensions (mm)							Applicable insert	Parts				
	R	L		R	L	h	b	L ₁	h ₁	h ₂	f	L ₃		Clamping screw	Clamp	Clamping bolt	Spring	Wrench
Figure-1	5107511	5107503	TBT ^{R/L} 08F	●	●	8	8	80	8	5			TB32 H51	LR-S-4* 10PW	-	-	-	CLR-15S (A)
	5107578	5107560	08K	●	●			120										
	5107495	5107487	10F	●	●	10	10	80	10	3	4	5.0						
	5107552	5107545	10K	●	●			120										
	5107479	5107461	12F	●	●	12	12	80	12	1								
	5107537	5107529	12K	●	●			120										
Figure-2	5837141		TB ^{R/L} 16N-42	●				78			11.5	9.0	TB42 H51	-	CPR/L5S	A0S-5*25	ASG-5	LW-2.5 (B)
	5504543		16NS	●				16	16	9		5.0						
	5504550	5524145	16N	●	●								TB43 H51					
	5820618		16N-H	●							10	9.0						
	5848288		16N-K	●														
	5553540	5524152	20N	●	●	20	20	100	20	5								
	5524160	25N	●		25	25	150	25	0									
Figure-3	5505029		TB ^{R/L} 16FS	●		16	16		16	9	15	5.0	TB43 H51	-	CPR/L5	A0S-5*25	ASG-5	LW-2.5 (B)
	5505037		16F	●								9.0						
	5526298		20FS	●		20	20	100	20	5	20	5.0						
	5505052		20F	●								9.0						
	5519723		25F	●		25	25	150	25	0	25	9.0						

Applicable insert

TB32 • 42 • 43 type



Part No.	Chip-breaker	Effective length of cutting edge a	Available cutting depth b	Dimensions (mm)					Cermet				PVD-coated cermet		PVD-coated micro-grain carbides			
				θ	r _ε	w	d	s	T15		Z15		ZM3 ^{※1}					
									R	Stock	L	Stock	R	Stock	R	Stock	L	Stock
TB3200 ^{R/L}	Provided	2.7	4.8	45°	0.00	0.5	9.525	3.18							5810544	●		
TB3205 ^{R/L}					0.05				5505110	●				5810536	●	5982335	●	
TB3210 ^{R/L}					0.10						5524178	●						
TB3215 ^{R/L}					0.15				5504519	●	5505102	●	5802095	●	5810528	●	5033550	●
TB3220 ^{R/L}					0.20										5160544	●		
TB4215 ^{R/L}		2.3	8.8	45°	0.15	1.0	12.70	3.18					5914270	●				
TB4300 ^{R/L}		4.0	4.8 ^{※2} 8.8	45°	0.00	1.0	12.70	4.76										
TB4305 ^{R/L}					0.05				5505060	●				5810502	●			
TB4315 ^{R/L}					0.15				5503719	●	5524244	●	5745609	●	5756614	●		
TB4340 ^{R/L}	0.40				5503701				●	5524251	●	5745526	●	5796412	●			

※1 The PVD-coated micro-grain carbide grade ZM3 has a sharp edge.

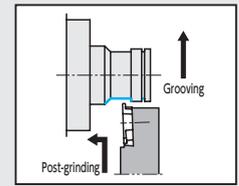
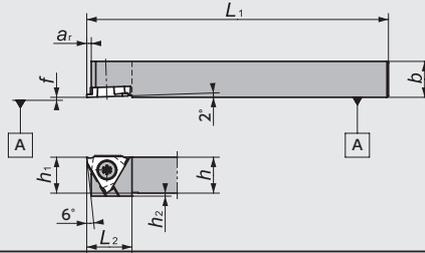
※2 in case of using holders which name ends by ---NS, ---FS

Note: All angles shown are obtained when insert is set in the holder.

SS Tools for Back Turning

GTT type

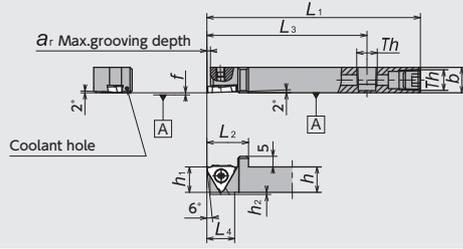
Front/back clamping type



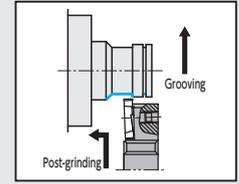
● Right-hand type shown.

Figure-1

GTT-OH type



Th		
□10	:	M6×1
□12, □16	:	Rc1/8 (PT1/8)

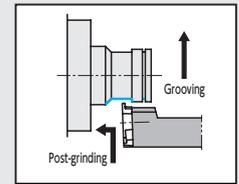
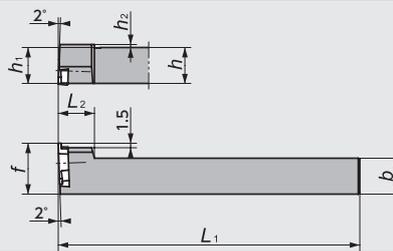


● Right-hand type shown.

Figure-2

CH-GTT type

For opposed gang tool post

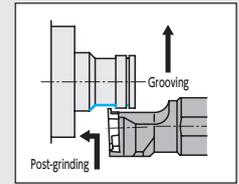
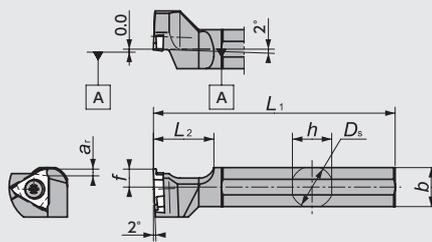


● Left-hand type shown.

Figure-3

DS-GTT type

DS holder



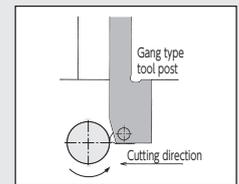
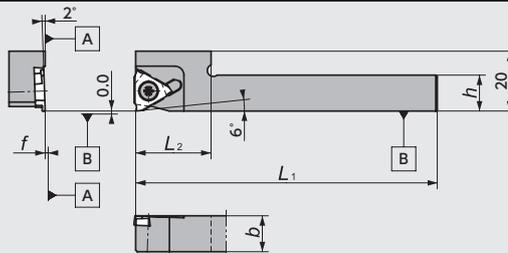
● Left-hand type shown.

☆Use a R-hand insert for L-hand type holder.

Figure-4

Y-GTT type

Front/back clamping type
For Y-axis



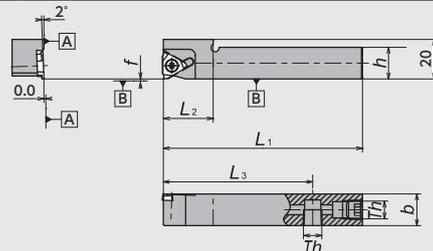
● Right-hand type shown.

☆Use a R-hand insert for R-hand type holder.

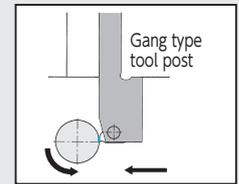
Figure-5

Y-GTT-OH type

Front/back clamping type
For high-pressure coolant Y-axis
SPLASH BAR NEW



Th		
□12, □16	:	Rc1/8 (PT1/8)



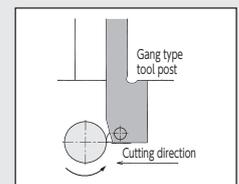
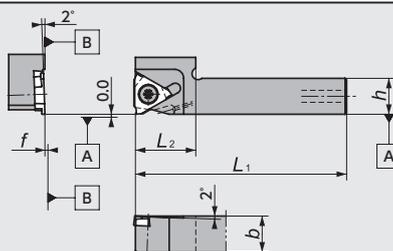
● Right-hand type shown.

☆Use a R-hand insert for R-hand type holder.

Figure-6

Y-GTT-OH type

Front/back clamping type
For high-pressure coolant Y-axis



● Right-hand type shown.

Figure-7

※The GTM32, GTMH32 and GTMX32 can be mounted to the toolholders of the GTT types.

Holder dimensions

Shape	Code No.		Toolholder Part No.	Stock		Dimensions (mm)								Applicable insert	Parts			
	R	L		R	L	D_s	h	b	L_1	h_1	f	L_2	a_r		h_2	Clamping screw	Wrench	
Figure-1	5107305	5107313	GTT$\frac{R}{L}$ 08F00	●	●	-	8	8	80	8	0	15	1.6	5	LR-S-4*10PW (A) LR-S-4*5.8 (B)	CLR-15S (A)		
	5608682		0810F00	●				10	80									
	5107206	5107214	08K00	●	●			8	120									
	5608690		0810K00	●				10	120									
	5107321	5107339	10F00	●	●			10	10								80	10
	5107222	5107230	10K00	●	●			10	10								120	10
	5107347	5107354	12F00	●	●			12	12								80	12
	5107248	5107255	12K00	●	●			12	12								120	12
	5459896	5551387	16H00	●	●			16	16								100	16
	5173687	5173679	16K00	●	●			16	16								120	16
	5530852	5780317	20K00	●	●			20	20								125	20
	5780309	5780291	25M00	●	●			25	25								150	25
	5107362	5107370	10F15	●	●			10	10								80	10
	5107263	5107271	10K15	●	●			10	10								120	10
	5537220	5537147	12F15	●	●			12	12								80	12
	5537246	5537162	12K15	●	●			12	12								120	12
	5537261	5537188	16H15	●	●			16	16								100	16
	5537287	5537204	16K15	●	●			16	16								120	16
	5107388	5107396	10F25	●	●			10	10								80	10
	5107289	5107297	10K25	●	●			10	10								120	10
5537238	5537154	12F25	●	●	12	12	80	12										
5537253	5537170	12K25	●	●	12	12	120	12										
5537279	5537196	16H25	●	●	16	16	100	16										
5537295	5537212	16K25	●	●	16	16	120	16										
Figure-2	5921750		GTT$\frac{R}{L}$ 1012H00-OH	●		-	10	12	100	12	0	19.5	1.6	1	LR-S-4*10PW (A)	CLR-15S (A)		
	5890157		12H00-OH	●		12	12	100	12	0	19.5	1.6	1					
	5921713		16H00-OH	●		16	16	100	16	0	19.5	1.6	0					
Figure-3	5659248		CH-GTT$\frac{R}{L}$ 10H00	●		-	10	10	120	10	15	12	1.5	3	LR-S-4*9 (B)	CLR-15S (A)		
	5659255		12H00	●		12	12	120	12	17	12	1.5	1					
Figure-4	5348560		DS-GTT$\frac{R}{L}$ 14F	●		14.000	13	13	80	-	6	20	1.6	-	LR-S-4*9 (B)	RLR-20S (B)		
	5348081		15H	●		15.875	15	15	100									
	5341532		16X*	●		16.000	15	15	95									
	5278288		19	●		19.050	18	18	120									
	5278304		20	●		20.000	19	19	120									
	5324041		22	●		22.000	21	21	120									
	5317144		25	●		25.400	24	24	10									
Figure-5	5371604		Y-GTT$\frac{R}{L}$ 10S	●		-	10	10	-	0	20	1.6	-	LR-S-4*10PW (A)	CLR-15S (A)			
	5371620		12S	●		12	12	20										
	5358452		Y-GTTR10	■		10	10	120								25		
	5371612		10L	■		10	10	120								30		
	5358445		12	■		12	12	120								30		
5371638		12L	■		12	12	120	30										
Figure-6	5911466		Y-GTT$\frac{R}{L}$ 12H00S-OH	●		-	12	12	100	-	0	20	1.6	-	LR-S-4*10PW (A)	CLR-15S (A)		
	5911474		16H00-OH	●		16	16	100	-	0	25	1.6	-					
Figure-7	5700034		Y-GTT$\frac{R}{L}$ 12SOH	■		-	12	12	70	-	0	20	1.6	-				

※Please select $\phi 16$ shank holder When using DS-Sleeve. Details of DS-Sleeve **H91**

Applicable insert

TBMH32 type

for back turning

Shape	Part No.	Chip-breaker	Effective length of cutting edge a	Available cutting depth b	Dimensions (mm)			PVD-coated micro-grain carbides ZM3 Stock	
					w	θ	r_ϵ		
<p>● Right-hand type shown.</p>	TBMH32100R05-22	Provided	0.3	1.8	1.0	22°	0.05	5395199	●
	100R05-45					45°		5395215	●
	TBMH32150R05-22				1.5	22°		5395207	●
	150R05-45					45°		5395223	●

▶ This type can be also used with the GTMH32 type toolholders for grooving inserts, listed from pages **I8 to I11**.

※ θ indicates the value when the insert is set into the holder. **H53**

For both Front and Back Turning

SVAC-NW type

For double-edged cutting tool

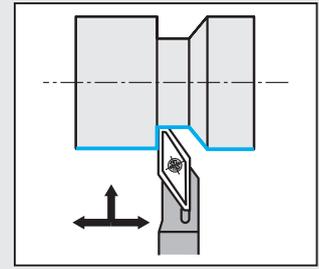
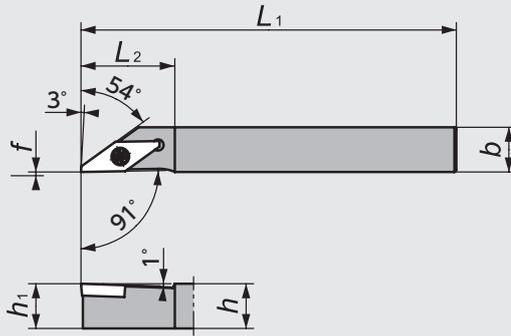


Figure-1

● Right-hand type shown.

SVAC-W type

For double-edged cutting tool

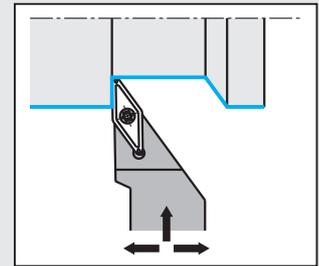
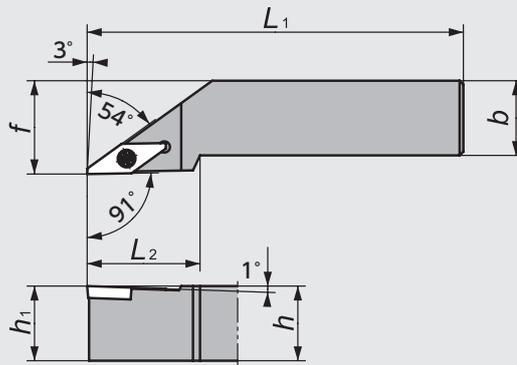


Figure-2

● Right-hand type shown.

Holder dimensions

Shape	Code No.		Toolholder Part No.	Stock		Dimensions (mm)					Applicable insert	Parts		
	R	L		R	L	h	b	L ₁	f	h ₁		L ₂	Clamping screw	Wrench
Figure-1	5401724	5401708	SVAC ^{R/L} 1010L13NW	●	●	10	10	140	0.0	10	25	VCGT1303 (See the table below)	LRIS-3*8	RLR-20S
	5401732	5401716	1212L13NW	●	●	12	12			12				
	5401740	5431077	1616M13NW	●	●	16	16			16				
Figure-2	5474549		SVAC ^{R/L} 2020M13W	●		20	20	150	25.0	20	30			

Applicable insert

VCGT1303 type

Shape	Part No.	Dimensions (mm)			PVD-coated micro-grain carbides			
		d	s	r _ε	QM3			
					R	Stock	L	Stock
<p>● R-hand shown.</p> <p>● L-hand shown.</p>	VCGT130300F ^{R/L} 2M	7.94	3.18	0.0	5360334	●	5360300	●
	VCGT130301F ^{R/L} 2M	7.94	3.18	0.1	5360326	●	5360292	●

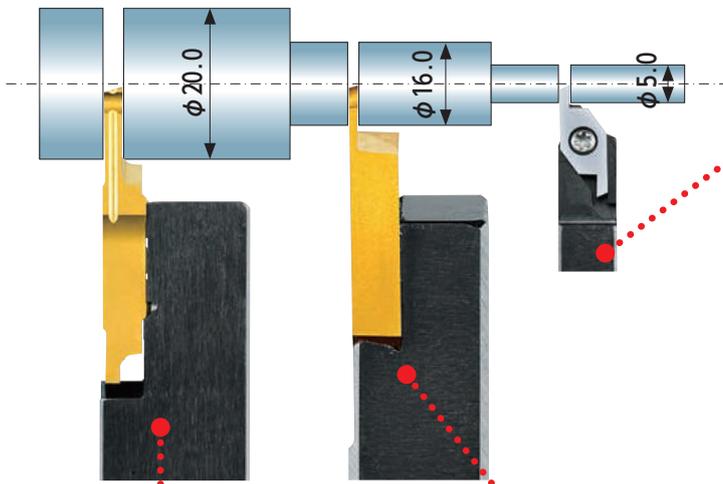
SS Tools for Cutting off

- Selection guide for cut off tools H56
- List of holders for cutting-off and applicable inserts..... H60

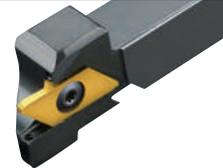


NTK SS Tools Selection guide for cut off tools

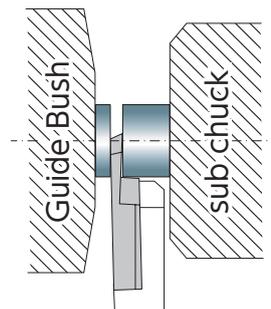
A wide variety of NTK cut off tools are available for cut off widths of 3.00 mm or less. They meet the needs of the many different requirements in cut off operations especially in small diameter component production.

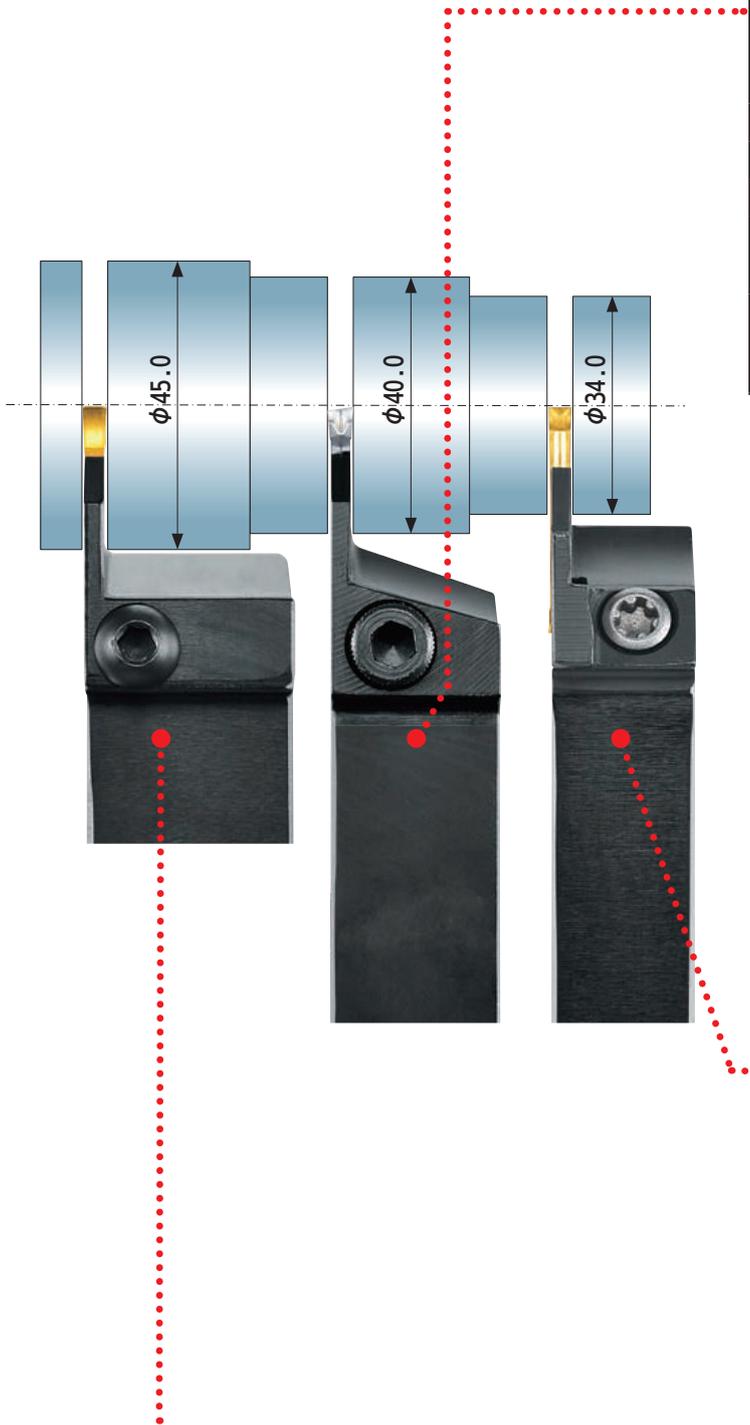


CSV type	CSV-NC type
	
→H60	→H60
Machining dia. : up to $\phi 5.0$	Machining dia. : up to 5.0
Width : 0.6 ~ 1.5	Width : 0.6 ~ 1.5
Shank size: $\square 7 \sim \square 12$	Shank size: $\square 10 \sim \square 12$
For radial type tool post	With 120 mm overall tool length, this type is best for automatic NC lathes
<ul style="list-style-type: none"> • Compact design, available as series from size 7 mm shank • The inserts with mirror-surface honing give excellent cutting performance ! 	

CTPW type	CTPA type	CTP type	NEW CTP-OH type	CTPS type
				
→H70	→H66	→H62	→H62	→H61
Machining dia. : up to $\phi 20.0$	Machining dia. : up to $\phi 16.0$	Machining dia. : up to $\phi 12.0$	Machining dia. : up to $\phi 12.0$	Machining dia. : up to $\phi 10.0$
Width : 2.5	Width : 0.7 ~ 2.0	Width : 0.5 ~ 2.0	Width : 0.5 ~ 2.0	Width : 0.7 ~ 2.0
Shank size : $\square 10 \sim \square 20$	Shank size : $\square 10 \sim \square 20$	Shank size : $\square 8 \sim \square 16$	Shank size : $\square 10 \sim \square 16$	Shank size : $\square 8 \sim \square 12$
A 20-mm cut off diameter is the largest possible allowed by the rhombus shape inserts. The insert is firmly clamped by the serration on the back of the insert.	The overhang at the head is 19.5 mm.	Compact design with a 15-mm overhang at the head.	SPLASH BAR	Smaller head size available for radial type tool posts
<ul style="list-style-type: none"> • These holders allow for a stable cut off operation by securely clamping the insert in a reversed taper shape. • Mirror-like honed inserts without a chipbreaker are also available in addition to the honed inserts with chipbreaker depending on application ! 				

We also offer toolholders for **sub-chuck** operations in the **CTPS, CTP and CTPA** series.





NTG type	NTGW type
	
⇒H77	⇒H76
Machining dia. : up to $\phi 40.0$	Machining dia. : up to $\phi 37.5$
Width : 2.2 and 3.0	Width : 2.2
Shank size : □10 ~ □20	Shank size : □10 ~ □20
The maximum machining diameter varies from 20 to 40 depending on the shank size.	Economical 2-corner insert.
<ul style="list-style-type: none"> • The top and bottom surface of the inserts are V-shaped for secure and stable machining, secure clamping eliminates any possibility of insert movement or mislocation. • The original chipbreaker gives improved chip control, tightly curling up the cut material giving excellent chip evacuation to prevent damage to machined surfaces. 	

CTV-K2 type	CTVN-K2 type
	
⇒H71	⇒H71
Machining dia. : up to $\phi 20.0$	Machining dia. : up to $\phi 20.0$
Width : 2.2 ~ 2.5	Width : 2.2 ~ 2.5
Shank size : □10 ~ □12	Shank size : □10 ~ □12
This toolholder can be used for sub-chuck type cutting as the insert is held at the center.	
Excellent cutting performance for mould type insert with chipbreaker !	

CTDP type
CUT DUO

⇒H73
Machining dia. : up to $\phi 34.0$
Width : 2.0 and 2.5
Shank size : □10 ~ □20
Sharp cut by ground finish.

CTV-B type	CTV type	CTV-M type	CTV-S type
			
⇒H74	⇒H74	⇒H74	⇒H74
Machining dia. : up to $\phi 45.0$	Machining dia. : up to $\phi 35.0$	Machining dia. : up to $\phi 28.0$	Machining dia. : up to $\phi 23.0$
Width : 3.0	Width : 2.5 and 3.0	Width : 2.5 and 3.0	Width : 2.5 and 3.0
Shank size : □25	Shank size : □16 ~ □20	Shank size : □16 and □20	Shank size : □16 and □20
A wide range of toolholders is available dependant on component diameter !			

- New Products
- Tool Materials / Selection Guide
- PCD, CBN and ceramic
- Cermet
- PVD-coated Cermet
- Micro-grain Carbide, Carbide
- Insert Stock List
- Outside Machining Toolholders
- SS
- Grooving Tools
- Threading Tools
- Shaper
- Internal Machining tool range
- Original Tools for Various Applications
- Indexable End Milling Tools
- Indexable Drill Inserts
- Milling Cutters
- Technical Data
- Index

Cut-off Tools Recommended Insert Grade and Cutting Conditions

CSV

Work Material	Free cutting Steels	Carbon Steels	Alloy Steels	Free cutting Steels Stainless	Hard-to-cut Stainless steels	Titanium (Alloy)	Aluminum Alloy
JIS Common Grade	SUM22 SUM23 SUM24	S35C S45C	SCr420 SCM435	SUS303 SUS430F	SUS304 SUS440C	6AL-4V-Ti	A5056 A6061
Insert Grade	DM4 VM1	VM1 DT4		DT4 VM1			
Cutting Speed v_c (m/min)	30 60 100			30 50 70		30 60 90	
feed speed f (mm/rev)	0.01 0.03 0.05			0.01 0.02 0.03		0.01 0.03 0.05	

CTP/CTPA/CTPS/CTPW

Work Material	Free cutting Steels	Carbon Steels	Alloy Steels	Free cutting Steels Stainless	Hard-to-cut Stainless steels	Titanium (Alloy)	Aluminum Alloy
JIS Common Grade	SUM22 SUM23 SUM24	S35C S45C	SCr420 SCM435	SUS303 SUS430F	SUS304 SUS440C	6AL-4V-Ti	A5056 A6061
Insert Grade	VM1 ZM3	QM3 DT4		DT4 ZM1	DT4 QM3		PD1 KM1
Cutting Speed v_c (m/min)	50 90 150			40 70 100		PD1 100 200 350 KM1 50 100 200	
feed speed f (mm/rev)	0.02 0.04 0.06			0.02 0.03 0.05		0.03 0.05 0.08	

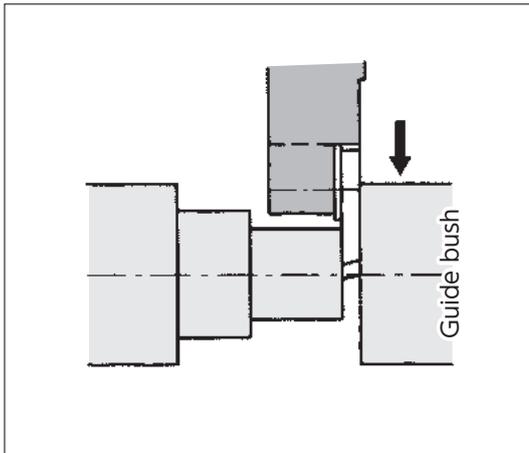
CTDP/CTV/NTG/NTGW

Work Material	Free cutting Steels	Carbon Steels	Alloy Steels	Free cutting Steels Stainless	Hard-to-cut Stainless steels	Titanium (Alloy)	Aluminum Alloy
JIS Common Grade	SUM22 SUM23 SUM24	S35C S45C	SCr420 SCM435	SUS303 SUS430F	SUS304 SUS440C	6AL-4V-Ti	A5056 A6061
Insert Grade	DM4 QM3	DM4 QM3		TM4 ZM3	DM4 QM3	DT4 TM4	TM4 ZM3
Cutting Speed v_c (m/min)	50 100 200	50 90 150		40 70 100		50 100 200	
feed speed f (mm/rev)	0.04 0.08 0.12			0.03 0.05 0.08		0.05 0.1 0.2	

※Please refer to Technical Information **Q56** for detailed recommendation.

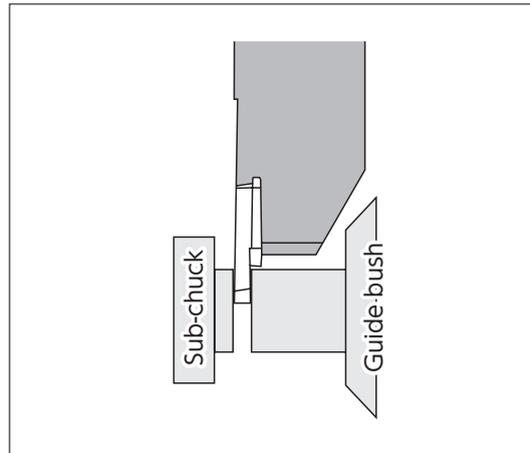
How to use R-hand and L-hand properly for "CTP/CTPA/CTPS/CTPW type"

In case of R-hand use



R-hand holder is recommended when workpiece is not held. R-hand angled type of insert is recommended.

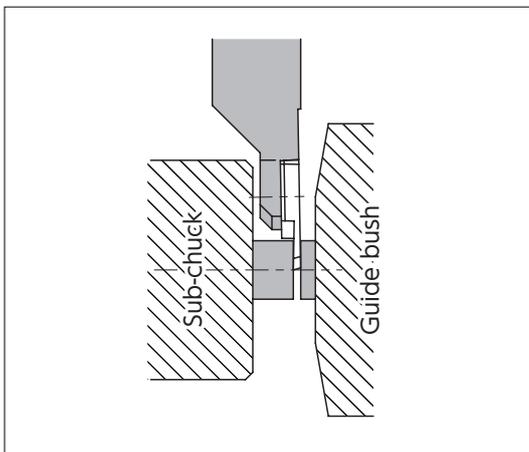
In case of L-hand use



L-hand holder is recommended when workpiece is held by Sub Spindle. Neutral type of insert is recommended due to no concern about generation of boss.

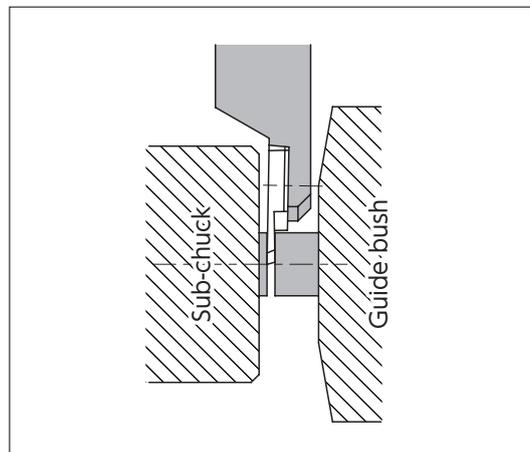
How to use R-hand and L-hand properly for "CTP/CTPA-SUB type"

In case of R-hand use



R-hand holder is recommended when workpiece is long or its diameter is quite small. If workpiece is too short to be held by Sub-Chuck, use L-hand holder under low cutting conditions.

In case of L-hand use



L-hand holder is recommended when workpiece is short."

SS Tools for Cutting off

Swiss tooling

Maximum diameter for cutting off : $\phi 5$

CSV type

For radial type tool post

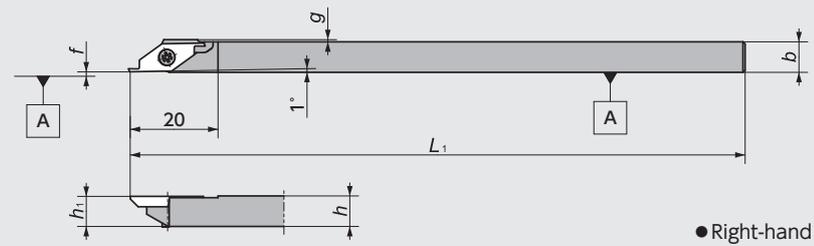


Figure-1

● Right-hand type shown.

CSV-NC/CSV-NC-F type

For gang type tool post

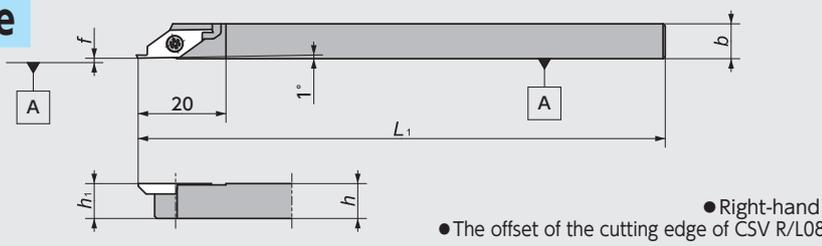


Figure-2

● Right-hand type shown.
● The offset of the cutting edge of CSV R/L08NC-F is small.

Holder dimensions

Shape	Code No.		Toolholder Part No.	Stock		Max. cutting-off dia (mm) ϕD	Dimensions (mm)						Applicable insert	Parts	
	R	L		R	L		h	b	L ₁	h ₁	f	g		Clamping screw	Wrench
Figure-1	5492962		CSV ^{R/L} 07GX	●		5.0 ※	7	7	85	7	0.1	0.0	CSVC (See table below)	LRIS-2.5*7	CLR-15S
	5303169	5303193	07	●	●		7	7	140	7					
	5492954		08GX	●			8	8	85	8					
	5303151	5303201	08	●	●		9.5	9.5	140	9.5					
	5303136		095	●			10	10		10					
	5303144	5303177	10	●	●		12	12	85	12					
	5474770		12GX	●			12	12	140	12					
	5327929		12	●											
Figure-2	5514062	5514070	CSV ^{R/L} 08NC	●	●		8	8	120	8	0.1	-	CSVC (See table below)	LRIS-2.5*7	CLR-15S
	5789615		08NC-F	●			0.0~0.1								
	5563010		10GXNC	●			10	10	85	10	0.1				
	5477492	5477542	10NC	●	●		12	12	120	12					
	5477534	5477500	12NC	●	●										

※The max. cut off diameter varies depending on the insert used. Please refer to the table below.

☆CSV toolholder is interchangeable tool. All CSV type inserts can be used (back turning, grooving, threading) on the same holder. (H80-83 for more information)

Applicable inserts

CSVC type

Shape	Part No.	Chip-breaker	Max. cutting off dia (mm) ϕD	Dimensions (mm)			PVD-coated micro-grain carbides			
				L	r_{ϵ}	w	VM1			
							R	Stock	L	Stock
<p>● R-hand shown.</p>	CSVC 11F ^{R/L} V06	None	3.0	2.0	0.0	0.6	5352547	●		
	11F ^{R/L} V07		0.7			5324272	●	5330840	●	
	11F ^{R/L} V08		0.8			5324256	●	5330832	●	
	11F ^{R/L} V09		0.9			5352554	●			
	11F ^{R/L} V10		1.0			5303490	●	5303599	●	
	11F ^{R/L} V13		1.3			5311824	●	5311816	●	
11F ^{R/L} V15	1.5	5303615	●	5303631	●					
<p>● R-hand shown.</p>	CSVC 11F ^{R/L} VB06	Provided	3.0	2.0	0.0	0.6	5358734	●		
	11F ^{R/L} VB07		0.7			5358742	●			
	11F ^{R/L} VB08		0.8			5358767	●			
	11F ^{R/L} VB09		0.9			5358775	●			
	11F ^{R/L} VB10		1.0			5358783	●			
	11F ^{R/L} VB13		1.3			5358676	●			
11F ^{R/L} VB15	1.5	5358668	●							

※The angles shown indicate the values when the insert is set into the holder.

SS Tools for Front Turning

SS Tools for Back Turning

SS Tools for Cutting off

Original Series

Maximum diameter for cutting off : $\phi 10$

CTPS type

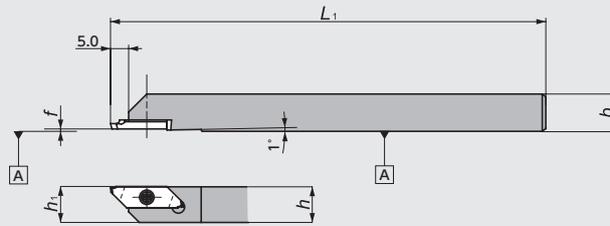


Figure-1

● Right-hand type shown.

Maximum diameter for cutting off : $\phi 4$

CTPSR-SUB type

Applicable with sub-chuck

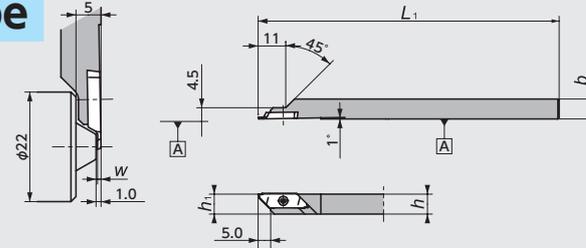


Figure-2

● Right-hand type shown.

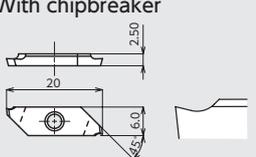
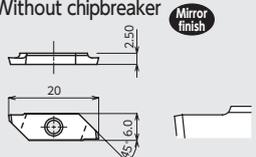
Holder dimensions

Shape	Code No.	Toolholder Part No.	Stock	Max. cutting-off dia (mm) ϕD	Dimensions (mm)					Applicable insert	Parts	
					h	b	L ₁	h ₁	f		Clamping screw	Wrench
Figure-1	5346572	CTPSR10 R12	●	10.0	10	10	120	10	0.0			
	5397187		●		12	12		12				
Figure-2	5486717	CTPSR08-SUB04	●	4.0	8	8	120	8	—	CTPS-001 (See table below)	LRIS-2.5*5	CLR-15S

☆CTPS toolholder is interchangeable tool. All CTPS type inserts can be used (front turning, back turning, cut-off, threading) on the same holder. (H84-85 for more information)

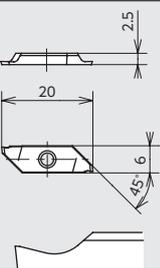
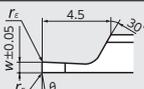
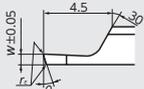
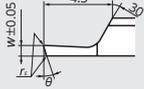
Applicable inserts

CTPS type

Shape	Part No.	Chip-breaker	Max. cutting-off dia (mm) ϕD	Dimensions (mm)				PVD-coated micro-grain carbides			
				w	L	θ	r _e	ZM3	Stock	VM1	Stock
With chipbreaker  ● Right-hand type shown.	CTPS12FR	Provided	4.0	1.2	3.5	16°	0.05	5346275	●	5362587	●
				1.5	4.0			5346267	●	5362595	●
				1.8	5.5			5346283	●	5362603	●
				2.0	6.0			5374210	●	5374194	●
Without chipbreaker  ● Right-hand type shown.	CTPS12FRV	None	4.0	1.2	3.5	20°	0.0	5346937	●	5362611	●
				1.5	4.0			5346929	●	5362629	●
				1.8	5.5			5346945	●	5362637	●
				2.0	6.0			5374202	●	5374228	●

※ θ shows degrees on the holders tool.

CTPS-001 type

Shape	Cutting edge shape	Part No.	Chip-breaker	Max. cutting-off dia (mm) ϕD	Dimensions (mm)			PVD-coated micro-grain carbides	
					w	θ	r _e	ZM3	Stock
 ● Right-hand type shown.		CTPS07FRN-001	Provided	4.0	0.7	0°	0.05	5460670	●
		CTPS07FR-001				16°	0.05	5441852	●
		CTPS07FRV-001	None			20°	0.0	5441860	●

※ θ shows degrees on the tool holders. **H61**

Maximum diameter for cutting off : $\phi 12$

CTP type

Front/back clamping type

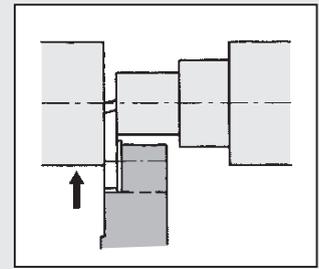
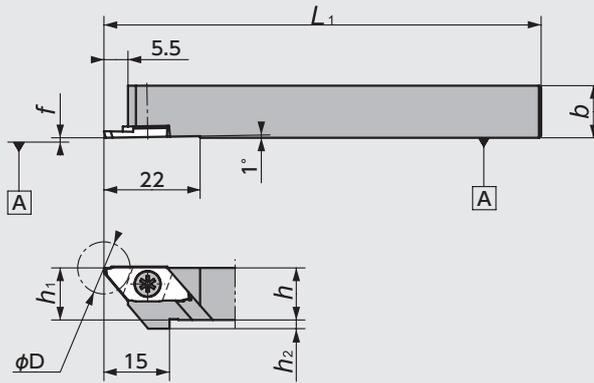


Figure-1

● Right-hand type shown.

CTP-OH type

Front/back clamping type
SPLASH BAR **NEW**

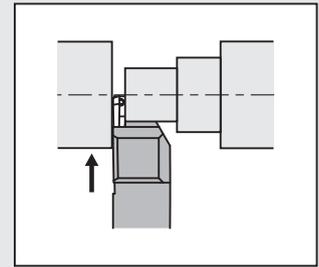
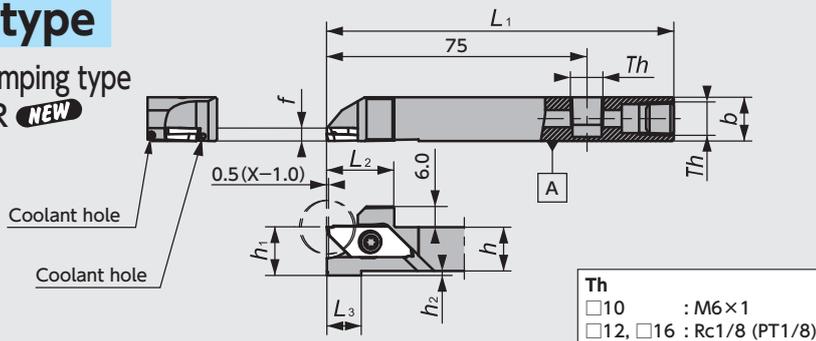


Figure-2

● Left-Hand holders are designed for Right-Hand machines.
(The positions for coolant supply connection are same between right and left hand.)

● Right-hand type shown.

(For mounting on back spindle)

CTPR-SUB type

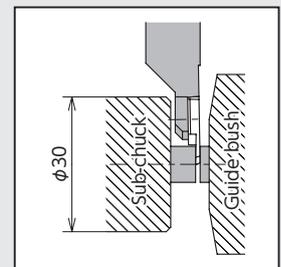
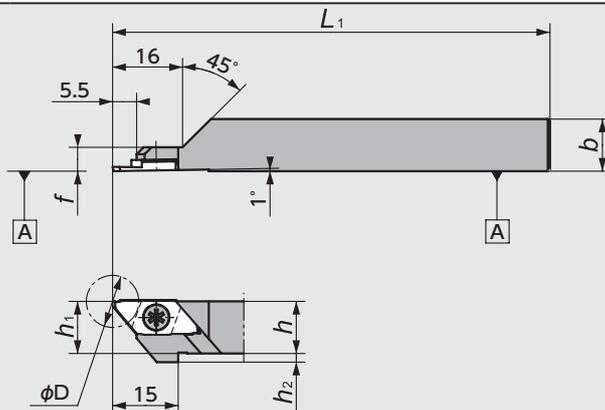


Figure-3

● Right-hand type shown.

CTPL-SUB type

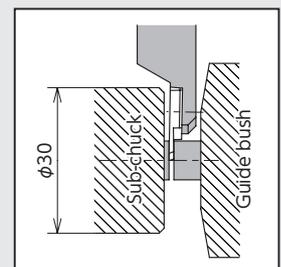
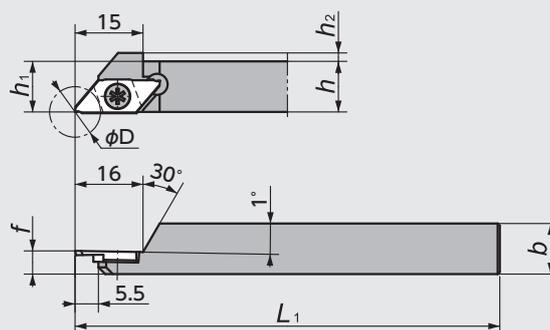
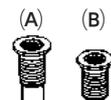


Figure-4

● Left-hand type shown.

Holder dimensions

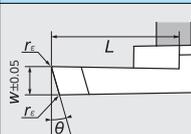
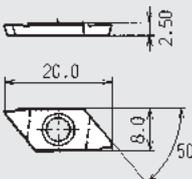
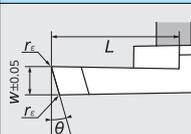
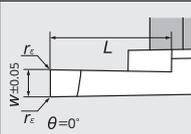
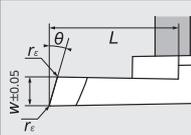
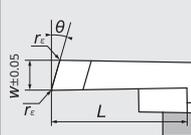
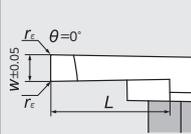
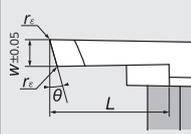
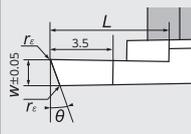
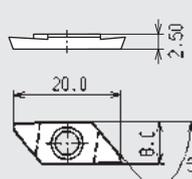
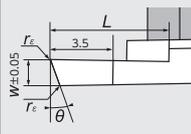
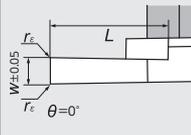
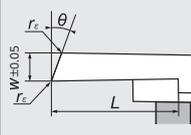
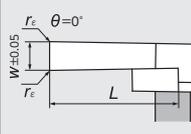
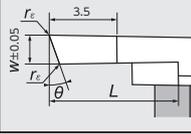
Shape	Code No.		Toolholder Part No.	Stock		Max. cutting-off dia (mm) φD	Dimensions (mm)						Applicable insert 	Parts			
	R	L		R	L		h	b	L ₁	h ₁	h ₂	f		Clamping screw		Wrench	
														(A)	(B)		(A)
Figure-1	5131362	5131354	CTP ^R / _L 08	●	●	12.0※	8		120	8	4	0.0	CTP CTP-X CTPX H64~65				
	5873849	5893458	10H	●	●		10	10	100								LRIS-4*10PW (A)
	5089644	5089636	10	●	●				120	10	2						
	5459730	5459748	12GX	●	●		12	12	85	12							LRIS-4*12PW (A)
	5089651	5089669	12	●	●				120								
	5089677	5089685	13	●	●		13	13		13	0						
	5459755		16H	●			16	16	100	16							
	5183496	5183504	16	●	●				120								
Figure-2	5921853	5921861	CTP ^R / _L 1012H-OH	●	●	12.0※	10	10		12	4.475	0.0	CTP CTP-X CTPX H64~65	LRIS-4*12PW (A)	CLR-15S (A)		
	5918651	5918040	12H-OH	●	●		12	12	100		1.3						
	5921879	5921887	16H-OH	●	●		16	16		16	0						
Figure-3	5571831		CTP ^R / _L 08-SUB	●		12.0※	8	8	120	8	4	5.5	CTP-FR (N) (V) (NV) CTP-FRX (FRNX) CTPX-FR (N) H64~65	LRIS-4*5 (B)	LLR-25S (B)		
	5607999		08J-SUB	★					110								
	5391610		10F-SUB	●			10	10	80	10	2						
	5605282		10KX-SUB	●					120								
	5474580		12GX-SUB	●			12	12	85	12	0						
	5391628		12-SUB	●					120								
Figure-4		5570791	CTP ^R / _L 08-SUB	●		12.0※	8	8	120	8	4	5.5	CTP-FLK CTP-FLKV CTP-FLN CTP-FLNV CTPX-FLN CTPX-FLNX H64~65	LRIS-4*5 (B)	LLR-25S (B)		
		5608005	08J-SUB	★					110								
		5499389	10GX-SUB	●			10	10		10	2						
		5482534	12GX-SUB	●			12	12	85	12	0						

※The max. cut off diameter varies depending on the insert used.
Please refer to page **H64~65**.

SS Tools for Cutting off

Applicable inserts

CTP type

Shape	Cutting edge shape	Part No.	Max. cutting off dia ϕD (mm)	Dimensions (mm)				Micro-grain carbide		PVD-coated micro-grain carbides							
				W	L	θ	r_ϵ	KM1	Stock	ZM3	Stock	VM1	Stock	DT4	Stock		
(With chipbreaker)   The above figures denote the CTP□□FR type. θ indicates the angle when the insert is set into the holder.		CTP05FR-SH	5.0	0.5	2.8	15°	0.03			5788732	●						
		07FR	8.0	0.7	4.5	16°				5126255	●						
		10FR	12.0	1.0	6.7					5089594	●			5847868	●		
		10FR-SH	7.0	1.0	4.1	15°	0.05			5788724	●			5847876	●		
		15FR	12.0	1.5	6.7	16°				5089602	●	5284690	●				
		20FR	12.0	2.0	6.7	16°				5125521	●	5432372	●				
		CTP05FRN-SH	5.0	0.5	2.8		0.03			5788799	●						
		10FRN	12.0	1.0	6.7					5133327	●			5847884	●		
		10FRN-SH	7.0	1.0	4.1	0°				5788757	●			5847892	●		
		15FRN	12.0	1.5	6.7					5133301	●	5306543	●				
		20FRN	12.0	2.0	6.7					5133335	●	5272224	●				
			CTP10FRK		1.0	6.7		0.05			5131412	●					
	15FRK		11.0	1.5	6.7	16°				5131404	●						
	20FRK		11.0	2.0	6.7	16°				5131388	●						
	 The above figures denote the CTP□□FR type. θ indicates the angle when the insert is set into the holder.	CTP07FL	8.0	0.7	4.5		0.05			5126263	●						
		10FL		1.0	6.7	16°				5089586	●						
		15FL	12.0	1.5	6.7	16°				5089610	●						
		20FL	12.0	2.0	6.7	16°				5125513	●						
		CTP05FLN-SH	5.0	0.5	2.8		0.03			5788773	●						
		10FLN	12.0	1.0	6.7					5133350	●			5847900	●		
		10FLN-SH	7.0	1.0	4.1	0°	0.05			5788765	●			5847918	●		
		15FLN	12.0	1.5	6.7					5133319	●	5378526	●				
		CTP05FLK-SH	5.0	0.5	2.8	17°	0.03			5788781	●						
		10FLK	11.0	1.0	6.7	16°				5131420	●			5847926	●		
10FLK-SH		7.0	1.0	4.1	17°				5788807	●			5847934	●			
15FLK		11.0	1.5	6.7	16°	0.05			5131396	●	5328240	●					
20FLK		11.0	2.0	6.7	16°				5131370	●	5280722	●					
R-hand shown.		15FLKB※	11.0	1.5	6.7	16°			5645254	●							
(Without chipbreaker)   The above figures denote the CTP□□FR type. θ indicates the angle when the insert is set into the holder.		CTP10FRV		1.0	6.7	20°			5576079	●	5255708	●	5264841	●	5847942	●	
		15FRV	12.0	1.5	6.7	20°				5576087	●	5255682	●	5264858	●		
		20FRV	12.0	2.0	6.7	20°				5576095	●	5255666	●	5264866	●		
		CTP15FRNV		1.5	6.7	0°				5576111	●						
		20FRNV	12.0	2.0	6.7	0°				5576020	●						
		CTP10FLV		1.0	6.7	20°					5255641	●	5264882	●			
		15FLV	12.0	1.5	6.7	20°					5255625	●	5264890	●			
		20FLV	12.0	2.0	6.7	20°					5255609	●	5264908	●			
		CTP15FLNV		1.5	6.7	0°	0.0			5576012	●						
		20FLNV	12.0	2.0	6.7	0°	0.0			5576004	●						
		CTP15FLKV		1.0	6.7	20°				5576103	●		5264874	●			
		20FLKV	11.0	1.5	6.7	20°						5392691	●				
	R-hand shown.																

※CTP15FLKB is the high performance version of CTP15FLK. (The rake angle is greater)

... Indicates inserts available for machines with sub-chucking.

Applicable inserts



CTP-X type

Strengthened cutting edge with land

Shape	Cutting edge shape	Part No.	Max. cutting off dia (mm) ϕD	Dimensions (mm)				PVD-coated micro-grain carbides	
				w	L	θ	r_ϵ	ZM3	Stock
(With chipbreaker) The above figures denotes the CTP-□FRX type. θ indicates the angle when the insert is set into the holder. R-hand shown.		CTP15FRX	12.0	1.5	6.7	16°	0.05	5360847	●
		20FRX						5360839	●
		CTP15FRNX		1.5	0°	5360813	●		
		20FRNX		2.0		5360821	●		

Applicable inserts



CTPX type

Shape	Cutting edge shape	Part No.	Max. cutting off dia (mm) ϕD	Dimensions (mm)				PVD-coated micro-grain carbides					
				w	L	θ	r_ϵ	ZM3	Stock	QM3	Stock	DT4	Stock
(With chipbreaker) R-hand shown.		CTPX15FR	12.0	1.5	6.7	16°	0.05	5334909	●	5535729	●	5827514	●
		20FR						5334834	●	5535745	●	5850169	●
		CTPX15FRN		1.5	0°		5535711	●	5850193	●			
		20FRN		2.0		5535737	●	5850144	●				
		CTPX15FL		1.5	16°	0.05			5850227	●			
		20FL		2.0			5850185	●					
		CTPX15FLN		1.5	0°		5535653	●	5850201	●			
		20FLN		2.0		5535638	●	5830468	●				
		CTPX15FLK		1.5	11.0	16°		5535646	●	5850219	●		
		20FLK		2.0			5535620	●	5850177	●			

... Indicates inserts available for machines with sub-chucking.

Maximum diameter for cutting off : $\phi 16$

CTPA type

Front/back clamping type

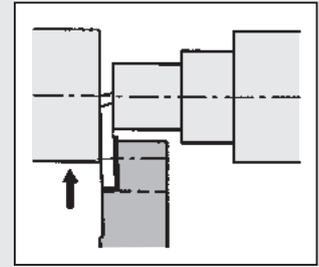
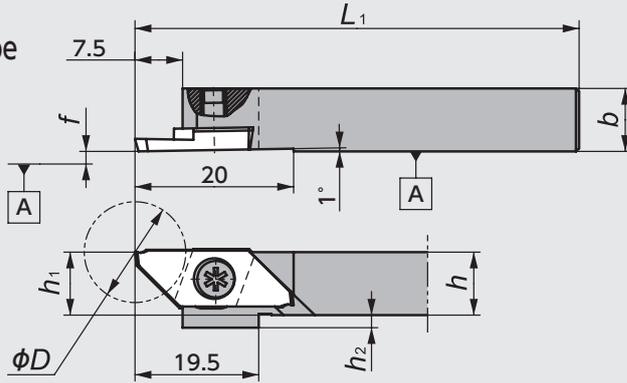


Figure-1

● Right-hand type shown.

(For mounting on back spindle)

CTPAR-SUB type

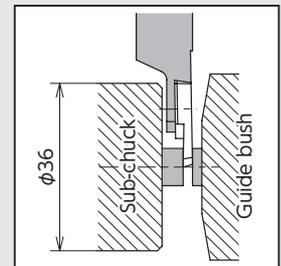
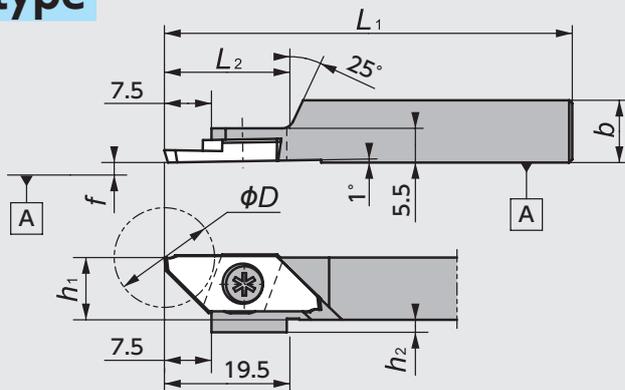


Figure-2

● Right-hand type shown.
● For machining of short length work pieces

CTPAL-SUB type

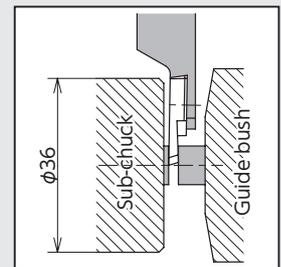
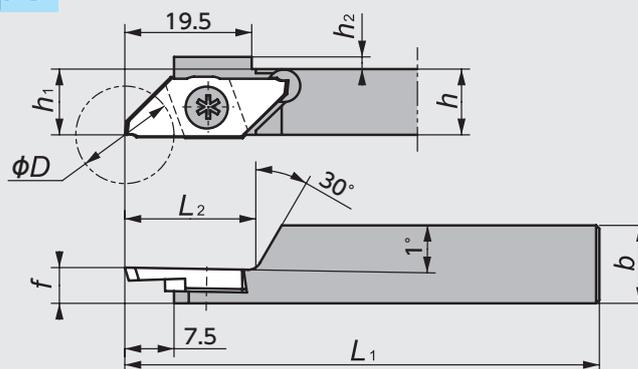


Figure-3

● Left-hand type shown.
● For machining of very short length work pieces

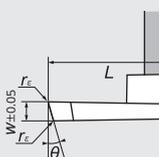
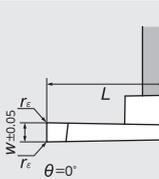
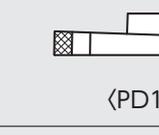
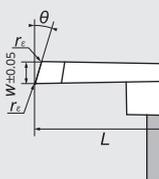
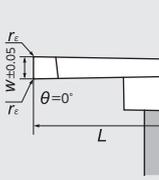
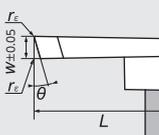
Holder dimensions

Shape	Code No.		Toolholder Part No.	Stock		Max. cutting off dia (mm) ϕD	Dimensions (mm)						Applicable insert 	Parts			
	R	L		R	L		h	b	L ₁	h ₁	h ₂	L ₂		f	Clamping screw		Wrench
															(A)	(B)	
Figure-1	5199187	5199153	CTPA^RL 10	●	●	16.0 ※	10	10		10	2			CTPA (cutting-off) CTPAX (cutting-off) H68~69 TBPA (back turning) H45	LRIS-4*10PW (A)	CLR-15S (A) LLR-25S (B)	
	5199195	5199161	12	●	●		12	12	120	12			—		0.0		LRIS-4*12PW (A)
	5199203	5199179	16	●	●		16	16		16	0						
	5459540	5459557	20F	●	●		20	20	80	20							LRIS-4*10 (B)
Figure-2	5600770		CTPAR10GX-SUB	●		16.0 ※	10	10		10	2			CTPA-FR (N)(V)(NV) CTPAX-FR (N) H68~69	LRIS-4*5 (B)	LLR-25S (B)	
	5454681		12GX-SUB	●			12	12	85	12	0		20		0.0		
	5570676		12KX-SUB	●			12	12	120								
Figure-3		5505904	CTPAL10GX-SUB	●		16.0 ※	10	10		10	2			CTPA-FL (N)(K)(NV)(KV) CTPAX-FL (N)(K) H68~69	LRIS-4*5 (B)	LLR-25S (B)	
		5454699	12GX-SUB	●			12	12	85	12			20		5.5		
		5570684	12KX-SUB	●			12	12	120		0						
		5604871	16GX-SUB	●			16	16	85	16			28				

※The max. cutting off diameter varies depending on the insert used.
Please refer to pages **H68** and **H69**.

Holder dimensions

CTPA type

Shape	Toolholder Part No.	Part No.	Max. cutting off dia (mm) φD	Dimensions (mm)				PVD-coated micro-grain carbides						PCD				
				w	L	θ	r _ε	ZM3	Stock	QM3	Stock	VM1	Stock	DT4	Stock	PD1	Stock	
(With chipbreaker)      	CTPA07FR	8.0	0.7	4.5	16°	0.05	5501242	●										
	10FR	12.0	1.0	6.7			5501218	●										
	15FR	16.0	1.5	9.2			5248075	●	5270020	●	5439328	●	5855077	●				
	20FR	2.0	5194113				●	5229596	●	5439310	●	5854997	●					
	CTPA07FRN	8.0	0.7	4.5	0°	0.05	5512496	●										
	10FRN	12.0	1.0	6.7			5496880	●										
	15FRN	16.0	1.5	9.2			5271473	●	5556881	●	5415096	●	5855051	●				
	20FRN	2.0	5199146				●	5562715	●	5476338	●	5854989	●					
	20FRN-P	16.0	2.0	9.2			0.1								5781620	●	※1-corner spec.	
	30FRN	3.0	0.05				5789151	●										
	CTPA07FL	8.0	0.7	4.5	16°	0.05	5501234	●										
	10FL	12.0	1.0	6.7			5501226	●										
	15FL	16.0	1.5	9.2			5342688	●					5855101	●				
	20FL	2.0	5199138				●					5855036	●					
	CTPA10FLN	12.0	1.0	6.7	0°	0.05	5496898	●										
	10FLND	12.0	1.0	6.7			5789599	●										
	15FLN	16.0	1.5	9.2			5286349	●	5562707	●	5365747	●	5855085	●				
	20FLN	2.0	5199120				●	5250964	●	5439351	●	5854971	●					
	20FLN-P	16.0	2.0	9.2			0.1								5781646	●	※1-corner spec.	
	30FLN	3.0	0.05				5782677	●										
CTPA07FLK	6.5	0.7	4.5	16°	0.05	5505912	●											
10FLK	11.0	1.0	6.7			5496906	●											
10FLKD	16.0	1.0	6.7			5789607	●											
15FLK	14.5	1.5	9.2			5248083	●	5562699	●	5476320	●	5855093	●					
20FLK	2.0	5199112				●	5250774	●	5439369	●	5855002	●						

● The above figures denote the CTPA
 □ FR type.
 ● R-hand shown.

☆ θ indicates the angle when the insert is set into the holder.

... Indicates inserts available for machines with sub-chucking.

Applicable inserts

CTPA type

Shape	Cutting edge shape	Part No.	Max. cutting off dia (mm) ϕD	Dimensions (mm)				Micro-grain carbide		PVD-coated micro-grain carbides			
				w	L	θ	r_e	KM1	Stock	ZM3	Stock	VM1	Stock
(Without chipbreaker)		CTPA20FRS	16.0	2.0	9.2	0°	0.05			5378823	●		
		CTPA20FRV				20°		5576038	●		5264916	●	
		CTPA20FRNV				0°	0.0	5576046	●				
		CTPA20FLS	16.0	2.0	9.2	0°	0.05			5225255	●		
		CTPA20FLV				20°				5264924	●		
		CTPA20FLNV				0°	0.0	5576053	●				
		CTPA20FLKV				20°		5576061	●		5264932	●	

● The above figures denotes the CTPA: FRS type.
● R-hand shown.

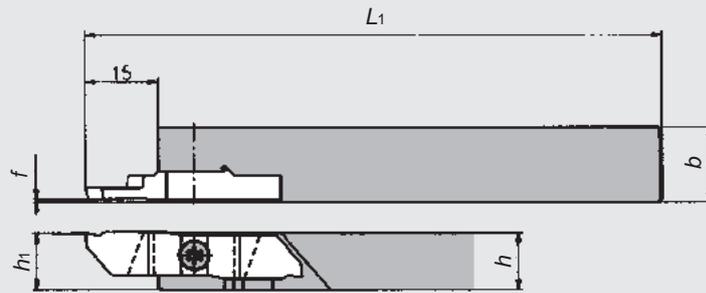
☆ θ indicates the angle when the insert is set into the holder. ...Indicates inserts available for machines with sub-chucking.

- New Products
- Tool Materials / Selection Guide
- PCD, CBN and ceramic
- Cermet
- Micro-grain Carbide, Carbide
- Insert Stock List
- Outside Machining Toolholders
- SS
- Grooving Tools
- Threading Tools
- Shaper
- Internal Machining tool range
- Original Tools for Various Applications
- Indexable End Milling Tools
- Indexable Drill Inserts
- Milling Cutters
- Technical Data
- Index

SS Tools for Cutting off

Maximum diameter for cutting off : $\phi 20$

CTPW type



● Right-hand type shown.

Holder dimensions

Code No.		Toolholder Part No.	Stock		Max. cutting off dia (mm) ϕD	Dimensions (mm)					Applicable insert	Parts	
R	L		R	L		h	b	L ₁	h ₁	f		Clamping screw	Wrench
—	5487004	CTPW^{R/L}10A	—	●	20.0	10	12	120	9.95	0.6	CTPW25 ^{R/L} (See table below)	LRIS-4*10	LLR-25S
5443593	—	10	●	—		16							
—	5488150	12A	—	●		12	12		11.95				
5443601	—	12	●	—		16							
5443627	5486980	16	●	●		16	16		15.95				
5443635	5486998	20	●	●		20	20		19.95				

Applicable inserts

CTPW type

Shape	Cutting edge shape	Part No.	Chip-breaker	Max. cutting off dia (mm) ϕD	Dimensions (mm)					PVD-coated micro-grain carbides			
					w	L	θ	r _{e1}	r _{e2}	R	Stock	L	Stock
		CTPW25F^{R/L}	Provided	20.0	2.5	12	17°	0.05	0.20	5437991	●	5487053	●
		CTPW25F^{R/L}K					17°	0.05	0.20			5487012	●
		CTPW25F^{R/L}N					0°	0.05	0.05	5438056	●	5487046	●
		CTPW25F^{R/L}P	17°				0.05	0.20	5443650	●	5487038	●	
		CTPW25F^{R/L}NV	0°				0.00	0.00	5438049	●	5487020	●	

● L-hand shown.

※ This insert is made to be multi-functionally.

Maximum diameter for cutting off : $\phi 20$

CTV-K2 type

Front/back clamping type

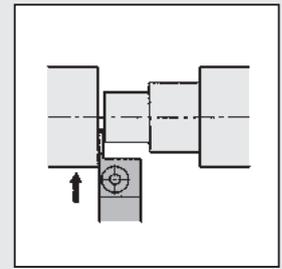
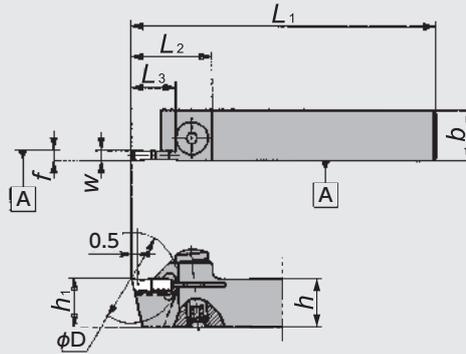


Figure-1

● Right-hand type shown.

CTVN-K2 type

Front/back clamping type

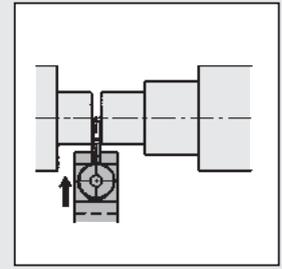
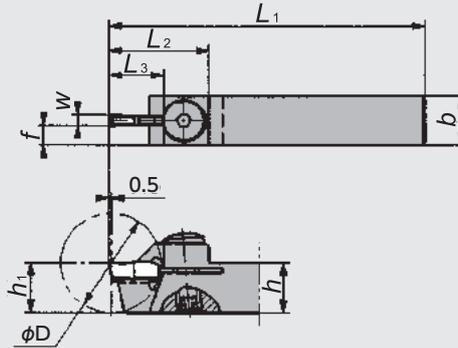


Figure-2

Holder dimensions

Shape	Code No.		Toolholder Part No.	Stock		Max. cutting off dia (mm) ϕD	Dimensions (mm)						Applicable insert	Parts			
	R	L		R	L		w	h	b	L ₁	h ₁	f		L ₂	L ₃	Clamping screw	Wrench
Figure-1	5111919	5111927	CTV^{R/L}10K2	●	●	20.0	2.2	10	10	120	10	0.0	20.0	11	CTV-S (See table below)	A0S-5*16	LW-2.5S
		5459763			●		12	12	85	12							
	5111950	5111935			●		120	12									
Figure-2	5208236		CTVN10K2	●		20.0	2.2	10	10	120	10	3.9	19.5	11	CTV-S (See table below)	A0S-5*16	LW-2.5S
	5208244			●	12		12	120	12	4.9							

Note) The dimension f indicates the value when an insert of CTV22□□□□S type is used.

Applicable inserts

CTV-S type

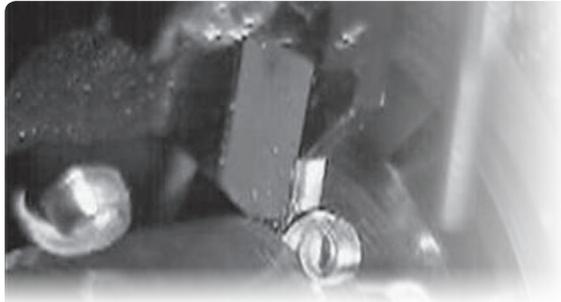
Shape	Part No.	Dimensions (mm)				PVD-coated micro-grain carbides		
		w	L	θ	r _ε	ZM3	Stock	
	CTV22N05S 22N10S	2.2	10	0°	0.05	5111976	●	
	CTV25N05S 25N10S				0.10	5111992	●	
	CTV22R05S 22R10S	2.2			0.05	5112024	●	
	CTV25R05S 25R10S				0.10	5112073	●	
	CTV22L05S 22L10S	2.2			17°	0.05	5111968	●
	CTV25L05S 25L10S					0.10	5112008	●
	CTV22N05S 22N10S	2.2	0.05	5112032		●		
	CTV25N05S 25N10S		0.10	5112065		●		
	CTV22R05S 22R10S	2.2	0.05	5111984		●		
	CTV25R05S 25R10S		0.10	5112016		●		
	CTV22L05S 22L10S	2.2	0.05	5112040	●			
	CTV25L05S 25L10S		0.10	5112057	●			

CUT DUO

High rigidity cut-off tool

Renewed CUT DUO

Improved clamping system offers more stable machining



Redesigned toolholder offers increased reliability and productivity

Larger clamp screw is used to enhance clamping force

Improved anti vibration performance with newly designed clamping system

Prevent insert movement by minimizing insert pocket gap

[Redesigned toolholder shape]

Precision ground chipbreaker enables low cutting force and good chip control

New PVD coated carbide "DM4" is available



Cut Duo offers longer tool life in all types of hard to cut materials, like, carbon steel, alloy steel, SUS304, SUS440C etc...

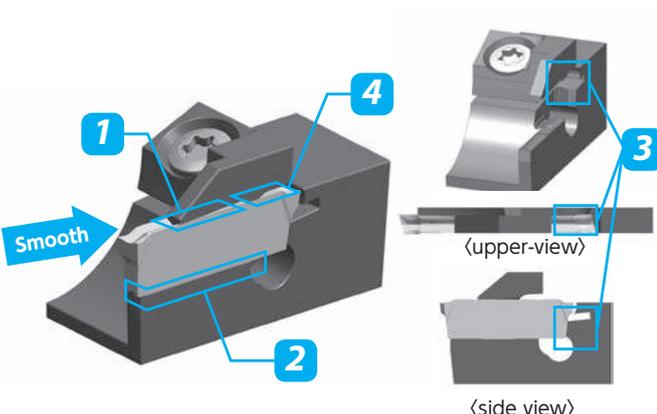
Chip control

Cutting condition $v_c=80\text{m/min}$ WET

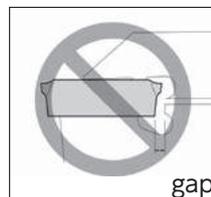
f	0.05mm/rev	0.08mm/rev	0.12mm/rev
SCM435			
SUS304			

Triple Dimple Structure Clamping System

- 1 Pulling in system to avoid dropping off
- 1 2 4 Smoothly attach by guide function
- 3 Stable clamping on convex configuration



check points



Example

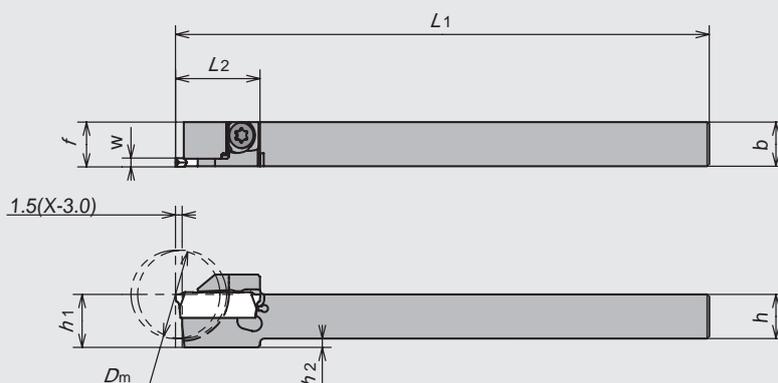
Shaft Cut-off	
Work Material: SCM435	
Cutting Speed: 80m/min	
Feed speed : 0.05mm/rev	
Coolant : WET	
NTK : QM3	6,000pcs/corner
competitor's PVD coat	3,000pcs/corner
CUT DUO get's donble tool life and exellent finish.	

Applicable inserts

Max. Cut-off diameter ~ $\phi 20$ 、~ $\phi 25.4$ 、~ $\phi 32$ 、~ $\phi 34$

CTDP type

Double edges



● Right-hand type shown.

Holder dimensions

Code No.		Toolholder Part No.	Stock		Dimensions (mm)							Max. cutting off dia (mm) D_m	Applicable insert	Parts		
R	L		R	L	w	h	b	L_1	h_1	h_2	f			L_2	Clamping screw	Wrench
5750534	5750559	CTDP ^{R/L} 10-20D20	●	●	2.0	10	10	120	10	2	10.15	19.0	20.0	CTDP20 (See table below)	LRIS-4 * 12 ※1	LLR-25S
5717087	5717079	12-20D20	●	●	2.0	12	12	120	12	0	12.15	19.0				
5717103	5717095	12-20D25	●	●	2.0	12	12	120	12	0	12.15	22.0				
5750567	5750575	16-20D25	●	●	2.0	16	16	120	16	0	16.15	22.0	25.4	CTDP20 (See table below)	LRIS5 * 10 ※2	LLR-28S
5842299	5842307	16-20D32A	●	●	2.0	16	16	120	16	0	16.15	27.5				
5842331	5842349	2012-20D32A	●	●	2.0	20	12	120	20	0	12.15	29.5	32.0	CTDP20 (See table below)	LRIS5 * 10 ※2	LLR-28S
5842315	5842323	20-20D32A	●	●	2.0	20	20	120	20	0	20.15	29.5				
5842356	5842364	16-25D34A	●	●	2.5	16	16	120	16	0	16.15	28.5	34.0	CTDP25 (See table below)	CS0516LSH ※3	LW-3 ※3
5842398	5842406	2012-25D34A	●	●	2.5	20	12	120	20	0	12.15	29.5				
5842372	5842380	20-25D34A	●	●	2.5	20	20	120	20	0	20.15	29.5				

※1 Recommended tightening torque 3.0N.m

※2 Recommended tightening torque 5.0N.m

※3 Parts had been changed since June.2013. (Old)LRIS5*10→(New)CS0516LSH (Old)LLR-28S→(New)LW-3

Applicable inserts

Shape	Part No.	Dimensions (mm)				PVD-coated micro-grain carbides					
		w	L	θ	r_e	TM4	Stock	QM3	Stock	DM4	Stock
	CTDP20N	2.0	19.1	0°	0.05	5717012	●	5717004	●	5844972	●
	20N02				0.2	5716998	●	5716980	●	5839352	●
	20R6			6°	0.05	5717038	●	5717020	●	5844956	●
	20R15				0.05	5717061	●	5717046	●	5844964	●
	CTDP25N			2.5	21.2	0°	0.05	5750682	●	5750690	●
	25N02	0.2	5750708				●	5750732	●	5846936	●
	25R6	6°	0.05			5750740	●	5750757	●	5852694	●
	25R15		0.05			5750765	●	5750773	●	5849377	●

SS Tools for Cutting off

Maximum diameter for cutting off : $\phi 45$

CTV(-S) type

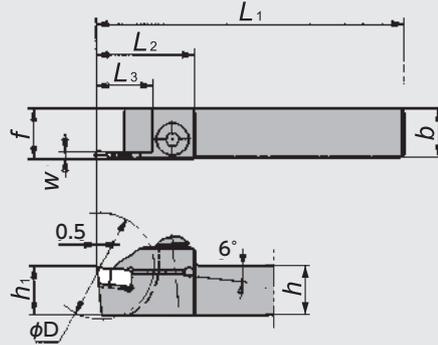


Figure-1

● Right-hand type shown.

CTV-X type

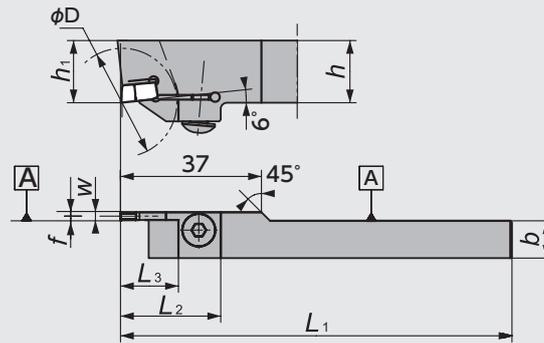


Figure-2

● Left-hand type shown.

CTV-M(B) type

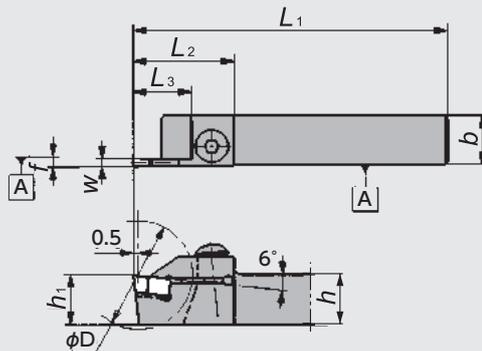


Figure-3

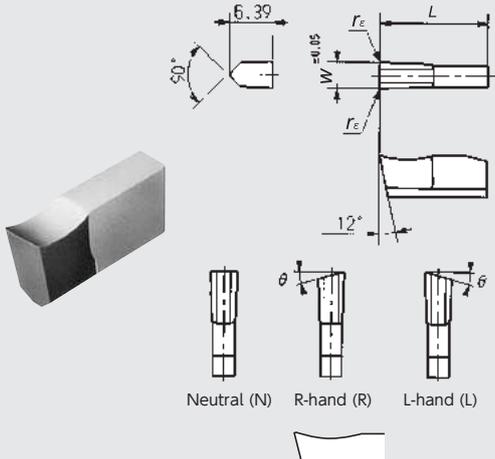
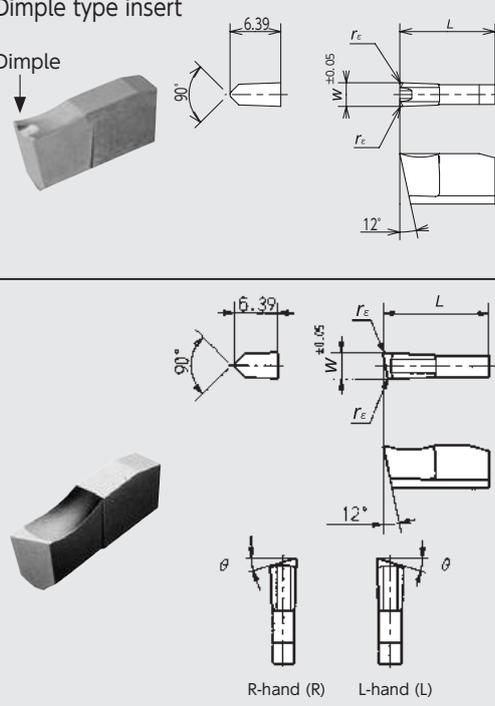
● Right-hand type shown.

Holder dimensions

Shape	Code No.		Toolholder Part No.	Stock		Max. cutting off dia (mm) ϕD	Dimensions (mm)							Applicable insert	Parts		
	R	L		R	L		w	h	b	L ₁	h ₁	f	L ₂		L ₃	Clamping screw	Wrench
Figure-1	5904131		CTV ^{R/L} 16K25S	●		23.0	2.5	16	16	125	16	16.5	24	12.2	CTV25 [□] H75	BS0620	LW-4
	5904180		20K25S	●				20	20		20	20.5					
	5904149		16K30S	●				16	16		16	16.5					
	5904172		20K30S	●		20	20	20	20.5								
	5853619	5853627	16K25	●	●	35.0	2.5	16	16	32	16	16.5	32	18.5	CTV25 [□] H75		
	5853643	5853635	20K25	●	●			20	20		20	20.5					
	5853593	5853601	16K30	●	●			16	16		16	16.5					
	5853577	5853585	20K30	●	●	20	20	20	20.5								
	5120423	5122197	1913L25	●	●	45.0	2.5	19	13	140	19	13.0	32	18.5	CTV25 [□] H75		
5120431	5122189	1913L30	●	●	20			12	125		20	3.0					
Figure-2	5595384	CTVL2012K30X-1	●		20			12	125		20	3.0					
Figure-3	5177100		CTV ^{R/L} 16-25M	●		28.0	2.5	16	16	120	16	0.5	25.5	15	CTV25 [□] H75	BS0520	LW-3
	5185541		20-25M	●				20	20		20						
	5185566		16-30M	●		16	16	16	16								
	5183314		20-30M	●		20	20	20	20								
	5162219	5184528	25-30B	●	●	25	25	150	25	34.5	23.5	34.5	23.5	CTV30 [□] H75	BS0625		

Applicable inserts

CTV type

Shape	Part No.	Dimensions (mm)				PVD-coated micro-grain carbides			
		w	L	θ	r_e	ZM3	Stock	QM3	Stock
 <p>Neutral (N) R-hand (R) L-hand (L)</p>	CTV25N	2.5	12	0°	0.20	5862248	●		
	30N	3.0				5864145	●	5972997	●
	25R	2.5				5868633	●		
	30R	3.0				5866892	●		
	25L	2.5							
	30L	3.0				5129564	●		
	CTV30N038	3.0				12	0°	0.20	5524921
 <p>R-hand (R) L-hand (L)</p>	CTV25R00A	2.5	12	8°	0.05 or less	5162003	●		
	30R00A	3.0				5185327	●		
	25R00B	2.5				5185178	●		
	30R00B	3.0				5183223	●		

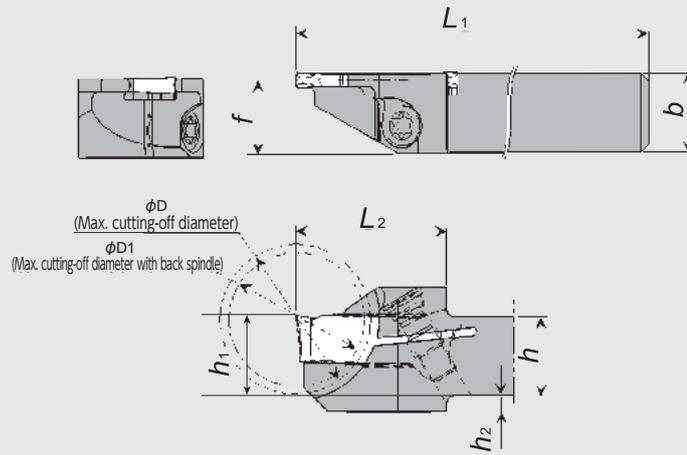
- New Products
- Tool Materials / Selection Guide
- PCD, CBN and ceramic
- Cermet
- PVD-coated Cermet
- Micro-grain Carbide, Carbide
- Insert Stock List
- Outside Machining Toolholders
- SS
- Grooving Tools
- Threading Tools
- Shaper
- Internal machining tool range
- Original Tools for Various Applications
- Indexable End Milling Tools
- Indexable Drill Inserts
- Milling Cutters
- Technical Data
- Index

SS Tools for Cutting off

Maximum diameter for cutting off : $\phi 37.5$

NTGW type

2-corner specification



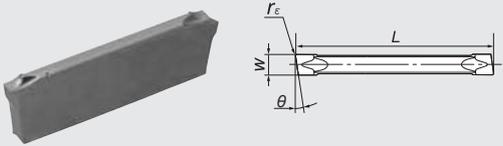
● Left-hand type shown.

Holder dimensions

Code No.		Toolholder Part No.	Stock		Max. cutting-off dia (mm) ϕD	Max. cutting-off dia w/ back spindle (mm) ϕD_1	Dimensions (mm)						Applicable insert 	Parts			
R	L		R	L			w	h	b	L ₁	h ₁	f		L ₂	h ₂	Clamping screw 	Wrench 
5500574	5500582	NTGW ^{R/L} 1010-2	●	●	19.8	17.0		10	10		10	9.2	2	KT \square W22 (See table below.)	SR-16-236/P	TORX-T15	
5500590	5500657	1212-2	●	●	23.6	21.0		12	12		12	11.2	19				
5500665	5500673	1616-2	●	●	24.6	22.0	2.2	16	16	120	16	15.2	19.5				0
5559992	5559984	2012-2	●	●	37.0	34.0					12	11.2	27				
5559976	5559968	2020-2	●	●			20	20	20	15.2							

Applicable inserts

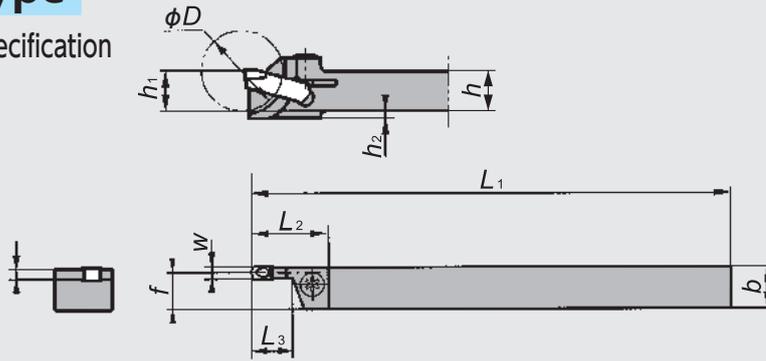
KT \square W type

Shape	Part No.	Dimensions (mm)				PVD-coated micro-grain carbides	
		w	L	θ	r _ε	QM3	Stock
 Neutral : KTNW type KTRW22JS6D KTRW22JS15D	KTNW22J	2.2	19.80	0°	0.20	5500756	●
	22JS		19.45			5500541	●
	KTRW22JS6D	20.55	6°	0.02	5500558	●	
	22JS15D		15°		5500566	●	

Maximum diameter for cutting off : $\phi 40$

NTG type

1-corner specification



[Max. cutting off diameter by work shape]

Part. No.	Round bar	Pipe
NTGR2020-2		
NTGR2020-3		

● Left-hand type shown.

Holder dimensions

Code No.		Toolholder Part No.	Stock		Max. cutting off dia (mm) ϕD	Dimensions (mm)										Applicable insert	Parts	
R	L		R	L		w	h	b	L_1	h_1	f	L_2	L_3	h_2	Clamping screw		Wrench	
5103882	5103890	NTG ^{R/L} 1010-2	●	●	20.0	10	10	120	10	9.1	19	10	2	KTN22J KTR22J8D KTR22J15D (See table below)	SR-16-236/P (A)	TORX-T15 (A)		
5459888		1212GX-2	●		25.0	12	12	85	12	11.1	21	12.5						
5103908	5103916	1212-2	●	●	32.0	2.2	16	16	120	16	15.1	28	16	0	SR-16-212(A)	TORX-T20(A)		
5103924	5103932	1616-2	●	●													34.0	19.1
5103940	5191689	2020-2	●	●	40.0	3.0	20	20	20	18.8	36	20	0	KTN30J KTR30J8D (See table below)	CS0520(B)	LW-4(B)		
5103957	5191671	2020-3	●	●													CS0620(B)	LW-5(B)

Applicable inserts

KT □ type

Shape	Part No.	Dimensions (mm)				PVD-coated micro-grain carbides	
		w	L	θ	r_e	QM3	Stock
<p>Neutral KTN type</p> <p>R/L KTR□□J8D type</p> <p>R/L KTR22J15D type</p>	KTN22J	2.2	16.2	0°	0.17	5103965	●
	30J	3.0		0°	0.25	5103999	●
	KTR22J8D	2.2		8°	0.17	5103973	●
	30J8D	3.0		8°	0.25	5104005	●
	22J15D	2.2		15°	0.00	5103981	●

MEMO

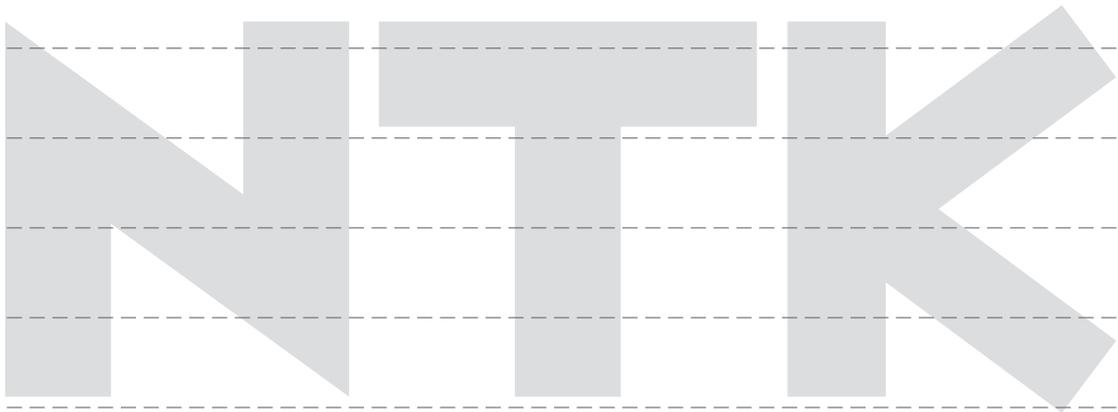
Swiss tooling

SS Tools for Front Turning

SS Tools for Back Turning

SS Tools for Cutting off

Original Series

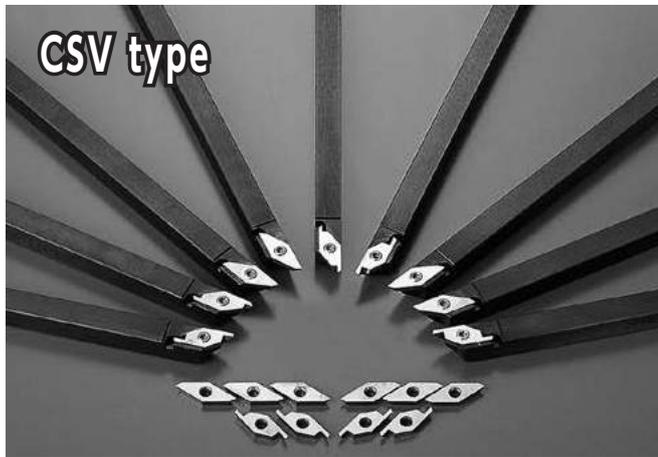


SS Tools Original Series

- CSV throw away type for machining of ultra small diameter H80
- CTPS suitable for radial type tool post H84
- Y-axis holders for Y-axis cutting operations H86
- Shift holder H90
- DS Sleeve H91

Index	Technical Data	Milling Cutters	Indexable Drill Inserts	Indexable End Milling Tools	Original Tools for Various Applications	Internal Machining Tool Range	Shaper	Threading Tools	Grooving Tools	SS	Outside Machining Toolholders	Insert Stock List	Micro-grain Carbide, Carbide	Cermet, PVD-coated Cermet	PCD, CBN and ceramic	Tool Materials / Selection Guide	New Products
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For machining of ultra small diameters CSV Series



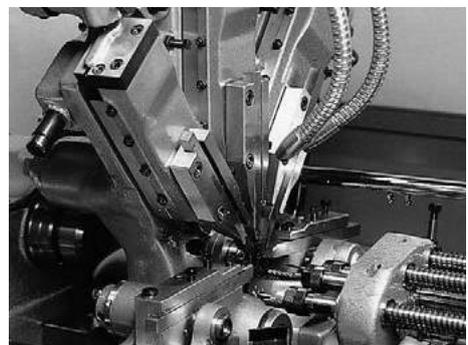
Features

Original edge shape shapes
Highly accurately honed edge



Best for machining work pieces with a very small diameter of $\phi 5$ or less

- Changing to this indexable type insert from brazed tools eliminates the need for regrinding and ensures repeatable results !
- Offers stable and precise machining with highly accurately honed cutting edges !



Possible to use on cam-type automatic lathes



Actual machining examples

Machining of wrist watch part ● Work material : SK4	
Cutting speed (m/min) = 15	
Feed rate (mm/rev) = 0.007	
Depth of cut (mm) = 0.03	
Coolant : WET	
NTK : VM1	40,000 pcs.
Brazed grade insert	20,000 pcs.

Machining of rivets ● Work material : SUS630	
Cutting speed (m/min) = 20	
Feed rate (mm/rev) = 0.015	
Depth of cut (mm) = 0.3	
Coolant : WET	
NTK : VM1	70,000 pcs.
Brazed grade insert	10,000 pcs.

The CSV series exhibited excellent machining accuracy and overwhelmingly longer tool life in the machining of very small diameter work pieces.

CSV type

For radial type tool post

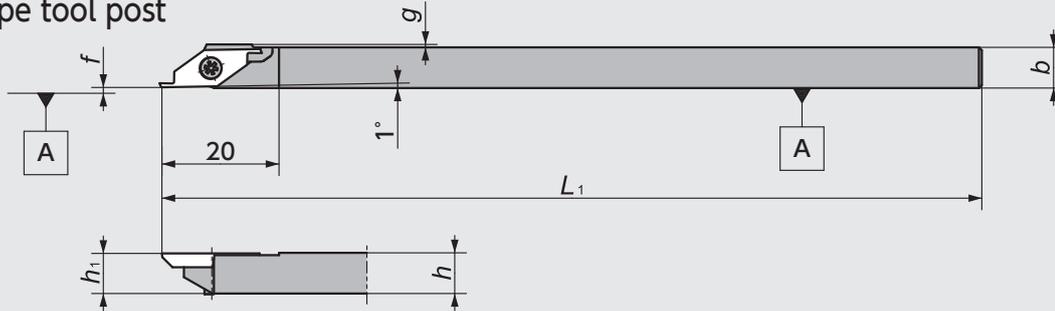


Figure-1

● Right-hand type shown.

CSV-NC/CSV-NC-F type

For gang type tool post

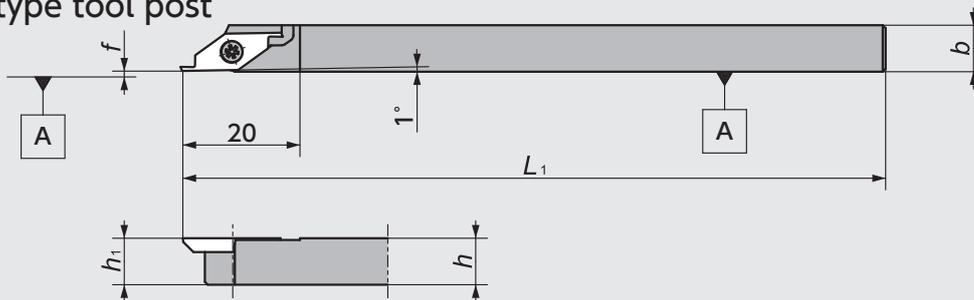


Figure-2

● Right-hand type shown.
● The offset of the cutting edge of CSV $\frac{1}{2}$ 08NC-F is small.

Holder dimensions

Shape	Code No.		Toolholder Part No.	Stock		Dimensions (mm)					Applicable insert	Parts	
	R	L		R	L	h	b	L ₁	h ₁	f		g	Clamping screw
Figure-1	5492962		CSV $\frac{1}{2}$ 07GX	●		7	7	85	7	0.5	CSVF(front turning) CSVB(back turning) CSVC(cutting-off) CSVG(grooving) CSVT(threading) H82~83	LRIS-2.5*7	CLR-15S
	5303169	5303193	07	●	●			140					
	5492954		08GX	●		8	8	85	8	0.1			
	5303151	5303201	08	●	●								
	5303136		095	●		9.5	9.5	140	9.5	0.0			
	5303144	5303177	10	●	●	10	10		10				
	5474770		12GX	●		12	12	85	12				
	5327929		12	●				140					
Figure-2	5514062	5514070	CSV $\frac{1}{2}$ 08NC	●	●	8	8	120	8	0.1	CSVF(front turning) CSVB(back turning) CSVC(cutting-off) CSVG(grooving) CSVT(threading) H82~83	LRIS-2.5*7	CLR-15S
	5789615		08NC-F	●						0.0~0.1			
	5563010		10GXNC	●		10	10	85	10	0.1			
	5477492	5477542	10NC	●	●				120				
	5477534	5477500	12NC	●	●	12	12		12				

Applicable inserts

CSVF type

for front turning



Shape	Part No.	Chip-breaker	Max. machining depth (mm)	Dimensions (mm)		PVD-coated micro-grain carbides													
				Cutting edge ($\alpha \times \beta^\circ$)	r_ϵ	ZM3				VM1				DT4					
						R	Stock	L	Stock	R	Stock	L	Stock	R	Stock	L	Stock		
<p>• Right-hand type shown.</p>	CSVF11F ^{R/L} V	None	—	0.3 × 5°	0.0					5303516	●	5303557	●						
	11F ^{R/L} V-A									5358858	●								
	11F ^{R/L} V-M					5436019	●	5386248	●	5386255	●	5850235	●						
	11F ^{R/L} V-C							5358577	●										
<p>• Right-hand type shown.</p>	CSVF11F ^{R/L} VB	Provided	3.0	0.3 × 5°	0.0					5313168	●	5313150	●						
	11F ^{R/L} VB-A									5358692	●								
	11F ^{R/L} VB-M					5436001	●	5386263	●	5386271	●	5850243	●						
	11F ^{R/L} VB-C							5358700	●										
<p>—For profiling—</p> <p>• L-hand shown.</p>	CSVF11F ^{R/L} VX	None	—	—	0.0									5358866	●				

※The angles shown indicate the values when the insert is set into the holder.

CSVB type

for back turning



Shape	Part No.	Chip-breaker	Max. machining depth (mm)	Dimensions (mm)		PVD-coated micro-grain carbides													
				Width of the cutting edge W	Cutting edge ($\alpha \times \beta^\circ$)	r_ϵ	ZM3				VM1				DT4				
							R	Stock	L	Stock	R	Stock	L	Stock	R	Stock	L	Stock	
<p>• Right-hand type shown.</p>	CSVB11F ^{R/L} V	None	2.0	1.00	0.0					5303573	●	5303532	●						
	11F ^{R/L} V-A									5358791	●								
	11F ^{R/L} V-M					5435995	●	5386289	●	5386297	●	5827480	●						
	11F ^{R/L} V-C							5358809	●										
	11F ^{R/L} V12							5344890	●										
	11F ^{R/L} V14							5344908	●										
<p>• Right-hand type shown.</p>	CSVB11F ^{R/L} VB	Provided	2.0	1.00	0.0					5358825	●								
	11F ^{R/L} VB-A									5358833	●								
	11F ^{R/L} VB-M					5435987	●	5386305	●	5386313	●	5827472	●						
	11F ^{R/L} VB-C							5358841	●										
	11F ^{R/L} VB12							5358718	●										
	11F ^{R/L} VB14							5358726	●										
<p>—For profiling—</p> <p>• L-hand shown.</p>	CSVB11F ^{R/L} VX	None	—	—	—									5358817	●				

※The angles shown indicate the values when the insert is set into the holder.

CSVC type

for cutting off

Mirror finish

Shape	Part No.	Chip-breaker	Max. machining depth (mm)	Dimensions (mm)			PVD-coated micro-grain carbides			
				w	L	r_ϵ	VM1			
							R	Stock	L	Stock
<p>Thickness:2.38</p> <p>•Right-hand type shown.</p>	CSVC11F ^{R/L} V06	None	3.0	0.6	2.0	0.0	5352547	●		
	11F ^{R/L} V07			0.7						
	11F ^{R/L} V08		4.0	0.8	2.5		5324272	●	5330840	●
	11F ^{R/L} V09			0.9						
	11F ^{R/L} V10		5.0	1.0	3.0		5352554	●		
	11F ^{R/L} V13			1.3						
11F ^{R/L} V15	1.5									
<p>Thickness:2.38</p> <p>•Right-hand type shown.</p>	CSVC11F ^{R/L} VB06	Provided	3.0	0.6	2.0	0.0	5358734	●		
	11F ^{R/L} VB07			0.7						
	11F ^{R/L} VB08		4.0	0.8	2.5		5358742	●		
	11F ^{R/L} VB09			0.9						
	11F ^{R/L} VB10		5.0	1.0	3.0		5358775	●		
	11F ^{R/L} VB13			1.3						
11F ^{R/L} VB15	1.5									

※The angles shown indicate the values when the insert is set into the holder.

CSVG type

for grooving

Mirror finish

Shape	Part No.	Chip-breaker	Max. machining depth (mm)	Dimensions (mm)			PVD-coated micro-grain carbides				
				w	L	r_ϵ	VM1				
							R	Stock	L	Stock	
<p>Thickness:2.38</p> <p>•Right-hand type shown.</p>	CSVG11F ^{R/L} V025	None	0.15	0.25	0.50	0.0	5354634	●			
	11F ^{R/L} V030			0.30							
	11F ^{R/L} V035			0.35							
	11F ^{R/L} V040			0.40							
	11F ^{R/L} V045		0.45	0.45	1.00		5344932	●			
	11F ^{R/L} V050			0.50							
	11F ^{R/L} V055			0.55							
	11F ^{R/L} V060			0.60							
	11F ^{R/L} V065		1.40	0.65	3.00		5354394	●			
	11F ^{R/L} V070			0.70							
	11F ^{R/L} V075			0.75				5332812	●	5332820	●
	11F ^{R/L} V080			0.80							
	11F ^{R/L} V085		2.60	0.85			5358650	●			
	11F ^{R/L} V090			0.90							
	11F ^{R/L} V095			0.95				5332846	●	5332838	●
	11F ^{R/L} V100			1.00							
	11F ^{R/L} V110			1.10			5352562	●			
	11F ^{R/L} V120			1.20							
	11F ^{R/L} V130			1.30				5352570	●	5357561	●
	11F ^{R/L} V140			1.40							
11F ^{R/L} V150		1.50		5358627	●						
				5358619	●						
				5358601	●						

CSVT type

for threading

Mirror finish

Shape	Part No.	Chip-breaker	Applicable thread	Dimensions (mm)		PVD-coated micro-grain carbides			
				Pitch	r_ϵ	VM1			
						R	Stock	L	Stock
<p>Thickness:2.38</p> <p>•Right-hand type shown.</p>	CSVT11F ^{R/L} P60-035A	None	0.2 ~ 0.5	R0.03MAX	5344874	●	5386909	●	
<p>Thickness:2.38</p> <p>•Right-hand type shown.</p>	CSVT11F ^{R/L} P60-035B	None	0.2 ~ 0.5	R0.03MAX	5344882	●	5386917	●	

※The angles shown indicate the values when the insert is set into the holder.

Most suitable for radial type tool posts!!

GTPS



Features

- Designed to be used for back turning, cutting-off, grooving and threading
- The same common holder accommodates all insert types
- The dedicated SVAC-N type is offered for front turning

CTPS type

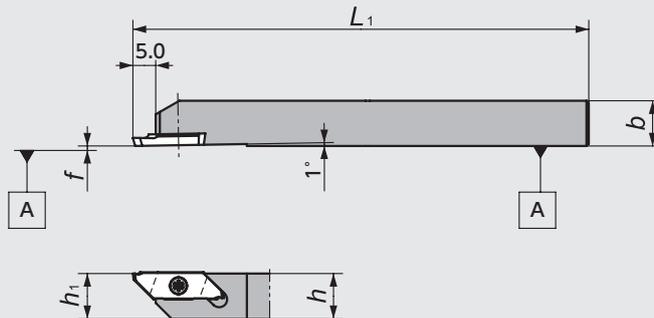


Figure-1

● Right-hand type shown.

Holder dimensions

Shape	Code No.	Toolholder Part No.	Stock	Dimensions (mm)					Applicable insert	Parts	
				h	b	L ₁	h ₁	f		Clamping screw	Wrench
Figure-1	5346572	CTPSR10	●	10	10	120	10	0.0	TBPS(back turning) (See table below) CTPS(cutting-off) GTPS(grooving) TTPS(threading) H85	LRIS-2.5*7	CLR-15S
	5397187	R12	●	12	12		12				

TBPS type

for back turning

Shape	Part No.	Chip-breaker	Effective length of cutting edge a	Available cutting depth b	Dimensions (mm)		PVD-coated micro-grain carbides			
					θ	r _ε	ZM3	Stock	VM1	Stock
(W/ chipbreaker) 	TBPS60FR00	Provided	3.1	3.5	60°	0.0	5346150	●	5362553	●
	60FR10					0.1	5346168	●	5362561	●
(W/o chipbreaker) 	TBPS60FRV	None	4.8	4.8	60°	0.0	5357058	●	5362579	●

※The angles shown indicate the values when the insert is set into the holder.

CTPS type

for cutting-off

Shape	Part No.	Chipbreaker	Max. cutting-off dia. ϕD	Dimensions (mm)				PVD-coated micro-grain carbides			
				w	L	θ	r_ϵ	ZM3	Stock	VM1	Stock
(W/ chipbreaker) 	CTPS12FR	Provided	4.0	1.2	3.5	16°	0.05	5346275	●	5362587	●
	15FR		5.0	1.5	4.0			5346267	●	5362595	●
	18FR		8.5	1.8	5.5			5346283	●	5362603	●
	20FR		10.0	2.0	6.0			5374210	●	5374194	●
(W/o chipbreaker) 	CTPS12FRV	None	4.0	1.2	3.5	20°	0.0	5346937	●	5362611	●
	15FRV		5.0	1.5	4.0			5346929	●	5362629	●
	18FRV		8.5	1.8	5.5			5346945	●	5362637	●
	20FRV		10.0	2.0	6.0			5374202	●	5374228	●

※The angles shown indicate the values when the insert is set into the holder.

GTPS type

for cutting-off

Shape	Part No.	Dimensions (mm)				PVD-coated micro-grain carbides			
		w	L	r_ϵ	Effective machining depth	ZM3	Stock	VM1	Stock
(W/ chipbreaker) 	GTPS075FR	0.75	1.5	0.0	1.0	5346952	●	5362652	●
	095FR	0.95	2.0			1.5	5346960	●	5362660
	100FR	1.00			5346978		●	5362678	●
	120FR	1.20	3.0		2.5	5346986	●	5362686	●
	150FR	1.50				5346994	●	5362694	●
	200FR	2.00				5347000	●	5362702	●

TTPS type

for threading

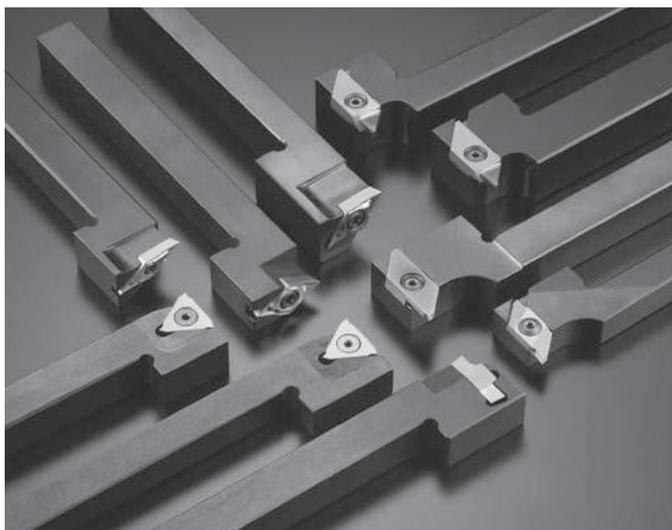
Shape	Part No.	Dimensions (mm)			Applicable thread	PVD-coated micro-grain carbides			
		Cutting edge shape	f	r_ϵ	Pitch	ZM3	Stock	VM1	Stock
	TTPS60FR4A	A	0.4	0.05MAX flat	0.2 ~ 0.75	5346648	●	5362710	●
	60FR4B	B				5346663	●	5362728	●
	60FR8A	A	0.8	0.05	0.5 ~ 1.25	5346689	●	5362744	●
	60FR8B	B				5346671	●	5362736	●
	60FR-N	N	1.25	0.1	1.0 ~ 1.5	5346655	●	5362751	●

※The angles shown indicate the values when the insert is set into the holder.

Y-axis holders for Y-axis machining !!

A great solution to solve chip control problems

Holders for use with high pressure coolant



Toolholders developed from an innovative idea to utilize the tool change control axis (Y axis) of automatic CNC lathes with a gang type tool post. Holders enabling front turning, back turning, grooving and multi-functional machining have been made available by utilizing the Y-axis control.

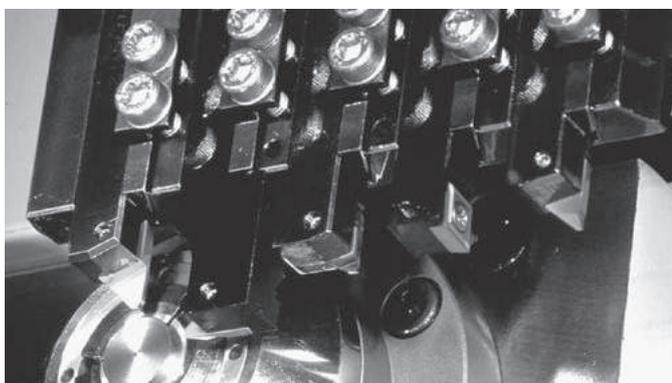
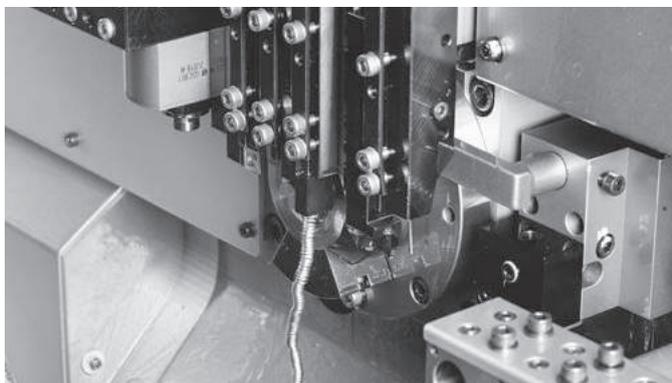
Features

- *A solution for better chip control by gravity evacuation*

NEW

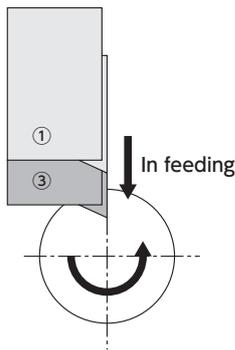
Holders with coolant-through specifications are also added to the series

- *The through coolant further improves chip control performance*
- *Coolant fed from the flanks works better for wear control and more stable machining*

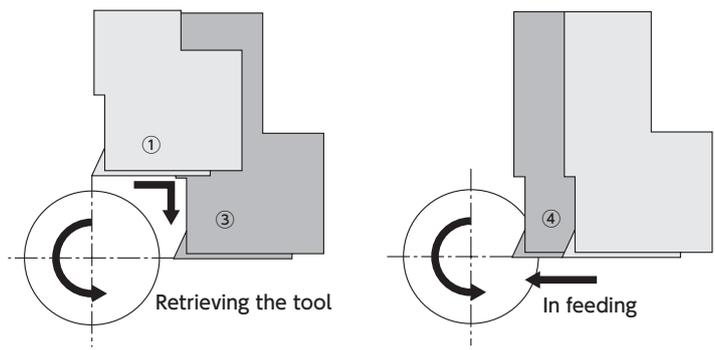


Machining concept

Standard machining



Machining with Y-axis holders



Programming example

- ①T300 ...Calling the tool
- ②G0 Y11.0 Z0 T3 ...Positioning the tool
- ③G1 X8.0 F0.08 ...Cutting depth: 8.0 mm
- ⑤Z5.0 F0.05 ...Cutting length: 5.0 mm
- ⑥X11.0
- ⑦G0 X11.0

Generally, for OD machining, the tool is called and positioned before the system starts the cutting operation. The direction of cut along the work diameter is the "X axis".

Programming example

- ①T300 ...Calling the tool
- ②G0 Y11.0 T3
- ③X0 ...Positioning the tool
- ④G1 Y8.0 F0.08 ...Cutting depth: 8.0 mm
- ⑤Z5.0 F0.05 ...Cutting length: 5.0 mm
- ⑥Y11.0
- ⑦G0 X11.0

With a Y-axis holder, the tool is called for position (1). Then, at position (3) for the system to start the cutting operation. The tool start cutting from this position. The direction of cut along the work diameter is the "Y axis".

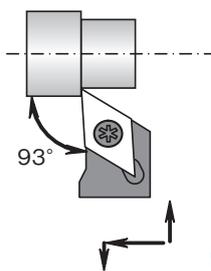
Note) In the actual programme, it is necessary to compensate for the tool length □ for the Y axis either with the tool data or on the program.

※Before using Y-axis holders, please read and understand "Important notes for using Y-axis holders" on page H88.

Lineup

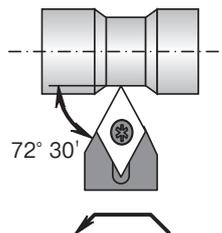
Front turning

Y-SDJC type Y-SDJC-OH type



→H20

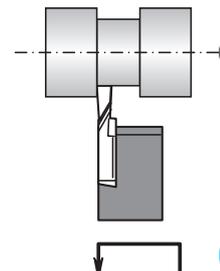
Y-SDNC type



→H21

Multi-functional

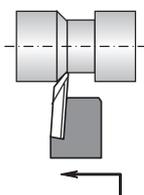
Y-GTPA type Y-GTPA-OH type



→I27

Back turning

Y-TBDP type Y-TBPR-OH type
Y-TBPR type



→H49

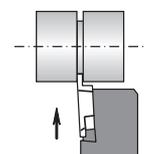
Y-TBPR type
Y-TBPR-OH type

→H42

Y-TBDP type

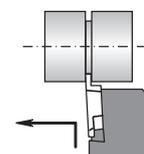
Grooving/Back turning

Y-GTTR type
Y-GTTR-OH type



→H52

Back turning also possible by mounting a TBMH insert

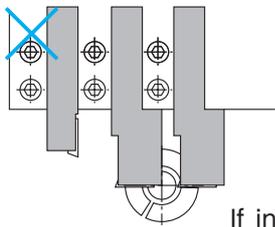


◆ Important notes for using Y-axis holders

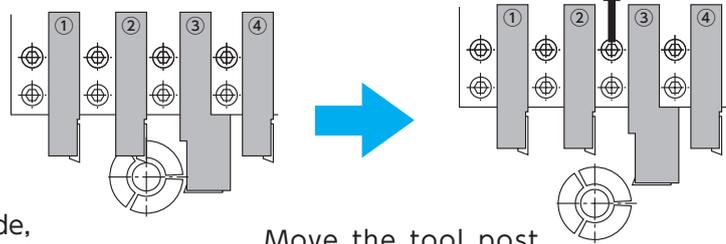
Up to 2 Y-axis holders can be installed on a tool post. Do not install side by side in order to prevent interference.

When changing tools, set the backward position of the tool post with the overhang of the Y-axis holder(s) as per the reference.

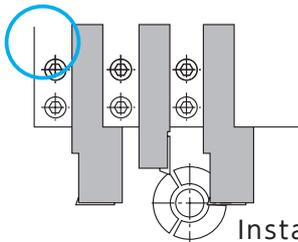
When changing from the tool No. (2) to (4)



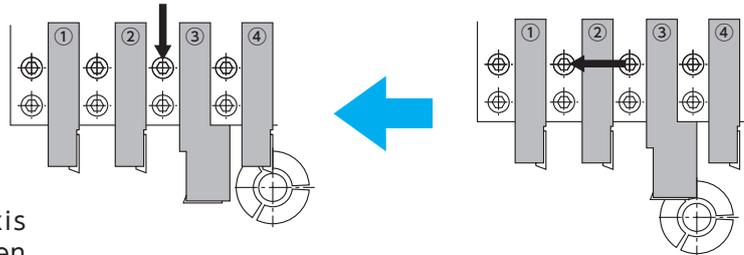
If installed side by side, the work piece and the Y-axis holders may interfere with each other.



Move the tool post back based on the position of the cutting edge of the Y-axis holder (3).



Install a non-Y-axis type holder between the two Y-axis holders.



OD machining table

The OD that can be machined are indicated by the grooving holder "Y-GTTR type" as an example (The dimensions of other Y-axis holders are the same.)

Overhang of the Y-axis holder	Figures	Item	L	20	22	25
20		D1 Machinable outer dia.for holder A		Not limited	Not limited	Not limited
		D2 Machinable outer dia.for holder B		13	13	13
		D3 Machinable outer dia.for holder C		Not limited	Not limited	Not limited
25		D1 Machinable outer dia.for holder A		38	58	Not limited
		D2 Machinable outer dia.for holder B		14.9	13.6	13
		D3 Machinable outer dia.for holder C		38	58	Not limited
30		D1 Machinable outer dia.for holder A		26.8	29	38.5
		D2 Machinable outer dia.for holder B		20.6	17.9	14.9
		D3 Machinable outer dia.for holder C		33 26.8 for TBP type	37 29 for TBP type	51.5 38.5 for TBP type

◆How to install a high-pressure coolant type holder

★New Splash Bar series don't require adaptor.

Target toolholders for adapters	
Y-SDJCR12-11SOH	Y-GTTR12SOH
Y-SDJCR16-11OH	Y-GTPAR1216SOH
Y-TBPR12SOH	Y-GTPAR1616OH
Y-TBPR16OH	

Another series of Y-axis holders with a coolant hole is now available for better chip control and improved dimensional stability. By connecting the holder to the dedicated adaptor, it is possible to supply coolant directly to the flank from the coolant hole in the holder.

■ Components

Select your Y-axis coolant holders from our catalogue.

Front turning → **H20**

Back turning → **H42**

Grooving → **I 10**

Multi-functional → **I 27**

Part No. : Y-□□ · □□-OH

Y-axis coolant holder

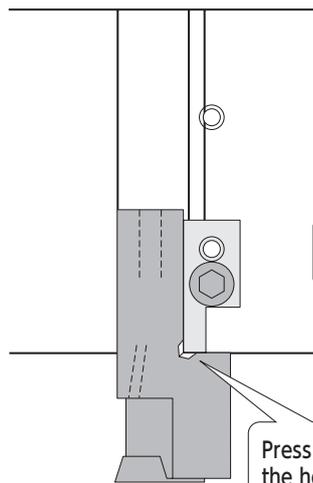
Coolant adaptor

Dedicated wed

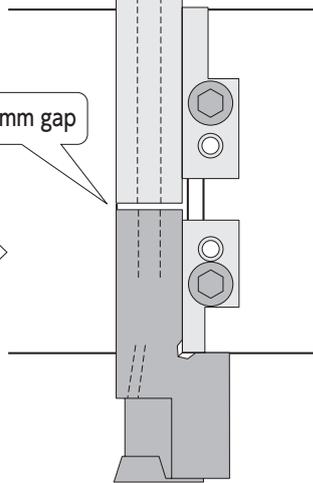
The coolant adaptors and dedicated wedges are not our products. For more information, please contact your nearest dealer.

■ How to connect

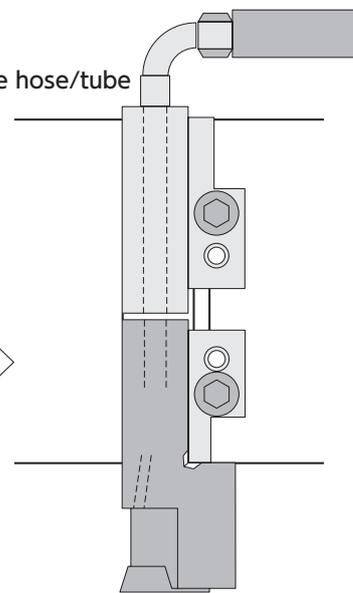
Set the Y-axis holder



Set the adaptor

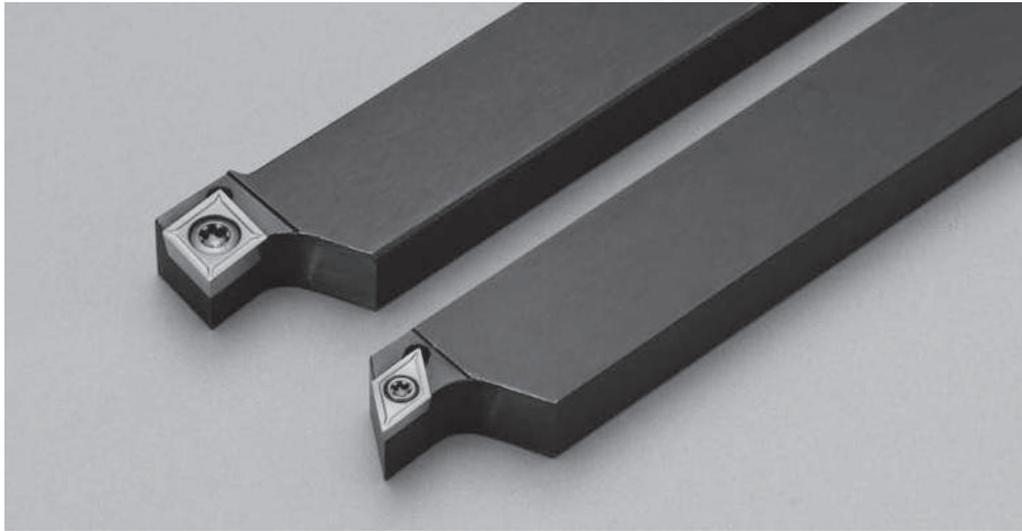


Connect the hose/tube



Turn on the coolant valve and check for leakage. (The discharge pressure makes the connecting part fit the Y-axis holder for the complete connection.)

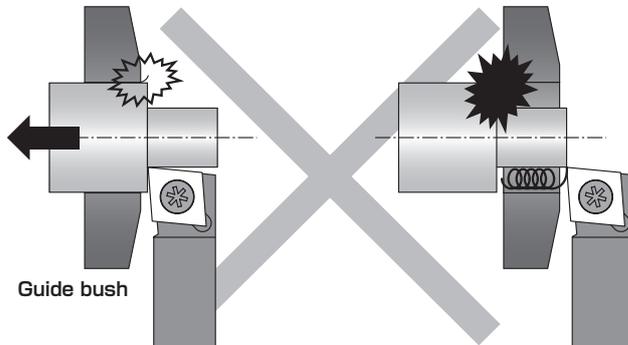
Shift holder



Features

- For spindle moving type automatic lathes
- Available for finish machining without returning workpiece into guide bush

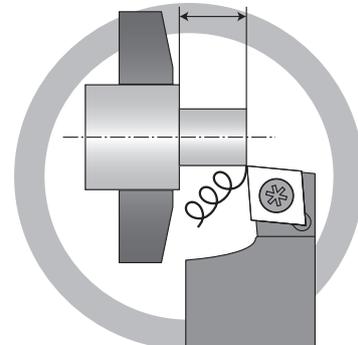
Problems of using general holder



The burr caused by rough machining can damage workpiece when workpiece moving back to guide bush.

Workpiece gets out of control of guide bush. Chips may come into guide bush.

Using Shift holder



Available for finish machining without returning workpiece into guide bush!
Great chip evacuation!

HOLDERS for 80 degree and 55 degree positive inserts are available!

Please refer to page H16 and H18 for details.

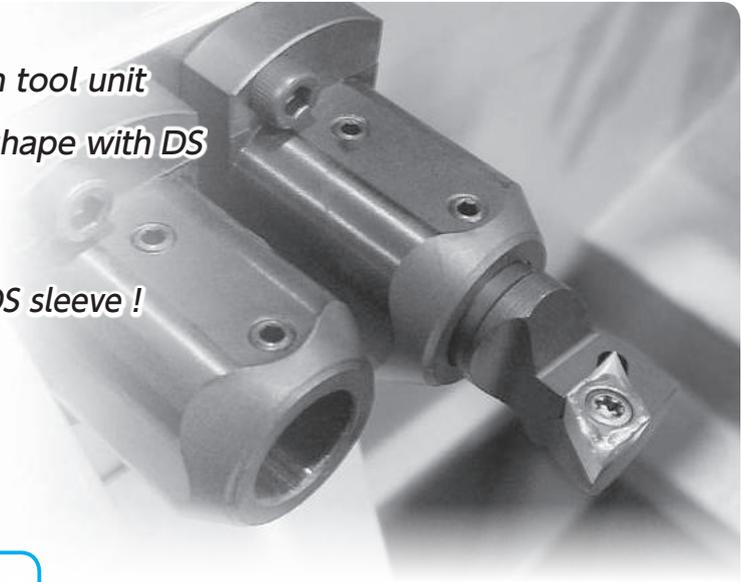
Rotation Tools protect unit

DS Sleeve

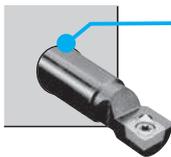
Stop coolant and chip going in rotation tool unit.

Features

- Keep chips and coolant out of rotation tool unit
- Applicable for a variety of machining shape with DS sleeve by back machining
- $\phi 22$ attachment diameter !
- $\phi 16$ DS holder can be attached in the DS sleeve !



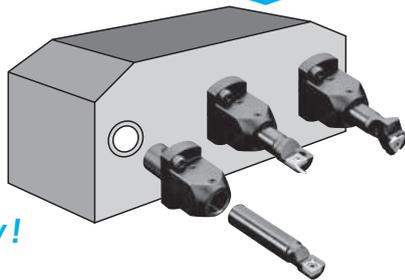
1 Keep coolant and chip away



coolant and chip going in rotation tool unit!

Direct attachment in the rotation tool unit may cause troubles by coolant and chip.

W/ DS sleeve



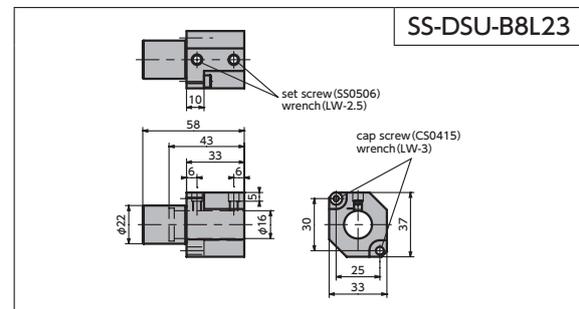
Keep coolant and chip away!

No problem and can attach more tools !!

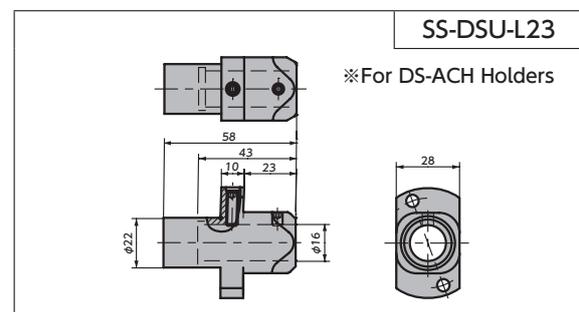
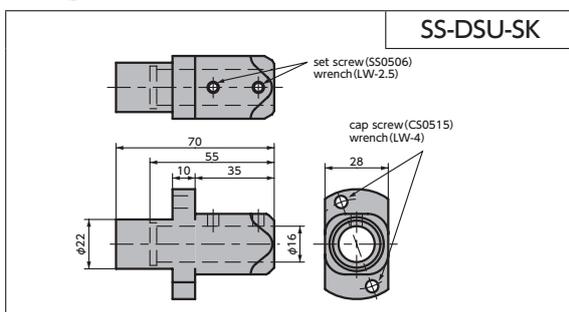
2 DS sleeves enable a variety of machining from back side.

Standard Item

code	Part No.	Stock	Parts			
			cap screw	Wrench	set screw	Wrench
5788401	SS-DSU-SK	●	CS0515	LW-4	SS0506	LW-2.5
5814512	SS-DSU-L23	●	CS0515	LW-4	SS0506 SS0515	LW-2.5
NEW 5892070	SS-DSU-B8L23	●	CS0415	LW-3	SS0506	LW-2.5



Configurations



I

Grooving Tools

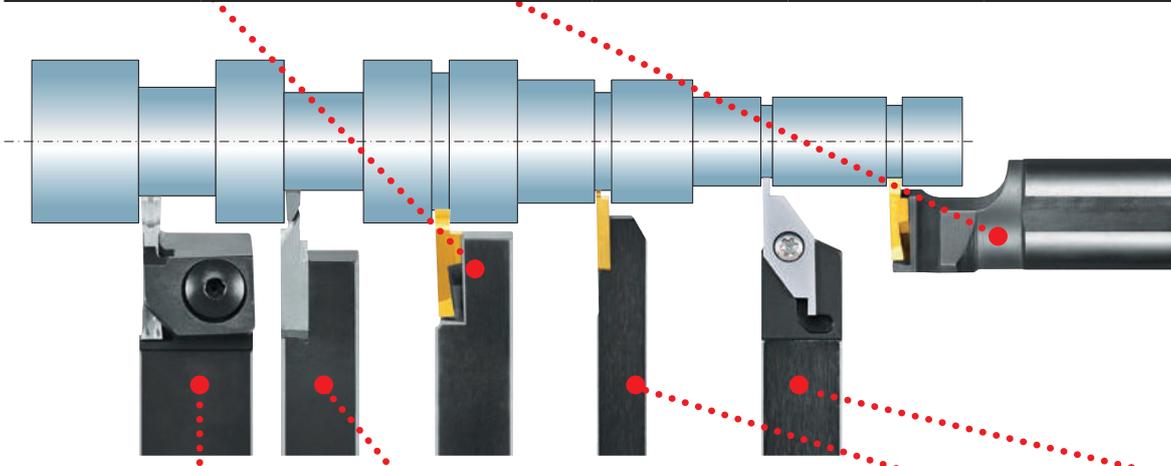
- Selection guide for grooving tools I 2
- Grooving tools I 6
- Multi-functional tools I 26
- Internal grooving tools I 27
- Face grooving tools I 32

Grooving tools

NTK SS Cutting Tools Selection guide for grooving and multi-functional cutting tools

Grooving

GTT type	GTT-OH type	Y-GTT-OH type	DS-GTT type	NGTN type	NGTB type	NGTA type
						
→I9	→I9	→I11	→I9	→I16	→I16	→I11·16
Groove width : 0.3~3.0	Groove width : 0.3~5.5	Groove width : 0.3~5.5	Groove width : 0.3~5.5			
Machining depth : 0.25~2.7	Machining depth : 0.25~1.6	Machining depth : 0.25~1.6	Machining depth : 0.25~1.6	Machining depth : 0.25~4.5	Machining depth : 0.25~4.5	Machining depth : 0.25~3.0
Shank size : □8~□25	Shank size : □10~□16	Shank size : □12~□16	Shank dia. : φ14~φ25.4	Shank size : □16	Shank size : □16 and □25	Shank size : □20
Applicable inserts : GTMH32, GTMX32, GTM32				Applicable inserts : GTMH32, GTMX32, GTM32, GTMA43, GTMT43, GTM43		
For narrow grooving operations such as E-ring machining!!				Economical 3-corner design !!		

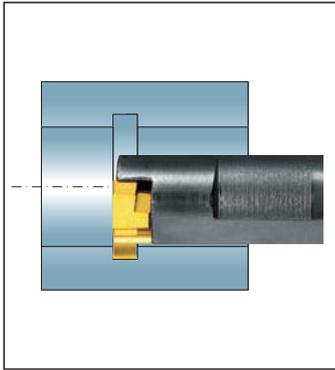


GTVW type	GTPA type	Y-GTPA-OH type	CTPS type	CSV type
				
→I26	→I27	→I27	→I37	→I6
Groove width : 3.0 ~ 6.0	Groove width : 2.0 ~ 2.5	Groove width : 2.0 ~ 2.5	Groove width : 0.75 ~ 2.0	Groove width : 0.25 ~ 1.5
Machining depth : 6.2 ~ 12.0	Machining depth : 3.0 ~ 6.0	Machining depth : 3.0 ~ 6.0	Machining depth : 1.0 ~ 2.5	Machining depth : 0.15 ~ 2.6
Shank size : □10 ~ □25	Shank size : □10 ~ □16	Shank size : □12 ~ □16	Shank size : □10 ~ □12	Shank size : □7 ~ □12
Applicable inserts : GVW □□□□	Applicable inserts : GTPA □□FR□□	Applicable inserts : GTPA □□FR□□	Applicable inserts : CTPS □□□□ FR	Applicable inserts : CSVG11
For wide or rough grooving !!	Suitable for machining of spools !!		The same holder can be used for cutting-off and back turning	Suitable for small-diameter work pieces !!

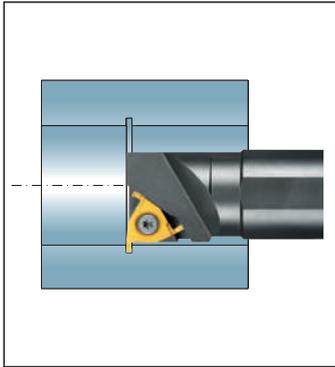
SCRUM DUO

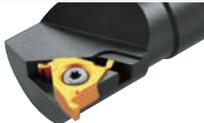
Flat 3 TWG type	GTV type	GKV type	GTWP type NEW
			
→I19	→I20	→I20	→I24
Groove width : 2.0 ~ 3.0	Groove width : 3.0 ~ 9.0	Groove width : 4.0 ~ 9.0	Groove width : 3.0 ~ 6.0
Machining depth : 3.0	Machining depth : 11.0	Machining depth : 11.0	Machining depth : 7.0 ~ 25.0
Shank size : □20 ~ □25	Shank size : □16 ~ □25	Shank size : □20 ~ □25	Shank size : □10 ~ □25
Applicable inserts : TWG □□□	Applicable inserts : GEV and GTV	Applicable inserts : GEV and GTV	Applicable inserts : GWP
Excellent chip control !!	Groove and side turning !!	Groove and side turning !!	Groove and side turning !!

Internal grooving

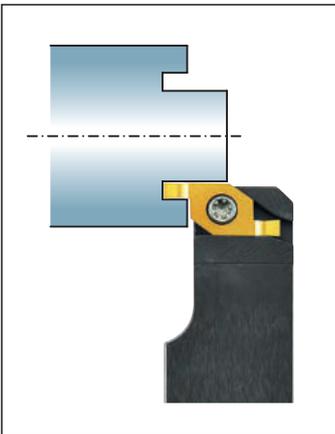


SBG type	BG type	GKV type
		
⇒ I28	⇒ I30	⇒ I31
Groove width : 0.5~2.0	Groove width : 0.5~2.0	Groove width : 3.0~3.5
Machining depth : 0.8~2.2	Machining depth : 1.0~3.0	Machining depth : 5.5~9.5
Shank dia. : $\phi 3 \sim \phi 8$	Shank dia. : $\phi 8 \sim \phi 20$	Shank dia. : $\phi 32 \sim \phi 40$
Min. machining dia. : from $\phi 3 \sim \phi 8.0$	Applicable inserts : GTG□□	Applicable inserts : GEV□□□
Highly stable machining!!	Economical 3-corner design!!	Suitable for deep grooving!!



Flat 3 TWG type

⇒ I19
Groove width : 2.0~3.0
Machining depth : 3.0
Shank dia. : $\phi 32 \sim \phi 40$
Applicable inserts : TWG□□
Chip control and economy focused !!

Face grooving



SFG type	CH-FGV type	DS-FGV type
		
ID Face grooving		
⇒ I29	⇒ I34	⇒ I34
Groove width : 1.0 ~ 3.0	Groove width : 1.0 ~ 2.0	Groove width : 1.0 ~ 2.0
Machining depth : 1.5 ~ 3.0	Machining depth : 1.5 ~ 3.0	Machining depth : 1.5 ~ 3.0
Shank dia. : $\phi 6 \cdot \phi 8$	Shank size. : □10 ~ □16	Shank dia. : $\phi 16.0 \sim \phi 25.4$
Min. machining dia. : $\phi 6.0 \sim \phi 8.0$	Applicable inserts : FGV□□□	Applicable inserts : FGV□□□
Highly stable machining!!	Suitable for front gang type tool post	For DS drill sleeve holders

FGV type	GFV type	GSV type
		
⇒ I34	⇒ I36	⇒ I36
Groove width : 1.0 ~ 2.0	Groove width : 6.0	Groove width : 6.0
Machining depth : 1.5 ~ 3.0	Machining depth : 6.0	Machining depth : 6.0
Shank dia. : □10 ~ □16	Shank size. : □20 and □25	Shank size. : □20 ~ □25
Applicable inserts : FGV□□□	Applicable insert : GFV600N	Applicable inserts : GFV600N
For L-shaped gang type tool posts	Groove and side turning	Groove and side turning

Grooving Tools Recommended Insert Grade and Cutting Conditions

CSV · GTG · GTM · GTMH · GTMT · GTMX · GTPS · SBG

Work Material		Free cutting steels	Carbon steels	Alloy steels	Free cutting steels Stainless	Hard-to-cut Stainless steels	Titanium (Alloy)	Stainless Alloy
JIS Common Grade		SUM22 SUM23 SUM24	S35C S45C	SCr420 SCM435	SUS303 SUS430F	SUS304 SUS440C	6AL-4V-Ti	A5056 A6061
Insert Grade	First Choice	DM4 DT4	DT4 QM3		DT4	DM4 DT4	DT4	PD1
	Second Choice	VM1 ZM3	VM1 C7Z		TM4 ZM3	QM3 VM1	ZM3	KM1
Cutting Speed v_c (m/min)		50 100 200	Carbide 50 90 150 C7Z 120 150 250		50 90 180	40 70 100	50 70 100	PD1 100 200 350 KM1 50 100 200
Feed speed f (mm/rev) ①grooving ②cross cutting	grooving width	0.25~0.5	①0.005 ~ 0.03 ②0.002 ~ 0.005					
		0.5~1.0	①0.02 ~ 0.07 ②0.005 ~ 0.01		①0.02 ~ 0.06 ②0.005 ~ 0.01			①0.02 ~ 0.07 ②0.005 ~ 0.01
		1.0~2.0	①0.03 ~ 0.08 ②0.03 ~ 0.06		①0.03 ~ 0.07 ②0.02 ~ 0.05			①0.03 ~ 0.08 ②0.03 ~ 0.06
		2.0 ~	①0.03 ~ 0.2 ②0.03 ~ 0.06					

Max. depth of cut is 0.2mm in cross cutting (unusable for inserts of width below 0.4mm)

GTV · GEV · GVMB · GVMN · GVW · GWP · TWG

Work Material		Free cutting steels	Carbon steels	Alloy steels	Free cutting steels Stainless	Hard-to-cut Stainless steels	Titanium (Alloy)	Stainless Alloy
JIS Common Grade		SUM22 SUM23 SUM24	S35C S45C	SCr420 SCM435	SUS303 SUS430F	SUS304 SUS440C	6AL-4V-Ti	A5056 A6061
Insert Grade	First Choice	QM3	DM4 QM3		DM4 QM3		TM1	PD1
	Second Choice	TM1	TM1 C7Z N40		TM1			KM1
Cutting Speed v_c (m/min)		50 100 200	Carbide 50 90 150 C7Z 120 150 250		50 90 180	40 70 100	50 70 100	PD1 100 200 350 KM1 50 100 200
Feed speed f (mm/rev) ①grooving ②cross cutting	grooving width	2.0~3.0	①0.04 ~ 0.2 ②0.03 ~ 0.15					
		3.0~4.0	①0.04 ~ 0.2 ②0.03 ~ 0.15					
		4.0~5.0	①0.04 ~ 0.3 ②0.03 ~ 0.15		①0.04 ~ 0.2 ②0.03 ~ 0.15			①0.08 ~ 0.25 ②0.1 ~ 0.25
		5.0 ~	①0.04 ~ 0.3 ②0.03 ~ 0.15					

Max. depth of cut is 3.5mm in cross cutting.

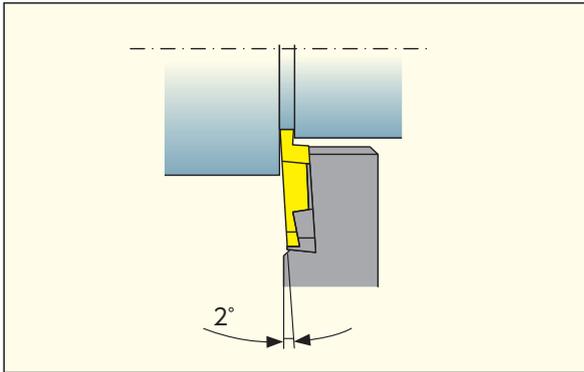
GTPA Aluminum (A5056/6061, etc)

Work Material		Stainless Alloy						
Cutting Speed v_c (m/min)		PD1 100 200 350 KM1 50 100 200						
Feed speed f (mm/rev) ①grooving ②cross cutting	grooving width	2	①0.05 ~ 0.15 ②0.05 ~ 0.15					
		2.5	①0.05 ~ 0.15 ②0.05 ~ 0.15					

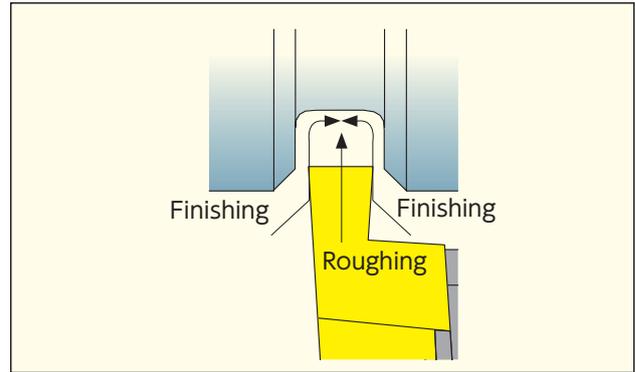
※Please refer to the page Q58 for recommended cutting parameters.

General grooving

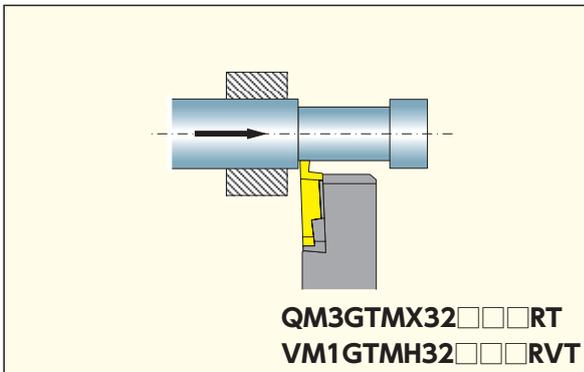
The NTK triangular tangential inserts for grooving incline at the angle of 2 degrees, thus allowing clearance for grooving a shaft having various diameters.



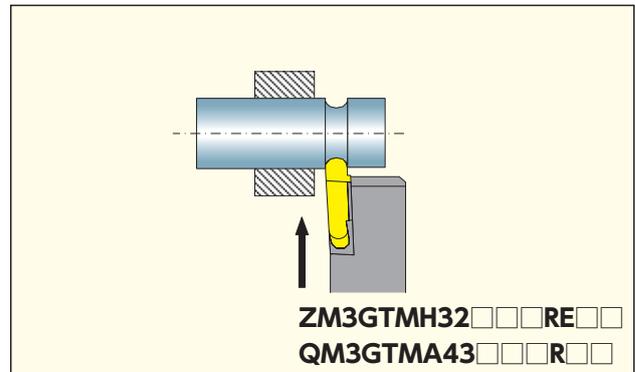
Chamfering and rounding at the bottom corners of a groove can be carried out by side turning after rough-grooving the center of the groove.



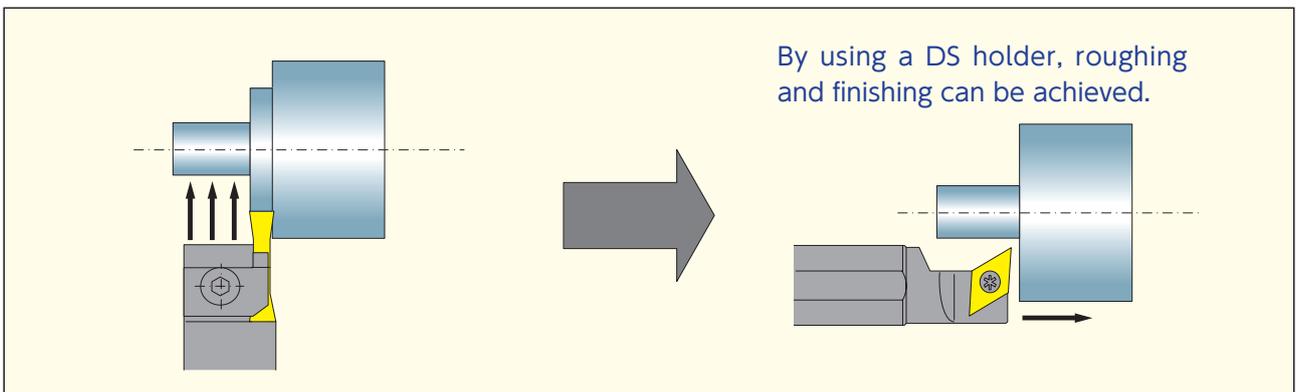
Side turning



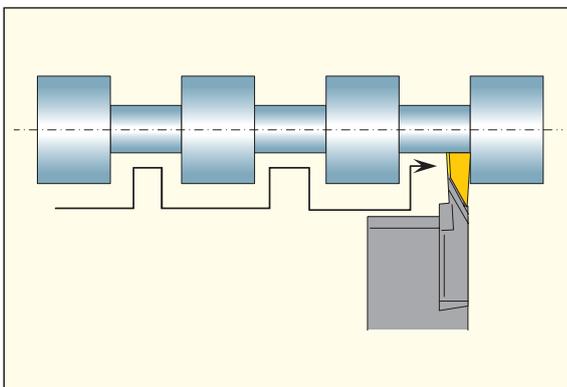
Grooving full radius



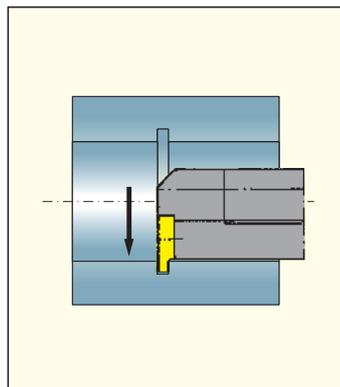
Front turn roughing



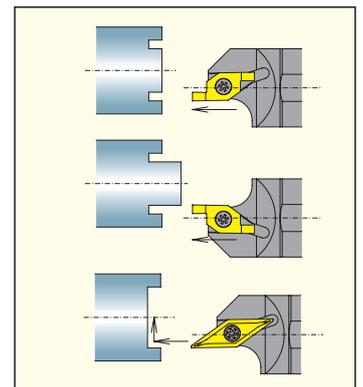
Grooving for spools



Internal grooving



Face grooving



New Products
Tool Materials / Selection Guide
PCD, CBN and ceramic
Cermet
PVD-coated Carbide
Micro-grain Carbide, Carbide
Insert Stock List
Outside Machining Toolholders
SS
Grooving Tools
Threading Tools
Shaper
Internal Machining tool range
Original Tools for Various Applications
Indexable End Milling Tools
Indexable Drill Inserts
Milling Cutters
Technical Data
Index

Grooving tools

CSV type

For radial type tool post

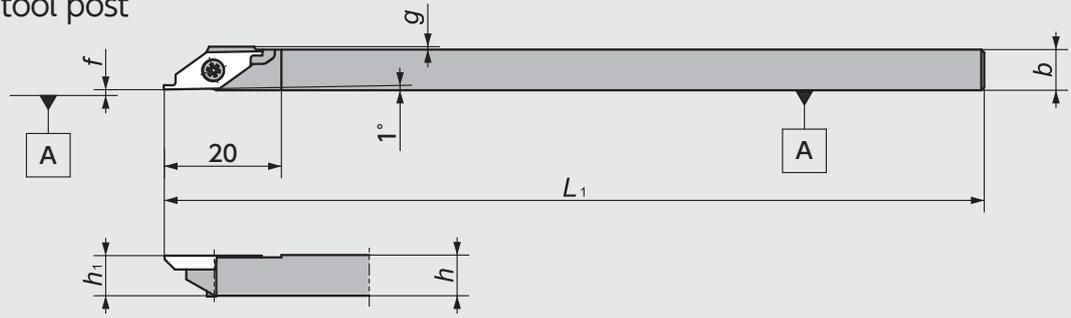


Figure-1

● Right-hand type shown.

CSV-NC/CSV-NC-F type

For gang type tool post

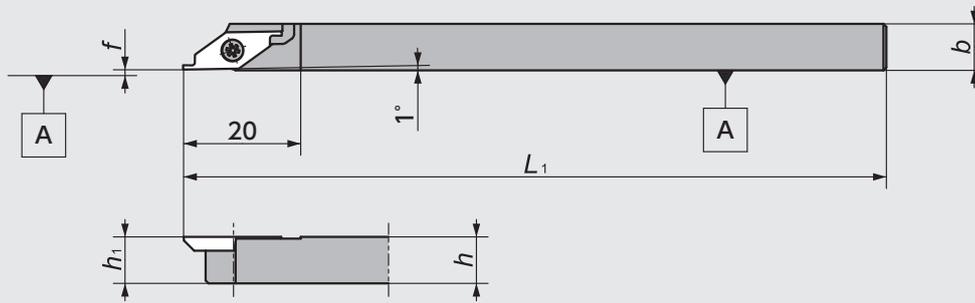


Figure-2

● Right-hand type shown.

● The cutting edge offset of CSVR/L08NC-F is small.

Holder dimensions

Shape	Code No.		Toolholder Part No.	Stock		Dimensions (mm)					Width of groove (mm) w	Applicable insert 	Parts		
	R	L		R	L	h	b	L ₁	h ₁	f			g	Clamping screw 	Wrench 
Figure-1	5492962		CSV ^{R/L} 07GX	●		7	7	85	7	0.1	0.5	0.25 ∩ 1.50	CSVG 17	LRIS-2.5*7	CLR-15S
	5303169	5303193	07	●	●			140							
	5492954		08GX	●		8	8	85	8						
	5303151	5303201	08	●	●										
	5303136		095	●		9.5	9.5	140	9.5						
	5303144	5303177	10	●	●	10	10		10						
	5474770		12GX	●		12	12	85	12						
	5327929		12	●				140							
Figure-2	5789615		CSV ^{R/L} 08NC-F	●		8	8	120	8	0.0 ∩ 0.1	0.25 ∩ 1.50	CSVG 17	LRIS-2.5*7	CLR-15S	
	5514062	5514070	08NC	●	●					0.1					
	5563010		10GXNC	●		10	10	85	10						
	5477492	5477542	10NC	●	●				120						
	5477534	5477500	12NC	●	●	12	12		12						

Applicable inserts

CSVG type

Shape	Part No.	Chip-breaker	Dimensions (mm)				PVD-coated micro-grain carbides			
			w	L	r _ε	Effective machining depth	VM1			
							R	Stock	L	Stock
<p>Mirror finish</p> <p>Thickness: 2.38</p> <p>6.35</p> <p>0.0</p> <p>w+0.03/0</p> <p>L</p> <p>●R-hand shown.</p>	CSVG11F_R1/2V025	None	0.25	0.50	0.0	0.15	5354634	●		
	11F_R1/2V030		0.30				5344940	●		
	11F_R1/2V035		0.35				5354402	●		
	11F_R1/2V040		0.40				5344932	●		
	11F_R1/2V045		0.45	1.00		0.45	5354394	●		
	11F_R1/2V050		0.50				5354642	●		
	11F_R1/2V055		0.55				5344924	●		
	11F_R1/2V060		0.60				5344916	●		
	11F_R1/2V065		0.65	5354410		●				
	11F_R1/2V070		0.70	5354428		●				
	11F_R1/2V075		0.75	2.00		1.40	5332812	●	5332820	●
	11F_R1/2V080		0.80				5358650	●		
	11F_R1/2V085		0.85				5354436	●		
	11F_R1/2V090		0.90				5354444	●		
	11F_R1/2V095		0.95	5332846		●	5332838	●		
	11F_R1/2V100		1.00	5352562		●				
	11F_R1/2V110		1.10	3.00		2.60	5358643	●		
	11F_R1/2V120		1.20				5352570	●	5357561	●
	11F_R1/2V130		1.30				5358627	●		
	11F_R1/2V140		1.40				5358619	●		
11F_R1/2V150	1.50	5358601	●							

☆CSV toolholder is interchangeable tool. All CSV type inserts can be used (back turning, grooving, threading) on the same holder. (H80-83 for more information)

- New Products
- Tool Materials / Selection Guide
- PCD, CBN and ceramic
- Cermet
- Micro-grain Carbide, Carbide
- PVD-coated Cermet
- Insert Stock List
- Outside Machining Toolholders
- SS
- Grooving Tools
- Threading Tools
- Shaper
- Internal Machining tool range
- Original Tools for Various Applications
- Indexable End Milling Tools
- Indexable Drill Inserts
- Milling Cutters
- Technical Data
- Index

GTT type

Front/back clamping type

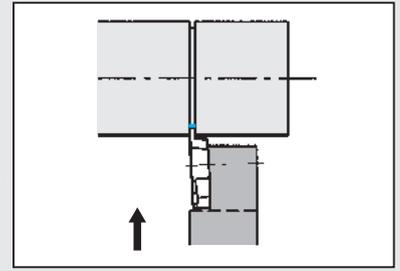
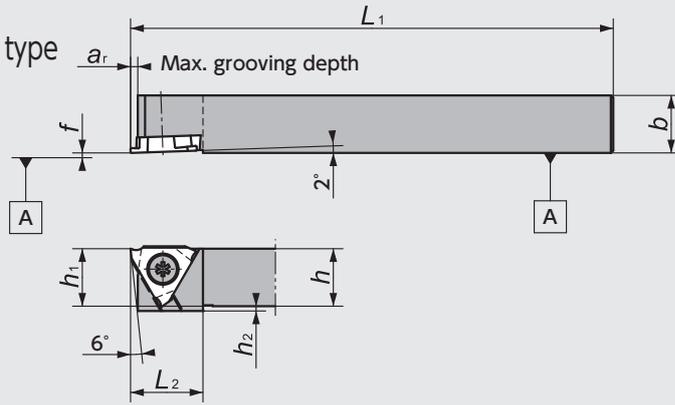


Figure-1

● Right-hand type shown.

GTT-OH type

SPLASH BAR **NEW**

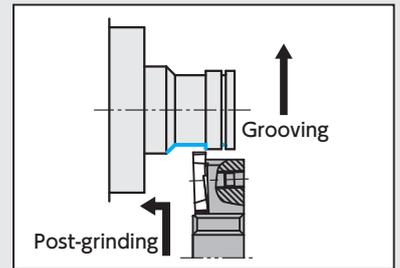
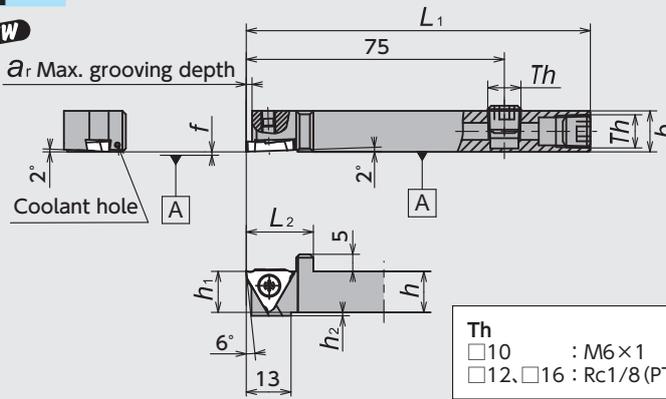


Figure-2

● Right-hand type shown.

Th	
□10	: M6×1
□12, □16	: Rc1/8 (PT1/8)

CH-GTT type

For front gang type tool post

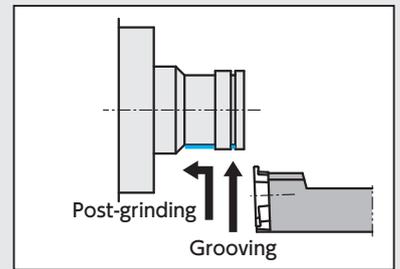
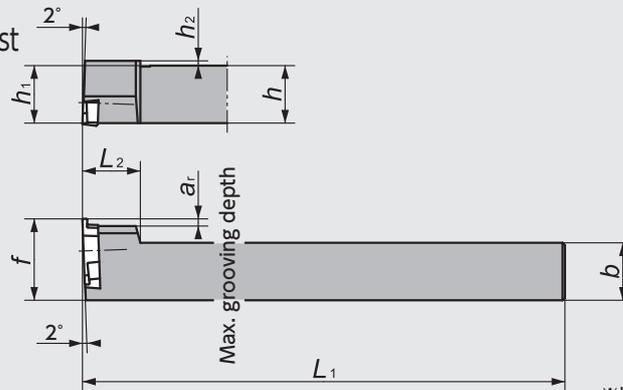


Figure-3

● Left-hand type shown.
※Use R-hand inserts for L-hand type holder

DS-GTT type

DS holder

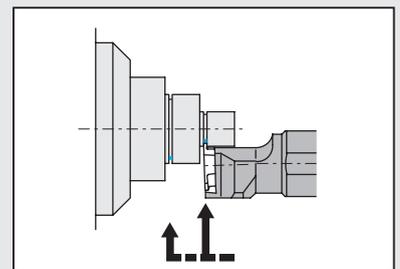
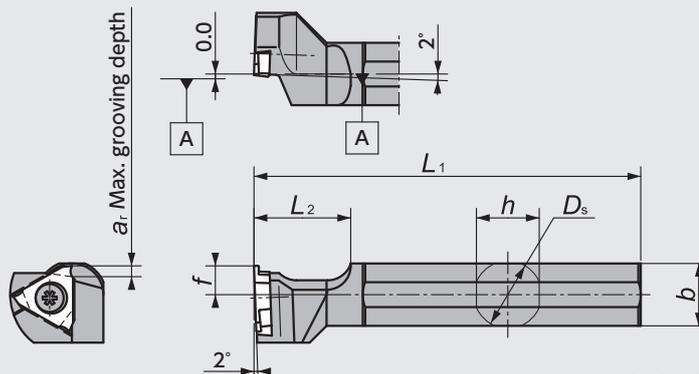


Figure-4

● Left-hand type shown.
※Use R-hand inserts for L-hand type holder.
※TBMH32 inserts for back turning can be mounted onto GTT type holders.

Holder dimensions

Shape	Code No.		Toolholder Part No.	Stock		Dimensions (mm)										Width of groove (mm) w	Applicable insert 	Parts	
	R	L		R	L	h	b	L ₁	h ₁	f	L ₂	a _r	h ₂	D _s	Clamping screw			Wrench	
Figure-1	5107305	5107313	GTT^R108F00	●	●		8											R hand : LR-S-4*10PW (A) L hand : LR-S-4*5.8 (B)	CLR-155 (A)
	5608682		0810F00	●			10										LR-S-4*10PW (A)		
	5107206	5107214	08K00	●	●		8											R hand : LR-S-4*10PW (A) L hand : LR-S-4*5.8 (B)	
	5608690		0810K00	●			10												
	5107321	5107339	10F00	●	●	10	10	80				1.6				3			
	5107222	5107230	10K00	●	●			120											
	5107347	5107354	12F00	●	●		12	12	80							1			
	5107248	5107255	12K00	●	●			120											
	5459896	5551387	16H00	●	●		16	16	100							0			
	5173687	5173679	16K00	●	●			120											
	5530852	5780317	20K00	●	●	20	20	125	20							0			
	5780309	5780291	25M00	●	●	25	25	150	25	0	15								
	5107362	5107370	10F15	●	●		10	10	80							3			
	5107263	5107271	10K15	●	●			120											
	5537220	5537147	12F15	●	●		12	12	80							1			
	5537246	5537162	12K15	●	●			120											
	5537261	5537188	16H15	●	●		16	16	100				2.7			0			
	5537287	5537204	16K15	●	●			120											
	5107388	5107396	10F25	●	●		10	10	80							3			
	5107289	5107297	10K25	●	●			120											
5537238	5537154	12F25	●	●		12	12	80							1				
5537253	5537170	12K25	●	●			120												
5537279	5537196	16H25	●	●		16	16	100							0				
5537295	5537212	16K25	●	●			120												
Figure-2	5921705		GTT^R1012H00-OH	●			10												
	5890157		GTT^R12H00-OH	●			12		100	12	0	19.5	1.6			1			
	5921713		GTT^R16H00-OH	●			16		16	16						0			
Figure-3	5659248		CH-GTT^R10H00	●			10	10	100	10	15					3			
	5659255		12H00	●			12	12		12	17					1			
Figure-4	5348560		DS-GTT^R14F	●			13	13	80								14.000		
	5348081		15H	●			15	15	100								15.875		
	5341532		16X[*]	●					95								16.000		
	5278288		19	●			18	18				6					19.050		
	5278304		20	●			19	19									20.000		
	5324041		22	●			21	21									22.000		
	5317144		25	●			24	24			10						25.400		

*For grooving deeper than the specified depth (a), adjust as required before use.

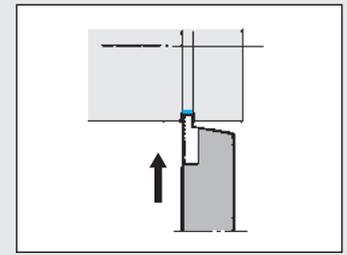
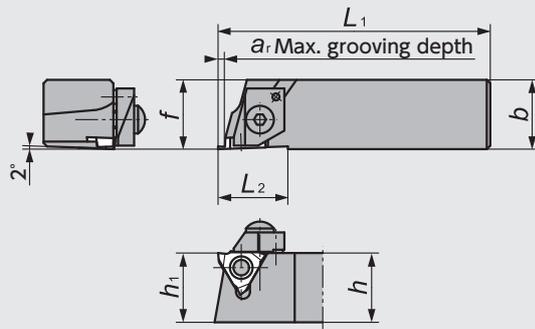
*Please select φ16 shank for DS sleeves DS sleeves details → H91

New Products
Tool Materials / Selection Guide
PCD, CBN and ceramic
Carbide / PVD-coated Carbide
Micro-grain Carbide, Carbide
Insert Stock List
Outside Machining Toolholders
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Shaper
Internal Machining tool range
Original Tools for Various Applications
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Milling Cutters
Technical Data
Index

Grooving tools

NGTN type

Without offset

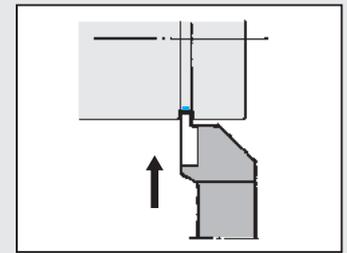
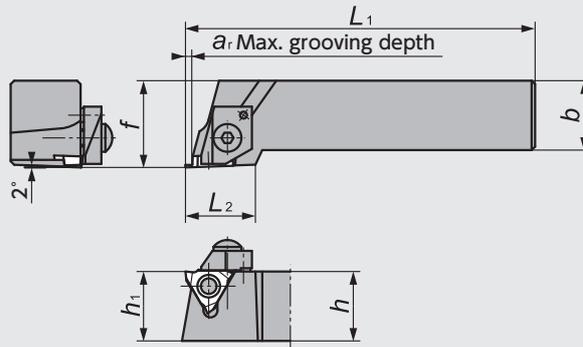


● Right-hand type shown.

Figure-1

NGTB type

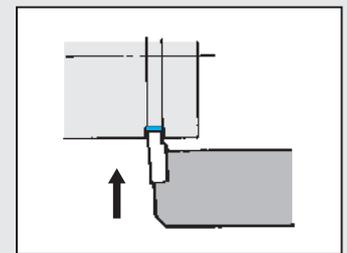
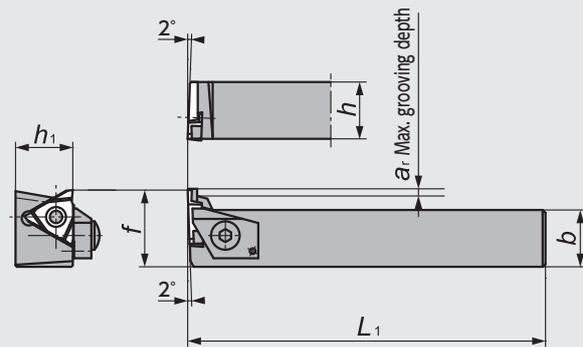
With offset



● Right-hand type shown.

Figure-2

NGTA type



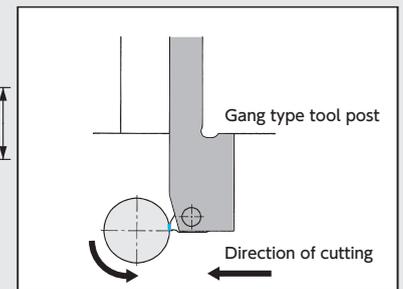
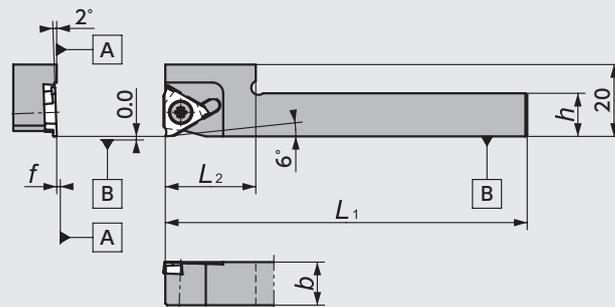
● Left-hand type shown.

Note) Use R-hand inserts for L-hand type holder.

Figure-3

Y-GTT type

Front/back clamping type
Y-axis holder



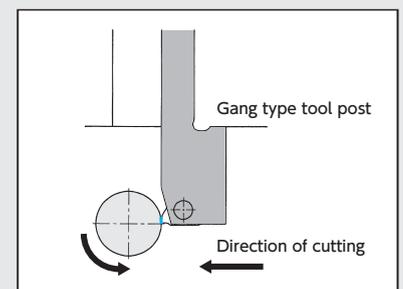
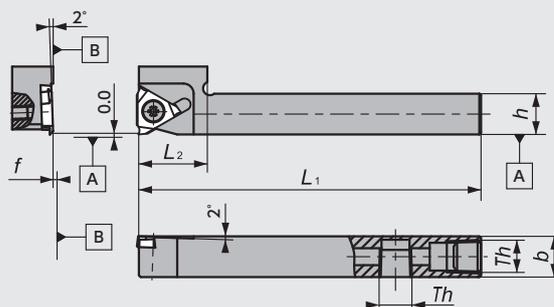
● Right-hand type shown.

Note) Use R-hand inserts for R-hand type holder.

Figure-4

Y-GTT-OH型

Front/back clamping type
SPLASH BAR **NEW**



● Right-hand type shown.

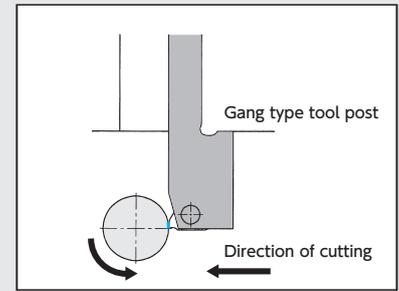
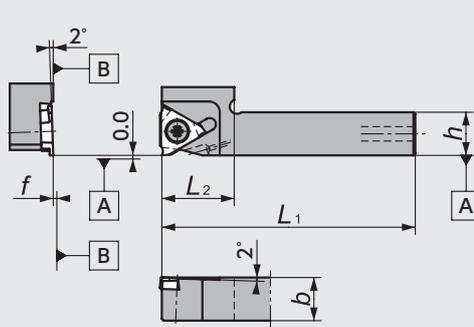
Note) Use R-hand inserts for R-hand type holder.

Figure-5

Th
□12, □16 : Rc1/8 (PT1/8)

Y-GTT-OH type

Front/back clamping type
For Y-axis high-pressure coolant



● Right-hand type shown.

Note) Use R-hand inserts for R-hand type holder.

Figure-6

Holder dimensions

Shape	Code No.		Toolholder Part No.	Stock		Dimensions (mm)										Width of groove (mm) w	Applicable insert	Parts				
	R	L		R	L	h	b	L ₁	h ₁	f	L ₂	a _r	h ₂	Clamp	Clamping bolt			Spring	Clamping screw	Wrench		
Figure-1	5525928	5525738	NGTN [®] 161632-00	●	●									1.6	0.30~3.00	GTM32 GTMH32 GTMX32 I12~15	CPR/L5S	AOS-5*20	ASG-5	—	LW-2.5 (A)	
	5534110		161632-15	●	●	16	16	78	16	16	20	—	1.45~3.00									
	5534128		161632-25	●	●								2.7	2.50~3.00								
Figure-2	5542295		NGTB [®] 202032-00S	●	●									1.6	0.30~3.00	GTM32 GTMH32 GTMX32 I12~15	CPR/L5	AOS-5*25	ASG-5	—	LW-2.5S (A)	
	5537717		202032-15S	●	●	20	20	125	20	25			2.7	1.45~3.00								
	5553243		202032-25S	●	●								2.7	2.50~3.00								
	5549563		252532-00S	●	●								1.6	0.30~3.00								
	5545801		252532-15S	●	●	25	25	150	25	30			2.7	1.45~3.00								
	5553417		252532-25S	●	●								2.7	2.50~3.00								
Figure-3	5536370		NGTA [®] 202032-00S	●	●									1.6	0.30~3.00	GTM32 GTMH32 GTMX32 I12~15	CPR/L5*	AOS-5*25	ASG-5	—	LW-2.5 (A)	
	5536388		202032-15S	●	●	20	20	125	20	25			2.7	1.45~3.00								
Figure-4	5371604		Y-GTT [®] 10S	●	●							20				GTM32 GTMH32 GTMX32 I12~15 TBMH32 (back turning) H53	—	—	—	LR-S-4* 10PW	CLR-15S (B)	
	5358452		10	■	■	10	10					25			0.30							
	5371612		10L	■	■							30			3.00							
	5371620		12S	●	●			120	—	0		20	1.6									
	5358445		12	■	■	12	12					25										
	5371638		12L	■	■							30										
Figure-5	NEW 5911466		Y-GTT [®] 12H00S-OH	●	●	12	12					20			0.30	—	—	—	LR-S-4* 10PW	CLR-15S (B)		
	NEW 5911474		Y-GTT [®] 16H00-OH	●	●	16	16			100	—	0	1.6		3.00							
Figure-6	5700034		Y-GTT [®] 12SOH	■	■	12	12	70	—	0		20	1.6		0.30 3.00	—	—	—	LR-S-4* 10PW	CLR-15S (B)		

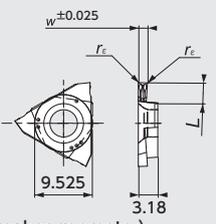
*For grooving deeper than the specified depth (a), adjust as required before use.

*The right-hand NGTA type holders come with a left-hand clamp while the left-hand come with a right-hand clamp.

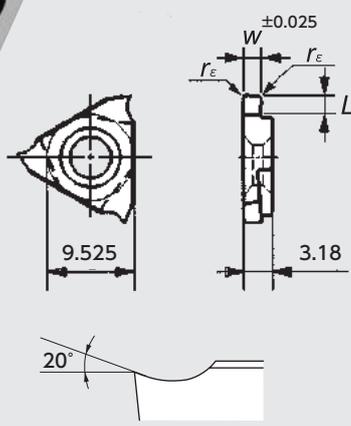
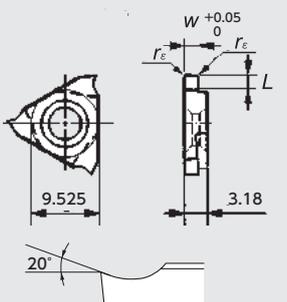
Grooving tools

Applicable inserts Micro-grain carbide series

GTMH32-GX type

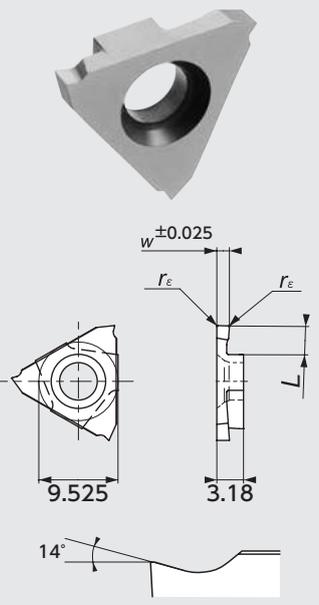
Shape	Part No.	Dimensions (mm)					PVD-coated micro-grain carbides			
		w	L	r _e	Effective machining depth	Side turning	TM4		DM4	
							R	Stock	R	Stock
Side turning possible  <p>(Chipbreaker geometry) Front rake angle: 17° Side rake angle: 14° ●R-hand shown.</p>	GTMH32075RGX	0.75	2.0	0.05	1.6	0.75	5910765	●	5910898	●
	095RGX	0.95					5922224	●	5922216	●
	100RGX	1.00					5910815	●	5910906	●
	100RGX01		0.1	5910823		●	5910963	●		
	150RGX	1.50	0.05	5910740		●	5910914	●		
	150RGX01		0.1	5910849		●	5910971	●		
	150RGX02		0.2	5910864	●	5910997	●			
	200RGX	2.00	3.0	0.05	5910732	●	5910930	●		
	200RGX01			0.1	5910856	●	5910989	●		
	200RGX02			0.2	5910872	●	5911003	●		
	300RGX		3.00	0.05	5910724	●	5910948	●		
	300RGX01			0.1	5910880	●	5911011	●		
	300RGX02			0.2						

GTMH32 type

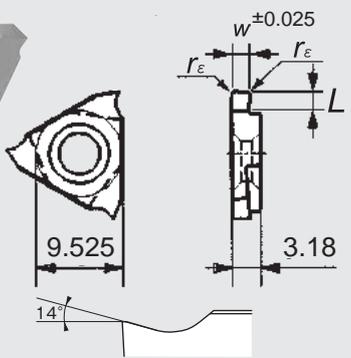
Shape	Part No.	Dimensions (mm)					PVD-coated micro-grain carbides				
		w	L	r _e	Effective machining depth	ZM3					
						R	Stock	L	Stock		
Tolerance of groove width $w \pm 0.025$  <p>●R-hand shown.</p>	GTMH32033R/L	0.33	0.6	0.03	0.3	5108766	●	5109046	●		
	043R/L	0.43	1.2			2.0	1.6	5108758	●	5109038	●
	053R/L	0.53						5108774	●	5109020	●
	075R/L	0.75	5108790	●				5109012	●		
	NEW 077R/L	0.77	5920574	●							
	095R/L	0.95	5108808	●			5109004	●			
	NEW 097RE	0.97	5919980	●							
	100R/L	1.00	5108816	●	5108998	●					
	120R/L	1.20	5108824	●	5108980	●					
	NEW 125RE	1.25	5373360	●							
	140R/L	1.40	5108782	●	5108907	●					
	NEW 145RE	1.45	5231667	●							
	150R/L	1.50	5108899	●	5108972	●					
	NEW 175RE	1.75	5919998	●							
	180R/L	1.80	5108881	●	5108964	●					
	200R/L	2.00	5108873	●	5108956	●					
	225R/L	2.25	5108865	●	5108949	●					
	250R/L	2.50	5108857	●	5108931	●					
	275R/L	2.75	5108840	●	5108923	●					
	300R/L	3.00	5108832	●	5108915	●					
	100R/L E01	1.00	2.0	0.1	1.6	5109079	●	5109087	●		
	120R/L E01	1.20	5109277			●	5109251	●			
	150R/L E01	1.50	3.0			2.7	5109061	●	5109269	●	
	200R/L E01	2.00	5109053	●	5109244		●				
Tolerance of groove width $w \begin{smallmatrix} +0.05 \\ 0 \end{smallmatrix}$  <p>●R-hand shown.</p>	GTMH32030R/L	0.30	0.6	0.03	0.3	5995915	■	5107107	■		
	050R/L	0.50	1.2	2.0		0.9	5995899	■	5107099	■	
	075R/L	0.75	5995907				■	5948476	■		
	095R/L	0.95	5071451		■		5107081	■			
	100R/L	1.00	0.05		1.6	5926167	■	5043625	■		
	103R/L	1.03				5283627	■				
	125R/L	1.25				5961826	■	5107073	■		
	145R/L	1.45	3.0	2.7	5013255	■	5107065	■			
	150R/L	1.50			5992151	■	5923651	■			
	175R/L	1.75			5992144	■	5107123	■			
	200R/L	2.00	5925664	■	5044680	■					
	250R/L	2.50	5037502	■	5107115	■					

Applicable inserts Micro-grain carbide series

GTMX32 type

Shape	Part No.	Dimensions (mm)				PVD-coated micro-grain carbides								
		w	L	r _ε	Effective machining depth	QM3				DT4				
						R	Stock	L	Stock	R	Stock	L	Stock	
Side turning possible  Cost effective  ●R-hand shown.	GTMX32030 ^R / _L T	0.30	0.6	0.05	0.25	5510110	●	5510490	■	5847967	●			
	033 ^R / _L T	0.33				5510102	●	5510508	■					
	043 ^R / _L T	0.43				5510094	●	5510516	■	5847983	●			
	050 ^R / _L T	0.50	1.2	0.05	0.9	5493895	●	5516034	■	5847991	●			
	053 ^R / _L T	0.53				5510086	●	5510524	■					
	065 ^R / _L T	0.65				5510078	●	5510532	■	5849013	●			
	075 ^R / _L T	0.75	2.0	0.05	1.6	5493903	●	5510540	●	5848999	●	5848981	●	
	080 ^R / _L T	0.80				5510060	●	5510573	■	5848965	●			
	095 ^R / _L T	0.95				5493911	●	5510581	●	5848882	●	5848874	●	
	100 ^R / _L T	1.00	3.0	0.05	2.7	5493929	●	5510599	■	5848866	●			
	110 ^R / _L T	1.10				5510052	●	5510607	■					
	120 ^R / _L T	1.20				5493937	●	5510623	■	5848841	●			
	125 ^R / _L T	1.25	3.0	0.05	2.7	5510045	●	5510631	■	5848833	●			
	130 ^R / _L T	1.30				5510037	●	5510649	■	5848825	●			
	140 ^R / _L T	1.40				5510029	●	5510656	■	5848817	●			
	145 ^R / _L T	1.45	3.0	0.05	2.7	5510011	●	5510664	■					
	150 ^R / _L T	1.50				5493945	●	5510672	●	5848791	●	5848783	●	
	160 ^R / _L T	1.60				5510003	●	5510680	■	5848775	●			
	175 ^R / _L T	1.75	3.0	0.05	2.7	5510243	●	5510458	■	5848767	●			
	180 ^R / _L T	1.80				5510250	●	5510466	■	5848759	●			
	200 ^R / _L T	2.00				5510227	●	5510425	●	5848742	●	5848734	●	
	250 ^R / _L T	2.50	3.0	0.05	2.7	5510219	●	5510417	●	5848726	●	5848718	●	
	300 ^R / _L T	3.00				5510235	●	5510771	■	5848700	●			
	100 ^R / _L T01	1.00				2.0	0.1	1.6	5510136	●	5510698	■	5848692	●
	120 ^R / _L T01	1.20	2.0	5510128	●	5510706			■	5848684	●			
	150 ^R / _L T01	1.50		5510482	●	5510714			■	5848676	●			
	200 ^R / _L T01	2.00	3.0	0.1	2.7	5510433	●	5510441	●	5848668	●	5848650	●	
	250 ^R / _L T01	2.50				5523204	●			5848627	●			
	150 ^R / _L T02	1.50				5523196	●			5848643	●			
	200 ^R / _L T02	2.00	3.0	0.2	2.7	5523188	●			5848635	●			
250 ^R / _L T02	2.50	5523170				●			5848619	●				
300 ^R / _L T02	3.00	5523162				●			5848601	●				

GTMH32-VT type

Shape	Part No.	Dimensions (mm)				PVD-coated micro-grain carbides							
		w	L	r _ε	Effective machining depth	VM1							
						R	Stock	L	Stock	R	Stock	L	Stock
Side turning possible  Mirror finish  ●R-hand shown.	GTMH32033 ^R / _L VT	0.33	0.6	0.0	1.6	0.25	5359484	●					
	043 ^R / _L VT	0.43	1.2			0.9	5359500	●					
	053 ^R / _L VT	0.53	2.0			0.0	1.6	5359526	●				
	065 ^R / _L VT	0.65						5359542	●				
	075 ^R / _L VT	0.75						5359567	●				
	080 ^R / _L VT	0.80	3.0			0.0	2.7	5359609	●				
	085 ^R / _L VT	0.85						5359633	●				
	095 ^R / _L VT	0.95						5359658	●				
	100 ^R / _L VT	1.00	3.0			0.0	2.7	5359674	●				
	110 ^R / _L VT	1.10						5359690	●				
	120 ^R / _L VT	1.20						5359716	●				
	130 ^R / _L VT	1.30	3.0			0.0	2.7	5359732	●				
	140 ^R / _L VT	1.40						5359757	●				
	150 ^R / _L VT	1.50						5359773	●				
	200 ^R / _L VT	2.00	5360532			●							

Useful tips for determining cutting conditions (for GTMH32-VT type)

- When grooving as deep as "the effective machining depth" using inserts having a groove width of 0.43 or greater, the feed rate for side turning should be 0.03 mm/rev. or lower.
- When grooving as deep as "the effective machining depth" using inserts with a groove width of 0.43 or greater and using a feed rate exceeding 0.03 mm/rev. (max. 0.1 mm/rev), secure the clearance for chips by grooving at least twice before starting the side turning, as machining at a feed rate exceeding 0.03 mm/rev. may cause the chip to scratch the side surfaces of the grooves.

Grooving tools

Applicable inserts Micro-grain carbide series

GTMH32 type

Shape	Part No.	Dimensions (mm)				PVD-coated micro-grain carbides			
		w	L	r _ε	Effective machining depth	R	Stock	L	Stock
Full radius type Tolerance of groove width $w_{\pm 0.025}$ 	GTMH32050^R/L E025	0.50	1.2	0.25	0.9	5446125	●		
	070^R/L E035	0.70	2.0	0.35	1.6	5446141	●		
	100^R/L E05	1.00		0.50		5160759	●		
	150^R/L E075	1.50	3.0	0.75	2.7	5501200	●		
	200^R/L E10	2.00		1.00		5160775	●		
	250^R/L E	2.50		1.25		5921671	●		
	300^R/L E15	3.00		1.50		5436720	●		

GTMH and GTMX32 type

Step-chipbreaker type

Shape	Part No.	Dimensions (mm)				PVD-coated micro-grain carbides				
		w	L	r _ε	Effective machining depth	R	Stock	L	Stock	
Short 	GTMH32100^R/L SSH	1.00	2.0	0.05	1.6	5599394	●			
	150^R/L SSH	1.50	3.0			2.7	5599386	●		
	200^R/L SSH	2.00					5599378	●		

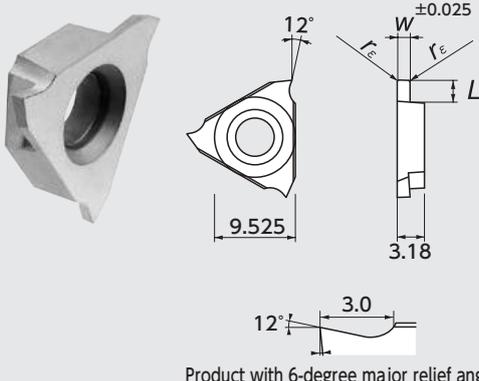
Shape	Part No.	Dimensions (mm)				PVD-coated micro-grain carbides				
		w	L	r _ε	Effective machining depth	R	Stock	L	Stock	
Short 	GTMX32100^R/L SS	1.00	2.0	0.05	1.6	5523345	●			
	150^R/L SS	1.50	3.0			2.7	5523337	●		
	200^R/L SS	2.00					5523329	●		

Long 	GTMX32100^R/L LS	1.00	2.0	0.05	1.6	5523295	●			
	150^R/L LS	1.50	3.0			2.7	5523303	●		
	200^R/L LS	2.00					5523311	●		

Shape	Part No.	Dimensions (mm)				PVD-coated micro-grain carbides			
		Angle	r _ε	f	Effective machining depth	R	Stock	L	Stock
NEW 	GTMX32V90 R 005	90°	0.05	0.5	0.5	5773940	●		
	V90 R 010	90°	0.1	1.0	0.7	5773957	●		

Applicable inserts Cermet series

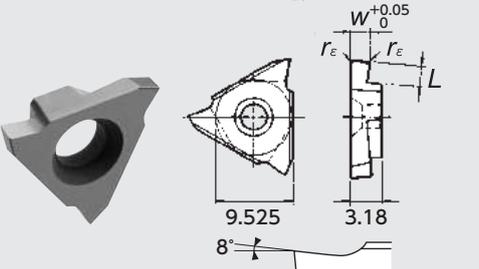
GTMH32-J type

Shape	Part No.	Dimensions (mm)				PVD-coated cermet			
		w	L	r _e	Effective machining depth	C7Z			
						R	Stock	L	Stock
 <p>Product with 6-degree major relief angle</p> <p>● R-hand shown.</p>	GTMH32075^R/LJ005	0.75	2.0	0.05	1.6	5651716	●	5651658	●
	080^R/LJ005	0.80				5651724	●	5651666	■
	095^R/LJ005	0.95				5651732	●	5651674	■
	100^R/LJ005	1.00				5651740	●	5651682	●
	115^R/LJ005	1.15				5651757	●	5651690	●
	120^R/LJ01	1.20				5639836	●	5639653	●
	125^R/LJ01	1.25	5639844	●	5639661	■			
	145^R/LJ01	1.45	5639760	●	5639588	■			
	150^R/LJ01	1.50	5639778	●	5639596	■			
	160^R/LJ01	1.60	5639786	●	5639604	■			
	175^R/LJ01	1.75	5639794	●	5639612	■			
	180^R/LJ01	1.80	5639802	●	5639620	●			
	200^R/LJ01	2.00	5639810	●	5639638	●			
	250^R/LJ01	2.50	5639828	●	5639646	■			
	150^R/LJ	1.50	5651617	●	5651575	●			
	200^R/LJ	2.00	5651625	●	5651583	●			
	250^R/LJ	2.50	5651633	●	5651591	●			
	300^R/LJ	3.00	5651641	●	5651609	●			

Note) The effective machining depths indicated are for grooving on work pieces having diameter of 120 or less.

GTM32 type

Molded chipbreaker type

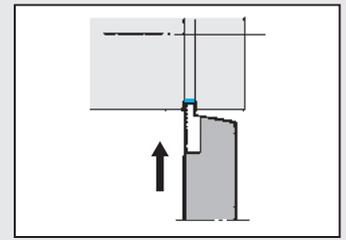
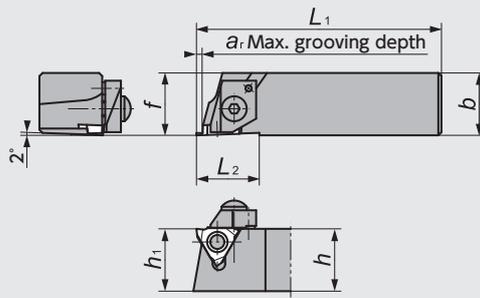
Shape	Part No.	Dimensions (mm)				Cermet			
		w	L	r _e	Effective machining depth	N40			
						R	Stock	L	Stock
 <p>● R-hand shown.</p>	GTM32100^R/L01	1.00	2.0	0.1	1.6	5661566	●		
	100^R/L	1.00		0.2		5654439	●		
	145^R/L	1.45	3.0	0.2	2.7	5654447	●		
	150^R/L	1.50				5653936	●	5653969	●
	200^R/L	2.00				5654454	●	5654462	●
	230^R/L	2.30				5654470	●		
	250^R/L	2.50				5653928	●		
	300^R/L	3.00				5654488	●		

Note) The effective machining depths indicated are for grooving on work pieces having a diameter of 120 or less.

Grooving tools

NGTN type

Without offset

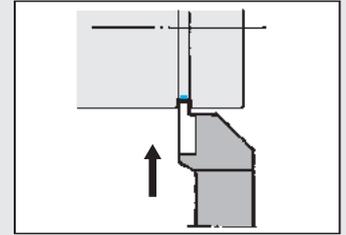
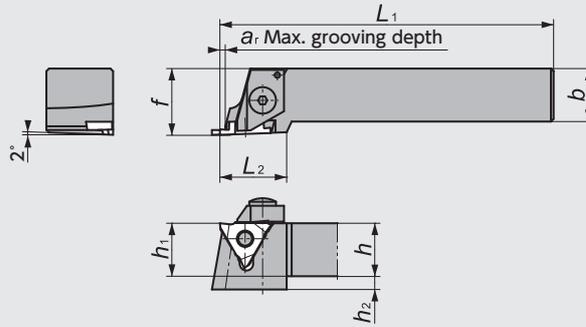


● Right-hand type shown.

Figure-1

NGTB type

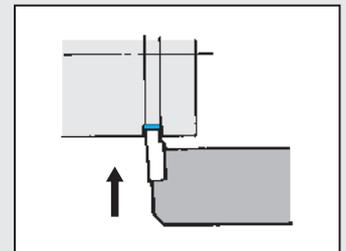
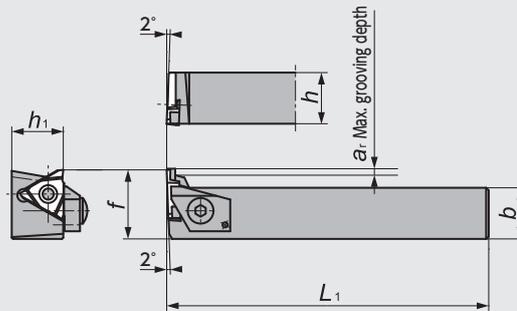
With offset



● Right-hand type shown.

Figure-2

NGTA type



● Left-hand type shown.

Note) Use R-hand inserts for L-hand type holder.

Figure-3

Holder dimensions

Shape	Code No.		Toolholder Part No.	Stock		Dimensions (mm)								Width of groove (mm) w	Applicable insert	Parts			
	R	L		R	L	h	b	L ₁	h ₁	f	L ₂	a	h ₂			Clamp	Clamping bolt	Spring	Wrench
Figure-1	5501994	5554241	NGTN ^R /L161643-20	●	●	16	16	78	16	16	20	4.5	9	2.00-3.49	GTM43 GTMA43 GTMT43 I17	CPR/L5S	AOS-5*20	ASG-5	LW-2.5
	5534136	5222112	161643-35	●	●									3.50-5.50					
Figure-2	5239900	5239843	NGTB ^R /L161643-00S	●	●								3.0	1.00-2.49	GTM43 GTMA43 GTMT43 I17	CPR/L5	AOS-5*25	ASG-5	LW-2.5
	5949615	5210901	161643-20S	●	●	16	16	100	16	20			9	2.00-3.49					
	5806096	5222021	161643-35S	●	●								4.5	3.50-5.50					
	5239850	5239868	202043-00S	●	●								3.0	1.00-2.49					
	5550041	5553367	202043-20S	●	●	20	20	125	20	25			5	2.00-3.49					
	5553375	5222039	202043-35S	●	●						25		4.5	3.50-5.50					
	5239876	5239892	252543-00S	●	●								3.5	1.00-2.49					
	5550058	5550066	252543-20S	●	●	25		150	25					2.00-3.49					
	5550074	5550082	252543-35S	●	●		25			30			0	3.50-5.50					
	5553433	5553441	322543-20S	●	●			170	32			5.5		2.00-3.49					
5222013	5222047	322543-35S	●	●	32								3.50-5.50						
Figure-3		5884903	NGTA ^R /L202043-00S	●		20	20	125	20	27		3.0		1.00-2.49	GTM43 GTMA43 GTMT43 I17	CPR/L5*	AOS-5*25	ASG-5	LW-2.5

*For grooving deeper than the specified depth (a), adjust as required before use.

Applicable inserts Micro-grain carbide series

GTMT43 and GTMA43 type

Shape	Part No.	Dimensions (mm)					PVD-coated micro-grain carbides							
		W	L	r _e	S	Effective machining depth	QM3				DM4			
							R	Stock	L	Stock	R	Stock	L	Stock
<p>●R-hand shown.</p>	GTMT43145 R _L	1.45	3.5	0.2	4.76	3.0	5238076	●	5237912	●	5846852	●	5846860	●
	150 R _L	1.50					5238084	●	5237920	●	5846837	●	5846845	●
	175 R _L	1.75					5238092	●	5237938	●	5846811	●	5846829	●
	200 R _L	2.00	5.5	0.3	5.76	4.3	5238100	●	5237946	●	5846795	●	5846803	●
	230 R _L	2.30					5238118	●	5237953	●	5846779	●	5846787	●
	250 R _L	2.50					5238126	●	5237961	●	5846753	●	5846761	●
	265 R _L	2.65	5.5	0.4	5.76	4.3	5238134	●	5237979	●	5846746	●		
	280 R _L	2.80					5238142	●	5238068	●	5846910	●		
	300 R _L	3.00					5238159	●	5237904	●	5846902	●	5846738	●
	330 R _L	3.30	5.5	0.4	5.76	4.3	5238167	●	5237987	●	5846894	●	5846720	●
	350 R _L	3.50					5238175	●	5237995	●				
	400 R _L	4.00					5238183	●	5238001	●	5846704	●	5846712	●
	430 R _L	4.30	5.5	0.4	5.76	4.3	5238191	●	5238019	●	5846688	●	5846696	●
	450 R _L	4.50					5238225	■	5238027	■				
	500 R _L	5.00					5238233	●	5238035	●	5846639	●	5846670	●
550 R _L	5.50	5.5	0.4	5.76	4.3	5238241	●	5238043	●	5846613	●	5846621	●	
						5238258	●	5238050	●	5846597	●	5846605	●	
<p>●R-hand shown.</p>	GTMA43200 R _L 10R	2.00	3.5	Full radius 1.0	—	3.0	5437918	●						
	300 R _L 15R	3.00	5.5	Full radius 1.5			4.5	5437926	●					
	400 R _L 20R	4.00	5.5	Full radius 2.0				5437934	●					

Applicable inserts Cermet series

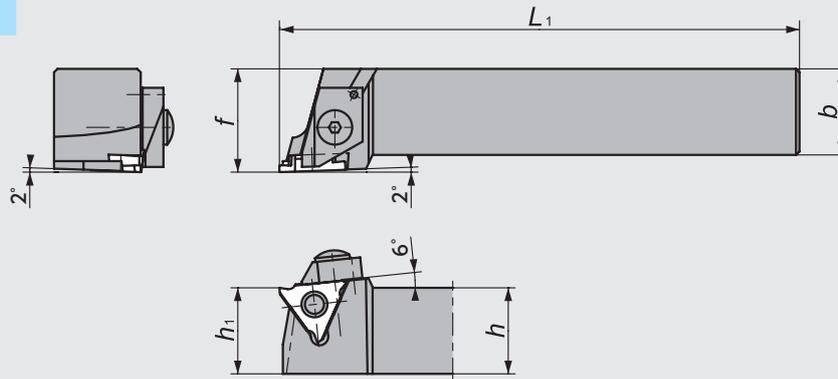
GTMA43-J and GTM43 type

Shape	Part No.	Dimensions (mm)					PVD-coated cermet				Cermet			
		W	L	r _e	Effective machining depth	C7Z				N40				
						R	Stock	L	Stock	R	Stock	L	Stock	
<p>Product with 6-degree major relief angle</p> <p>●R-hand shown.</p>	GTMA43100 R _L J01	1.00	2.0	0.1	1.6	5640529	●	5640354	●					
	125 R _L J01	1.25				5640537	●	5640362	■					
	145 R _L J01	1.45				5640503	●	5640347	●					
	150 R _L J	1.50	3.5	0.2	3.0	5640453	●	5640297	●					
	175 R _L J	1.75				5640461	●	5640305	●					
	185 R _L J	1.85				5640479	●	5640313	■					
	200 R _L J	2.00	5.5	0.3	4.5	5640487	●	5640321	■					
	230 R _L J	2.30				5640495	●	5640339	■					
	250 R _L J03	2.50				5640396	●	5640230	●					
	265 R _L J03	2.65	5.5	0.3	4.5	5640404	●	5640248	■					
	280 R _L J03	2.80				5640412	●	5640255	■					
	300 R _L J03	3.00				5640420	●	5640263	●					
330 R _L J03	3.30	5.5	0.4	4.5	5640438	●	5640271	■						
350 R _L J03	3.50				5640446	●	5640289	■						
400 R _L J04	4.00				5640370	●	5640214	●						
450 R _L J04	4.50	5.5	0.4	4.5	5640388	●	5640222	●						
<p>Product with 0-degree major relief angle</p> <p>●R-hand shown.</p>	GTMA43100 R _L J05R	1.00	2.0	0.50	1.6	5638358	●							
	150 R _L J075R	1.50	3.5	0.75	3.0	5638341	●							
	200 R _L J10R	2.00	5.5	1.00	4.0	5638333	●							
	250 R _L J125R	2.50	5.5	1.25	4.0	5638382	●							
	300 R _L J15R	3.00	5.5	1.50	4.0	5638374	●							
400 R _L J20R	4.00	5.5	2.00	4.0	5638366	■								
<p>●R-hand shown.</p>	GTM43200 R _L	2.00	3.5	0.2	3.0				5654009	●	5654033	●		
	230 R _L	2.30							5654546	●				
	250 R _L	2.50	5.5	0.2	4.2				5654553	●	5654561	●		
	265 R _L	2.65							5852785	●				
	300 R _L	3.00							5653993	●	5654025	●		
	330 R _L	3.30							5445846	●				
	350 R _L	3.50							5690896	●	5667787	●		
	400 R _L	4.00							5653985	●	5654017	●		
450 R _L	4.50							5654579	●					

Note) The effective machining depths indicated are for grooving on work pieces having a diameter of 120 or less.

Grooving tools

NGBB type



Holder dimensions

Code No.	Toolholder Part No.		Stock		Dimensions (mm)						Width of groove (mm) w	Applicable insert	Parts				
					R	L	h	b	L ₁	h ₁			f	a _r	Clamp	Clamping bolt	Spring
5768387		NGBB $\frac{R}{L}$ 252543-00S	●									GTMX43-J (See table below)	CPR6	AOS-6*30	ASG-6	LW-3	
5768395		-25S	●		25	25	150	25	30	-	1.0 ~ 2.49						

Applicable inserts

GTMX43-J type

Shape	Part No.	Dimensions (mm)							PVD-coated cermet			
		w	L	r _e	d	s	Effective machining depth	C7Z				
		R	Stock	L	Stock							
	GTMX43100$\frac{R}{L}$J01	1.00	2.0	0.1	12.70	4.76	1.6	5659081	●	5658927	■	
	125$\frac{R}{L}$J01	1.25						5659073	●	5658919	■	
	145$\frac{R}{L}$J01	1.45						5659065	●	5658901	■	
	150$\frac{R}{L}$J	1.50	3.5	0.2			3.0	5659057	●	5658877	■	
	175$\frac{R}{L}$J	1.75						5659040	●	5658869	●	
	185$\frac{R}{L}$J	1.85						5659032	●	5658851	■	
	200$\frac{R}{L}$J	2.00	5.5	0.3			4.5	5659024	●	5658786	●	
	230$\frac{R}{L}$J	2.30						5659016	●	5658778	●	
	250$\frac{R}{L}$J03	2.50						5659008	●	5658760	■	
	265$\frac{R}{L}$J03	2.65	0.4	0.4			4.5	5658992	●	5658752	■	
	280$\frac{R}{L}$J03	2.80						5658984	●	5658737	■	
	300$\frac{R}{L}$J03	3.00						5658976	●	5658729	■	
	330$\frac{R}{L}$J03	3.30	4.5	0.4			4.5	5658968	●	5658711	■	
	350$\frac{R}{L}$J03	3.50						5658950	●	5658703	■	
	400$\frac{R}{L}$J04	4.00						5658943	●	5658695	■	
	450$\frac{R}{L}$J04	4.50						5658935	●	5658687	■	
J type for full radius grooves 	GTMX43100RJ05R	1.00	2.0	0.50	12.70	4.76	1.6	5659149	●	-	-	
	150RJ075R	1.50	3.5	0.75				3.0	5659131	●	-	-
	200RJ10R	2.00		1.00			5659123		●	-	-	
	250RJ125R	2.50	5.5	1.25			4.0	5659115	●	-	-	
	300RJ15R	3.00		1.50				5659107	●	-	-	
	400RJ20R	4.00	2.00	5659099			●	-	-			

Flat 3

TWG type

Side turning possible*
 ※Limited to 1.5 mm grooving depth

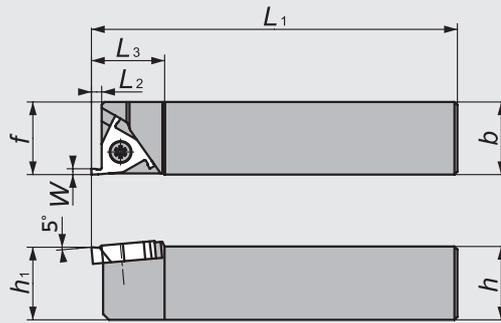


Figure-1

● Right-hand type shown.

TWG type

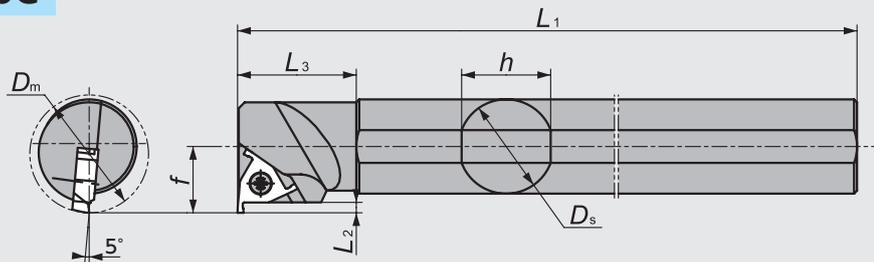


Figure-2

● Right-hand type shown.

Note) Use L-hand inserts for R-hand type holders.

Holder dimensions

Shape	Code No.		Toolholder Part No.	Stock		Dimensions(mm)							Applicable insert	Parts					
	R	L		R	L	h	D _s	D _m	b	L ₁	h ₁	f		L ₂	L ₃	Clamping screw	Wrench		
Figure-1	5794649		TWG ^R / _L 2012X	★		12					12				TWG (See table below)	FSS25-5.0*10	RLR-20S		
	5859350		2016X	★		16			20	16	20		3.5	25				FSS10-5.0*14	LLR-20S
	5714332	5720511	2020K	●	●	20				20				FSS10-5.0*14					
	5714233	5720503	2525K	●	●	25			25	25	25								
Figure-2	5722541		S32S-TWGR38	●		30	32	38		250	40	20.5		TWG (See table below)	FSS10-5.0*14	RLR-20S			
	5722533		S40T-TWGR46	●		38	40	46		300	40	24.5					3.5	40	

Applicable inserts

TWG type

Flat 3 inserts Molded chipbreaker

Shape	Part No.	Dimensions(mm)				PVD-coated micro-grain carbides			
		w	L	r _e	Effective machining depth	TM1			
						R	Stock	L	Stock
	TWG20 ^R / _L 005	2.0	(3.5)	0.05	3.0	5714340	●	5720040	●
	020			5714357		●	5720057	●	
	TWG25 ^R / _L 010	2.5		0.1		5714365	●	5720065	●
	030			5714373		●	5720073	●	
	TWG30 ^R / _L 010	3.0		0.1		5714381	●	5720081	●
	030			5714399		●	5720099	●	

Grooving tools

GTV type

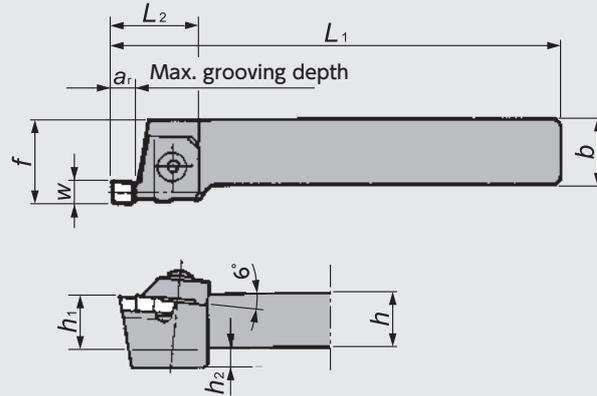


Figure-1

• Right-hand type shown.

GKV type

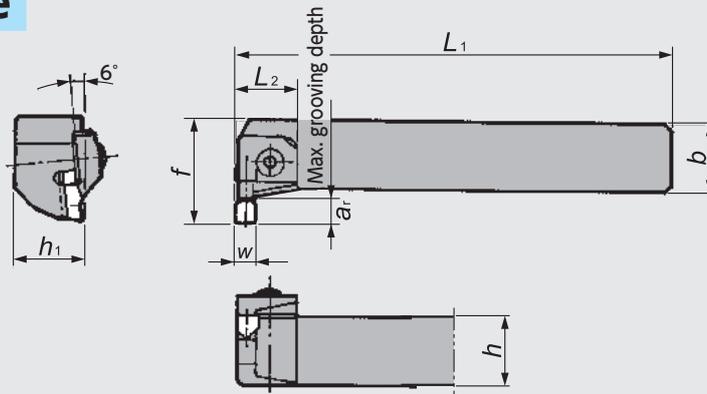


Figure-2

• Right-hand type shown.

Holder dimensions

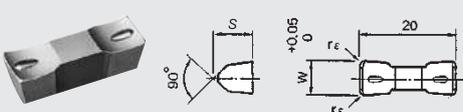
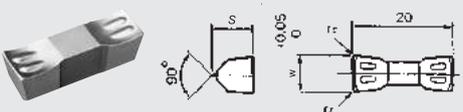
Shape	Code No.		Toolholder Part No.	Stock		Dimensions (mm)								Width of groove (mm) w	Applicable insert	Parts				
	R	L		R	L	h	b	L ₁	h ₁	f	L ₂	a ₁	h ₂			Clamp	Clamping bolt	Spring	Wrench	
Figure-1	5765920		GTV ^{R/L} 16-3N	●		16	16	100	16	20	25		9	3.00 } 3.50	GEV300N(04) GEV350N(04) I21	CVR/L3SN	AOB-5C	ASG-5	LW-3	
	5778980		20-3N	●		20	20	125	20	25	32		0			CVR/L3N	AOB-6C	ASG-6	LW-4	
	5801667	5801675	25-3N	●	●	25	25	150	25	30	32									
	5657739	5657747	16-4N	●	●	16	16	100	16	20	25		9	4.00 } 5.90	GEV I21	CVR/L4SN	AOB-5C	ASG-5	LW-3	
	5657754	5657762	20-4N	●	●	20	20	125	20	25	32		0			CVR/L4N				
	5657770	5657788	25-4N	●	●	25	25	150	25	30	32									
	5657796	5657804	20-6	●	●	20	20	125	20	25	32		0	6.00 } 7.90	GTV (cross-grinding) GVMB GVMN GVGN I21~22	CVR/L6	AOB-6C	ASG-6	LW-4	
	5609193	5611397	25-6	●	●	25	25	150	25	30	32									
	5657812		20-8	●		20	20	125	20	25	32									
	5657697	5657705	25-8	●	●	25	25	150	25	30	32			8.00 } 9.00						
Figure-2	5657820	5657838	GKV ^{R/L} 20-4N	●	●	20	20	125	20	33	32		11	4.00 } 5.90 6.00 } 7.90 8.00 } 9.00		CVR/L4N				
	5657846	5657853	25-4N	●	●	25	25	150	25	38	32									
	5657861		20-6	●		20	20	125	20	33	32									
	5657713	5657721	25-6	●	●	25	25	150	25	38	32									
			20-8			20	20	125	20	33	32									
		25-8			25	25	150	25	38	32										

Note) The right-hand GKV type holders come with a left-hand clamp.

Applicable inserts

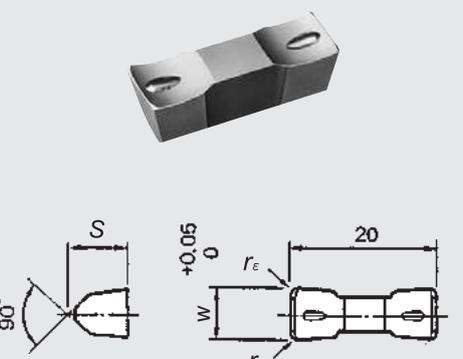
GVGN type

V-shaped location type Molded chipbreaker

Shape	Part No.	Dimensions (mm)			Cermet		PVD-coated micro-grain carbide	
		w	S	r _ε	N40	Stock	QM3	Stock
	GTV400N	4.0	8.5	0.15	5654496	●	5027610	●
	400N04			0.4	5654504	●	5046727	●
	GTV600N	6.0	8.5	0.15	5654512	●	5027602	●
	600N04			0.4	5654520	●	5046735	●

GEV type

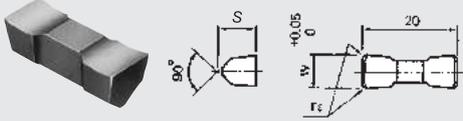
Molded chipbreaker

Shape	Part No.	Dimensions (mm)			Cermet		PVD-coated micro-grain carbide	
		w	S	r _ε	N40	Stock	QM3	Stock
	GEV300N	3.0	5.2	0.2	5763271	●	5027586	●
	300N04			0.4			5048392	●
	GEV350N	3.5	5.2	0.2	5801972	●		
	350N04			0.4			5053616	●
	GEV400N	4.0	8.5	0.2	5658893	●	5046818	●
	400N04			0.4	5669726	●	5035233	●
	GEV450N	4.5	8.5	0.2				
	450N04			0.4			5227517	●
	GEV500N	5.0	8.5	0.2	5653829	●	5046800	●
	500N04			0.4			5035225	●
	GEV550N	5.5	8.5	0.2	5653837	●		
	550N04			0.4			5255385	●
	GEV600N	6.0	8.5	0.2	5653845	●	5082961	●
	600N04			0.4			5042189	●
	GEV650N	6.5	8.5	0.2	5653852	●		
	650N04			0.4			5064191	●
GEV700N	7.0	8.5	0.2					
700N04			0.4	5653860	●	5037080	●	
GEV750N	7.5	8.5	0.2	5653878	●			
750N04			0.4			5255393	●	
GEV800N	8.0	8.5	0.2	5653886	●			
800N04			0.4			5255401	●	
GEV900N	9.0	8.5	0.2					
900N04			0.4					

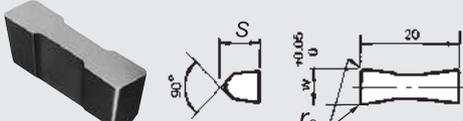
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 PCBN, CBN and ceramic
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 Machining Toolholders
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 Shaper
 Internal machining tool range
 Original Tools for Various Applications
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 Indexable Drill Inserts
 Milling Cutters
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 Index

Grooving tools

GVMB type

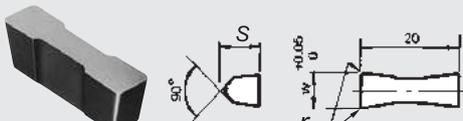
Shape	Part No.	Dimensions (mm)			Cermet			
		w	S	r _ε	C7X	Stock		
 <p>With chipbreaker</p>	GVMB20400N	4.0	8.5	0.2	5687520	●		
	20450N	4.5						
	20500N	5.0					5687512	●
	20550N	5.5						
	20600N	6.0					5687538	●
	20650N	6.5						
	20700N	7.0					5687546	●
	20750N	7.5					5687553	●
	20800N	8.0					5687561	●
	20900N	9.0						

GVMN type

Shape	Part No.	Dimensions (mm)			Cermet		
		w	S	r _ε	C7X	Stock	
 <p>Without chipbreaker</p>	GVMN20400N	4.0	8.5	0.2	5691167	●	
	20450N04 *	4.5		0.4			
	20500N	5.0					
	20550N	5.5					
	20600N	6.0				5687652	●
	20650N	6.5					
	20700N	7.0					
	20750N	7.5					
	20800N	8.0					
	20900N	9.0					

*This part no. alone has a nose radius of 0.4.

GVGN type

Shape	Part No.	Dimensions (mm)			Ceramic					
		w	S	r _ε	HC2	Stock	HC4	Stock		
 <p>Without chipbreaker</p>	GVGN20400N	4.0	8.5	0.2						
	20500N	5.0								
	20600N	6.0								
	20700N	7.0								
	20800N	8.0								
	20900N	9.0								

The ceramic grade inserts are manufactured on a production-to-order basis.

MEMO

NTK

New Products

Tool Materials / Selection Guide

PCD, CBN and ceramic

Cermet
PVD-coated Carbide

Micro-grain Carbide, Carbide

Insert Stock List

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SS

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Threading Tools

Shaper

Internal Machining tool range

Original Tools for Various Applications

Indexable End Milling Tools

Indexable Drill Inserts

Milling Cutters

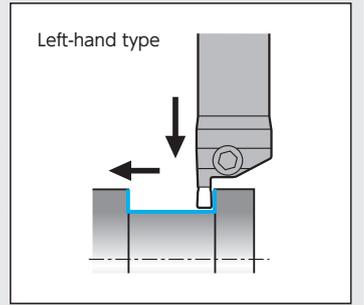
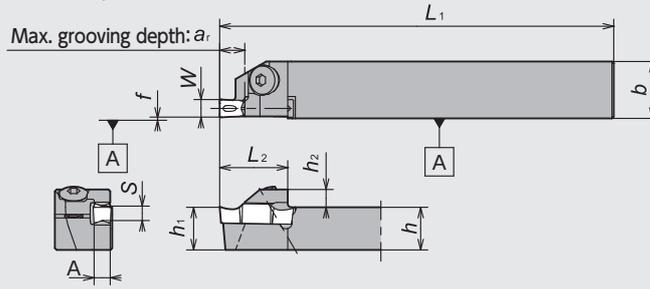
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SCRUM DUO

GTWP type

For Swiss lathe (shank size □16)
Side turning possible
Maximum diameter for grooving $\phi 42$

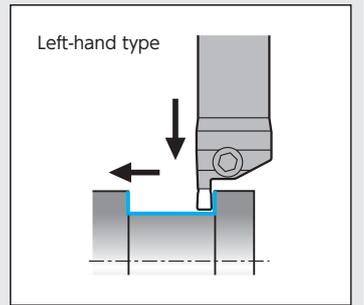
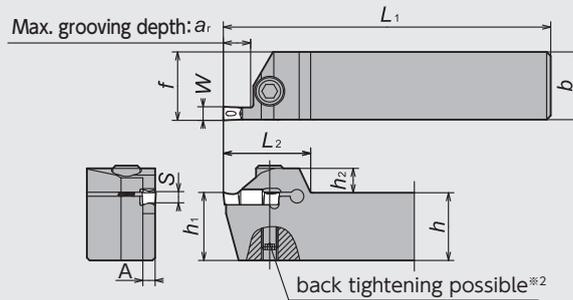


● Right-hand type shown.

Figure-1

GTWP type

For mutipurpose lathe (shank size □20, □25)
Side turning possible



● Right-hand type shown.

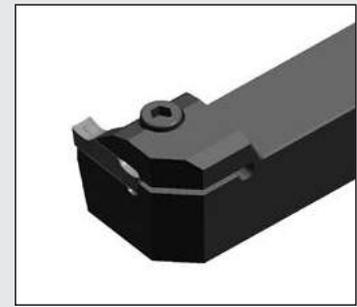
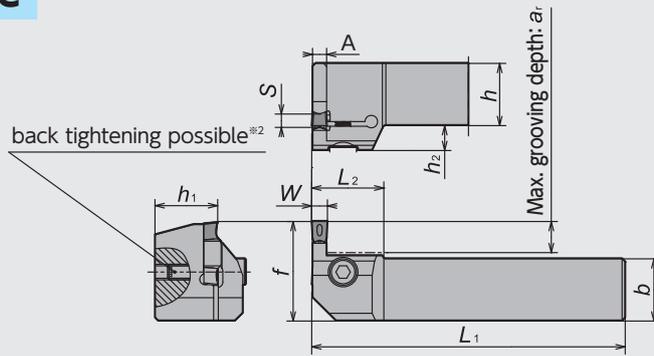
Figure-2

Shape	Code No.		Toolholder Part No.	Stock		Width of groove (mm) w	Max. grooving depth ar	Dimensions (mm)							Height*1 S	Applicable insert	Parts			
	R	L		R	L			h	b	h1	h2	f	L1	L2			A	Clamping bolt	Wrench	Wrench*2
Figure-1	5875125		GTWP% 1016-3D07	●		3	7	10		12	2	0.3	120	19	2.6	D	GWPO300 I25	AOB-5*14	LW-3S	—
	5849054	5852280	1216-3D07	●	●		12		16	0	19.5									
	5849070	5852306	1616-3D09	●	●		9	16	16	0	22									
	5875133		1016-4E07	●		4	7	10		12	2	0.3	120	19	3.5	E	GWPO400 I25	AOB-5*14	LW-3S	—
	5849088	5852314	1216-4E07	●	●		12	16	16	0	19.5									
	5849096	5852322	1616-4E09	●	●		9	16	16	0	22									
	5875141		1016-5F07	●		5	7	10		12	2	0.3	120	19	4.5	F	GWPO500 I25	AOB-5*14	LW-3S	—
	5849104	5852355	1216-5F07	●	●		12	16	16	0	19.5									
	5849112	5852371	1616-5F09	●	●		9	16	16	0	22									
	5893565		1020-6G07	●		6	7	10	20	10	2	0.3	120	22	5.3	G	GWPO600 I25	AOB-5*14	LW-3S	—
5893573		1220-6G07	●		7		12	20	12	0	22.5									
5893581	5893599	1620-6G09	●	●	9		16	20	16	0	25									
Figure-2	5849120	5852397	GTWP% 2020K-3D10	●	●	3	10	20	20	20	8	20.2	125	29	2.6	D	GWPO300 I25	CS0520W	LW-4	LW-2.5
	5849138	5852405	2525M-3D10	●	●		25	25	25	9	25.2	150	32	CS0625W				LW-5	LW-3	
	5849146	5852421	2020K-3D20	●	●		20	20	20	8	20.2	125	41	CS0520W				LW-4	LW-2.5	
	5849153	5852439	2525M-3D20	●	●	25	25	25	9	25.2	150	44	CS0625W	LW-5	LW-3					
	5849161	5852447	2020K-4E10	●	●	4	10	20	20	20	8	20.3	125	29	3.5	E	GWPO400 I25	CS0520W	LW-4	LW-2.5
	5849179	5852454	2525M-4E10	●	●		25	25	25	9	25.3	150	32	CS0625W				LW-5	LW-3	
	5849187	5852470	2020K-4E20	●	●		20	20	20	8	20.3	125	41	CS0520W				LW-4	LW-2.5	
	5849195	5852488	2525M-4E20	●	●	25	25	25	9	25.3	150	44	CS0625W	LW-5	LW-3					
	5849203	5852496	2020K-5F10	●	●	5	10	20	20	20	8	20.3	125	29	4.5	F	GWPO500 I25	CS0520W	LW-4	LW-2.5
	5849211	5852512	2525M-5F10	●	●		25	25	25	9	25.3	150	32	CS0625W				LW-5	LW-3	
	5849229	5852520	2020K-5F20	●	●		20	20	20	8	20.3	125	41	CS0520W				LW-4	LW-2.5	
	5849237	5852538	2525M-5F20	●	●	25	25	25	9	25.3	150	44	CS0625W	LW-5	LW-3					
	5849245	5852546	2020K-6G12	●	●	6	12	20	20	20	8	20.35	125	34	5.3	G	GWPO600 I25	CS0520W	LW-4	LW-2.5
	5849252	5852553	2525M-6G12	●	●		25	25	25	9	25.35	150	37	CS0625W				LW-5	LW-3	
	5849260	5852561	2020K-6G25	●	●		20	20	20	8	20.35	125	49	CS0520W				LW-4	LW-2.5	
	5849278	5852587	2525M-6G25	●	●	25	25	25	9	25.35	150	52	CS0625W	LW-5	LW-3					

* 1 Please make sure the insert height fit on the toolholder.
* 2 Wrench for back side clamping is optional.

GKWP type

L style holder



※Recommended torque 7.0 (N · m)
● Left-hand type shown.

Code No.		Toolholder Part No.	Stock		Width of groove (mm) w	Max. grooving depth ar	Dimensions (mm)							Height ^{※1} S	Applicable insert	Parts		
R	L		R	L			h	b	h ₁	h ₂	f	L ₁	L ₂			A	Clamping bolt	Wrench
	5893607	GKWP[®] 2020K-3D10	●	3	10	20	20	20	8	32	125	23	2.6	D	GWPO300	CS0520W	LW-4	LW-2.5
	5893615	2020K-4E10	●	4									3.5	E	GWPO400			
	5893623	2020K-5F10	●	5									4.5	F	GWPO500			
	5893631	2020K-6G12	●	6									5.3	G	GWPO600			

※ 1 Please make sure the insert height fit on the toolholder.
※ 2 Wrench for back side clamping is optional.

GWP type

Applicable insert

Shape	Part No.	Dimensions (mm)					Height ^{※1} S	PVD coated micro-grain carbide						
		W		r _e	M	L		DM4	Stock					
		Width	Tolerance											
<p>●Excellent in both sharpness and chipcontrol ●Applicable for both grooving and traverse machining</p>	GW (ground chipbreaker)	GWPG300N02D-GW 300N04D-GW	3.0	±0.025	0.2	2.5	20.6	D	5848023	●				
	GWPG400N02E-GW 400N04E-GW 400N08E-GW	4.0	0.2		3.4	E		5848064	●					
	GWPG500N02F-GW 500N04F-GW 500N08F-GW	5.0	0.2		4.3	F		5848106	●					
	GWPG600N02G-GW 600N04G-GW 600N08G-GW	6.0	0.2		5.2	G		5848148	●					
			0.4		25.6			5848155	●					
			0.8					5852900	●					
	<p>●Excellent in both sharpness and chipcontrol ●Applicable for both grooving and traverse machining</p>	GW (no-ground chipbreaker)	GWPM300N04D-GW 400N04E-GW 500N04F-GW 600N04G-GW		3.0 4.0 5.0 6.0	±0.05	0.4	2.5 3.4 4.3 5.2	20.6	D E F G	5848171 5848197 5848213 5848239	● ● ● ●		
		<p>●Excellent sharpness with high-rake angle ●Chipbreaker designed to V chip shape so that it does not rub on side walls of part</p>	GV (ground chipbreaker)		GWPG300N02D-GV 300N04D-GV GWPG400N02E-GV 400N04E-GV GWPG500N02F-GV 500N04F-GV GWPG600N02G-GV 600N04G-GV		3.0 4.0 5.0 6.0	±0.025	0.2	2.5	20.6	D	5848262	●
							0.4		4.3	E		5848270	●	
							0.2		4.3	F		5848353	●	
					0.4	4.3	G		5848361	●				
					0.2	25.6			5848395	●				
			0.4			5848403	●							
		0.2	4.3		5848437	●								
		0.4			5848445	●								

※ 1 Please make sure the insert height fit on the toolholder.

Grooving tools

GTVW type

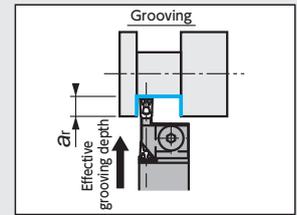
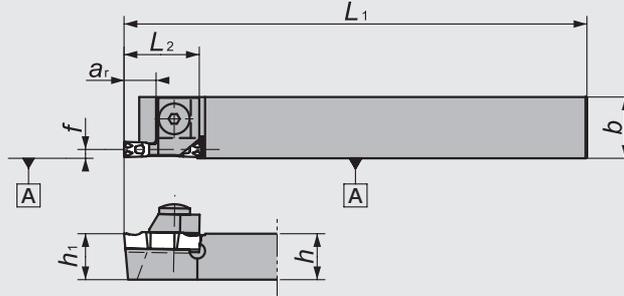


Figure-1

- Use for grooving.
- Right-hand type shown.

GTVW type

With offset

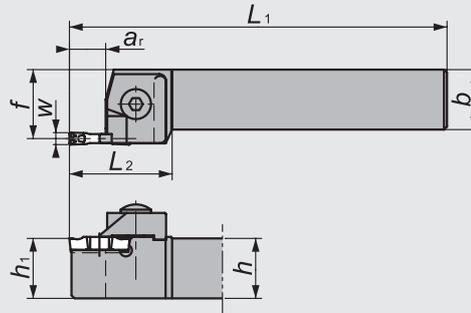


Figure-2

- Right-hand type shown.

Holder dimensions

Shape	Code No.		Toolholder Part No.	Stock		Dimensions (mm)						Width of groove (mm) w	Applicable insert	Parts						
	R	L		R	L	h	b	L ₁	h ₁	f	L ₂			a _r	Clamp	Clamping bolt	Spring	Wrench		
Figure-1		5512355	GTVW ^{R/L} 1016-3	■		10				10				3.0	GVW300 (See table below)	CVSR/L3	AOS-5*16 AOS-5*20	ASG-5	LW-2.5S	
		5512371		1216-3	■		12	16			12		19.5							6.2
				1616-3			16				16		22							8.0
		5565189		2020-3	■		20	20			20			4.0	GVW400 GVW500 (See table below)	CVSR/L4	AOS-5*16 AOS-5*20	ASG-5	LW-2.5S	
		5509989	1016-4		■		10				10		19.5							6.2
				2020-4					120		12			5.0	GVW600 (See table below)	CVSR/L6	AOS-5*16 AOS-5*20	ASG-5	LW-2.5S	
			1216-4				12	16			12		22							8.0
		5509948	1616-4		■		16				16		19.5							6.2
		5565205	5565213		■	■	20	20			20			6.0	GVW600 (See table below)	CVSR/L6	AOS-5*16 AOS-5*20	ASG-5	LW-2.5S	
					10				10		19.5	6.2								
					12	20			12		22	8.0								
	5520903	5520853		■	■	16				16			6.0	GVW600 (See table below)	CVSR/L6	AOS-5*16 AOS-5*20	ASG-5	LW-2.5S		
					20				20		22	8.0								
		5565239		■		20				20										
Figure-2		5519293	GTVW ^{R/L} 20-3	■		20	20	125	20	23.5				3.0	GVW300 (See table below)	CVR/L3N	AOB-6C	ASG-6	LW-4	
		5517081		25-3	■		25	25	150	25	28.0									
		5514013	5514021	20-4	■	■	20	20	125	20	23.5			4.0	GVW400 GVW500 (See table below)	CVR/L4N	AOB-6C	ASG-6	LW-4	
			5514047		25-4	■		25	25	150	25	28.0								
			5520895	20-6	■		20	20	120	20				6.0	GVW600 (See table below)	CVR/L6	AOB-6C	ASG-6	LW-4	
			5520887		25-6	■		25	25	150	25									

Applicable inserts

GVW type

Molded chipbreaker

Shape	Part No.	Dimensions (mm)		PVD-coated micro-grain carbides	
		w	r _e	QM3	Stock
	GVW300N02	3.00	0.2	5520390	■
	300N04		0.4	5520382	■
	GVW400N02	4.00	0.2	5510839	■
	400N04		0.4	5510847	■
	GVW500N02	5.00	0.2	5520432	■
	500N04		0.4	5520424	■
GVW600N02	6.00	0.2	5520374	■	
600N04		0.4	5520366	■	

※ ■ change to non-stock items as soon as no stock

Multi-functional tools for machining of aluminum

GTPA type

Front/back clamping type

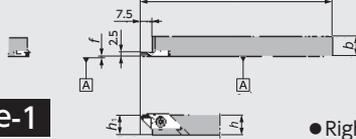


Figure-1

● Right-hand type shown.

Y-GTPA type

Front/back clamping type
Y-axis holder

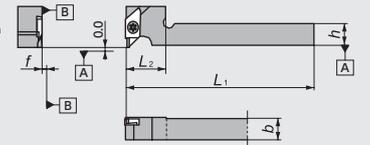


Figure-2

● Right-hand type shown.

GTPA-OH型

Front/back clamping type
SPLASH BAR

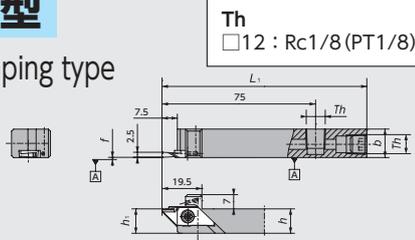


Figure-3

Y-GTPA-OH型

Front/back clamping type
SPLASH BAR **NEW**

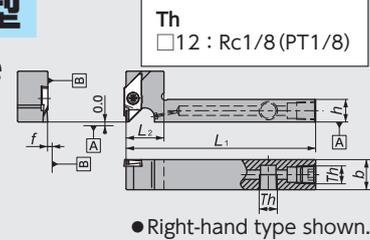


Figure-4

● Right-hand type shown.

Y-GTPA-OH type

Front/back clamping type
For Y-axis high-pressure coolant

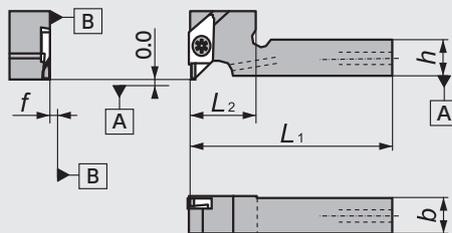
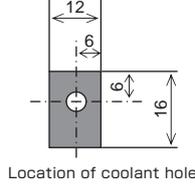


Figure-5

Y-GTPA[®]/L1216SOH



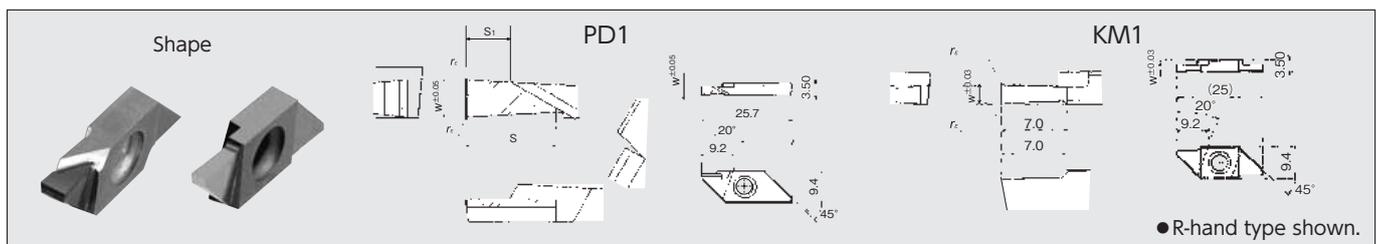
Location of coolant hole

Holder dimensions

Shape	Code No.		Toolholder Part No.	Stock		Dimensions (mm)						Width of groove (mm) w	Applicable insert 	Parts	
	R	L		R	L	h	b	L ₁	h ₁	f	L ₂			Clamping screw 	Wrench
Figure-1	5552401		GTPA [®] /L1010	●		10	10		10			2.0	GTPA (See table below)		
	5552419		1212	●		12	12	120	12	0.1	—				
	5577291		1616	★		16	16		16						
Figure-2	5563820		Y-GTPA [®] /L1216	●		12	16	120	—	0.1	20	2.5	GTPA (See table below)		
Figure-3	5912845		GTPA [®] /L1214H-OH	★		12	14	100	12	0.1	—				
Figure-4	5911482		Y-GTPA [®] /L1216HS-OH	●		12	16		—	0.1	20	2.5	GTPA (See table below)		
	Figure-5	5911490		Y-GTPA [®] /L1216H-OH	●		16	16		—	0.1				
Figure-5	5700018		Y-GTPA [®] /L1216SOH	■		12	16	70	—	0.1	20	2.5	GTPA (See table below)		
	5700026		1616OH	■		16	16		—	0.1	25				

Applicable inserts

GTPA type



● R-hand type shown.

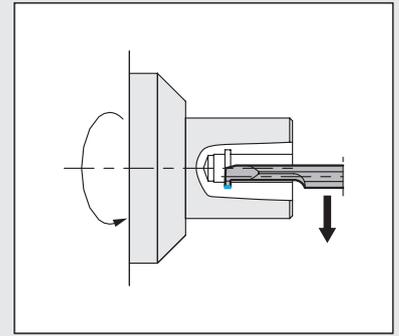
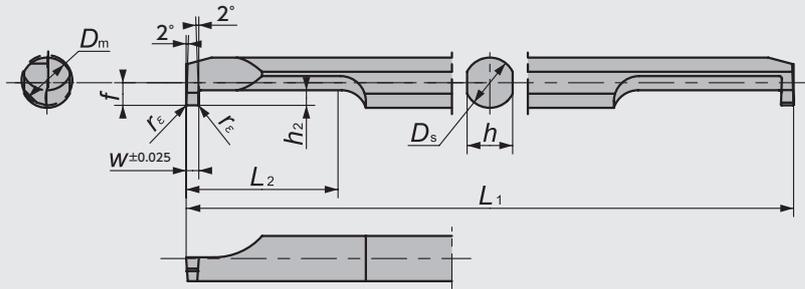
Part No.	Dimensions (mm)				Effective grooving depth	PCD		Micro-grain carbide	
	w	s	s ₁	f _e		PD1	Stock	KM1	Stock
GTPA20FRN01	2.0	6.0	4.0	0.1 and or less	5.0	5552385	●		
20FRN01		—	—		6.0			5576525	●
20FRN01-082		4.0	2.0		3.0	5574611	●		
GTPA25FRN01	2.5	6.0	3.0	0.1 and or less	5.0	5552393	●		
25FRN01		—	—		6.0			5576533	●
25FRN01-081		4.0	1.0		3.0	5561808	●		

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SBG type

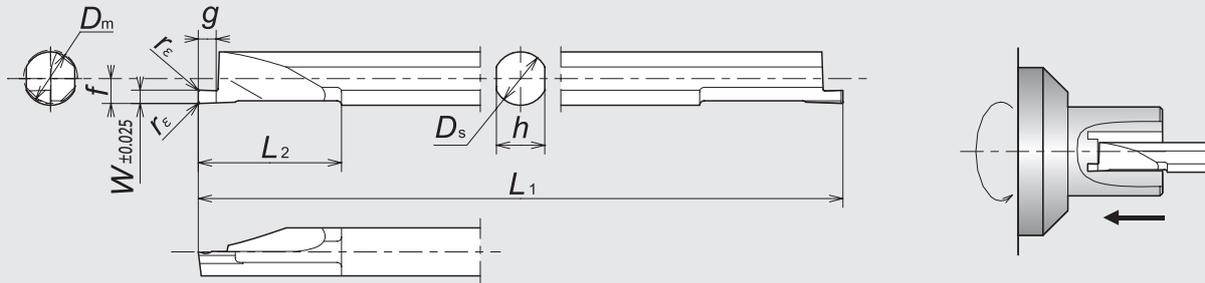
Minimum diameter for grooving: From $\phi 3.0$



type	Shape	Chip breaker	Min. diameter for grooving (mm) D_m	Dimensions (mm)								PVD-coated micro-grain carbides	
				w	D_s	L_1	L_2	f	h	h_2	r_e	ZM3	Stock
Short type	SBG030050RB-S	Provided	3.0	0.50	3.0	50	4.5	1.3	2.7	0.8	0.05	5815782	●
	030075RB-S			0.75								5815808	●
	030100RB-S			1.00								5815816	●
	030150RB-S			1.50								5815824	●
	SBG040050RB-S		0.50	4.0	60	6	1.8	3.6	1.0	0.05	5815832	●	
	040075RB-S		0.75								5815840	●	
	040100RB-S		1.00								5815857	●	
	040150RB-S		1.50								5815865	●	
	SBG050050RB-S		0.50	5.0	70	7.5	2.3	4.5	1.2	0.05	5815881	●	
	050100RB-S		1.00								5815899	●	
	050150RB-S		1.50								5815907	●	
	050200RB-S		2.00								5815915	●	
	SBG060100RB-S		1.00	6.0	80	7.5	2.8	5.4	1.8	0.05	5815931	●	
	060150RB-S		1.50								5815949	●	
	060200RB-S		2.00								5815956	●	
	SBG080100RB-S		1.00								8.0	8.5	3.8
080150RB-S	1.50	5815980	●										
080200RB-S	2.00	5815998	●										
SBG030050RB	Provided	3.0	0.50	3.0	50	9	1.3	2.7	0.8	0.05			
030075RB			0.75								5652839	●	
030100RB			1.00								5652847	●	
SBG040050RB			0.50								4.0	60	12
040075RB		0.75	5652805	●									
040100RB		1.00	5652813	●									
SBG050050RB		0.50	5.0	70	20	2.3	4.5	1.2	0.05	5652854			
050100RB		1.00								5652862	●		
050150RB		1.50								5652870	●		
SBG060100RB		1.00								6.0	80	20	2.8
060150RB		1.50	5704838	●									
060200RB		2.00	5704820	●									
SBG080100RB		1.00	8.0	20	3.8	7.3	2.2	0.05	5704895				
080150RB		1.50							5704903	●			
080200RB		2.00							5704911	●			

► For sleeves, please refer to pages L22 and L23.

SFG type



● Right-hand type shown.

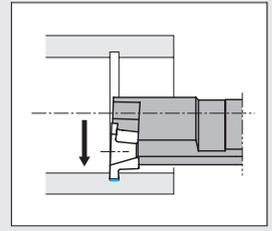
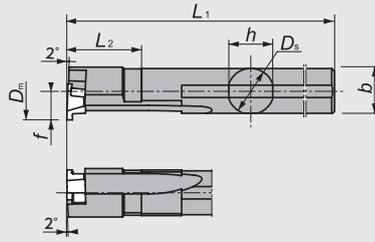
Shape	Chip breaker	Min. diameter for grooving (mm) D_m	Dimensions (mm)								PVD-coated micro-grain carbides	
			W	D_s	L_1	L_2	g	f	h	r_e	TM4	Stock
SFG060R100B		6.0	1.00	6.0	80	16.0	1.5	2.8	5.4	0.05	5813837	●
060R150B			1.50				2.0				5813845	●
060R200B			2.00				3.0				5813852	●
SFG080R100B		Provided	8.0	1.00	8.0	16.0	1.5	3.8	7.3	0.05	5813878	●
080R150B	1.50			2.0			5813886				●	
080R200B	2.00			3.0			5813894				●	
080R300B	3.00			3.0			5813902				●	

► For sleeves, please refer to pages L22 and L23.

Grooving tools

S-BG type

Minimum diameter for grooving: From $\phi 10$

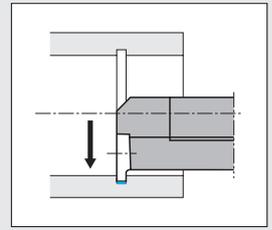
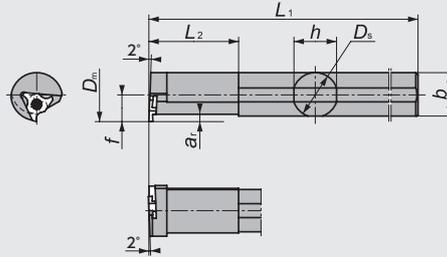


● Right-hand type shown.
Note) Use L-hand inserts for R-hand type holders.

Figure-1

BG type

Minimum diameter for grooving: From $\phi 10$



● Right-hand type shown.
Note) Use L-hand inserts for R-hand type holders.

Figure-2

Shape	Code No.		Toolholder Part No.	Stock		Min.dia. for grooving D_m	Effective grooving depth a_r	Dimensions (mm)						Width of groove (mm) w	Applicable insert	Parts	
	R	L		R	L			D_s	h	b	L_1	f	L_2			Clamping screw	Wrench
Figure-1	5854500		S08H-BG$\frac{R}{L}$10D10	●		10.0	1.0	8	7.7	7.85	120	5.0	20	0.50 ~ 2.00	GTG10 (See table below)	LR-S-2.5 * 6.8	CLR-15S (A)
	5854518		S10K-BG$\frac{R}{L}$10D12	●		12.0		10	9.6	9.8	120	6.0	25				
Figure-2	5711585		BG$\frac{R}{L}$08-00S	●		10.0	1.0	8	7.0	7.5	125	5.0	20	0.50 ~ 2.00	GTG10 (See table below)	LR-S-2.5 * 6.8	CLR-15S (A)
	5711593		08-10S	●		10.0		1.00 ~ 2.00									
	5711601		10-00S	●		12.0	2.0	10	9.0	9.5	150	6.0	25	0.50 ~ 2.00	GTG10 (See table below)	LR-S-2.5 * 6.8	CLR-15S (A)
	5711619		10-10S	●		12.0		1.00 ~ 2.00									
	5711627		12-00S	●		14.0	2.0	12	11.0	11.5	180	7.0	30	1.00 ~ 2.00	GTG14 (See table below)	LR-S-3 * 7.8	RLR-20S (B)
	5711635		12-12S	●		14.0		1.45 ~ 2.00									
	5711643		14-00S	●		16.0	3.0	14	13.0	13.5	180	8.0	35	1.00 ~ 2.00	GTG14 (See table below)	LR-S-3 * 7.8	RLR-20S (B)
	5711650		14-12S	●		16.0		1.45 ~ 2.00									
	5536362		16	●		20.0	3.0	16	15.0	15.5	200	10.0	40	1.50 ~ 2.00	GTG20 (See table below)	LR-S-3 * 7.8	RLR-20S (B)
	5435433		20	●		25.0		20	19.0	19.5	200	12.0	40				

※Use applicable holders from -00s, -10s and -12s accordingly with the groove width required.

Applicable inserts

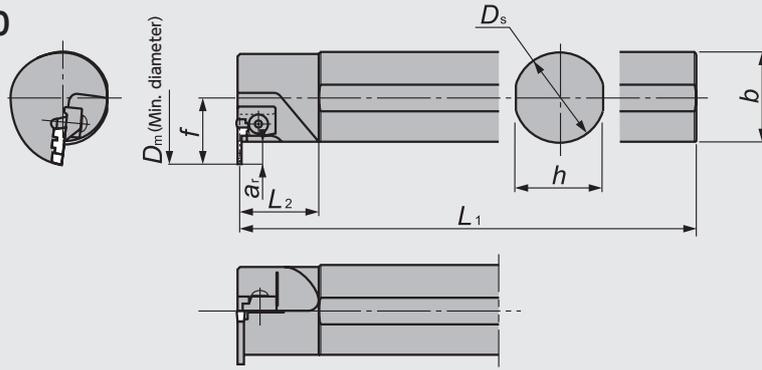
GTG type

Shape	Part No.	Dimensions (mm)					Cermet		PVD-coated micro-grain carbides					
		w	Effective grooving depth	L	r_e	d	C7X	Stock	TM4	Stock	ZM3	Stock	QM3	Stock
	GTG10050FL005	0.50	1.0	1.2	0.05	5.56			5853130	●				
	10075FL005	0.75							5853114	●				
	10100FL005	1.00							5853098	●				
	10150FL005	1.50							5853080	●				
	10200FL005	2.00							5853072	●				
	GTG10050FL00	0.50					1.0	1.2	0.05	5.56				
	10065FL00	0.65				5514104					●			
	10075FL00	0.75				5376835					●			
	10100FL00	1.00				5376843					●			
	10125L	1.25			0.2	5687611					●			
10150FL00	1.50			0.05							5376850	●		
	10200FL01	2.00			0.1			5357884	●					
	GTG14100FL00	1.00	2.0	2.2	0.05	7.94					5376868	●		
	14145L	1.45							5687579	●				
	14150FL00	1.50										5376876	●	
	14175L	1.75							0.2	5687587	●			
	14200FL01	2.00							0.1			5376884	●	
	GTG20150FL	1.50					3.0	3.2	0.2	9.525				
	20175L	1.75			5687595	●								
	20200L	2.00			5687603	●								
	20200FL	2.00												5376991

● L-hand shown.

GKV type

Minimum diameter for grooving: From $\phi 30$



● Right-hand type shown.

Holder dimensions

Code No.		Toolholder Part No.	Stock		Dimensions (mm)								Width of groove (mm) w	Applicable insert 	Parts			
R	L		R	L	D _s	h	b	L ₁	f	L ₂	a _r	D _m			Clamp	Clamping bolt	Spring	Wrench
5255567		GKV^RL3230-3	●		32	30	31	200	21	50	5.5	30	3.00	GEV (See table below)				
5255559		3240-3	●		32	30	31	250	23	50	7.5	40	}					
5255542		4055-3	●		40	38	39	300	29	35	9.5	55						

Note) The right-hand type holders come with a left-hand clamp.

Applicable inserts

GEV type

Molded chipbreaker

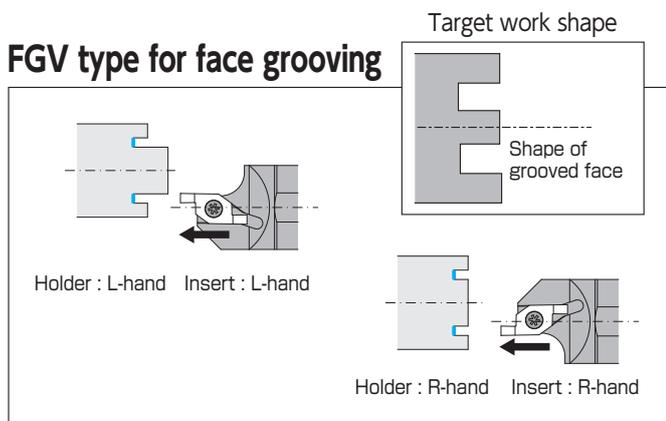
Shape	Part No.	Dimensions (mm)			Cermet		PVD-coated micro-grain carbide	
		w	S	r _ε	N40	Stock	QM3	Stock
 	GEV300N	3.0	5.2	0.2	5763271	●	5027586	●
	300N04			0.4			5048392	●
	GEV350N	3.5	5.2	0.2	5801972	●		
	350N04			0.4			5053616	●

Face grooving tool series SATURN DUO

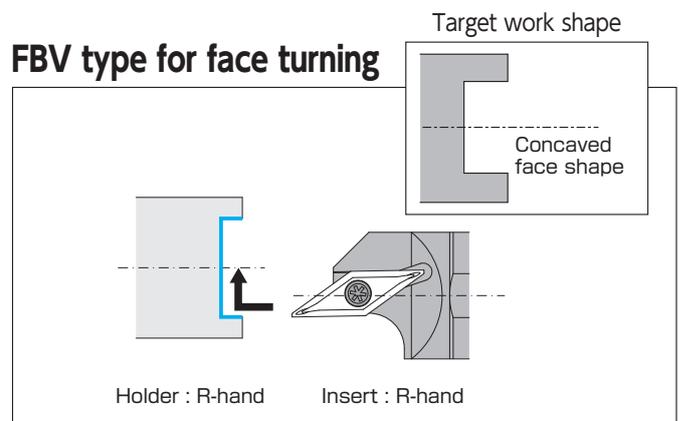


Features

- FGV type for face grooving and FBV type for face turning.
- Economical double-corner specification.
- Improved tool rigidity by optimizing overhang and holder shape.
- Gang-type, front-gang-type and sleeve holder type are available.
- A new coating, ultra Z-coated "TM4" is used as the insert material.
- Both cutting performance and wear resistance improved.



- Grooving possible under a wide range of cutting conditions due to the improved rigidity of both inserts and holders
- Minimum machining diameter from $\phi 6$, groove width from 1.0 mm
- L-hand types available for machining work with a boss



- Further improved face machining efficiency
- Minimum machining diameter from $\phi 8$

<FGV type for face grooving> Minimum machining diameter : $\phi 6$ WET

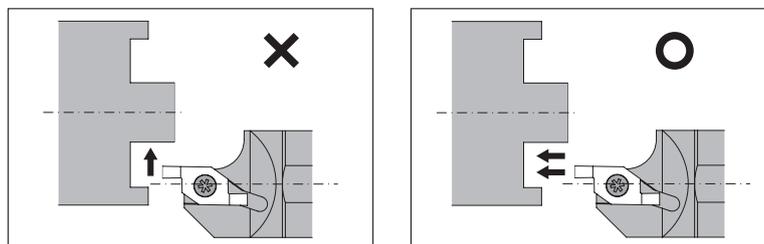
		General steel (carbon steel, alloy steel)	Stainless steel (excluding SUS303)	Free-cutting steel (including SUS303)	Non ferrous metal (Brass, aluminum, copper, etc.)
Cutting speed (m/min)		50 (30 ~ 100)	40 (30 ~ 100)	60 (30 ~ 100)	80 (50 ~ 120)
Feed rate (mm/rev)	Groove width W (mm)	1.0	0.03 (0.01 ~ 0.05)	0.04 (0.01 ~ 0.06)	0.04 (0.01 ~ 0.06)
		1.5	0.02 (0.01 ~ 0.04)	0.01 (0.005 ~ 0.03)	0.03 (0.01 ~ 0.05)
		2.0	0.01 (0.005 ~ 0.03)	0.01 (0.005 ~ 0.03)	0.02 (0.01 ~ 0.04)

☆Useful tips for machining

- ① It's possible to cut wider than the groove width of the insert by dividing the cut into several passes. When grooving, always cut from the outer to the inner side because the insert may otherwise interfere with the work piece. (Especially when widening the groove width so that the face diameter becomes the minimum advised or less.)
- ② If tool pass is left on the boss of the work, decrease the feed for withdrawing the insert.
- ③ If the tip end of the boss of the work is marked, lower the feed rate.
- ④ If the outer peripheral surfaces of grooves on the work show feed marks, either lower the feed rate or increase the cutting speed.
- ⑤ If the back end surface shows feed marks under a condition of low feed rate and low cutting speed, increase the cutting speed.

☆Caution

- Side turning is not possible.



Recommended cutting conditions for face grooving tool series

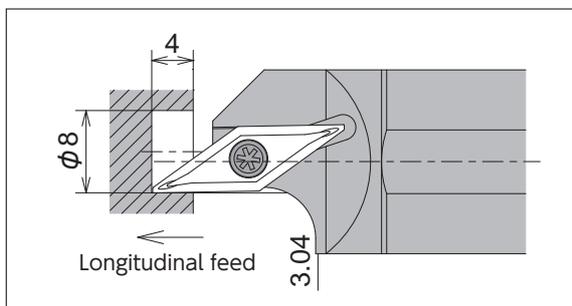
<FBV type for face machining> Minimum machining diameter : $\phi 8$ WET

		General steel (carbon steel, alloy steel)	Stainless steel (excluding SUS303)	Free-cutting steel (including SUS303)	Nonferrous metal (Brass, aluminum, copper, etc.)
Cutting speed (m/min)		50 (30 ~ 70)	40 (30 ~ 60)	60 (30 ~ 80)	80 (50 ~ 100)
Feed rate Longitudinal/ cross (mm/rev)	Depth of machining (mm)	1.0	Longitudinal : 0.015/cross : 0.06	Longitudinal : 0.015/cross : 0.06	Longitudinal : 0.03/cross : 0.06
		2.0	Longitudinal : 0.01/cross : 0.04	※	Longitudinal:0.015/cross : 0.03
		3.0	※	※	Longitudinal : 0.015/cross : 0.03
		4.0	※	※	Longitudinal : 0.015/cross : 0.03

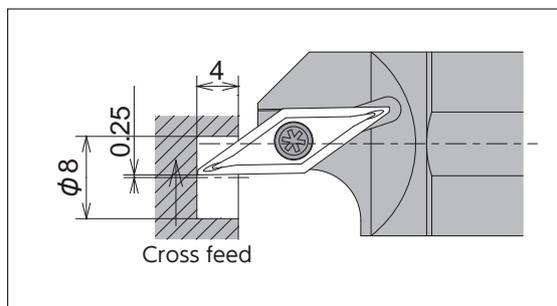
※When machining difficult materials where chip control is problematic (such as SUS304), it is recommended that the machining be carried out in several stages.

☆Machining method

- With materials allowing easy chip control, it is possible to machine up to 4 mm deep at a low feed rate in a single pass for both longitudinal feed and cross feed.



Cutting in the direction of Z: Longitudinal feed



Cutting in the direction of X: Cross feed

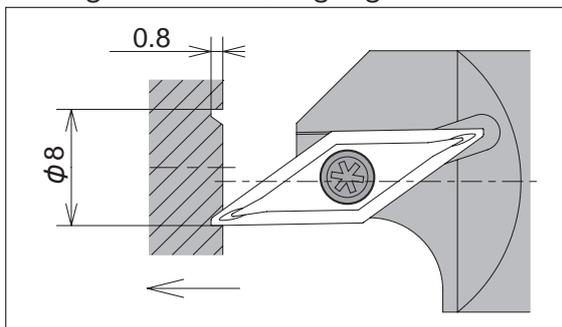
Supplemental explanation : Cutting in the direction of Z axis is expressed as the longitudinal feed and cutting in the direction X axis is expressed as the cross feed, here.

☆Useful tips for machining

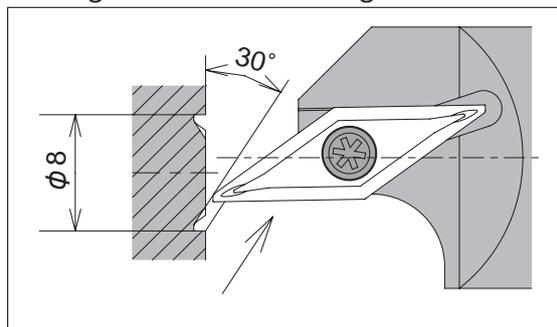
- When an area of inner peripheral is gauged, it is recommended that the machining be carried out in 2 passes , one of roughing and one of finishing in the following procedure:

☆Example of 2-pass machining: With 0.2 mm finishing allowance left, first carry out roughing and then, finish machine.

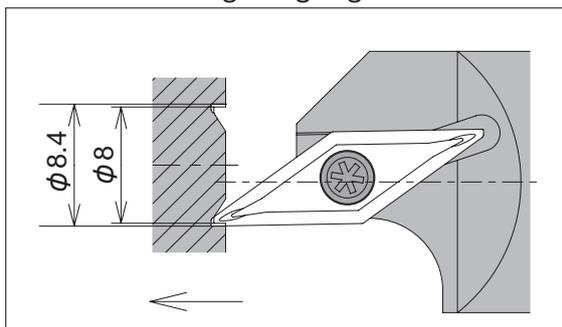
① Longitudinal feed (roughing)



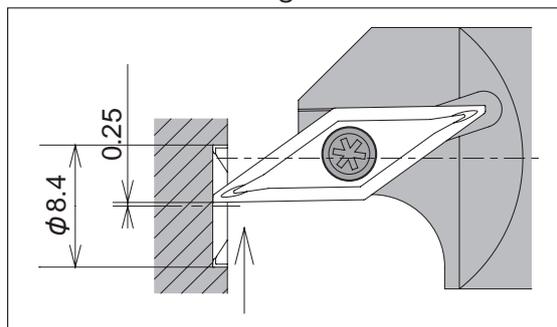
② Longitudinal feed (finishing)



③ Slant machining (roughing)



④ Cross feed (finishing)



Grooving tools

CH-FGV type

For front gang type tool post

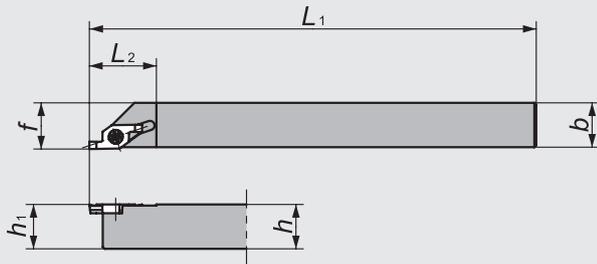
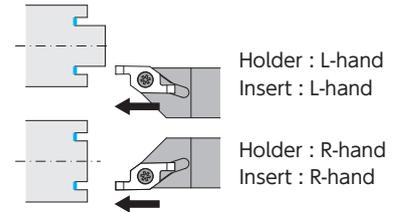


Figure-1

● Right-hand type shown.



Only R-hand type available with FBV type inserts.

FGV type

For gang type tool post

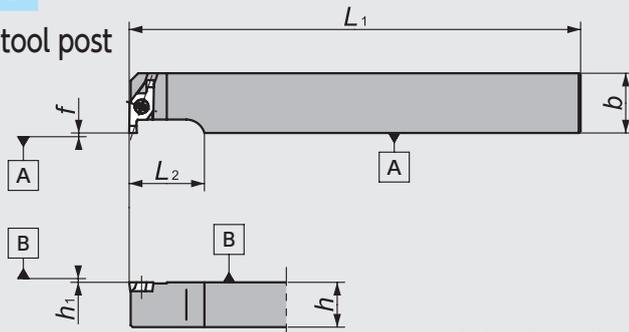
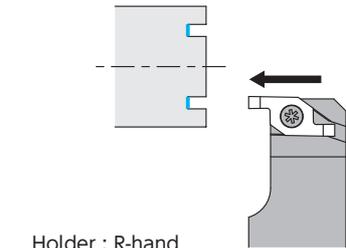


Figure-2

● Right-hand type shown.

Note) Use L-hand inserts for R-hand type holders.



Holder : R-hand
Insert : L-hand

DS-FGV type

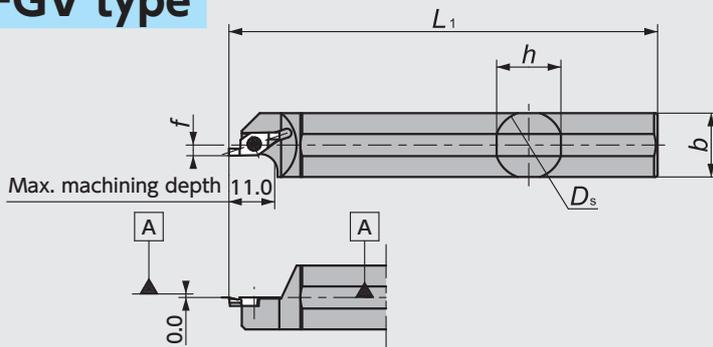
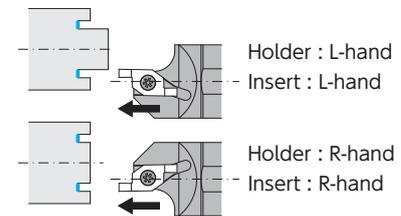


Figure-3

● Right-hand type shown.
● With an FGV type insert mounted



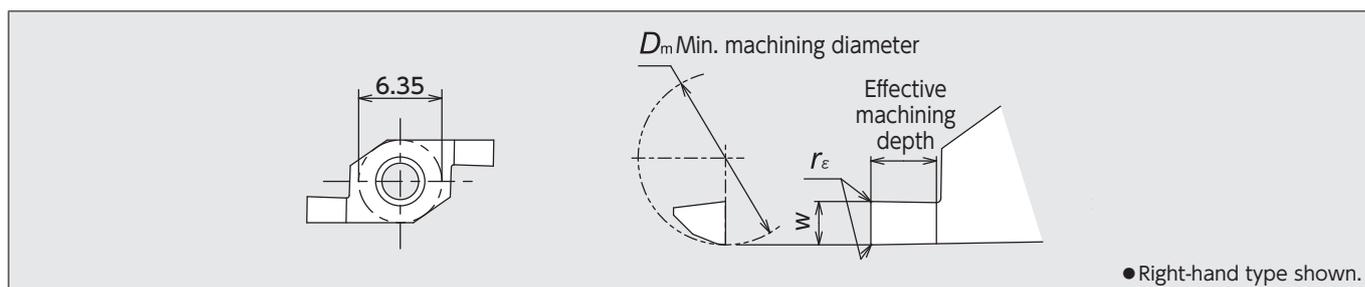
Only R-hand type available with FBV type inserts.

Holder dimensions

Shape	Code No.		Toolholder Part No.	Stock		Dimensions (mm)						Applicable insert	Parts		
	R	L		R	L	D_s	h	b	L_1	h_1	f		L_2	Clamping screw	Wrench
Figure-1	5691068	5691076	CH-FGV ^{R/L} 1010	●	●	—	10	10	120	10	10.5	18	FGV FBV I35	LRIS-2.5×7	CLR-15S
	5691084	5691100	1212	●	●	—	12	12		12	12.5				
	5691118	5691134	1616	●	●	—	16	16		16	16.5				
Figure-2	5691035	—	FGV ^{R/L} 1016	●	—	—	10	16	120	0.0	0.0	20	FGV I35	LRIS-2.5×7	CLR-15S
	5691043	—	1216	●	—	—	12								
	5691050	—	1616	●	—	—	16								
Figure-3	5841861	5772439	DS-FGV ^{R/L} 16-012	●	★	16	15	15	120	—	3.0	—	FGV FBV I35	LRIS-2.5×7	CLR-15S
	5690938	5690946	19	●	●	19.05	18	18							
	5690953	5690961	20	●	●	20	19	19							
	5690979	5690987	22	●	●	22	21	21							
	5690995	5691001	25	●	●	25.4	24.5	24.5							

Applicable inserts

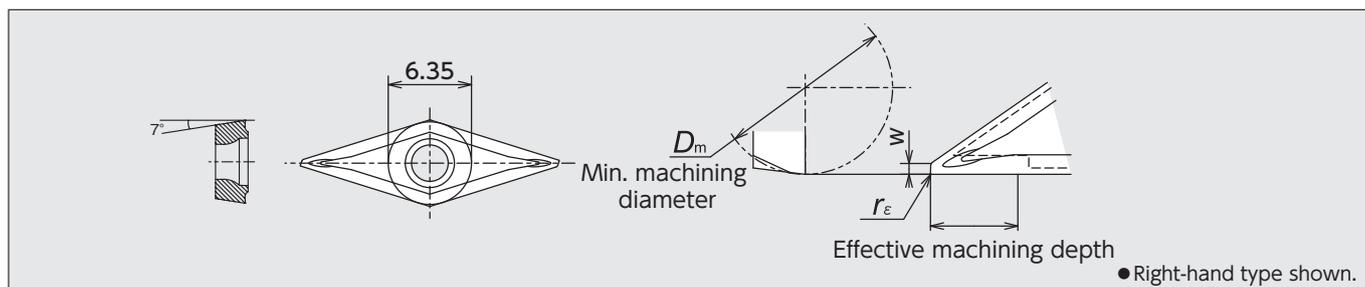
FGV type



	Part No.	Min. machining dia	Dimensions (mm)				PVD-coated micro-grain carbides	
			Thickness	w	r _ε	Effective machining depth	TM4	Stock
 R-hand shown	FGV100RB00D6	6.0	2.38	1.0	0.00	1.5	5704580	●
	100RB05D6				0.05		5704606	●
	FGV150RB00D6			1.5	0.00	2.0	5704614	●
	150RB05D6				0.05		5704622	●
	FGV200RB00D6			2.0	0.00	3.0	5704630	●
	200RB05D6				0.05		5704648	●
 L-hand shown	FGV100LB00D6	6.0	2.38	1.0	0.00	1.5	5704572	●
	100LB05D6				0.05		5704564	●
	FGV150LB00D6			1.5	0.00	2.0	5704556	●
	150LB05D6				0.05		5704549	●
	FGV200LB00D6			2.0	0.00	3.0	5704531	●
	200LB05D6				0.05		5704523	●

Applicable inserts

FBV type



	Part No.	Min. machining dia	Dimensions (mm)				PVD-coated micro-grain carbides	
			Thickness	w	r _ε	Effective machining depth	TM4	Stock
 R-hand shown	FBV40R05D8AM3	8.0	2.58	0.5	0.05	4.0	5697453	●
	40R15D8AM3				0.15		5697461	●

Note) The FBV type inserts are applicable only for right-hand holders of CH-FGVR and DS-FGVR types; Not applicable for left-hand types and FGV R/L type holders.

Face grooving tools

GFV type

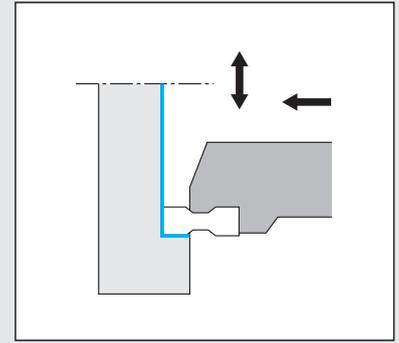
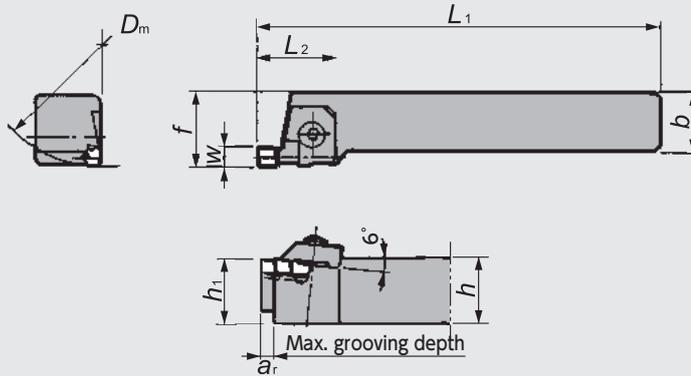


Figure-1

● Right-hand type shown.

GSV type

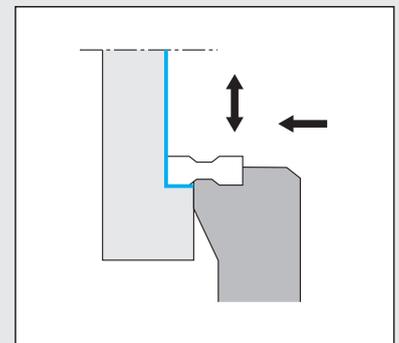
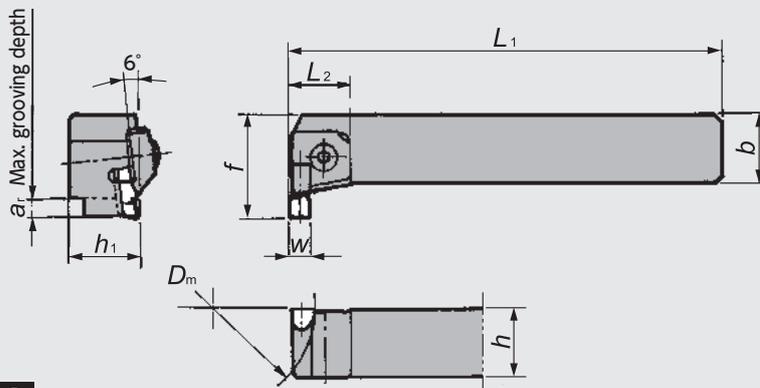


Figure-2

● Right-hand type shown.

Holder dimensions

Shape	Code No.		Toolholder Part No.	Stock		Dimensions (mm)							Width of groove (mm) w	Applicable insert	Parts				
	R	L		R	L	h	b	L ₁	h ₁	f	L ₂	a _r			D _m	Clamp	Clamping bolt	Spring	Wrench
Figure-1	5657887	5657895	GFVR/L20-6	●	●	20	20	125	20	25	32	6	38	6.0	GFV (See table below)	CVR/L6	AOB-6C	ASG-6	LW-4
	5655220	5657903	25-6	●	●	25	25	150	25	30									
Figure-2	5657911	5657929	GSVR/L20-6	●	●	20	20	125	20	33	23.5	6	38	6.0	GFV (See table below)	CVR/L6	AOB-6C	ASG-6	LW-4
	5645965	5657937	25-6	●	●	25	25	150	25	38									

Note) The right-hand holders of GSV type come with a left-hand clamp.

Applicable inserts

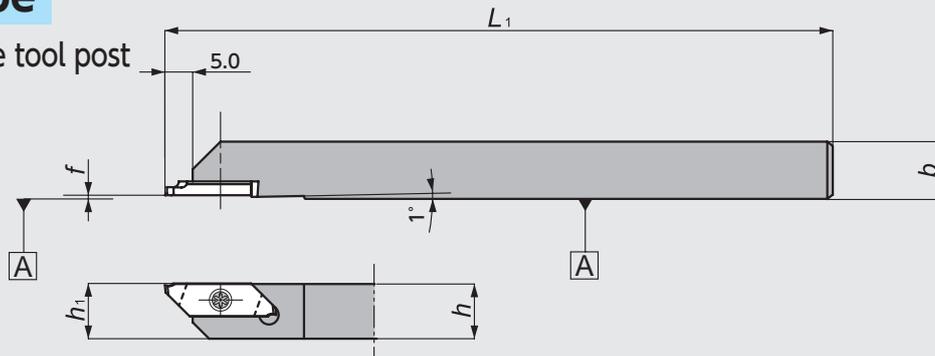
GFV type

V-shaped location type with chipbreaker

Shape	Part No.	Dimensions (mm)		Cermet		PVD-coated micro-grain carbides	
		w	r _ε	N40	Stock	QM3	Stock
	GFV600N	6.0	0.15	5654538	●	5027594	●
	600N04		0.4	5653209	●	5068218	●

CTPS type

For radial type tool post



●Right-hand type shown.

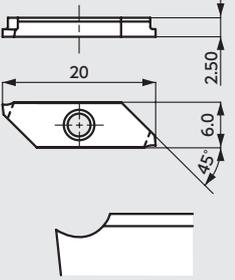
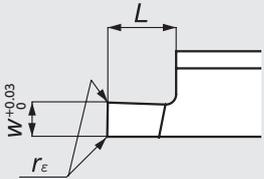
Holder dimensions

Code No.	Toolholder Part No.	Stock	Dimensions (mm)					Width of groove (mm) w	Applicable insert 	Parts	
			h	b	L ₁	h ₁	f			Clamping screw 	Wrench 
5346572	CTPSR10	●	10	10	120	10	0.0	0.75 } 2.00	GTPS (See table below)	LRIS-2.5*7	CLR-15S
5397187	R12	●	12	12		12					

☆CTPS toolholder is interchangeable tool. All CTPS type inserts can be used (front turning, back turning, cut-off, threading) on the same holder. (H84-85 for more information)

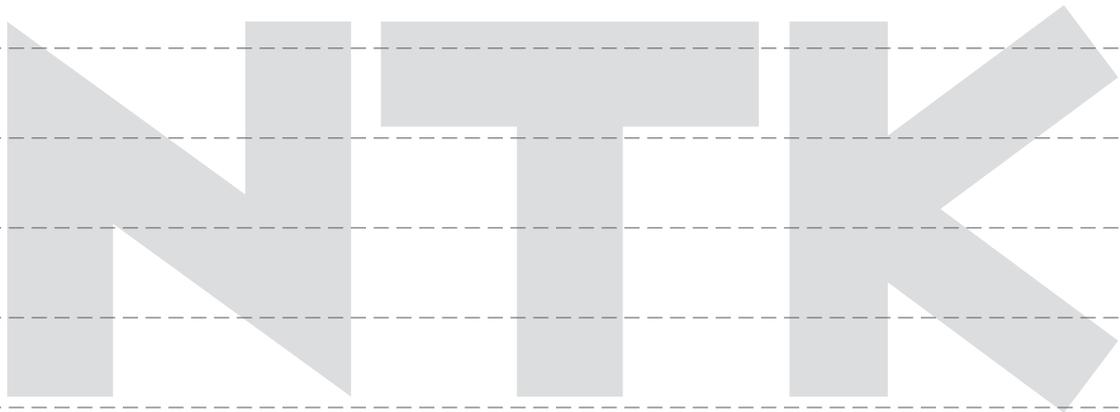
Applicable inserts

GTPS type

Shape 	Cutting edge shape 	Part No.	Dimensions (mm)				PVD-coated micro-grain carbides			
			w	r _ε	L	Effective machining depth	ZM3	Stock	VM1	Stock
●R-hand type shown. ☆θ indicates the value when the insert is set in the holder.		GTPS075FR	0.75	0.0	1.5	1.0	5346952	●	5362652	●
		095FR	0.95		2.0		1.5	5346960	●	5362660
		100FR	1.00			3.0		2.5	5346978	●
		120FR	1.20		5346986		●		5362686	●
		150FR	1.50		5346994	●	5362694	●		
		200FR	2.00		5347000	●	5362702	●		

MEMO

New Products
Tool Materials / Selection Guide
PCD, CBN and ceramic
Cermet, PVD-coated Carbide
Micro-grain Carbide, Carbide
Insert Stock List
Outside Machining Toolholders
SS
Grooving Tools
Threading Tools
Shaper
Internal machining tool range
Original Tools for Various Applications
Indexable End Milling Tools
Indexable Drill Inserts
Milling Cutters
Technical Data
Index



J

Threading Tools

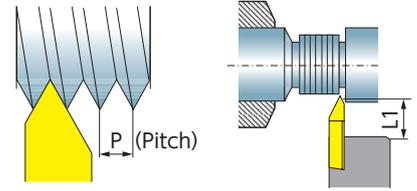
- Selection guide for threading tools ···· J2
- List of holders and inserts for threading ·· J6
- Thread whirling·········· J22

Threading Tools

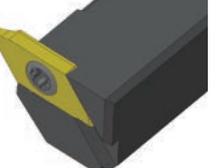
NTK SS Tools Selection guide for threading tools

Features

- Produces smooth, burr-free finished thread surfaces.
- Does not require a change to pitch-specific tool(s) due to single point cutting.

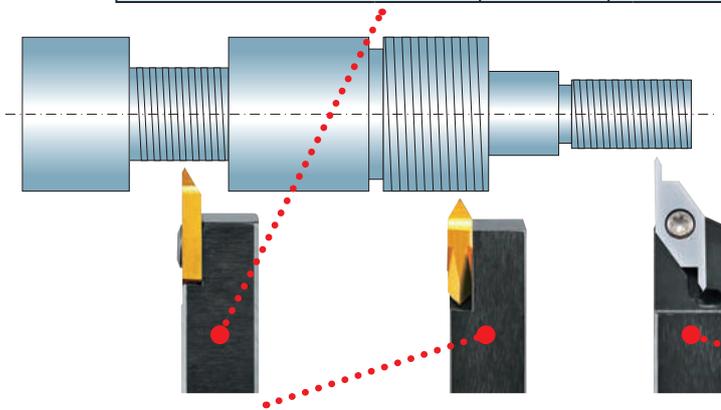


OD threading

TTP type	DS-TTP type	CH-TTP type
		
→J10	→J10	→J10
Pitch : 0.2 ~ 2.0		
L1 : 5.5		
Shank size : □8 ~ □20	Shank dia. : φ16 ~ φ25.4	Shank size : □16 · □20
Applicable inserts : TTP□□FR/L		Applicable inserts : TTP□□FR
For various shapes of work pieces !		

CTPS type

→J8
Pitch : 0.2 ~ 1.5
L1 : 5.0
Shank size : □10 · □12
Applicable inserts : TTPS□□FR
Common holder for cutting-off and back-turning



Thread whirling

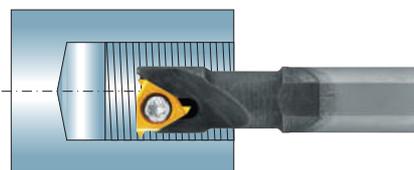
→J22
Applicable inserts : Special (Short delivery time)
High efficiency threading !

STTN type	DS-STT type	NTTB type
		
→J14	→J14	→J14
Pitch : 0.8 ~ 3.0		
L1 : 4.0	L1 : 3.0	L1 : 4.0
Shank size : □10 · □12	Shank dia. : φ14 ~ φ16	Shank size : □16 ~ □25
Applicable inserts : TTMH32		

CSV type

→J6
Pitch : 0.2 ~ 0.5
L1 : 3.0
Shank size : □7 ~ □12
Applicable inserts : CSVT11FR
Recommended for small diameter threading !

Internal threading



Hexagon socket machining



TGC type: Carbide shank HN59 type: Steel shank

→J20
Pitch : 0.4 ~ 0.75
L1 : 0.7 ~ 1.0
Shank dia. : φ6.0 ~ φ10.0
Applicable inserts : TMN

SBT type

→J18
Pitch : 0.5 ~ 1.75
L1 : 0.8 ~ 1.8
Shank dia. : φ2.5 ~ φ6.0
Solid bar type

SHAPER DUO

→K2
Machinable side distance : 1.4 ~ 12.2
Shank dia. : φ2.0 ~ φ6.0, φ8.0
Solid bar type

Recommended threading pitches and threading ranges

Insert Part No.	Dimensions (mm)		
	Edge radius	Recommended threading pitch	Machining pitch range
TTP(S)60F^R/4A 60F^R/4B 60F^R/8A 60F^R/8B 60F^R/L-N	0.05 Max. flat	0.3	0.2~0.75
	0.05	0.4	0.4~1.25
	0.1	1.0	1.0~1.5
TTP60F^R/L-N02	0.2	1.5	1.5~2.0
TTP55F^R/8A 55F^R/8B	0.05		16~48 threads/inch
TTMH3260^R/010 3260^R/015 3260^R/020 3260^R/025	0.1	1.0	0.8~3.0
	0.15	1.5	1.0~3.0
	0.2	2.0	1.5~3.0
	0.25	2.5	1.75~3.0
CSVT11F^R/P60-035A 11F^R/P60-035B	0.03Max	0.3	0.2~0.5
TTMA4360R015 4360R020	0.15	1.5	1.0~4.0
	0.20	2.0	1.5~4.0

Selectively using inserts having a different edge onfiguration, A or B type

Right-handed				Left-handed			
Machining close to the guide bush		Close to back turned section		Machining close to the guide bush		Close to back turned section	
<p>Cutting edge shape : A type</p>		<p>Cutting edge shape : B type</p>		<p>Cutting edge shape : B type</p>		<p>Cutting edge shape : A type</p>	
Holder	Holder	Holder	TTPR	Holder	TTPL	Holder	TTPL
Insert	TTP□□FR□A	Insert	TTP□□FR□B	Insert	TTP□□FL□B	Insert	TTP□□FL□A
<p>Frequently used for threading operations where the front section of the workpiece is threaded. Using a right-handed holder with A type allows machining very close to the guide bush when required</p>		<p>Frequently used for threading in areas which are previously back turned allowing access and total flexibility in threading direction. Using a right-handed holder with the B type insert allows threading up to the back turned face.</p>		<p>Using a left-handed holder moves the cutting point further away from the guide bush. Again increasing flexibility of machining.</p>			

- For operations with a left-handed holder, select the cutting edge shape opposite to the shape/type for right-handed holders. (For left-handed holders use A type for operations close to the guide bush and B type for near back turned areas.)
- In addition, you may select a left-handed holder when you do not wish to return the machined diameter into the guide bush. (as any burrs on the outer surface can damage the guide bush)
- The cutting edge length of the inserts of A and B types is designed to be 0.4 or 0.8 mm, with the pitch either 0.2 to 0.75 or 0.5 to 1.25 so that they can cut very close to the guide bush/a ground area. Inserts of N type should be used where a greater thread pitch is required.

Threading Tools

Range of threads for machining

Metric thread (60°)

Machining thread ranges

Pitch	Effective diameter of thread																								
	1	2	4	5	6	7	8	9	10	15	20	25	30	35	40	45	50	60	70	80	90	100	125	150	
0.20																									
0.25																									
0.30																									
0.35																									
0.40																									
0.45																									
0.50																									
0.60																									
0.70																									
0.75																									
0.80																									
1.00																									
1.25																									
1.50																									
1.75																									
2.00																									
2.50																									
3.00																									
3.50																									
4.00																									

55° thread (Whitworth screw threads, parallel threads for pipes)

Machining thread ranges

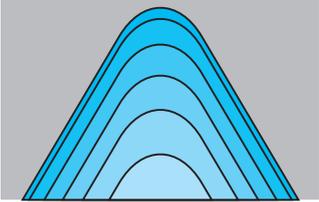
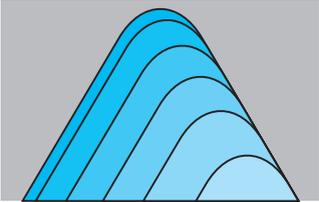
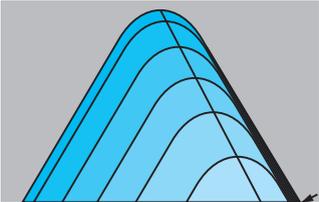
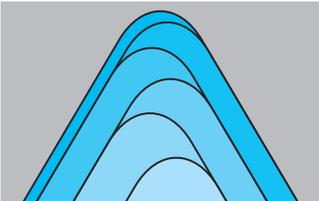
Pitch	No. of threads	Effective diameter of thread																							
		1	2	4	5	6	7	8	9	10	15	20	25	30	35	40	45	50	60	70	80	90	100	125	150
0.5292	48																								
0.6048	42																								
0.7056	36																								
0.7938	32																								
0.9071	28																								
1.0583	24																								
1.2700	20																								
1.3368	19																								
1.5875	16																								
1.8143	14																								
2.1167	12																								
2.3091	11																								
2.5400	10																								
2.8222	9																								
3.1750	8																								

Threading Tools Recommended Insert Guide and Cutting Conditions

Work Material	Free cutting steels	Carbon steels	Alloy steels	Free cutting steels Stainless	Hard-to-cut Stainless Stainless	Titanium (Alloy)	Stainless Alloy
JIS Common Grade	SUM22 SUM23 SUM24	S35C S45C	SCr420 SCM435	SUS303 SUS430F	SUS304 SUS440C	6AL-4V-Ti	A5056 A6061
Insert Grade	First Choice	VM1 ZM3	QM3 ZM3 C7X	VM1 ZM3		VM1 ZM3	KM1
	Second Choice	QM3	VM1	QM3		KM1	ZM3
Cutting Speed v_c (m/min)	50 100 200	carbide C7X	50 90 150 120 150 250	50 90 180	40 70 100	50 70 100	50 100 200

※Please refer to Technical Information Q62 for detailed recommendation.

Infeed Methods

	Features	
	Strengths	Weaknesses
 <p>↑ Radial infeed</p>	<ul style="list-style-type: none"> ● Most common and usual method. ● Easy to change cutting conditions. ● Wears on right and left side edges are proceeded equally. 	<ul style="list-style-type: none"> ● Chip control can be difficult. ● Chattering tends to be causing since contact area of cutting edge is larger. ● Unsuitable for large pitch size threads.
 <p>Flank infeed</p>	<ul style="list-style-type: none"> ● Relatively easy method. ● Suitable for large pitch threads or easy to tear materials due to low cutting force. ● Good chip control. 	<ul style="list-style-type: none"> ● Edge on the right (with zero infeed) tends to be worn heavily. ● Difficult to change infeed amount.
 <p>1°~5° Modified flank infeed</p>	<ul style="list-style-type: none"> ● Wear of the right edge can be suppressed. ● Suitable for large pitch threads or easy to tear materials due to low cutting force. ● Good chip control. 	<ul style="list-style-type: none"> ● Difficult to creat NC program. ● Difficult to change infeed amount.
 <p>↑ ↑ Alternating flank infeed</p>	<ul style="list-style-type: none"> ● Wears on right and left side edges are proceeded equally. ● Suitable for large pitch threads or easy to tear materials due to low cutting force. 	<ul style="list-style-type: none"> ● Difficult to creat NC program. ● Difficult to change infeed amount. ● Chip control can be difficult. (Chips are discharged alternately in right and left directions, resulting possibly in entanglement.)

※Machine feed speed(F) need to be set within 2000mm/min so as not to generate inperect thread. (This situation doesn't applies to the case the machine has high speed threading setting)

〈Calculating method〉

① Calculating Revolution speed

$$n = \frac{V_c \times 1000}{\pi \times \text{nominal diameter}}$$

② Calculating Feed speed

$$F = n (\text{Revolution speed}) \times P (\text{Pitch})$$

Threading Tools

CSV type

For radial type tool post

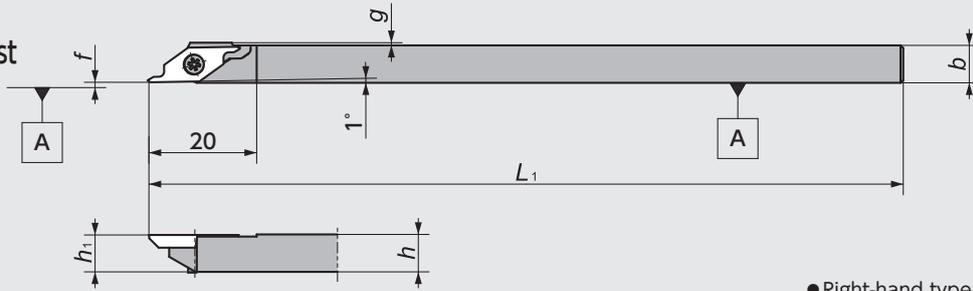


Figure-1

● Right-hand type shown.

CSV-NC/CSV-NC-F type

For gang type tool post

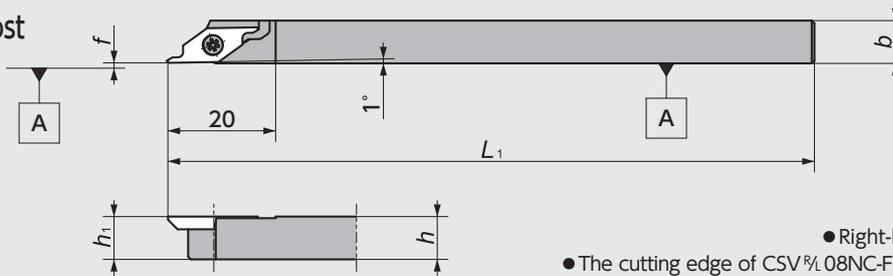


Figure-2

● Right-hand type shown.
● The cutting edge of CSV[®] 08NC-F has a small offset.

☆ CSV toolholder is interchangeable tool. All CSV type inserts can be used (back turning, grooving, threading) on the same holder. (H80-83 for more information)

Holder dimensions

Shape	Code No.		Toolholder Part No.	Stock		Dimensions (mm)						Applicable inserts	Parts	
	R	L		R	L	h	b	L ₁	h ₁	f	g		Clamping screw	Wrench
Figure-1	5492962		CSV [®] 07GX	●		7	7	85	7	0.1	0.5	CSVT (See table below)	LRIS-2.5*7	CLR-15S
	5303169	5303193	07	●	●	7	7	140	7					
	5492954		08GX	●		8	8	85	8					
	5303151	5303201	08	●	●	8	8	85	8					
	5303136		095	●		9.5	9.5	140	9.5					
	5303144	5303177	10	●	●	10	10	140	10					
	5474770		12GX	●		12	12	85	12					
5327929		12	●		12	12	140	12						
Figure-2	5789615		CSV [®] 08NC-F	●		8	8	120	8	0.0~0.1	-	CSVT (See table below)	LRIS-2.5*7	CLR-15S
	5514062	5514070	08NC	●	●	8	8	120	8					
	5563010		10GXNC	●		10	10	85	10					
	5477492	5477542	10NC	●	●	10	10	120	10					
	5477534	5477500	12NC	●	●	12	12	120	12					

Applicable inserts

CSVT type

Shape	Code No.	Chip-breaker	Dimensions (mm)		Applicable thread	PVD-coated micro-grain carbides			
			r _ε	Pitch		VM1			
						R	Stock	L	Stock
<p>(A type)</p> <p>Thickness: 2.38</p> <p>● Right-hand type shown.</p>	CSV [®] T11F [®] P60-035A	None	R0.03MAX	0.2 ~ 0.5	5344874	●	5386909	●	
<p>(B type)</p> <p>Thickness: 2.38</p> <p>● Right-hand type shown.</p>	CSV [®] T11F [®] P60-035B				5344882	●	5386917	●	

☆ Angles shown indicate the value when the insert is set into the holder.

CSVT type

► For applicable holders and inserts, please refer to page J6.



Metric thread/for both coarse and fine threads

Nominal dia. of thread			Pitch				
No.1	No. 2	No. 3	0.50	0.40	0.35	0.25	0.20
M1						Coarse	Fine
M2				Coarse		Fine	
M3			Coarse		Fine		
M4			Fine				
M5							

Unified thread

	Nominal dia. of thread			Pitch
	No.1	No. 2	(for reference)	(for reference)
Coarse		No.1-64 UNC	0.0730-64 UNC	0.3969
	No.2-56 UNC		0.0860-56 UNC	0.4536
Fine	No.0-80 UNF		0.0600-80 UNF	0.3175
		No.1-72 UNF	0.0730-72 UNF	0.3528
	No.2-64 UNF		0.0860-64 UNF	0.3969
		No.3-56 UNF	0.0990-56 UNF	0.4536

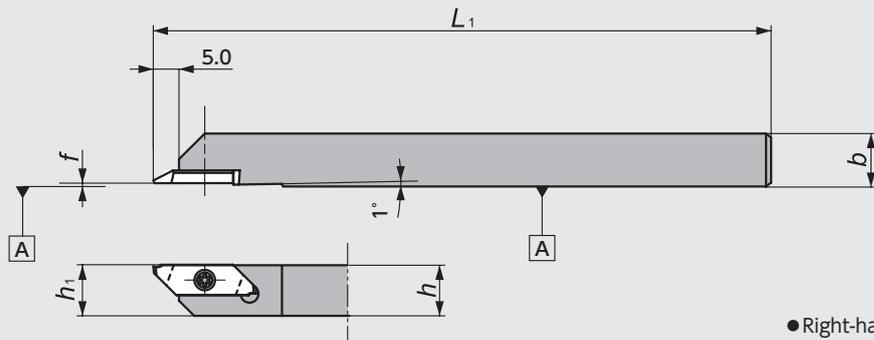
Depth of cut and number of passes (The depth of cut indicates the value of the on component radius not diameter.)

TTP, TTPS, TTMH, TTMA and CSVT type, 60 degrees, without wiper (Guideline for the radius of 0.05)

Holder	Pitch (mm)	Total D.O.C (mm)	No. of passes	1	2	3	4	5	6	7	8	9	10
Metric thread 60	Pin type screw	0.20	0.20	4	0.08	0.06	0.04	0.02					
		0.25	0.24	4	0.10	0.08	0.04	0.02					
		0.30	0.28	5	0.08	0.07	0.07	0.04	0.02				
		0.35	0.32	5	0.10	0.09	0.07	0.04	0.02				
		0.40	0.35	5	0.12	0.10	0.07	0.04	0.02				
		0.45	0.39	5	0.16	0.10	0.07	0.04	0.02				
		0.50	0.33	5	0.10	0.10	0.07	0.04	0.02				
		0.60	0.40	6	0.10	0.10	0.08	0.06	0.04	0.02			
		0.70	0.48	6	0.10	0.10	0.10	0.10	0.06	0.02			
		0.75	0.52	7	0.10	0.10	0.10	0.08	0.07	0.05	0.02		
		0.80	0.56	7	0.10	0.10	0.10	0.10	0.08	0.06	0.02		
		1.00	0.71	8	0.15	0.15	0.12	0.10	0.08	0.06	0.03	0.02	
		1.25	0.90	9	0.20	0.18	0.13	0.10	0.10	0.07	0.05	0.05	0.02
1.50	1.09	10	0.22	0.20	0.15	0.12	0.10	0.10	0.08	0.05	0.05	0.02	

Threading Tools

CTPS type



● Right-hand type shown.

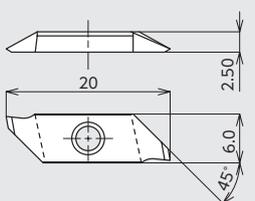
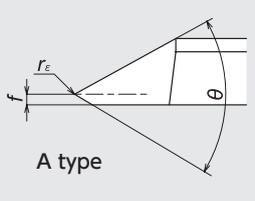
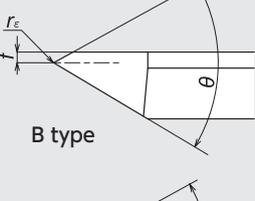
Holder dimensions

Code No.	Toolholder Part No.	Stock		Dimensions (mm)				Applicable inserts 	Parts		
		R	L	h	b	L ₁	h ₁		f	Clamping screw 	Wrench 
5346572	CTPS^RL 10	●		10	10	120	10	0.0	TTPS (See table below)	LRIS-2.5*7	CLR-15S
5397187	12	●		12	12		12				

☆CTPS toolholder is interchangeable tool. All CTPS type inserts can be used (front turning, back turning, cut-off, threading) on the same holder. (H84-85 for more information)

Applicable inserts

TTPS type

Shape	Code No.	Dimensions (mm)				Applicable screw Pitch	PVD-coated micro-grain carbides			
		Edge shape	θ	f	r _e		ZM3	Stock	VM1	Stock
	TTPS60FR4A	A		0.4	(0.05) Max. flat	0.2 ~ 0.75	5346648	●	5362710	●
	60FR4B	B					5346663	●	5362728	●
	60FR8A	A	60°	0.8	(0.05)	0.4 ~ 1.25	5346689	●	5362744	●
	60FR8B	B					5346671	●	5362736	●
	60FR-N	N		1.25	(0.1)	1.0 ~ 1.5	5346655	●	5362751	●

● Right-hand type shown.

☆ θ indicates the value when the insert is set into the holder.
☆Nose R shows referential value.

TTPS type

▶ For applicable holders and inserts, please refer to page **J8**.

[Machining pitch range]

Part No.	Pitch
TTPS60FR4A (B)	0.2-0.75
TTPS60FR8A (B)	0.4-1.25
TTPS60FR-N	1.0-1.5

Metric screw/for both coarse and fine threads

Nominal dia. of thread			Pitch										
No.1	No. 2	No. 3	1.50	1.25	1.00	0.80	0.75	0.70	0.50	0.40	0.35	0.25	0.20
M1												Coarse	Fine
M2										Coarse		Fine	
M3									Coarse		Fine		
M4								Coarse	Fine				
M5						Coarse							
M6	M7				Coarse								
M8		M9		Coarse			Fine						
M10		M11	Coarse	Fine									
M12	M14			Fine									
		M15			Fine								
M16		M17				Fine							
	M18												
M20	M22		Fine										
M24													
		M25											
		M26											
	M27												
		M28			Fine								

Unified screw

	Nominal dia. of thread			Pitch	Applicable part No.
	No.1	No. 2	(for reference)	(for reference)	
Coarse		No.1-64 UNC	0.0730-64 UNC	0.397	TTPS60FR4A (B)
	No.2-56 UNC		0.0860-56 UNC	0.454	TTPS60FR4A (B) TTPS60FR8A (B)
		No.3-48 UNC	0.0990-48 UNC	0.529	
	No.4-40 UNC		0.1120-40 UNC	0.635	
	No.5-40 UNC		0.1250-40 UNC	0.635	
	No.6-32 UNC		0.1380-32 UNC	0.794	TTPS60FR4A (B) TTPS60FR8A (B) TTPS60FR-N
	No.8-32 UNC		0.1640-32 UNC	0.794	
	No.10-24 UNC		0.1900-24 UNC	1.058	
		No.12-24 UNC	0.2160-24 UNC	1.058	TTPS60FR4A (B) TTPS60FR8A (B) TTPS60FR-N
	1/4-20 UNC		0.2500-20 UNC	1.270	
5/16-18 UNC		0.3125-18 UNC	1.411		
Fine	No.0-80 UNF		0.0600-80 UNF	0.318	TTPS60FR4A (B)
		No.1-72 UNF	0.0730-72 UNF	0.353	TTPS60FR4A (B) TTPS60FR8A (B)
	No.2-64 UNF		0.0860-64 UNF	0.397	
		No.3-56 UNF	0.0990-56 UNF	0.454	
	No.4-48 UNF		0.1120-48 UNF	0.529	TTPS60FR4A (B) TTPS60FR8A (B)
	No.5-44 UNF		0.1250-44 UNF	0.577	
	No.6-40 UNF		0.1380-40 UNF	0.635	
	No.8-36 UNF		0.1640-36 UNF	0.706	
	No.10-32 UNF		0.1900-32 UNF	0.794	TTPS60FR8A (B)
		No.12-28 UNF	0.2160-28 UNF	0.907	
	1/4-28 UNF		0.2500-28 UNF	0.907	TTPS60FR8A (B) TTPS60FR-N
	5/16-24 UNF		0.3125-24 UNF	1.058	
	3/8-24 UNF		0.3750-24 UNF	1.058	
	7/16-20 UNF		0.4375-20 UNF	1.270	
	1/2-20 UNF		0.5000-20 UNF	1.270	TTPS60FR8A (B) TTPS60FR-N
	9/16-18 UNF		0.5625-18 UNF	1.411	
5/8-18 UNF		0.6250-18 UNF	1.411		

Threading Tools

TTP type

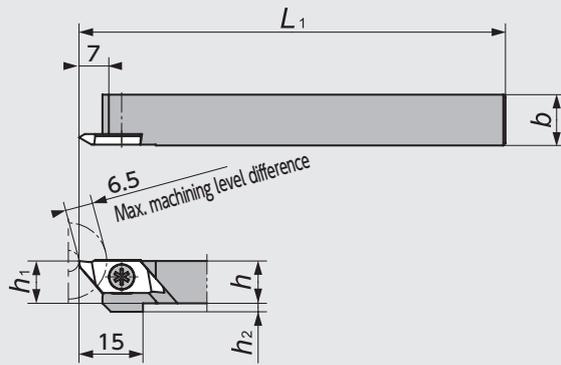
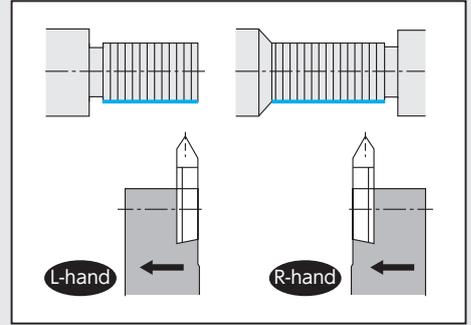


Figure-1



● Right-hand type shown.

DS-TTP type

DS Holder

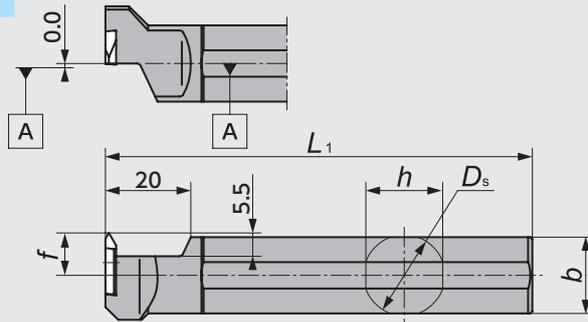
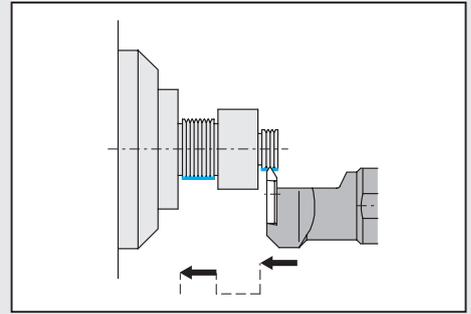


Figure-2



● Left-hand type shown.

☆ Use R-hand inserts for L-hand type holders.

CH-TTP type

NEW

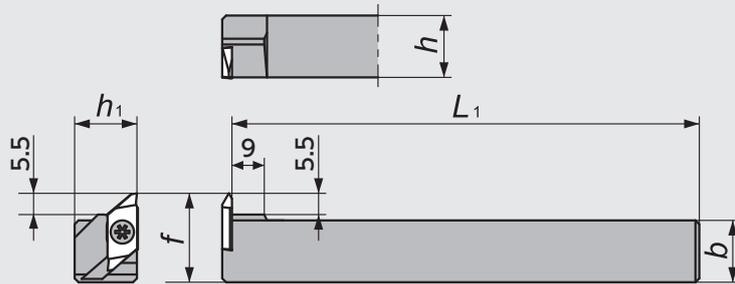
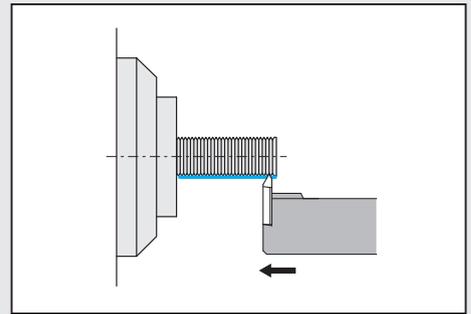


Figure-3



● Left-hand type shown.

☆ Use R-hand inserts for L-hand type holders.

Holder dimensions

Shape	Code No.		Toolholder Part No.	Stock		Dimensions (mm)						Applicable insert	Parts		
	R	L		R	L	D_s	h	b	L_1	h_1	f		h_2	Clamping screw	Wrench
Figure-1	5146238	5146220	TTP ^{R/L} 08	●	●	-	8	10	120	8	-	4	TTP J11	LRIS-4*10PW (A)	CLR-15S (A)
	5145693	5145685	10	●	●		10	10	120	10		2			
	5459854	5503024	12GX	●	●		12	12	85	12		0			
	5145701	5145719	12	●	●		120	12	120	12					
	5459862	5459870	16H	●	●		16	16	100	16					
	5191234	5267190	16	●	●		120	16	120	16					
	5459573	5459581	20F	●	●		20	20	80	20					
Figure-2	5782149	5782149	DS-TTP ^{R/L} 16F*	★	●	16.00	15	15	80	-	10.0	-	LRIS-4*10 (B)	LLR-25S-20*65 (B)	
	5278270	5278270	19	●	●	19.05	18	18							
	5278296	5278296	20	●	●	20.00	19	19	120						
	5324033	5324033	22	●	●	22.00	21	21							
	5317151	5317151	25	●	●	25.40	24	24	150						
Figure-3	5885090	5885090	CH-TTP ^{R/L} 16	●	●	-	16	16	120	16	23	-	TTP ^{R/L} FR J11	LRIS-4*10 (B)	LLR-25S (B)
	5885108	5885108	20	●	●	-	20	20	120	20	27				

*Please select ϕ 16 shank DS sleeves. DS sleeves details → H91

Applicable inserts

TTP type

handed	Shape	Code No.	Dimensions (mm)			Applicable screw		Micro-grain carbide	PVD-coated micro-grain carbides				
			θ	f	r_e	Pitch	No. of threads/inch	KM1	Stock	ZM3	Stock	QM3	Stock
Right-handed	A type 	TTP60FR2A	60°	0.2	(0.05) MAX flat	0.2~0.75	48~16		5892278	★			
		60FR4A		0.4					5145602	●	5234216	●	
		60FR4AS		0.4				5578158	●				
		60FR8A		0.8	(R0.05)			0.4~1.25		5145537	●	5337340	●
		60FR8AS								5578117	●		
		TTP55FR8A		55°						5145495	●		
	B type 	TTP60FR2B	60°	0.2	(0.05) MAX flat	0.2~0.75	48~16		5892302	★			
		60FR4B		0.4					5145586	●	5601315	●	
		60FR4BS		0.4				5578133	●				
		60FR8B		0.8	(R0.05)			0.4~1.25		5145529	●	5506472	●
		60FR8BS								5578091	●		
		TTP55FR8B		55°						5145487	●		
N type 	TTP60FR-N	60°	1.25	(R0.1)	1.0~1.5	48~16		5145560	●	5474630	●		
	60FR-NS			(R0.2)	1.5~2.0			5578067	●				
	60FR-N02								5626247	●	5626254	●	
Left-handed	A type 	TTP60FL2A	60°	0.2	(0.05) MAX flat	0.2~0.75	48~16		5892286	★			
		60FL4A		0.4					5145594	●	5601307	●	
		60FL4AS		0.4				5578174	●				
		60FL8A		0.8	(R0.05)			0.4~1.25		5145545	●	5601273	●
		60FL8AS								5578125	●		
		TTP55FL8A		55°						5145503	●		
	B type 	TTP60FL2B	60°	0.2	(0.05) MAX flat	0.2~0.75	48~16		5912555	★			
		60FL4B		0.4					5145578	●	5601299	●	
		60FL4BS		0.4				5578141	●				
		60FL8B		0.8	(R0.05)			0.4~1.25		5145511	●	5503438	●
		60FL8BS								5578109	●		
		TTP55FL8B		55°						5145479	●		
N type 	TTP60FL-N	60°	1.25	(R0.1)	1.0~1.5	48~16		5145552	●	5601265	●		
	60FL-NS			(R0.2)	1.5~2.0			5578083	●				
	60FL-N02								5626270	●	5626262	●	

★Nose R shows referential value.

Selectively using inserts having a different edge configuration, A or B type

Right-handed				Left-handed			
Machining close to the guide bush		Close to back turned section		Machining close to the guide bush		Close to back turned section	
<p>Cutting edge shape : A type</p>		<p>Cutting edge shape : B type</p>		<p>Cutting edge shape : B type</p>		<p>Cutting edge shape : A type</p>	
Holder	TTPR	Holder	TTPR	Holder	TTPL	Holder	TTPL
Insert	TTP□□FR□A	Insert	TTP□□FR□B	Insert	TTP□□FL□B	Insert	TTP□□FL□A

Threading Tools

TTP type

▶ For applicable holders and inserts, please refer to pages **J10** and **11**.



[Machining pitch range]

Part No.	Pitch
TTP60F^{R/L}4A,AS(B,BS)	0.2-0.75
TTP60F^{R/L}8A,AS(B,BS)	0.4-1.25
TTP60F^{R/L}-N(S)	1.0-1.5
TTP60F^{R/L}-N02	1.5-2.0

TTP60F^{R/L}-N02 allows for machining up to M150. (with 2.0 as the pitch)

Metric screw/for both coarse and fine threads

Nominal dia. of thread			Pitch											
No.1	No. 2	No. 3	2.00	1.50	1.25	1.00	0.80	0.75	0.70	0.50	0.40	0.35	0.25	0.20
M1													Coarse	Fine
M2											Coarse		Fine	
M3										Coarse		Fine		
M4									Coarse	Fine				
M5							Coarse							
M6						Coarse								
M7														
M8					Coarse			Fine						
M9														
M10			Coarse		Fine									
M11														
M12														
M13			Coarse											
M14														
M15														
M16			Coarse											
M17														
M18														
M19														
M20														
M21														
M22			Fine	Fine										
M23														
M24														
M25														
M26														
M27														
M28			Fine				Fine							
M29														
M30														
M31														
M32														

Unified screw

	Nominal dia. of thread		Pitch	Applicable part No.
	No.1	No. 2	(for reference)	
Coarse		No.1-64 UNC	0.3969	TTP60F^{R/L}4A, AS(B, BS)
		No.2-56 UNC	0.4536	
		No.3-48 UNC	0.5292	TTP60F^{R/L}4A, AS(B, BS)
		No.4-40 UNC	0.6350	TTP60F^{R/L}8A, AS(B, BS)
		No.5-40 UNC	0.6350	
		No.6-32 UNC	0.7938	TTP60F^{R/L}8A, AS(B, BS)
		No.8-32 UNC	0.7938	
		No.10-24 UNC	1.0583	TTP60F^{R/L}8A, AS(B, BS)
		No.12-24 UNC	1.0583	TTP60F^{R/L}-N(S)
		1/4-20 UNC	1.2700	
		5/16-18 UNC	1.4111	TTP60F^{R/L}-N(S)
		3/8-16 UNC	1.5875	
		7/16-14 UNC	1.8143	TTP60F^{R/L}-N02
		1/2-13 UNC	1.9538	

	Nominal dia. of thread		Pitch	Applicable part No.
	No.1	No. 2	(for reference)	
Fine		No.0-80 UNF	0.3175	
		No.1-72 UNF	0.3528	TTP60F^{R/L}4A, AS(B, BS)
		No.2-64 UNF	0.3969	
		No.3-56 UNF	0.4536	
		No.4-48 UNF	0.5292	TTP60F^{R/L}4A, AS(B, BS)
		No.5-44 UNF	0.5773	TTP60F^{R/L}8A, AS(B, BS)
		No.6-40 UNF	0.6350	
		No.8-36 UNF	0.7056	
		No.10-32 UNF	0.7938	
		No.12-28 UNF	0.9071	TTP60F^{R/L}8A, AS(B, BS)
		1/4-28 UNF	0.9071	
		5/16-24 UNF	1.0583	TTP60F^{R/L}8A, AS(B, BS)
		3/8-24 UNF	1.0583	TTP60F^{R/L}-N(S)
		7/16-20 UNF	1.2700	
		1/2-20 UNF	1.2700	TTP60F^{R/L}-N(S)
		9/16-18 UNF	1.4111	
		5/8-18 UNF	1.4111	
		3/4-16 UNF	1.5875	TTP60F^{R/L}-N02
	7/8-14 UNF	1.8143		

Parallel screws for pipes

Code No.	Nominal dia. of thread	Pitch (for reference)
TTP55F$\frac{R}{L}$8A(B)	G1/16	0.9071
	G1/8	0.9071
	G1/4	1.3368
	G1/8	1.3368

- Index
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- Grooving Tools
- SS
- Outside Machining Toolholders
- Insert Stock List
- Micro-grain Carbide, Carbide
- Cermet, PVD-coated Cermet
- PCD, CBN and ceramic
- Tool Materials / Selection Guide
- New Products

STTN type

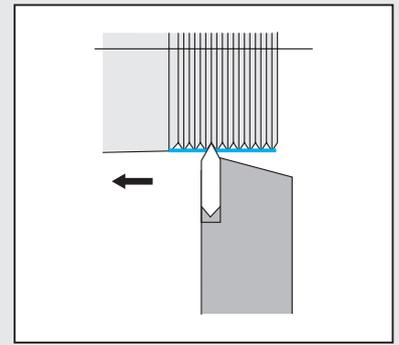
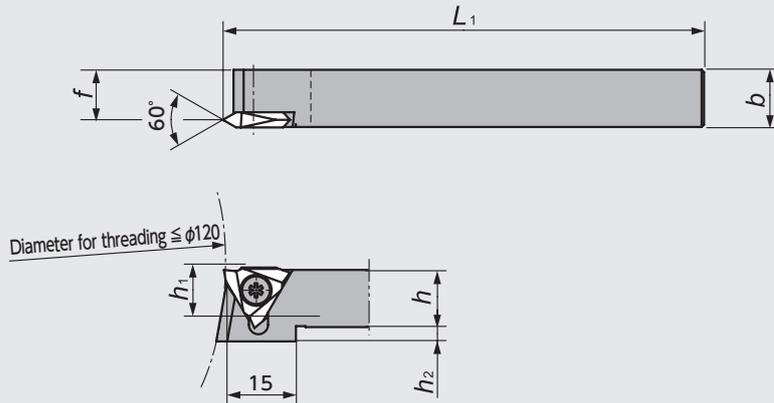


Figure-1

● Right-hand type shown.

NTTB type

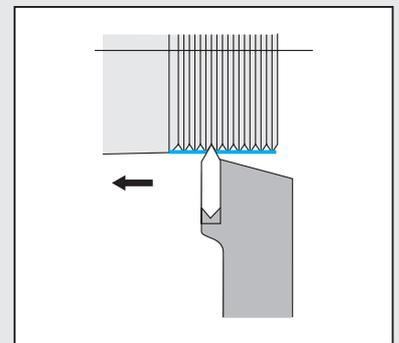
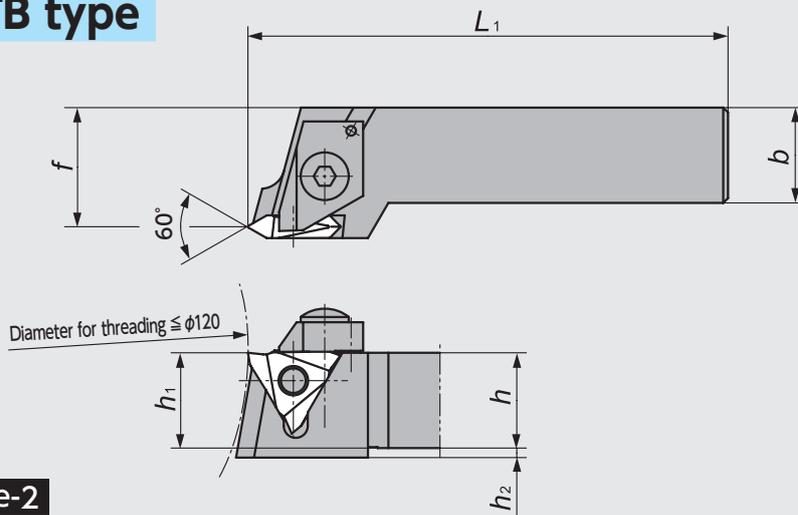


Figure-2

● Right-hand type shown.

DS-STT type

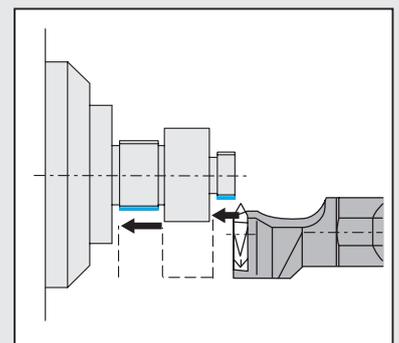
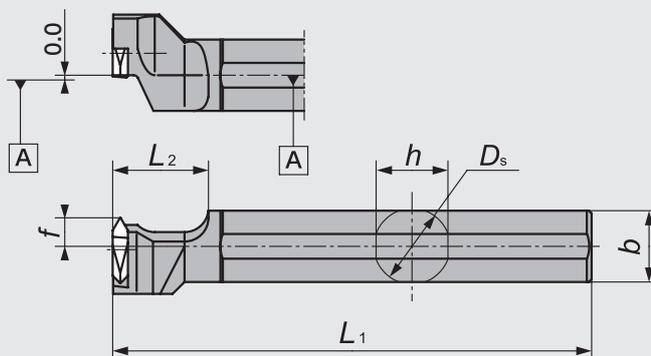


Figure-3

☆ Use R-hand inserts for left-hand type holders.
● Left-hand type shown.

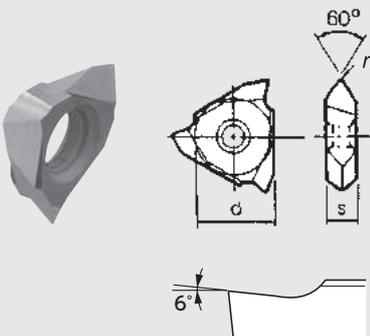
Holder dimensions

Shape	Code No.		Toolholder Part No.	Stock		Dimensions (mm)							Applicable insert	Parts				
	R	L		R	L	D_s	h	b	L_1	h_1	f	h_2		Clamp	Clamping bolt	Spring	Clamping screw	Wrench
Figure-1	5630405		STTN ^{R/L} 101032	●			10	10		10	8.5	TTMH3260 (See table below)	—	—	—	LR-S-4*9	RLR-20S (A)	
	5827662		121232	●		—			80		5.0							
	5834817		121232-K	●			12	12		12	10.5							
Figure-2	5262530		NTTB ^{R/L} 161632	●			16	16	120	16	20.0	TTMH3260 (See table below)	CPR/L5	AOS-5*25	ASG-5	—	LW-2.5 (B)	
	5262548		202032	●		—	20	20	140	20	25.0							0.0
	5262555	5307434	252543	●	●		25	25	160	25	30.0							0.0
Figure-3		5348552	DS-STT ^{R/L} 14F	●		14.000	13	13	80			TTMH3260 (See table below)	—	—	—	LR-S-4*9	RLR-20S (A)	
		5348099	15H	●		15.875			100	—	6.0							—
		5341508	16X*	●		16.000	15	15			85							

*Please select ϕ 16 shank DS sleeves. DS sleeves details → H91

Applicable inserts

TTMH • TTMA type

Shape	Code No.	Dimensions (mm)			Applicable screw	Cermets		PVD-coated micro-grain carbides	
		d	s	r_e		Pitch	C7X	Stock	ZM3
 <p>● Right-hand type shown.</p>	TTMH3260R010	9.525	3.18	0.10	0.8~3.0	5687694	●	5120928	●
	3260R015			0.15	1.0~3.0	5687686	●	5211826	●
	3260R020			0.20	1.5 ~ 3.0			5105697	●
	3260R025			0.25	1.75 ~ 3.0	5687702	●		
	TTMA4360R015	12.70	4.76	0.15	1.0 ~ 4.0	5687678	●		
	4360R020			0.20	1.5 ~ 4.0	5687660	●		

*The left-handed inserts: produced to order.

Threading Tools

TTMH type

▶ For applicable holders and inserts, please refer to pages **J14 and 15**.



[Machining pitch range]

Part No.	Pitch
TTMH3260R010	0.8-3.0
TTMH3260R015	1.0-3.0
TTMH3260R020	1.5-3.0
TTMH3260R025	1.75-3.0

Metric screw/for both coarse and fine threads

Nominal dia. of thread			Pitch							
No.1	No. 2	No. 3	3.00	2.50	2.00	1.75	1.50	1.25	1.00	0.80
M5										Coarse
M6										Coarse
M8	M7									Coarse
M10		M9						Coarse	Fine	Fine
M12		M11				Coarse				
M16	M14	M15			Coarse					
M20	M18	M17								
M24			Coarse							
M30		M25 M26								
M36		M27	Coarse							
M40		M28								
		M32								
		M35								
		M38								
		M39								
		M40	Fine		Fine					

Unified screw

	Nominal dia. of thread		Pitch	Applicable part No.
	No.1	No. 2	(for reference)	
Coarse	No.10-24 UNC		1.0583	TTMH3260R010 TTMH3260R015
		No.12-24 UNC	1.0583	
	1/4-20 UNC		1.2700	
	5/16-18 UNC		1.4111	TTMH3260R010,R015 TTMH3260R020
	3/8-16 UNC		1.5875	
	7/16-14 UNC		1.8143	
	1/2-13 UNC		1.9538	TTMH3260R010,R015 TTMH3260R020,R025
	9/16-12 UNC		2.1167	
	5/8-11 UNC		2.3091	
	3/4-10 UNC		2.5400	
	7/8-9 UNC		2.8222	

	Nominal dia. of thread		Pitch	Applicable part No.
	No.1	No. 2	(for reference)	
Fine		No.12-28 UNF	0.9071	TTMH3260R010
	1/4-28 UNF		0.9071	
	5/16-24 UNF		1.0583	
	3/8-24 UNF		1.0583	TTMH3260R010 TTMH3260R015
	7/16-20 UNF		1.2700	
	1/2-20 UNF		1.2700	
	9/16-18 UNF		1.4111	TTMH3260R010,R015 TTMH3260R020
	5/8-18 UNF		1.4111	
	3/4-16 UNF		1.5875	
	7/8-14 UNF		1.8143	TTMH3260R010,R015 TTMH3260R020,R025
	1-12 UNF		2.1167	
	1 1/8-12 UNF		2.1167	
	1 1/4-12 UNF		2.1167	
	1 3/8-12 UNF		2.1167	
	1 1/2-12 UNF		2.1167	

TTMA type

▶ For applicable holders and inserts, please refer to pages **J14** and **15**.



[Machining pitch range]

Part No.	Pitch
TTMA4360R015	1.0-4.0
TTMA4360R020	1.5-4.0

Metric screw/for both coarse and fine threads

Nominal dia. of thread			Pitch								
No.1	No. 2	No. 3	4.00	3.50	3.00	2.50	2.00	1.75	1.50	1.25	1.00
M6											Coarse
	M7										
M8											Coarse
		M9									
M10											Fine
		M11									
M12											Fine
	M14										
M16											Fine
		M15									
		M17									Fine
	M18										
M20											Fine
	M22										
M24											Fine
		M25									
		M26									Fine
	M27										
		M28									Fine
M30											
		M32									Fine
	M33										
		M35									Fine
M36											
		M38									Fine
	M39										
		M40									Fine
M42											
	M45										Fine
M48											
		M50									Fine

Unified screw

	Nominal dia. of thread		Pitch	Applicable part No.
	No.1	No. 2	(for reference)	
Coarse	No.10-24 UNC		1.0583	TTMA4360R015
		No.12-24 UNC	1.0583	
	1/4-20 UNC		1.2700	
	5/16-18 UNC		1.4111	
	3/8-16 UNC		1.5875	
	7/16-14 UNC		1.8143	TTMA4360R015
	1/2-13 UNC		1.9538	
	9/16-12 UNC		2.1167	
	5/8-11 UNC		2.3091	
	3/4-10 UNC		2.5400	
	7/8-9 UNC		2.8222	TTMA4360R020
	1-8 UNC		3.1750	
	1 1/8-7 UNC		3.6286	
	1 1/4-7 UNC		3.6286	

	Nominal dia. of thread		Pitch	Applicable part No.
	No.1	No. 2	(for reference)	
Fine	5/16-24 UNF		1.0583	TTMA4360R015
	3/8-24 UNF		1.0583	
	7/16-20 UNF		1.2700	
	1/2-20 UNF		1.2700	
	9/16-18 UNF		1.4111	
	5/8-18 UNF		1.4111	TTMA4360R015
	3/4-16 UNF		1.5875	
	7/8-14 UNF		1.8143	
	1-12 UNF		2.1167	
	1 1/8-12 UNF		2.1167	
	1 1/4-12 UNF		2.1167	TTMA4360R020
	1 3/8-12 UNF		2.1167	
	1 1/2-12 UNF		2.1167	

Threading Tools

For inside boring



SBT type

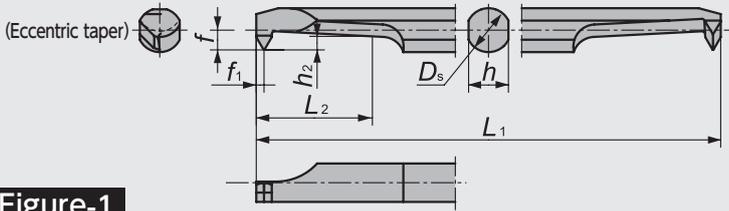


Figure-1

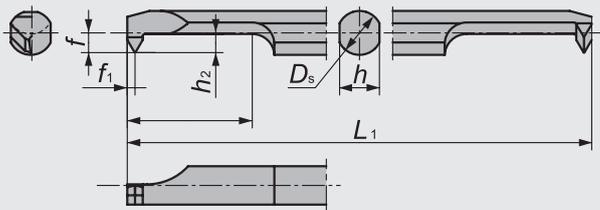
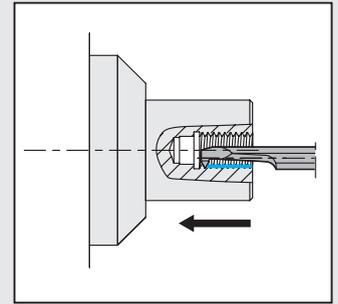
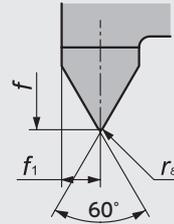


Figure-2



● Right-hand type shown.

Insert Shape	Code No.	Min. machining dia	Chip-breaker	Dimensions (mm)								Applicable screw				General recommendations for screw selection		PVD	
				Ds	L2	h2	L1	f	f1	h	rε	Metric screw	Unified screw	Metric screw	Unified screw	Metric screw	Unified screw	Micro-grain carbide	Stock
Figure-1	SBT025M3R	2.5	None	2.5	5.4	0.6	50	1.1	0.4	2.3	0.05 max flat	M3	0.5	—	—	M3×0.5	—	5784459	●
	030M4R	3.0	None	3.0	7.5	0.8	50	1.3	0.5	2.7	0.05 max flat	M4 and larger	0.5~0.8	No.8-32UNC and larger	36~32	M4×0.7	No.8-32UNC	5784467	●
	030M4RB	3.0	Provided	3.0	7.5	0.8	50	1.30	0.50	2.7	0.05 max flat	M4 and larger	0.5~0.8	No.8-32UNC and larger	36~32	M4×0.7	No.8-32UNC	5658018	●
	035M5RB	3.5	Provided	3.5	8.5	1.0	60	1.55	0.55	3.2	0.05 max flat	M4.5 and larger	0.5~1.0	No.10-24UNC and larger	32~24	M5×0.8	No.10-24UNC No.12-24UNC	5658117	●
	040M6RB	4.0	Provided	4.0	10.5	1.2	60	1.80	0.70	3.6	R0.05	M5.5 and larger	0.75~1.25	No.12-24UNC and larger	28~20	M6×1.0	1/4-20UNC	5658000	●
Figure-2	SBT050M8RB	5.0	Provided	5.0	15.8	1.5	70	2.30	0.80	4.5	R0.05	M7 and larger	0.75~1.5	1/4-28UNF and larger	28~18	M8×1.25	5/16-18UNC	5657994	●
	060M10RB	6.0	Provided	6.0	18.4	1.8	80	2.80	0.95	5.4	R0.05	M8 and larger	0.75~1.75	5/16-24UNF and larger	28~16	M10×1.5	3/8-16UNC	5685870	●

▶ For cutting conditions, please refer to page J19.
▶ For sleeves, please refer to pages L22~23.



SBT type(for internal threading)



Metric screw/for both coarse and fine threads

Nominal dia. of thread			Pitch (Feed)								
No.1	No. 2	No. 3	2.0	1.75	1.5	1.25	1.0	0.8	0.75	0.7	0.5
M3	-	-	-	-	-	-	-	-	-	-	Coarse (φ 2.5) SBT025M3R
M4	-	-	-	-	-	-	-	-	-	Coarse (φ 3.3) SBT030M4R (B)	Fine (φ 3.5) SBT030M4R (B)
-	M4.5	-	-	-	-	-	-	-	Coarse (φ 3.75) SBT035M5RB	-	Fine (φ 4) SBT035M5RB
M5	-	-	-	-	-	-	-	Coarse (φ 4.2) SBT035M5RB	-	-	Fine (φ 4.5) SBT035M5RB
-	-	M5.5	-	-	-	-	-	-	-	-	Fine (φ 5) SBT035M5RB
M6	-	-	-	-	-	-	-	Coarse (φ 5) SBT040M6RB	-	Fine (φ 5.25) SBT040M6RB	-
-	M7	-	-	-	-	-	-	Coarse (φ 6) SBT050M8RB	-	Fine (φ 6.25) SBT050M8RB	-
M8	-	-	-	-	-	-	Coarse (φ 6.75) SBT050M8RB	Fine (φ 7) SBT050M8RB	-	Fine (φ 7.25) SBT050M8RB	-
-	-	M9	-	-	-	-	Coarse (φ 7.75) SBT060M10RB	Fine (φ 8) SBT060M10RB	-	Fine (φ 8.25) SBT060M10RB	-
M10	-	-	-	-	-	Coarse (φ 8.5) SBT060M10RB	Fine (φ 8.75) SBT060M10RB	Fine (φ 9) SBT060M10RB	-	Fine (φ 9.25) SBT060M10RB	-
-	-	M11	-	-	-	Coarse (φ 9.5) SBT060M10RB	-	Fine (φ 10) SBT060M10RB	-	Fine (φ 10.25) SBT060M10RB	-
M12	-	-	-	Coarse (φ 10.25) SBT060M10RB	Fine (φ 10.5) SBT060M10RB	Fine (φ 10.75) SBT060M10RB	Fine (φ 11) SBT060M10RB	-	-	-	-
-	M14	-	Coarse ×	-	Fine (φ 12.5) SBT060M10RB	Fine (φ 12.6) SBT060M10RB	Fine (φ 13) SBT060M10RB	-	-	-	-
-	-	M15	-	-	Fine (φ 13.5) SBT060M10RB	-	Fine (φ 14) SBT060M10RB	-	-	-	-

Unified screw

	Nominal dia. of thread			Recommended pilot hole(mm)	Pitch	Recommended Part No.
	No.1	No. 2	(for reference)	(for reference)	(for reference)	
Coarse	No.8-32UNC	-	0.1640-32UNC	φ 3.42	0.7938	SBT030M4R (B)
	No.10-24UNC	-	0.1900-24UNC	φ 3.83	1.0583	
	-	No.12-24UNC	0.2160-24UNC	φ 4.47	1.0583	SBT035M5RB
	1/4-20UNC	-	0.2500-20UNC	φ 5.12	1.2700	SBT040M6RB
	5/16-18UNC	-	0.3125-18UNC	φ 6.57	1.4111	SBT050M8RB
	3/8-16UNC	-	0.3750-16UNC	φ 7.98	1.5875	SBT060M10RB
Fine	No.8-36UNF	-	0.1640-36UNF	φ 3.51	0.7056	SBT030M4RB
	No.10-32UNF	-	0.1900-32UNF	φ 4.07	0.7938	SBT035M5RB
	-	No.12-28UNF	0.2160-28UNF	φ 4.61	0.9071	SBT040M6RB
	1/4-28UNF	-	0.2500-28UNF	φ 5.47	0.9071	
	5/16-24UNF	-	0.3125-24UNF	φ 6.91	1.0583	SBT050M8RB
	3/8-24UNF	-	0.3750-24UNF	φ 8.51	1.0583	SBT060M10RB
	7/16-20UNF	-	0.4375-20UNF	φ 9.88	1.2700	
	1/2-20UNF	-	0.5000-20UNF	φ 11.47	1.2700	
	9/16-18UNF	-	0.5625-18UNF	φ 12.9	1.4111	
	5/8-18UNF	-	0.6250-18UNF	φ 14.5	1.4111	
3/4-16UNF	-	0.7500-16UNF	φ 17.5	1.5875		

Cutting conditions for STICK DUO

Depth of cut guide for pitch at revolution speed n(min⁻¹) between 600 and 1,500

Metric screw		Counts of cutting																				
Machining pitch(mm)	Total depth of cut. (mm)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
0.5	0.3	0.06	0.05	0.05	0.04	0.04	0.03	0.02	0.01	-	-	-	-	-	-	-	-	-	-	-	-	-
0.7	0.43	0.06	0.06	0.06	0.05	0.05	0.05	0.04	0.03	0.02	0.01	-	-	-	-	-	-	-	-	-	-	-
0.75	0.46	0.06	0.06	0.06	0.05	0.05	0.04	0.04	0.04	0.03	0.02	0.01	-	-	-	-	-	-	-	-	-	-
0.8	0.49	0.06	0.06	0.06	0.05	0.05	0.04	0.04	0.04	0.03	0.03	0.02	0.01	-	-	-	-	-	-	-	-	-
1.0	0.62	0.07	0.07	0.06	0.06	0.05	0.05	0.05	0.04	0.04	0.04	0.03	0.03	0.02	0.01	-	-	-	-	-	-	-
1.25	0.76	0.07	0.07	0.07	0.07	0.07	0.06	0.06	0.06	0.05	0.05	0.04	0.03	0.03	0.02	0.01	-	-	-	-	-	-
1.5	0.92	0.07	0.07	0.07	0.07	0.07	0.07	0.06	0.06	0.06	0.05	0.05	0.05	0.04	0.04	0.03	0.03	0.02	0.01	-	-	-
1.75	1.09	0.07	0.07	0.07	0.07	0.07	0.07	0.06	0.06	0.06	0.06	0.06	0.05	0.05	0.05	0.04	0.04	0.03	0.03	0.02	0.01	-

Unified screw		Counts of cutting																		
No. of threads/inch	Total depth of cut. (mm)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
36	0.43	0.06	0.05	0.05	0.05	0.04	0.05	0.04	0.03	0.02	0.01	-	-	-	-	-	-	-	-	-
32	0.49	0.06	0.06	0.06	0.05	0.05	0.04	0.04	0.04	0.03	0.03	0.02	0.01	-	-	-	-	-	-	-
28	0.56	0.07	0.06	0.06	0.06	0.05	0.05	0.04	0.04	0.04	0.03	0.03	0.02	0.01	-	-	-	-	-	-
24	0.66	0.07	0.06	0.06	0.06	0.05	0.05	0.05	0.05	0.04	0.04	0.04	0.03	0.03	0.02	0.01	-	-	-	-
20	0.78	0.07	0.07	0.07	0.07	0.06	0.06	0.06	0.05	0.05	0.05	0.04	0.04	0.03	0.03	0.02	0.01	-	-	-
18	0.87	0.07	0.07	0.07	0.07	0.07	0.06	0.06	0.06	0.06	0.05	0.05	0.05	0.04	0.04	0.03	0.03	0.02	0.01	-
16	0.98	0.07	0.07	0.07	0.07	0.07	0.07	0.06	0.06	0.06	0.06	0.06	0.05	0.05	0.05	0.04	0.04	0.03	0.03	0.02

Threading Tools

Minimum machining diameter: from $\phi 8$

TGC type

Carbide shank

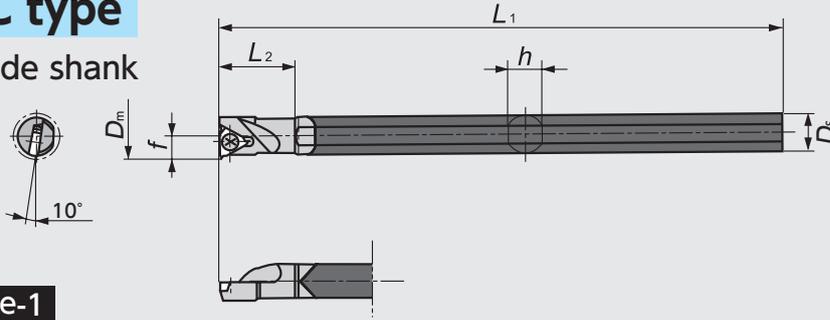


Figure-1

● Right-hand type shown.

HN type

Steel shank

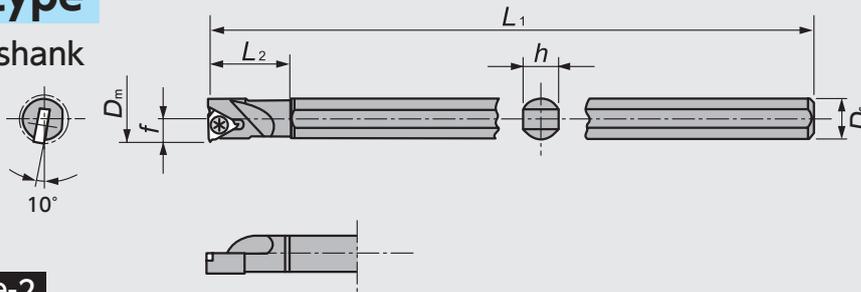


Figure-2

● Right-hand type shown.

Holder dimensions

Shape	Code No.	Toolholder Part No.	Stock	Min. Machining dia (mm) D_m	Dimensions (mm)					Applicable inserts	Parts	
					D_s	h	L_1	f	L_2		Clamping screw	Wrench
Figure-1	5455092	TGC10T06H161R	●	8.0	6	5.5	100	3.8	13.0	TMN06 (See table below)	LR-S-2 * 4.4	CLR-13S
	5455084	08K162R	●	10.0	8	7.0	125	4.7	17.0	TMN08 (See table below)	LR-S-2 * 5.5	
	5455076	10M163R	●	12.0	10	9.0	150	6.0	20.0	TMN09 (See table below)	LRIS-2.2 * 6	
Figure-2	5845177	HN59Z-0028	●	8.0	6	5.5	100	3.8	13.0	TMN06 (See table below)	LR-S-2 * 4.4	CLR-13S
	5845193	-0029	●	10.0	8	7.0	125	4.7	17.0	TMN08 (See table below)	LR-S-2 * 5.5	
	5845185	-0030	●	12.0	10	9.0	150	6.0	20.0	TMN09 (See table below)	LRIS-2.2 * 6	

Applicable inserts

TMN type

Shape	Code No.	Dimensions (mm)			Applicable screw		PVD-coated micro-grain carbides	
		ϕd	s	r_e	Recommended pitch for machining	Machining pitch range	ZM3	Stock
	TMN06FR03	3.97	1.59	0.03	0.5	0.4 ~ 0.75	5228044	●
	08FR03	4.76	2.38				5293642	●
	09FR03	5.56					5484647	●

● Right-hand type shown.

TMN type

▶ For applicable holders, please refer to page J20.

■ Metric screw/for both coarse and fine threads ($\phi \sim$: recommended prepared hole diameter)

Nominal dia. of thread			Pitch		
No. 1	No. 2	No. 3	0.75	0.50	0.40
		M9	Fine ($\phi 8.25$)		
M10			Fine ($\phi 9.25$)		
		M11	Fine ($\phi 10.25$)		

- New Products
- Tool Materials / Selection Guide
- PCD, CBN and ceramic
- Cement Carbide
- Micro-grain Carbide, Carbide
- Insert Stock List
- Outside Machining Toolholders
- SS
- Grooving Tools
- Threading Tools
- Shaper
- Internal Machining tool range
- Original Tools for Various Applications
- Indexable End Milling Tools
- Indexable Drill Inserts
- Milling Cutters
- Technical Data
- Index

THREAD WHIRLING

Thread Whirling

High efficiency threading!

Features



High efficiency threading

- Threading completed in just a single pass
- ↓
- Greatly shortens the cycle time
- Allows for multi-start threading in a single operation

Longer life

- Prolonged tool life due to the use of multiple cutting edges
- Stable tool life attained thanks to the excellent cutting performance and insert coating

Short delivery time

- Inserts will be shipped from our factory in approx. 3 weeks after required information is received (For multi start threading inserts add one week for delivery.)
- Express delivery (Special fees are charged)

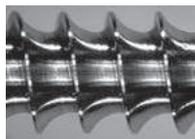
High quality machined surface

- The multi-edged design, excellent grinding quality and coating technologies realize high quality machined surfaces

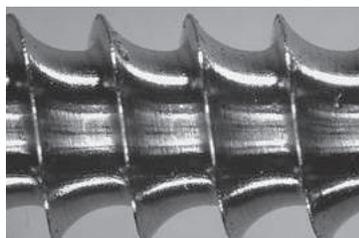
Excellent chip control

- The interrupted cutting process of thread whirling ensures chip evacuate the work area easily

Ti-6Al-4V ELI (×50)



Single point threading



NTK Thread Whirling

Ti-6Al-4V ELI



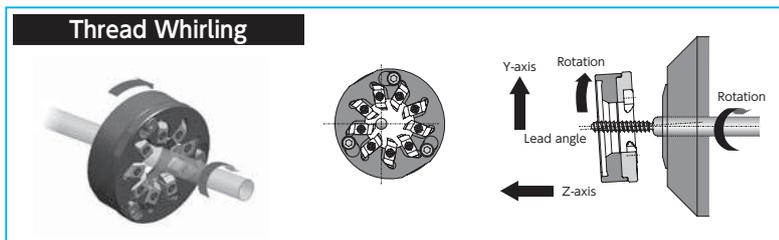
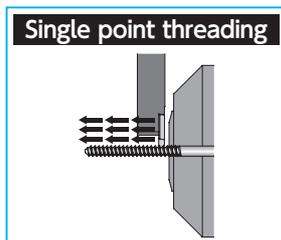
Single point threading



NTK Thread Whirling

Single point threading

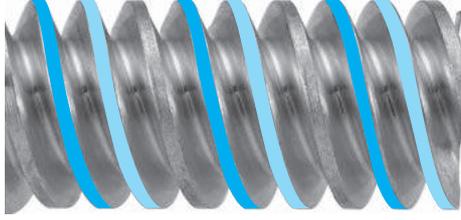
Conventional threading with Swiss type automatic lathes is carried out by repeating the same cutting process several times. However, in the cases of threading long medical type screws, the work piece is not fully supported by the guide bush during conventional threading. Conversely, Thread Whirling produces highly efficient threading for long medical type screws by making the threading operation complete in a single pass.



With Thread Whirling, the whirling head is tilted by the amount of the thread lead angle while rotated at high speed, with the work (C-axis) being turned at a low speed and fed by the pitch in the direction of Z-axis. The inserts are provided with a wiper so that the threading process in a single pass is made possible.

“Multi-start threading in a single process,” for which there has been a large demand, can be successfully achieved!

Patented ★Possible to perform 2-start or 3-start threads in a single pass!

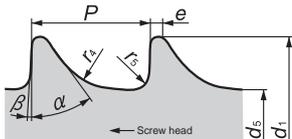
	Example of 2-start threading in a single pass	Example of 3-start threading in a single pass
Work	Bone screw	Worm screw
Material	Ti-6Al-4V ELI	Brass
Work		
Insert shape		
Outer diameter of the screw	φ 4.0	φ 7.0
Bottom surface diameter of the screw	φ 2.4	φ 4.7
Pitch	3.42mm	4.9mm

★6.5-mm thick inserts for even greater pitch now released!

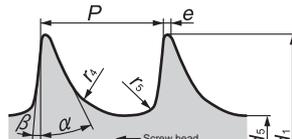
Advice : For multi-start threading in a single process, there are certain restrictions in terms of the specifications of machines, spindles, inserts, tooling and the likes. Please consult us for a higher productivity in your threading operations.

Threading inserts for ISO standard are in stock.

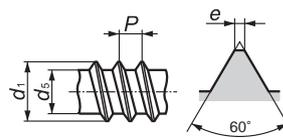
Inserts applicable to ISO standard ※For cutter part of which diameter between cutting edges is φ12



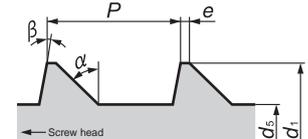
ISO5835 HA



ISO5835 HB



ISO9268 HC



ISO9268 HD

Code No.	PVD-coated Micro-grain carbide		Screw configuration ※ see above								Standardized code	Standard
	ZM3	Stock	d ₁	d ₅	e	P	r ₄	r ₅	α	β		
TW5835-HA1.5-D12	5818356	●	1.5 ^{0.15}	1.1 ^{0.1}	0.1	0.5	0.3	0.1	35°	3°	HA1.5	ISO5835
5835-HA2.0-D12	5818349	●	2.0 ^{0.15}	1.3 ^{0.1}		0.6	0.4				HA2.0	
5835-HA2.7-D12	5818323	●	2.7 ^{0.15}	1.9 ^{0.15}		1	0.6				HA2.7	
5835-HA3.5-D12	5818315	●	3.5 ^{0.15}	2.4 ^{0.15}		1.25	0.8	HA3.5				
5835-HA4.0-D12	5818307	●	4.0 ^{0.15}	2.9 ^{0.15}		1.5		HA4.0				
5835-HA4.5-D12	5818281	●	4.5 ^{0.15}	3.0 ^{0.15}		1.75	1	0.3			HA4.5	
5835-HA5.0-D12	5818273	●	5.0 ^{0.15}	3.5 ^{0.15}							HA5.0	
TW5835-HB4.0-D12	5818265	●	4.0 ^{0.15}	1.9 ^{0.15}	0.1	1.75	0.8	0.3	25°	5°	HB4.0	ISO5835
5835-HB6.5-D12	5818257	●	6.5 ^{0.15}	3.0 ^{0.15}	0.2	2.75	1.2	0.8			HB6.5	
TW9268-HC2.9-D12	5818240		2.79 to 2.9	2.03 to 2.18	0.1 max	1.06	—	—	—	—	HC2.9	ISO9268
9268-HC3.5-D12	5818232		3.43 to 3.53	2.51 to 2.64		1.27	—	—			HC3.5	
9268-HC3.9-D12	5818224		3.78 to 3.91	2.77 to 2.92		—	—	—			HC3.9	
9268-HC4.2-D12	5818216		4.09 to 4.22	2.95 to 3.25		—	—	—			HC4.2	
TW9268-HD4.0-D12	5818208		4.0±0.03	2.92±0.03	0.1	1.59	—	—	45°	10°	HD4.0	ISO9268
9268-HD4.5-D12	5818190		4.5±0.03			2.18	—	—			HD4.5	

Threading Tools

Threading Tools

Whirling set includes [mount adaptor] · [insert exchange holder] · [adapter attachment bolt] · [holder attachment bolt] · [insert screw] · [Wrench]

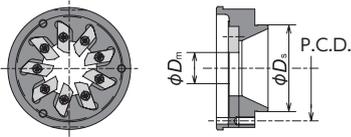


Figure-1

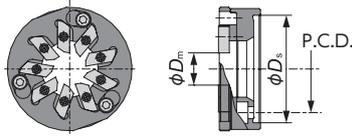


Figure-2

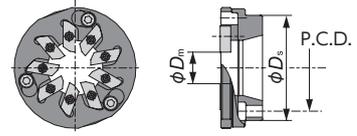


Figure-3

Machine Manufacturer	Machine model	Spindle installation	Spindle manufacturer	Spindle Part No.	Lead angle	NTK cutter Part No.	
CITIZEN	L20E/L20X	Gang	CITIZEN	BTW-3000	0° ~ -15°	TWC9C0746HP1	
	A20	Gang		BTW-2000	±25°	TWC9C1040HP1 TWC6C1040HP1 TWC9C1040HP1-D16	
	C32			BTW-1000	±25°		
	L20				+20° ~ -25°		
	M20				±25°		
	M32	Gang	CITIZEN	LTR0170	±15°	TWC9C1037P2	
	C12/16			LTR0168			
	M12/16			MSW105			
	M12/16Ⅲ			KSW110			
	STAR	M20/32Ⅲ	Gang	CITIZEN	LTR0183	±15°	TWC9J1040P2
		L20			LTR0169		
		M20/32	Turret	PCM	LSW-101-L20	±10°	TWC9P1340P2
		M20/32			MSW-101		
		L20	Turret	STAR	KSW-101	±10°	TWC9S1640P2
M12/16		54178					
M20/M32		0M171					
ECAS-12/20		68172					
SB-20R		59172					
SR-20J/20RⅢ/20RIV		58171					
SW-20	43156						
ECAS-20T	45172						
ECAS-32T	42173						
ST-38	43172						
SV-12	43156						
SV-20	3263-Y481	±10°	TSUGAMI	±10°	TWC9TS2252P2		
SV-32	3214-Y1371	±10°		TWC9TS20550P2			
SV-38R	3268-Y450/451	0° ~ 10°		TWC9TS2244HP1			
TSUGAMI		0° ~ 20°		TWC9TS1944HP1			
BH20/BH38	Turret	TSUGAMI		3281-Y451	0° ~ 25°	TWC9TS1644HP1	
BS20				3220-Y6541	0° ~ 30°	TWC9TS1044HP1	
SS20/SS26/SS32	Attachment	TSUGAMI		—	0° ~ 15°	TWC4TS3010HP1	
B0265/B0266-II				—	±15°	TWC6TO11542HP1	
B0325/B0326-II				—	±15°	TWC9TO10540P2	
S205/S206				—			
B0123/124/125/126-II			—				
B0203/204/205/205-Ⅲ/206-II			—				
S207/SS267/SS327	—	±15°	TWC9TO12050P2-D18				
DECO 10/10a	Attachment	TORNOS	224-1900	±15°	TWC9TO10540P2		
Evo DECO 10/10			242-1900				
DECO 13a/13e			226-1900				
Evo DECO 16/10			243-1900				
DECO 20a			223-1900	±15°	TWC9TO12050P2-D18		
DECO 26a			225-1900				
Sigma 20			234-2750				
Sigma 32			236-2750				
HASEGAWA	JS-1W	—	HASEGAWA	—	0° ~ 20°	TWC9HA22594P2	

NTK-simplified attaching/detaching system

Allows you to change inserts outside of the machine, by detaching the holder easily **without the need to remove any bolts**. (Excluding the types shown in Fig. 4 and 5)



①Loosen the holder locking bolts.

②Rotate the holder to change inserts by 10 degrees.

③Pull off the holder for insert changing. (No need to remove fixing bolts)

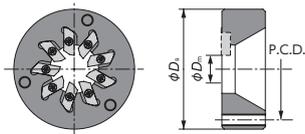


Figure-4

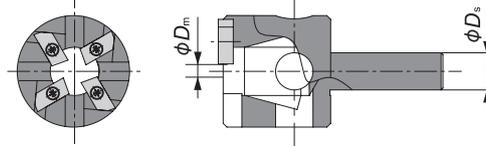


Figure-5

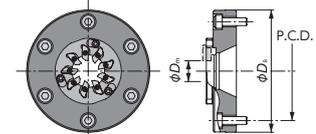


Figure-6

Code	Stock	Shape	No. of cutting edges	ϕD_m	ϕD_s	P.C.D.	adapter mounting bolts	
5829312		Fig. 1	9	$\phi 12$	$\phi 46$	$\phi 35$	—	
5720966 5762737 5798301	● ★ ★	Fig. 1	9 6 9	$\phi 12$ $\phi 12$ $\phi 16$	$\phi 33$	$\phi 40$	—	
5703368	●	Fig. 2	9	$\phi 12$	$\phi 37$	$\phi 30.5$	CS0310 (M3)	5770763
5699947	■	Fig. 2			$\phi 40$	$\phi 32.5$	H-M4×12	5703392
5699921	●	Fig. 2			$\phi 40$	$\phi 32.5$	CS0414 (M4)	5609797
5699863	●	Fig. 3	9	$\phi 12$	$\phi 40$	$\phi 33$	CS04148S (M4)	5702212
5724174	●	Fig. 3	9	$\phi 12$	$\phi 52$	$\phi 42$	CS0515 (M5)	5442199
5774674		Fig. 3		$\phi 16$	$\phi 50$	$\phi 40$		
5779467	●	Fig. 4		$\phi 12$	$\phi 52$	$\phi 44$	CS0520 (M5)	5426895
5779459	●							
5779434	●						CS0515 (M5)	5442199
5779426	●							
5789698	●	Fig. 5	4	$\phi 7$	$\phi 10$	Specification of 1-corner inserts		
5823620		Fig. 4	6	$\phi 12$	$\phi 42$	$\phi 32$		
5743265		Fig. 3	9	$\phi 12$	$\phi 40$	$\phi 31$	CS0410 (M4)	5902481
5847348		Fig. 3	9	$\phi 18$	$\phi 50$	$\phi 40$		
5786447		Fig. 6	9	$\phi 16$	$\phi 94$	$\phi 76$	CS0620 (M6)	5883764

*Cutters include insert screws for thickness of 4.5mm and 6.5mm. Please use the suitable screw for your inserts.

Holders for indexing inserts.

NTK Part No.	Code	Stock	No. of cutting edges	Diameter between the cutting edges	
TWC9HP2	5699962	●	9	12	Common for Fig. 2 and 3
TWC9HP2-D16	5756762		9	12	Fig. 6

The holder locking bolts are not supplied. Only the screw and wrench for inserts supplied.

Mounting adaptor

NTK Part No.	Code
Various types	Various types

Various types of mounting adaptors are available for our thread whirling sets.

Other parts

Part Name	NTK Part No.	Code	Stock	
Screws for inserts	For 4-mm thick insert	FSI17-2.2*6.0	5683768	● Common for the series
	For 6.5-mm thick insert	FSI24-2.2*7.9	5786595	● Common for the series
Wrench	T-07	5094917	●	Common for the series
Holder locking bolts	CS0309-TW	5702196	●	Common for the series

Applicable Thread Shapes (Reference)

- Number of starts: Adjustable depending on the requirement.
- Lead angle: Up to approx. 30 degrees (dependant on the angle of the spindle)
- Thread height: Up to approx. 2.5 mm
- Outer diameter of workpiece: Up to approx. $\phi 10$ mm (In the case of a cutter having the diameter between the cutting edges $\phi 12$)
- Depth of cut: Up to approx. 4 mm
- Pitch: Up to approx. 6.0 mm

The above values are for reference use only, as they may vary depending on the shape of the workpiece.

Recommended cutting conditions and procedure for use

- (1) Check and confirm the model of the machine in use and its spindle type. Select a whirling cutter suitable for your machine and spindle type from our listed range.
- (2) Please send drawings of your component to NTK. We will manufacture inserts dedicated to cutting your work piece by calculating the lead angle and shape of inserts required from the drawings sent.
- (3) Set the whirling cutter at the specified lead angle and set the cutting conditions.

Cutting conditions

Cutter speed	Work speed	Feed rate
1,000-4,000 min^{-1}	10-30 min^{-1}	The same as the thread pitch

Applicable work

Work diameter	Material
$\phi 3 \sim \phi 10\text{mm}$ (In the case of a cutter having the diameter between the cutting edges $\phi 12$)	Pure titanium, titanium alloys, SUS316 and the likes

Useful tip

Calculation of Cutting time via Thread Whirling
(Time for threading only)

$$T(\text{second}) = \frac{60 \times \text{overall length (length to be cut)}}{\text{Main spindle rotation speed} \times \text{feed (pitch)}}$$

Technical know-how

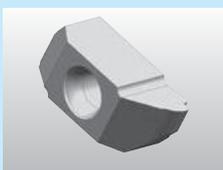
- Give advice how to set up tools to get accurate form.
- Flexibly make inserts to get form which can't be got with conventional tools.

Insert Lineup

Two grades of PVD coated carbide materials are available. The thickness is 4mm or 6.5mm. The inserts are 2-corner type (except in special cases)

TM4

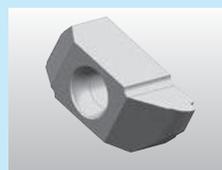
Suitable for pure titanium and titanium alloys



New material grade excellent in wear resistance, deposition resistance and chipping resistance

ZM3

Suitable for titanium alloys and SUS316



General-purpose grade excellent in deposition resistance, chipping resistance and resistance to adhesion

Actual cutting examples

Worm screw ● Material : Brass			
Work diameter	φ 7	No. of starts	2
Outer diameter of the screw	φ 6	Lead angle	10.1°
Bottom surface diameter of the screw	φ 4	Direction of thread	Left
Cutting condition with Thread Whirling			
Main spindle speed (min ⁻¹)	30	Cutter speed (min ⁻¹)	3,200
Pitch = feed (mm/rev)	2.8		
NTK Thread Whirling with 9 cutting edges	25s.		
Single point	50s.		
The total cycle time was halved, with the threading time for each workpiece significantly reduced by changing to thread whirling from single point cutting.			

Pin ● Material : Hastelloy			
Work diameter	φ 3	No. of starts	1
Outer diameter of the screw	φ 1.5	Lead angle	4.3°
Bottom surface diameter of the screw	φ 1.1	Direction of thread	Right
Cutting condition with Thread Whirling			
Main spindle speed (min ⁻¹)	20	Cutter speed (min ⁻¹)	2,250
Pitch = feed (mm/rev)	0.3		
NTK Thread Whirling with 9 cutting edges	600 pcs/corner		
Single point	100 pcs/corner		
Greatly improved cutter life was achieved in the threading of Hastelloy, a very tough, abrasive material, by changing to thread whirling from single point cutting.			

Bone screw ● Material : SUS316			
Work diameter	φ 8	No. of starts	1
Outer diameter of the screw	φ 3.45	Lead angle	7.5°
Bottom surface diameter of the screw	φ 2.67	Direction of thread	右
Cutting condition with Thread Whirling			
Main spindle speed (min ⁻¹)	23	Cutter speed (min ⁻¹)	2,000
Pitch = feed (mm/rev)	1.24		
NTK Thread Whirling with 9 cutting edges	2,600 pcs/corner		
Competitor's thread whirling with 6 cutting edges	1,000 pcs/corner		
NTK's thread whirling achieved 2.6 times longer life, compared with the competitor's product.			

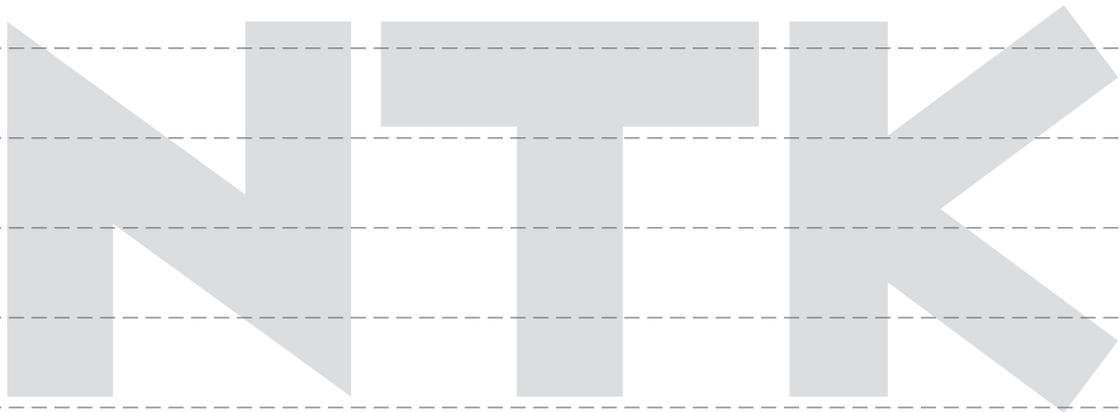
Bone screw ● Material : SUS316			
Work diameter	φ 6.35	No. of starts	1
Outer diameter of the screw	φ 3.23	Lead angle	8.5°
Bottom surface diameter of the screw	φ 2.2	Direction of thread	Right
Cutting condition with Thread Whirling			
Main spindle speed (min ⁻¹)	15	Cutter speed (min ⁻¹)	2,250
Pitch = feed (mm/rev)	1.27		
NTK Thread Whirling with 9 cutting edges	1,200 pcs/corner		
Competitor's thread whirling head with 12 cutting edges	1,000 pcs/corner		
Competitor's thread whirling head with 3 cutting edges	400 pcs/corner		
NTK's thread whirling achieved 1.2 up to 3 times longer life, compared with the competitor's product.			

More than 100 orders for our thread whirling sets in just 2 years after release !

- Work material : bore screw • implant • worm gear • ball screw, etc
- Material : Pure titanium, Ti-6Al-4V ELI, SUS316, Hastelloy, Brass, 17-4PH, Platinum, and more
- Work diameter : φ 3~ φ 10mm
- Thread height : 0.1~1.78mm
- Pitch : 0.32~6mm
- Number of starts : 1~3

MEMO

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Shaper

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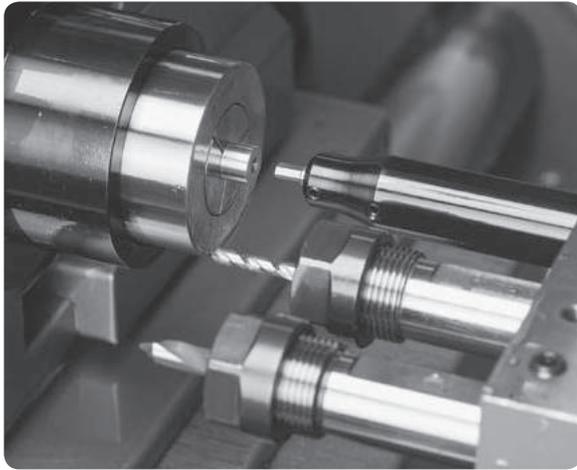
Micro-grain
Carbide, Carbide

Cermet
PVD-coated Cermet

PCD, CBN
and ceramic

Tool Materials /
Selection Guide

New
Products



Hexagon socket



Square socket



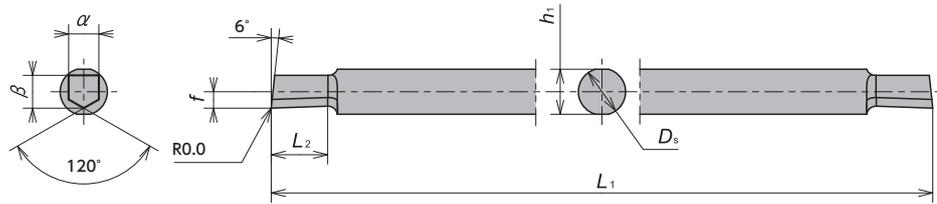
New line-up for square shape hole

Features

- Hexagonal hole machining is possible with back spindle of Swiss type lathe!
- Economical with 2 corners cutting edge!
- Easy dimensional correction!

Stock list

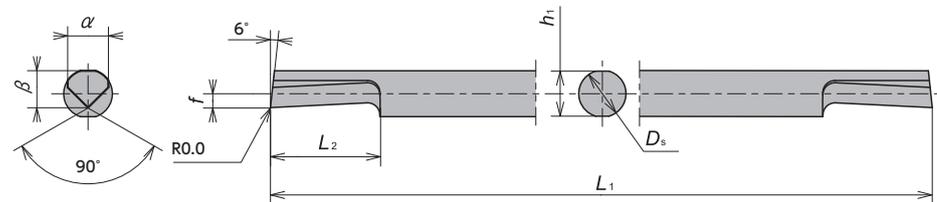
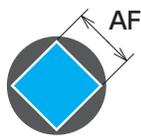
Hexagon socket



Part number	Base O.S. for capable machining AF (mm)	O.S. for capable machining AF (mm)	Dimensions (mm)							PVD coated micrograin carbide	
			D_s	L_1	L_2	h_1	α	β	f	TM4	Stock
SSP020N1130H	1.5	1.4 ~ 2.0	$\phi 2$	50	3.0	1.8	1.1	0.8	0.4	5885934	●
020N1430H	2.0	1.9 ~ 2.6	$\phi 2$		4.0	2.8	1.4	1.1	0.55	5885942	●
030N1940H	3.0	2.4 ~ 3.6	$\phi 3$		5.0	3.8	1.9	1.6	0.8	5885959	●
040N2450H	4.0	3.4 ~ 4.6	$\phi 4$	60	5.0	3.8	2.4	2.6	1.3	5885967	●
050N3260H	5.0	4.4 ~ 6.2	$\phi 5$	70	6.0	4.8	3.2	3.4	1.7	5885975	●
060N42120H	6.0	5.9 ~ 8.2	$\phi 6$	80	12.0	5.6	4.2	4.0	2.0	5873120	●
080N62160H	8.0	7.9 ~ 12.2	$\phi 8$		16.0	7.6	6.2	4.7	2.35	5885926	●

※See page L20-21 for sleeve holder.

Square socket



Part number	Base O.S. for capable machining AF (mm)	O.S. for capable machining AF (mm)	Dimensions (mm)							PVD coated micrograin carbide	
			D_s	L_1	L_2	h_1	α	β	f	TM4	Stock
SSP020N1740S	2.0	1.9 ~ 2.3	$\phi 2.0$	50	4.0	1.8	1.70	1.60	0.70	5920186	●
025N1940S	2.5	2.2 ~ 2.6	$\phi 2.5$			2.3	1.95	1.80	0.65	5920194	●
030N2260S	3.0	2.5 ~ 3.0	$\phi 3.0$		60	6.0	2.8	2.20		2.05	5920202
035N2760S	3.5	2.9 ~ 3.7	$\phi 3.5$	8.0		3.3	2.70	2.25	0.60	5920210	●
040N3380S	4.0	3.6 ~ 4.6	$\phi 4.0$	70	8.0	3.8	3.35	3.05	1.15	5920228	●
050N39100S	5.0	4.5 ~ 5.4	$\phi 5.0$		10.0	4.8	3.90	3.95	1.55	5920236	●
060N47120S	6.0	5.3 ~ 6.6	$\phi 6.0$	80	12.0	5.6	4.75	4.50	1.70	5920244	●
080N58160S	8.0	6.5 ~ 8.1	$\phi 8.0$		16.0	7.6	5.80	5.50		5920251	●

※See page L20-21 for sleeve holder.

Recommended cutting condition

Feed...F4000~F1000 (mm/min) D.O.C.(radial depth)...0.05~0.01mm

Following machining process is recommended for beautiful surface finish.

1. Roughing at D.O.C.(radial depth) 0.05mm
2. Finishing at D.O.C.(radial depth) 0.01mm for 1-2 times.

Case study

Hexagonal hole machining	
Work material	: SUS303
Feed (mm/min)	: 2,000
Depth of cut (mm)	: Rough 0.025 / Finish 0.005
Coolant	: WET
NTK : TM4 SSP030N1840H	10,000 pcs/corner
competitor : carbide	300pcs/corner
<ul style="list-style-type: none"> • Hexagonal hole machined by competitor's is unstable shape and short tool life. • NTK's achieved the following good result due to the superior grinding tech and "TM4" PVD coating. <ol style="list-style-type: none"> ① stable hexagonal shape and longer tool life ② less dimensional correct ③ good surface finish 	

machining process

- center drilling**

 - select dia of center drilling over O.S. length
- drilling (pilot hole)**

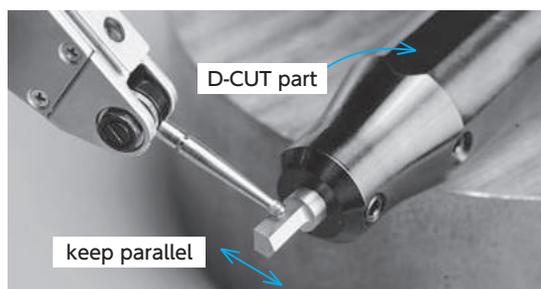
 - select the dia of drill insert same with hexagonal O.S.
 - Deeper depth of pilot hole is recommended, because burrs is accumulated when machined
- center drilling (chamfering)**

 - use the same drill in process ①
 - machining the process ① and ③ at the same time is also possible.
- shaping hexagonal hole**

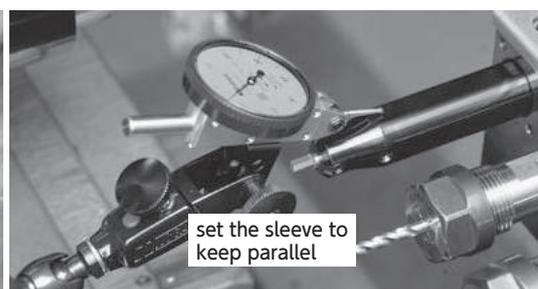
 - shaping hexagonal hole
 - shaping hexagonal shape 6 times with 60 degree positioned.
- drilling finish zero cutting**

 - finishing with the same drill in the process ②
 - ※In the zero cutting, reduce the cutting condition due to the heavy interrupted machining

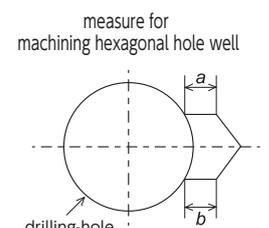
How to set insert in the sleeve



①outside machine



②inside machine



after machining one corner, rotating the sleeve to adjust the length "a" and "b" to be same.

SHAPER Programming example

Caution: The command codes and values will change according to the types of machinery. Please ask Machine builder for detailed information.

Sample work piece: Hexagon socket...AF 3.0mm Diagonal 3.6mm Depth 2.7mm Pre-hole diameter...φ3.0mm

Shaper Main Program

```

☆ : Back spindle stop rotation
☆ : Back spindle index 0° .....①
T○○○○ (シェーパー)
G50 U2.0 .....②
G0 X2.9 Z-2.0 T○○ .....③
☆ : Call sub-program(○○○①) repeat 14 times .....④
☆ : Call sub-program(○○○②) .....⑤

☆Back spindle index 60° .....①
G0 X2.9 Z-2.0
☆ : Call sub-program(○○○①) repeat 14 times .....④
☆ : Call sub-program(○○○②) .....⑤

☆ : Back spindle index 120° .....①
G0 X2.9 Z-2.0
☆ : Call sub-program(○○○①) repeat 14 times .....④
☆ : Call sub-program(○○○②) .....⑤

☆ : Back spindle index 180° .....①
G0 X2.9 Z-2.0
☆ : Call sub-program(○○○①) repeat 14 times .....④
☆ : Call sub-program(○○○②) .....⑤

☆ : Back spindle index 240° .....①
G0 X2.9 Z-2.0
☆ : Call sub-program(○○○①) repeat 14 times .....④
☆ : Call sub-program(○○○②) .....⑤

☆ : Back spindle index 300° .....①
G0 X2.9 Z-2.0
☆ : Call sub-program(○○○①) repeat 14 times .....④
☆ : Call sub-program(○○○②) .....⑤

☆ : Release spindle index
G0 Z-10.0
G50 U-2.0
G0 U0 W0 T0
M1
    
```

☆ : Input program for your machinery

- ①= index each 60 degrees, total 6times
- ②= input value of (distance from tool center to cutting edge)×2
※The program will become easy by setting tools to plus direction.
Minus direction setting requires program with minus X coordinate.
- ③= Approach coordinate
X2.9=a little value minus to pre-hole diameter
Z-2.0=Approach position a little way considering time to reach the commanded speed.

Shaper Sub Program①

```

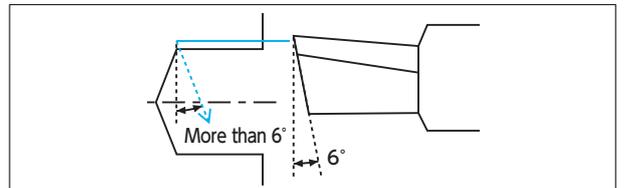
N○○○① (Roughing)
G4 U0.02 .....⑥
G98 G1 Z2.7 F3000 .....⑦
G4 U0.02
U-0.2 W-0.018 .....⑧
G4 U0.02
G0 Z-2.0
G4 U0.02
U0.25 .....⑨
M99
    
```

Shaper Sub Program②

```

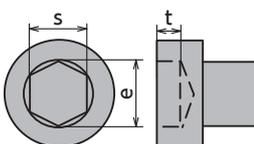
N○○○② (Finishing)
G98 G1 X3.61 Z-2.0 F1000 .....⑩
G4 U0.02
Z2.7 F3000
G4 U0.02
U-0.2 W-0.018
G4 U0.02
G0 Z-2.0
M99
    
```

- ④=To shaper sub program①
14times=X2.9 start point X3.6 end point
Each depth of cut is 0.05mm(diameter)
⇒ (3.6-2.9)÷0.05=14 times
- ⑤=To Shaper Sub Program②
- ⑥=Input dwell or error detection after each operation because of slack in axis operation
- ⑦=Cut to target Z coordinate
- ⑧=Release by more than 6 degrees. 10 degrees in this case below. More than 6 degrees



- ⑨=Each depth of cut is 0.05mm in this case
Go back by (released X coordinate value in⑧+depth of cut)
- ⑩Tiny Doc cutting for finishing will make the machined surface good.
The end X position is 3.6mm. Finish cutting by positioning with additional 0.01mm

Reference: Hexagon Socket Specification Extract from JIS B1176



s	Name	1.5	1.5	2	2.5	3	4	5	6	8	10	12
		Max.	1.58	1.58	2.08	2.58	3.08	4.095	5.14	6.14	8.175	10.175
	Min.	1.52	1.52	2.02	2.52	3.02	4.020	5.02	6.02	8.025	10.025	12.032
e	Min.	1.733	1.733	2.303	2.873	3.443	4.583	5.723	6.863	9.149	11.429	13.716
t	Min.	0.7	1	1.1	1.3	2	2.5	3	4	5	6	7
Thread (reference)		M1.6	M2	M2.5	M3	M4	M5	M6	M8	M10	M12	M14

SHAPER Programming example by machine builders

Caution: The command codes and values will change according to the types of machinery. Please ask Machine builder for detailed information.

Sample work piece: Hexagon socket...AF 3.0mm Diagonal 3.6mm Depth 2.7mm Pre-hole diameter... ϕ 3.0mm

Program example for CITIZEN machine

Program example for STAR machine

Program example for TSUGAMI machine

```

Shaper Main Program

M25
M78 S0 .....①
T○○○○(Shaper)
G50 U2.0 .....②
G0 X2.9 Z-2.0 T○○ .....③
M98 P2100 L14 .....④
M98 P2200 .....⑤

M78 S60 .....①
G0 X2.9 Z-2.0
M98 P2100 L14
M98 P2200 } 《A》

Repeat 《A》 by S120, S180, S240,
S300 with each 60 degrees

M20
G0 Z-10.0
G50 U-2.0
G0 U0 W0 T0
M1
    
```

```

Shaper Main Program

M25
T○○○○ (Shaper)
G50 U2.0 .....②
M8
G0 X2.9 Z-2.0 C0 T○○ .....①
M98 P2100 L14 .....④
M98 P2200 .....⑤

G0 C60.0 .....①
G0 X2.9 Z-2.0
M98 P2100 L14
M98 P2200 } 《A》

Repeat 《A》 by S120, S180, S240,
S300 with each 60 degrees

G0 Z-2.0
G50 U-2.0
G0 T0
G28 W0
M1
    
```

```

Shaper Main Program

M105
M150
G28 H0 .....①
M182
T○○○○(Shaper)
G50 U-2.0 .....②
G0 X2.9 Z2.0 T○○ .....③
M98 P2100 L14 .....④
M98 P2200 .....⑤
M183

G0 C60 .....①
M182
G0 X2.9 Z2.0
M98 P2100 L14
M98 P2200
M183 } 《A》

Repeat 《A》 by S120, S180, S240,
S300 with each 60 degrees

M151
G0 Z10.0
G50 U2.0
G0 U0 W0 T0
M1
    
```

```

Shaper Sub Program①

N2100 (Roughing)
G4 U0.02 .....⑥
G98 G1 Z2.7 F3000 .....⑦
G4 U0.02
U-0.2 W-0.018 .....⑧
G4 U0.02
G0 Z-2.0
G4 U0.02
U0.25 .....⑨
M99
    
```

```

Shaper Sub Program①

O2100 (Roughing)
G4 U0.02 .....⑥
G98 G1 Z2.7 F3000 .....⑦
G4 U0.02
U-0.2 W-0.018 .....⑧
G4 U0.02
G0 Z-2.0
G4 U0.02
U0.25 .....⑨
M99
    
```

```

Shaper Sub Program①

O2100 (Roughing)
G4 U0.02 .....⑥
G98 G1 Z-2.7 F3000 .....⑦
G4 U0.02
U-0.2 W0.018 .....⑧
G4 U0.02
G0 Z2.0
G4 U0.02
U0.25 .....⑨
M99
    
```

```

Shaper Sub Program②

N2200 (Finishing)
G98 G1 X3.61 Z-2.0 F1000 .....⑩
G4 U0.02
Z2.7 F3000
G4 U0.02
U-0.2 W-0.018
G4 U0.02
G0 Z-2.0
M99
    
```

```

Shaper Sub Program②

O2200 (Finishing)
G98 G1 X3.61 Z-2.0 F1000 .....⑩
G4 U0.02
Z2.7 F3000
G4 U0.02
U-0.2 W-0.018
G4 U0.02
G0 Z-2.0
M99
    
```

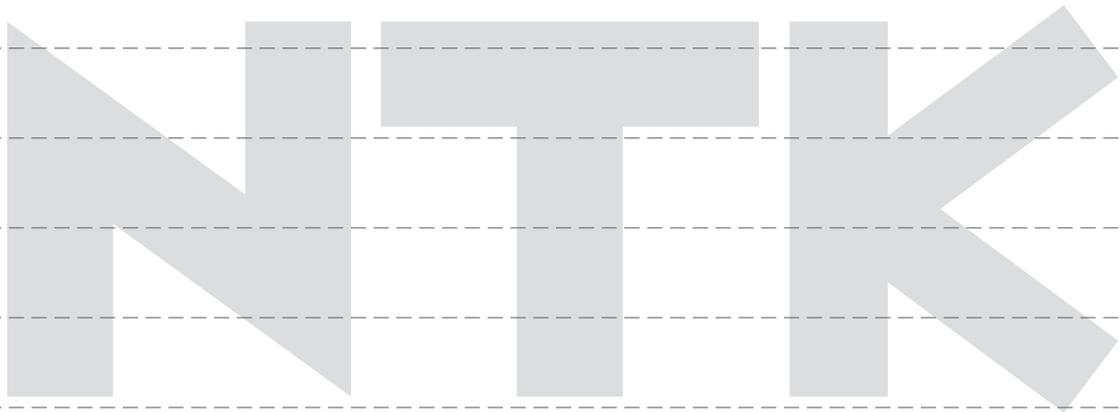
```

Shaper Sub Program②

O2200 (Finishing)
G98 G1 X3.61 Z2.0 F1000 .....⑩
G4 U0.02
Z-2.7 F3000
G4 U0.02
U-0.2 W0.018
G4 U0.02
G0 Z2.0
M99
    
```

MEMO

New Products
Tool Materials / Selection Guide
PCD, CBN and ceramic
Cermet, PVD-coated Carbide
Micro-grain Carbide, Carbide
Insert Stock List
Outside Machining Toolholders
SS
Grooving Tools
Threading Tools
Shaper
Internal machining tool range
Original Tools for Various Applications
Indexable End Milling Tools
Indexable Drill Inserts
Milling Cutters
Technical Data
Index



L

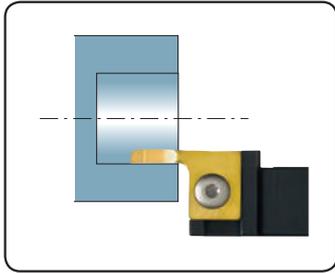
Boring Bars

- Selection guide for boring and internal machining tools · · L2
- LBM · · · · · L6
- STICK DUO SPLASH · · · · · L8
- STICK DUO Hyper · · · · · L16
- STICK DUO · · · · · L22
- MOGUL BAR · · · · · L28
- Multi-clamp holder · · · · · L41

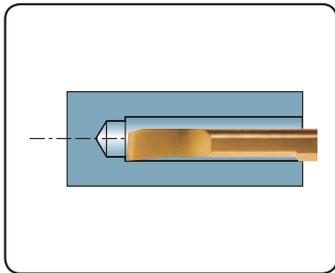
Boring bars and internal machining tool range

NTK Selection guide for boring and internal machining tools

Minimum machining diameter $\phi 1.0 \sim 8.2$ Solid type

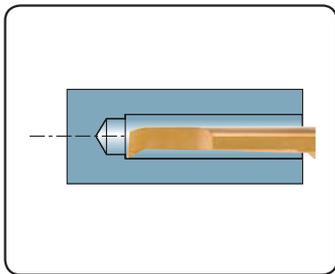


LBMA/LBMA-S type	CH-LBM type	DS-LBMB type
		
→L6	→L6	→L6
Min. machining dia. : $\phi 1.0 \sim \phi 2.3$	Min. machining dia. : $\phi 1.0 \sim \phi 3.0$	Min. machining dia. : $\phi 1.0 \sim \phi 3.0$
Shank size : □8 ~ □16	Shank size : □10 • □12	Shank dia. : $\phi 14 \sim \phi 25.4$



SBFS type (Carbide solid bar)	SHFS type (Carbide solid bar)
	
→L24	→L20
Min. machining dia. : $\phi 2.2 \sim \phi 8.2$	Min. machining dia. : $\phi 2.2 \sim \phi 8.2$
Shank dia. : $\phi 2.0 \sim \phi 8.0$	Shank dia. : $\phi 2.0 \sim \phi 8.0$

High degree of accuracy results in precise tool length setting with STICK DUO!!



SBFB type (Carbide solid bar)	SHFB type (Carbide solid bar)
	
→L24	→L20
Min. machining dia. : $\phi 2.2 \sim \phi 6.2$	Min. machining dia. : $\phi 2.2 \sim \phi 6.2$
Shank dia. : $\phi 2.0 \sim \phi 6.0$	Shank dia. : $\phi 2.0 \sim \phi 6.0$

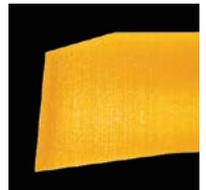
High degree of accuracy results in precise tool length setting with STICK DUO!!

S chipbreaker



Excellent cutting performance

H No chipbreaker



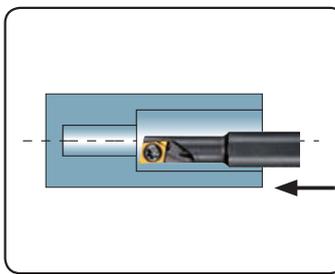
Mirror-like honing

F chipbreaker

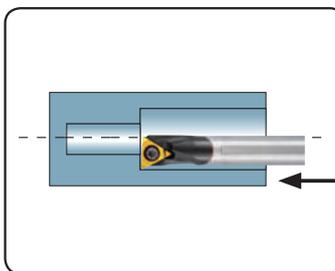


Evacuates chips in the forward direction.

Minimum machining diameter from $\phi 5.0$ Insert type **MOGUL BAR**

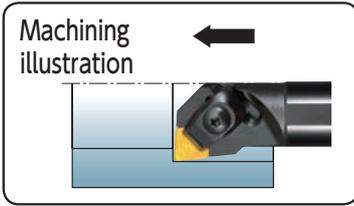


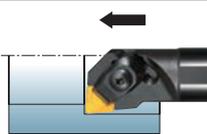
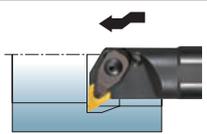
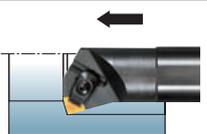
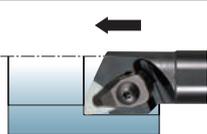
C-MBR type (Carbide shank)	S-MBR type (Steel shank)	C-SEXR type (Carbide shank)	S-SEXR type (Steel shank)
			
→L32	→L34	→L34	→L34
Min. machining dia. : $\phi 5.0$	Min. machining dia. : $\phi 5.0$	Min. machining dia. : $\phi 6.0$	Min. machining dia. : $\phi 6.0$
Shank dia. : $\phi 4.5 \sim \phi 6.0$	Shank dia. : $\phi 6.0$	Shank dia. : $\phi 5.0 \sim \phi 6.0$	Shank dia. : $\phi 8.0$



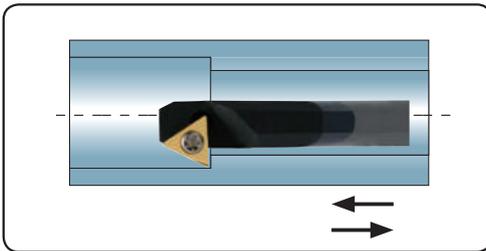
C-STUC(P) type (Carbide shank)	S-STUC(P) type (Steel shank)	C-SCLP(C) type (Carbide shank)	S-SCLP(C) type (Steel shank)
			
→L39	→L38	→L36	→L36
Min. machining dia. : $\phi 8.0 \sim \phi 18.0$	Min. machining dia. : $\phi 8.0 \sim \phi 18.0$	Min. machining dia. : $\phi 7.0 \sim \phi 14.0$	Min. machining dia. : $\phi 7.0 \sim \phi 18.0$
Shank dia. : $\phi 7.0 \sim \phi 16.0$	Shank dia. : $\phi 7.0 \sim \phi 16.0$	Shank dia. : $\phi 6.0 \sim \phi 12.0$	Shank dia. : $\phi 6.0 \sim \phi 16.0$

Multi-clamp series



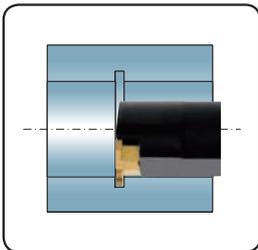
S-□CLN type	S-□DUN type	S-□SKN type	S-□WLN-2 type
 →L41	 →L42	 →L43	 →L44
T type : Clamp-on	T type : Clamp-on	T type : Clamp-on	W type : Dimple clamping
W type : Dimple clamping	H type : Dimple clamping	W type : Dimple clamping	
H type : Dimple clamping		H type : Dimple clamping	
Min. machining dia. : $\phi 33 \sim \phi 63$	Min. machining dia. : $\phi 42 \sim \phi 50$	Min. machining dia. : $\phi 50$	Min. machining dia. : $\phi 33 \sim \phi 50$
Shank size : $\phi 25 \sim \phi 50$	Shank size : $\phi 32 \sim \phi 40$	Shank size : $\phi 40$	Shank size : $\phi 25 \sim \phi 40$

Multi-clamp series



C-MSBR type(Carbide shank)	C-STZP(C) type(Carbide shank)	SBB type(Carbide solid bar)
 →L33	 →L40	 NEW →L24
Min. machining dia. : $\phi 5.7 \cdot \phi 7.7$	Min. machining dia. : $\phi 10.0 \sim \phi 17.5$	Min. machining dia. : $\phi 3.0 \sim \phi 4.0$
Shank dia. : $\phi 4.0 \cdot \phi 6.0$	Shank dia. : $\phi 6.0 \sim \phi 12.0$	Shank dia. : $\phi 4.0$

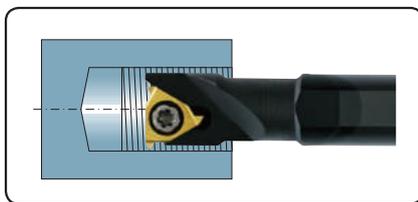
Internal grooving



For inside boring
STICK DRILL

SBG type	BG type	GKV type	FLAT 3
 →I28	 →I30	 →I31	 →I19
SFG type			
ID Face grooving  →I29			

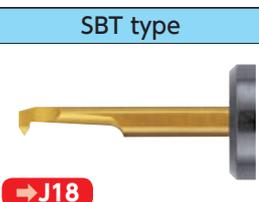
Internal threading



TGC type...Carbide shank
HN59 type...Steel shank

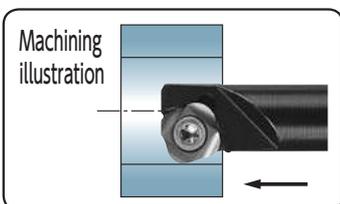


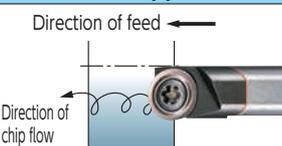
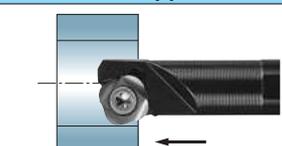
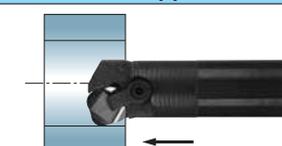
For inside boring
STICK DRILL



SHAPER DUO
 →K2
O.S. for capable machining : 1.4 ~ 11.5
Shank dia. : $\phi 2.0 \sim \phi 6.0 \cdot \phi 8.0$
Solid bar type

For machining of bearings



SRC type	BBR type	BBR type
 Direction of feed Direction of chip flow →M16	 →M17	 →M17

Boring bars and internal machining tool range

Internal Machining Tools Recommended Insert Grade and Cutting Conditions

■ ~φ6 (LBM · STICKDUO)

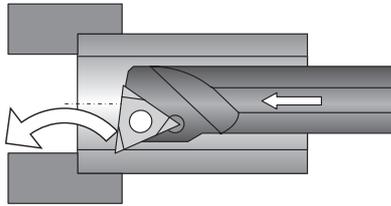
Work Material	Free cutting steels	Carbon steels	Alloy steels	Free cutting steels Stainless	Hard-to-cut Stainless steels	Titanium (Alloy)	Stainless Alloy
JIS Common Grade	SUM22 SUM23 SUM24	S35C S45C	SCr420 SCM435	SUS303 SUS430F	SUS304 SUS440C	6AL-4V-Ti	A5056 A6061
Insert Grade	First Choice	VM1 TM4	VM1	DT4 TM4		TM4	ZM3
	Second Choice	TM4 ZM3	TM4 ZM3	ZM3 VM1			
Cutting Speed v_c (m/min)	30 60 90			20 50 70		30 60 90	
depth of cut (mm)	0.05 0.08 0.10						
Feed speed f (mm /rev)	0.03 0.05 0.07						

■ φ6 ~

Work Material	Free cutting steels	Carbon steels	Alloy steels	Free cutting steels Stainless	Hard-to-cut Stainless steels	Titanium (Alloy)	Stainless Alloy
JIS Common Grade	SUM22 SUM23 SUM24	S35C S45C	SCr420 SCM435	SUS303 SUS430F	SUS304 SUS440C	6AL-4V-Ti	A5056 A6061
Insert Grade	First Choice	VM1	TM1 ZM3	DT4 TM1	DT4	PD1	KM1 ZM3
	Second Choice	TM1 DT4	QM3 C7Z	TM4	TM1	TM1	KM1 ZM3
Cutting Speed v_c (m/min)	50 100 200	carbide 50 90 150 C7Z 120 180 250	50 90 180	40 70 100	50 70 100	carbide 50 100 200	PD1 100 200 350
depth of cut (mm)	0.10 0.50 2.0						
Feed speed f (mm /rev)	0.01 0.04 0.12						

※Please refer to Technical Information **Q64** for detailed recommendation.

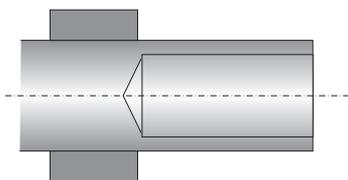
■ Boring on a conventional lathe



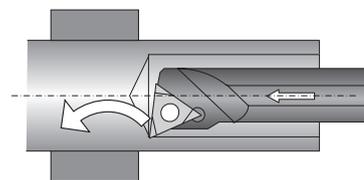
As the component has a through hole it is possible to evacuate the chips out through the bore.

Molded type chipbreaker (AM5) and honed chipbreaker A and B type can be used.

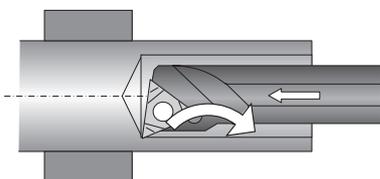
■ Boring on an automatic lathe



Boring into a blind hole.



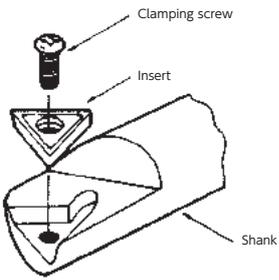
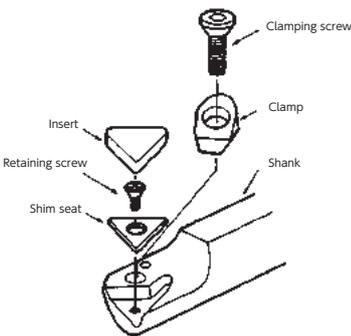
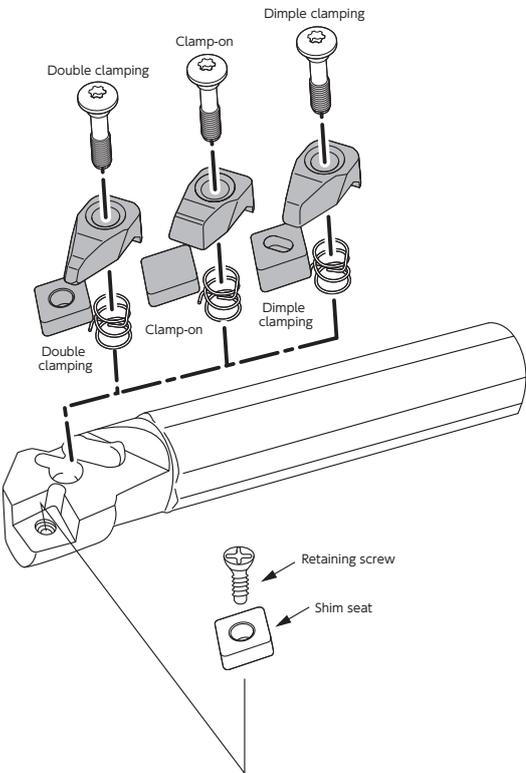
Insert breakage may occur as chips jam in the blind hole.



FG, F1, and F05 chipbreakers allow the chips to evacuate the bore reducing the possibility of insert damage.

※When using a chipbreaker of FG, F1 or F05 type, use an R-hand insert for an R-hand holder.

Structure and features of NTK boring bars

Series	Structure	Features
Screw-on type		<ul style="list-style-type: none"> ● Screw-on type that clamps small insert securely ● Durable torx screw ensures secure clamping. ● Available for three inserts type : triangle, 75° and 80° rhombus ● Both steel and carbide shanks are offered as standard holders (Minimum machining diameter : $\phi 5$ or larger)
Clamp-on type		<ul style="list-style-type: none"> ● Most suitable for ceramic insert use or for cermet inserts without hole ● Available for two types of inserts : triangle and square ● Minimum machining diameter : $\phi 20$ or larger
W type Double clamping		<ul style="list-style-type: none"> ● Three clamping methods are possible by a simple exchange of clamps.
T type Clamp-on		<ul style="list-style-type: none"> ● First choice for ceramic, stronger and more accurate clamping via the new clamp system ● Prevents insert breakage by optimizing the clamping force evenly.
H type Dimple clamping		<ul style="list-style-type: none"> ● Allows for highly accurate machining with high repeatability. ● Inserts can be clamped from both the front and back sides of the toolholder.

Boring bars and internal machining tool range

Minimum machining diameter : $\phi 1.0 \sim \phi 3.0$

LBMA/LBMA-S type

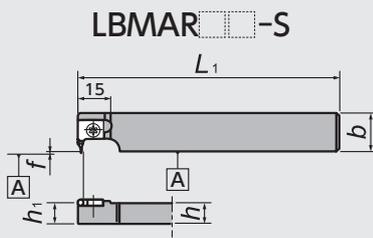


Figure-1

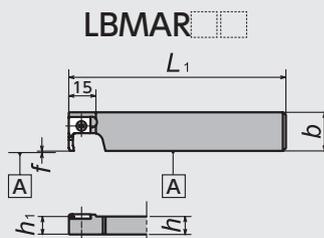


Figure-2

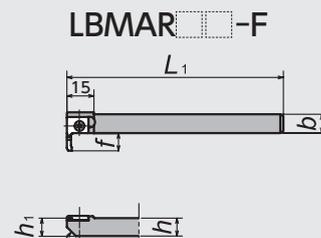


Figure-3

● Right-hand type shown.

CH-LBM type

For gang-type tool post

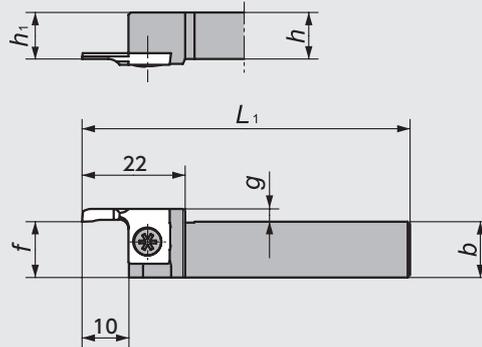
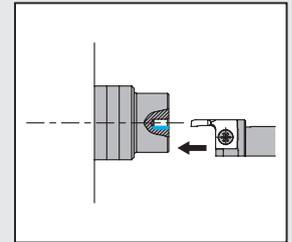


Figure-4



● Left-hand type shown.

DS-LBMB type

DS holder

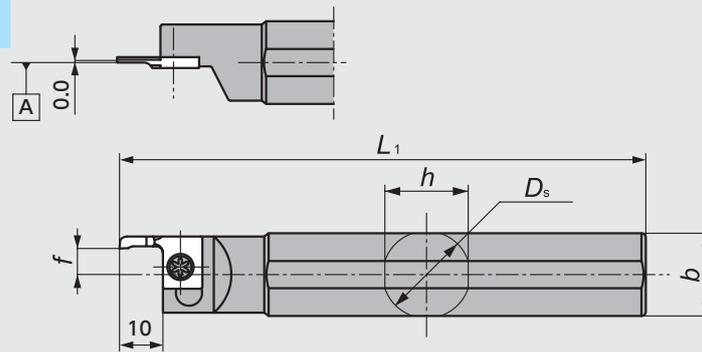
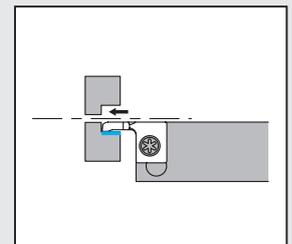


Figure-5



● Left-hand type shown.

Holder dimensions

Shape	Code No.	Toolholder Part No.	Stock	Dimensions (mm)						Applicable insert	Parts				
				D_s	h	b	L_1	h_1	f		Clamping screw	Wrench			
Figure-1	5571435	LBMAR10SGX	●	—	10	—	85	10	0.0	Short type L7	LRIS-4*10PW	CLR-15S (A)			
	5486311	R10S	●	—	10	18	120	10							
	5486329	R12S	●	—	12	—	120	12							
Figure-2	5383476	LBMAR08	●	—	8	21.5	120	8	0.0	Long type L7	LRIS-4*10	LLR-25S (B)			
	5359849	R10	●	—	10			10							
	5362199	R12	●	—	12			12							
	5378278	R16	●	—	16			16							
Figure-3	5359831	LBMAR10-F	●	—	10	10.0	120	10	10.0	Short type L7	LRIS-4*10PW	CLR-15S (A)			
Figure-4	5659164	CH-LBML1012H	●	—	10	12	100	10	※1						
Figure-5	5659172	L1212H	●	—	12	—	—	12	—	※1	Long type L7	LRIS-4*10PW	CLR-15S (A)		
	5359856	DS-LBMBL14F	●	14.000	13	13	80*3	—	※2	Long type L7				LRIS-4*10PW	CLR-15S (A)
	5359914	L15H	●	15.875	15	15	100*3	—							
	5359906	L16X ※4	●	16.000	—	—	95*3	—							
	5359898	L19	●	19.050	18	18	—	—							
	5359880	L20	●	20.000	19	19	120*3	—							
	5359872	L22	●	22.000	21	21	—	—							
	5483441	L25-MET	●	25.000	24	24	—	—							
5393905	L25	●	25.400	—	—	150*3	—								

※1 With an insert having the min. machining diameter of $\phi 3 \rightarrow 12.35\text{mm}$ With an insert having any min. machining diameter than $\phi 3 \rightarrow 12.75\text{mm}$

※2 With an insert having the min. machining diameter of $\phi 3 \rightarrow 6.35\text{mm}$ With an insert having any min. machining diameter than $\phi 3 \rightarrow 6.75\text{mm}$

※3 With a short type insert mounted, the overall length (L_1) becomes reduced by approx. 4.0 mm.

※4 Please select $\phi 16$ shank for DS sleeves. DS sleeves details [→ H91](#)

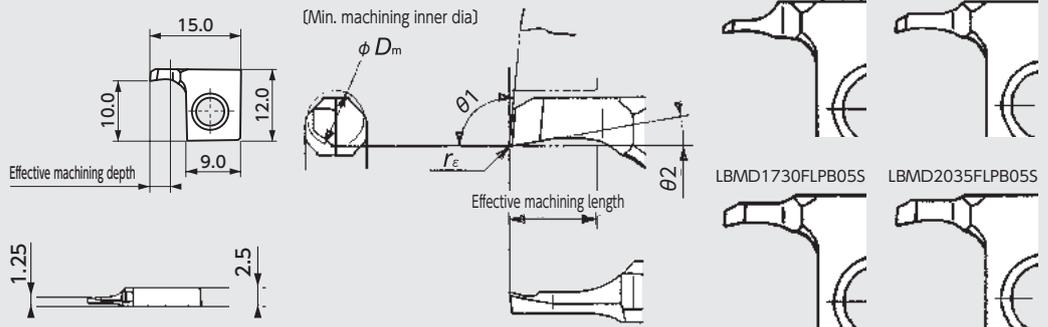
Applicable insert

LBMD-S type

Short type

Mirror finish

Enlarged photo of the cutting edge



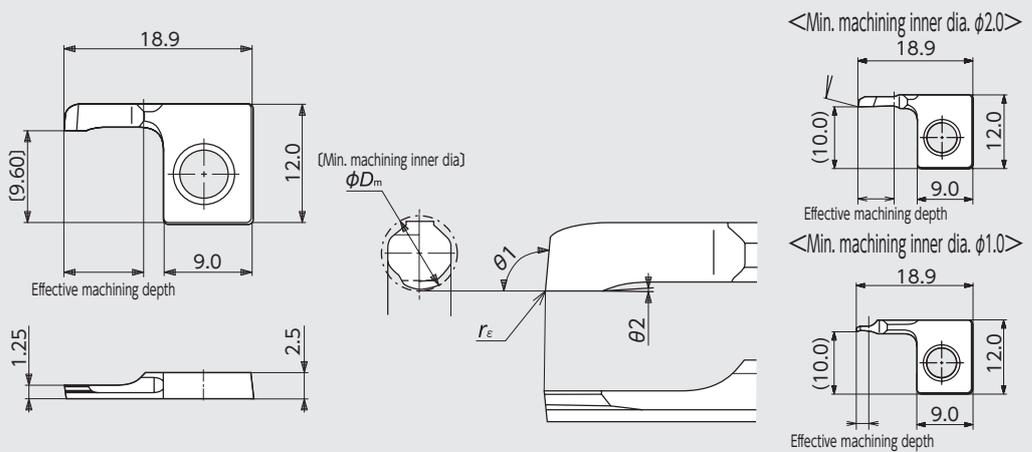
※LBMD2335FLPB05S is shown here.

LBM type

Long type

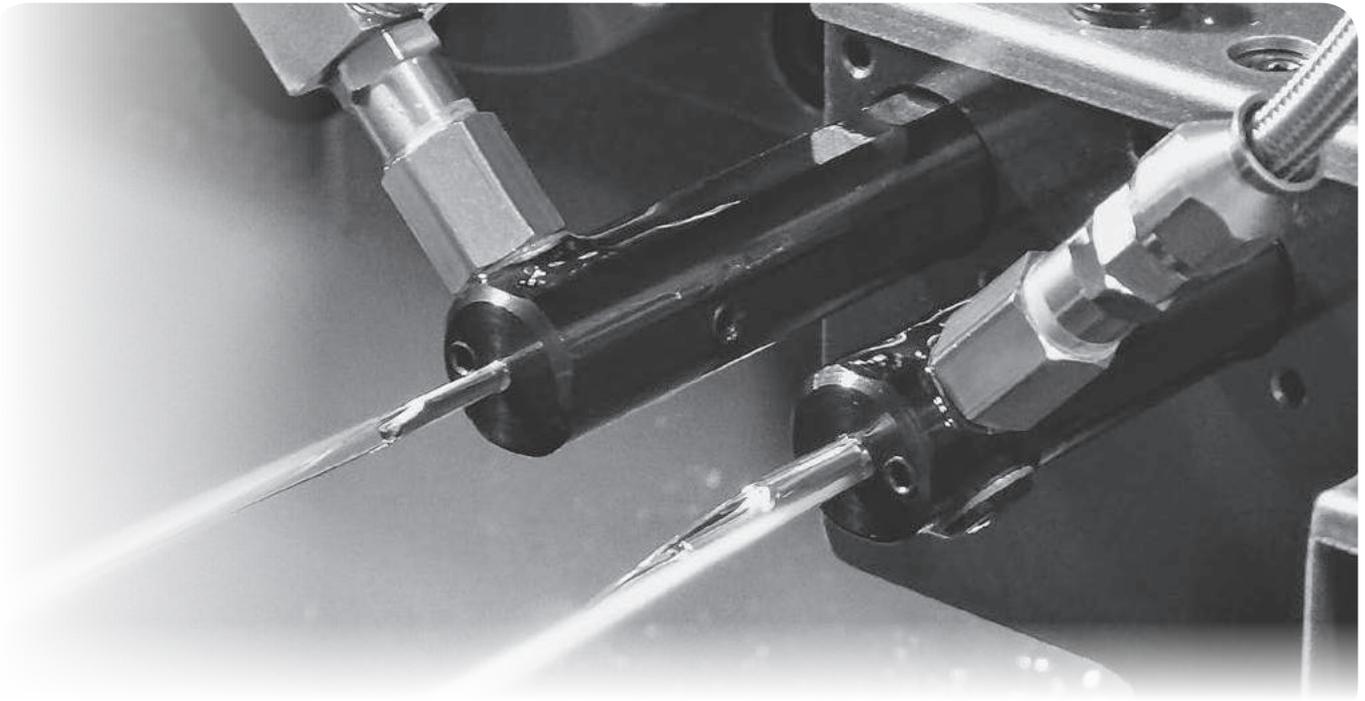
Mirror finish

Enlarged photo of the cutting edge



Insert type	Part No.	Chipbreaker	Dimensions (mm)					PVD-coated micro-grain carbides			
			Min. machining dia. ϕD_m	Effective machining depth	$\theta 1$	$\theta 2$	r_ϵ	ZM3	Stock	VM1	Stock
Short type	LBMD1020FLVBS 1020FLPB05S	Provided	$\phi 1.0$	2.0	95°	10°	0.00		5638150	●	
	0.05							5486592	●		
	$\phi 1.4$		3.0	0.00				5529169	●		
				0.05				5486600	●		
	$\phi 1.7$		3.5	0.00				5638143	●		
				0.05				5486618	●		
Long type	LBMD1020FLVB 1020FLPB05	Provided	$\phi 1.0$	2.0	95°	10°	0.00		5433222	●	
	0.05							5433214	●		
	LBMD2060FLVB 2060FLPB05	None	$\phi 2.0$	6.0	105°	2°	0.00		5421888	●	
	0.05							5421896	●		
LBME2060FLV 2060FLP05	Provided	$\phi 2.0$	6.0	105°	2°	0.00		5421920	●		
0.05							5421938	●			
LBMC3080FLV 3080FLP05	None	$\phi 3.0$	8.0	95°	2°	0.00	5372834	●	5359799	●	
0.05						5372826	●	5359807	●		
Long type	LBMC3080FLV 3080FLP05	Provided	$\phi 3.0$	8.0	90°	2°	0.00		5368030	●	
	0.05							5368048	●		
	LBMC3080FLVB 3080FLPB05	None	$\phi 3.0$	8.0	95°	2°	0.00	5372842	●	5359815	●
							0.05	5372859	●	5359823	●

STICK DUO SPLASH

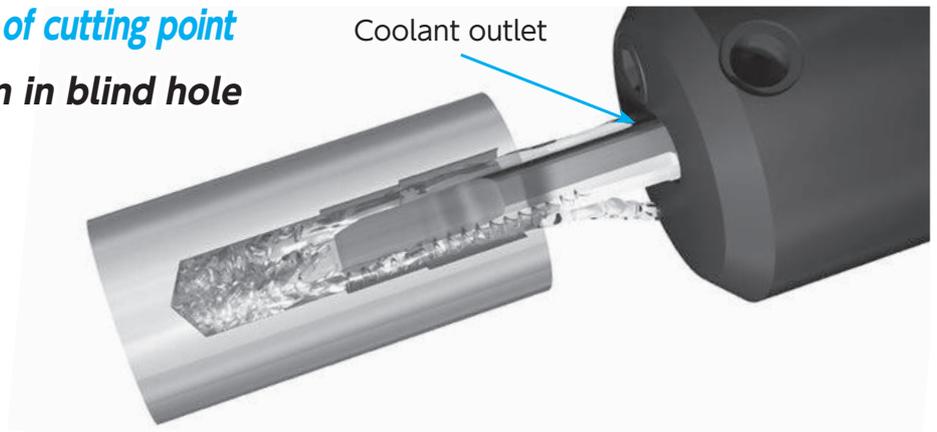


Features

You can select 2 types of coolant outlet

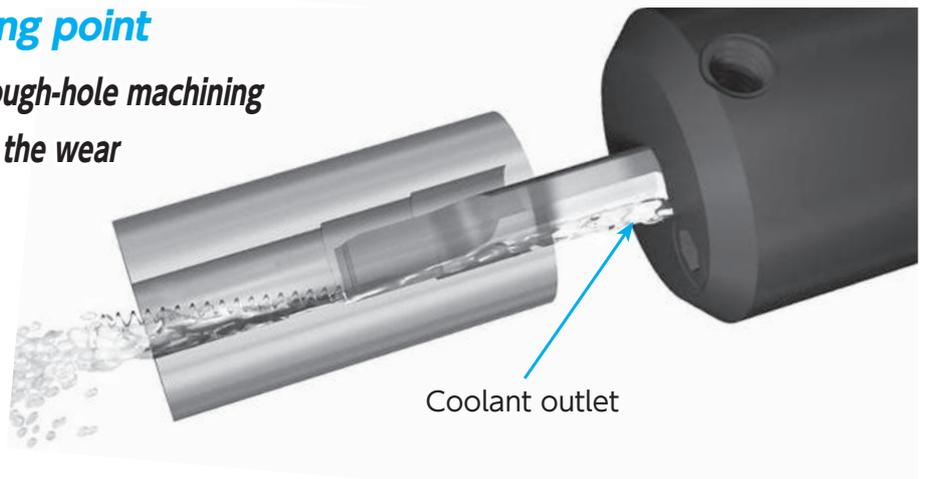
Internal coolant to back side of cutting point

- Good chip evacuation in blind hole machining



Internal coolant to cutting point

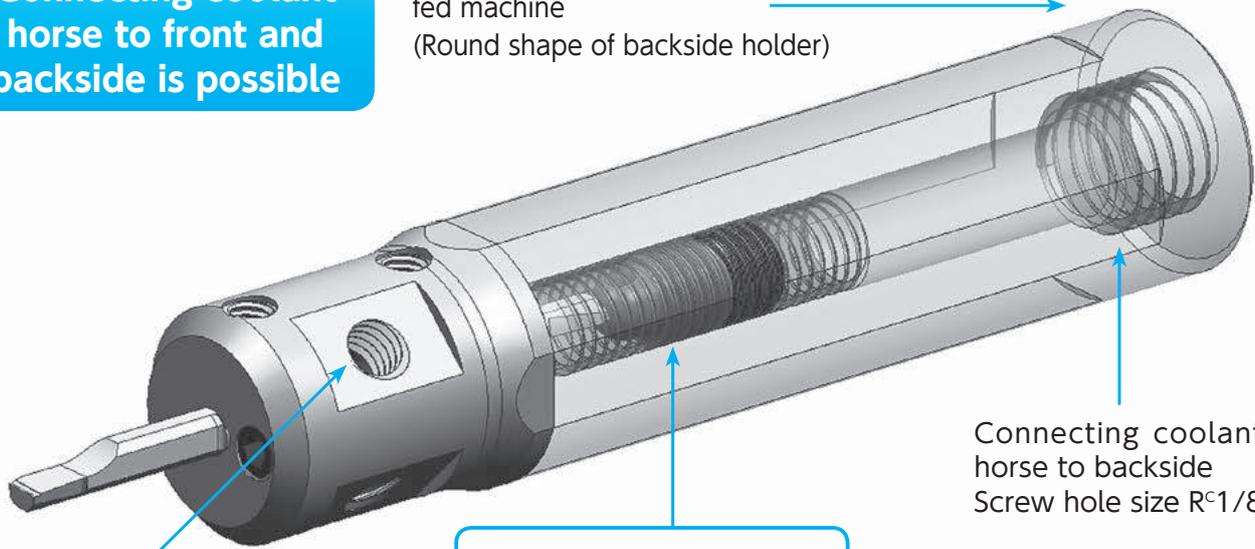
- Good chip evacuation in through-hole machining
- Coolant to insert tip improve the wear resistance



Structure

Connecting coolant horse to front and backside is possible

Designed for using with coolant fed machine
(Round shape of backside holder)

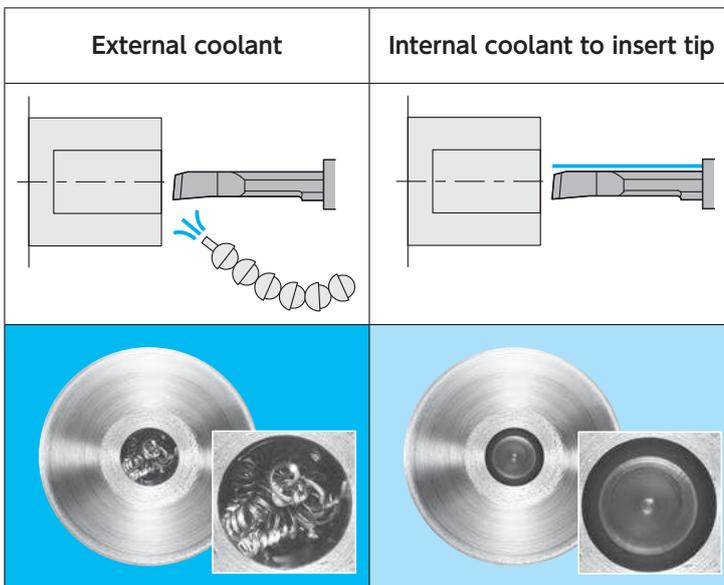


Connecting coolant horse for front side
M6 x 1.0 screw hole
(Adjusting screw hole size is possible with adapter)

Adjustable overhang length

Connecting coolant horse to backside
Screw hole size R^c1/8

Machined work piece comparison



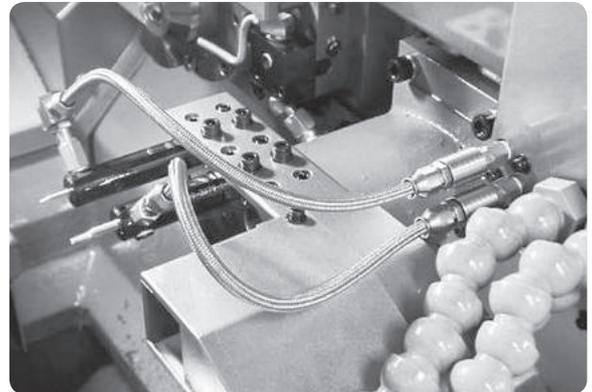
Chip clogging

No chip clogging

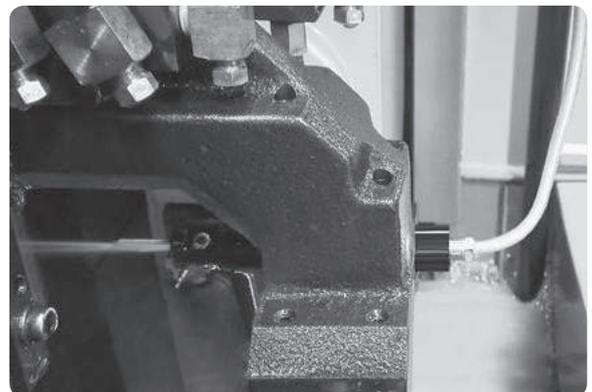
Work material : SCM435
Insert : SHFS040R005S
Cutting speed : $v_c=50\text{m/min}$
D.O.C. : $a_p=0.2$
Feed : $f=0.02\text{mm/rev}$
Hole depth : 15mm
Pilot hole : $\phi 5.1 \times 28\text{L}$
Coolant pressure : 5MPa

Picture for jointing coolant horse

Frontside jointed



Backside jointed



Boring bars and internal machining tool range

STICK DUO sleeve (HY-NBH-OH type)

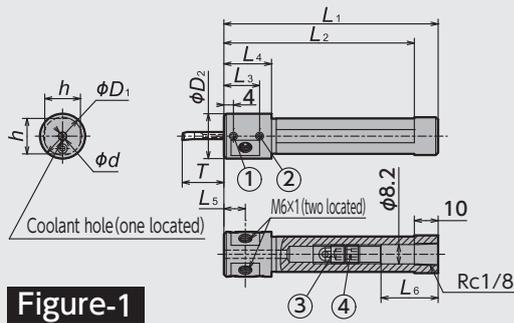


Figure-1

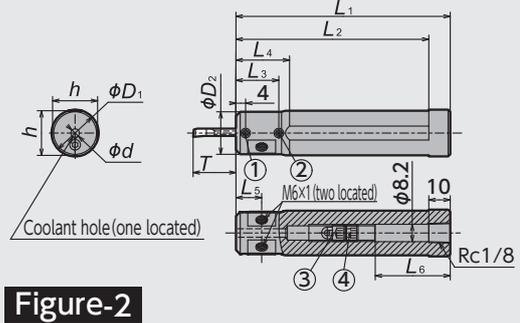
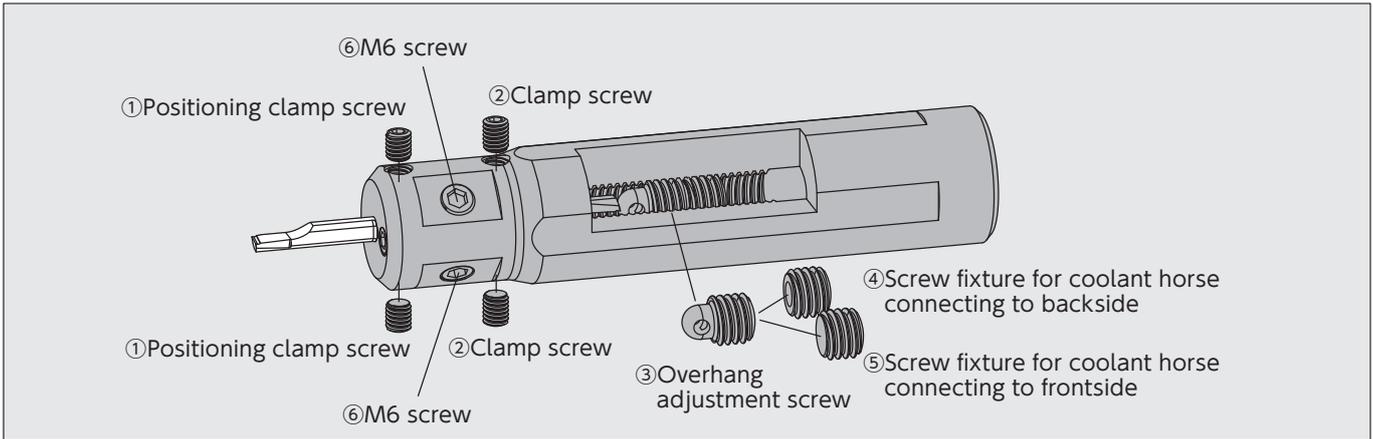


Figure-2

Shape	Code No.	Stock	Toolholder Part No.	Dimensions (mm)											overhang length of bar T (mm)	
				I.D. ϕd	ϕD_1	ϕD_2	h	L_1	L_2	L_3	L_4	L_5	L_6	Min.	Max.	
Figure-1	5893011	●	HY-NBH02016G-OH	2	16	19	15	90	80	15	19	9.5	29	5	18	
	5893029	●	02516G-OH	2.5									30	6.3	19.5	
	5893037	●	03016G-OH	3									31	7.5	21	
	5893045	●	03516G-OH	3.5						20	24	12	23	8.8	24.5	
	5893052	●	04016G-OH	4									23	10	28	
	5893060	●	05016G-OH	5									16	12.5	35	
Figure-2	5893078	●	HY-NBH02019J-OH	2	19.05	19.05	18	110	100	15	—	9.5	49	5	18	
	5893086	●	02519J-OH	2.5									50	6.3	19.5	
	5893094	●	03019J-OH	3									51	7.5	21	
	5893102	●	03519J-OH	3.5						20	12	43	8.8	24.5		
	5893136	●	04019J-OH	4								43	10	28		
	5893144	●	05019J-OH	5								36	12.5	35		
	5893151	●	HY-NBH02020J-OH	2	20	20	19	110	100	15	—	9.5	49	5	18	
	5893169	●	02520J-OH	2.5									50	6.3	19.5	
	5893177	●	03020J-OH	3									51	7.5	21	
	5893185	●	03520J-OH	3.5						20	12	43	8.8	24.5		
	5893193	●	04020J-OH	4								43	10	28		
	5893201	●	05020J-OH	5								36	12.5	35		
	5893219	●	HY-NBH02022X-OH	2	22	20	21	120	110	15	25	9.5	59	5	18	
	5893227	●	02522X-OH	2.5									60	6.3	19.5	
	5893235	●	03022X-OH	3									61	7.5	21	
	5893243	●	03522X-OH	3.5						20	12	53	8.8	24.5		
	5893250	●	04022X-OH	4								53	10	28		
	5893268	●	05022X-OH	5								46	12.5	35		
	5893276	●	HY-NBH02025.0K-OH	2	25.0	20	24	125	115	15	25	9.5	64	5	18	
	5893284	●	02525.0K-OH	2.5									65	6.3	19.5	
	5893292	●	03025.0K-OH	3									66	7.5	21	
	5893300	●	03525.0K-OH	3.5						20	12	58	8.8	24.5		
	5893318	●	04025.0K-OH	4								58	10	28		
	5893326	●	05025.0K-OH	5								51	12.5	35		
5893334	●	HY-NBH02025.4K-OH	2	25.4	20	24	125	115	15	25	9.5	64	5	18		
5893367	●	02525.4K-OH	2.5									65	6.3	19.5		
5893375	●	03025.4K-OH	3									66	7.5	21		
5893383	●	03525.4K-OH	3.5						20	12	58	8.8	24.5			
5893391	●	04025.4K-OH	4								58	10	28			
5893409	●	05025.4K-OH	5								51	12.5	35			

Dimension "T" show overhang length of STICKDUO(hyper) bar when attached to sleeve with adjustment screw ③,④.

Parts



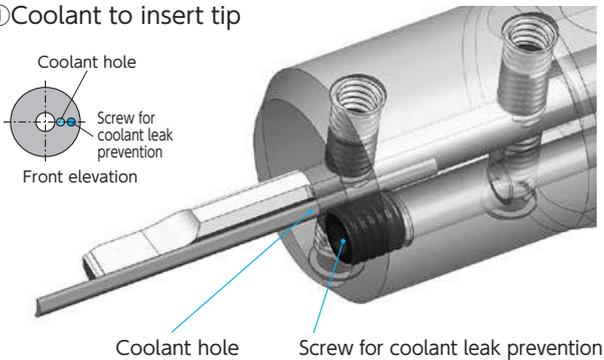
Toolholder Part No.	Clamping screw		Overhang Adjustment			M6 screw	Wrench		
	①	②	③	④*1	⑤*2	⑥	①、②	③、④、⑤	⑥
HY-NBH 020○○-OH	SS04045FS	SS0406F	SS0811R-OH	SS0806F-OH (Through hole)	SS0806F	SS0606SC	LW-2	LW-4*104	LW-3
025○○-OH									
030○○-OH									
035○○-OH									
040○○-OH									
050○○-OH									

※1 Select screw ④ to connect coolant hoses to backside
 ※2 Select screw ⑤ to connect coolant hoses to frontside

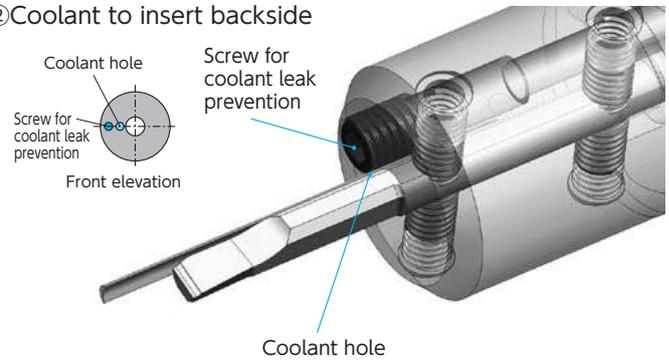
How to set bar in the sleeve when internal coolant to insert tip or to insert backside

By rotating sleeve up side down, you can select the coolant output position
 Coolant hole located in the side of screw for coolant leak prevention. See the following about the details.

① Coolant to insert tip



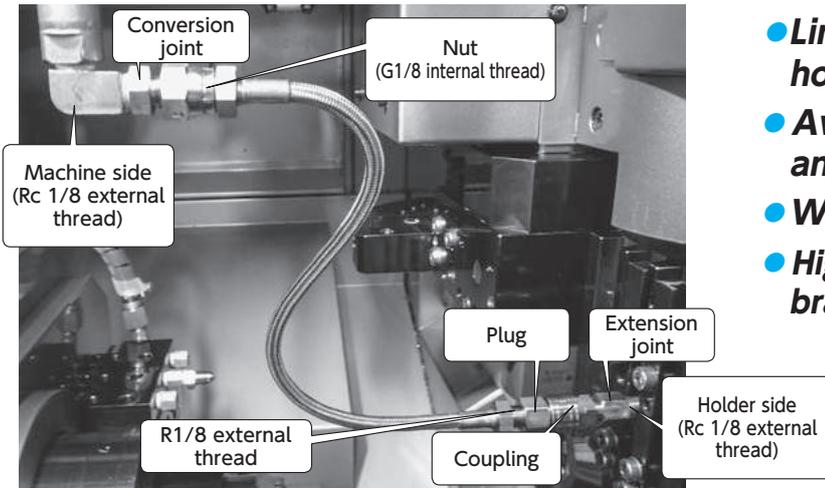
② Coolant to insert backside



Boring bars and internal machining tool range

Coolant Components

Coolant hose for connecting with R1/8



Ex. of connecting ①

- Line up wide range of coolant hose length
- Available for 2 types of coupling and conversion joint
- Working pressure MAX. 20.6 MPa
- High quality flexible stainless steel braided hose

Ex. of connecting ①

Parts	P/N
Conversion joint	JOINT-ST-R1/8
Hose	HOSE-R1/8-CN-400
Plug	PLUG-RC1/8
Coupling	COUP-R1/8
Extension joint	SCJ-R1/8-RC1/8-L

Chart for connecting coolant components

Coupling

① Case: Use "HOSE-R1/8-CN" for connecting hose

Connect to Holder or Machine

Joint

② Case: Use "HOSE-CN-CN" for connecting hose

Connect to Holder or Machine

Hose

① **HOSE-R1/8-CN**

② **HOSE-CN-CN**

Hose

Shape	Code No.	P/N	Dimensions (mm)	Working pressure MAX. (MPa)	Working pressure MIN. (mm)
			L		
① R1/8 External thread + nut: G1/8 internal thread 	5923255	HOSE-R1/8-CN-200	200	20.6	50
	5923263	HOSE-R1/8-CN-250	250		
	5923297	HOSE-R1/8-CN-300	300		
	5923305	HOSE-R1/8-CN-400	400		
	5923313	HOSE-R1/8-CN-500	500		
	5923321	HOSE-R1/8-CN-800	800		
② Both side: nut G1/8 internal thread 	5923339	HOSE-CN-CN-200	200		
	5923347	HOSE-CN-CN-250	250		
	5923354	HOSE-CN-CN-300	300		
	5923388	HOSE-CN-CN-400	400		
	5923396	HOSE-CN-CN-500	500		
	5923304	HOSE-CN-CN-800	800		



R1/8 External thread
Fix by rotating hose



Nut G1/8 internal thread
Fix by rotating nut
(No need to rotate hose)

Conversion / Extension Joint

	Code No.	Stock	Spare parts	Dimensions (mm)						
				T_2	L_1 ※1	L_2	B	d		
	5891049	●	SCJ-R1/8-M10-L	M10×1	16	12	13	4.5		
	5891056	●	1/8-RC1/8-L	Rc1/8 (PT1/8)		15				
	5891064	●	1/8-NPT1/8-L	NPT1/8						
	5892906	●	SCJ-M6-M10	M10×1	6	12	13	2.5		
	5892914	●	SCJ-M6-RC1/8	Rc1/8 (PT1/8)		15				
	5892922	●	SCJ-M6-NPT1/8	NPT1/8						
	5892948	●	SCJ-R1/8-M10	M10×1		10			12	4.5
	5892963	●	SCJ-R1/8-NPT1/8	NPT1/8					13	

※1 To prevent hitting the coolant connecting part of holder from the gang tool post, "L1" dimension length is set longer.
NPT: ANSI/ASME B.1.20...1-1983(National Taper Pipe)

Joint

Coupling

Suitable use of Coupling and Joint

- Detach Hose frequently
⇒ Coupling is suitable
- Less detach Hose
⇒ Joint is suitable

Joint

Coupling

Connect to Holder or Machine

Conversion joint (nut G1/8 internal thread)

Parts	Straight style	L style
P/N	JOINT-ST-R1/8	JOINT-AN-R1/8
Code No.	5918966	5923412
Working pressure MAX.(MPa)	20.6	20.6
Shape		

Coupling

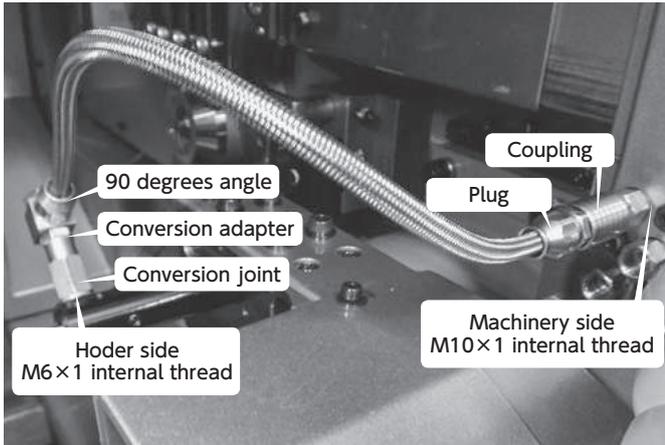
Parts	Plug	Coupling
P/N	PLUG-RC1/8	COUP-R1/8
Code No.	5915491	5915517
Working pressure MAX.(MPa)	7.5	7.5
Shape		

New Products
 Tool Materials / Selection Guide
 PC.D, CBN and ceramic
 Cermet
 PVD-coated Cermet
 Micro-grain Carbide, Carbide
 Insert Stock List
 Outside Machining Toolholders
 SS
 Grooving Tools
 Threading Tools
 Shaper
 Internal Machining tool range
 Original Tools for Various Applications
 Indexable End Milling Tools
 Indexable Drill Inserts
 Milling Cutters
 Technical Data
 Index

Boring bars and internal machining tool range

Coolant Components

Coolant hose by HEB for connecting M10×1, M8×1, G1/8



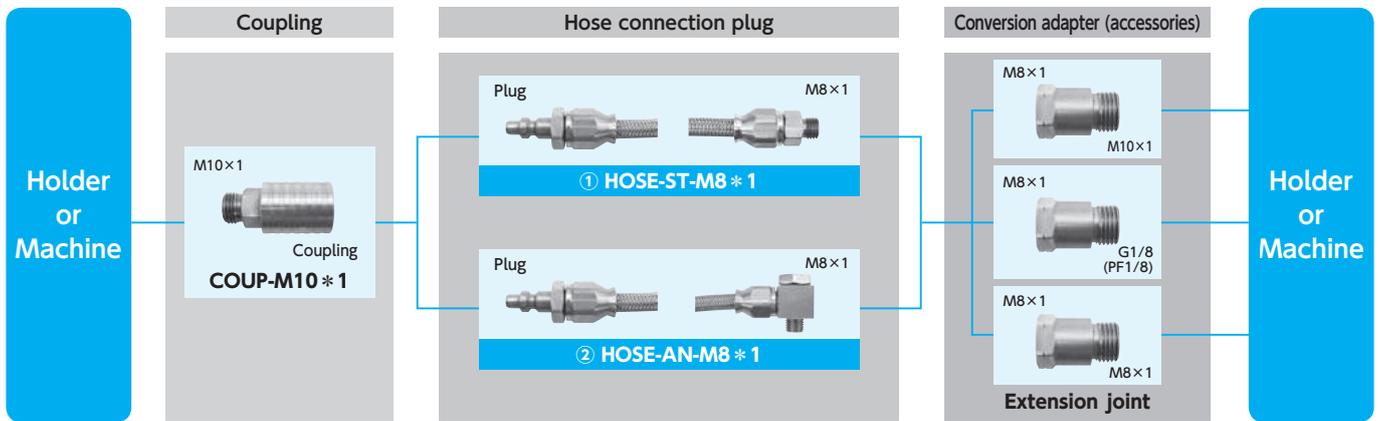
- Hos length 300mm
- Coupling by HEB
- Working pressure MAX. 20MPa

Ex. of connecting

Parts	P/N
Coupling	COUP-M10*1
Hose	HOSE-AN-M8*1
Conversion adapter	M8×1-M10×1
Conversion joint	SCJ-M6-M10

Ex. of connecting

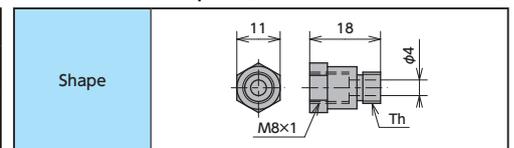
Ex. of coolant hose connection



Horse set with plug

Shape	Code No.	Part No.	Adapter (Th)			Working pressure MAX. (MPa)
			①	②	③	
<p>① Straight type</p>	5894290	HOSE-ST-M8*1	M10x1	G1/8 (PF1/8)	—	20
<p>② 90 degrees angle type</p>	5894282	HOSE-AN-M8*1	M10x1	G1/8 (PF1/8)	M8x1	

Conversion Adapter (Accessories of Hose Set)



Coupling

Parts	Coupling
Part No.	COUP-M10*1
Code No.	5894308
Shape	

MEMO

NTK

New Products

Tool Materials / Selection Guide

PCD, CBN and ceramic

Cermet
PVD-coated Carbide

Micro-grain Carbide, Carbide

Insert Stock List

Outside Machining Toolholders

SS

Grooving Tools

Threading Tools

Shaper

Internal machining tool range

Original Tools for Various Applications

Indexable End Milling Tools

Indexable Drill Inserts

Milling Cutters

Technical Data

Index

For inside boring

STICK DUO released!!

Hyper

Higher precision than STICK DUO series with accurate overall length positioning !!

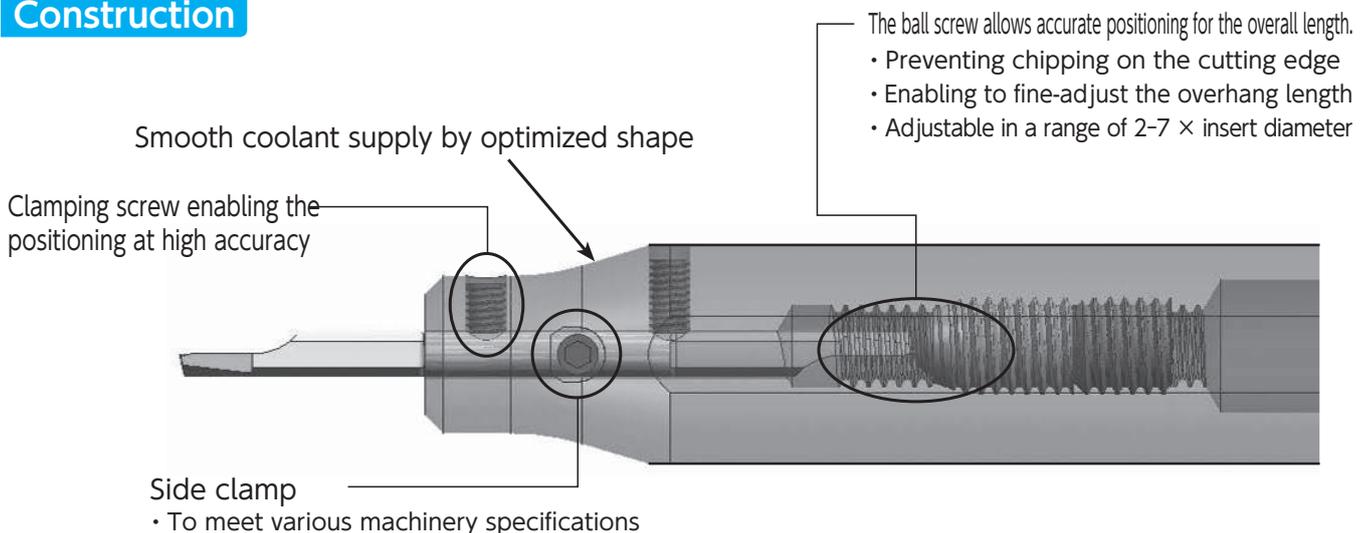


Features

- Offers high precision while maintaining compatibility with STICK DUO series
- For the first time in the industry, the new series offers accurate positioning for the overall length of a 2-cornered solid bar type*
- A high precision sleeve that offers excellent repeatability under clamping
- Hangover length is easily adjusted via a precision ball screw
- A new ultra Z-coated “TM4” grade is available

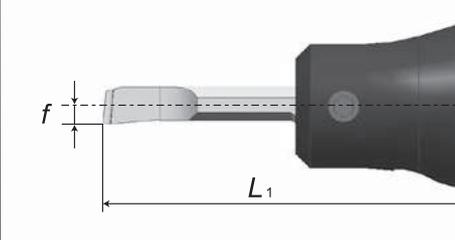
*Based on our research

Construction

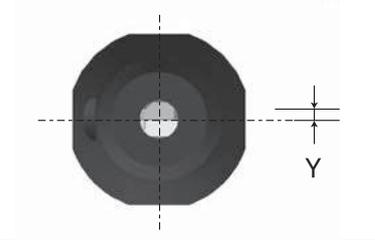


Precision of the boring bars range has been further improved !

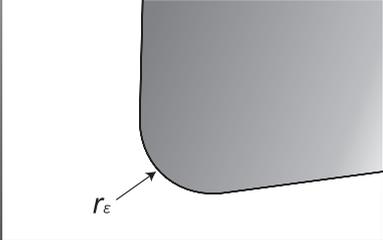
Dimensional tolerances



Offset f : $\pm 0.015\text{mm}$
Overall length L_1 : $\pm 0.02\text{mm}$



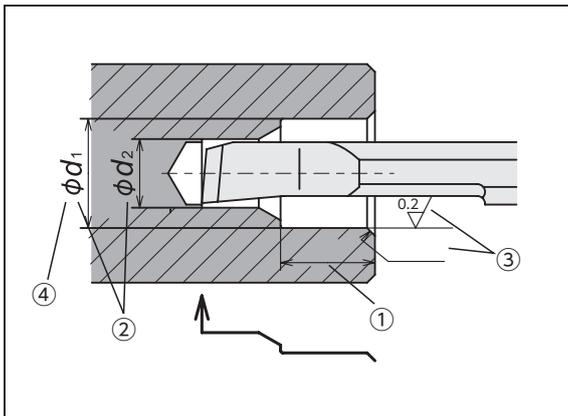
Center height Y : $+0.05/0\text{mm}$



Nose R : $\pm 0.015\text{mm}$

Application example

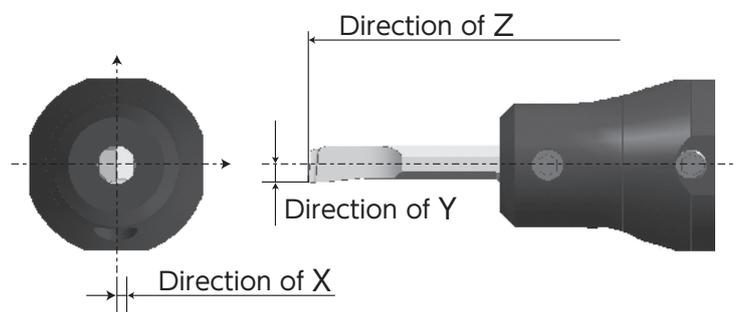
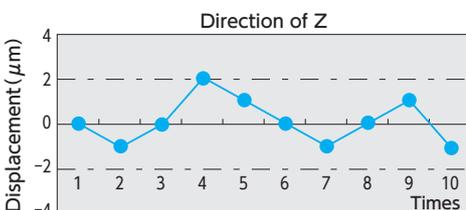
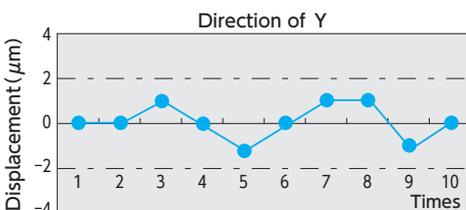
Work piece example



When replacing the insert

- | | | |
|--|---|--------------------------------------|
| ① The machined depth is unstable
※Face machining included. | ➔ | Check for :
Overall length |
| ② The bored diameters ($\phi d_1, d_2$)
are not stable at the staged part | ➔ | Center height |
| ③ Unstable surface roughness
Unstable chamfering dimension
※Tapering. | ➔ | Nose Radius |
| ④ Bored diameters not stable | ➔ | Offset |

Repeat accuracy



Excellent mounting accuracy leads to high precision machining !

- New Products
- Tool Materials / Selection Guide
- PCD, CBN, Cermet, PVD-coated Cermet and ceramic
- Micro-grain Carbide, Carbide
- Insert Stock List
- Outside Machining Toolholders
- SS
- Grooving Tools
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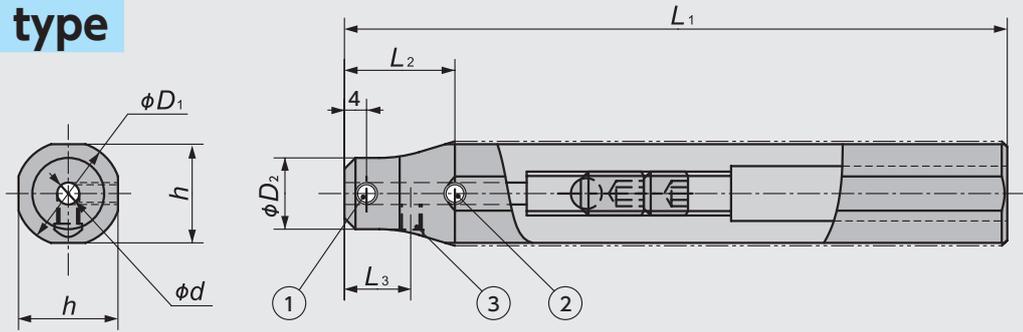
Boring bars and internal machining tool range

For inside boring



Shank diameter : $\phi 16 \sim 25.4$

HY-NBH type



Holder dimensions

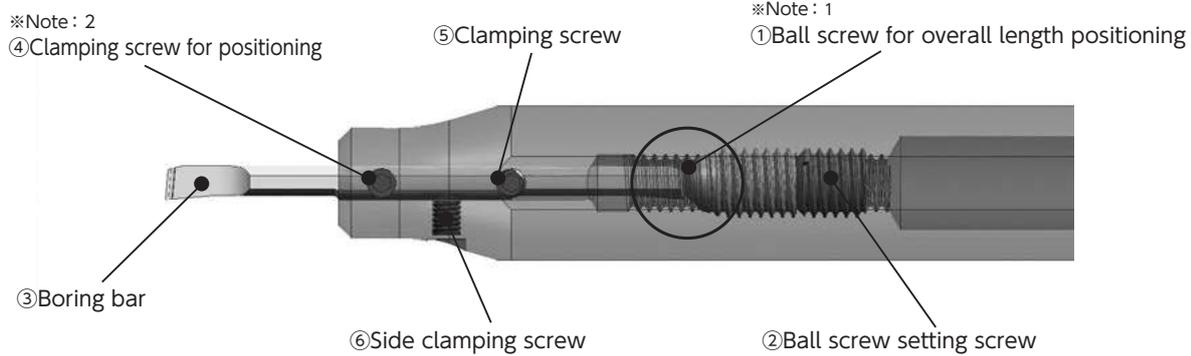
Code No.	Toolholder Part No.	Stock	Dimensions (mm)							Clamping screw		
			ϕd	ϕD_1	ϕD_2	h	L_1	L_2	L_3	①	②	③
5709894	HY-NBH02016H	●	2.0	16	11	15	100	15	9.5	SS04045FS	SS0406F	SS0404F
5709902	02516H	●	2.5		11.5							
5709910	03016H	●	3.0		12							
5709936	03516H	●	3.5		12.5							
5709944	04016H	●	4.0		13							
5709951	05016H	●	5.0		14							
5709969	HY-NBH02019K	●	2.0	19.05	11	18	125	15	9.5	SS04045FS	SS0406F	SS0404F
5709977	02519K	●	2.5		11.5							
5709985	03019K	●	3.0		12							
5709993	03519K	●	3.5		12.5							
5710009	04019K	●	4.0		13							
5710017	05019K	●	5.0		14							
5712708	HY-NBH02020K	●	2.0	20	11	19	125	15	9.5	SS04045FS	SS0406F	SS0404F
5712716	02520K	●	2.5		11.5							
5712724	03020K	●	3.0		12							
5712740	03520K	●	3.5		12.5							
5712757	04020K	●	4.0		13							
5712765	05020K	●	5.0		14							
5712773	HY-NBH02022K	●	2.0	22	11	21	125	15	9.5	SS04045FS	SS0406F	SS0404F
5712799	02522K	●	2.5		11.5							
5712831	03022K	●	3.0		12							
5712856	03522K	●	3.5		12.5							
5712872	04022K	●	4.0		13							
5712914	05022K	●	5.0		14							
5712732	HY-NBH02025K-MET	●	2.0	25	11	24	125	15	9.5	SS04045FS	SS0406F	SS0404F
5712823	02525K-MET	●	2.5		11.5							
5712849	03025K-MET	●	3.0		12							
5712864	03525K-MET	●	3.5		12.5							
5712898	04025K-MET	●	4.0		13							
5712922	05025K-MET	●	5.0		14							
5713003	HY-NBH02025K	●	2.0	25.4	11	24	125	15	9.5	SS04045FS	SS0406F	SS0404F
5713029	02525K	●	2.5		11.5							
5713045	03025K	●	3.0		12							
5713060	03525K	●	3.5		12.5							
5713086	04025K	●	4.0		13							
5713102	05025K	●	5.0		14							

Parts

Name	P/N	Width between two facing sides of the hexagonal hole
Ball screw for overall length positioning	SS0812R	4.0
Screw for setting the ball screw	SS0808F	4.0
Wrench for clamping screw	LW-2	—

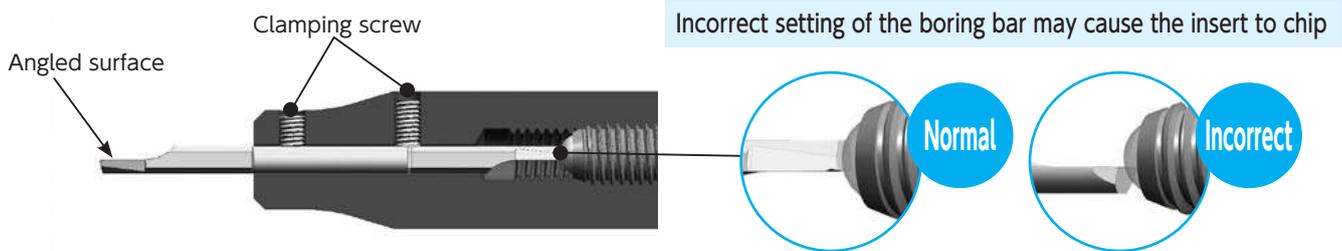
Precautions for use

● Procedure for clamping the boring bar



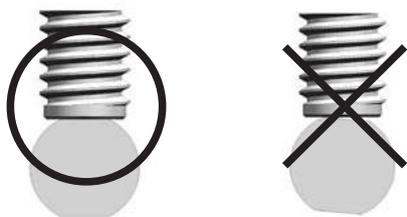
- Step(1) Slide the ball screw to position to determine the overall length.
- Step(2) Slide the ball screw setting screw into position.
- Step(3) Insert the boring bar.

※Note1 : As shown in the illustrations below, make the angled surface of the boring bar parallel with the end surfaces of the clamping screws before inserting the bar.



- Step(4) Clamp the bar with the clamping screw for positioning. ▶ Recommended clamping force: 2.0 Nm

※Note2 : Be careful that the bottom surface of the clamping screw is located and fits against the flat surface of the boring bar without causing the bar to tilt.



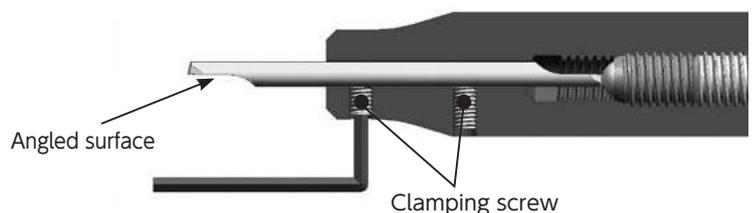
A boring bar clamped in a slant position may make the center height and offset dimension unstable.

- Step(5) Clamp the bar with the clamping screw. ▶ Recommended clamping force: 2.0 Nm
- Step(6) If the clamping screws described in steps (4) and (5) cannot be used due to your tooling layout, it is possible to use the boring bar for by just clamping with the side clamping screw.

Once the overall length has been correctly calibrated for the initial cut, only steps (3) to (5) need be repeated.

● Precaution for use in the opposite direction

※As described in *Note 1 above, make the angled surface of the boring bar parallel with the end surfaces of the clamping screws before inserting the bar.



Boring bars and internal machining tool range

For inside boring



Minimum machining diameter : $\phi 2.2 \sim 5.2$

SHFS-S type

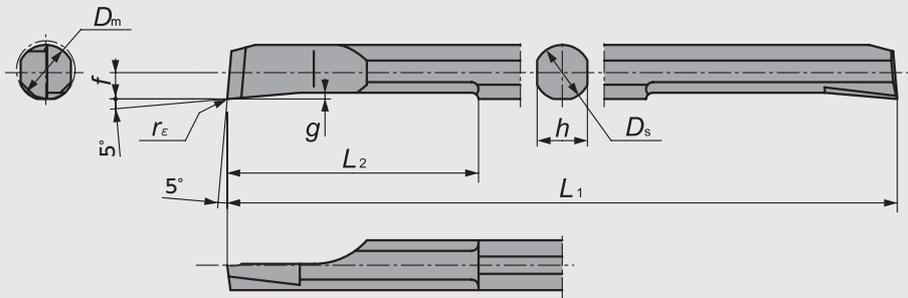


Figure-1

SHFB-F type

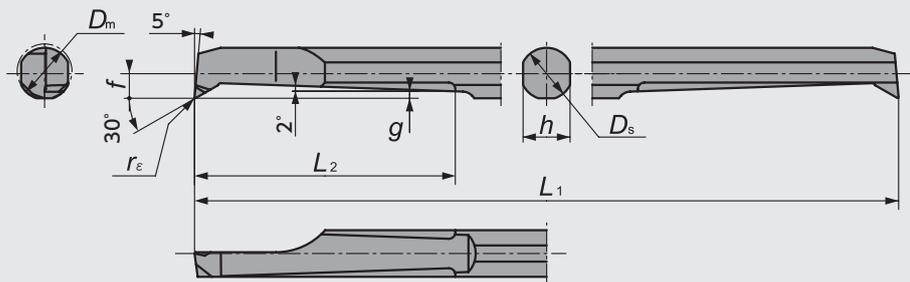


Figure-2

SHFS-H type

Mirror finish

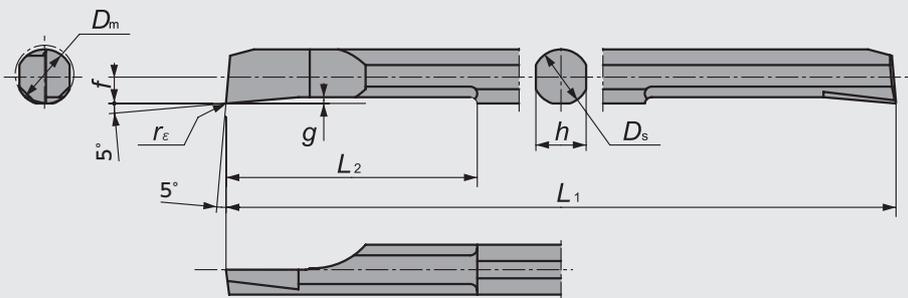


Figure-3

New Products
Tool Materials / Selection Guide
PCD, CBN and ceramic
Cermet
Micro-grain Carbide, Carbide
Insert Stock List
Outside Machining Toolholders
SS
Grooving Tools
Threading Tools
Shaper
Internal Machining Tool Range
Original Tools for Various Applications
Indexable End Milling Tools
Indexable Drill Inserts
Milling Cutters
Technical Data
Index

Shape	Part No.	Min. machining dia. (mm) D_m	Dimensions (mm)							PVD-coated micro grain carbide		
			D_s	L_1	L_2	f	h	g	r_ϵ	Chipbreaker	TM4	Stock
Figure-1	SHFS020R005S	2.2	2	50	10	0.9	1.8	0.25	0.05	Provided	5709548	●
	025R005S	2.7	2.5	50	12.5	1.15	2.3	0.30	0.05		5709563	●
	025R015S								0.15		5709571	●
	030R005S	3.2	3	50	15	1.4	2.7	0.40	0.05		5709589	●
	030R015S								0.15		5709597	●
	035R005S	3.7	3.5	60	17.5	1.65	3.2	0.40	0.05		5709605	●
	035R015S								0.15		5709613	●
	040R005S	4.2	4	60	20	1.9	3.6	0.45	0.05		5709621	●
	040R015S								0.15		5709639	●
	050R005S	5.2	5	70	25	2.4	4.5	0.50	0.05		5709647	●
	050R015S								0.15		5709654	●
Figure-2	SHFB020R005F	2.2	2	50	8	0.95	1.8	0.25	0.05	Provided	5709779	●
	025R005F	2.7	2.5	50	12.5	1.2	2.3	0.30	0.05		5709787	●
	025R015F								0.15		5709795	●
	030R005F	3.2	3	50	15	1.4	2.7	0.45	0.05		5709803	●
	030R015F								0.15		5709811	●
	035R005F	3.7	3.5	60	17.5	1.65	3.2	0.50	0.05		5709829	●
	035R015F								0.15		5709837	●
	040R005F	4.2	4	60	20	1.9	3.6	0.50	0.05		5709845	●
	040R015F								0.15		5709852	●
	050R005F	5.2	5	70	25	2.4	4.5	0.70	0.05		5709860	●
	050R015F								0.15		5709878	●
Figure-3	SHFS020R005H	2.2	2	50	10	0.9	1.8	0.25	0.05	None	5709662	●
	025R005H	2.7	2.5	50	12.5	1.15	2.3	0.30	0.05		5709670	●
	025R015H								0.15		5709688	●
	030R005H	3.2	3	50	15	1.4	2.7	0.40	0.05		5709696	●
	030R015H								0.15		5709704	●
	035R005H	3.7	3.5	60	17.5	1.65	3.2	0.40	0.05		5709712	●
	035R015H								0.15		5709720	●
	040R005H	4.2	4	60	20	1.9	3.6	0.45	0.05		5709738	●
	040R015H								0.15		5709746	●
	050R005H	5.2	5	70	25	2.4	4.5	0.50	0.05		5709753	●
	050R015H								0.15		5709761	●

- New Products
- Tool Materials / Selection Guide
- PCD, CBN and ceramic
- Carbide / PVD-coated Carbide
- Micro-grain Carbide, Carbide
- Insert Stock List
- Toolholders
- Outside Machining
- SS
- Grooving Tools
- Threading Tools
- Shaper
- Internal machining tool range
- Original Tools for Various Applications
- Indexable End Milling Tools
- Indexable Drill Inserts
- Milling Cutters
- Technical Data
- Index

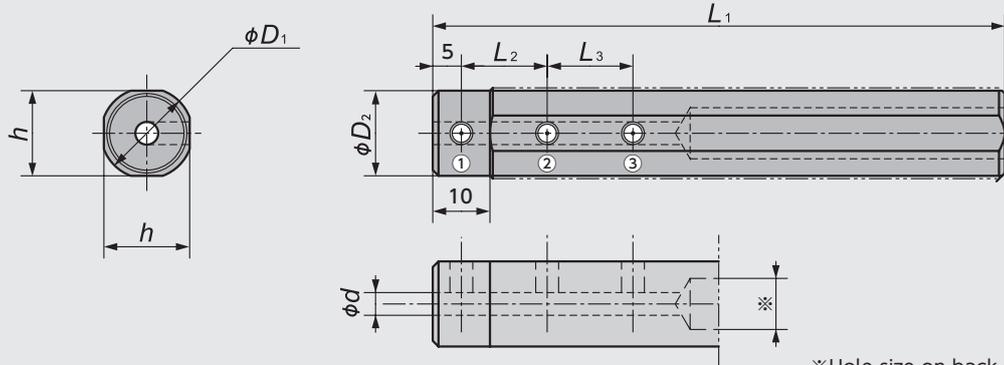
Boring bars and internal machining tool range

For inside boring



Shank diameter : $\phi 15.875 \sim 19.05$

NBH type



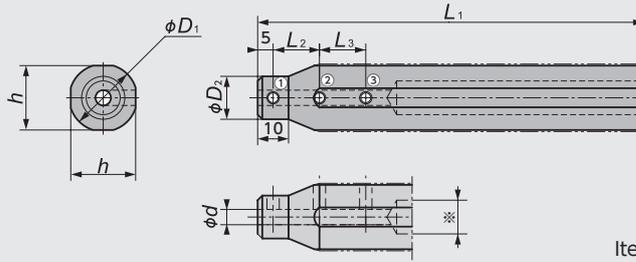
※Hole size on back end of the holder
Item number 'NBH...15H/16H' : $\phi 9$
Item number 'NBH...19K ~ 25K(MET)' : $\phi 11$

Holder dimensions

Code No.	Toolholder Part No.	Stock	Dimensions (mm)							Clamping screw			Wrench					
			ϕd_1	ϕD_1	ϕD_2	h	L_1	L_2	L_3	①	②	③						
5631403	NBH02015H	●	2.0	15.875	15	15	100	10	—	SS0406F	SS0406F	—	LW-2					
5702915	02515H	●	2.5															
5631411	03015H	●	3.0															
5586110	03515H	●	3.5															
5586128	04015H	●	4.0															
5585997	04515H	●	4.5															
5585989	05015H	●	5.0															
5585971	06015H	●	6.0															
5585963	08015H	●	8.0	20	20	SS0403F	SS0403F	SS0403F										
5631429	NBH02016H	●	2.0			16	15	15	100	10	—	SS0406F	SS0406F	—	LW-2			
5702899	02516H	●	2.5															
5631437	03016H	●	3.0															
5586102	03516H	●	3.5															
5586094	04016H	●	4.0															
5586086	04516H	●	4.5															
5586078	05016H	●	5.0															
5586060	06016H	●	6.0															
5774195	07016H	●	7.0	20	20	SS0403F	SS0403F	SS0403F										
5586052	08016H	●	8.0															
5631445	NBH02019K	●	2.0	19.05	18	18	125	10	—	SS0408F	SS0408F	—	LW-2					
5702907	02519K	●	2.5															
5631452	03019K	●	3.0															
5586045	03519K	●	3.5															
5586037	04019K	●	4.0															
5586029	04519K	●	4.5															
5586011	05019K	●	5.0															
5586003	06019K	●	6.0															
5774203	07019K	●	7.0											20	20	SS0404F	SS0404F	SS0404F
5586227	08019K	●	8.0															
5586219	10019K	●	10.0						SS0403F	SS0404F	SS0404F							

Shank diameter : $\phi 20 \sim 25.4$

NBH type



※Hole size on back end of the holder
Item number 'NBH...15H/16H' : $\phi 9$
Item number 'NBH...19K ~ 25K(MET)' : $\phi 11$

Holder dimensions

Code No.	Toolholder Part No.	Stock	Dimensions (mm)							Clamping screw			Wrench
			ϕd	ϕD_1	ϕD_2	h	L_1	L_2	L_3	①	②	③	
5631460	NBH02020K	●	2.0	20	11	19	125	10	—	SS0404F	SS0406F	SS0406F	LW-2
5702881	02520K	●	2.5										
5631478	03020K	●	3.0										
5586201	03520K	●	3.5										
5586185	04020K	●	4.0										
5586177	04520K	●	4.5										
5586169	05020K	●	5.0										
5586151	06020K	●	6.0										
5774211	07020K	●	7.0										
5586144	08020K	●	8.0										
5586136	10020K	●	10.0	19	20	20	20	20	SS0404F	SS0404F	SS0404F	LW-2	
5914742	12020K	★	12.0										
5631486	NBH02022K	●	2.0	22	11	21	125	10	—	SS0404F	SS0406F	SS0406F	LW-2
5702873	02522K	●	2.5										
5631494	03022K	●	3.0										
5586326	03522K	●	3.5										
5586318	04022K	●	4.0										
5586300	04522K	●	4.5										
5586292	05022K	●	5.0										
5586284	06022K	●	6.0										
5774229	07022K	●	7.0										
5586276	08022K	●	8.0										
5586268	10022K	●	10.0	19	20	20	20	20	SS0404F	SS0404F	SS0404F	LW-2	
5631502	12022K	●	12.0										
5631510	NBH02023K	●	2.0	23	11	21	125	10	—	SS0404F	SS0406F	SS0406F	LW-2
5702857	02523K	●	2.5										
5631528	03023K	●	3.0										
5586250	03523K	●	3.5										
5651336	04023K	●	4.0										
5586243	04523K	●	4.5										
5631536	05023K	●	5.0										
5631544	06023K	●	6.0										
5631551	08023K	●	8.0										
5631569	10023K	●	10.0										
5631577	12023K	●	12.0	19	20	20	20	20	SS0404F	SS0404F	SS0404F	LW-2	
5631585	NBH02025K-MET	●	2.0										
5704283	02525K-MET	●	2.5	25	11	24	125	10	—	SS0404F	SS0408F	SS0408F	LW-2
5631593	03025K-MET	●	3.0										
5631601	03525K-MET	●	3.5										
5651328	04025K-MET	●	4.0										
5631619	04525K-MET	●	4.5										
5631627	05025K-MET	●	5.0										
5631635	06025K-MET	●	6.0										
5774252	07025K-MET	●	7.0										
5631643	08025K-MET	●	8.0										
5631650	10025K-MET	●	10.0										
5631668	12025K-MET	●	12.0	19	20	20	20	20	SS0406F	SS0406F	SS0406F	LW-2	
5631676	NBH02025K	●	2.0										
5702865	02525K	●	2.5	25.4	11	24	125	10	—	SS0404F	SS0408F	SS0408F	LW-2
5631684	03025K	●	3.0										
5586235	03525K	●	3.5										
5586383	04025K	●	4.0										
5586375	04525K	●	4.5										
5586367	05025K	●	5.0										
5586359	06025K	●	6.0										
5774260	07025K	●	7.0										
5586342	08025K	●	8.0										
5586334	10025K	●	10.0										
5631692	12025K	●	12.0	19	20	20	20	20	SS0406F	SS0406F	SS0406F	LW-2	
5631692	12025K	●	12.0										

Boring bars and internal machining tool range

For inside boring



Minimum machining diameter : $\phi 2.2 \sim 8.2$

SBFS-S type

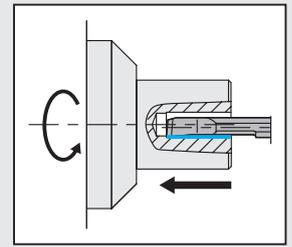
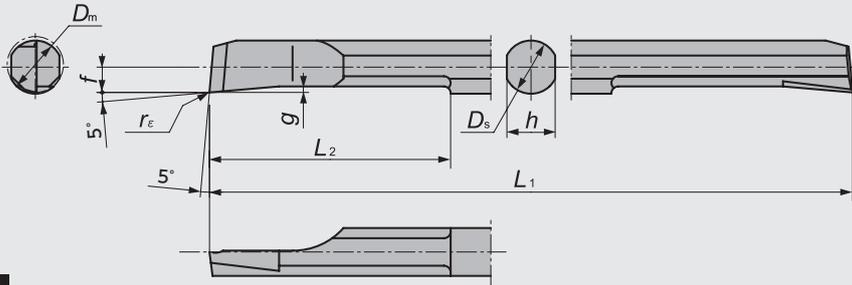


Figure-1

SBFB-F type

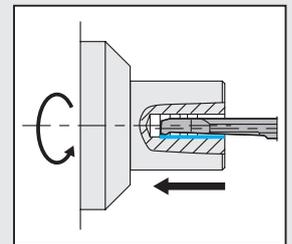
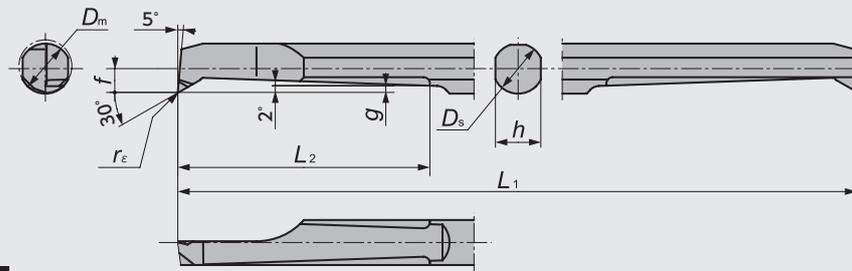


Figure-2

SBFS-H type

Mirror finish

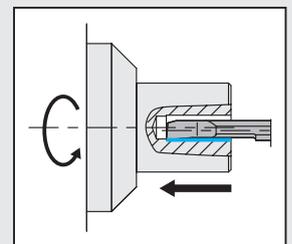
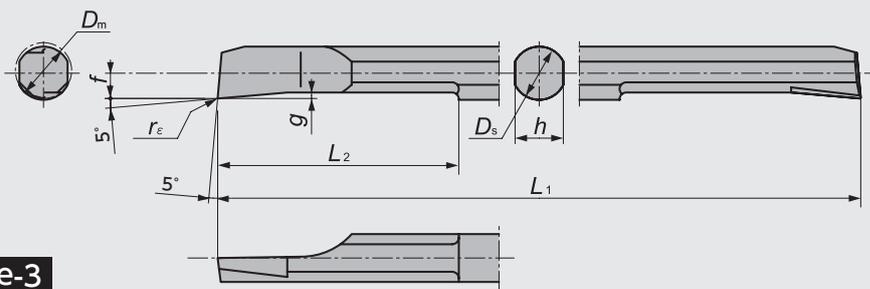


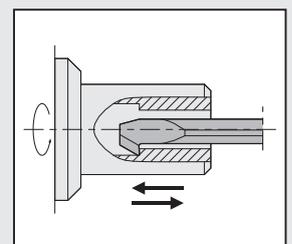
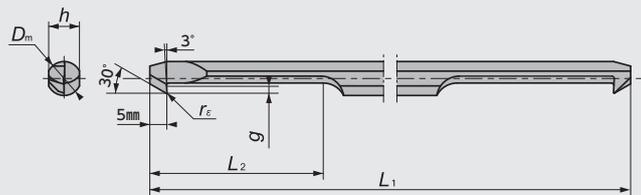
Figure-3

ID back turning Minimum machining diameter $\phi 3.0\text{mm}$

SBB type

NEW

Short type
2 cutting edges



Long type
1 cutting edge

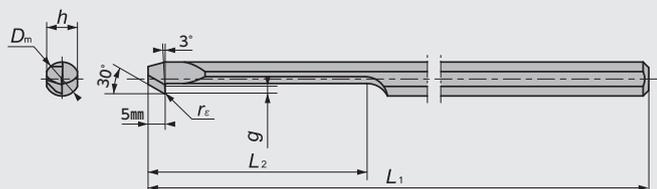


Figure-4

Shape	Part No.	Min. machining dia. (mm) D_m	Dimensions (mm)							PVD-coated micro grain carbide				
			D_s	L_1	L_2	f	h	g	r_e	Chipbreaker	NEW DT4	Stock	ZM3	Stock
Figure-1	SBFS020R005S	2.2	2	50	10	0.9	1.8	0.25	0.05	Provided	5882907	●	5654975	●
	025R005S	2.7	2.5	50	12.5	1.15	2.3	0.30	0.05		5882881	●	5685995	●
	025R015S								0.15		5882873	●	5685987	●
	030R005S	3.2	3	50	15	1.4	2.7	0.40	0.05		5882865	●	5640891	●
	030R015S								0.15		5882857	●	5649165	●
	035R005S	3.7	3.5	60	17.5	1.65	3.2	0.40	0.05		5882840	●	5685888	●
	035R015S								0.15		5882832	●	5685979	●
	040R005S	4.2	4	60	20	1.9	3.6	0.45	0.05		5882824	●	5640867	●
	040R015S								0.15		5882816	●	5649140	●
	050R005S	5.2	5	70	25	2.4	4.5	0.50	0.05		5882808	●	5654983	●
	050R015S								0.15		5882790	●	5654991	●
	060R005S	6.2	6	80	30	2.9	5.4	0.60	0.05		5882782	●	5704861	●
060R015S	0.15								5882766	●	5704853	●		
Figure-2	SBFB020R005F	2.2	2	50	8	0.95	1.8	0.25	0.05	Provided	5882758	●	5658026	●
	025R005F	2.7	2.5	50	12.5	1.2	2.3	0.30	0.05		5882741	●	5685920	●
	025R015F								0.15		5882733	●	5685912	●
	030R005F	3.2	3	50	15	1.4	2.7	0.45	0.05		5882725	●	5640883	●
	030R015F								0.15		5882717	●	5649173	●
	035R005F	3.7	3.5	60	17.5	1.65	3.2	0.50	0.05		5882709	●	5685904	●
	035R015F								0.15		5882691	●	5685896	●
	040R005F	4.2	4	60	20	1.9	3.6	0.50	0.05		5882683	●	5640875	●
	040R015F								0.15		5882675	●	5649157	●
	050R005F	5.2	5	70	25	2.4	4.5	0.70	0.05		5882667	●	5655006	●
	050R015F								0.15		5882659	●	5655014	●
	060R005F	6.2	6	80	30	2.9	5.4	0.90	0.05		5882634	●	5704796	●
060R015F	0.15								5882626	●	5704812	●		
Figure-3	SBFS020R005H	2.2	2	50	10	0.9	1.8	0.25	0.05	None			5674866	●
	025R005H	2.7	2.5	50	12.5	1.15	2.3	0.30	0.05				5685961	●
	025R015H								0.15				5685953	●
	030R005H	3.2	3	50	15	1.4	2.7	0.40	0.05				5674874	●
	030R015H								0.15				5674882	●
	035R005H	3.7	3.5	60	17.5	1.65	3.2	0.40	0.05				5685946	●
	035R015H								0.15				5685938	●
	040R005H	4.2	4	60	20	1.9	3.6	0.45	0.05				5674890	●
	040R015H								0.15				5674908	●
	050R005H	5.2	5	70	25	2.4	4.5	0.50	0.05				5674924	●
	050R015H								0.15				5674940	●
	060R005H	6.2	6	80	30	2.9	5.4	0.60	0.05				5705207	●
060R015H	0.15										5705199	●		
080R005H	8.2	8	80	30	3.9	7.3	0.80	0.05			5705850	●		
080R015H								0.15			5705843	●		
Figure-4 Short Type	SBB030RB005-S	3.0	3	50	15	1.3	2.7	0.50	0.05	Provided			5917067	●
	030RB010-S								0.1				5917042	●
	040RB005-S	4.0	4	60	18	1.8	3.6	0.80	0.05				5917414	●
	040RB015-S								0.15				5917372	●
Figure-4 Long Type	SBB030RB005	3.0	3	50	19	1.3	2.7	0.50	0.05	Provided			5917059	●
	030RB010								0.1				5917034	●
	040RB005	4.0	4	60	24	1.8	3.6	0.80	0.05				5917380	●
	040RB015								0.15				5917364	●

▶ For cutting conditions, please refer to page L26

New Products
Tool Materials / Selection Guide
PCD, CBN and ceramic
Carbide
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Micro-grain Carbide, Carbide
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Indexable End Milling Tools
Indexable Drill Inserts
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Technical Data
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Boring bars and internal machining tool range

Cutting conditions for STICK DUO

Boring

	General steel (Carbon steel and alloy steel)	Stainless steel (excluding SUS303)	Free cutting steel (including SUS303)	Non ferrous metals (brass, aluminum, copper, etc.)
Cutting speed (m/min)	50 (30 ~ 70)	40 (30 ~ 60)	60 (30 ~ 80)	80 (50 ~ 100)
Feed rate (mm /rev)	0.03 (0.01 ~ 0.05)			

※For depths of cut : a_p : 0.05 ~ 0.2mm
 ※Please refer to **Q64 ~ 65** for detailed cutting parameters.

Grooving

			General steel (Carbon steel and alloy steel)	Stainless steel (excluding SUS303)	Free cutting steel (including SUS303)	Non ferrous metals (brass, aluminum, copper, etc.)
Cutting speed (m/min)			40 (20 ~ 50)	40 (20 ~ 50)	50 (30 ~ 60)	60 (50 ~ 80)
Feed rate (mm /rev)	Groove width w (mm)	0.50	0.04 (0.01 ~ 0.06)			
		0.75	0.03 (0.01 ~ 0.05)			
		1.00	0.02 (0.01 ~ 0.04)			
		1.50	0.02 (0.01 ~ 0.04)			

Threading

Depth of cut guide for thread pitch at speed $n(\text{min}^{-1})$ between 600 and 1,500

Metric screw		Counts of cutting																				
Machining pitch (mm)	Total depth of cut (mm)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
0.5	0.3	0.06	0.05	0.05	0.04	0.04	0.03	0.02	0.01	—	—	—	—	—	—	—	—	—	—	—	—	—
0.7	0.43	0.06	0.06	0.06	0.05	0.05	0.05	0.04	0.03	0.02	0.01	—	—	—	—	—	—	—	—	—	—	—
0.75	0.46	0.06	0.06	0.06	0.05	0.05	0.04	0.04	0.04	0.03	0.02	0.01	—	—	—	—	—	—	—	—	—	—
0.8	0.49	0.06	0.06	0.06	0.05	0.05	0.04	0.04	0.04	0.03	0.03	0.02	0.01	—	—	—	—	—	—	—	—	—
1.0	0.62	0.07	0.07	0.06	0.06	0.05	0.05	0.05	0.04	0.04	0.04	0.03	0.03	0.02	0.01	—	—	—	—	—	—	—
1.25	0.76	0.07	0.07	0.07	0.07	0.07	0.06	0.06	0.06	0.05	0.05	0.04	0.03	0.03	0.02	0.01	—	—	—	—	—	—
1.5	0.92	0.07	0.07	0.07	0.07	0.07	0.07	0.06	0.06	0.06	0.05	0.05	0.05	0.04	0.04	0.03	0.03	0.02	0.01	—	—	—
1.75	1.09	0.07	0.07	0.07	0.07	0.07	0.07	0.06	0.06	0.06	0.06	0.06	0.05	0.05	0.05	0.05	0.04	0.04	0.03	0.03	0.02	0.01

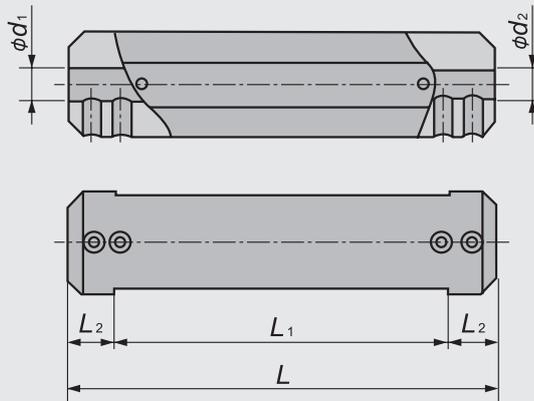
Unified screw		Counts of cutting																			
Machining pitch No. of threads/inch	Total depth of cut (mm)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	
36	0.43	0.06	0.06	0.06	0.05	0.05	0.05	0.04	0.03	0.02	0.01	—	—	—	—	—	—	—	—	—	
32	0.49	0.06	0.06	0.06	0.05	0.05	0.04	0.04	0.04	0.03	0.03	0.02	0.01	—	—	—	—	—	—	—	
28	0.56	0.07	0.06	0.06	0.06	0.05	0.05	0.04	0.04	0.04	0.03	0.03	0.02	0.01	—	—	—	—	—	—	
24	0.66	0.07	0.06	0.06	0.06	0.05	0.05	0.05	0.05	0.04	0.04	0.04	0.03	0.03	0.02	0.01	—	—	—	—	
20	0.78	0.07	0.07	0.07	0.07	0.06	0.06	0.06	0.05	0.05	0.05	0.04	0.04	0.03	0.03	0.02	0.01	—	—	—	
18	0.87	0.07	0.07	0.07	0.07	0.07	0.06	0.06	0.06	0.06	0.05	0.05	0.05	0.04	0.03	0.03	0.02	0.01	—	—	
16	0.98	0.07	0.07	0.07	0.07	0.07	0.07	0.06	0.06	0.06	0.06	0.06	0.05	0.05	0.05	0.04	0.04	0.03	0.03	0.02	0.01

“NBP” type internal back threading tool

Features

- Able to machine deeper bores (Max. 22 mm deep for 4.0 diameter)
- Improved accuracy when indexing due to the positioning mechanism
- Ease of insert clamping/unclamping

NBP type

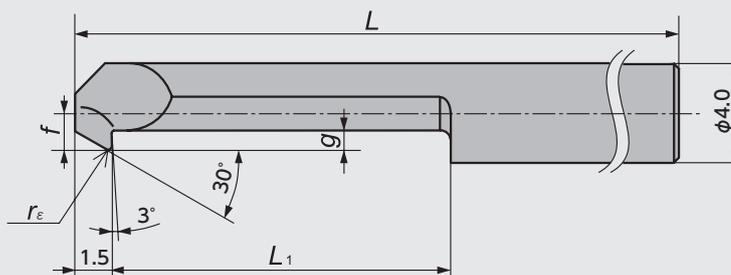


Holder dimensions

Code No.	Toolholder Part No.	Stock	Dimensions (mm)						Applicable insert	Parts	
			ϕd	ϕd_1	ϕd_2	L	L_1	L_2		Clamping screw	Wrench
											
5500731	NBPR19	■	19.05	5	4	88.9	68.9	10	KBR (See table below)	SR-M5 * 6	LW-2.5
5500749	R22	■	22.00			90	70	10			

Applicable insert

KBR type



Part No.	Min. machining dia. (mm) D_m	Dimensions (mm)					PVD-coated micro grain carbide	
		L	L_1	g	f	r_ϵ	ZM3	Stock
KBR03170PB	$\phi 3.0$	34	17	0.5	0.6	0.1	5500681	■
04220PB	$\phi 4.0$	39	22	0.8	1.5	0.15	5500723	■

Anti vibration boring bar "Mogul Bar"



Features

Boring bar with special chipbreaker allowing chips to flow out of the bore in the opposite direction to the feed.
Improved anti vibration boring bar.
Minimum machining diameter $\phi 5 \sim$

1 Useful with good chipcontrol chip breaker

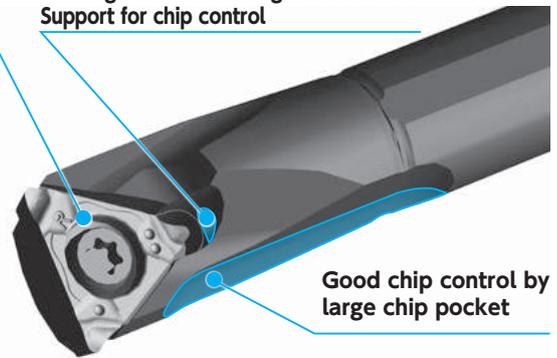
Excellent performance from the F type chipbreaker

All Mogulbar have through coolant hole Support for chip control

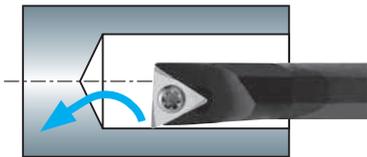
FG chipbreaker



F1•F05 chipbreaker

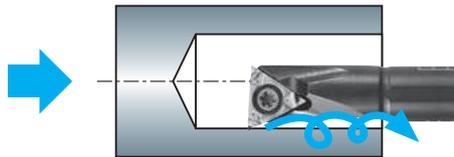


Conventional chipbreaker

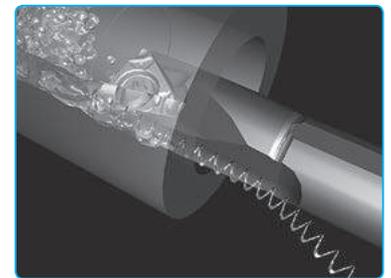


Allows chips to flow the direction to the feed possibly causing chips to jam in the bore.

FG chipbreaker / F1 • F05 chipbreaker [※]



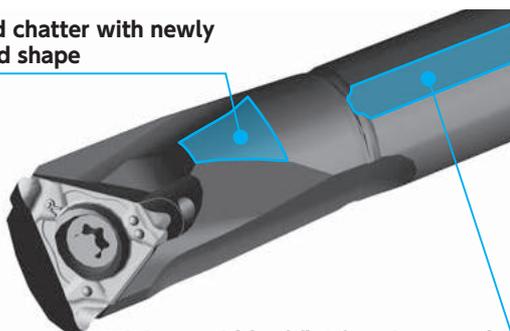
Allows chips to flow in the opposite direction to the feed, good chip control!



※FG • F1 • F05 chipbreaker, R-hand inserts fit to R-hand toolholder.

2 Improved anti vibration with special design

Reduced chatter with newly designed shape



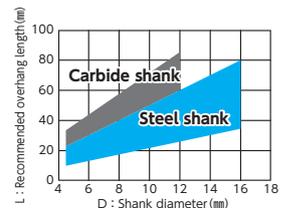
Minimum width of flat face improved anti vibration performance

Recommended overhang length

Steel shank $L/D \leq 5$

Carbide shank $L/D \leq 7$

※L : Overhang length
D : Shank diameter

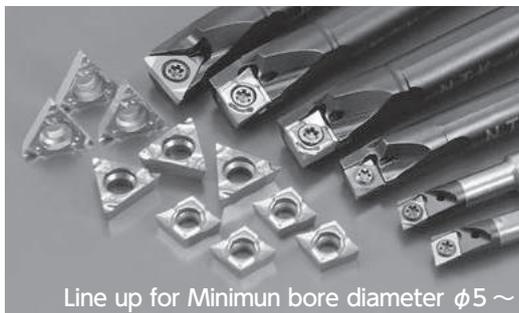


Work material : Alloy steel • Stainless steel
 Cutting condition : $v_c=80\text{m/min}$ $f=0.05 \sim 0.10\text{mm/rev}$ $a_p=0.1 \sim 0.5\text{mm (D.O.C.)}$

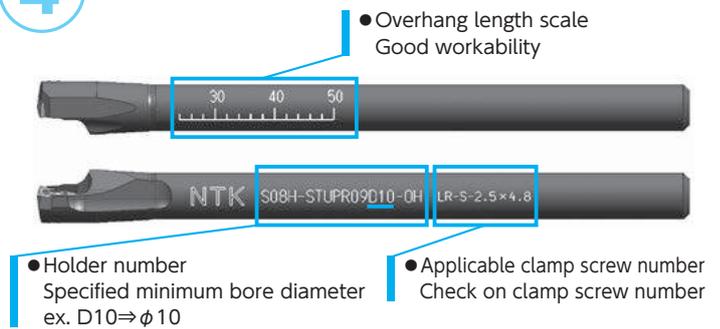
	Rigidity analysis (FEM) ※1	Vibration analysis (FFT analysis) ※2
MogulBar	<p>Reduce flexure by 20%</p> <p>Stress relaxation</p>	<p>Good attenuation performance</p>
Conventional boring bar	<p>NTK conventional boring bar</p> <p>Stress concentration</p>	<p>Comp. boring bar</p>

注：Overhang length L/D=5 ※1：Principal force directions=100N ※2：Acceleration test by same impactive force
MogulBar：S08H-STUPR09D10-OH

3 CC.CP.TP.TC type insert Minimum bore diameter $\phi 5 \sim$



4 Desinged to be useful



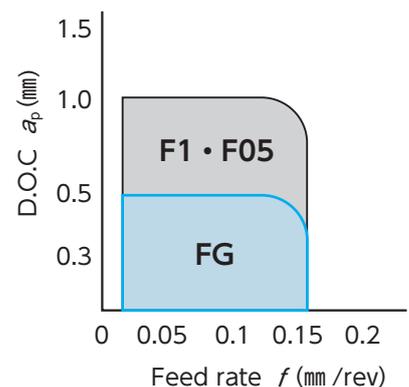
Features of "F chipbreaker"

"F chipbreaker" allows chips to be disposed to opposite direction from feed.
Combination of F chipbreaker and MogulBar achieve the best performance.

Insert	D.O.C a_p (mm)	Feed rate f (mm/rev)	
		0.05	0.1
FG chipbreaker <ul style="list-style-type: none"> Perfect for Finishing Applicable for low depth of cut $\sim 0.5\text{mm}$ Cut cleanly with excellent sharp edge 	0.1		
	0.3		
F1·F05 chipbreaker <ul style="list-style-type: none"> For wide cutting condition range Cut cleanly with ground chipbreaker 	0.5		
※FG·F1·F05 chipbreaker, R-hand inserts fit to R-hand toolholder. Work material : SCM435 Holder : S10K-STUPR11D12-OH Insert : TPGH110304 Cutting condition : $v_c=80\text{m/min}$ Bore diameter : $\phi 12$ External coolant Depth : 20mm			



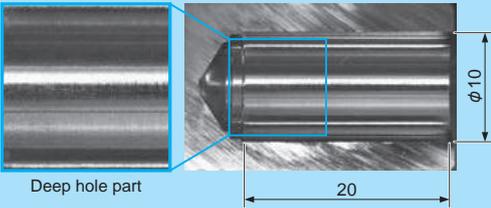
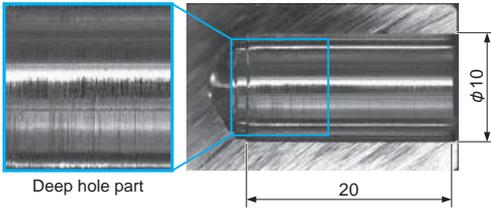
Chip control rage of "F chipbreaker"



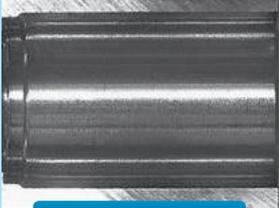
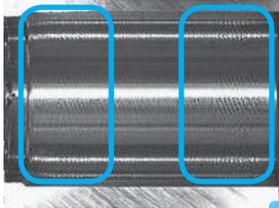
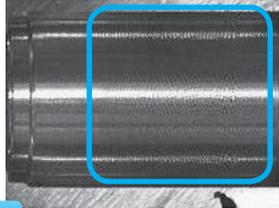
New Products
Tool Materials / Selection Guide
PCD, CBN and ceramic
Cement PVD-coated Carbide
Micro-grain Carbide, Carbide
Insert Stock List
Outside Machining Toolholders
SS
Grooving Tools
Threading Tools
Shaper
Internal Machining tool range
Original Tools for Various Applications
Indexable End Milling Tools
Indexable Drill Inserts
Milling Cutters
Technical Data
Index

Boring bars and internal machining tool range

Chip control performance

Holder	MogulBar S08H-STUPR09D10-OH	Comp. boring bar
Insert	F1-chipbreaker ZM3 TPGH090204FRF1	Comp. chipbreaker
Surface		
Chip	 Good chip control	 Chip packing
<p>Work material : SCM435 Holder : S08H-STUPR09D10-OH (Min.bore Dia.: $\phi 10$) Shank diameter : $\phi 8$ Insert : TPGH090204 Cutting condition : $v_c=80\text{m/min}$ $f=0.05\text{mm/rev}$ $a_p=0.25\text{mm}$ Bore diameter : $\phi 10$ External coolant Overhang length : L/D=4 Depth : 20mm ※For F1 chip breaker, R-hand inserts fit to R-hand toolholder.</p>		

Chatter resistant

	MogulBar	Comp.A	Comp.B
			
<p>Work material : SCM435 Holder : S08H-STUPR09D10-OH Shank diameter : $\phi 8$ Steel shank Insert : ZM3 TPGH090204FRF1 Cutting condition : $v_c=80\text{m/min}$ $f=0.1\text{mm/rev}$ $a_p=0.25\text{mm}$ Bore diameter : $\phi 10\text{mm}$ External coolant Depth : 15mm Overhang length : L/D=5</p>			

Application example

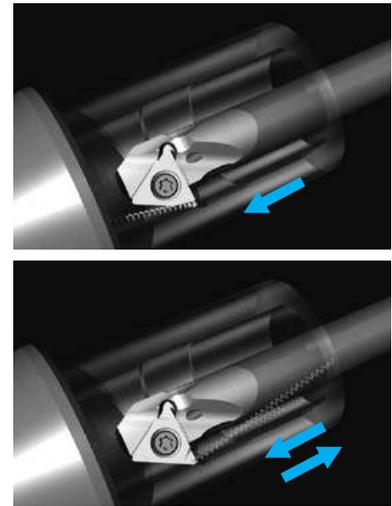
Valve	Sleeve
Work material : SUS304	Work material : SUM43
Holder : S08H-STUPR09D10-OH	Holder : C06H-SCLPR04D07-OH
Insert : TPGH090202RFG	Insert : CPGH04102FRF1
Cutting speed (m/min) = 80	Cutting speed (m/min) = 75
Feed (mm / rev) = 0.05	Feed (mm / rev) = 0.05
Depth of cut (mm) = 0.2 ~ 0.5	Depth of cut (mm) = 0.1
MogulBar + FG chip breaker	MogulBar + F1 chip breaker
1500 pcs	900 pcs
Competitor	Competitor + Ground chip breaker
700 pcs	500 pcs
MogulBar+FG chipbreaker achieves : 2.1 times tool life & Stable tool life.	MogulBar+F1 chipbreaker achieves: Reduce chatter & 1.8 times tool life.

Anti vibration boring bar for internal backturning “C-STZP” type

Prevent chattering with higher rigidity toolholder design
Higher rigidity toolholder offers max. machining length L/D ≤ 7

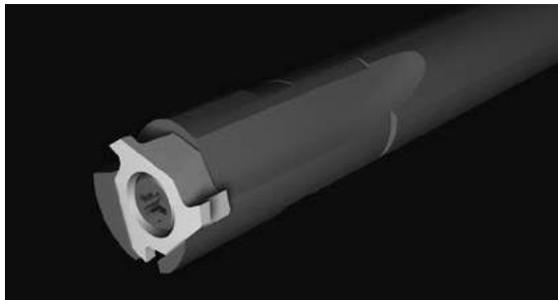


Both machining directions are available



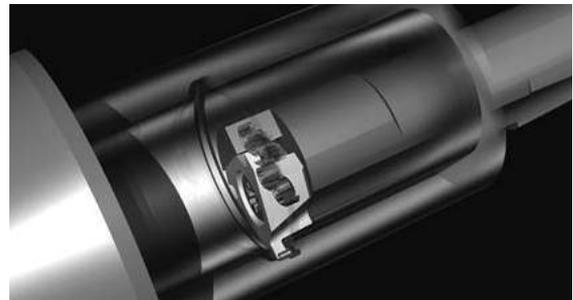
Anti vibration boring bar for internal grooving “S-BG” type

Prevent chattering with higher rigidity toolholder design



Newly designed chipbreaker offers good chip control

Sharp cutting edge prevents burrs



Economical 3 cutting edges

Recommended cutting conditions

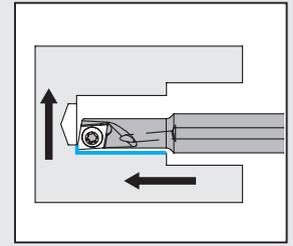
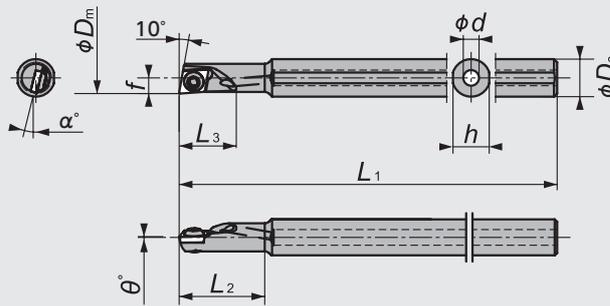
Work material	Cutting speed v_c (m/min)	Feed f (mm/rev)				
		Width (mm)				
		0.25 ~ 0.5	0.5 ~ 1.0	1.0 ~ 2.0	2.0以上	
Free cutting steels	50 100 200	0.005 ~ 0.03	0.02 ~ 0.07	0.02 ~ 0.06	0.03 ~ 0.2	
Carbon steels	Carbide 50 90 150					
Alloy steels	Cermet 120 150 250					
Free cutting stainless steels	50 90 180		0.03 ~ 0.08	0.03 ~ 0.07		
Hard-cut stainless steels	40 70 100		0.02 ~ 0.07	0.03 ~ 0.08		0.05 ~ 0.25
Non ferrous metal	50 100 200					

MOGUL BAR

Minimum machining diameter : $\phi 5$

S-MBR type

Steel shank
(Thin end type)



● Right-hand type shown.

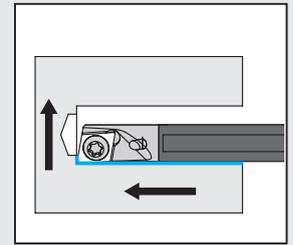
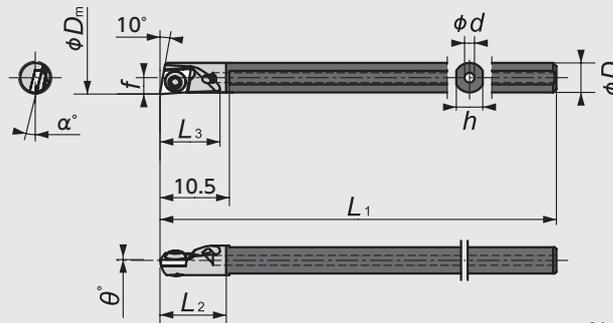
Note) Use a L-hand insert for a R-hand holder.

Note) When using F1 type chipbreaker, use R-hand insert for R-hand holder in order to evacuate chips in the opposite direction to the feed.

Figure-1

C-MBR type

Carbide shank
(Straight type)



● Right-hand type shown.

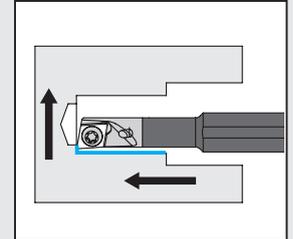
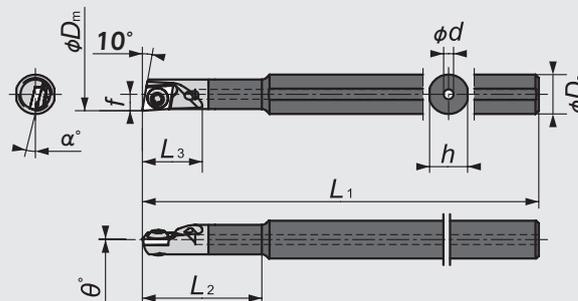
Note) Use a L-hand insert for a R-hand holder.

Note) When using F1 type chipbreaker, use R-hand insert for R-hand holder in order to evacuate chips in the opposite direction to the feed.

Figure-2

C-MBR type

Carbide shank
(Thinner end type)



● Right-hand type shown.

Note) Use a L-hand insert for a R-hand holder.

Note) When using F1 type chipbreaker, use R-hand insert for R-hand holder in order to evacuate chips in the opposite direction to the feed.

Figure-3

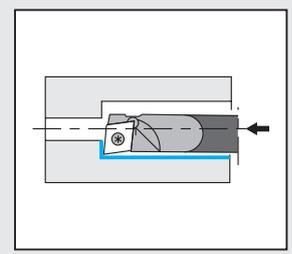
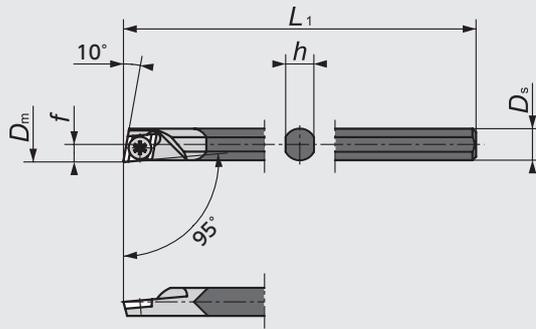
Holder dimensions

Shape	Code No.	Toolholder Part No.	Stock	Min. machining dia. (mm) D_m	Dimensions (mm)										Standard nose radius (mm) r_{E1}	Applicable insert	Parts			
					ϕD_s	h	L_1	f	L_2	L_3	L_4	ϕd	θ	α			Clamping screw	Wrench		
Steel shank	Figure-1	5789888	S06F-MBRD05-OH	●	5.0	6.0	5.7				13.5				2.5		MBL L33	LR-S-2*3.5	CLR-13S	
Carbide shank	Figure-2	5789896	C045F-MBRD05-OH	●		4.5	4.0													
Carbide shank	Figure-3	5789904	C06F-MBRD05-OH	●		6.0	5.7				18				1.5					

Minimum machining diameter : $\phi 5 \sim 7.7$

C-MBR type

Carbide shank
(Straight type)



● Right-hand type shown.

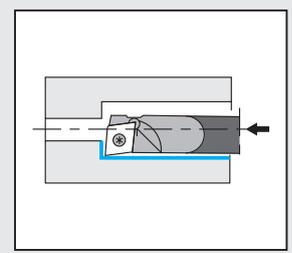
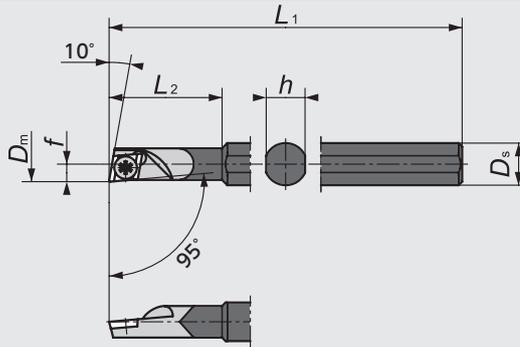
Note) Use a L-hand insert for a R-hand holder.

Note) When using F1 type chipbreaker, use R-hand insert for R-hand holder in order to evacuate chips in the opposite direction to the feed.

Figure-1

C-MBR type

Carbide shank
(Stepped diameter type)



● Right-hand type shown.

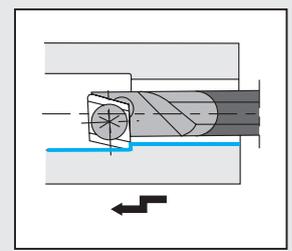
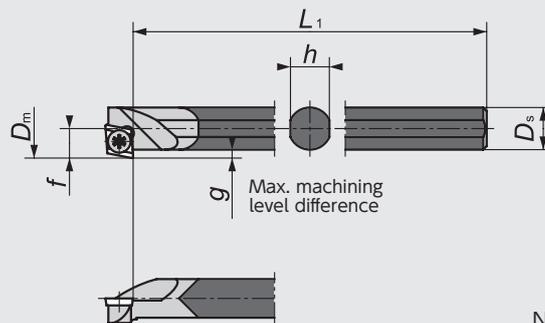
Note) Use a L-hand insert for a R-hand holder.

Note) When using F1 type chipbreaker, use R-hand insert for R-hand holder in order to evacuate chips in the opposite direction to the feed.

Figure-2

C-MSBR type

Carbide shank
(Straight type)



● Right-hand type shown.

Note) Use a L-hand insert for a R-hand holder.

Note) When using F1 type chipbreaker, use R-hand insert for R-hand holder in order to evacuate chips in the opposite direction to the feed.

Figure-3

Holder dimensions

Shape	Code No.	Toolholder Part No.	Stock	Min. machining dia. (mm) D_m	Max. machining level difference (mm) g	Dimensions (mm)*					Applicable insert	Parts	
						D_s	h	L_1	f	L_2		Clamping screw	Wrench
Carbide shank	Figure-1	5610175	●	5.0	—	4.5	4.0	80	2.5	—	MBL (See table below)	LR-S-2 * 3.5	CLR-13S
	Figure-2	5162706	●	5.0	—	6.0	5.5	80	2.5	18			
	Figure-3	5161054	●	5.7	1.0	4.0	3.5	110	3.2	—			
		5161047	●	7.7		6.0	5.5		4.2	—			

Applicable insert

*Based on a master insert having a nose radius of 0.15mm (R=0.15mm).

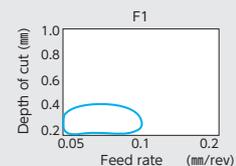
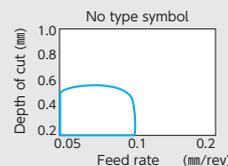
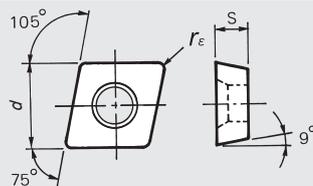
MBL type



Left-hand type shown.



F1*
Right-hand type shown.



● Left-hand type shown.

Part No.	Dimensions (mm)			PVD-coated micro grain carbide			
	d	s	$r_{\epsilon 1}$	ZM3	Stock	TM4	Stock
MBL005FL	3.6	1.0	0.05	5161252	●	5696018	●
MBL015FL			0.15	5161245	●	5696026	●
MBL005FRF1	3.6	1.0	0.05			5789763	●
MBL015FRF1			0.15			5789771	●

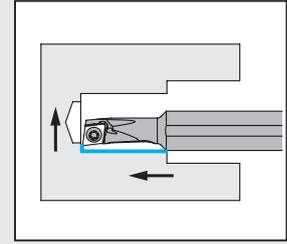
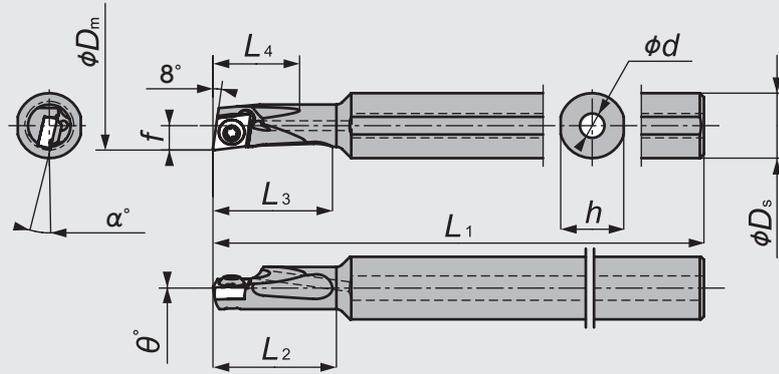
Note) When using F1 type chipbreaker, use R-hand insert for R-hand holder in order to evacuate chips in the opposite direction to the feed. □ indicates a sharp-edged product.

MOGUL BAR

Minimum machining diameter : $\phi 6$

S-SEXR type

Steel shank
(Thinner end type)



● Right-hand type shown.

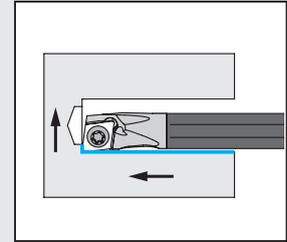
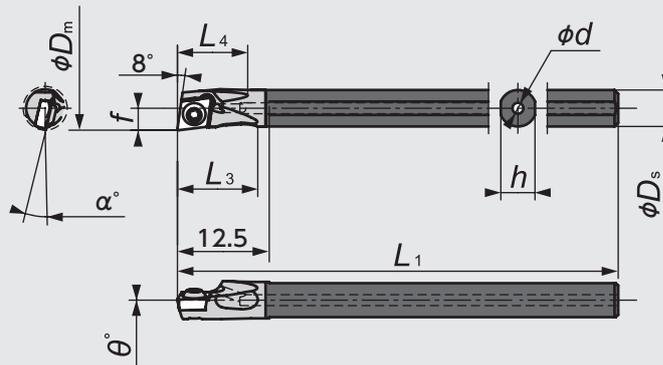
Note) Use a L-hand insert for a R-hand holder.

Note) When using an F1 type chipbreaker, use a R-hand insert for a R-hand holder in order to evacuate chips forward.

Figure-1

C-SEXR type

Carbide shank
(Straight type)



● Right-hand type shown.

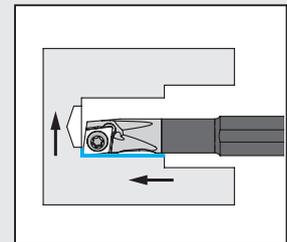
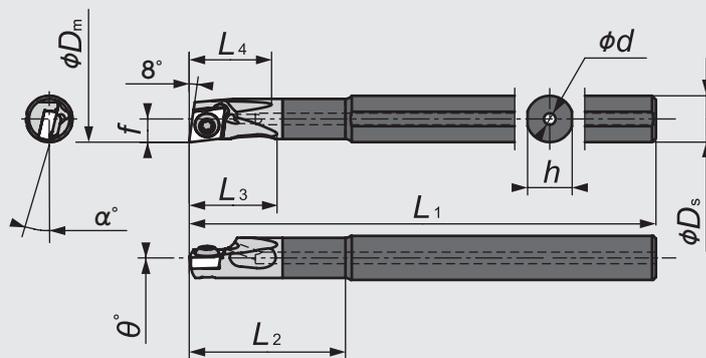
Note) Use a L-hand insert for a R-hand holder.

Note) When using an F1 type chipbreaker, use a R-hand insert for a R-hand holder in order to evacuate chips forward.

Figure-2

C-SEXR type

Carbide shank
(Thinner end type)



● Right-hand type shown.

Note) Use a L-hand insert for a R-hand holder.

Note) When using an F1 type chipbreaker, use a R-hand insert for a R-hand holder in order to evacuate chips forward.

Figure-3

Holder dimensions

Shape	Code No.		Toolholder Part No.	Stock		Min. machining dia (mm) D_m	Dimensions (mm)										Standard nose radius (mm) $r_{\epsilon 1}$	Applicable insert	Parts		
	R	L		R	L		ϕD_s	h	L_1	f	L_2	L_3	L_4	ϕd	θ	α			Clamping screw	Wrench	
Steel shank	Figure-1	5789912	S08G-SEXR $\frac{R}{L}$ T3D06-OH	●		6.0	8.0	7.7				15	15		3.0			ERGHT301 (See table below)	LR-S-2*3.7	CLR-13S	
Carbide shank	Figure-2	5789920	C05G-SEXR $\frac{R}{L}$ T3D06-OH	●	★		5.0	4.0		90	3.0				10		0°				-13°
		5800479																			
Figure-3	5789938	C06G-SEXR $\frac{R}{L}$ T3D06-OH	●	★	6.0	5.7					20				1.5						

Applicable insert

ERGH type

A2^{※1}
Right-hand type shown.

F1^{※2}
Right-hand type shown.

A2 R-hand

A2 L-hand

F1

● Right-hand type shown.

Part No.	Previous P/N	Dimensions (mm)		PVD-coated micro grain carbide												Cermets									
		ϕd	s	ZM3			VM1			TM4			T15			C7X									
				R	Stock	L	R	Stock	L	R	Stock	L	R	Stock	L	R	Stock	L							
ERGHT30102F $\frac{R}{L}$ A2	ERGP52Y-F $\frac{R}{L}$ -A2	3.97	1.6	0.2	5899158	●	5889670	●	5375050	●	5306535	●	5696034	●	5696059	●	5659602	●	5659594	●	5689930	●	5689948	●	
30104F $\frac{R}{L}$ A2	521-F $\frac{R}{L}$ -A2			0.4		5146063	●							5696067	●										
ERGHT30101F $\frac{R}{L}$ F1	—	3.97	1.6	0.1									5793039	●											
30102F $\frac{R}{L}$ F1	—			0.2										5789789	●										
30104F $\frac{R}{L}$ F1	—			0.4											5789797	●									

※1 The R-hand A2 type inserts work effectively for very small depths of cut.

※2 When using an F1 type chipbreaker, use a R-hand insert for a R-hand holder in order to evacuate chips forward.

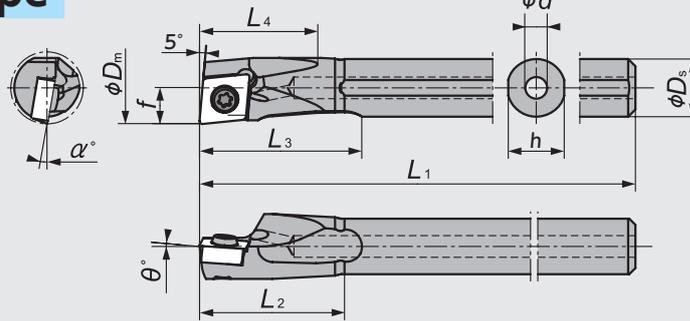
□ indicates a sharp-edged product.

MOGUL BAR

Minimum machining diameter : $\phi 7 \sim 18$

S-SCLP(C) type

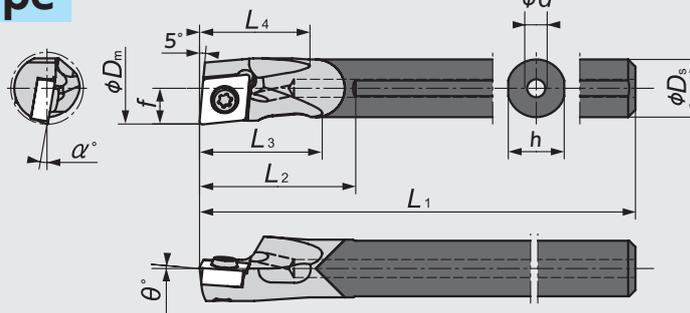
Steel shank



● Right-hand type shown.
Note) Use a L-hand insert for a R-hand holder.

C-SCLP(C) type

Carbide shank



● Right-hand type shown.
Note) Use a L-hand insert for a R-hand holder.

Holder dimensions

Shape	Code No.		Toolholder Part No.	Stock		Min. machining dia. (mm)	Dimensions (mm)										Standard nose radius (mm)	Applicable insert	Parts	
	R	L		R	L		ϕD_m	ϕD_s	h	L_1	f	L_2	L_3	L_4	ϕd	θ			α	Clamping screw
Steel shank	Figure-1	5770029	S06F-SCLP $\frac{R}{L}$ 04D07-0H	●		7.0	6.0	5.75	80	3.5	14	17	12	2.5	+5°	-9°	0.2	CPO00401 F36	LR-S-2*3.7	CLR-13S (A)
		5770037	S07G-SCLP $\frac{R}{L}$ 04D08-0H	●		8.0	7.0	6.75	90	4.0	16	19.5	13.5	3.0		-7°				
		5770045	S08H-SCLP $\frac{R}{L}$ 06D10-0H	●		10.0	8.0	7.7	100	5.0	20	22	16	3.0	-10°	0.4	CPO00602 F35~36	LR-S-2.5*6	CLR-15S (A)	
		5770052	S08H-SCLC $\frac{R}{L}$ 06D10-0H	●		10.0	8.0	7.7	100	5.0	20	22	16	3.0	-13°	0.4	CC000602 F33~35	LRIS-2.5*5	CLR-15S (A)	
		5770060	S10K-SCLC $\frac{R}{L}$ 06D12-0H	●		12.0	10.0	9.6	125	6.0	24	27.5	20	3.5	-11°					
		5770078	S12M-SCLC $\frac{R}{L}$ 06D14-0H	●		14.0	12.0	11.5	150	7.0	28	32.5	23	4.0	0°					-9°
		5770086	S16Q-SCLC $\frac{R}{L}$ 09D18-0H	●		18.0	16.0	15.4	180	9.0	36	42.5	30	5.0	-10°	CC0009T3 F33~35	LRIS-4*8	LLR-25S-20*6.5 (B)		
Carbide shank	Figure-2	5770136	C06H-SCLP $\frac{R}{L}$ 04D07-0H	●	★	7.0	6.0	5.75	100	3.5	15.5	11.5	12	2.0	+5°	-9°	0.2	CPO00401 F36	LR-S-2*3.7	CLR-13S (A)
		5800495		●		8.0	7.0	6.75	110	4.0	17.5	13	13.5	2.0		-7°				
		5770151	C07J-SCLP $\frac{R}{L}$ 04D08-0H	●		8.0	7.0	6.75	110	4.0	17.5	13	13.5	2.0	-10°	0.4	CPO00602 F35~36	LR-S-2.5*6	CLR-15S (A)	
		5770169	C08K-SCLP $\frac{R}{L}$ 06D10-0H	●	●	10.0	8.0	7.7	125	5.0	21.5	16.5	15	2.5	-13°	0.4	CC000602 F35~36	LRIS-2.5*5	CLR-15S (A)	
		5800503		●		10.0	8.0	7.7	125	5.0	21.5	16.5	15	2.5	-11°					
		5770185	C08K-SCLC $\frac{R}{L}$ 06D10-0H	●		10.0	8.0	7.7	125	5.0	21.5	16.5	15	2.5	0°					-9°
		5770193	C10M-SCLC $\frac{R}{L}$ 06D12-0H	●	★	12.0	10.0	9.6	150	6.0	25	20	19.5	2.5	-9°					
	5800511		●		14.0	12.0	11.5	150	7.0	29	23.5	22.5	3.0							
	5770201	C12M-SCLC $\frac{R}{L}$ 06D14-0H	●		14.0	12.0	11.5	150	7.0	29	23.5	22.5	3.0							

Minimum machining diameter : $\phi 8 \sim 12$

C-SCLP type

Carbide shank

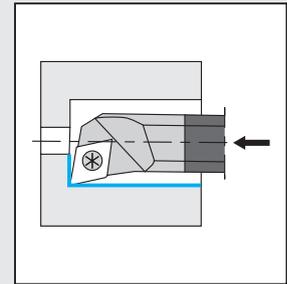
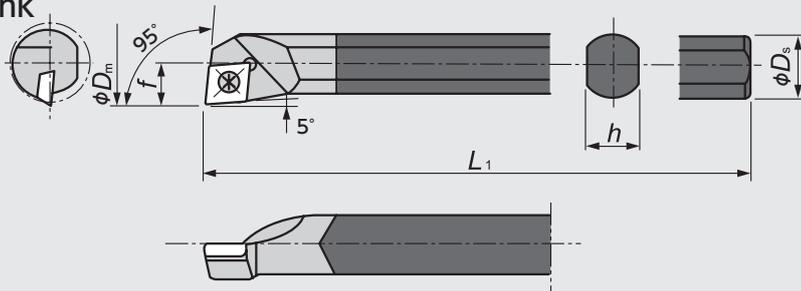


Figure-1

● Right-hand type shown.

Note) Use a L-hand insert for a R-hand holder.

Holder dimensions

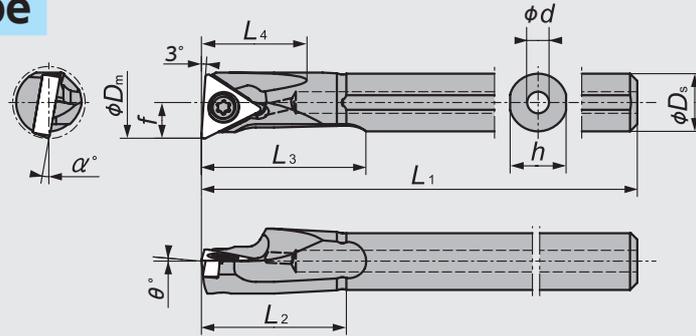
Shape	Code No.	Toolholder Part No.	Stock	Min. machining dia (mm) ϕD_m	Dimensions (mm)						Applicable insert	Parts	
					ϕD_s	h	b	L_1	f	L_2		Clamping screw	Wrench
Figure-1	5853288	C06J-SCLPR-04-N	●	8.0	6.0	5.2		110	4.0		CPO00401 F36	LR-S-2*4.4	CLR-13S (A)
	5853296	C08K-SCLPR-06-N	●	10.0	8.0	7.0	—	125	5.0	—	CPO00602 F33~36	LR-S-2.5*5.5	CLR-15S (A)
Carbide shank	5853304	C10M-SCLPR-08-N	●	12.0	10.0	9.0		150	6.0		CPGH0802 F36	LR-S-3*6.2	RLR-20S (B)

MOGUL BAR

Minimum machining diameter : $\phi 8 \sim 18$

S-STUC(P) type

Steel shank



● Right-hand type shown.

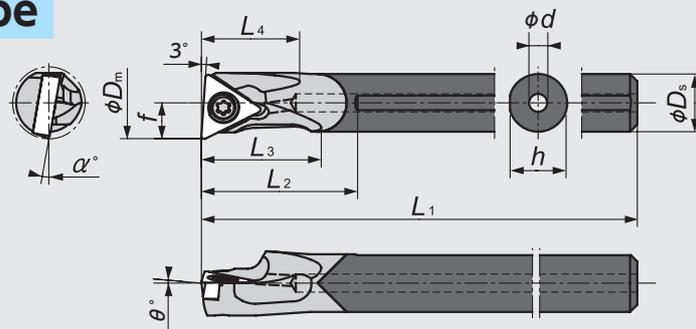
Note) Use a L-hand insert for a R-hand holder.

Note) When using an F1 type chipbreaker, use a R-hand insert for a R-hand holder in order to evacuate chips backward.

Figure-1

C-STUC(P) type

Carbide shank



● Right-hand type shown.

Note) Use a L-hand insert for a R-hand holder.

Note) When using an F1 type chipbreaker, use a R-hand insert for a R-hand holder in order to evacuate chips backward.

Figure-2

Holder dimensions

Shape	Code No.		Toolholder Part No.		Stock		Min. machining dia. (mm)	Dimensions (mm)										Standard nose radius (mm)	Applicable insert	Parts	
	R	L	R	L	ϕD_m	ϕD_s		h	L_1	f	L_2	L_3	L_4	ϕd	θ	α	Clamping screw			Wrench	
Steel shank	Figure-1	5769971		S07G-STUC $\frac{R}{L}$ 06D08-0H	●		8.0	7.0	6.75	90	4.0	16.0	19.5	12.5	2.5	0°	-11°	0.2	T0000601 F43~44	LR-S-2*4.4	CLR-13S (A)
		5769989		S08H-STUP $\frac{R}{L}$ 09D10-0H	●		10.0	8.0	7.7	100	5.0	20.0	22.5	14.5	3.0		-10°		T0000902 F44~45	LR-S-2.5*4.8	CLR-15S (A)
		5769997		S10K-STUP $\frac{R}{L}$ 11D12-0H	●		12.0	10.0	9.6	125	6.0	24.0	27.5	18.5	3.5		-7.5°	0.4	T0001103 F22·44~45	LR-S-3*5.8	RLR-20S (B)
		5770003		S12M-STUP $\frac{R}{L}$ 11D14-0H	●		14.0	12.0	11.5	150	7.0	28.0	32.5	22	4.0	+5°	-5°				
		5770011		S16Q-STUP $\frac{R}{L}$ 11D18-0H	●		18.0	16.0	15.4	180	9.0	32.0	42.5	28.5	5.0		-3°				
Carbide shank	Figure-2	5770094		C07J-STUC $\frac{R}{L}$ 06D08-0H	●	★	8.0	7.0	6.75	110	4.0	17.5	13.0	12.5	2.0	0°	-11°	0.2	T0000601 F43~44	LR-S-2*4.4	CLR-13S (A)
		5800529																			
		5770102		C08K-STUP $\frac{R}{L}$ 09D10-0H	●	★	10.0	8.0	7.7	125	5.0	21.5	16.5	14.5	2.5		-10°	0.4	T0000902 F44~45	LR-S-2.5*4.8	CLR-15S (A)
		5800537																			
		5770110		C10M-STUP $\frac{R}{L}$ 11D12-0H	●	★	12.0	10.0	9.6	150	6.0	25.0	20.0	17.5	2.5	+5°	-7.5°		T0001103 F22·44~45	LR-S-3*5.8	RLR-20S (B)
		5800545																			
5770128		C12M-STUP $\frac{R}{L}$ 11D14-0H	●		14.0	12.0	11.5	150	7.0	29.0	23.0	21.5	3.0		-5°						
5821814		NEW C16Q-STUP $\frac{R}{L}$ 11D18-0H	●		18.0	16.0	15.4	180	9.0	37.0	29.0	28.0	4.0		-3°						

Minimum machining diameter : $\phi 8 \sim 12$

C-STUC(P) type

Carbide shank

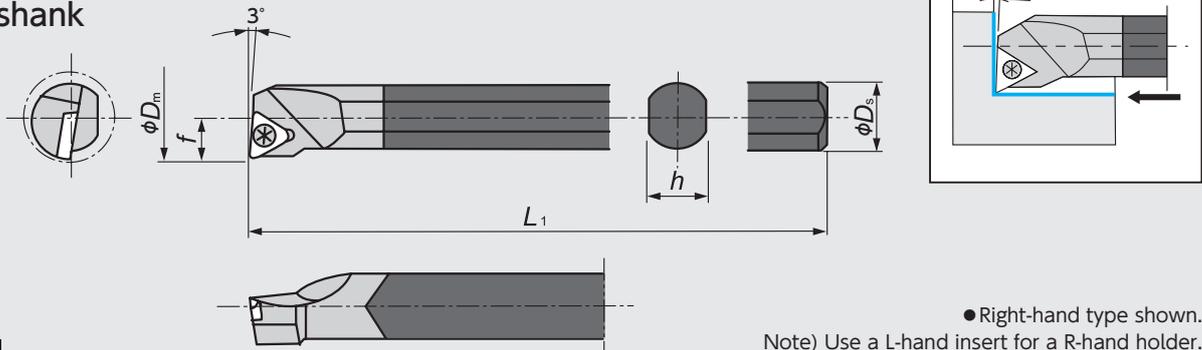


Figure-1

Note) When using F1, F05, FG chipbreakers, use R-hand insert for R-hand toolholder to evacuate chips backward.

Holder dimensions

Shape	Code No.	Toolholder Part No.	Stock	Min. machining dia. (mm)	Dimensions (mm) *							Applicable insert	Parts	
					ϕD_m	ϕD_s	h	b	L_1	f	L_2		g	Clamping screw
Figure-1	5853247	C06J-STUCR-06-N	●	8.0	6.0	5.2		110	4.0			TC○○0601 F43~44	LR-S-2*3.7	CLR-13S
	5853262	C08K-STUPR-08-N	●	10.0	8.0	7.0	—	125	5.0	—	—	TP○○0802 F44~45	LR-S-2*5.5	
Carbide shank	5853270	C10M-STUPR-09-N	●	12.0	10.0	9.0		150	6.0			TP○○0902 F44~45	LR-S-2.5*6	CLR-15S

※Based on master insert having a nose radius of 0.2mm (R=0.2mm)

Boring bars and internal machining tool range

Minimum machining diameter : $\phi 10 \sim 17.5$

C-STZP(C) type

Carbide shank
(Coolant through)

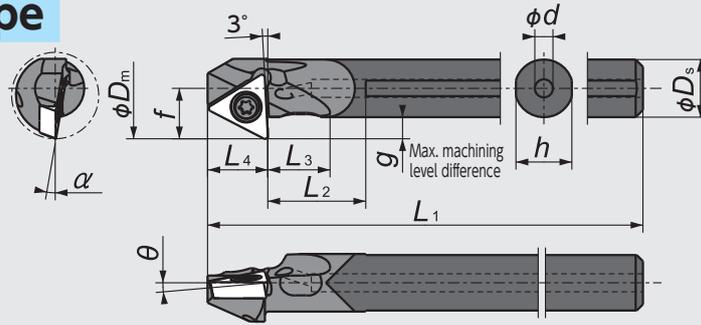


Figure-1

B-STZ type

Carbide shank

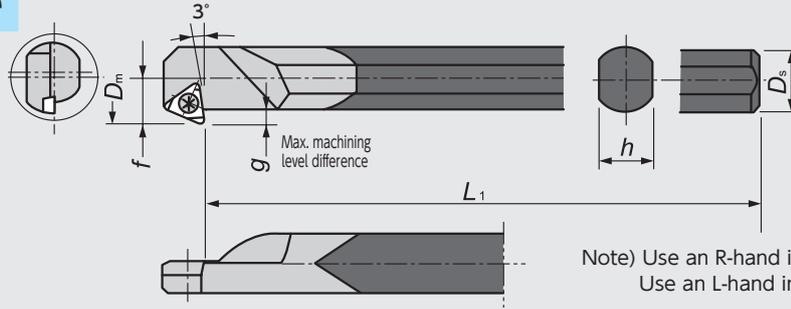


Figure-2

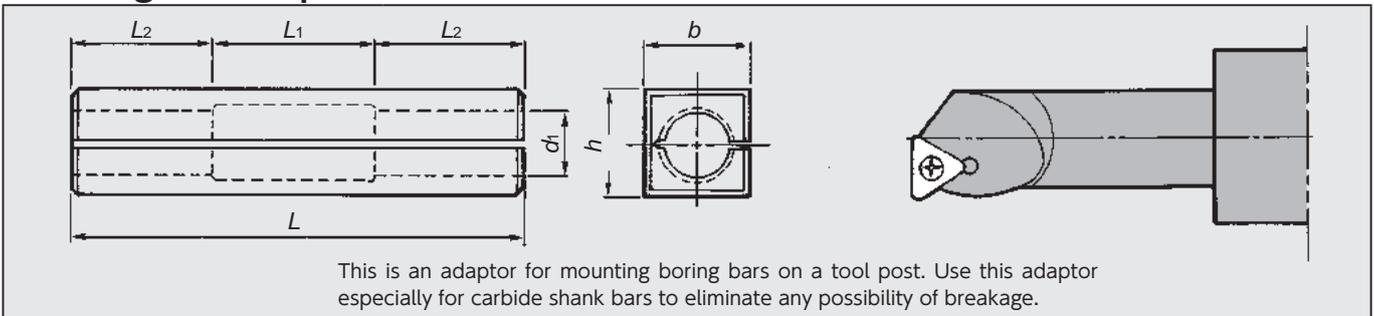
Note) Use an R-hand insert for cutting for back boring.
Use an L-hand insert for cutting for front turning.
● Right-hand type shown.

Holder dimensions

Shape	Code No.	Toolholder Part No.	Stock	Min. machining dia. (mm) ϕD_m	Max. machining level difference (mm) g	Dimensions (mm) ^{※1}										Standard nose radius (mm)	Applicable insert	Parts	
						ϕD_s	h	L_1	f	L_2	L_3	L_4	ϕd	θ	α			Clamping screw	Wrench
Figure-1	5842851	C06H-STZCR06D10-OH	●	10.0	2.5	6.0	5.8	100	5.5	10.5	6	6	2.0	0°	-10°	0.2	TC000601 F43~44	LR-S-2*4	CLR-13S
	5842869	C08K-STZPR09D12-OH	●	12.0	3.0	8.0	7.7	125	7.0	13.5	8.5	8.3	2.5		-10°	0.4	TPO00902 F44~45	LR-S-2.5*4.8	CLR-15S
	5842877	C10M-STZPR09D14-OH	●	14.0	3.0	10.0	9.6	150	8.0	18.5	12	8.3	2.5	+5°	-7°	0.4	TPO01103 F22~44~45	LR-S-3*5.8	RLR-20S
	5842885	C12M-STZPR11D175-OH ^{※2}	●	17.5	4.5	12.0	11.5	150	10.5	22	14.5	9.6	3.0		-5°	0.4	TPO01103 F22~44~45	LR-S-3*5.8	RLR-20S
Figure-2	5852819	B06J-STZCR-06-N	●	10.0	2.5	6.0	5.2	110	5.5							0.2	TC000601 F43~44	LR-S-2*4.4	CLR-13S
	5852801	B12Q-STZPR-09-N	●	16.0	3.0	12.0	11.0	180	9.0							0.2	TPO00902 F43~44	LR-S-2.5*6.8	CLR-15S

※1 Based on a master insert having a nose radius of 0.2mm (R=0.2mm).
※2 Applicable insert size is different from insert for B12Q-STZPR-09.

Boring bar adaptors.



Code No.	Adaptor P/N	Stock	Dimensions (mm)						Applicable holder
			h_1	b	L	L_1	L_2	d_1	
5764204	S06-H	●	20	20	60	20	20	6	 For shank of $\phi 6$
5580717	S08-H	●	20	20	60	20	20	8	
5632286	S10-H	●	20	20	60	20	20	10	
5758198	S12-H	●	25	25	70	20	25	12	

Multi-clamp holder Minimum machining diameter : $\phi 33 \sim 63$

S-TCLN type
Clamp-on

S-WCLN type
Double clamping

S-HCLN type
Dimple clamping

● Right-hand type shown.

Holder dimensions and parts for the Multi-clamp holder

Code No.		Toolholder Part No.	Stock		Min. machining dia. (mm) D _m	Dimensions (mm) *1						Clamp	Shim seat	Clamping screw	Retaining screw	Wrench	Shim Wrench	Spring
R	L		R	L		D _s	h	L ₁	f	L ₂	α							
5701685	5701693	S25R-TCLN $\frac{R}{L}$ 12	●	●	33	25	24	200	17	40	14	TC6CN Clamp-on	ACN423	AOS-6X26W AOS-6X30W*2 (For small-dia. boring bar)	FSS16-3.0 * 8	LLR-T20	LLR-T10	ASGL6-D
5701701	5701719	S32S-TCLN $\frac{R}{L}$ 12	●	●	40	32	30	250	22	50	12							
5701727	5701735	S40T-TCLN $\frac{R}{L}$ 12	●	●	50	40	38	300	27	60	10							
5701743	5701750	S50U-TCLN $\frac{R}{L}$ 12	●	●	63	50	47	350	35	65	8							
5682646	5682653	S25R-WCLN $\frac{R}{L}$ 12	●	●	33	25	24	200	17	40	14	DC6CN Double clamping	ACN423	AOS-6X26W AOS-6X30W*2 (For small-dia. boring bar)	FSS16-3.0 * 8	LLR-T20	LLR-T10	ASGL6-D
5682661	5682679	S32S-WCLN $\frac{R}{L}$ 12	●	●	40	32	30	250	22	50	12							
5682687	5682695	S40T-WCLN $\frac{R}{L}$ 12	●	●	50	40	38	300	27	60	10							
5682703	5682711	S50U-WCLN $\frac{R}{L}$ 12	●	●	63	50	47	350	35	65	8							
5701180	5701198	S25R-HCLN $\frac{R}{L}$ 12	●	●	33	25	24	200	17	40	14	HC6CN Dimple clamping	—	AOS-6X26W AOS-6X30W*2 (For small-dia. boring bar)	—	LLR-T20	—	ASGL6-D
5701206	5701214	S32S-HCLN $\frac{R}{L}$ 12	●	●	40	32	30	250	22	50	12							
5701222	5701230	S40T-HCLN $\frac{R}{L}$ 12	●	●	50	40	38	300	27	60	10							
5701248	5701255	S50U-HCLN $\frac{R}{L}$ 12	●	●	63	50	47	350	35	65	8							

*1 Based on a master insert having a nose radius of 0.8mm (R=0.8mm).

*2 AOS-6*30WH is an option for hexagonal hole type screw.

Applicable insert

Toolholder Part No.	Applicable insert	Listed on pages
S-TCKLN $\frac{R}{L}$...	CNON1204	F5
S-WCLN $\frac{R}{L}$...	CNOA1204	F4 • 16 • 24 • 25
S-HCLN $\frac{R}{L}$...	CNOX1207	F5

Multi-clamp holder
Just changing the clamps enables the holder to clamp inserts with or without holes, and dimple type inserts.

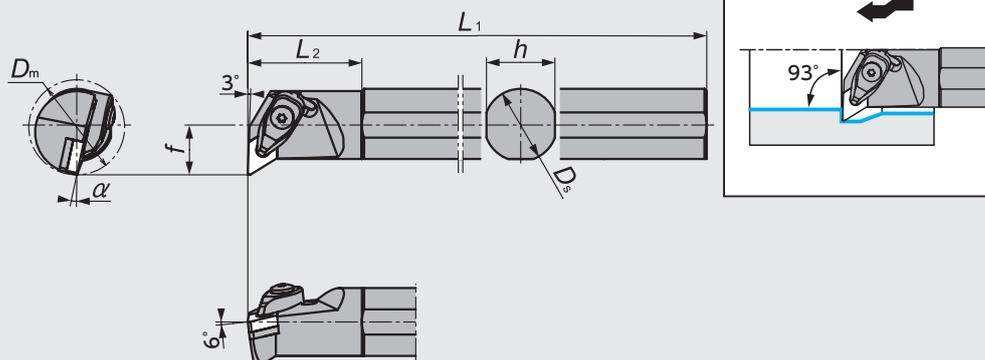
Multi-clamp holder Minimum machining diameter : $\phi 42 \sim 50$

S-WDUN type

Double clamping

S-HDUN type

Dimple clamping



● Right-hand type shown.

Holder dimensions and parts for the Multi-clamp holder

Code No.		Toolholder Part No.	Stock		Min. machining dia. (mm) D_m	Dimensions (mm) ^{※1}						Clamp	Shim seat	Clamping screw	Retaining screw	Wrench	Shim Wrench	Spring
R	L		R	L		D_s	h	L_1	f	L_2	α							
5682794	5682802	S32S-WDUN $R_{L} 15$	●	●	42	32	30	250	22	50	12	DC6DN Double clamping	ADN423	AOS-6X26W AOS-6X30W ^{※2} (For small-dia. boring bar)	FSS16-3.0 * 8	LLR-T20	LLR-T10	ASGL6-D
5701545	5701560	S40T-WDUN $R_{L} 15$	●	●	50	40	38	300	27	60	10							
5701354	5701362	S32S-HDUN $R_{L} 15$	●	●	42	32	30	250	22	50	12	HC6DN Dimple clamping	—	AOS-6X26W AOS-6X30W ^{※2} (For small-dia. boring bar)	—	LLR-T20	—	ASGL6-D
5701370	5701388	S40T-HDUN $R_{L} 15$	●	●	50	40	38	300	27	60	10							

※1 Based on a master insert having a nose radius of 0.8mm (R=0.8mm).

※2 AOS-6*30WH is an option for hexagonal hole type screw.

Applicable insert

Toolholder Part No.	Applicable insert	Listed on pages
S-WDUN R_{L} ...	DN \circ A1504 	F6 • 17 • 25 • 26
S-HDUN R_{L} ...	DN \circ X1507 	F6

Multi-clamp holder

Just changing the clamps enables the holder to clamp inserts with or without holes, and dimple type inserts.

Multi-clamp holder Minimum machining diameter : $\phi 50$

S-TSKN type
Clamp-on

S-WSKN type
Double clamping

S-HSKN type
Dimple clamping

Holder dimensions and parts for the Multi-clamp holder

Code No.		Toolholder Part No.	Stock		Min. machining dia. (mm) D_m	Dimensions (mm) ^{※1}						Clamp	Shim seat	Clamping screw	Retaining screw	Wrench	Shim Wrench	Spring
R	L		R	L		D_s	h	L_1	f	L_2	α							
5701800	5701818	S40T-TSKN $\frac{R}{L} 12$	●	●	50	40	38	300	27	60	10	TC6CN Clamp-on	ASN423	AOS-6 * 30W ^{※2} (For small-dia. boring bar)	FSS16-3.0 * 8	LLR-T20	LLR-T10	ASGL6-D
5682950	5682968	S40T-WSKN $\frac{R}{L} 12$	●	●	50	40	38	300	27	60	10	DC6CN Double clamping	ASN423	AOS-6 * 30W ^{※2} (For small-dia. boring bar)	FSS16-3.0 * 8	LLR-T20	LLR-T10	ASGL6-D
5701529	5701537	S40T-HSKN $\frac{R}{L} 12$	●	●	50	40	38	300	27	60	10	HC6CN Dimple clamping	—	AOS-6 * 30W ^{※2} (For small-dia. boring bar)	—	LLR-T20	—	ASGL6-D

※1 Based on a master insert having a nose radius of 0.8mm (R=0.8mm).
 ※2 AOS-6*30WH is an option for hexagonal hole type screw.

Applicable insert

Toolholder Part No.	Applicable insert	Listed on pages
S-TSKN $\frac{R}{L}$...	SNON1204	F8 • 9 • 18 • 28
S-WSKN $\frac{R}{L}$...	SNOA1204	F8 • 18 • 27 • 28
S-HSKN $\frac{R}{L}$...	SNOX1207	F9

Multi-clamp holder
 Just changing the clamps enables the holder to clamp inserts with or without holes, and dimple type inserts.

Multi-clamp holder Minimum machining diameter : $\phi 33 \sim 50$

S-WWLN type

Double clamping

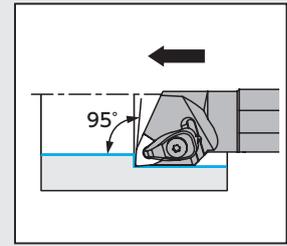
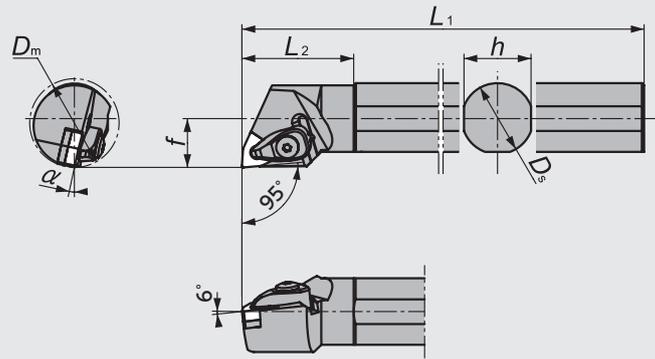


Figure-1

● Right-hand type shown.

S-WWLN-2 type

Double clamping

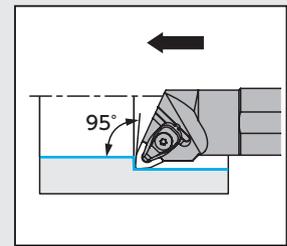
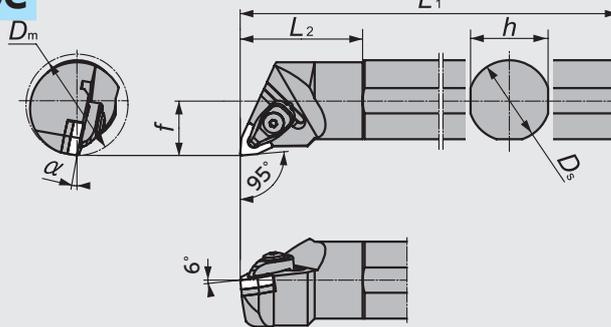


Figure-2

● Right-hand type shown.

Holder dimensions and parts for the Multi-clamp holder

Shape	Code No.		Toolholder Part No.	Stock		Min. machining dia. (mm)	Dimensions (mm) *1						Clamp	Shim seat	Clamping screw	Retaining screw	Wrench	Shim Wrench	Spring	
	R	L		R	L		D _s	h	L ₁	f	L ₂	α								
Figure-1	5683032	5683040	S25R-WWLN R/L 08	●	●	33	25	24	200	17	40	14	DC6CN Double clamping	AWN423-W	AOS-6X26W AOS-6X30W*2 (For small-dia. boring bar)	FSS16-3.0 *8	LLR-T20	LLR-T10	ASGL6-D	
	5683057	5683065	S32S-WWLN R/L 08	●	●	40	32	30	250	22	50	12								
	5683073	5683081	S40T-WWLN R/L 08	●	●	50	40	38	300	27	60	10								
Figure-2	5701594	5701602	S40T-WWLN R/L 08-2	●	●	50	40	38	300	27	60	10								

*1 Based on a master insert having a nose radius of 0.8mm (R=0.8mm).

*2 AOS-6*30WH is an option for hexagonal hole type screw.

Applicable insert

Toolholder Part No.	Applicable insert	Listed on pages
S-WWLN R/L ...	WN \circ A0804 	F12 • 32

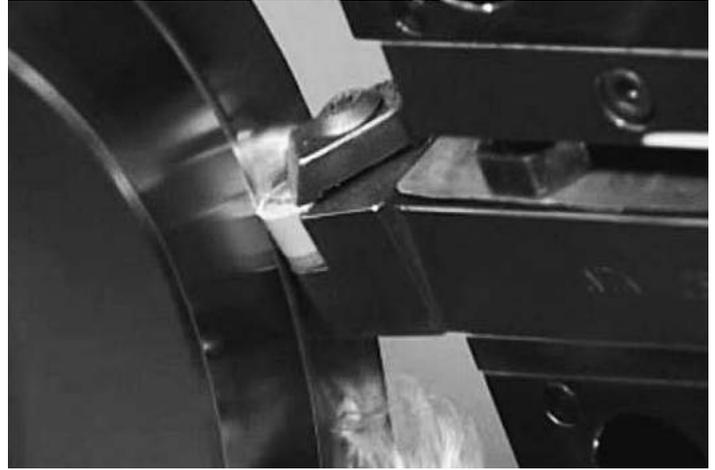
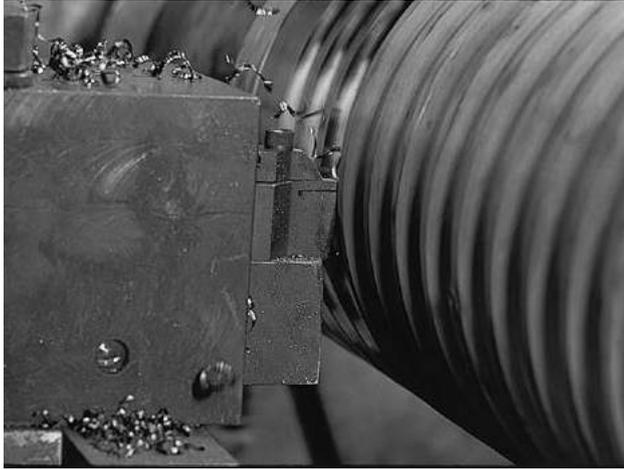
M

Original Tools for Various Applications

- Tools for machining steel mill rolls and heat-resistant alloys M2
- Tools for bearings production M6
- Tools for tube scarfing M18
- Tools for V-pulleys M20

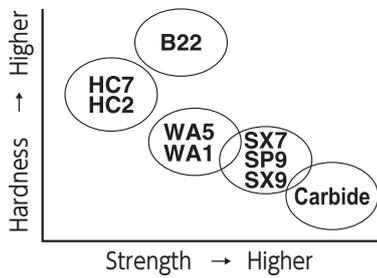
Index	Technical Data	Milling Cutters	Indexable Drill Inserts	Indexable End Milling Tools	Original Tools for Various Applications	Internal Machining Tool Range	Shaper	Threading Tools	Grooving Tools	SS	Outside Machining Toolholders	Insert Stock List	Micro-grain Carbide, Carbide	Cermets, PVD-coated Cermets	PCD, CBN and ceramic	Tool Materials / Selection Guide	New Products
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Tools for Machining Mill Rolls and Heat-Resistant Alloys



Features of Tool Materials

Advantages of Ceramic Tools (for mill rolls/heat-resistant alloys)



Longer tool life!

Higher heat-resistance due to metal-free composition

Higher efficiency!

Machining at a higher cutting speeds than carbide.

Better surface finish!

Result in improved surface finish because of a lower affinity with the work materials

Selection guide for tool materials

		Tool material grade					
		CBN	Alumina-based	Whisker-based	Silicon-nitride-based		
		B22	HC7·HC2	WA1/WA5	SP9	SX7	SX9
Mill roll material	Forged roll (High-speed steel roll) Cr-Mo-based Carbon-based	○	○	◎			
	Cast steel roll Carbon-based	○	○	○			
	Cast iron roll Adamite Chilled Grain Ductile or special cast iron	◎	◎	◎	◎		
Heat-resistant alloy	Nickel-based heat-resistant alloys (Inconel)			◎		◎	◎
	Cobalt-based heat-resistant alloys (Stellite)			◎		◎	

Actual machining examples [Machining of a mill roll]

Machining of an alloy cast-iron roll	
Work material : Alloy cast-iron	
Cutting speed (m/min) = 40	
Feed rate (mm /rev) = 0.2	
Depth of cut (mm) = 20	
Cutting oil : DRY	
NTK : HC2	Over 43 min. per corner
Competitor : Whisker grade	20 min. per corner
<ul style="list-style-type: none"> ● Tool life : With the competitor's whisker-based insert, the surface being cut became overheated and the operation was ceased. With our HC2, the cutting operation continued up to 43 minutes or more on occasion. (The machined length was approx. 270 mm.) ● Chips : With the competitor's whisker-based tool, the chips were bluish and brittle/weak showing overheating, while the chips remained constant and normal when the HC2 grade was used. ● Wear : The competitor's product showed a great flank wear while HC2 remained in excellent condition. ● Overall evaluation : HC2 was proven to be superior in terms of tool life and cost. 	

Machining of a roll by simultaneous cutting of cast iron and high-speed steel	
Work material : High-speed Cr steel	
Cutting speed (m/min) = 63	
Feed rate (mm /rev) = 0.15	
Depth of cut (mm) = 63.5	
Cutting oil : DRY	
NTK : HC7	100mm
Competitor : Black ceramic	40mm
<p>HC7 has better fracture resistance than the competitor's black ceramic, exhibiting a longer tool life. The surface finish produced with the competitor's current product was poor, while the surface with our HC7 retained a high quality.</p>	

Machining of alloy cast-iron roll	
Work material : High-Cr cast iron	
Cutting speed (m/min) = 60	
Feed rate (mm /rev) = 0.2	
Depth of cut (mm) = 2.0	
Cutting oil : WET	
NTK : B22	2 passes
Competitor : CBN grade	1 passé
<p>B22 exhibited twice longer tool life when compared with the competitor's CBN.</p>	

Roughing of high-speed roll	
Work material : High-speed steel based	
Cutting speed (m/min) = 11.8	
Feed rate (mm /rev) = 1.0	
Depth of cut (mm) = 7.0	
Cutting oil : DRY	
NTK : WA1	1 roll
<p>Conventionally the cutting speed was 8 m/min with a K20 carbide grade. But the cutting speed became approximately 1.5 times higher with the WA1 grade.</p>	

[Machining of heat-resistant alloys]

Semi-rough machining of turbine disc ●Work material : Inco 718		
	Current	NTK
Grade	Whisker Ceramic	SX7
Shape	RPGX120700	←
Cutting speed (m/min)	240	←
Feed rate (mm/rev)	0.15	←
Depth of cut (mm)	1.50	←
Cutting oil	WET	←
Life (min)	7.0	←

Competition's whisker Ceramic

SX7

SX7, excellent in notching resistance, controlled insert chipping, on the other hand competitor's Whisker ceramic could not.

Machining of turbine disc Inconel 718 (Gas turbine component)			
	OD turning	Grooving	Ramping
	WA1	WA1	WA1
Cutting speed (m/min)	300	300	300
Feed rate (mm/rev)	0.15	0.1	0.06
Depth of cut (mm)	3 - 4	-	2 - 3
Cutting oil	WET	WET	WET
Life (min)	20	20	20

The machining operation was stable when using WA1 for each process.

Tools for Machining Mill Rolls and Heat-Resistant Alloys

HRCD type

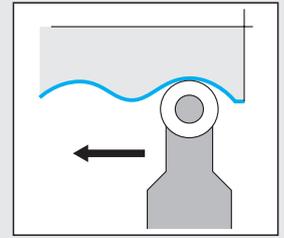
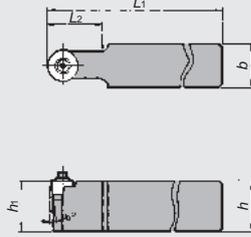


Figure-1

CRDC type

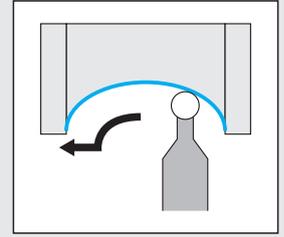
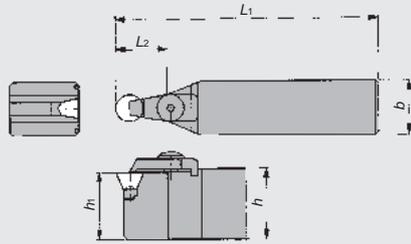


Figure-2

CRXC type

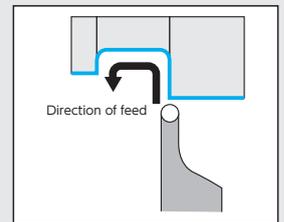
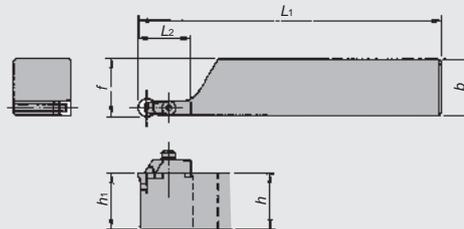


Figure-3

● Right-hand type shown.

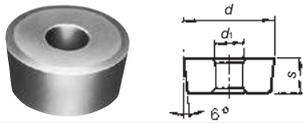
Holder dimensions

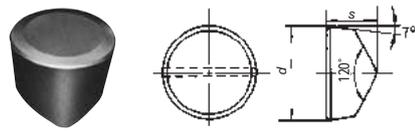
Shape	Code No.			Holder Part No.	Stock			Dimensions (mm)					Applicable insert			
	R	N	L		R	N	L	h	b	L ₁	h ₁	f			L ₂	
Figure-1		5454921		HRCD-22	●			50	50	300	50	—	30		CDH22	
		5144274			●										50	CDH33
		5454947													80	CDH42
		5844113													80	CDH43
															100	CDH53
Figure-2		5720750		CRDCN2525M06				25	25	150	25	20		※RCGX/RPGX0607(08)		
		5478706													※RCGX/RPGX0907(08)	
		5691613													※RCGX/RPGX1207(08)	
		5911557			●										※RCGX/RPGX0607(08)	
		5829528			●	32	170							32	25	※RCGX/RPGX0907(08)
		5829510			●											
	5634241							RCGX/RPGX1510								
Figure-3	5981469		CRXC^R3232P09Y	●	32	32	170	32	32.7	28		RCGY090603				
	5981188			●											38	RCGY120603

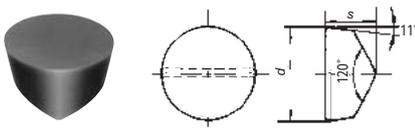
※Both of thickness 07&08 can be used.

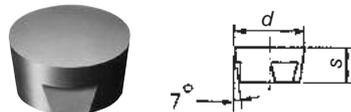
Parts

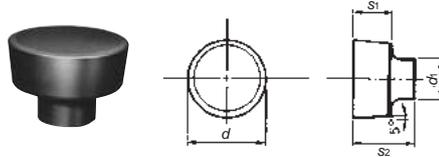
Part	Cap screw	Button screw	Washer	Shim seat	Retaining screw	Spring	Clamp	Spring pin	Wrench
Holder P/N				 (A)  (B)  (C)  (D)					
HRCD-22	CS0316		W120	HACDH22 (A)					LW-2.5
HRCD-33	CS0625		W110	HACDH33 (A)					LW-5
HRCD-42	1/4-20UNC * 11/4		W106	HACDH42 (A)					LWU-4
HRCD-43	1/4-20UNC * 11/2			HACDH43 (A)					
HRCD-53	3/8-16UNC * 11/2		W107	HACDH53 (A)					LWU-5
CRDCN3225P06		BS0520	WS-5	HARCGX06 (C)			HC35KR-4099	—	LW-3
CRDCN3225P09		BS0625	WS-6	HARCGX0908V (D)			HC35KR-6075	2 * 8AW	LW-4
CRDCN3225P12				HARCGX1208V (D)			HC35KR-6076	2.5 * 8AW	
CRXC3232P09Y	CS0425		WS-4	HAR09Y (B)	M2 * 8	ASGL4	CRN4		LW-3
CRXC3232P12Y	CS0525		WS-5	HAR12Y (B)	M3 * 8	ASGL5	CRN5		LW-4

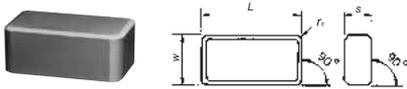
CDH type [Inserts applicable for HRDC holders]	Part No.	Dimensions (mm)			For machining of mill rolls	
		d	s	d ₁	HC2	Stock
	CDH22PN	12.70	6.35	3.18	5455126	●
	33PN	19.05	9.52	6.35	5496278	●
	42PN	25.40	12.70	6.75	5444500	
	43PN				19.05	5305404
	53PN	31.75	19.05	9.92	5448253	

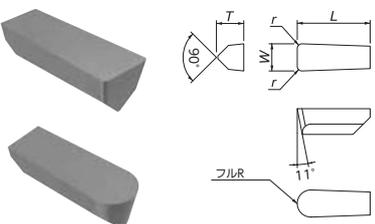
RCGX type [Inserts applicable for CRDCN holders]	Part No.	Dimensions (mm)		For machining of mill rolls				For machining of heat-resistant alloys				
		d	s	HC2	Stock	HC5	Stock	SX9	Stock	WA1	Stock	WA5
	RCGX060400T00520	6.35	4.76						5661012	●	5790944	●
	060700T00520		7.94					5661087	●			
	0608PN		7.86		5118021	■						
	090700T00520	9.525	7.94				5650130	●	5650429	●		
	090700T01020						5661103	●				
	090700T00820								5766027	●		
	0908PN	12.70	7.86	5559943	●	5118062	■					
	0908TNB					5570163	●	5905674	●			
	120700T00520					5650148	●	5650437	●			
	120700T00820								5661111	●		
	120700T01020								566243	●		
	120700Z01520										5766035	●
	1208PN			5545660	●							
	1208TNB						5570114	●				

RPGX type [Inserts applicable for CRDCN holders]	Part No.	Dimensions (mm)		For machining of heat-resistant alloys							
		d	s	SX7	Stock	SX9	Stock	WA1	Stock	WA5	Stock
	RPGX060400T00520	6.35	4.76					5660956	●		
	090700T00520	9.525	7.94			5650171	●	5650478	●		
	090700T00820			5822291	●				5723507	●	
	0908TNB			7.86		5570171	●				
	120700T00520	12.70	7.94			5650189	●	5650486	●		
	120700T01020						5660964	●			
	120700T00820			5822283	●				5751441	●	
	1208TNB			7.86		5570122	●				

RCGY type [Inserts applicable for CRXC holders]	Part No.	Dimensions (mm)		For machining of heat-resistant alloys	
		d	s	WA1	Stock
	RCGY090603TNB	9.525	6.35	5981477	●
	120603TNB	12.70	6.35	5981451	●

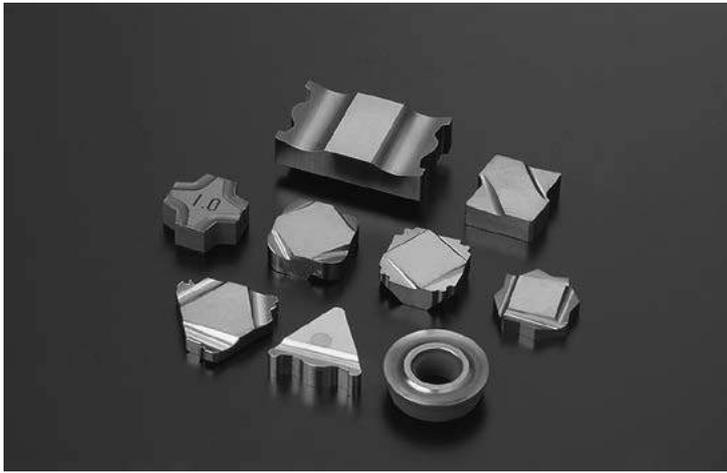
RBGX type [Inserts applicable for CRXC holders]	Part No.	Dimensions (mm)				For machining of mill rolls					
		d	d ₁	s ₁	s ₂	HC2	Stock	WA1	Stock	B22	Stock
	RBGX16SPN	16	8	8	13	5535331	●				
	16SSN2							5971841	●		
	16S									5972765	●
	20SPN	20	10	10	15	5564638	●				
	20SSN3									5972773	●
	20S										
	26SPN	26	14	10	15	5539465	●				
26SSN3							5971825	●			

LNG, LNM type [Inserts applicable for CRXC holders]	Part No.	Dimensions (mm)				For machining of mill rolls					
		w	L	s	r _e	SP2	Stock	WA1	Stock	WA5	Stock
	LNM6688PNX8	19.05	38.10	12.70	3.2					5791066	●
	6688SN2	19.05	38.10	12.70	3.2			5971858	●		
	6688PN9	19.05	38.10	12.70	3.2	5020003	■				

VGW type (Only inserts listed)	Part No.	Dimensions (mm)				For machining of heat-resistant alloys			
		W	r	T	L	WA1	Stock	WA5	Stock
	VGW4125-2EX0001	3.18	0.8	4.75	12.7	5663323	●	5790951	●
	4125-REX0001		Full R			5663489	●	5790969	●
	4156-2EX0001		0.8			5663349	●	5790977	●
	4156-REX0001	Full R	5663497	●	5790985	●			
	4187-2EX0001	4.75	0.8	5663364	●	5790993	●		
	4187-REX0001		Full R	5663505	●	5791009	●		
	6250-2EX0001		0.8	5663414	●	5791017	●		
	6250-REX0001	Full R	5663521	●	5791025	●			
	8375-2EX0001	9.525	0.8	8.56	25.4	5663463	●	5791033	●
	8375-REX0001		Full R			5663562	●	5791041	●

New Products
Tool Materials / Selection Guide
PCD, CBN and ceramic
Cement
Micro-grain Carbide, Carbide
Insert Stock List
Outside Machining Toolholders
SS
Grooving Tools
Threading Tools
Shaper
Internal machining tool range
Original Tools for Various Applications
Indexable End Milling Tools
Indexable Drill Inserts
Milling Cutters
Technical Data
Index

Tools for Machining of Bearings



Inserts applicable for CRXC

	Features	Applications
TiC - TiN-based cermet T15	Very hard tool materials excellent in wear resistance, having a refined micro structure obtained by combining TiC, the main component of cermet, with TiN.	Boring, turning, facing and machining of profiles
TiN-based cermet N40	It is NTK that introduced nitride-based material grades to the world market. This material grade is composed mainly of titanium nitride. It has all the advantages of and higher toughness than the existing TiC-TiN based cermet grades as it has a special alloy-like structure. <ul style="list-style-type: none"> ● Excellent fracture resistance ● Excellent size control 	Boring, turning, facing, radius inserts and grooving
TiCN-based cermet C7X	By a special alloying process and through a metal binding phase, C7X was developed as a tool material that remarkably improved heat resistance. It is a totally new tool material covering a wide range of cutting requirements, having both outstandingly thermal shock resistance and mechanical strength.	Machining of profiles, seal grooving and radius machining

Actual machining examples

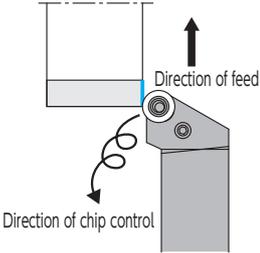
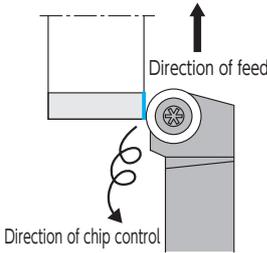
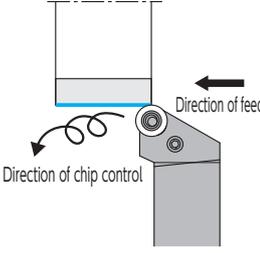
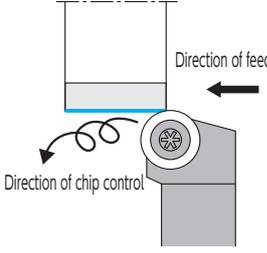
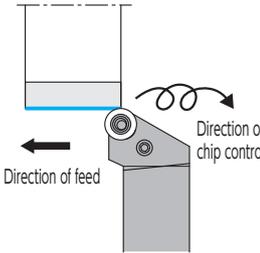
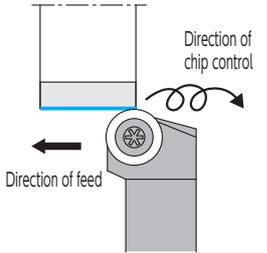
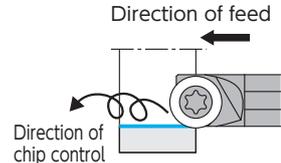
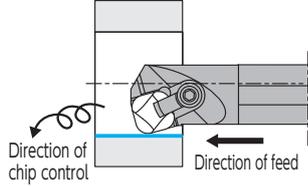
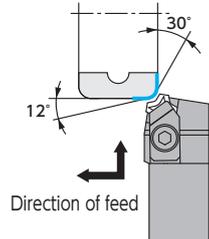
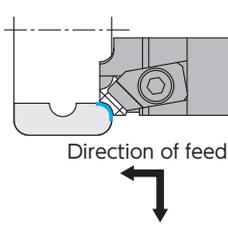
Machining of a bearing	
Work material : SUJ2 (HB180)	
Cutting speed (m/min) = 180	
Feed rate (mm /rev) = 0.3	
Depth of cut (mm) = 2 ~ 3	
Cutting oil : WET	
NTK : N40	120 pcs/corner
Competitor' s TiC-TiN based cermet	80 pcs/corner
N40 exhibited 1.5 times longer tool life when compared with the competitor's cermet. General TiC-TiN based cermet tools frequently fracture in areas where there is sudden depth of cut changes, thus it has been difficult to put them into practical use due to unstable tool life. However, the N40 grade allowed a stable machining operation, exhibiting little of this type of failure.	

Bearing machining (GB breaker)	
Work material : SUJ2	
Cutting speed (m/min) = 65	
Feed rate (mm /rev) = 1.2	
Depth of cut (mm) = 0.7	
Cutting oil : DRY	
NTK : N40	3,000 pcs/corner
Competitor' s carbide tool	20 min. per corner
N40 exhibited 1.5 times longer tool life when compared with the competitor's carbide. It was also possible to increase the feed rate 5 times the original setting, resulting in great improvement in machining efficiency.	

R-chamfering of a bearing	
Work material : SUJ2	
Cutting speed (m/min) = 110	
Feed rate (mm /rev) = 0.2	
Cutting oil : DRY	
NTK : C7X	2,600 pcs/corner
C7X was evaluated in an operation to produce a radius on a bearing component. No thermal cracking was evident on the cutting edge of C7X. The growth of the wear on the major flank was also very limited.	

Grooving of a bearing	
Work material : SUJ2	
Cutting speed (m/min) = 65	
Feed rate (mm /rev) = 0.15	
Cutting oil : DRY	
NTK : C7X	10,000 pcs/corner
In this process, thermal concentration is produced on one area of the insert, where the radius and chamfer operations overlap. Thus, fracture and chipping due to thermal shock often occurs. But with C7X, which is highly resistant to thermal shock, no thermal cracking was seen on these areas, achieving stable tool life.	

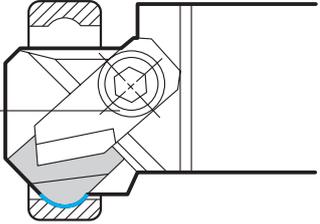
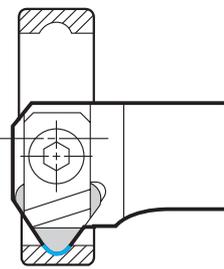
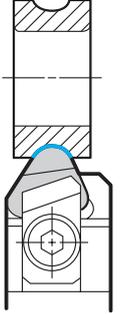
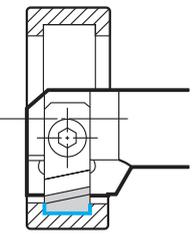
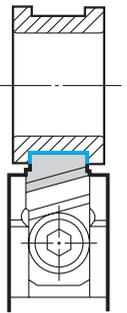
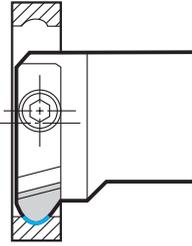
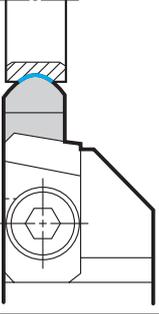
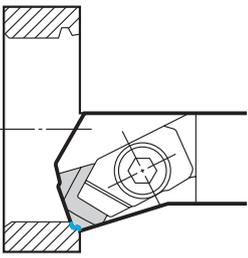
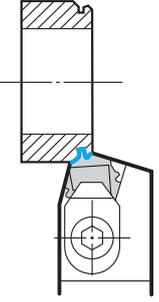
Application example with standard type inserts

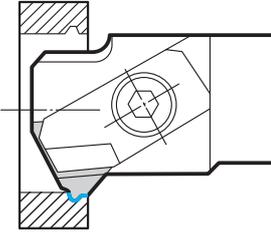
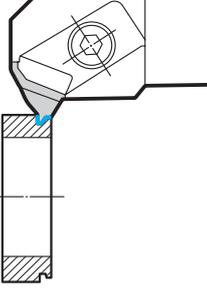
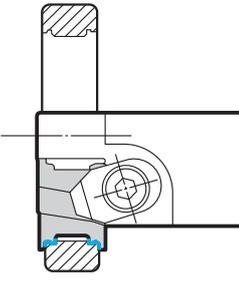
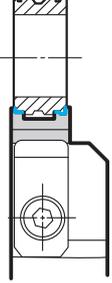
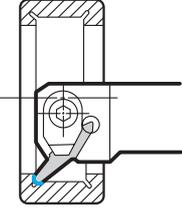
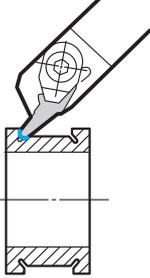
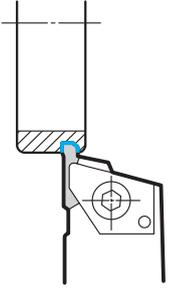
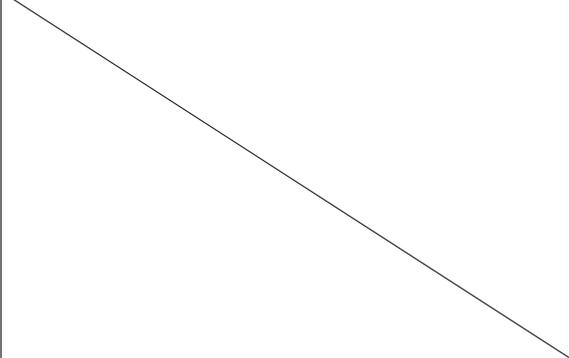
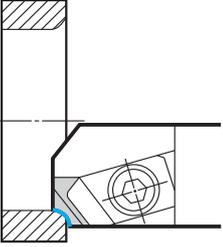
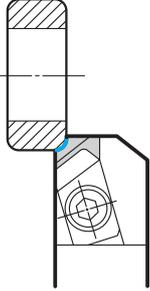
Process and holder type	Application example with standard type inserts	
<p>Face turning PRFP type SRF type</p>	<p>●PRFP-B</p>  <p>Direction of feed</p> <p>Direction of chip control</p>	<p>●SRF-B</p>  <p>Direction of feed</p> <p>Direction of chip control</p> <p>It is so designed that chips flow in the opposite direction to the feed.</p>
<p>OD turning PRGP type PRGN type SRG type</p>	<p>●PRGP-F</p>  <p>Direction of feed</p> <p>Direction of chip control</p>	<p>●SRG-F</p>  <p>Direction of feed</p> <p>Direction of chip control</p> <p>It is so designed that the chips flow in the same direction as the feed.</p>
	<p>●PRGP-B</p>  <p>Direction of feed</p> <p>Direction of chip control</p>	<p>●SRG-B</p>  <p>Direction of feed</p> <p>Direction of chip control</p> <p>It is so designed that the chips flow in the opposite direction to the feed</p>
<p>Boring bar S-SRC type C-SRC type BBR type</p>	<p>●S : Steel shank ●C : Carbide shank</p>  <p>Direction of feed</p> <p>Direction of chip control</p>	<p>●BBR</p>  <p>Direction of chip control</p> <p>Direction of feed</p> <p>It is so designed that chips flow in the same direction as the feed.</p>
<p>Radius machining CBS type CBU type CBN type CBG type</p>	<p>●CBS-F · B ●CBS-F</p>  <p>Direction of feed</p>	<p>●CBU-B ●CBN-B</p>  <p>Direction of feed</p>

- New Products
- Tool Materials / Selection Guide
- PCD, CBN and ceramic
- Cermet, PVD-coated Carbide
- Micro-grain Carbide, Carbide
- Insert Stock List
- Outside Machining Toolholders
- SS
- Grooving Tools
- Threading Tools
- Shaper
- Internal machining tool range
- Original Tools for Various Applications
- Indexable End Milling Tools
- Indexable Drill Inserts
- Milling Cutters
- Technical Data
- Index

Tools for Machining of Bearings

Tools available on production to order basis

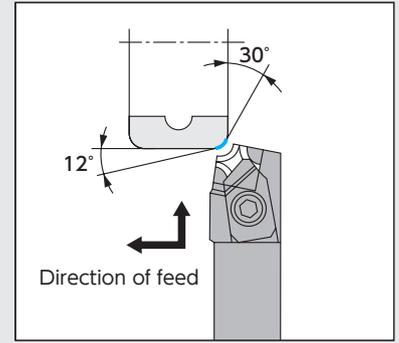
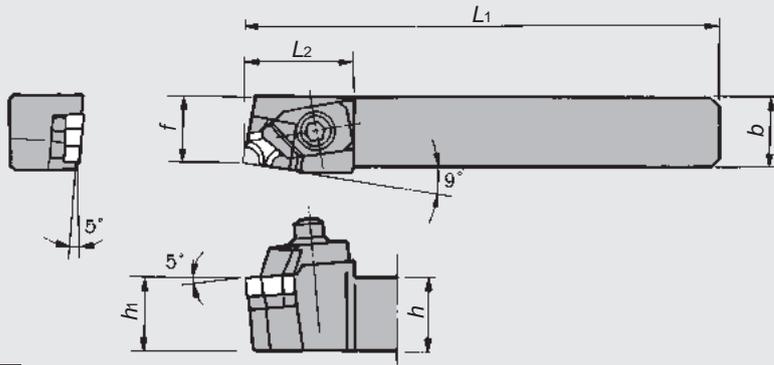
		Tools available on production to order basis	
		Outer race	Inner race
Machining of raceways KSN type KTN type KSP type KV type	●KSN		
	●KTN		
	●KSP		
	●KV		
	●SSN		
Seal grooving SSN type			

	Tools available on production to order basis	
	Outer race	Inner race
Seal grooving STN type SV type	<p>●STN</p> 	<p>●STN</p> 
	<p>●SV</p> 	<p>●SV</p> 
Clearance grooving FD type	<p>●FD</p> 	<p>●FD</p> 
	<p>●GTMA</p> 	
Radius machining BSGN type	<p>●BSGN</p> 	<p>●BSGN</p> 

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Holders for machining of bearings (Holders for radius machining)

CBG...F type

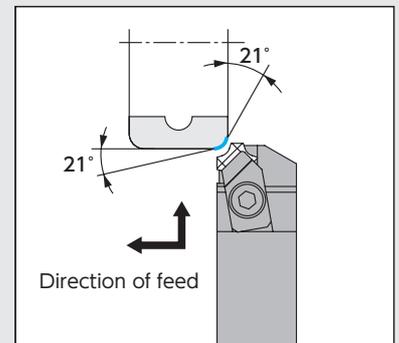
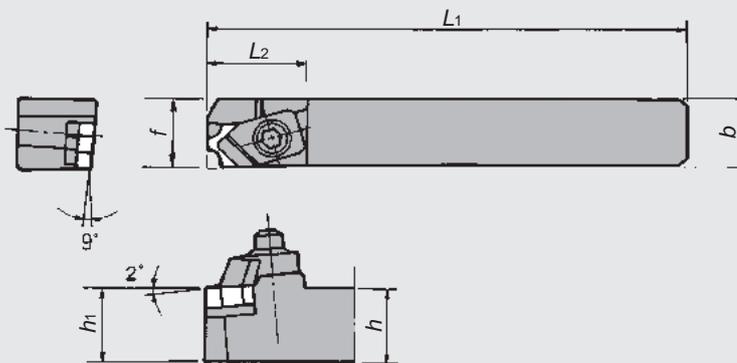


(Insert with $\theta = 21$ mounted)

Figure-1

● Right-hand type shown.

CBS...B type

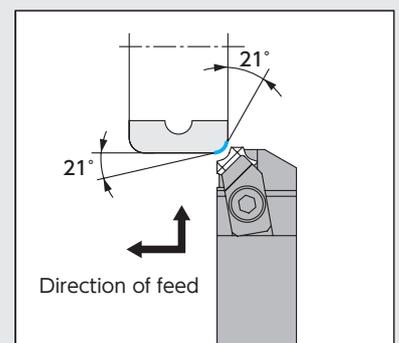
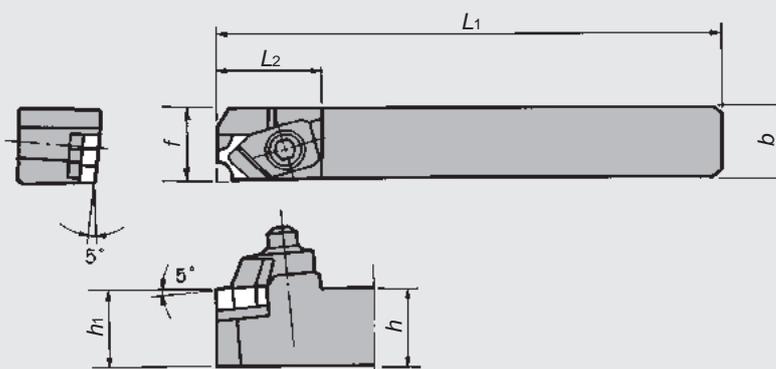


(Insert with $\theta = 21$ mounted)

Figure-2

● Right-hand type shown.

CBS...F type



(Insert with $\theta = 21$ mounted)

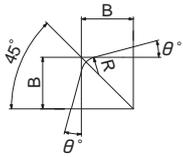
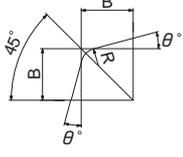
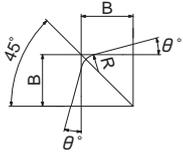
Figure-3

● Right-hand type shown.

Holder dimensions

Shape	Code No.		Toolholder P/N	Stock		Dimensions (mm)							Applicable insert		Cap screw	Washer	Shim seat	Retaining screw	Clamp	Wrench	
	R	L		R	L	h	b	L ₁	h ₁	f	L ₂										
Figure-1	5745286		CBGR_L20K43F	●		20	20	125	20	20	30			CS0625	WS-6	ABS42	M3 * 8	CB $\frac{1}{4}$	LW-5		
	5745302		25M43F	●		25	25	150	25	25	30									BSMF43 (See table below)	
Figure-2			CBSR_L16K32B			16	16	125	16	16	23			CS0520	WS-5	ABS32	M2 * 6	CB $\frac{1}{3}$	LW-4		
	5745021	5745039	20K43B	●	●	20	20	125	20	20	28									BSMF32 (See table below)	BSMF43 (See table below)
			25M43B			25	25	150	25	32	28									BSMF43 (See table below)	
			25M53B			25	25	150	25	32	35									BSGF53	
Figure-3	5745070		CBSR_L16K32F	●		16	16	125	16	16	23			CS0520	WS-5	ABS32	M2 * 6	CB $\frac{1}{3}$	LW-4		
	5745104	5745112	20K43F	●	●	20	20	125	20	20	28									BSMF32 (See table below)	BSMF43 (See table below)
	5745120		25M43F	●		25	25	150	25	25	28									BSMF43 (See table below)	
	5745153	5745146	25M53F	●	●	25	25	150	25	25	35									BSGF53	

BSMF type

Shape	Part No.	Dimensions (mm)					Cermet			
		R	θ	B	Inscribed circle	Thickness	T15	Stock	N40	Stock
 	BSMF3206D20EM	0.6	15°	2.0	9.525	3.18				
	3206H20EM	0.6	18°	2.0					5531629	●
	4315H29EM	1.5	18°	2.9	12.70	4.76	5521182	●		
	4320H26EM	2.0	18°	2.6			5486873	●		
	4330H33EM	3.0	18°	3.3			5509476	●		
 	BSMF4308D34EN	0.8	15°	3.4	12.70	4.76			5903315	●
	4310H30EN	1.0	18°	3.0			5802962	●		
	4312D29EN	1.2	15°	2.9			5453246	●		
	4317D29EN	1.7	15°	2.9			5467972	●		
	4320H26EN	2.0	18°	2.6			5480322	●		
	4330H37EN	3.0	18°	3.7			5486477	●		
	4335H39EN	3.5	18°	3.9			5531637	●		
 	BSMF4206T20EN	0.6	21°	2.0	12.70	3.18			5779962	●
	4210T30EN	1.0	21°	3.0						
	4216T35EN	1.6	21°	3.5						
	4221T35EN	2.1	21°	3.5						
	4306T20EN	0.6	21°	2.0	12.70	4.76			5780002	●
	4310T30EN	1.0	21°	3.0			5779970	●		
	4316T35EN	1.6	21°	3.5			5779988	●		
	4321T35EN	2.1	21°	3.5			5779996	●		

New Products
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 PCD, CBN and ceramic
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HOLDERS for machining of bearing (internal radius machining)

CBN...B type

Minimum machining diameter: From $\phi 15$

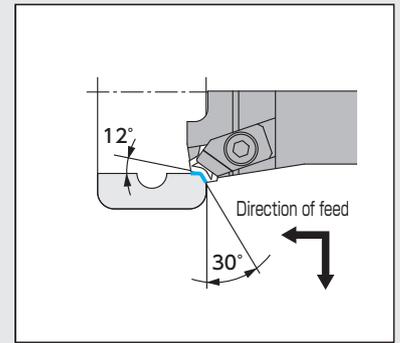
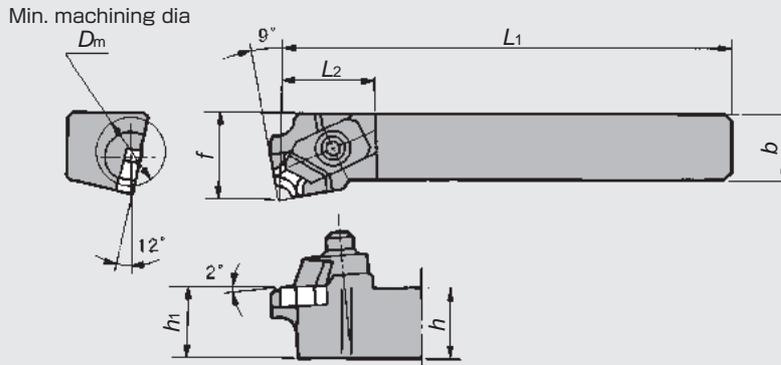


Figure-1

● Right-hand type shown.

CBU...B type

Minimum machining diameter: From $\phi 15$

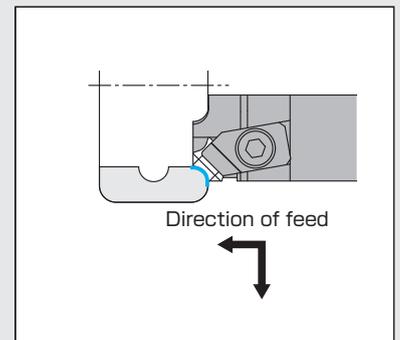
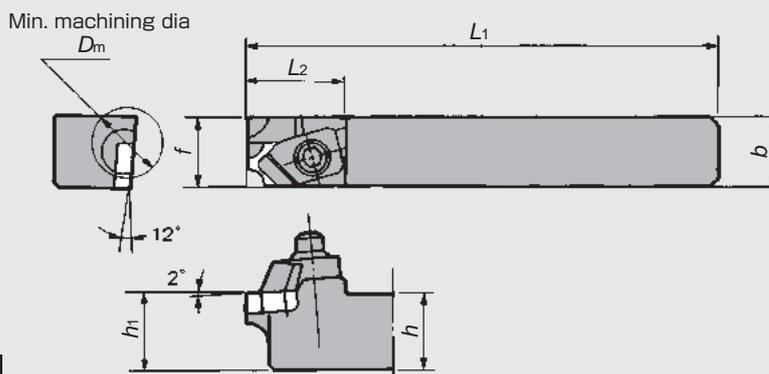


Figure-2

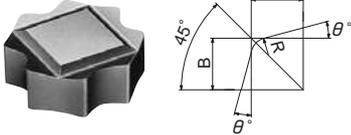
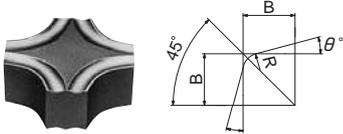
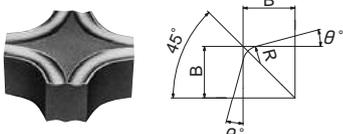
● Right-hand type shown.

Holder dimensions

Shape	Code No.		Toolholder P/N	Stock		Min. machining dia. (mm) D _m	Dimensions (mm)						Applicable insert		Cap screw	Washer	Clamp	Wrench		
	R	L		R	L		h	b	L ₁	h ₁	f	L ₂								
Figure-1			CBN ^{R/L} 20K42B			15	20	20	125	20	25	28			CS0625	WS-6	CB ^{R/L} 4	LW-5		
			25M42B			15	25	25	150	25	32	28							BSMF42 ^{R/L} T	M13
	5745328		20K43B	●		20	20	20	125	20	25	28							BSMF43 ^{R/L} T	M13
	5745344		25M43B	●		20	25	25	150	25	32	28								
Figure-2			CBU ^{R/L} 20K42B	●		15	20	20	125	20	20	28			CS0625	WS-6	CB ^{R/L} 4	LW-5		
			25M42B			15	25	25	150	25	25	28							BSMF42	M13
	5745161		20K43B	●		20	20	20	125	20	20	28							BSMF43	M13
	5745187		25M43B	●		20	25	25	150	25	25	28								

Applicable inserts

BSMF type

Shape	Part No.	Dimensions (mm)					Cermet				
		R	θ	B	Inscribed circle	Thickness	T15	Stock	N40	Stock	
	BSMF3206D20EM	0.6	15°	2.0	9.525	3.18					
	3206H20EM	0.6	18°	2.0					5531629	●	
	4315H29EM	1.5	18°	2.9	12.70	4.76	5521182	●			
	4320H26EM	2.0	18°	2.6			5486873	●			
	4330H33EM	3.0	18°	3.3			5509476	●			
	BSMF4308D34EN	0.8	15°	3.4	12.70	4.76			5903315	●	
	4310H30EN	1.0	18°	3.0					5802962	●	
	4312D29EN	1.2	15°	2.9					5453246	●	
	4317D29EN	1.7	15°	2.9					5467972	●	
	4320H26EN	2.0	18°	2.6					5480322	●	
	4330H37EN	3.0	18°	3.7					5486477	●	
	4335H39EN	3.5	18°	3.9					5531637	●	
	BSMF4206T20EN	0.6	21°	2.0	12.70	3.18			5779962	●	
	4210T30EN	1.0	21°	3.0							
	4216T35EN	1.6	21°	3.5							
	4221T35EN	2.1	21°	3.5							
	4306T20EN	0.6	21°	2.0	12.70	4.76			5780002	●	
	4310T30EN	1.0	21°	3.0					5779970	●	
	4316T35EN	1.6	21°	3.5					5779988	●	
	4321T35EN	2.1	21°	3.5					5779996	●	

- Index
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- SS
- Outside Machining Toolholders
- Insert Stock List
- Micro-grain Carbide, Carbide
- Cermet PVD-coated Cermet
- PCD, CBN and ceramic
- Tool Materials / Selection Guide
- New Products

Holder for turning (Screw-on type)

SRF...B type

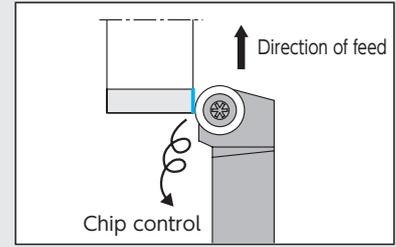
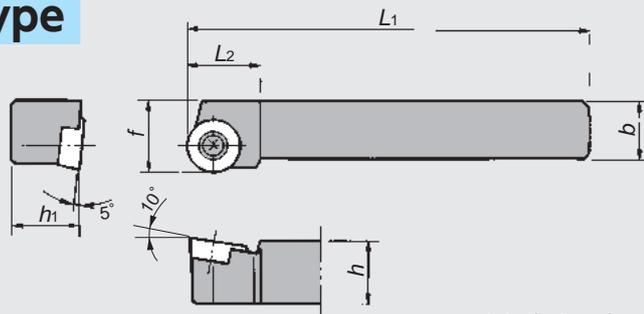


Figure-1

● Right-hand type shown.
● It is designed so that the chips flow opposite to the direction of feed.

SRG...B type

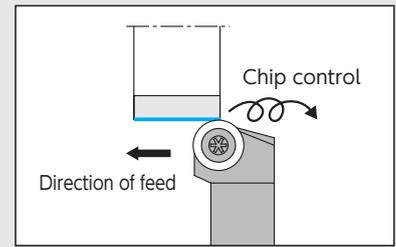
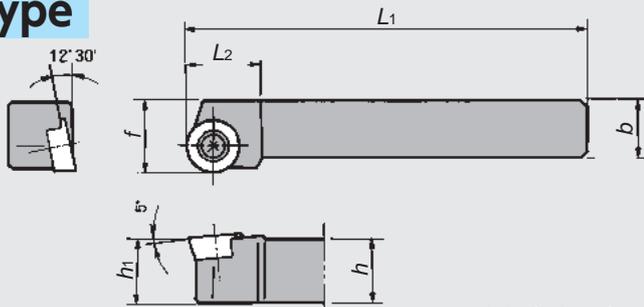


Figure-2

● Right-hand type shown.
● It is designed so that the chips flow opposite to the direction of feed.

SRG...F type

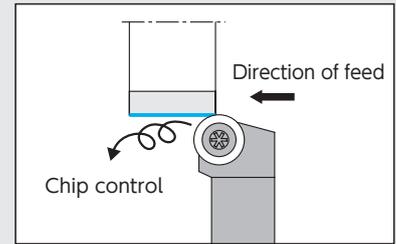
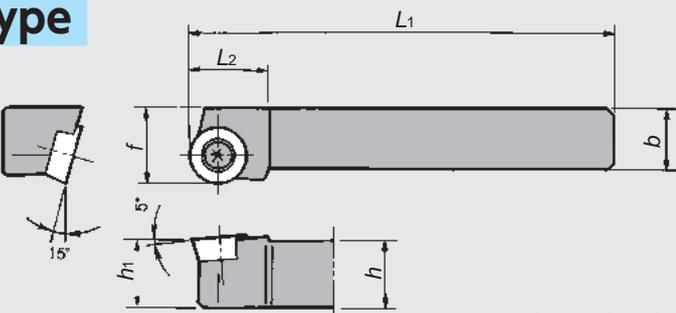


Figure-3

● Right-hand type shown.
● It is designed so that the chips flow opposite to the direction of feed.

Holder dimensions

Shape	Code No.		Toolholder P/N	Stock		Dimensions (mm)						Applicable insert	Clamping screw	Wrench
	R	L		R	L	h	b	L ₁	h ₁	f	L ₂			
Figure-1			SRF ^{R/L} 20K16B			20	20	125	20	25	20	RPMT1604M0GB RPMT2004M0GB	LRIS-5 * 10	LLR-28S
			25M20B			25	25	150	25	32	25			
Figure-2	5744925		SRG ^{R/L} 20K16B	●		20	20	125	20	25	20	RPMT1604M0GB RPMT2004M0GB	LRIS-5 * 10	LLR-28S
			25M20B			25	25	150	25	32	25			
Figure-3	5744883	5744891	SRG ^{R/L} 20K16F	●	●	20	20	125	20	25	20	RPMT1604M0GB RPMT2004M0GB	LRIS-5 * 10	LLR-28S
	5744909		25M20F	●		25	25	150	25	32	25			

Applicable inserts

RPMT type

Shape	Part No.	Dimensions (mm)		Cermet			
		Inscribed circle	Thickness	N40	Stock	C7X	Stock
	RPMT1604M0GB	16.0	4.76	5779947	●	5641121	●
	2004M0GB	20.0	4.76	5779954	●	5641139	●

Holders for turning (Lever-locking type)

PRFP...B type

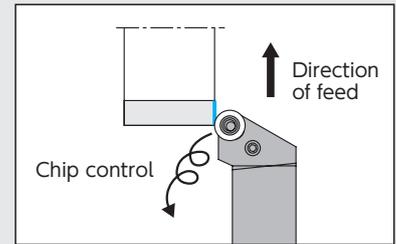
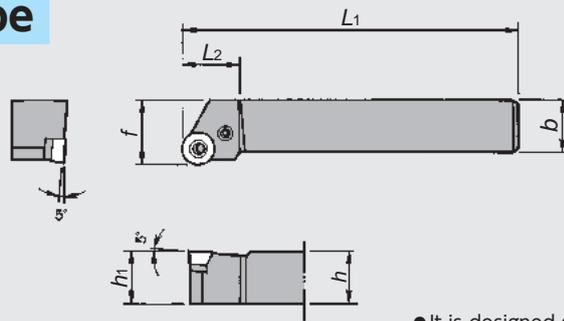


Figure-1

● Right-hand type shown.
 ● It is designed so that the chips flow opposite to the direction of feed.

PRGP...B type

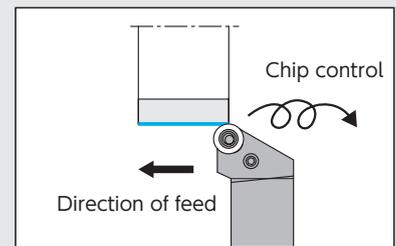
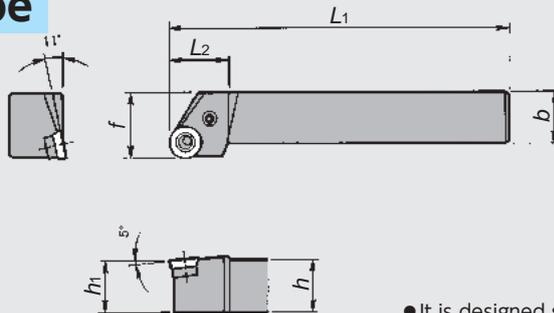


Figure-2

● Right-hand type shown.
 ● It is designed so that the chips flow opposite to the direction of feed.

PRGP...F type

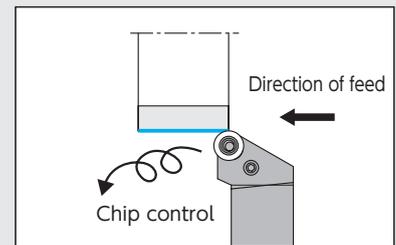
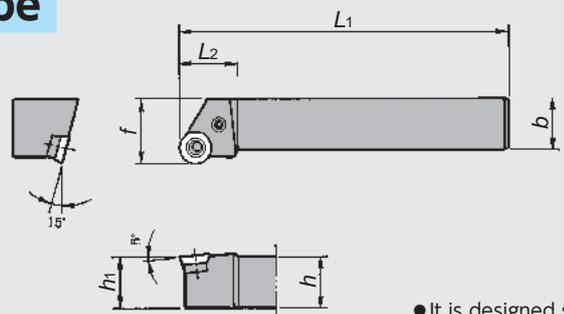


Figure-3

● Right-hand type shown.
 ● It is designed so that the chips flow opposite to the direction of feed.

Holder dimensions

Shape	Code No.		Toolholder P/N	Stock		Dimensions (mm)						Applicable insert	Shim seat	Lever	Clamping screw	Spring	Wrench
	R	L		R	L	h	b	L ₁	h ₁	f	L ₂						
Figure-1	5905906		PRFP ^{R/L} 20K1203B	●		20	20	125	20	25	22	RPMX1203M0GB	ELSR42C	LCL4C	LCS3	LSP3	LW-2.5
	5905997		25M1203B	●		25	25	150	25	32	22						
Figure-2	5905989		PRGP ^{R/L} 20K1203B	●		20	20	125	20	25	22	RPMX1203M0GB	ELSR42C	LCL4C	LCS3	LSP3	LW-2.5
	5905963		25M1203B	●		25	25	150	25	32	22						
Figure-3	5905948		PRGP ^{R/L} 20K1203F	●		20	20	125	20	25	22	RPMX1203M0GB	ELSR42C	LCL4C	LCS3	LSP3	LW-2.5
	5905922		25M1203F	●		25	25	150	25	32	22						

Applicable inserts

RPMX type

Shape	Part No.	Dimensions (mm)		Cermet			
		Inscribed circle	Thickness	N40	Stock	C7X	Stock
	RPMX1203M0GB	12.0	3.18	5909718	●	5641154	●

*The screw head shape differs between the RPMX and RPMT. Use the PRMX for the lever locking type.

Boring bars (Screw-on type)

C-SRC type

Carbide shank

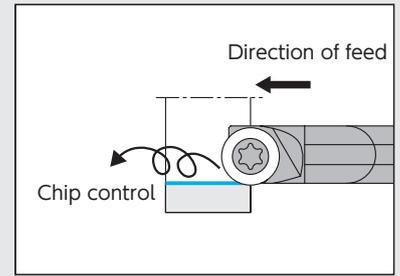
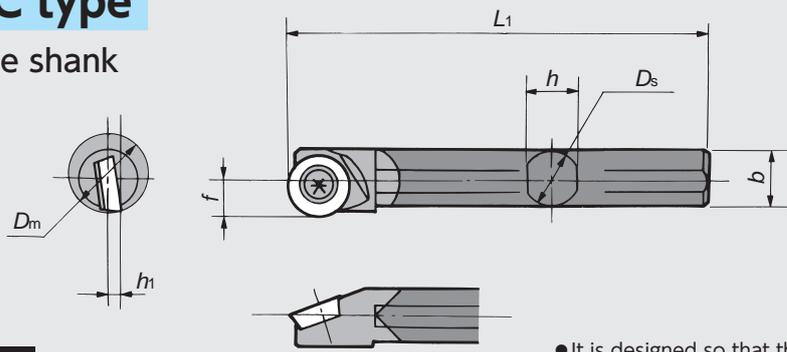


Figure-1

● Right-hand type shown.
● It is designed so that the chips flow opposite to the direction of feed.
Note) Only the holder marked with an asterisk (*) have an effective machining depth of 11 mm ($L_2 = 11$ mm).

S-SRC type

Steel shank

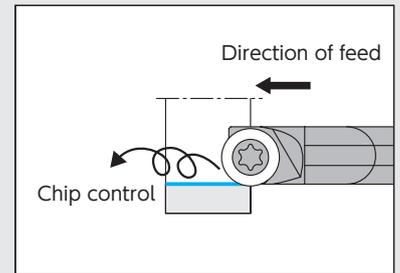
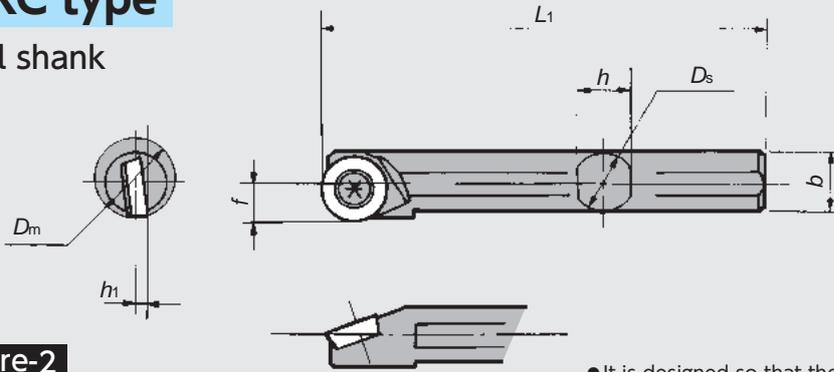


Figure-2

● Right-hand type shown.
● It is designed so that the chips flow opposite to the direction of feed.

Holder dimensions

Shape	Code No.		Toolholder P/N	Stock		Dimensions (mm)						Min. machining dia.	Applicable insert	Clamping screw	Wrench
	R	L		R	L	D_s	h	L_1	f	b	h_1				
Figure-1		5811385	C08K-SRC ^{R/L} 06F	●		8	7	125	4.0	7.5	1.0	8	RPMT0602M0GB	LRIS-2.2*6	CLR-13S (C)
		5744701	-SRC ^{R/L} 08F	●		8	7	125	4.5	7.5	0.8	10	RPMT0802M0GB	LRIS-3*6	RLR-20S (B)
		5744727	C10M-SRC ^{R/L} 10F	●		10	9	150	5.5	9.5	1.2	12	RPMT10T2M0GB	LRIS-4*6	LLR-25S (A)
			C12M-SRC ^{R/L} 12F	●		12	11	150	6.5	11.5	1.5	15	RPMT1203M0GB	LRIS-4*8	LLR-25S (A)
Figure-2		5744750	S08K-SRC ^{R/L} 08F	●		8	7	125	4.5	7.5	0.3	10	RPMT0802M0GB	LRIS-3*6	RLR-20S (B)
		5744784	S10M-SRC ^{R/L} 10F	●		10	9	150	5.5	9.5	1.2	12	RPMT10T2M0GB	LRIS-4*6	LLR-25S (A)
		5744800	S12M-SRC ^{R/L} 12F	●		12	11	150	6.5	11.5	1.5	15	RPMT1203M0GB	LRIS-4*8	LLR-25S (A)
		5744826	S16Q-SRC ^{R/L} 16F	●		16	15	180	8.5	15.5	2.0	20	RPMT1604M0GB	LRIS-5*10	LLR-28S (A)
		5744842	S20Q-SRC ^{R/L} 20F	●		20	19	180	10.5	19.5	2.0	25	RPMT2004M0GB	—	
		5744867	S25Q-SRC ^{R/L} 20F	●		25	24	180	13.0	24.5	2.0	30		—	

Applicable inserts

RPMT type

Shape	Part No.	Dimensions (mm)		Cermets			
		Inscribed circle	Thickness	N40	Stock	C7X	Stock
	RPMT0602M0GB	6.0	2.38	5827217	●	5641089	●
	0802M0GB	8.0	2.38	5779913	●	5641097	●
	10T2M0GB	10.0	2.78	5779921	●	5641105	●
	1203M0GB	12.0	3.18	5779939	●	5641113	●
	1604M0GB	16.0	4.76	5779947	●	5611121	●
	2004M0GB	20.0	4.76	5779954	●	5641139	●

Tools for Bearings (for boring)

BBR type

Screw-on type
Steel shank
Minimum machining diameter : $\phi 15 - 20$
Hole provided

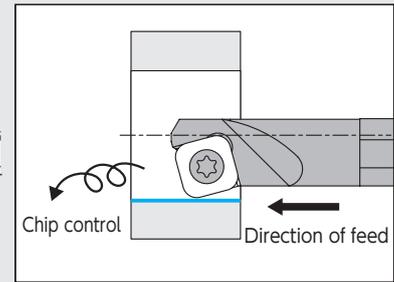
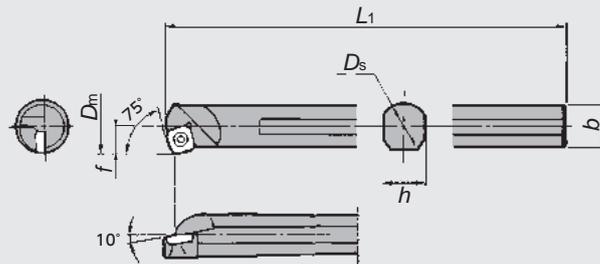


Figure-1

● Right-hand type shown.
● It is designed so that the chips flow opposite to the direction of feed.

BBR type

Clamp-on type
Steel shank
Minimum machining diameter : $\phi 25 - 30$
Hole not provided

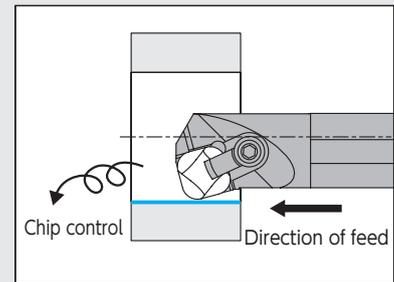
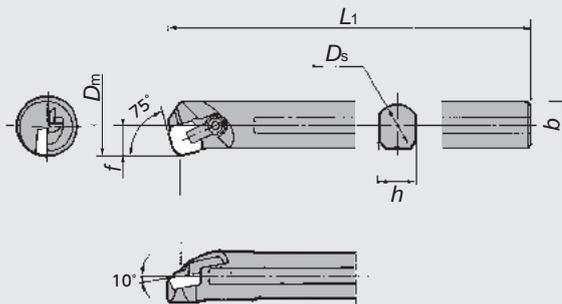


Figure-2

● Right-hand type shown.
● It is designed so that the chips flow opposite to the direction of feed.

Holder dimensions

Shape	Code No.	Toolholder P/N	Stock		Dimensions (mm)						Min. machining dia.	Applicable insert			Clamping screw	Clamp	Double screw	Wrench
			R	L	D _s	h	b	L ₁	f	D _m								
Figure-1	5526801	BBR1532	●		12	11	11.5	150	7.5	15		SPMH326LH1			LR-S-4 * 5.8	—	—	RLR-20S
	5526819	2032	●		16	15	15.5	150	10	20		SPMH328LH1						
Figure-2	5526827	BBR2543	●		20	19	19.5	150	12.5	25		—	SPMR4310TL-H2	SPMN4310TN	—	AM-612L-9	WS0616	LW-3
	5534102	3043	●		25	24	24.5	180	15.0	30								

※If burring on exit is an issue, please use SPMH328LH1.

Applicable inserts

SPMH type

Shape	Part No.		Dimensions (mm)			Cermet	
	Metric system	Inch system	Inscribed circle	Thickness	Nose radius	T15	Stock
	SPMH090324TLBH1	SPMH326-TLB-H1	9.525	3.18	2.4	5657614	●
	090332TLAH1	328-TLA-H1	9.525	3.18	3.2	5661541	●

SPM type

Shape	Part No.		Dimensions (mm)			Cermet	
	Metric system	Inch system	Inscribed circle	Thickness	Nose radius	T15	Stock
	SPMN120440TN	SPMN4310TN	12.70	4.76	4.0	5530373	●
	SPMR120440TLH2	SPMR4310TL--H2	12.70	4.76	4.0	5657606	●

ATS type

HN59ATS (Right-handed)
HN60ATS (Left-handed)

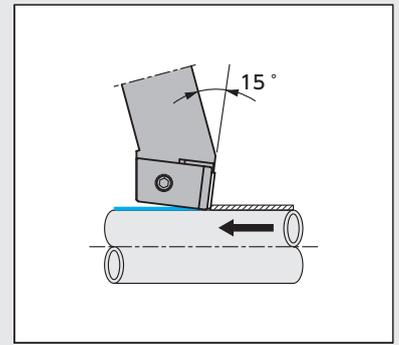
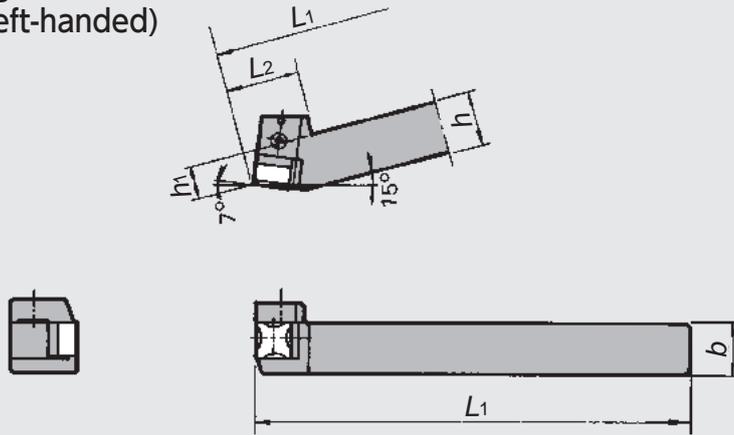


Figure-1

● Right-hand type (60) shown.

BTS type

HN59BTS (Right-handed)
HN60BTS (Left-handed)

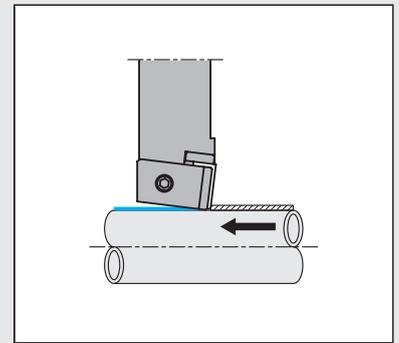
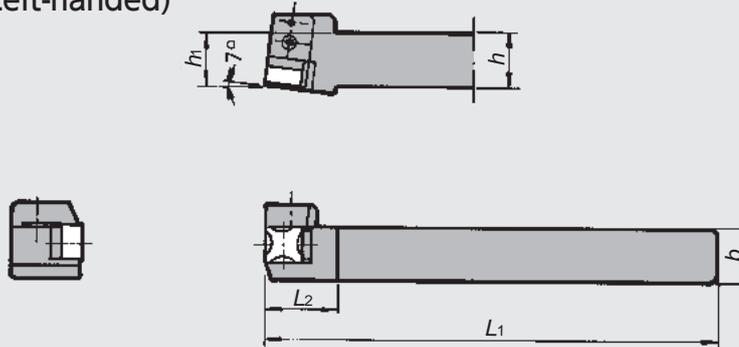
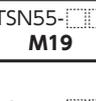
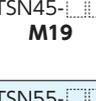


Figure-2

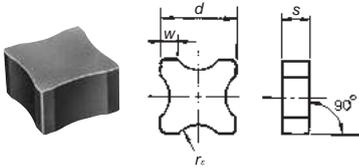
● Right-hand type (60) shown.

Holder dimensions

Shape	Code No.		Toolholder P/N	Stock		Dimensions (mm)					Applicable insert	Shim seat	Retaining screw	Clamp	Double screw	Wrench				
	59	60		59	60	h	b	L ₁	h ₁	L ₂										
Figure-1	5350574		HN59/60ATS-33E			19	19	160	12.5	26										
			-44E	●		25	25	160	18.5	26										
			-44E-5			25	25	160	18.5	26										
Figure-2			HN59/60BTS-33E			19	19	160	19	25										
				-44E			25	25	160	25							25			
				-44E-5			25	25	160	25							25			

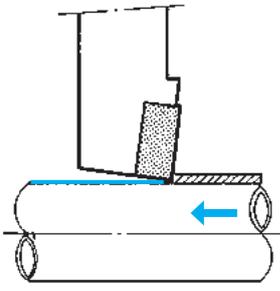
Applicable inserts

TSN type

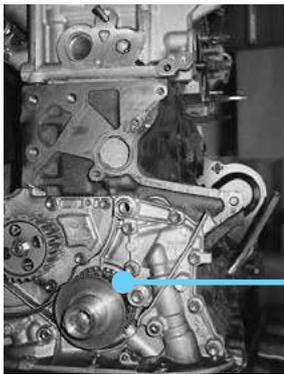
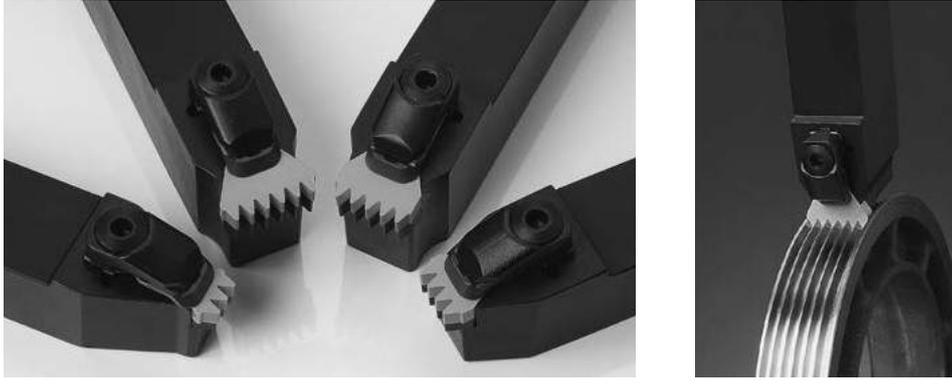
Shape	Part No.	Dimensions (mm)				Cermets	
		r_e	w	d	s	CX3*	Stock
	TSN45-10	10	2.10	12.70	7.94	5125323	●
	-12	12				5119987	●
	-14	14				5123914	●
	-16	16				5119995	●
	-18	18				5124839	●
	-20	20				5120001	●
	-25	25				5120027	●
	-30	30				5120019	●
	-35	35				5123922	●
	-40	40				5123948	●
	-50	50				5123906	●
	-60	60					
	-70	70					
	TSN55-15	15	3.20	15.875	7.94		
	-20	20				5270244	●
	-25	25				5270251	●
	-30	30				5270269	●
	-35	35				5144936	●
	-40	40				5271218	●
	-45	45				5144944	●
	-70	70					

*CX3 is an alumina-based ceramic similar to HC1.

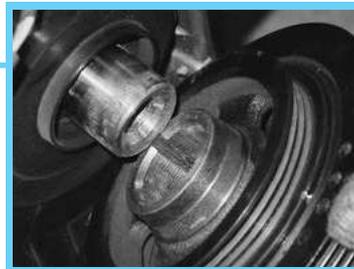
Actual machining example

Tube scarfing	
Work material : SPHT4	
Cutting speed (m/min) = 70	
Depth of cut (mm) = 3.0	
Width of cutting (mm) = 5.0	
Cutting oil : DRY	
NTK : CX3	70 min./corner
Competitor' s black ceramic grade	30 min./corner
CX3 exhibited a tool life more than double that of the competitor' s black ceramic tool.	

1. Features and applications of V-pulleys



A V-pulley is a rotary component that can rotate on a shaft and has vee shaped grooves around the circumference which are rotated by the force of a matching belt installed around the pulley. Combinations of such pulleys can generate a driving force greater than originally applied.

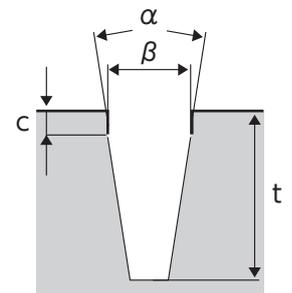


Major applications

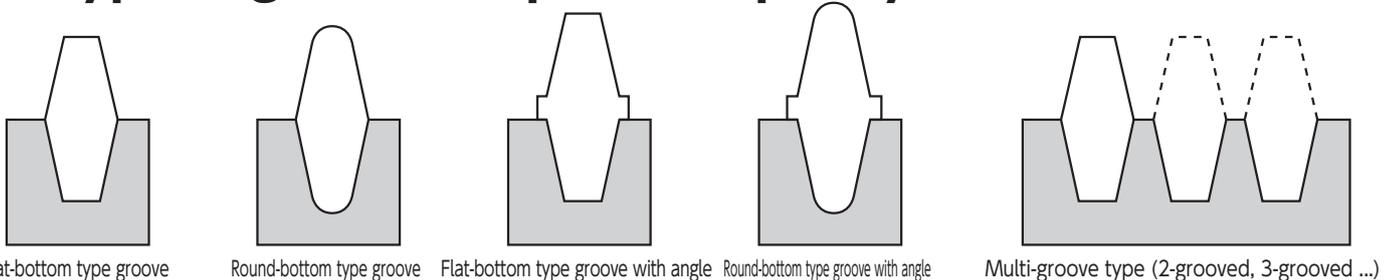
- Engines, transmissions and other automobile parts
- Various machine tools including NC lathes
- Air conditioning units, power tools and home electric appliances
- Sewing machines, elevators and others

2. Shapes and specifications/dimensions of V-pulleys

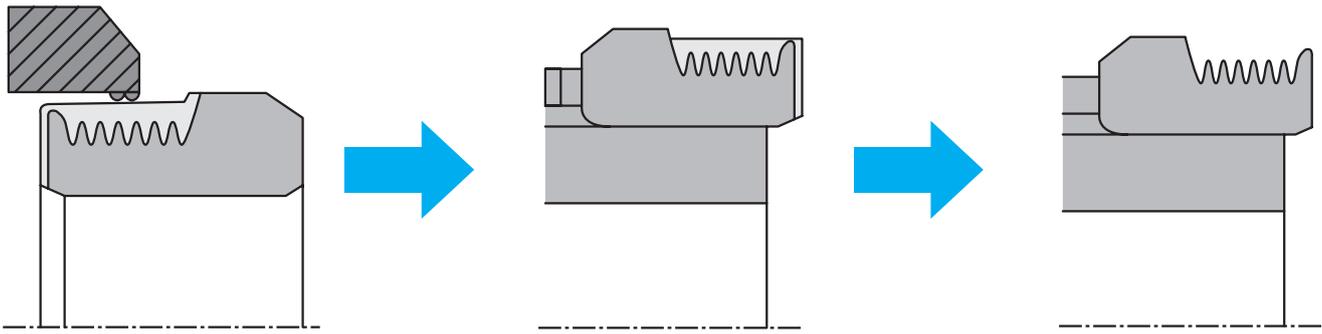
Main dimensions of V-pulley		$\alpha (^{\circ}, ')$	β (mm)	c (mm)	t (mm)
V-belt shape code (ISO/DIN/JIS)					
SPZ	ISO	32° / 34° / 36° / 38° (±30')	8.5	2	11
	DIN	34° / 38° (±1')	8.5	2	11+0.6/0
	JIS	32° / 34° / 36° / 38° (±30')	8.5	2	11
SPA	ISO	32° / 34° / 36° / 38° (±30')	11	2.75	13.75
	DIN	34° / 38° (±1')	11	2.8	13.8+0.6/0
	JIS	32° / 34° / 36° / 38° (±30')	11	2.75	13.75
SPB	ISO	32° / 34° / 36° / 38° (±30')	14	3.5	17.5
	DIN	34° / 38° (±1')	14	3.5	17.5+0.6/0
	JIS	32° / 34° / 36° / 38° (±30')	14	3.5	17.5
SPC	ISO	32° / 34° / 36° / 38° (±30')	19	4.8	23.8
	DIN	34° / 38° (±1')	19	4.8	23.8+0.6/0
	JIS	32° / 34° / 36° / 38° (±30')	19	4.8	23.8



3. Typical groove shapes of V-pulleys



4. Typical tooling for V-pulley machining (Poly-groove type)



Roughing of OD and end face/
Roughing of ID, Finishing

Roughing of OD and end face/Finishing
of end face, Rough grooving/Chamfering

One pass grooving with a multi-groove
type tool or grooving in several passes

Work material : Mainly materials equivalent to cast iron FC230 – FC250

Recommended tool materials : Silicon nitride-based ceramic grades for roughing of outside and end faces Silicon nitride-based or alumina-based ceramic grades for finishing of outside and end faces Multi-groove type inserts of carbide or alumina-based ceramic grades are recommended.

“HW2” has been selected for multi-groove type inserts

Guidelines for cutting conditions : $V_c=300 \sim 600\text{m/min}$ $f=0.05 \sim 0.15\text{mm/rev}$

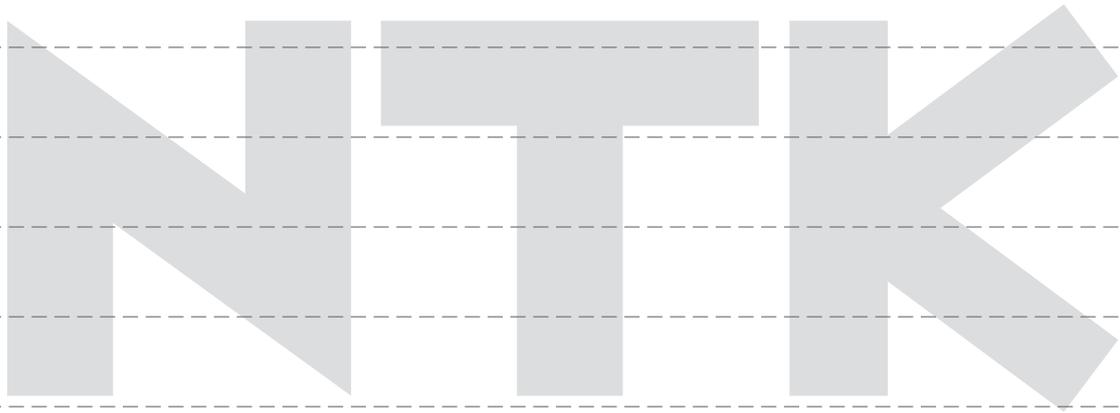
DRY (for HW2, it is recommended to use the insert after removing component outer skin.)

5. Other tooling for V-pulley machining (Poly-groove type)

3 grooves	4 grooves	5 grooves	6 grooves
Typical insert shapes			
PTM33K30504ENB HW2	PTM43K40504ENB HW2	PTM53K50504ENB HW2	PTM53K60504ENB HW2

MEMO

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Cermet, PVD-coated Carbide	
PCD, CBN and ceramic	
Tool Materials / Selection Guide	
New Products	



N

Indexable End Milling Tools

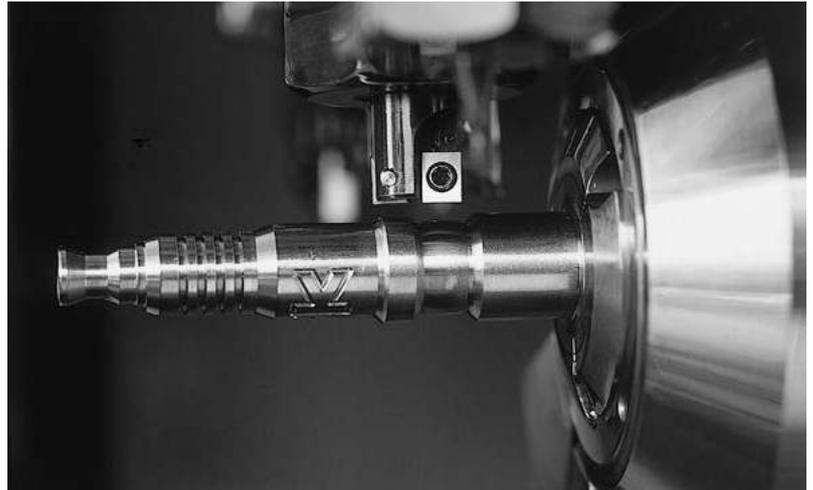
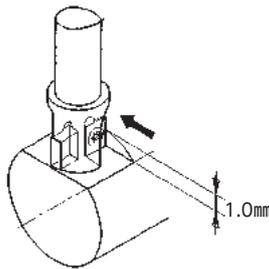
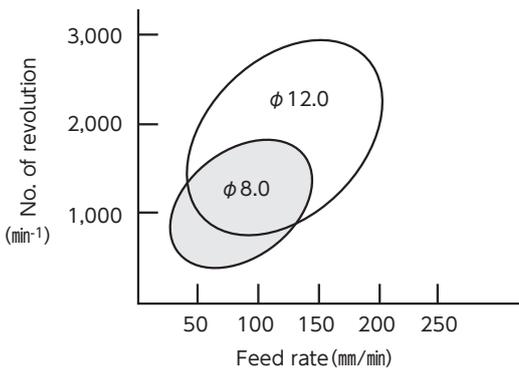
- List of Indexable end milling holders and inserts **N5**
- RCL type rectangular tooth chamfering type **N7**

Small diameter indexable end milling tools

Features

- Using PVD-coated carbide grade inserts allows for cutting at three to five times higher speed than conventional high-speed steel (HSS) end milling tools.
- The REZ type allows for shoulder milling at right angles (90 degree)
- Surface finish can be improved; to 5 micron Rz (JIS) with the NTK conventional type and to 1 micron Rz (JIS) with the NTK wiper style inserts.
- Using inserts having a center cutting edge enables deep grooving and taper machining in addition to normal D-cutting.

Recommended cutting conditions (SUS304)



Work material : SUS304

Work diameter : $\phi 8.0$ and $\phi 12.0$

Depth of cut : 1.0mm

Insert part No. : ZM3CZH0402CFR-070

Holder part No. : REZ100CZR141

Note) The smaller the work diameter becomes, the greater the chances of chatter under machining becomes. If chatter occurs, check and adjust the cutting speed and/or feed rate.

Actual examples

End milling with ZM3 indexable end milling tool

	Current tool	NTK	Work piece	Plug
Insert P/N	Standard shape	CZH0402CFR-070	Material	SUS304
Material grade	Competitor's PVD-coated carbide	ZM3		
No. of revolution (min ⁻¹)	1,200	←		
Cutting speed (m/min)	38	←		
Feed rate (mm/min)	36	72		
Depth of cut (mm)	2.5	←		
Cutting oil	WET	←		
Life (pcs/corner)	200	1,200		
Index	<ul style="list-style-type: none"> • The current tool wore quickly and dimensional stability was poor. • To prevent wear the feed was doubled for the NTK' product, (36 mm/min to 72 mm/min) reducing wear through lower contact time. • Both longer tool life and reduced cycle time were achieved. 			

End milling (D-cutting) with ZM3 end milling tool

	Current tool	NTK	Work piece	Shaft
Insert P/N	Solid end mill (N.O.B:4)	CZH0402CFR-070 (N.O.B:2)	Material	SUS430
Material grade	Competitor's PVD-coated carbide	ZM3		
No. of revolution (min ⁻¹)	2,500	1,500		
Cutting speed (m/min)	78.5	47.1		
Feed rate (mm/min)	100	200		
Depth of cut (mm)	1.0	1.0		
Cutting oil	WET	←		
Life (pcs/corner)	5,000	8,000		
Index	<ul style="list-style-type: none"> • The conventional current solid end mill required regrinding to achieve the required result. • Efficiency was doubled with NTK and tool life improved by 60%, resulting in significant cost reduction. 			

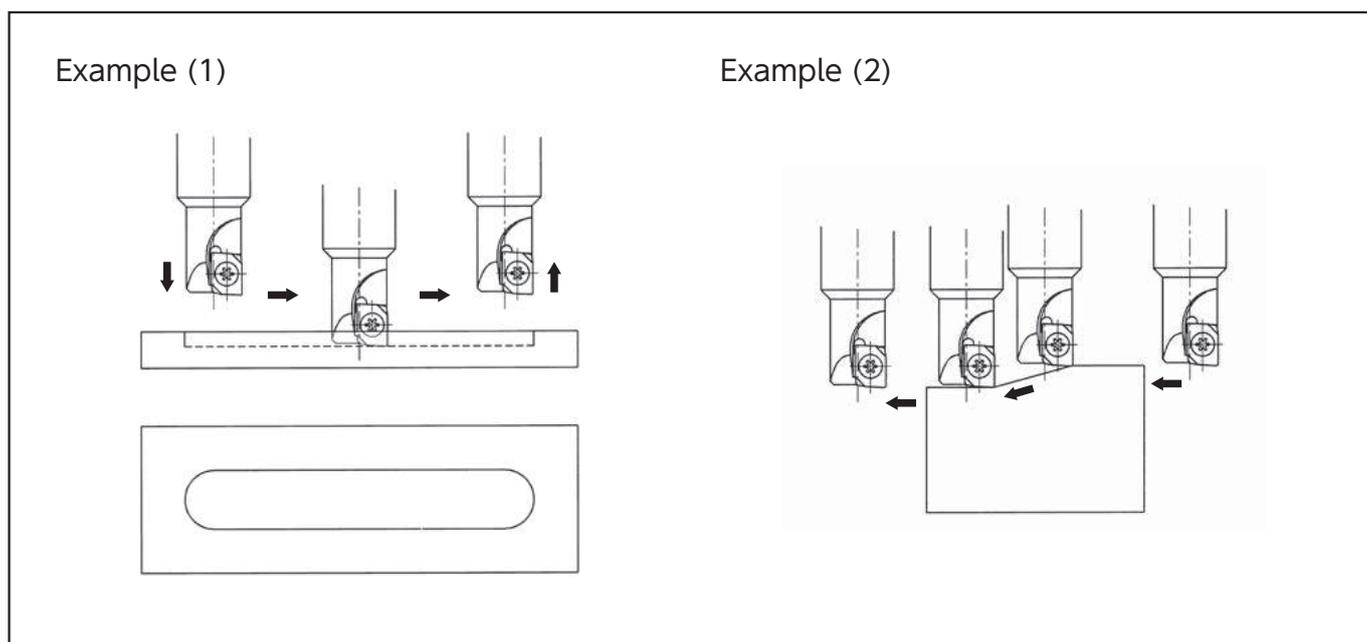
[Recommended Cutting Conditions]

Work material	Cutting speed (m/min)	Axial feed rate (mm / t)	Depth of cut (mm)	Cutting Width (mm)
Stainless steel / Steel	40 ~ 60	~ 0.05	~ 1.5	below 50% of the cutter diameter
Nonferrous metal (Aluminum, brass)	80 ~ 120	~ 0.05	~ 3.0	below 50% of the cutter diameter

Effects of mounting an insert having a center cutting edge

- ① By mounting an insert with a center cutting edge, it is possible to use a single-blade type, indexable end milling tool to plunge cut and then feed as shown in (1) (left below.)
- ② By mounting an insert having a center cutting edge, it is possible for a single-blade type indexable end milling tool to perform taper machining, as shown in (2) (right below.)
- ③ As the wiper function is provided at the tip end of the cutting edge, excellent surface finish can be produced.

■ Machining examples



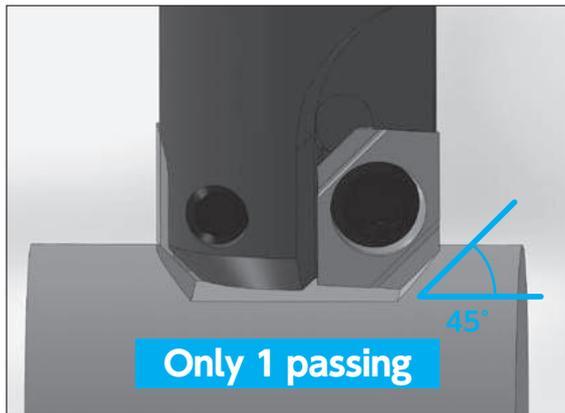
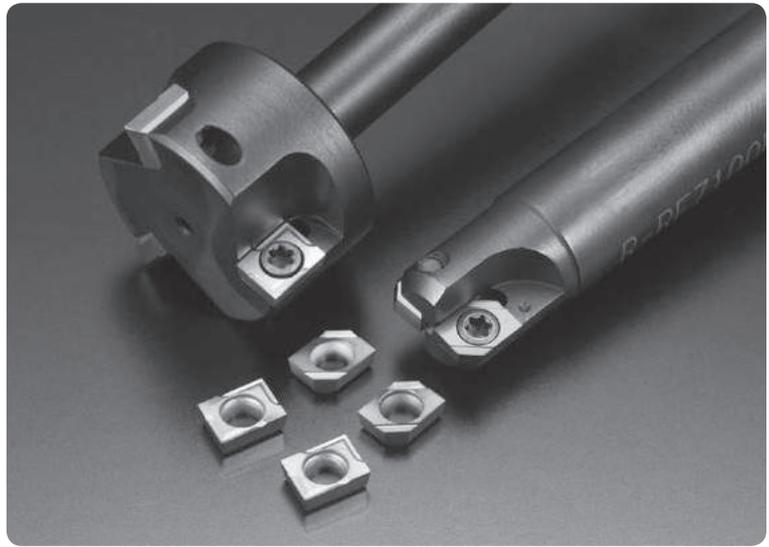
Cautions

- ① It is possible to mount inserts having a center cutting edge on a two-blade or three-blade type end milling tool, however, plunge cutting is not possible. On the other hand, the surface finish of the cut surface may be improved.
- ② In the cases of taper machining using a single-blade type end milling tool with an insert having a center cutting edge, program carefully by taking the effective length of the cutting edge (4.0 mm) into consideration.

Indexable End Milling Tools

Features

- New insert for machining chamfered surface finish has been line up
- Low cutting force with chipbreaker ! Good surface finish with wiper insert
- Stocked variety insert



Recommended cutting conditions

Work material	Cutting speed (mm/min)	Traversing feed rate (mm/t)	Depth of cut (mm)	Width of cut (mm) a_p
Stainless / Steel	40 ~ 60	~ 0.05	~ 1.5	-50% of cutter diameter
Non-ferrous metals	80 ~ 120	~ 0.05	~ 3.0	-50% of cutter diameter

Case study

Chamfered surface finish insert	
Work material : S45C	
Cutting speed (m/min) : 95	
Feed (mm/min) : 0.14	
Depth of cut (mm) : 1.0	
Coolant : WET	
QM3-C45 type	700 pcs/corner + α
Comp. solid endmill	500 pcs/corner
NTK insert achieved longer tool life.	

BL chipbreaker	
Work material : SUS304	
Cutting speed (m/min) : 75	
Speed (min ⁻¹) : 1,200	
Feed (mm/min) : 70	
Depth of cut (mm) : ~ 1.25	
Coolant : WET	
BL chipbreaker	300 pcs/corner
NTK non chipbreaker	200 pcs/corner
NTK Endmill insert with chipbreaker offered good surface of workmaterial with good sharpness, stable machining.	

Small diameter indexable end milling tools

REZ type

(D cutting = lead angle 90 type end milling tool)

NEW (D cutting = lead angle 45 type end milling tool)

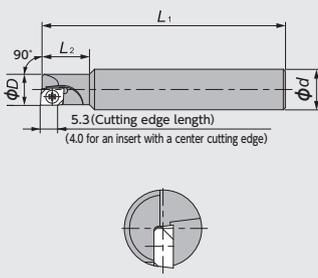


Figure-1

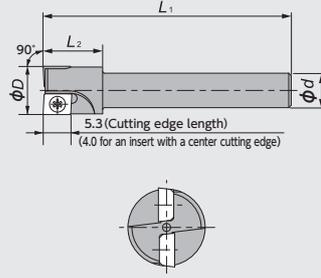


Figure-2

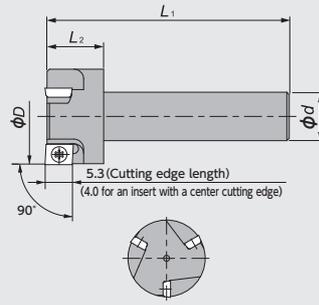


Figure-3

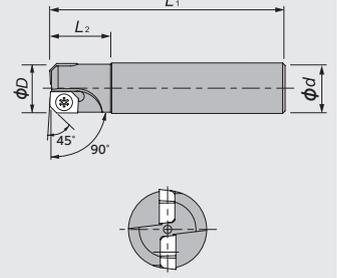


Figure-4

● Right-hand type shown.

Holder dimensions

Shape	Code No.	Toolholder P/N	Stock		No. of blades	Dimensions (mm)				Applicable insert	Part								
			R	L		ϕD	ϕd	L_1	L_2		Clamping screw	Wrench							
Figure-1	5276498	REZ080C1R212	●		1	8	10	60	12	CZH04: CFR: ※1	FS102-2.2 * 4.0	T-07							
	5285812	100C1R218	●																
Figure-2	5520317	REZ100B2R329	●		2	10	5	40	10	CZH04: CFR: ※1	FS102-2.2 * 4.3	T-07							
	5120936	100C2R133	●																
	5120951	100C2R132	●																
	5137971	100C2R141	●																
	5355458	120C2R141	●																
	5355466	140C2R141	●																
Figure-3	5520325	REZ150B3R330	●		3	15	5	40	10	CZH04: CFR: ※1	FS102-2.2 * 4.3	T-07							
	5496088	200M3R319	●																
	5496096	200M3R320	●																
Figure-4	5880281	REZ100C2R461	●		2	10	10	50	12	CZH0400CFR-C45 CZH04: CFR: ※1	FS102-2.2 * 4.3	T-07							
	5880299	100C2R466	●																

Note) Use over an extended period may cause wear on clamp threads, resulting in insufficient clamping force. To avoid this, please replace the screw on a regular basis.

※1 Please don't mount D cut 45° taper insert CZH0400CFR-C45. The holder will interfere the work piece.

Applicable inserts

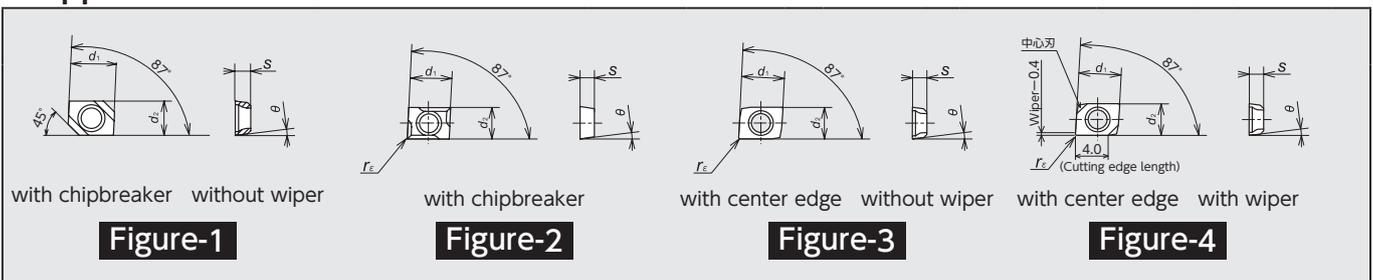


Figure-1

Figure-2

Figure-3

Figure-4

Shape	Part No.	Dimensions (mm)					PVD-coated micro-grain carbide									
		d_1	d_2	s	θ	C or r_{e1}	ZM3	Stock	TM4	Stock	DT4	Stock	QM3	Stock	DM4	Stock
Figure-1	CZH0400CFR-C45 ※2	5.56	4.20	1.88	7°	C1.35					5880315	●	5880307	●		
Figure-2	CZH04005CFR-BL 0402CFR-BL	5.56	4.20	1.88	7°	0.05		5819008	●					5900907	●	
						0.2		5818984	●				5900915	●		
Figure-3	CZH04005CFR-070 0402CFR-070	5.56	4.20	1.88	7°	0.05	5230479	●	—	—	5849815	●				
						0.2	5120944	●	—	—	5849823	●				
Figure-4	CZH04005CFR-140 0402CFR-140	5.56	4.20	1.88	7°	0.05	5310883	●	—	—	5849831	●				
						0.2	5310958	●	—	—	5849849	●				
						0.05	5310925	●	—	—						
	CZH05005CFR-141 0502CFR-141	5.28	5.56	2.18	10°	0.2	5310909	●	—	—						

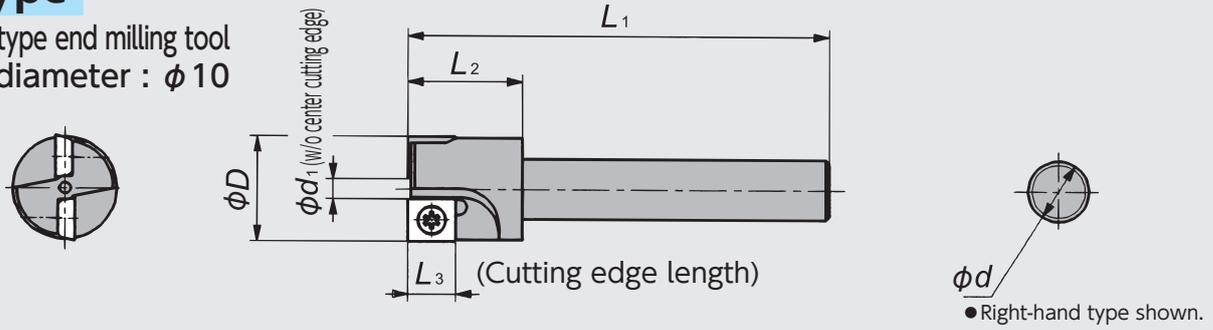
※2 Please use REZ100C2R461/R466. the peculiar holder.

New Products
 Tool Materials / Selection Guide
 PC-D, CBN and ceramic
 Cermet
 Micro-grain Carbide, Carbide
 Insert Stock List
 Outside Machining Toolholders
 SS
 Grooving Tools
 Threading Tools
 Shaper
 Internal machining tool range
 Original Tools for Various Applications
 Indexable End Milling Tools
 Indexable Drill Inserts
 Milling Cutters
 Technical Data
 Index

Indexable End Milling Tools

REL type

Standard type end milling tool
Cutter diameter : $\phi 10$

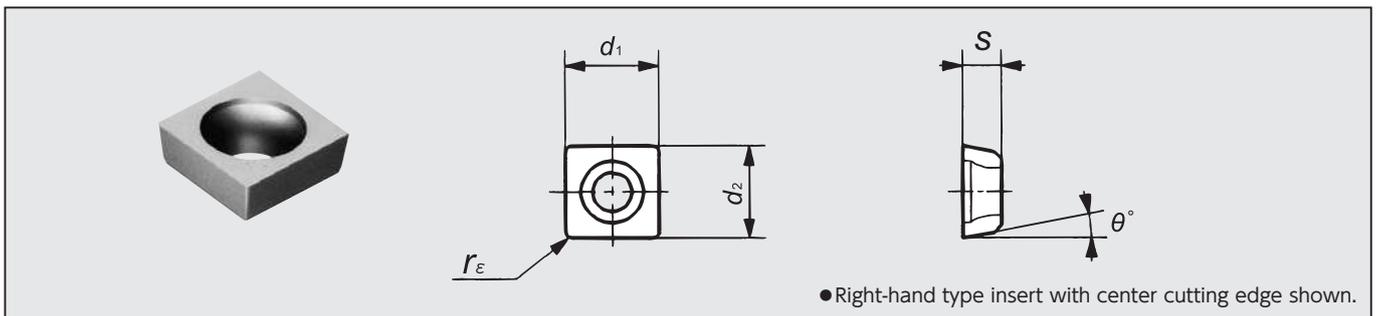


Holder dimensions

Code No.	Toolholder P/N	Stock		No. of blades	Dimensions (mm)						Applicable insert	Part	
		R	L		ϕD	ϕd	ϕd_1	L_1	L_2	L_3		Clamping screw	Wrench
5092358	REL100C2R107	●		2	10	7	(1.2)	50	12	5.3	CLH04 CFN-045 (See table below)		
5092374	100C2R106	●				10							

Applicable inserts

CLH type



Part No.	Dimensions (mm)					PVD-coated micro grain carbide		
	d_1	d_2	s	θ	r_ϵ	ZM3	Stock	
CLH04005CFN-045	5.56	4.20	1.88	7°	0.05	5101894	●	
0402CFN-045					0.2	5066535	●	

Precaution for using REL type

When using the REL type end milling tool, tapering will occur on the side machined area of the work piece by the following amount:

Depth of cut (mm)	Top face machining dia - Bottom face machining dia (mm)
2	0.05
3	0.08
4	0.12
5	0.15

RCL type rectangular tooth chamfering type



Features

- Cycle time can be reduced by using micro-grain carbide grade inserts. (Compared with the high-speed steel (HSS) end milling tools).
- Improved surface finish

① Cutter diameter and machining conditions

Cutter diameter	Recommended module	Recommended feed rate
φ 14	2.25 or less	0.3mm /rev or less
φ 12	2.15 or less	0.3mm /rev or less

If the recommended module or the recommended feed rate is exceeded, the clamping screw should be re-tightened at least once or twice a day to prevent loss of secure clamping.

Precautions

- ① When mounting the end milling tool, ensure a minimum amount of overhang from the chuck to the tool nose in order to prevent run out during machining (Target value: approx. 20 mm)
- ② As is probably known, gear tooth chamfering applies shock loading due to interrupted cutting. For this reason, the holder and clamping screw may deteriorate quicker than normal. Therefore, we request that you replace the holder and clamping screw periodically with new ones for safer and more stable operation.
- ③ In addition, please re-tighten the clamping screw regularly to avoid loss of clamping force during machining.

【Actual examples】

Gear tooth chamfering on sleeve	
Work material : SCM415	
Cutting speed (m/min) = 154	
No. of revolutions (min ⁻¹) = 3,500	
Cutting oil : WET	
NTK : ZM3 2-insert	2,000 pcs
Competitor's PVD-coated carbide Single insert	200 pcs

Gear chamfering on speed gear	
Work material : SCr420 (HB140 ~ 230)	
Cutting speed (m/min) = 42	
No. of revolutions (min ⁻¹) = 955	
Cutting oil : WET	
NTK : ZM3 2-insert	1,500 pcs
SKH55 Solid	100 pcs

Indexable End Milling Tools

RCL type Gear tooth chamfering type

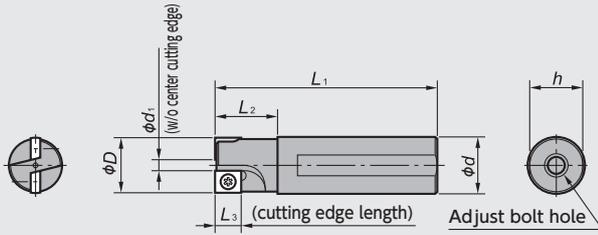


Figure-1

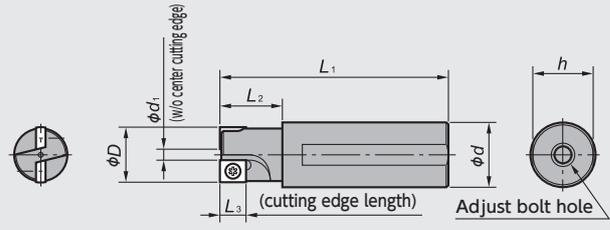


Figure-2

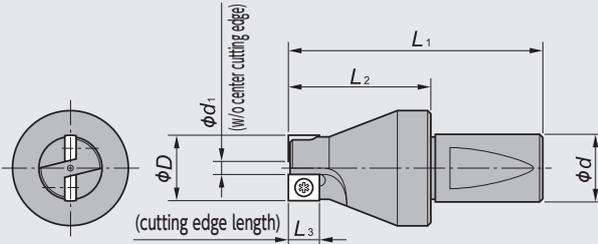


Figure-3

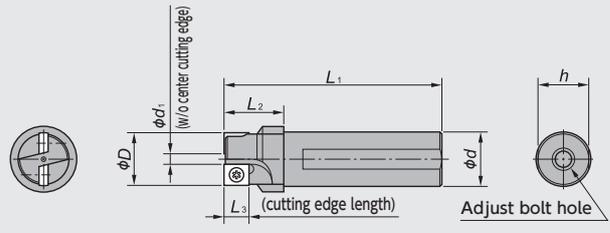


Figure-4

● Right-hand type shown.

Holder dimensions

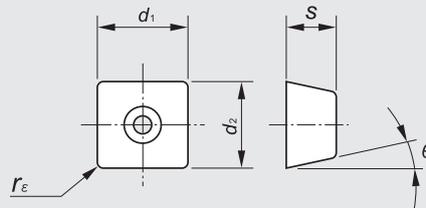
Shape	Code No.	Toolholder P/N	Stock		Dimensions (mm)							Adjust bolt hole	Applicable insert	Part		
			R	L	ϕD	ϕd	ϕd_1	h	L_1	L_2	L_3			Clamping screw	Wrench	
Figure-1	5025952	RCL120D2R050	●		12	12	($\phi 3$)	11	60	15	(5)	M4 * 20L	CLH0402C□□□□-004 (See table below)	FS101-2.5 * 5	CLR-15S (A)	
	5025945	L050		●												
	5005046	RCL140D2R021	●		14	14	($\phi 4$)	13	55		(6)	M6 * 20L	CLH050□□CFN (See table below)			
	5005053	L021		●												
Figure-2	5034913	RCL120D2R059	●		12	14	($\phi 3$)	13	55	15	(5)	M6 * 20L	CLH0402C□□□□-004 (See table below)	FS101-2.5 * 5	CLR-15S (A)	
	5034921	L059		●												
Figure-3	5005236	RCL140Z2R020	●		14	14	($\phi 4$)	-	54	30	(6)	-	CLH050□□CFN (See table below)	FS101-2.5 * 5	CLR-15S (A)	
	5005228	L020		●												
Figure-4	5051792	RCL100D2R066	●		10	10	($\phi 3$)	9.5	60	18	(5)	M4 * 20L	CLH0402C□□□□-035 (See table below)	FS104-2.0 * 4.3	T-06 (B)	
	5051784	L066		●												

Applicable inserts

CLH type

[Cutting edge process]

FN	Sharp edge
TNB	T00525



Part No.	Dimensions (mm)					PVD-coated micro grain carbide			
	d_1	d_2	s	θ	r_ϵ	ZM3	Stock	DM4	Stock
CLH0402CFN-035 CTNB035 CFN-004 CTNB004	5.56	4.20	1.88	7°	0.2	5051750	●	5846951	●
						5084819	●	5847744	●
						5027123	●	5847736	●
CLH0502CFN CLH0504CFN	6.35	5.56	2.18	11°	0.2	5019351	●	5827381	●
						5992201	●	5847710	●
						5996186	●	5847702	●



Indexable Drill Inserts

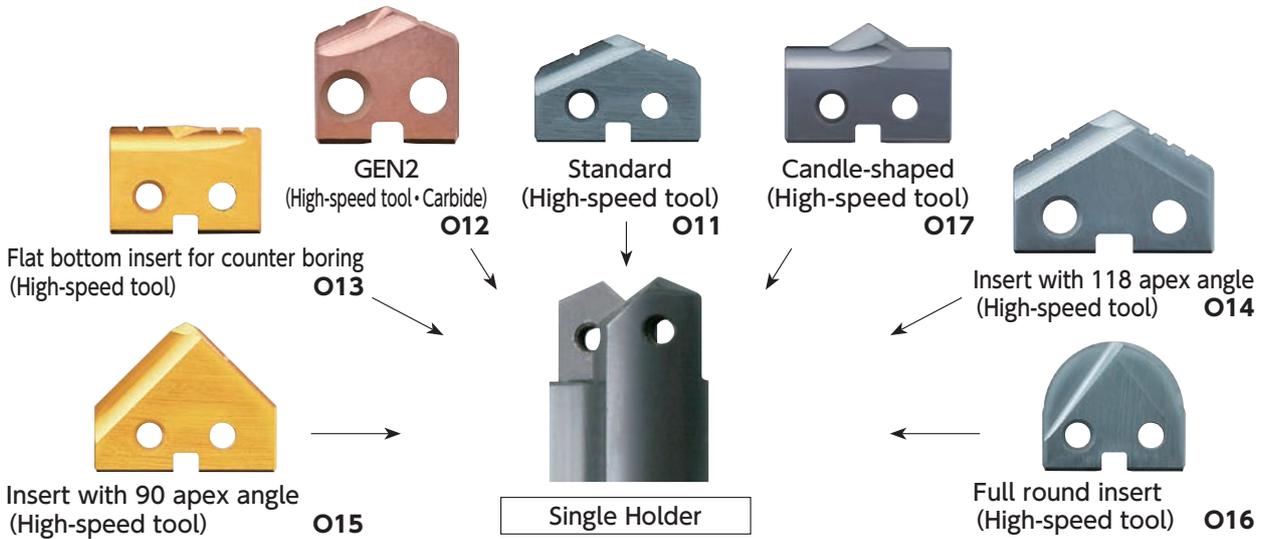
- Configuration and features O2
- Important notes and precautions O4
- Applications requiring special attentions and countermeasures .. O6
- Actual machining examples..... O7
- Features on various types O11
- Standard Type / GEN2 Type (compatible holders) .. O23
Item list / Recommended cutting parameter / detailed information
- GEN3 Type O77
Item list / Recommended cutting parameter / detailed information

※ Please refer to page **Q16** for technical data.

Indexable Drill Inserts

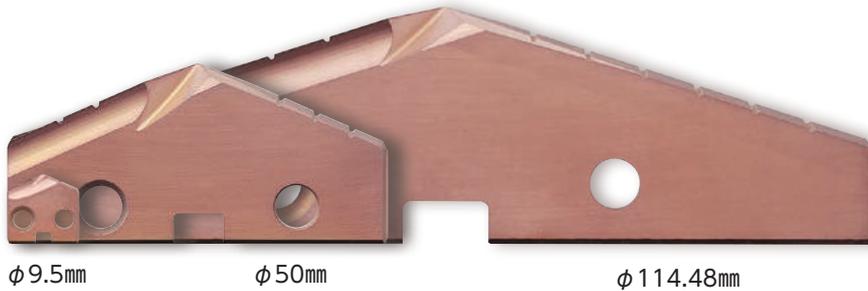
Configuration of NTK drills

● The holders can accommodate all of the following insert shapes !! Capable of machining a variety of work materials and varied drilling applications.

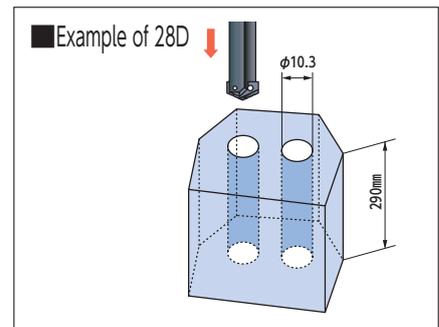


● With indexable insert type drills, drilling from 9.50 mm up to maximum are possible 114.48 mm are possible.

Shown as life size



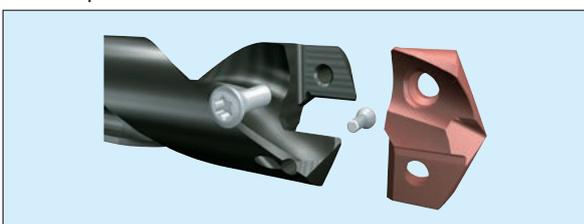
● Deep drilling, up to 32D (machining diameter x 32) is also possible



● GEN3 Type is lined up for High Efficient Drilling (φ 12 ~ 32mm)

GEN3 Inserts are all **carbide** and **not compatible with holders for Standard/GEN2 type**. (More information **O78**)

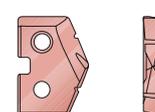
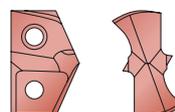
● Example structure for GEN3



No compatibility

● GEN3 insert

● GEN2 insert



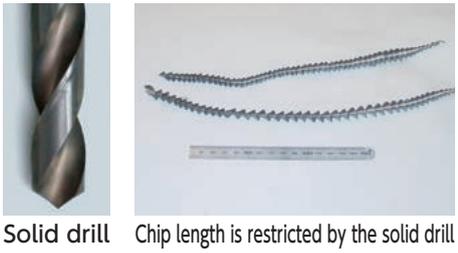
Performance

● Outstanding chip control !!

NTK drill
Chips produced by the nick and chipbreaker.

Step feed is not necessary

Photos of chips produced by the NTK drill
Coolant is fed through the end of the holder, helping evacuate chips and cooling the cutting edge.

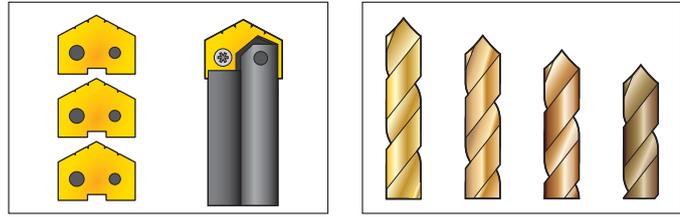


Solid drill Chip length is restricted by the solid drill

● Pre - centering is not required before main hole drilling

As the drill shape is geometrically very accurate, holes can be drilled without centering or centering for a pre-hole. (The pre-drilling operation is eliminated.)

● Stable tool life variation makes overall length adjustments unnecessary



NTK's inserts: overall length is constant and repeatable Solid drills: Vary in tool life after re-grinding/re-coating

As a new insert is always used, no tool life variation occurs.

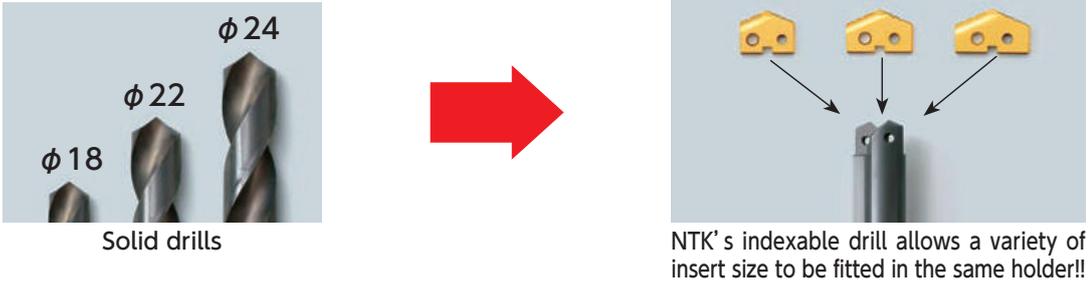
● Accuracy in hole drilling

The following is the accuracy reference data for drilled holes, even though this may vary depending on the condition of the machine, material type and shape of the work piece, ratio of length to the diameter and cutting conditions:
 Enlarging allowance for holes with a diameter of $\phi 35$ or less: 0 - approx. 0.075 mm
 Enlarging allowance for holes with a diameter of $\phi 35$ or more: 0 - approx. 0.075 mm
 (The values are empirically obtained from practical results and may not be guaranteed.)

Economic effect

● Easy stock control

- Inserts having a cutting edge diameter, in the range $\phi 9.5$ up to $\phi 114.48$ mm, can be used in conjunction with 12 different holders.
- One holder accommodates several inserts types with different cutting edge diameters.

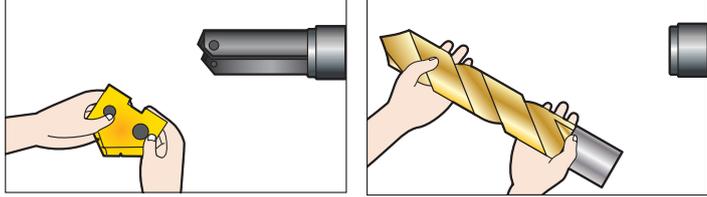


Solid drills NTK's indexable drill allows a variety of insert size to be fitted in the same holder!!

Allows economic and flexible production of small batch sizes !

Ease of use

● Indexing made easy.

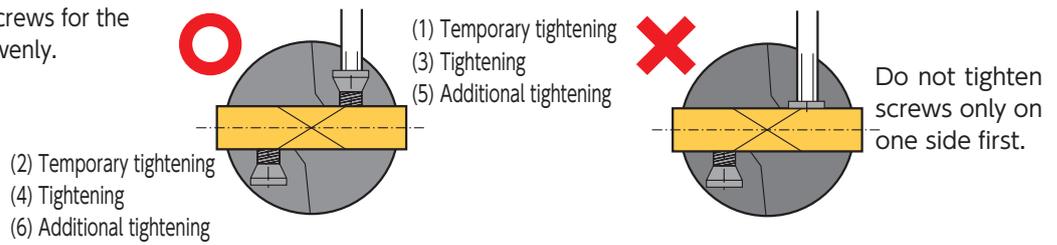


NTK's inserts: Changeable within the machine Solid drills

NTK's indexable drill inserts enable you to change inserts on the spot without having to remove the insert holder. In addition, the use of throw away drill inserts keeps the cutting edge/apex in the same position.

Important notes and precautions

1. Tighten the clamping screws for the insert alternately and evenly.



2. Be careful not to damage the insert cutting edges during setup.
3. Refer to recommended cutting conditions on pages **070 - 74, 098 - 99** of this catalog. Then, adjust and check the cutting speed and feed as required.
 - Work material ● Hardness of the work material ● Insert material grade (coating) ● Diameter of the tool cutting edge ● Holder length

Example) When drilling $\phi 15 \times L30$ holes on free-cutting steel (HB170):
 Use: indexable drill insert 150A-15, holder 22000S-20FMS (Standard short type).

Recommended Cutting Conditions for Indexable Drill Insert **Coated with High-Speed Steel**

Work material	Hardness (HB)	Recommended material grade	Cutting speed (m/min)				Cutting feed rate (mm/rev)						
			TiN	TiCN	TiAlN	AlCrN	$\phi 9.5$ $\phi 13.0$	$\phi 13.0$ $\phi 18.0$	$\phi 18.0$ $\phi 25.0$	$\phi 25.0$ $\phi 36.0$	$\phi 36.0$ $\phi 48.0$	$\phi 48.0$ $\phi 66.0$	$\phi 66.0$ $\phi 114.48$
Free cutting steel	100 ~ 150	HSS, SC	49	64	69	80	0.15	0.20	0.27	0.33	0.41	0.47	0.57
	150 ~ 200	HSS , SC	44	58	64	74	0.15	0.20	0.27	0.33	0.41	0.47	0.57
	200 ~ 250	HSS, SC	40	52	59	68	0.12	0.20	0.27	0.33	0.41	0.47	0.57

When using holders longer than the Long (L) type, be sure to refer to the recommended cutting conditions by holder length on pages **070 - 71, 067, 098**.

4. When cutting steel, the key to success is successful chip evacuation. Check and alter the cutting conditions so that the shapes of the chip become either C type or 6 type. Be sure to have the chips force-evacuated by a high flow of **internally supplied coolant**.
 - To check the shape of chips, always do so under the following condition: the ratio of length and diameter should be **1D** or less.
 - Always drill new holes (1D or less) to test the chip shape to see if any of the cutting conditions requires change.
 - When the chip shape is as desired, you may go on to test by drilling deeper holes under the same cutting conditions.

However, be careful to check that chips are not jamming by checking the load meter and any change in the machining sound.

	1 up to 1.5 coils	Spiral	Irregularly extended
Shape of chips	 C type		
Evaluation	Excellent		If chips in this form evacuate the hole this condition is acceptable. However, if chips remain in this form at a deeper level, the cutting conditions should be changed.
Cutting speed	Low speed		High speed
Feed rate	High feed rate		Low feed rate

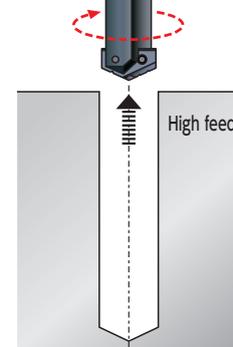
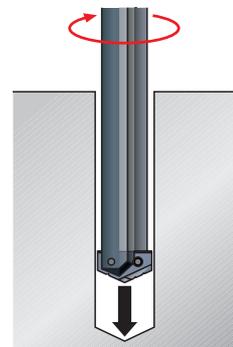
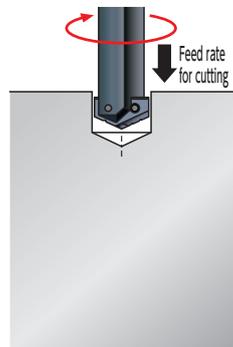
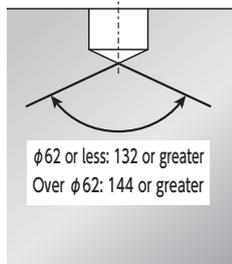
- Note-1) When chips are long and extended, try the following:
- A) Gradually decrease the cutting speed (while checking the chip shape, with **50%** of the recommended speed as the lowest limit)
 - B) Gradually increase the feed rate (with **120%** of the recommended feed rate as the upper limit; if the feed rate exceeds **150%** of the recommended rate, the tools could break.)
 - C) Change the standard chipbreaker to HI, HR, HE or PB type chipbreaker.

Note-2) You can find detailed references of how to determine cutting conditions in "Optimizing the cutting conditions" on pages **068** and **069**.

Recommendations for use - Long (L), Extra Long (XL) and 3 Extra Long (3XL) holder For both vertical and horizontal machines

- ① With NTK's short type holder, prepare a guide hole. With the same drill insert to be used for the L, XL, or 3XL holder, check the chip control. (See the photo at right below.)
- ② Insert the L, XL or 3XL holder, which is fitted with an insert having the same dia. as the guide hole. Feed into the guide hole, at a low cutting speed and a high feed with good coolant supply.
- ③ Change over to the recommended cutting speed and feed rate 1 to 2 mm before reaching the bottom.
- ④ Whilst cutting continually check the chip control and the load meter of the machine.
- ⑤ Return to the start position at a low cutting speed and in fast return mode.

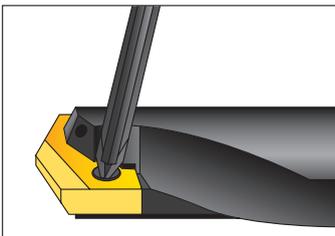
Depth of guide hole: 1D - 2D



- ※ Always prepare a guide hole 1D to 2D before using a Long (L), Extra Long (XL) or 3 Extra Long (3XL) holder.
- ※ A good flow of coolant should be supplied.
- ※ For detailed information, please refer to O67.

- Note 2-1 Always prepare a guide hole 1D to 2D before using a Long (L), Extra Long (XL) or 3 Extra Long (3XL) holder.
- Note 3 A good flow of coolant should be supplied.
- Note 4 If chips remain 'stringy' or elongated, step feeding should be performed.
A) Start the step feed from 4 mm per step and gradually increase the feed per step.
- Note 5 If the reading of load-meter changes suddenly chips may be jammed. In which case, stop the cutting operation to prevent damage to the drilling tool. Then, change the cutting conditions and/or use a different type of chipbreaker.

5. When vibration occurs, the clamping screws may have become loose. We request that you check the condition of the screws at least once a day for the initial phase.

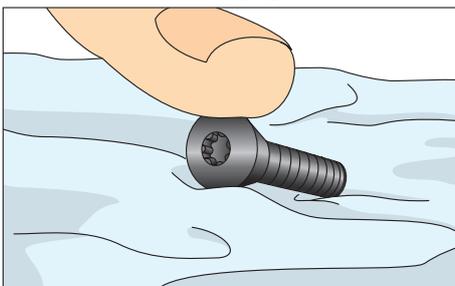


Perform additional tightening once a day.

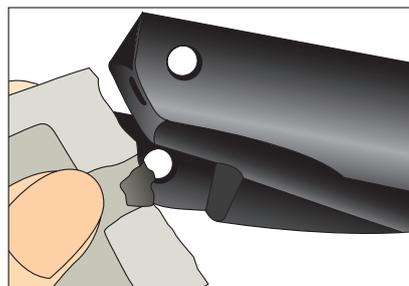
6. A releasing agent for the screws is supplied with the holder. Use the agent once every 5 - 10 replacements of inserts.

How to use:

Clean the surfaces of the clamping screws and the holes.



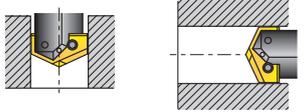
Pour the agent into the holes.



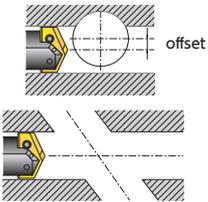
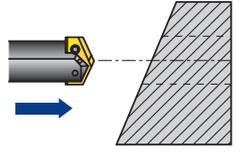
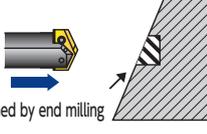
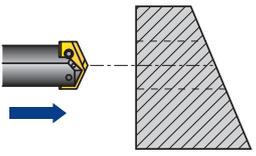
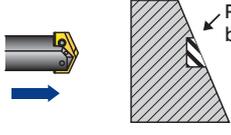
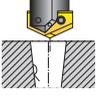
Indexable Drill Inserts

Applications requiring special attentions and countermeasures

- Please exercise precautions as problems as described below may occur in the following applications:

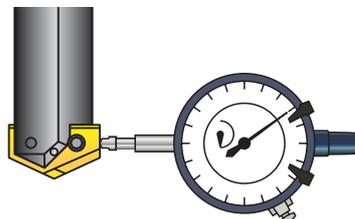
Application	Possible problem	Countermeasures
 <p>Machining with external coolant supply and drilling depth is 1D or over on vertical type machine and 2D or over on horizontal type machine</p>	The drilling tool may be broken when the vertical depth is 1D or over on a vertical machine and horizontal length is 2D or over on a horizontal machine.	Please consider using a system equipped with a internal coolant supply.
<p>DRY machining MIST machining</p>	There are risks of drilling tool breakage due to abnormal wear on the insert, if the cutting edge is not cooled sufficiently and chips are not evacuated properly.	

- The drilling tools of standard shapes/types may not be suitable for the following applications: Please refer to the countermeasures and contact us for inquiries.

Application	Possible problem	Countermeasures
 <p>When there is a cross hole whose diameter is larger than the margin length of the insert</p>	Vibration may be caused if only one of the marginal sections of the insert contacts the work piece. In addition, an incomplete cylindrical hole shape and/or broken drilling tool may result.	Please consider using a guided holder with the same diameter as the insert diameter, a chrome bush or carbide pad type as listed on pages O19 and O66 . (These holders are manufactured on the production-to-order basis.)
 <p>When the shoulder of the insert comes into contact with the work piece earlier than the tip of the insert</p>	Vibration may be caused if only one of the marginal sections of the insert contacts the work piece. In addition, an incomplete cylindrical hole shape and/or broken drilling tool may result.	 <p>Part machined by end milling</p> <p>First, make the part to be drilled flat with an end milling tool. Then, perform the drilling operation.</p>
 <p>When retracting the drill the tilt angle of the exit is so great that only one side of the insert's marginal section comes into contact with the work piece</p>	Vibration may be caused if only one of the marginal sections of the insert contacts the work piece. In addition, an incomplete cylindrical hole shape and/or broken drilling tool may result.	 <p>Part machined by end milling</p> <p>As described for the previous case of "Shoulder contact at entrance" above, make the part to be drilled flat with an end milling tool before drilling. Please consider using a guided holder, a chrome bush or carbide pad type</p>
 <p>When there is a misalignment of 0.2 mm or greater with respect to the pre-hole (cast-through hole)</p>		Flat-bottom type inserts may be capable of drilling this application. (Please refer to the recommended conditions for FB type inserts.)

Guidelines for allowable run out accuracy

If the amount of run out exceeds each of the levels as listed at the right, when measured with the drill holder and insert installed to the machine, the insert is more likely to break.



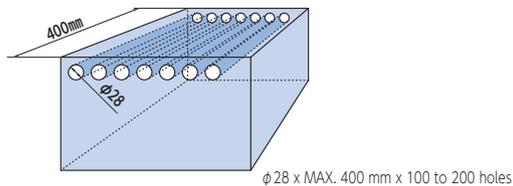
Up to $\phi 20$ in diameter (Except for GEN3 type)	Limited to 75 μm
20 or over in diameter (Except for GEN3 type)	Limited to 125 μm
GEN3	Limited to 25 μm

Actual machining examples

Drilling a die for plastic ($\phi 28$ mm x 400 mm) 14D

Work piece machined	Metal die for plastic
Work material	S55C (HR20 - 30) / SCM
Machine	Horizontal type machining center

	Conventional tool	NTK
Part No.	—	152N-28-HI
Material grade	Competitor's high-speed steel coated drilling insert	SC (T15) + TiCN
Cutting speed	15 ~ 20m/min	32m/min
Feed rate	0.24mm/rev	0.22mm/rev
Machining efficiency (F)	55mm/min	80mm/min
Drilling time	30min/hole	7min/hole
Cutting oil	WET (water soluble, internally supplied)	WET (water soluble, internally supplied)
Step feed	Provided	Provided
Hole depth	400mm	400mm
Life	20 - 30 holes	50 - 60 holes



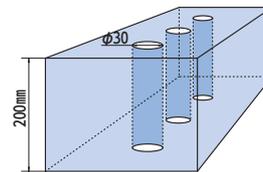
<Considerations>

- With a decreased number of steps, **the drilling time was reduced to less than 25%** in addition to the higher machining efficiency.
- **The tool life was almost double** compared with the conventional tool.

Drilling a casting die. ($\phi 30$ mm x 200 mm) 7D

Work piece machined	Metal die for cylinder block
Work material	DH31 (HRC30 ~ 32)
Machine	Vertical type machining center

	Conventional tool	NTK
Part No.	—	152A-30-HI
Material grade	Competitor's indexable drill insert	SC (T15) + TiAlN
Cutting speed	42m/min	19m/min
Feed rate	0.1 mm/rev	0.1 mm/rev
Machining efficiency (F)	45mm/min	20mm/min
Drilling time	18min/hole	9 min/hole
Cutting oil	WET (water soluble, internally supplied)	WET (water soluble, internally supplied)
Step feed	1 mm per step	Not provided
Hole depth	200mm	200mm
Life	12 holes	24 holes



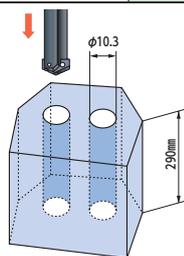
<Considerations>

- Without step feed, **the drilling time was reduced to 50%**.
- **The tool life was double** compared with the conventional tool.

Drilling a die for pressing ($\phi 10.3$ mm x 290 mm) 28D

Work piece machined	Metal parts for press
Work material	SKD61
Machine	Vertical type machining center

	Conventional tool	NTK
Part No.	—	15YN-10.3
Material grade	Competitor's gun drill	SC (T15) + TiCN
Cutting speed	60m/min	20m/min
Feed rate	0.035mm/rev	0.095mm/rev
Machining efficiency (F)	65mm/min	59mm/min
Cutting oil	WET (water soluble, internally supplied)	WET (water soluble, internally supplied)
Step feed	3 mm per step	Not provided
Hole depth	290mm	290mm
Life	5 holes	6 holes



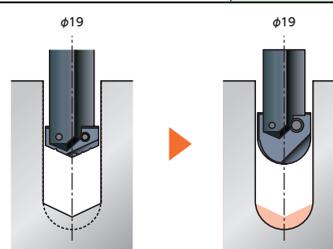
<Considerations>

- Excellent chip control made **step feeding unnecessary**.
- The abnormal noise, which was generated due to an increase in cutting drag when the conventional tool was used, was not generated with the NTK drilling tool.

Drilling with a SR insert having a new shape ($\phi 19$ mm x 250 mm)

Work piece machined	Metal die for die-casting
Work material	SKD61 (HRC30 ~ 32)
Machine	Horizontal type machining center

	Conventional tool	NTK
Part No.	Additionally processed high-speed tool steel drill	151N-19-SR (SR9.5)
Material grade	High-speed tool steel drill	SC (T15) + TiCN
Cutting speed	12m/min	12m/min
Feed rate	0.05 ~ 0.07mm/rev	0.05 ~ 0.07mm/rev
Machining efficiency (F)	14mm/min	14mm/min
Cutting oil	WET (water soluble, internally supplied)	WET (water soluble, internally supplied)
Step feed	3 mm per step	Not provided
Hole depth	250mm	250mm
Life	15 holes	50 holes



<Considerations>

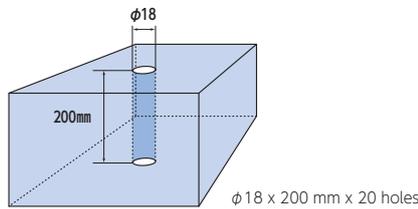
- Excellent chip control made **step feeding unnecessary**.
- The tool life was more than three times longer than that of the conventional tool.

Actual machining examples

Drilling a die for plastic ($\phi 18$ mm x 200 mm) 11D

Work piece machined	Metal die for plastic
Work material	S55C
Machine	Gate type machining center

	Conventional tool	NTK
Part No.	Competitor's high-speed solid drill	151N-18
Material grade	—	SC+TiCN
Cutting speed	14.3m/min	37m/min
Feed rate	0.14mm/rev	0.25mm/rev
Machining efficiency (F)	35m/min	162m/min
Cutting oil	WET	WET
Step feed	Yes	No
Hole depth	200 mm, blind hole	200 mm, blind hole



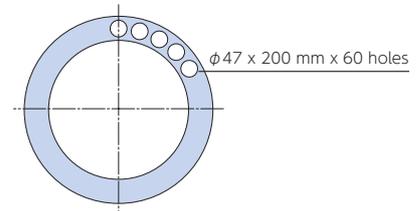
<Considerations>

- By omitting the step feed, the **machining time was reduced to less than one eighth**, in addition to the machining efficiency which became **4.6 times higher**.
- The tool life reached the same number of machined parts as the current tool and it still keeps on machining more parts.

Drilling with GEN2 (AlCrN) insert ($\phi 47$ mm x 200 mm)

Work piece machined	Slewing ring
Work material	SCM445
Machine	Vertical type machining center

	Conventional tool	NTK
Part No.	154N-47-HI	454H-47-HI
Material grade	SC (T15) + TiCN	SC (T15) + AlCrN
Cutting speed	40m/min	40m/min
Feed rate	0.30mm/rev	0.30mm/rev
Machining efficiency (F)	81mm/min	81mm/min
Cutting oil	WET (water soluble, internally supplied)	WET (water soluble, internally supplied)
Step feed	Not provided	Not provided
Hole depth	200mm	200mm
Arial	20 holes	30 holes



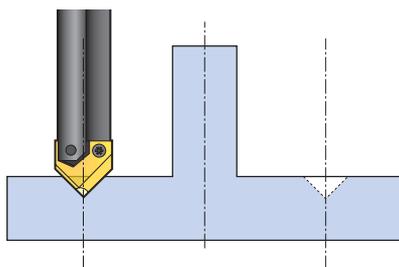
<Considerations>

- **The tool life was extended by 50%** due to the excellent hardness and wear resistance of the new AlCrN coating compared with the conventional tool.
- **The machining accuracy was improved.**
- Better chip control with the HI chipbreaker **resulted in an excellent surface finish.**

Chamfering with an insert of 90 degree apex angle

Work piece machined	Clamp for bolt
Work material	SCM435

	Conventional tool	NTK
Part No.	Competitor's solid centering drill	15YT-0012-SP
Material grade	WC	SC+TiN
Cutting speed	38m/min	30m/min
Feed rate	0.07mm/rev	0.12mm/rev
Machining efficiency (F)	88.9m/min	120m/min
Cutting oil	WET	WET
Life	1,700 holes	2,300 holes



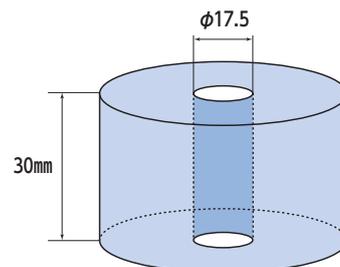
<Considerations>

- By using indexable inserts, **tool length correction after re-grinding became unnecessary.**
- **The machining efficiency improved by 30%** compared with the conventional tool.
- **The tool life was 1.3 times longer** than that of the conventional tool

Drilling pre-holes for tapping ($\phi 17.5$ mm x 30 mm)

Work piece machined	Fitting component
Work material	SUS630H

	Conventional tool	NTK
Part No.	Competitor's high-speed steel coated drilling insert	150N-17.5
Material grade	High-speed steel coating	SC+TiCN
Cutting speed	11m/min	11m/min
Feed rate	0.25mm/rev	0.25mm/rev
Machining efficiency (F)	50m/min	50m/min
Cutting oil	WET (water soluble, internally supplied)	WET (water soluble, internally supplied)
Hole depth	30mm	30mm
Life	50 holes	100 holes



<Considerations>

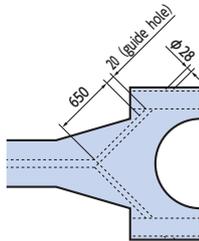
- In addition to the fact that **tool life was doubled** compared with the conventional tool, the tool life was also highly stable.

Actual machining examples

Drilling of ship component ($\phi 28$ mm x 650 mm) 23D

Work piece machined	Connecting rod for a ship	
Work material	Equivalent to S35C	
Machine	Horizontal type machining center	

	Conventional tool	NTK
Part No.	—	152N-28
Material grade	Competitor's high-speed steel drill	SC (T15) + TiCN
Cutting speed	18m/min	28m/min
Feed rate	0.2mm/rev	0.48mm/rev
Machining efficiency (F)	41mm/min	153mm/min
Drilling time	55 min/hole	5 min/hole
Cutting oil	WET (water soluble, internally supplied)	WET (water soluble, internally supplied)
Step feed	5 mm per step	Not provided
Hole depth	650 mm (20 mm for guide hole)	650 mm (20 mm for guide hole)
Life	14 holes	14 holes



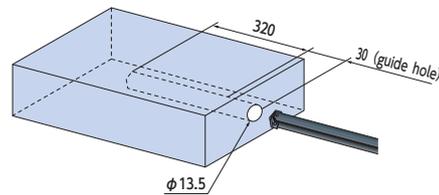
<Considerations>

- By omitting step feeding, **the machining time was reduced to less than one eleventh of the previous time**, in addition to the **3.7 times higher machining efficiency** which was a great improvement.

Drilling of balancer ($\phi 13.5$ mm x 350 mm) 26D

Work piece machined	Balancer	
Work material	SNCM439	
Machine	Horizontal type machining center	

	Conventional tool	NTK
Part No.	—	150N-13.5
Material grade	Competitor's high-speed steel drill	SC (T15) + TiCN
Cutting speed	13m/min	15.3m/min
Feed rate	0.11 mm/rev	0.12mm/rev
Machining efficiency (F)	34mm/min	43mm/min
Drilling time	12 min/hole	10 min/hole
Cutting oil	WET (water soluble, internally supplied)	WET (water soluble, internally supplied)
Step feed	5 mm per step	10 mm per step
Hole depth	350 mm (30 mm for guide hole)	350 mm (30 mm for guide hole)
Life	16 holes	24 holes



<Considerations>

- As the distance fed per step greater, the machining time was reduced in addition to 1.3 times better machining efficiency when compared with the conventional tool.
- **The tool life was 1.5 times longer** than that of the conventional tool.

Drilling of ship component ($\phi 32$ mm x 425 mm) 13D

Work piece machined	Cross head of a ship	
Work material	Forged carbon steel; Equivalent to SF590A (HB167 or harder)	
Machine	Horizontal type machining center	

	Conventional tool	NTK
Part No.	—	152N-32
Material grade	Competitor's high-speed steel coated drill	SC (T15) + TiCN
Cutting speed	25m/min	30m/min
Feed rate	0.28mm/rev	0.43mm/rev
Machining efficiency (F)	70mm/min	128mm/min
Drilling time	Approx. 10 min/hole	3.3 min/hole
Cutting oil	WET (water soluble, internally supplied)	WET (water soluble, internally supplied)
Step feed	4 mm per step	Not provided
Hole depth	425mm	425mm
Life	6 work pieces (12 holes)	10 work pieces (20 holes)

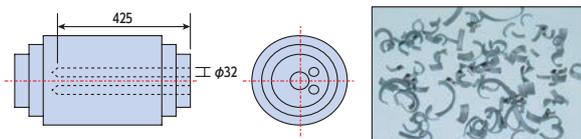


Fig. of work piece

Chips

<Considerations>

- By omitting the step feed, **the machining time was reduced to less than one third**, in addition to the **1.8 times higher machining efficiency**.
- **The tool life became 1.6 times longer when** compared with the conventional tool.

Drilling of balancer ($\phi 17$ mm x 175 mm) 10D

Work piece machined	Arm for M/C-ATC	
Work material	SCM435	
Machine	Horizontal type machining center	

	Conventional tool	NTK
Part No.	—	150N-17
Material grade	Competitor's high-speed steel coated drill	SC (T15) + TiCN
Cutting speed	20m/min	22m/min
Feed rate	0.1 mm/rev	0.12mm/rev
Machining efficiency (F)	40mm/min	49mm/min
Drilling time	3.9 min/hole	2.3 min/hole
Cutting oil	WET (water soluble, internally supplied)	WET (water soluble, internally supplied)
Step feed	5 mm per step	Not provided
Hole depth	113 mm (guide hole: 62 mm)	113 mm (guide hole: 62 mm)
Life	10 work pieces (20 holes)	44 work pieces (88 holes)

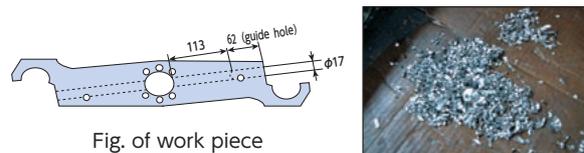


Fig. of work piece

Chips

<Considerations>

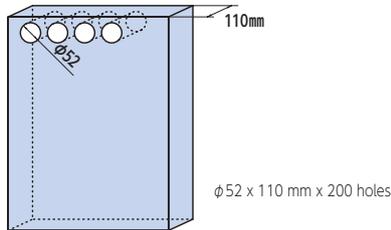
- By omitting the step feed, **the machining time was reduced to less than two thirds**, in addition to the **1.2 times higher machining efficiency**.
- **The tool life became 4.4 times longer** than the conventional tool.

Actual machining examples

Drilling of components for hydro power generation facility ($\phi 52$ mm x 110 mm) 2D

Work piece machined	Stainless steel plate
Work material	SUS304
Machine	Gate type machining center

	Conventional tool	NTK
Part No.	—	434H-52
Material grade	Competitor's high-speed steel solid drill	HSS (M4) + AlCrN
Cutting speed	8m/min	14m/min
Feed rate	0.2mm/rev	0.3mm/rev
Machining efficiency (F)	10mm/min	26mm/min
Cutting oil	WET (water soluble, internally supplied)	WET (water soluble, internally supplied)
Step feed	3 mm per step	3 mm per step
Hole depth	110mm	110mm
Life	10	20 ~ 30



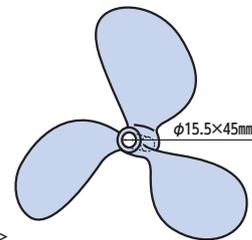
<Considerations>

- **The machining efficiency was 2.6 times higher** than that of the conventional tool, which is a significant improvement.
- **The tool life became approximately 3 times longer** than that of the conventional tool.

Drilling of agitator components ($\phi 15.5$ mm x 45 mm) 3D

Work piece machined	Screw
Work material	SUS304
Machine	Vertical type machining center

	Conventional tool	NTK
Part No.	—	150A-15.5
Material grade	Competitor's carbide drill	SC (T15) + TiAlN
Cutting speed	20m/min	20m/min
Feed rate	0.1mm/rev	0.14mm/rev
Machining efficiency (F)	41mm/min	58mm/min
Cutting oil	WET (water soluble, internally supplied)	WET (water soluble, internally supplied)
Step feed	3.5 mm per step	Not provided
Hole depth	45mm	45mm
Life	40 holes	100 holes



<Considerations>

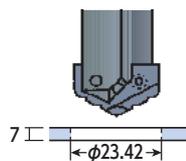
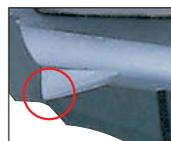
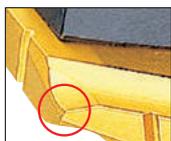
- **The machining efficiency was improved and became 1.4 times higher.**
- Excellent chip control made **the step feeding unnecessary.**
- The centering process, which was required with the conventional tool, was made unnecessary, resulting in a shorter set up time.

Drilling of thin plate with insert having the X-thinning ($\phi 23.42$ mm x 7 mm)

Work piece machined	Balancer weight
Work material	S15C (HB111 ~ 149)
Machine	Vertical type machining center

	Conventional tool	NTK
Part No.	151N-921	151N-921-NP
Material grade	SC (T15) + TiCN	SC (T15) + TiCN
Cutting speed	65m/min	65m/min
Feed rate	0.15mm/rev	0.15mm/rev
Machining efficiency (F)	133mm/min	133mm/min
Cutting oil	WET	WET
Step feed	Not provided	Not provided
Life	2,000 holes	3,700 holes

Enlarged part:



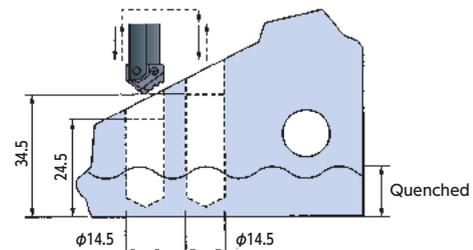
<Considerations>

- When the standard insert (151N-921) was used, a cutting noise was generated for a while after each insert replacement and also around the end of the tool life, which was one of the reasons for the replacement of the inserts.
- The notch-point insert **did not generate any cutting noise** at the initial stage, and **the tool life was longer.**

Drilling of hardened material ($\phi 14.5$ mm x 24.5 mm x 34.5 mm)

Work piece machined	Connecting link
Work material	Boron steel (partially hardened) (End: up to HRC50)
Machine	Vertical type machining center

	Conventional tool	NTK
Part No.	150N-14.5-H I	150A-14.5-H I
Material grade	SC (T15) + TiCN	SC (T15) + TiAlN
Cutting speed	20m/min	20m/min
Feed rate	0.24mm/rev	0.24mm/rev
Machining efficiency (F)	105mm/min	105mm/min
Cutting oil	WET	WET
Step feed	None	None
Life	380 holes	800 holes



<Considerations>

- As the TiAlN coating creates a very hard film and provides excellent resistance to oxidation, the insert exhibited outstanding performance in drilling hardened materials.

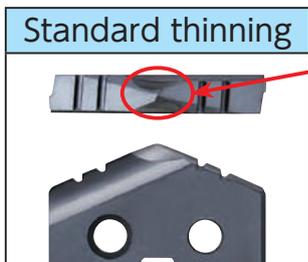
High-speed tool steel + TiAlN coating

See pages **O30** - **O47** for standard stock.

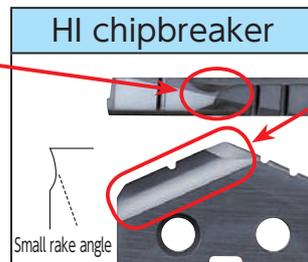
Description

The inserts of this material grade is offered in the following sizes as standard stock !

- More cutting edge diameters have been added for our powered high-speed tool steel drills with a TiAlN coating, most suitable for hardened materials used for metal dies
 $\phi 9.5$ - $\phi 22$: Size available by the increment of 0.5 mm
 $\phi 22$ - $\phi 47$: Size available by the increment of 1.0 mm
- The TiAlN coating, is excellent in oxidation resistance in the high temperature range, most suitable for drilling very hard work materials
- In addition to standard chipbreaker inserts for each diameter size, inserts with HI chipbreaker, for drilling hardened materials, are also standardized



The longer chisel edge prevents the apex from being easily fractured against hard material

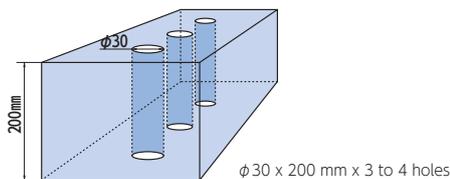


Higher strength with the small rake angle

Drilling of a casting die ($\phi 30$ mm x $\phi 200$ mm) 7D

Work piece machined	Metal die for cylinder block
Work material	DH31 (HRC30 ~ 32)
Machine	Vertical type machining center

	Conventional tool	NTK
Part No.	—	152A-30-HI
Material grade	Competitor's indexable drill insert	SC (T15) + TiAlN
Cutting speed	42m/min	19m/min
Feed rate	0.1mm/rev	0.1mm/rev
Machining efficiency (F)	45mm/min	20mm/min
Drilling time	18min/holes	9min/hole
Cutting oil	WET (water soluble, internally supplied)	WET (water soluble, internally supplied)
Step feed	1 mm each	None
Hole depth	200mm	200mm
Life	12 holes	24 holes



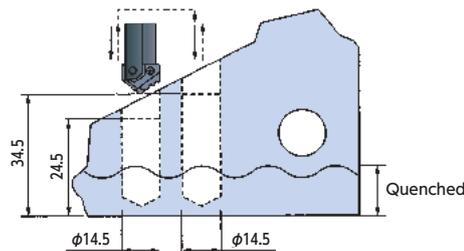
<Considerations>

- Without the need for step feeding, **the drilling time was reduced to 50%**.
- **The tool life was doubled** compared with the conventional tool.

Drilling of hardened material ($\phi 14.5$ mm x 24.5 mm x 34.5 mm)

Work piece machined	Connecting link
Work material	Boron steel (partially hardened) (End: up to HRC50)
Machine	Vertical type machining center

	Conventional tool	NTK
Part No.	150N-14.5-H I	150A-14.5-H I
Material grade	SC (T15) + TiCN	SC (T15) + TiAlN
Cutting speed	20m/min	20m/min
Feed rate	0.24mm/rev	0.24mm/rev
Machining efficiency (F)	105mm/min	105mm/min
Cutting oil	WET	WET
Step feed	None	None
Life	380 holes	800 holes



<Considerations>

- As TiAlN coating creates a very hard film and provides excellent resistance to oxidation, the insert exhibited outstanding performance in drilling of hardened materials.

GEN2

See pages **O30 - O47** for standard stock.

Description

*More sizes have been added.
More types in standard stock!
The series are offered in the following sizes as standard stock!*

- φ9.5 - φ20: Size available by the increment of 0.1 mm
- φ20 - φ50: Size available by the increment of 0.5 mm
- φ50 - φ65: Size available by the increment of 1.0 mm
- φ65 - φ114: Size available by the increment of 2.0 mm

New AlCrN coating

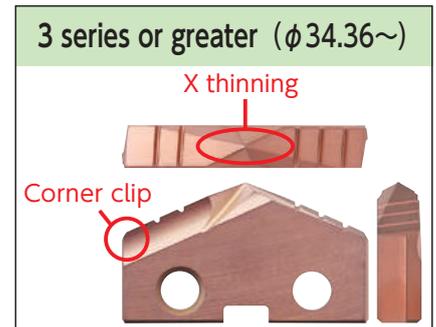
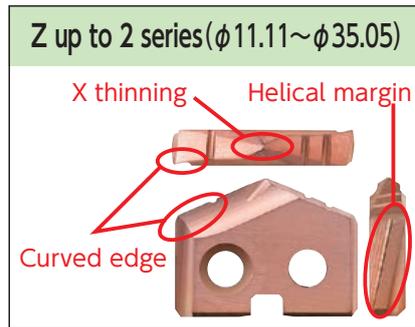
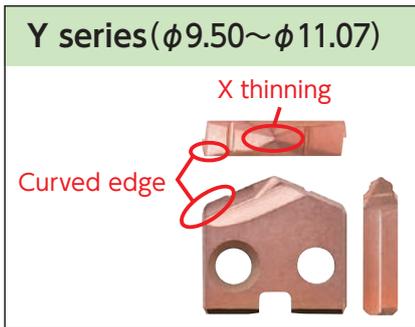
Features

- Both hardness and thermal resistance of the drill inserts are higher due to the new AlCrN coating when compared with the existing coating !!

Improved wear resistance

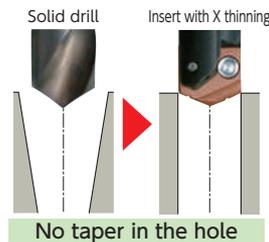


- The latest shapes and coatings for drill inserts allows a wide range of work materials to be cut. The following edge shapes/processes are applied in each size series:



- The X thinning can improve the cutting performance by:

- Biting/engaging performance
- Reduced thrust force
- Improved hole roundness
- No tapering
- Improved straight drilling for deep holes



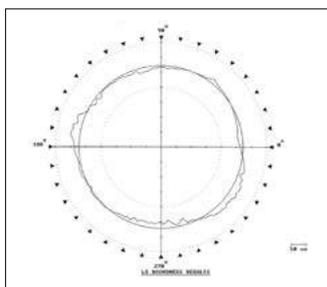
- The helical margin and curved edge make the drilling operations stable.

- The helical margin provides a better guide characteristic, controlling "rattling" which can occur at the exit point.
- The curved edge controls chips, producing smaller manageable pieces.

Comparison of entry hole shapes

NTK GEN2

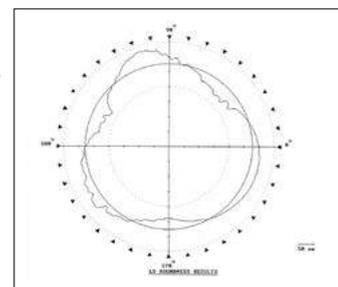
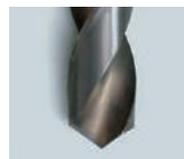
- Cutting conditions
Cutting speed = 47 m/min
Feed rate = 0.32 mm/rev
Work material : SCM440



Roundness : 57 μm

High-speed solid drill

- Cutting conditions
Cutting speed = 22 m/min
Feed rate = 0.32 mm/rev
Work material : SCM440



Roundness : 112 μm

FB type inserts (Flat-bottom)

See pages **O48 - 49** for standard stock.

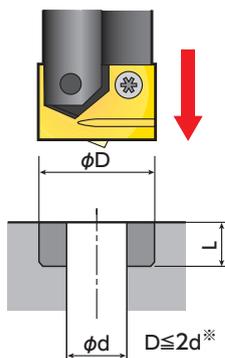
Description

More sizes have been added.

- Countersinking, counterboring and flat-bottom drilling are possible
- The sizes from $\phi 36.0$ up to $\phi 65.0$ have been added as standard products in addition to the current minimum machining diameter of $\phi 9.50$ to $\phi 35.0$



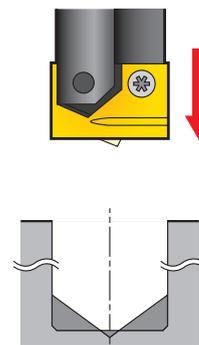
Countersinking, counterboring



A) Countersinking and counterboring

※Flat-bottom inserts can be used for counterboring with a machining diameter (D) up to twice the pre-hole diameter (d). However, the counterboring depth (L), should be limited to a range in which a stab-short type holder can be used.

Flat bottom machining



B) Flat bottom machining.

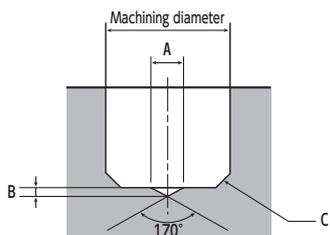
※Flat-bottom inserts can also be used for remachining conical bottoms which were formed by the apex angle of a general drill.

- Notes) ● No flat-bottom inserts can be used for machining with a radial feed such as end milling.
 ● Since each flat-bottom insert has an apex angle in its center, the center of the surface to be machined suffers slight recessing.
 ● The corners of the flat-bottom insert are slightly chamfered.

Major applications

Flat bottom machining.

<The shape of the hole>



<Dimensions by machining diameter>

Insert size series	Machining dia (mm)	A (mm)	B (mm)	C (mm)
Y	9.50 ~ 12.95	2.9	0.13	0.4
Z				
0	12.98 ~ 17.65	4.1	0.18	0.4
1	17.53 ~ 24.38	4.8	0.21	0.4
2	24.41 ~ 35.05	6.0	0.26	0.4
3	34.36 ~ 47.80	8.2	0.36	0.9
4	46.99 ~ 65.28	10.5	0.46	0.9

<Holders>

Any type of inserts can be installed to a standard holder.
 Use only a stab-short type holders high in rigidity to minimize chatter.
 ※See "Recommended Cutting Conditions for Flat-Bottom Inserts" on page **O72**.

Apex angle: 118

See page **O50** for standard stock.

Description

More types in standard stock !

- The 118-degree type apex angle was developed mainly for pre-drilling for subsequent tapping of ship component
- Fine” type has been added to the “coarse” type



Features

- The angle for the bottom of holes is 118 -degrees !!
- Single pass pre-drilling for subsequent tapping of ship components is possible !!
- Machining time can be reduced as stepped feeding is unnecessary !!
- The inserts can be installed to standard holders !!
- A wide variety of sizes ranging from 1 up to 8 series offered !!



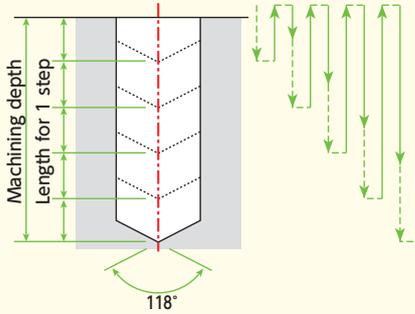
- Applicable components
Cylinder block
Cylinder frame
Cylinder cover
Frame panel, and the likes

Comparison with a conventional tool

High-speed tool steel drill



Drilling feed
Fast feed



Machining depth
Length for 1 step

118°



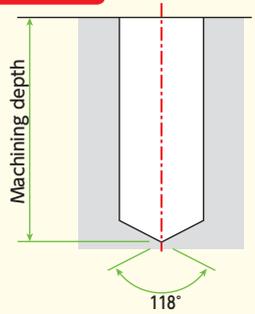
Shape of chips when cut by high-speed tool steel drill

NTK's indexable insert with 118 apex angle

Without stepped feed



Drilling feed
Fast feed



Machining depth

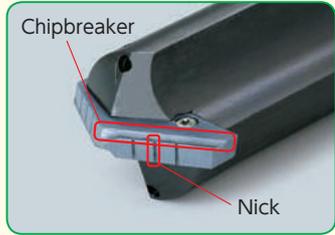
118°



C type 6 type

C type 6 type Shape of chips when steel was machined.

Pre-drilling for tapping in a single pass!



Chipbreaker
Nick

Chips cut into small, manageable pieces by the chipbreaker and nick.



Shape of chips when cast iron was machined.

Apex angle: 90

See page **O51** for standard stock.

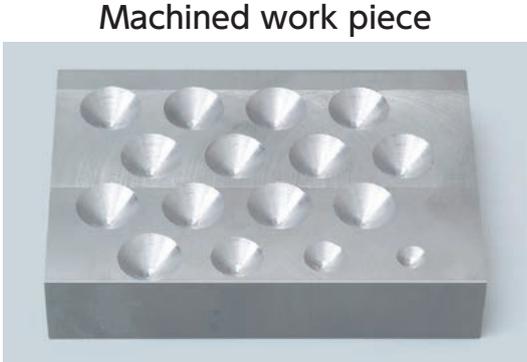
Description

The 90-degree apex angle type is primarily used for centering or chamfering, being one of the tools which further enhances the NTK drilling system.

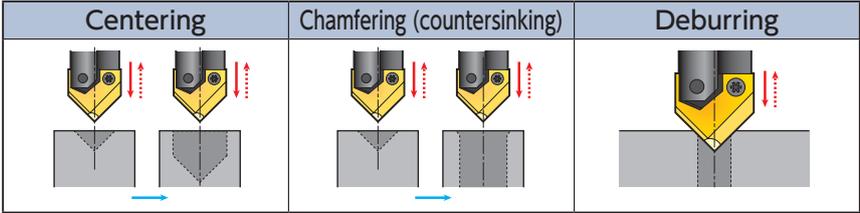


Features

- Effective positive angle shape !!
 - Center cutting for improved strength and tool stability !!
 - Nicked inserts can be produced as required !!
 - Usable insert sizes : 9.5 mm up to 47.63 mm !!
- Material grade: Powder high-speed tool steel (T15) + TiN coating



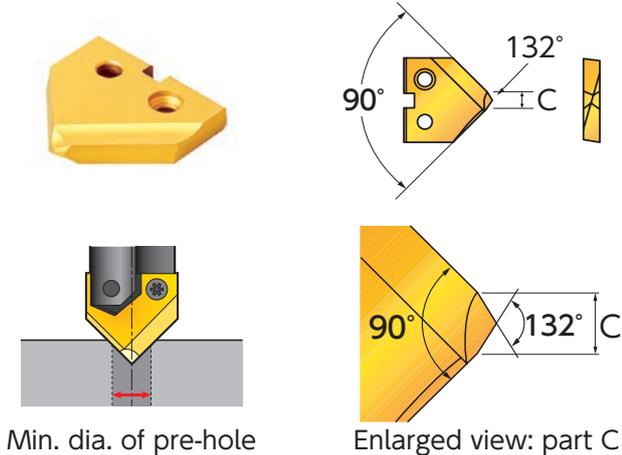
Major applications



This type of insert can work for the improvement of machining accuracy in centering, omission of post-chamfering processes, and removal of burrs. The products also allows one tool to be used in a wide range of applications by adjusting the machining depth.

※ See recommended cutting conditions on page **O73**.

Dimensions of the SP inserts



Size series	C Dia (mm)	Minimum dia. of pre-hole (mm)
Y	ϕ 2.4	ϕ 3.00
Z	ϕ 2.4	ϕ 3.00
0	ϕ 4.2	ϕ 5.00
1	ϕ 4.9	ϕ 6.00
2	ϕ 6.4	ϕ 7.00
3	ϕ 8.8	ϕ 10.00

- New Products
- Tool Materials / Selection Guide
- PCD, CBN and ceramic
- Cement PVD-coated Cement
- Micro-grain Carbide, Carbide
- Insert Stock List
- Outside Machining Toolholders
- SS
- Grooving Tools
- Threading Tools
- Shaper
- Internal machining tool range
- Original Tools for Various Applications
- Indexable End Milling Tools
- Indexable Drill Inserts
- Milling Cutters
- Technical Data
- Index

SR insert for machining with a full radius

See page **O51** for standard stock.

Description

Machining of blind holes with a fully radius has been made possible for metal die machining

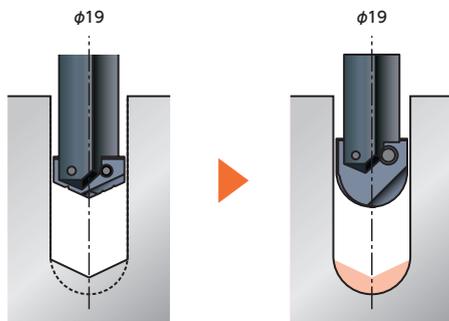


Features

- Can cut the hole base with a full radius !!
- Machining time can be reduced as stepped feed is unnecessary !!
- The inserts can be installed to standard holders !!
- Through coolant !!

Actual machining example

Drilling with a SR insert having a new shape (φ19 mm x 250 mm)



<Considerations>

- Excellent chip control made **step feeding unnecessary**.
- **The tool life was more than three times longer** than that of the conventional tool.

Work piece machined	Metal die for die-casting
Work material	SKD61 (HRC30 ~ 32)
Machine	Horizontal machining center

	Conventional tool	NTK
Part No.	Additionally processed high-speed tool steel drill	151N-19-SR (SR9.5)
Material grade	High-speed tool steel	SC (T15) + TiCN
Cutting speed	12m/min	12m/min
Feed rate	0.05 ~ 0.07mm/rev	0.05 ~ 0.07mm/rev
Machining efficiency (F)	14mm/min	14mm/min
Cutting oil	WET (water soluble, internally supplied)	WET (water soluble, internally supplied)
Step feed	3 mm each	None
Hole depth	250mm	250mm
Life	15 holes	50 holes

※The insert cannot be used for ball end milling

※See recommended cutting conditions on page **O74**.

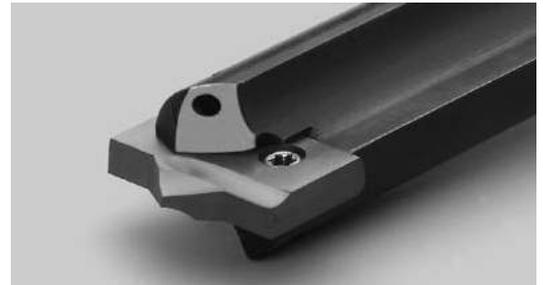
Candle-shaped inserts

Candle-shaped

See page **O51** for standard stock.

Description

We have developed a candle-shape type drilling inserts for structural steel in addition to various existing types of indexable drill inserts! This new type offers excellent drilling results for machining through webs of H-section steels and plates with a thickness of 8 mm or less as the major applications.



Features

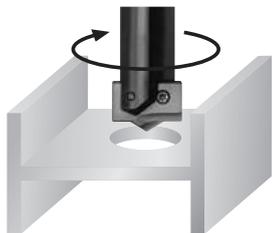
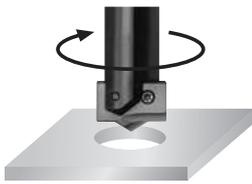
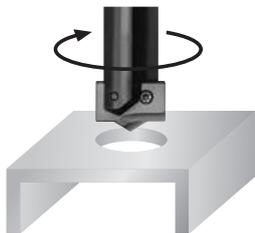
- The shape is like the head of candle, with only the pointed tip protruding !!
- Excellent biting/engaging performance !!
- The TiAlN coating provides improve wear resistance !!
- Can be mounted to standard holders !!
- Through coolant supply available !!
- The cutting edge size varies from 13.0mm up to 35.0mm !!



Work drilled with a candle-shaped insert



Major applications

Machining of H-section steels	Machining of thin steel plates	Machining of shaped steels
		
Drilling of web part of H-section steels	Drilling of bridge part section	Drilling of channel section steel

The projection apex gives improved biting/engaging performance while the marginal section secures the accuracies of holes.

This type can work as a solution in application where the section is prone to deflection.

For applicable holders, please refer to page **O36**.

Extra Long Holder

Description

NTK has successfully produced holders allowing for the drilling of holes to maximum of **32D**, in addition to existing holders !!



Extra Long

Features

- Through coolant !!
- Requiring no step feeding !! (other than exceptional cases)

Machining time can be significantly reduced !

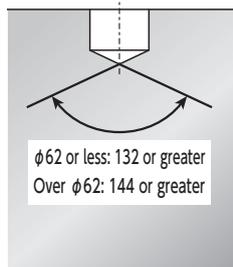
● Maximum machining depth by size series

Size series	Cutting edge dia. of insert	Max. machining depth	
		mm	L/D
Y	9.50 ~ 11.07	290.5	31
Z	11.11 ~ 12.95	290.5	26
0	12.98 ~ 17.65	387.4	30
1	17.53 ~ 24.38	565.2	32
2	24.41 ~ 35.05	692.2	28
3	35.72 ~ 47.80	787.4	22
4	46.99 ~ 65.28	879.5	19
5 • 6	62.38 ~ 89.08	889.0	14
7 • 8	87.76 ~ 114.48	939.8	11

Recommendation for use - (L), Extra Long (XL) and 3 Extra Long (3XL) holder For both vertical and horizontal machines.

① With NTK's short type holder, prepare a guide hole. With the same drill insert to be used for the L, XL, or 3XL holder, check the chip control. (See photo - right below.)

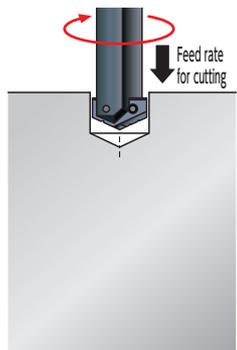
Depth of guide hole: 1D - 2D



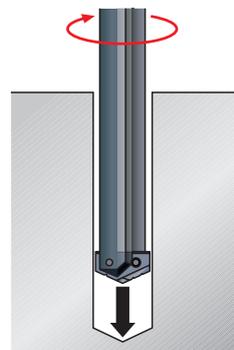
② Insert the L, XL or 3XL holder, fitted with an insert having the same dia. as the guide hole. Feed into the guide hole, at a low cutting speed and high feed with the coolant on.



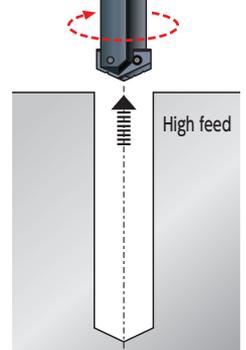
③ Change over to the correct cutting speed and feed rate 1 to 2 mm before reaching the bottom.



④ Whilst cutting check the chip control is good and that the load on the machine is not excessive.



⑤ Return to the start position at a low cutting speed and in fast return mode.



- ※ Always prepare a guide hole of 1D to 2D before using a Long (L), Extra Long (XL) or 3 Extra Long (3XL) holder.
- ※ A good flow of coolant should be supplied.
- ※ For further long holders, please refer to page **O66**.

Guided holders

Description

- Provide cross hole drilling with high efficiency !!
- Allows accurate deep drilled holes !!
- Prevents rattling when exiting slanted drill holes

Chrome-bush guide



Thermal sprayed carbide type



Brazed carbide type



Carbide clamped with screws



Features

- Changes in feed rate when drilling cross holes is not necessary !!
Our unique mechanism to prevent runout has achieved outstanding stability, making it possible to reduce machining time significantly as feed rate adjustment is unnecessary
- Step machining is unnecessary with our existing inserts !!
An original design of the cutting edge can control chips remarkably well, allowing you to greatly reduce machining as stepped machining is no longer necessary

Please refer to page Q17 for selective use of the guided holders

Brazed carbide type guided holder

Highly reliable high-speed tool steel coating



Screw-clamping allows for easy replacement when damaged

Pad using highly tough carbide

※The drill holders and pads are manufactured on a production-to-order basis.

NTK drilling tool

Cutting speed= **47.0** (m/min)
Feed rate= **0.32** (mm/rev)



Competitor's product

Twisted drill Cutting speed= **22.0** (m/min)
Feed rate= **0.32** (mm/rev)



New Products

Tool Materials / Selection Guide

PCD, CBN and ceramic

Cermet / PVD-coated Cermet

Micro-grain Carbide, Carbide

Insert Stock List

Outside Machining Toolholders

SS

Threading Grooving Tools

Shaper

Internal machining tool range

Original Tools for Various Applications

Indexable End Milling Tools

Indexable Drill Inserts

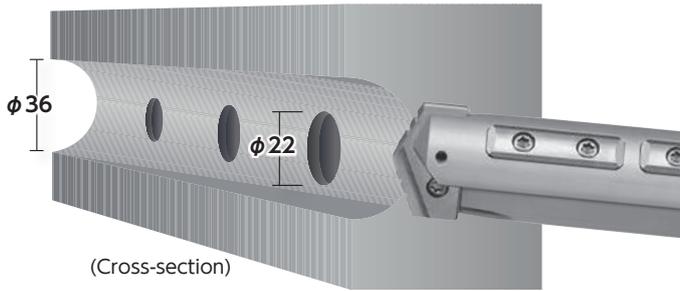
Milling Cutters

Technical Data

Index

Indexable Drill Inserts

Machining example



(Cross-section)

With a conventional carbide gun drill, the feed rate had to be altered to drill the cross holes. With the **NTK drilling tool**, the feed was constant, reduced the machining time significantly.

Machining application	Drilling of a cross hole in a metal die for plastic parts.
Work material	P20 (HRC30)
Machine	Horizontal boring machine
Description of machining	The center of a $\phi 36$ hole to be drilled should cross the centers of a $\phi 22$ side holes.
Insert P/N	153A-36
Holder P/N	Special specification
Cutting speed	20.0 (m/min)
Feed rate	0.31 (mm/rev) ※No feed rate adjustment for cross holes
Machining efficiency	54.9 (mm/min)
Cutting oil	WET (internally supplied)
Life	5 m of machining distance and greater



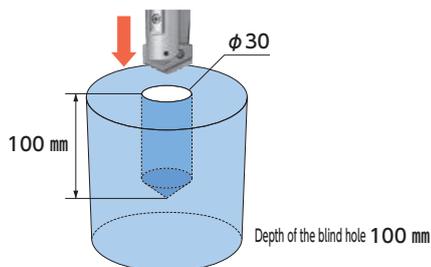
Useful Tips!!

NTK Indexable Drill Inserts can cut very hard materials, even those of HRC 40 up to 45!!
With these inserts, the “**machining efficiency and tool life**” can improve greatly !!

Actual examples of machining of hardened materials (HRC 40 – 45)

Work piece machined	Metal die material
Work material	SNCM447 (HRC42)
Machine	Vertical type machining center

	Conventional tool	NTK
Part No.	—	452H-30
Material grade	Competitor's high-speed steel solid drill(HSS)	HSS + AlCrN coating
Cutting speed	11m/min	15m/min
Feed rate	0.15mm/rev	0.2mm/rev
Machining efficiency (F)	40m/min	74m/min
Cutting oil	Internally supplied	Internally supplied
Step feed	100mm	100mm
Life	10m	16m

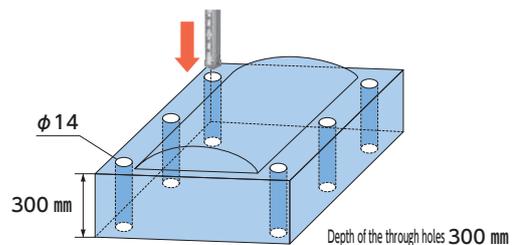


<Considerations>

- In the case of the conventional tool, a pre-hole was prepared to prevent tool breakage due to the chips jamming. But the **NTK** indexable drill insert chipbreaker enabled chips to be cut into small pieces, omitting the pre-hole preparation. This excellent chip control can avoid various problems.

Work piece machined	Metal die material
Work material	SKD61 (HRC44)
Machine	Vertical type machining center

	Conventional tool	NTK
Part No.	—	4C20H-14
Material grade	Competitor's high-speed steel solid drill(HSS)	Carbide + AlCrN
Cutting speed	10m/min	25m/min
Feed rate	0.08mm/rev	0.05mm/rev
Machining efficiency (F)	18m/min	28m/min
Cutting oil	Internally supplied	Internally supplied
Step feed	300mm	300mm
Life	600mm	2400mm



<Considerations>

- As the competitor's conventional carbide solid drill controlled the chips poorly and tool breakage was a concern, high-speed steel solid drills were employed. **NTK** indexable drill inserts posed no problem in chip control, with the combination of the carbide and AlCrN coating which made for a great improvement in productivity.

Selective use of guided holders

Type	Features
1. Chrome-bush guide 	<ul style="list-style-type: none"> ● First choice for general deep hole drilling ● Superior lubrication to carbide guide ● Ideal choice for seizure prevention on guide portion at deep hole drilling
2. Thermal sprayed carbide type 	<ul style="list-style-type: none"> ● Superior wear resistance to chrome guide
3. Brazed carbide type 	<ul style="list-style-type: none"> ● More resistant to wear than the thermal sprayed carbide type ● Re-brazing is possible ● Applicable for diameters of $\Phi 15$ and over
4. Carbide clamped with screws 	<ul style="list-style-type: none"> ● Easy to replace pads ※ Please send the holder to NTK to change the pad. NTK assembles and regrinds it. ● Applicable for diameters of $\Phi 24$ and over

Keys: ◎: Excellent ○: Good △: Acceptable X: Unacceptable

	Chrome-bush guide	Thermal sprayed carbide	Brazed carbide	Carbide clamped with screws
Low friction	◎	○	○	○
Wear resistance	△	○	◎	◎
Repeated used	○	○	○	◎
Dimensional accuracy	○	○	○	△

※ Holders are designed specially for actual insert diameter.

Inserts with different diameters can't be put on the holders.

※ You can decide the length of guide area and number of coolant holes.
(around 30mm to 50mm for deep hole drilling)

※ Reuse may be impossible in case of big damage on the holders.

New Products / Tool Materials / Selection Guide / PCD, CBN and ceramic / Cermet / PVD-coated Cermet / Micro-grain Carbide, Carbide / Insert Stock List / Outside Machining Toolholders / SS / Grooving Tools / Threading Tools / Shaper / Internal machining tool range / Original Tools for Various Applications / Indexable End Milling Tools / Indexable Drill Inserts / Milling Cutters / Technical Data / Index

Automatic lathe holders for machining cross holes

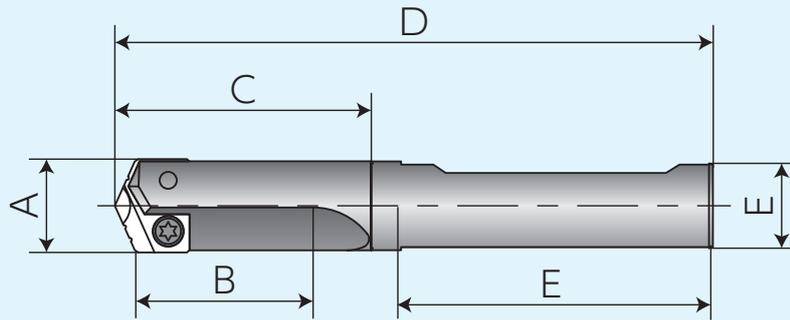
NTK Indexable drill inserts for cross holes drilling on automatic lathes
For machining of non ferrous metals



Description

- Installed to the main tool spindle of an automatic lathe, these drill holders and inserts can drill cross holes with the diameter of $\phi 9.5$ or greater !!
- A series of shank sizes are now available dependant on the machine spindle !!
- The steel shank is highly strong !!
- The use of indexable inserts eliminates the need for offset correction !!

Holder



Size Series	(A) Insert cutting edge dia.	(B) Max. machining length	P/N	Stock	Dimensions			Parts		Applicable REGO-FIX chuck
					(C) Body length	(D) Overall length	(E) Shank dia. x length	Clamping screw	Screwdriver (Optional)	
Y	9.5 ~ 11.0	16.0	210Y0S-07M	●	25.0	55.0	$\phi 7.0 \times 30L$	724-IP7-10	8IP-7	ER11
		20.0	210Y0S-10M	●	30.0	70.0	$\phi 10.0 \times 40L$			ER16
Z	11.5 ~ 12.5	16.0	210Z0S-07M	●	30.0	70.0	$\phi 7.0 \times 30L$	7247-IP7-10	8IP-7	ER11
		20.0	210Z0S-10M	●						ER16
0	13.0 ~ 17.5	20.0	21000S-10M	●			$\phi 10.0 \times 40L$	72556-IP8-10	8IP-8	

Applicable inserts

When a ferrous material is machined, the material should be limited to free-cutting steel or similar. For recommended machining conditions, please refer to pages **070** - **071**. However, please note that the feed rate should be set at the level of 50% of the recommended value as a guideline.

※The machine's power output at the main spindle may become insufficient. Please contact us or the manufacturer of your machine for consultation.

Standard • GEN2

(Common Holder)

CONTENTS

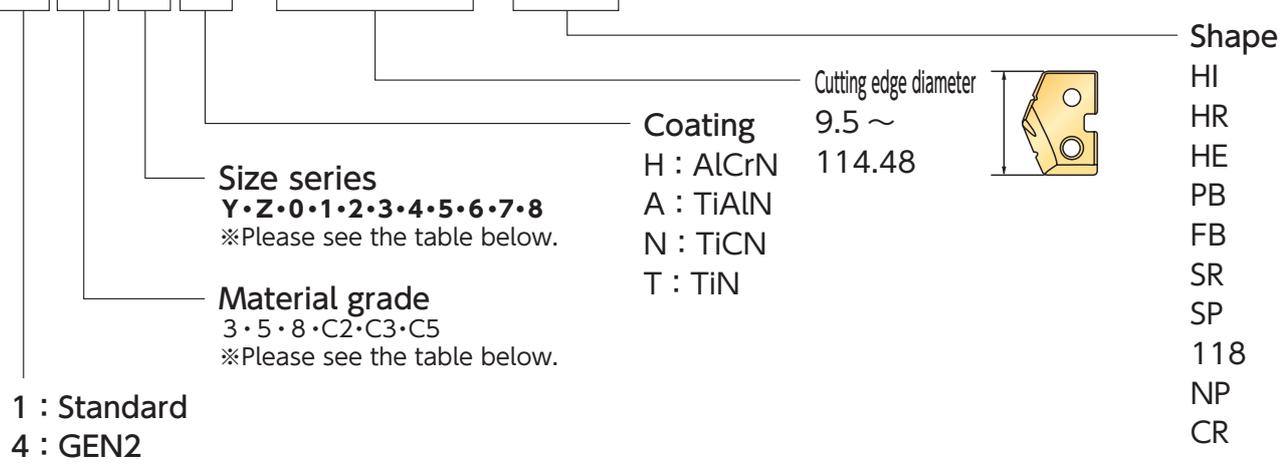
Insert Part No. designation code system	O24
Holder Part No. designation code system	O26
Holder and insert selection example	O28
List for Part No.	
φ 9.50 ~ 11.07 Y Series	O30
φ 11.10 ~ 12.95 Z Series	O32
φ 12.98 ~ 17.65 0 • 0.5 Series	O34
φ 17.53 ~ 24.38 1 • 1.5 Series	O36
φ 24.41 ~ 35.05 2 • 2.5 Series	O38
φ 34.36 ~ 47.80 3 Series	O40
φ 46.99 ~ 65.28 4 Series	O42
φ 62.38 ~ 89.08 5 • 6 Series	O44
φ 87.76 ~ 114.48 7 • 8 Series	O46
Flat-bottom inserts Y, Z, 0, 1, 2, 3, 4 Series	O48
Inserts with 118° apex angle	O50
Inserts with 90° apex angle/SR inserts with full radius/Candle-shaped inserts	O51
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For GEN3, please refer to pages **O77 - O100**.

New Products
Tool Materials / Selection Guide
PCD, CBN and ceramic
Cermets, PVD-coated Cermets
Micro-grain Carbide, Carbide
Insert Stock List
Outside Machining Toolholders
SS
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Threading Tools
Shaper
Internal machining tool range
Original Tools for Various Applications
Indexable End Milling Tools
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Insert Part No. designation code system

1 5 0 T - 1 3 . 5 - H I



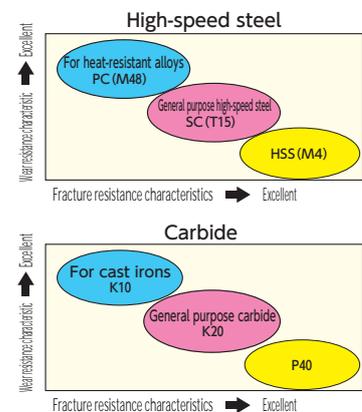
Size series

Please ensure that when initially selecting the insert size series that your choice matches with the corresponding holder size series as listed in the table below. Also, please note that different size series are allotted to some of the basic cutting edge diameter ranges.

Holder size series	Basic cutting edge diameter range	Size series of applicable inserts
Y	φ 9.50 ~ φ 11.07	Y
Z	φ 11.11 ~ φ 12.95	Z
0 • 0.5	φ 12.98 ~ φ 17.65	0
1 • 1.5	φ 17.53 ~ φ 24.38	1
2 • 2.5	φ 24.41 ~ φ 35.05	2
3	φ 34.36 ~ φ 47.80	3
4	φ 46.99 ~ φ 65.28	4
5	φ 62.38 ~ φ 89.08	5 • 6
7	φ 87.76 ~ φ 114.48	7 • 8

Insert material grade

Code	Material grade	Application
3	Powder high-speed steel	HSS (M4) Equivalent to SKH54
5		SC (T15) Equivalent to SKH10 General purpose
8		PC (M48) Equivalent to SKH57 For heat resistant alloys
C2	Micro grain carbide	K20 General purpose
C3		K10 For cast irons
C5		P40

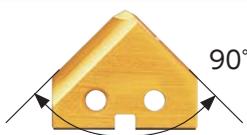


Coating

Code	Component	Hardness	Wear resistance	Heat resistance	Deposition resistance	Oxidation resistance	Application
H	AlCrN (AM200)	◎	◎	◎	○ (Other than aluminum)	◎	Cast irons, carbon steels, alloy steels, heat-resistant alloys
A	TiAlN	○	◎	◎	△	◎	Cast irons, carbon steels, alloy steels, heat-resistant alloys
N	TiCN	◎	◎	○	○	○	Cast irons, carbon steels, alloy steels
T	TiN	△	○	△	◎	○	General steels, aluminum

◎ : Excellent ○ : Good △ : Acceptable

●Insert shape

Code	Photo	Features/Applications	See pages:
None		Indexable drill inserts without this code represent those having a standard chipbreaker, and are for general purpose.	O31 O47
HI	 Small rake angle	<ul style="list-style-type: none"> ●For cutting materials high in hardness ●The cutting edge strength is high as the rake angle is small and corner clip area is large. ●The shape with a lowered center forces chips into the chipbreaker wall to break into pieces. ●Applicable to most of the indexable drill inserts except for those of GEN2 shape in the sizes of Y, Z, O, 1 and 2. 	O31 O43
HR	 Large rake angle	<ul style="list-style-type: none"> ●A chipbreaker that can control chips of materials low in hardness, which usually pose difficulty in chip control ●With the lowered center and high rake angle, this chipbreaker produces and curls up elongated chips into manageable lengths. ●Applicable to most of the indexable drill inserts except for those of GEN2 shape in the sizes of Y, Z, O, 1 and 2. 	/
HE	 Narrow	<ul style="list-style-type: none"> ●The narrow width of this chipbreaker forces chips into the chipbreaker wall, improving the chip control performance. ●A chipbreaker that can also cut off chips of materials in a lower feed range than the standard one. ●Applicable only to those of GEN2 shape in the sizes of Y, Z, O, 1 and 2. 	
PB	 Very narrow	<ul style="list-style-type: none"> ●A chipbreaker whose width is narrower than the HE type, enabling chips to be broken into pieces at a low feed range. ●This may make the cutting load higher than that of a standard type chipbreaker. ●Applicable to most of the indexable drill inserts except for those of GEN2 shape in the sizes of Y, Z, O, 1 and 2. 	/
FB	 180°	For countersinking, counterboring and flat bottom machining.	
SR	 Fully round	For cutting radius bottom holes.	O16 O51
SP	 90°	For centering, chamfering and deburring	O15 O51
118	 118°	For applications specifically requiring an apex angle of 118	O14 O50
NP		X thinning type. Hole accuracy can be improved. All the GEN2 types can give the same effect when they are provided with X thinning.	/
CR	 2-R	By making the corner clip round, advantageous effects can be expected in surface finish, burr control at exit and thermal distribution.	

Holder Part No. designation code system

2 2 0 Y 0 S - 0 0 2 M

Shape

- M – Morse taper shank in metric system
- FM – Straight shank in metric system (flanged)
- FMS – Straight shank in metric system (flanged; products for greater D-cut length)
- FMSW – Straight shank in metric system (flanged; whistle notch type)
- L – Straight shank in inch system (w/o flange)
- F – Straight shank in inch system (flanged)

Flute shape S – Straight fluted H – Helical fluted



Size series

Code	Size series	Code	Size series
Y0	Y	20	2
Z0	Z	25	2.5
00	0	30	3
05	0.5	40	4
10	1	50	5
15	1.5	70	7

Holder length

Code	Shape
10	Stab
20	Short
30	Medium
40	Standard
45 • 50	Long (L)
55 • 60	Long (L)
65 • 70 • 75	Extra Long (XL)
90	3 Extra Long (3XL)

Represents a holder

- New Products
- Tool Materials / Selection Guide
- P.C.D., CBN and ceramic
- Cermet, PVD-coated Cermet
- Micro-grain Carbide, Carbide
- Insert Stock List
- Outside Machining Toolholders
- SS
- Grooving Tools
- Threading Tools
- Shaper
- Internal Machining Tool Range
- Original Tools for Various Applications
- Indexable End Milling Tools
- Indexable Drill Inserts
- Milling Cutters
- Technical Data
- Index

Changes to the shape of holder shanks

There are some changes in the size of FMS(straight shank). New dimension is attached on the holder case by sticker as shown to the right.

【FMSホルダシャंक形状変更のお知らせ】
 シャंक部長さが一部変更になりますので、
 ご使用の際はご注意ください。

シャंक径 φd	L1		L2	
	旧	新	旧	新
16	41.9	48.0	6.35	6.0
20	41.9	50.0	6.35	6.0
25	53.1	56.0	6.0	6.0
32	57.9	60.0	6.0	6.0
40	69.0	70.0	6.0	6.0

Shank diameter	Previous Part No. code: -FM	New Part No. code: -FMS
φ 16		
φ 20		
φ 25		
φ 32		
φ 40		

No change for the blew.

Shank diameter	-FMSW
φ 40	
φ 50	

Holder and insert selection example

How to select appropriate NTK drilling tools is described here in details. We assume that holes with diameter of 32 and 250 mm deep are to be drilled.

[$\phi 32 \times 250$]

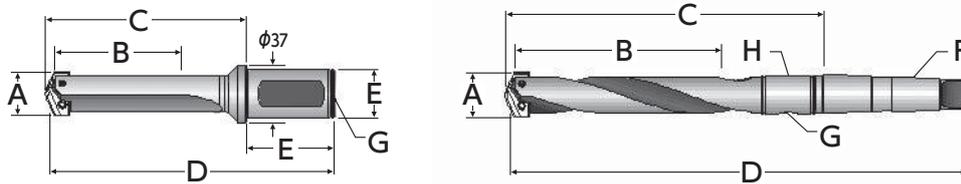
① The machining diameter for the work piece [$\phi 32$] falls into the range of [2 series].

Holder size series	Basic diameter range of cutting edge	Corresponding insert size
Y	$\phi 9.50 \sim \phi 11.07$	Y
Z	$\phi 11.11 \sim \phi 12.95$	Z
0 • 0.5	$\phi 12.98 \sim \phi 17.65$	0
1 • 1.5	$\phi 17.53 \sim \phi 24.38$	1
2 • 2.5	$\phi 24.41 \sim \phi 35.05$	2
3	$\phi 34.36 \sim \phi 47.80$	3
4	$\phi 46.99 \sim \phi 65.28$	4
5	$\phi 62.38 \sim \phi 89.08$	5 • 6
7	$\phi 87.76 \sim \phi 114.48$	7 • 8

② There are straight-shank type and Morse tapered-shank type holders.

Select the holder type you are using by referring to page **O38** in this catalog.

The last section of the part no., [-004M] indicates the holder corresponds to MT-4 while [-32FMS] indicates the applicable diameter is $\phi 32$.



Example) Let us assume that the straight shank type holder is selected.

③ By checking the values listed under the column (B) Max. machining length, select the drill holder allowing to machine holes as deep as 250 mm. We recommend choosing a drill holder whose overall length is shortest for stability. The maximum machining length is set to a length calculated by subtracting the space for chip evacuation from the length of the flute.

(A) Insert cutting edge dia.	(B) Max. machining length	P/N	Long holder	Stock	Shape
24.41 ~ 35.05	187.3	24020H-32FMS		●	S-3
30.00 ~ 35.05		24025H-32FMS		●	
24.41 ~ 35.05	288.9	25020H-32FMS	L	●	
30.00 ~ 35.05		25025H-32FMS	L	●	
24.41 ~ 35.05	400.0	26020S-32FMS	L	●	S-2
30.00 ~ 35.05		27020S-32FMS	XL	●	

When the hole depth is 250 mm → The part numbers of the applicable holders can be found at the right of the bracket for [288.9 mm as the maximum machining length]. Then, the holders have different body diameters. If you are to drill smaller holes, select the one with the thinner body, if you think the holder rigidity is more important, choose the thicker body type.

Holder P/N	Mountable insert	Body diameter	Selection guideline
25020H-32FMS	$\phi 24.41 \sim \phi 35.05$	smaller (thinner)	Focus on general purpose application
25025H-32FMS	$\phi 30.00 \sim \phi 35.05$	larger (thicker)	Focus on rigidity

④ When you use a Long type holder for drilling, also select a drill holder for drilling pilot holes.

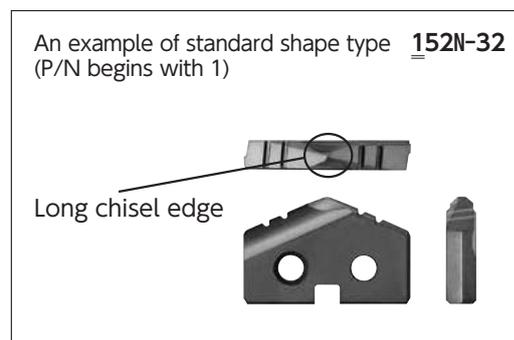
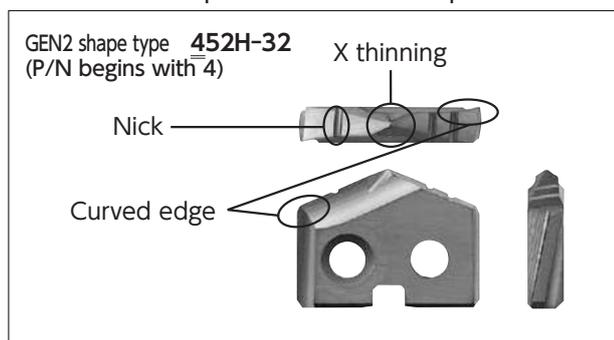
For drilling pilot holes, select either a short-type or stab type holder. Similarly, the holders are different in body diameter. You can choose either one as per the step ③ above.

(A) Insert cutting edge dia.	(B) Max. machining length	P/N	Long holder	Stock	Shape
24.41 ~ 35.05	57.2	21020S-32FMS		●	S-1
30.00 ~ 35.05	92.1	21025S-32FMS		●	
24.41 ~ 35.05	85.7	22020S-32FMS		●	S-2
30.00 ~ 35.05		22025S-32FMS		●	
24.41 ~ 35.05	136.5	23020H-32FMS		●	S-3
30.00 ~ 35.05		23025H-32FMS		●	

Holder P/N	Mountable insert	Body diameter	Selection guideline
22020S-32FMS	$\phi 24.41 \sim \phi 35.05$	smaller (thinner)	Focus on general purpose application
22025S-32FMS	$\phi 30.00 \sim \phi 35.05$	larger (thicker)	Focus on rigidity

⑤ How to select inserts

<1> GEN2 shape or standard shape



- The GEN2 type has a part number beginning with 4 and the X-thinning apex. As the shape is highly centripetal, this type is effective in improving geometric hole shapes. (Please refer to pages **012** where GEN2 is introduced.)
 - The standard type has a part number beginning with 1 and a relatively long chisel edge. One of the features is the apex is not easily fractured. This type is suitable for drilling of hardened materials and those materials that work harden.
 - It is possible to use GEN2 type if the work material is not so hard.
 - The standard type is recommended if the work material is relatively hard.
- The level of oxidation resistance by coating is as follows: Excellent TiAlN > TiCN > TiN Low

<2> Guideline for selecting chipbreakers among standard type inserts

When selecting chipbreakers, please take into consideration the work material, application and out stock condition.

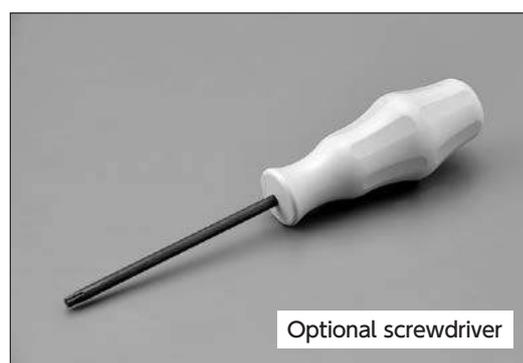
Symbol	Photo	Application	Page
None		No symbol indicates a standard chipbreaker for general purpose use.	
HI		<p><HI chipbreaker></p> <ul style="list-style-type: none"> ● For materials with a high hardness. ● The cutting edge strength is high as the rake angle is shallow and the corner clip area is large. ● The shape with a lowered center makes the material chips easily at the chipbreaker wall easily breaking into manageable chips. ● Applicable to most of the indexable drill inserts except for those of GEN2 shape in the sizes of Y, Z, 0, 1 and 2. 	

HR, HE, PB chipbreaker types are also available, but these products are not standard stock items. (Please refer to page **025**.)

⑥ Selecting screwdrivers

Our clamping screws are Torx Plus.

Please place your purchase orders for our optional screwdrivers if you need them. (Please refer to page **052**.)

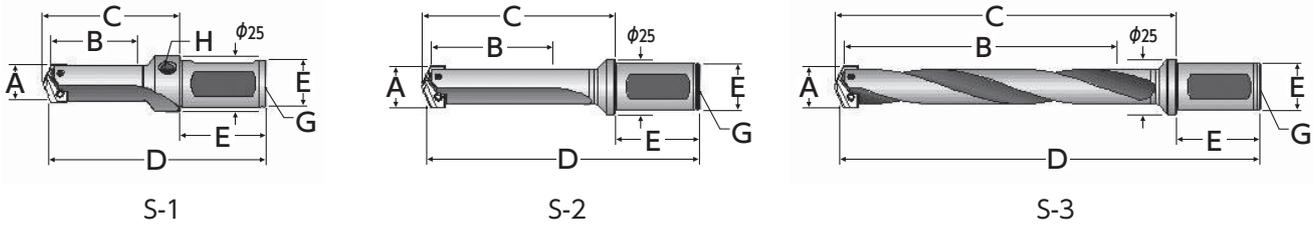


Indexable Drill Inserts

Holders for Y Series: $\phi 9.50 - \phi 11.07$

★ Select same size series between inserts and holders.

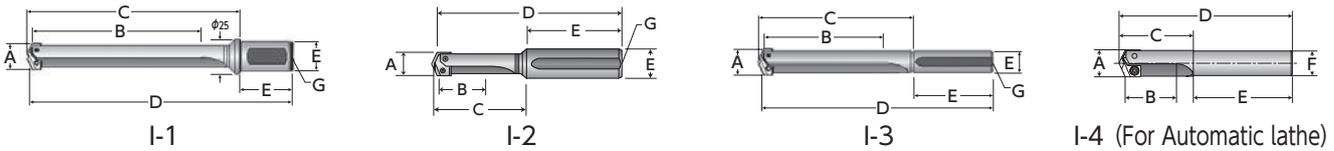
Metric system straight shank holders



(A) Insert cutting edge dia	(B) Max. machining length	P/N	Long holder	Stock	Shape	Dimensions				Parts		
						(C) Body length	(D) Overall length	(E) Shank dia. x length	(G) Screw for pipe	(H) Screw for pipe	Clamping screw	Screwdriver (Optional)
9.50 ~ 11.07	19.1	210Y0S-16FMS		●	S-1	50.0	95.6	$\phi 20.0 \times 50.0$	1/16"	1/8"	724-IP7-10	8IP-7
	31.8	220Y0S-20FMS		●	S-2	63.5	111.1					
	60.3	240Y0H-20FMS		●	S-3	92.1	139.7					
	111.1	250Y0H-20FMS		●	S-3	142.9	190.5					
	170.0	260Y0S-20FMS	L	●	S-2	202.1	252.1					
	222.3	270Y0S-20FMS	XL	●	S-2	254.1	301.7					
290.5	290Y0S-20FMS	3XL	●	S-2	322.3	369.9						

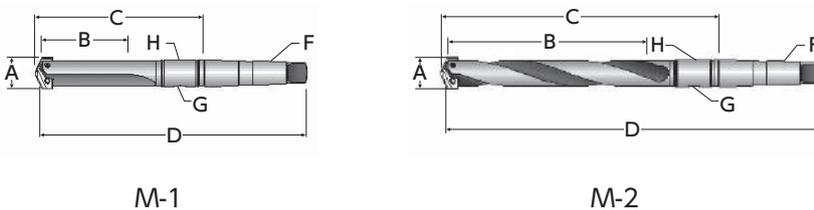
Use a 3/16" size wrench for the screw for pipe (H).

Straight shank holders



(A) Insert cutting edge dia	(B) Max. machining length	P/N	Stock	Shape	Dimensions				Parts	
					(C) Body length	(D) Overall length	(E) Shank dia. x length	(G) Screw for pipe	Clamping screw	Screwdriver (Optional)
9.50 ~ 11.07	16.0	210Y0S-07M	●	I-4	25.0	55.0	$\phi 7.0 \times 30.0$	1/8"	724-IP7-10	8IP-7
	20.0	210Y0S-10M	●		30.0	70.0	$\phi 10.0 \times 40.0$			
	31.8	220Y0S-075F	●	I-1	63.5	112.7	$\phi 19.05 \times 51.6$			
	31.8	220Y0S-075L	●	I-2	54.0	111.9	$\phi 19.05 \times 60.3$			
	40.3	220Y0S-22M	●	I-3	62.3	152.3	$\phi 22.0 \times 90.0$			
	40.0	010703-102	●		70.0	146.2	$\phi 25.4 \times 76.2$			
65.0	230Y0S-22M	●	95.0		145.0	$\phi 22.0 \times 50.0$				

Morse tapered shank holders



※For coolant adaptors for Morse tapered shank holders, please see page O53.

(A) Insert cutting edge dia	(B) Max. machining length	P/N	Long holder	Stock	Shape	Dimensions				Parts		
						(C) Body length	(D) Overall length	(F) MT	(G) Screw for pipe	(H) Coolant adaptor	Clamping screw	Screwdriver (Optional)
9.50 ~ 11.07	31.8	220Y0S-002M		●	M-1	88.0	160.3	#2	1/16"	2T-2SRM	724-IP7-10	8IP-7
	60.3	240Y0H-002M		●	M-2	116.7	188.9					
	111.1	250Y0H-002M	L	●		167.4	239.7					

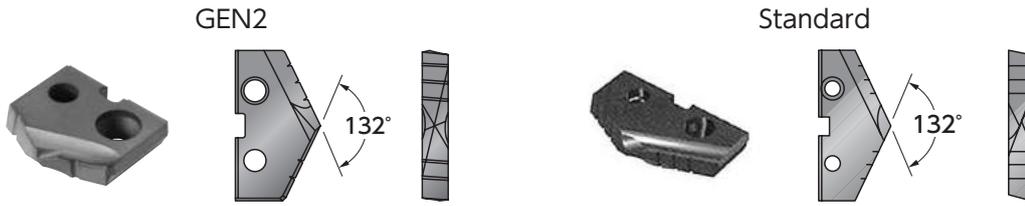
For recommended cutting conditions, please refer to pages O70 -.

Notes)•Each holder comes with only 4 clamping screws and a screw releasing agent (E-Z BREAK). A screwdriver is available only as an optional item.
•Replace the holders periodically, using "every 100th insert replacement" as a guideline.

Inserts for Y Series: $\phi 9.50 - \phi 11.07$

★ Select same size series between inserts and holders.

<Shapes>



Please order in units of 2 as 1 package contains 2 inserts.

Edge shape	GEN2				Standard								GEN2	
Material	Powder high-speed steel (T15)				Powder high-speed steel (T15)								Carbide (K20)	
Coating	AlCrN				TiAlN			TiCN			TiN		AlCrN	
Edge dia.	P/N	Chipbreaker		P/N	Chipbreaker		P/N	Chipbreaker		P/N	Chipbreaker		P/N	Chipbreaker
		Standard	HE		Standard	HI		Standard	HI		Standard	HI		Standard
9.50	45YH-9.5	●	●	15YA-9.5	●		15YN-9.5	●		15YT-9.5	●		4C2YH-9.5	●
9.53	45YH-0012	●	●	15YA-0012	●		15YN-0012	●		15YT-0012	●		4C2YH-0012	●
9.60	45YH-9.6	●												
9.70	45YH-9.7	●												
9.80	45YH-.386	●	●	15YA-.386	●		15YN-.386	●		15YT-.386	●		4C2YH-.386	●
9.90	45YH-9.9	●												
9.92	45YH-.390	●		15YA-.390	●		15YN-.390	●		15YT-.390	●		4C2YH-.390	●
10.00	45YH-10	●	●	15YA-10	●		15YN-10	●	●	15YT-10	●	●	4C2YH-10	●
10.10	45YH-10.1	●												
10.20	45YH-10.2	●	●	15YA-10.2	●		15YN-10.2	●	●	15YT-10.2	●		4C2YH-10.2	●
10.30	45YH-10.3	●												
10.32	45YH-0013	●		15YA-0013	●		15YN-0013	●		15YT-0013	●		4C2YH-0013	●
10.40	45YH-10.4	●												
10.50	45YH-10.5	●	●	15YA-10.5	●		15YN-10.5	●	●	15YT-10.5	●	●	4C2YH-10.5	●
10.60	45YH-10.6	●												
10.70	45YH-10.7	●												
10.72	45YH-.421	●	●	15YA-.421	●		15YN-.421	●		15YT-.421	●		4C2YH-.421	●
10.80	45YH-10.8	●	●	15YA-10.8	●		15YN-10.8	●		15YT-10.8	●		4C2YH-10.8	●
10.90	45YH-10.9	●												
11.00	45YH-11	●	●	15YA-11	●		15YN-11	●	●	15YT-11	●	●	4C2YH-11	●

For recommended cutting conditions, please refer to pages 070 -. ※The part numbers of HI chipbreakers are followed by "-HI". (Ex.) 15YN-11-HI

● : Standard stock

● : Semi-standard stock (Time required for delivery: approx. 2 weeks)production-to-order basis

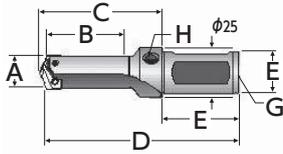
No symbol: Products manufactured production-to-order basis

Indexable Drill Inserts

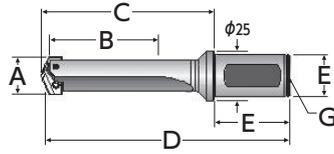
HOLDERS for Z Series: $\phi 11.10 - \phi 12.95$

★ Select same size series between inserts and holders.

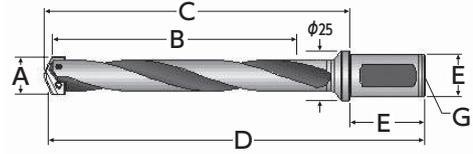
Metric system straight shank holders



S-1



S-2

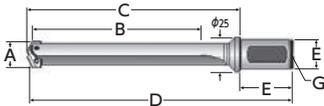


S-3

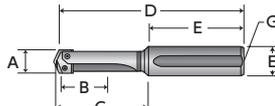
(A) Insert cutting edge dia	(B) Max. machining length	P/N	Long holder	Stock	Shape	Dimensions				Parts		
						(C) Body length	(D) Overall length	(E) Shank dia. x length	(G) Screw for pipe	(H) Screw for pipe	Clamping screw	Screwdriver (Optional)
11.10 ~ 12.95	19.1	210Z0S-16FMS		●	S-1	48.0	104.6	$\phi 20.0 \times 50.0$	1/16"	1/8"	7247-IP7-10	8IP-7
	31.8	220Z0S-20FMS		●	S-2	63.5	111.1					
	60.3	240Z0H-20FMS		●	S-3	92.1	139.7					
	111.1	250Z0H-20FMS		●	S-3	142.9	190.5					
	170.0	260Z0S-20FMS	L	●	S-2	201.8	251.8					
	222.3	270Z0S-20FMS	XL	●	S-2	254.1	301.7					
290.5	290Z0S-20FMS	3XL	●	S-2	322.3	369.9						

Use a 3/16" size wrench for the screw for pipe (H).

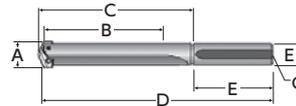
Straight shank holders



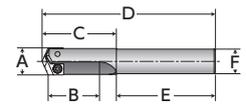
I-1



I-2



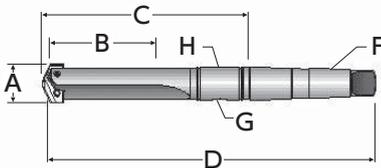
I-3



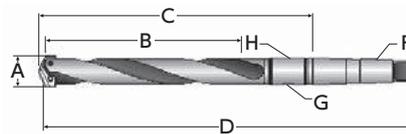
I-4 (For Automatic lathe)

(A) Insert cutting edge dia	(B) Max. machining length	P/N	Stock	Shape	Dimensions				Parts	
					(C) Body length	(D) Overall length	(E) Shank dia. x length	(G) Screw for pipe	Clamping screw	Screwdriver (Optional)
11.10 ~ 12.95	16.0	210Z0S-07M	●	I-4	25.0	55.0	$\phi 7.0 \times 30.0$	1/8"	7247-IP7-10	8IP-7
	20.0	210Z0S-10M	●		30.0	70.0	$\phi 10.0 \times 40.0$			
	31.8	220Z0S-075F	●	I-1	63.5	112.7	$\phi 19.05 \times 51.6$			
	31.8	220Z0S-075L	●	I-2	54.0	111.9	$\phi 19.05 \times 60.3$			
	35.0	220Z0S-22M	●	I-3	62.3	152.3	$\phi 22.0 \times 90.0$			
	40.0	010703-103	●		70.0	146.2	$\phi 25.4 \times 76.2$			
65.0	230Z0S-22M	●	95.0		145.0	$\phi 22.0 \times 50.0$				

Morse tapered shank holders



M-1



M-2

※For coolant adaptors for Morse tapered shank holders, please see page 053.

(A) Insert cutting edge dia	(B) Max. machining length	P/N	Long holder	Stock	Shape	Dimensions				Parts		
						(C) Body length	(D) Overall length	(F) MT	(G) Screw for pipe	(H) Coolant adaptor	Clamping screw	Screwdriver (Optional)
11.10 ~ 12.95	31.8	220Z0S-002M		●	M-1	88.0	160.3	#2	1/16"	2T-2SRM	7247-IP7-10	8IP-7
	60.3	240Z0H-002M		●	M-2	116.7	188.9					
	111.1	250Z0H-002M	L	●		167.4	239.7					

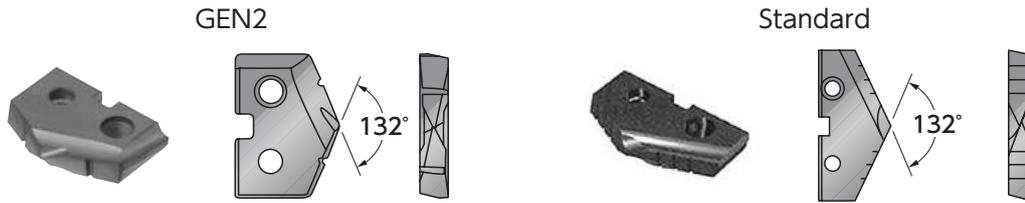
For recommended cutting conditions, please refer to pages 070 -.

Notes)•Each holder comes with only 4 clamping screws and a screw releasing agent (E-Z BREAK). A screwdriver is available only as an optional item.
•Replace the holders periodically, using "every 100th insert replacement" as a guideline.

Inserts for Z Series: $\phi 11.10 - \phi 12.95$

★ Select same size series between inserts and holders.

<Shapes>



Please order in units of 2 as 1 package contains 2 inserts.

Edge shape	GEN2				Standard								GEN2	
Material	Powder high-speed steel (T15)				Powder high-speed steel (T15)								Carbide (K20)	
Coating	AlCrN				TiAlN		TiCN			TiN			AlCrN	
Edge dia.	P/N	Chipbreaker		P/N	Chipbreaker		P/N	Chipbreaker		P/N	Chipbreaker		P/N	Chipbreaker
		Standard	HE		Standard	HI		Standard	HI		Standard	HI		Standard
11.10	45ZH-11.1	●												
11.11	45ZH-0014	●	●	15ZA-0014	●		15ZN-0014	●		15ZT-0014	●		4C2ZH-0014	●
11.20	45ZH-11.2	●												
11.30	45ZH-11.3	●												
11.40	45ZH-11.4	●												
11.50	45ZH-11.5	●	●	15ZA-11.5	●		15ZN-11.5	●	●	15ZT-11.5	●		4C2ZH-11.5	●
11.51	45ZH-.453	●		15ZA-.453	●		15ZN-.453	●		15ZT-.453	●		4C2ZH-.453	●
11.60	45ZH-11.6	●												
11.70	45ZH-11.7	●												
11.80	45ZH-11.8	●												
11.90	45ZH-11.9	●												
11.91	45ZH-0015	●		15ZA-0015	●		15ZN-0015	●		15ZT-0015	●		4C2ZH-0015	●
12.00	45ZH-12	●	●	15ZA-12	●		15ZN-12	●	●	15ZT-12	●	●	4C2ZH-12	●
12.10	45ZH-12.1	●												
12.20	45ZH-12.2	●												
12.30	45ZH-.484	●	●	15ZA-.484	●		15ZN-.484	●		15ZT-.484	●		4C2ZH-.484	●
12.40	45ZH-12.4	●												
12.50	45ZH-12.5	●	●	15ZA-12.5	●		15ZN-12.5	●	●	15ZT-12.5	●	●	4C2ZH-12.5	●
12.60	45ZH-12.6	●												
12.70	45ZH-0016	●	●	15ZA-0016	●		15ZN-0016	●		15ZT-0016	●		4C2ZH-0016	●
12.80	45ZH-12.8	●	●											
12.90	45ZH-12.9	●												

For recommended cutting conditions, please refer to pages 070 -. ※The part numbers of HI chipbreakers are followed by "-HI". (Ex.) 15ZN-12-HI

● : Standard stock

● : Semi-standard stock (Time required for delivery: approx. 2 weeks)production-to-order basis

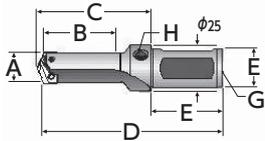
No symbol: Products manufactured production-to-order basis

Indexable Drill Inserts

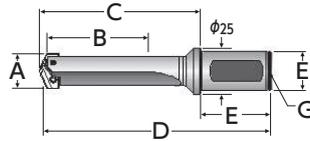
Holders for 0,0.5 Series: $\phi 12.98 - \phi 17.65$

★ Select same size series between inserts and holders.

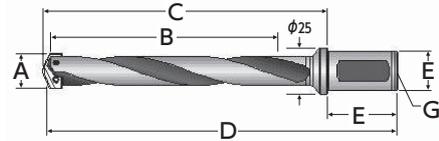
Metric system straight shank holders



S-1



S-2

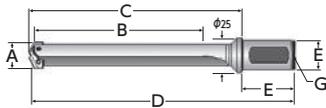


S-3

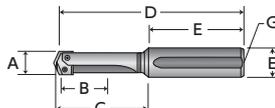
(A) Insert cutting edge dia	(B) Max. machining length	P/N	Long holder	Stock	Shape	Dimensions				Parts	
						(C) Body length	(D) Overall length	(E) Shank dia. x length	(G) Screw for pipe	(H) Screw for pipe	Clamping screw
12.98 ~ 17.65	22.2	21000S-20FMS		●	S-1	50.4	97.6	$\phi 20.0 \times 50.0$	1/8"	72556-IP8-10	8IP-8
15.50 ~ 17.65		21005S-20FMS		●							
12.98 ~ 17.65	34.9	22000S-20FMS		●	S-2	66.3	113.5				
15.50 ~ 17.65		22005S-20FMS		●							
12.98 ~ 17.65	63.5	24000H-20FMS		●	S-3	94.9	142.1				
15.50 ~ 17.65		24005H-20FMS		●							
12.98 ~ 17.65	114.3	25000H-20FMS	L	●	S-3	145.7	192.9				
15.50 ~ 17.65		25005H-20FMS	L	●							
12.98 ~ 17.65	177.8	26000H-20FMS	L	●	S-3	209.1	256.4				
15.50 ~ 17.65		26005H-20FMS	L	●							
12.98 ~ 17.65	240.0	26500S-20FMS	XL	●	S-2	271.7	321.7	$\phi 20.0 \times 50.0$	1/8"	72556-IP8-10	8IP-8
	295.3	27000S-20FMS	XL	●							
	387.4	29000S-20FMS	3XL	●							

Use a 3/16" size wrench for the screw for pipe (H).

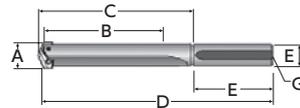
Straight shank holders



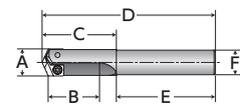
I-1



I-2



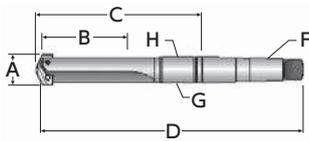
I-3



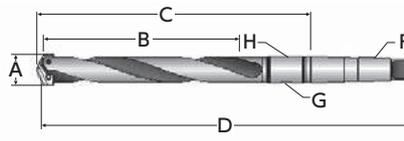
I-4 (For Automatic lathe)

(A) Insert cutting edge dia	(B) Max. machining length	P/N	Stock	Shape	Dimensions				Parts	
					(C) Body length	(D) Overall length	(E) Shank dia. x length	(G) Screw for pipe	Clamping screw	Screwdriver (Optional)
12.98 ~ 17.65	20.0	21000S-10M	●	I-4	30.0	70.0	$\phi 10.0 \times 40.0$	1/8"	72556-IP8-10	8IP-8
		22000S-075F	●	I-1	66.3	115.1	$\phi 19.05 \times 51.6$			
15.50 ~ 17.65	34.9	22005S-075F	●	I-1	66.3	115.1	$\phi 19.05 \times 51.6$			
		22000S-075L	●	I-2	58.3	115.9	$\phi 19.05 \times 60.3$			
15.50 ~ 17.65	34.9	22005S-075L	●	I-2	58.3	115.9	$\phi 19.05 \times 60.3$			
		22005S-075L	●	I-2	58.3	115.9	$\phi 19.05 \times 60.3$			
12.98 ~ 17.65	35.0	22000S-22M	●	I-3	62.7	152.7	$\phi 22 \times 90.0$	72556-IP8-10	8IP-8	
	40.0	010703-104	●		70.0	146.2	$\phi 25.4 \times 76.2$			
	65.0	23000S-22M	●		95.0	145.0	$\phi 22 \times 50.0$			

Morse tapered shank holders



M-1



M-2

※For coolant adaptors for Morse tapered shank holders, please see page 053.

(A) Insert cutting edge dia	(B) Max. machining length	P/N	Long holder	Stock	Shape	Dimensions				Parts	
						(C) Body length	(D) Overall length	(F) MT	(G) Screw for pipe	(H) Coolant adaptor	Clamping screw
12.98 ~ 17.65	35.0	22000S-002M		●	M-1	92.4	164.3	#2	1/16"	2T-2SRM	8IP-8
15.50 ~ 17.65		22005S-002M		●							
12.98 ~ 17.65	63.5	24000H-002M		●	M-2	121.0	192.9				
15.50 ~ 17.65		24005H-002M		●							
12.98 ~ 17.65	114.3	25000H-002M	L	●	M-2	171.8	243.7				
15.50 ~ 17.65		25005H-002M	L	●							

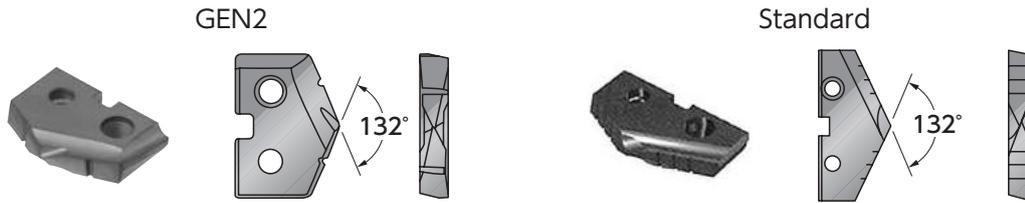
For recommended cutting conditions, please refer to pages 070 -.

Notes)•Each holder comes with only 4 clamping screws and a screw releasing agent (E-Z BREAK). A screwdriver is available only as an optional item.
•Replace the holders periodically, using "every 100th insert replacement" as a guideline.

Inserts for 0, 0.5 Series: $\phi 12.98 - \phi 17.65$

★ Select same size series between inserts and holders.

<Shapes>



Please order units of 2 as 1 package contains 2 inserts.

Edge shape	GEN2				Standard								GEN2	
Material	Powder high-speed steel (T15)				Powder high-speed steel (T15)								Carbide (K20)	
Coating	AlCrN				TiAlN		TiCN			TiN			AlCrN	
Edge dia.	P/N	Chipbreaker Standard	HE	P/N	Chipbreaker Standard	HI	P/N	Chipbreaker Standard	HI	P/N	Chipbreaker Standard	HI	P/N	Chipbreaker Standard
13.00	450H-13	●	●	150A-13	●		150N-13	●	●	150T-13	●	●	4C20H-13	●
13.10	450H-.515	●		150A-.515	●		150N-.515	●		150T-.515	●		4C20H-.515	●
13.20	450H-13.2	●												
13.30	450H-13.3	●												
13.40	450H-13.4	●												
13.49	450H-0017	●		150A-0017	●		150N-0017	●		150T-0017	●		4C20H-0017	●
13.50	450H-13.5	●		150A-13.5	●		150N-13.5	●	●	150T-13.5	●	●	4C20H-13.5	●
13.60	450H-13.6	●												
13.70	450H-13.7	●												
13.80	450H-13.8	●												
13.89	450H-.546	●	●	150A-.546	●		150N-.546	●		150T-.546	●		4C20H-.546	●
13.90	450H-13.9	●												
14.00	450H-14	●	●	150A-14	●	●	150N-14	●	●	150T-14	●	●	4C20H-14	●
14.10	450H-14.1	●												
14.20	450H-14.2	●												
14.29	450H-0018	●	●	150A-0018	●		150N-0018	●		150T-0018	●		4C20H-0018	●
14.30	450H-14.3	●												
14.40	450H-14.4	●												
14.50	450H-14.5	●		150A-14.5	●		150N-14.5	●	●	150T-14.5	●	●	4C20H-14.5	●
14.60	450H-14.6	●												
14.68	450H-.578	●		150A-.578	●		150N-.578	●		150T-.578	●		4C20H-.578	●
14.70	450H-14.7	●												
14.80	450H-14.8	●	●											
14.90	450H-14.9	●												
15.00	450H-15	●	●	150A-15	●	●	150N-15	●	●	150T-15	●	●	4C20H-15	●
15.08	450H-0019	●	●	150A-0019	●		150N-0019	●		150T-0019	●		4C20H-0019	●
15.10	450H-15.1	●												
15.20	450H-15.2	●												
15.30	450H-15.3	●												
15.40	450H-15.4	●												
15.48	450H-.609	●		150A-.609	●		150N-.609	●		150T-.609	●		4C20H-.609	●
15.50	450H-15.5	●	●	150A-15.5	●		150N-15.5	●	●	150T-15.5	●	●	4C20H-15.5	●
15.60	450H-15.6	●												
15.70	450H-15.7	●												
15.80	450H-15.8	●												
15.88	450H-0020	●	●	150A-0020	●		150N-0020	●		150T-0020	●		4C20H-0020	●
15.90	450H-15.9	●												
16.00	450H-16	●		150A-16	●		150N-16	●	●	150T-16	●	●	4C20H-16	●
16.10	450H-16.1	●												
16.20	450H-16.2	●												
16.27	450H-.640	●		150A-.640	●		150N-.640	●		150T-.640	●		4C20H-.640	●
16.30	450H-16.3	●												
16.40	450H-16.4	●												
16.50	450H-16.5	●	●	150A-16.5	●	●	150N-16.5	●	●	150T-16.5	●	●	4C20H-16.5	●
16.60	450H-16.6	●												
16.67	450H-0021	●	●	150A-0021	●		150N-0021	●		150T-0021	●		4C20H-0021	●
16.70	450H-16.7	●												
16.80	450H-16.8	●	●											
16.90	450H-16.9	●												
17.00	450H-17	●	●	150A-17	●		150N-17	●	●	150T-17	●	●	4C20H-17	●
17.07	450H-.671	●		150A-.671	●		150N-.671	●		150T-.671	●		4C20H-.671	●
17.10	450H-17.1	●												
17.20	450H-17.2	●												
17.30	450H-17.3	●												
17.40	450H-17.4	●												
17.46	450H-0022	●	●	150A-0022	●		150N-0022	●		150T-0022	●		4C20H-0022	●
17.50	450H-17.5	●	●	150A-17.5	●	●	150N-17.5	●	●	150T-17.5	●	●	4C20H-17.5	●
17.60	450H-17.6	●												

For recommended cutting conditions, please refer to pages 070 -. ※The part numbers of HI chipbreakers are followed by "-HI". (Ex.) 150N-13-HI

● : Standard stock ○ : Semi-standard stock (Time required for delivery: approx. 2 weeks)production-to-order basis No symbol: Products manufactured production-to-order basis

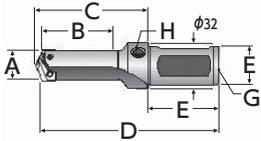
New Products
 Tool Materials / Selection Guide
 PCD, CBN and ceramic
 Cermet
 PVD-coated Cermet
 Micro-grain Carbide, Carbide
 Insert Stock List
 Machining Toolholders
 Outside Machining
 SS
 Grooving Tools
 Threading Tools
 Shaper
 Internal machining tool range
 Original Tools for Various Applications
 Indexable End Milling Tools
 Indexable Drill Inserts
 Milling Cutters
 Technical Data
 Index

Indexable Drill Inserts

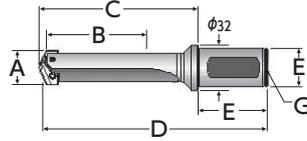
Holders for 1, 1.5 Series: $\phi 17.53 - \phi 24.38$

★ Select same size series between inserts and holders.

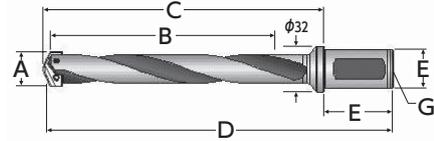
Metric system straight shank holders



S-1



S-2

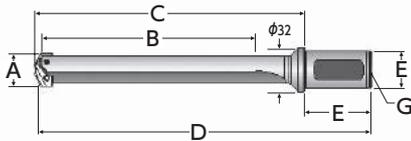


S-3

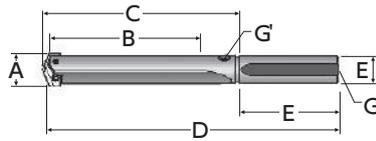
(A) Insert cutting edge dia	(B) Max. machining length	P/N	Long holder	Stock	Shape	Dimensions				Parts	
						(C) Body length	(D) Overall length	(E) Shank dia. x length	(G) Screw for pipe	(H) Screw for pipe	Clamping screw
17.53 ~ 24.38	47.6	21010S-25FMS		●	S-1	79.4	131.8	$\phi 25.0 \times 56.0$	1/8"	7375-IP9-10	8IP-9
21.83 ~ 24.38	57.2	21015S-25FMS		●	S-1	92.1	144.5				
17.53 ~ 24.38	66.7	22010S-25FMS		●	S-2	110.7	163.2				
21.83 ~ 24.38		22015S-25FMS		●	S-2						
17.53 ~ 24.38	117.5	23010H-25FMS		●	S-3	158.4	210.8				
21.83 ~ 24.38		23015H-25FMS		●							
17.53 ~ 24.38	168.3	24010H-25FMS		●		209.2	261.6				
21.83 ~ 24.38		24015H-25FMS		●							
17.53 ~ 24.38	269.9	25010H-25FMS	L	●	S-2	310.8	363.2				
21.83 ~ 24.38		25015H-25FMS	L	●							
17.53 ~ 24.38	365.0	26010S-25FMS	L	●	S-2	406.1	462.1				
	457.2	27010S-25FMS	XL	●		498.1	550.5				
	565.2	29010S-25FMS	3XL	●		606.1	658.5				

Use a 3/16" size wrench for the screw for pipe (H).

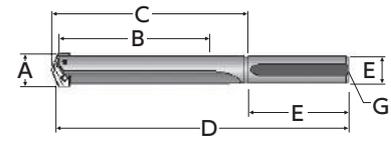
Inch system straight shank holders



I-1



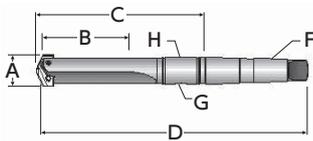
I-2



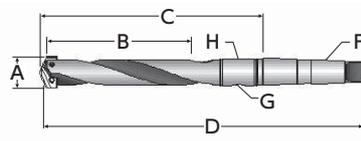
I-3

(A) Insert cutting edge dia	(B) Max. machining length	P/N	Stock	Shape	Dimensions				Parts	
					(C) Body length	(D) Overall length	(E) Shank dia. x length	(G), (G') Screw for pipe	Clamping screw	Screwdriver (Optional)
17.53 ~ 24.38	66.7	22010S-100F	●	I-1	110.7	165.1	$\phi 25.4 \times 57.9$	1/8"	7375-IP9-10	8IP-9
21.83 ~ 24.38		22015S-100F	●							
17.53 ~ 24.38		22010S-075L	●							
21.83 ~ 24.38		22015S-075L	●	I-2	102.0	174.6	$\phi 19.05 \times 76.2$			
17.53 ~ 24.38		22010S-100L	●							
21.83 ~ 24.38		22015S-100L	●							
17.53 ~ 24.38	35.0	010703-105	●	I-3	70.0	146.2	$\phi 25.4 \times 76.2$	7375-IP9-10		

Morse tapered shank holders



M-1



M-2

※For coolant adaptors for Morse tapered shank holders, please see page O53.

(A) Insert cutting edge dia	(B) Max. machining length	P/N	Long holder	Stock	Shape	Dimensions				Parts		
						(C) Body length	(D) Overall length	(F) MT	(G) Screw for pipe	(H) Coolant adaptor	Clamping screw	Screwdriver (Optional)
17.53 ~ 24.38	69.8	22010S-003M		●	M-1	142.5	232.5	#3	1/8"	2T-3SRM	7375-IP9-10	8IP-9
21.83 ~ 24.38		22015S-003M	●									
17.53 ~ 24.38		23010H-003M	●									
21.83 ~ 24.38		23015H-003M	●	M-2	244.1	334.2						
17.53 ~ 24.38		24010H-003M	●									
21.83 ~ 24.38		24015H-003M	●									
17.53 ~ 24.38	273.1	25010H-003M	L	●	M-2	345.7	435.8					
21.83 ~ 24.38		25015H-003M	L	●								

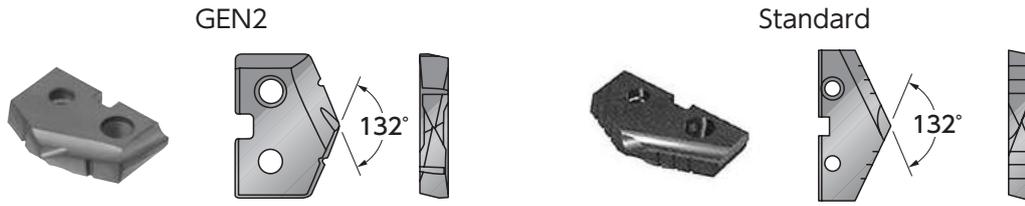
For recommended cutting conditions, please refer to pages O70 -.

Notes)•Each holder comes with only 4 clamping screws and a screw releasing agent (E-Z BREAK). A screwdriver is available only as an optional item.
•Replace the holders periodically, using "every 100th insert replacement" as a guideline.

Inserts for 1, 1.5 Series: $\phi 17.53 - \phi 24.38$

★ Select same size series between inserts and holders.

<Shapes>



Please order in units of 2 as 1 package contains 2 inserts.

Edge shape	GEN2				Standard								GEN2	
Material	Powder high-speed steel (T15)				Powder high-speed steel (T15)								Carbide (K20)	
Coating	AlCrN				TiAlN		TiCN			TiN			AlCrN	
Edge dia.	P/N	Chipbreaker Standard	HE	P/N	Chipbreaker Standard	HI	P/N	Chipbreaker Standard	HI	P/N	Chipbreaker Standard	HI	P/N	Chipbreaker Standard
17.70	451H-17.7	●												
17.80	451H-17.8	●												
17.86	451H-703	●		151A-703	●		151N-703	●	●	151T-703	●		4C21H-703	●
17.90	451H-17.9	●												
18.00	451H-18	●	●	151A-18	●	●	151N-18	●	●	151T-18	●	●	4C21H-18	●
18.10	451H-18.1	●												
18.20	451H-18.2	●												
18.26	451H-0023	●		151A-0023	●		151N-0023	●		151T-0023	●		4C21H-0023	●
18.30	451H-18.3	●												
18.40	451H-18.4	●												
18.50	451H-18.5	●	●	151A-18.5	●	●	151N-18.5	●	●	151T-18.5	●		4C21H-18.5	●
18.60	451H-18.6	●												
18.65	451H-734	●		151A-734	●		151N-734	●		151T-734	●		4C21H-734	●
18.70	451H-18.7	●												
18.80	451H-18.8	●												
18.90	451H-18.9	●												
19.00	451H-19	●	●	151A-19	●		151N-19	●	●	151T-19	●	●	4C21H-19	●
19.05	451H-0024	●	●	151A-0024	●		151N-0024	●		151T-0024	●		4C21H-0024	●
19.10	451H-19.1	●												
19.20	451H-19.2	●												
19.25	451H-758	●	●											
19.30	451H-19.3	●												
19.40	451H-19.4	●												
19.45	451H-765	●		151A-765	●		151N-765	●		151T-765	●		4C21H-765	●
19.50	451H-19.5	●	●	151A-19.5	●		151N-19.5	●	●	151T-19.5	●		4C21H-19.5	●
19.60	451H-19.6	●												
19.70	451H-19.7	●												
19.80	451H-19.8	●												
19.84	451H-0025	●	●	151A-0025	●		151N-0025	●		151T-0025	●		4C21H-0025	●
19.90	451H-19.9	●												
20.00	451H-20	●	●	151A-20	●		151N-20	●	●	151T-20	●	●	4C21H-20	●
20.20	451H-20.2	●					151N-20.2	●						
20.24	451H-796	●		151A-796	●		151N-796	●		151T-796	●		4C21H-796	●
20.50	451H-20.5	●	●	151A-20.5	●	●	151N-20.5	●	●	151T-20.5	●	●	4C21H-20.5	●
20.64	451H-0026	●	●	151A-0026	●		151N-0026	●		151T-0026	●		4C21H-0026	●
21.00	451H-21	●	●	151A-21	●	●	151N-21	●	●	151T-21	●	●	4C21H-21	●
21.43	451H-0027	●		151A-0027	●		151N-0027	●		151T-0027	●		4C21H-0027	●
21.50	451H-21.5	●	●	151A-21.5	●		151N-21.5	●	●	151T-21.5	●		4C21H-21.5	●
21.83	451H-859	●		151A-859	●		151N-859	●		151T-859	●		4C21H-859	●
22.00	451H-22	●	●	151A-22	●	●	151N-22	●	●	151T-22	●	●	4C21H-22	●
22.23	451H-0028	●	●	151A-0028	●		151N-0028	●	●	151T-0028	●		4C21H-0028	●
22.50	451H-22.5	●	●											
22.62	451H-890	●		151A-890	●		151N-890	●		151T-890	●		4C21H-890	
23.00	451H-23	●		151A-23	●		151N-23	●	●	151T-23	●	●	4C21H-23	●
23.02	451H-0029	●	●	151A-0029	●		151N-0029	●		151T-0029	●		4C21H-0029	●
23.42	451H-921	●	●	151A-921	●		151N-921	●		151T-921	●		4C21H-921	●
23.50	451H-23.5	●	●				151N-23.5		●					
23.70	451H-23.7		●											
23.81	451H-0030	●	●	151A-0030	●		151N-0030	●		151T-0030	●		4C21H-0030	●
24.00	451H-24	●	●	151A-24	●	●	151N-24	●	●	151T-24	●	●	4C21H-24	●

For recommended cutting conditions, please refer to pages 070 -. ※The part numbers of HI chipbreakers are followed by "-HI". (Ex.) 151N-24-HI

● : Standard stock

◎ : Semi-standard stock (Time required for delivery: approx. 2 weeks)production-to-order basis

No symbol: Products manufactured production-to-order basis

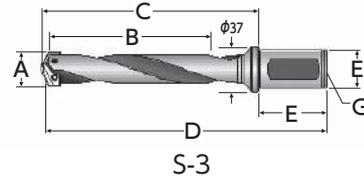
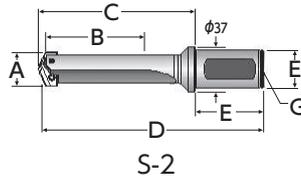
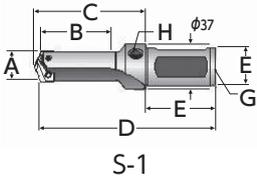
New Products
Tool Materials / Selection Guide
PCD, CBN and ceramic
Cement
PVD-coated Cement
Micro-grain Carbide, Carbide
Insert Stock List
Outside Machining Toolholders
SS
Grooving Tools
Threading Tools
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Internal machining tool range
Original Tools for Various Applications
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Indexable Drill Inserts

Holders for 2, 2.5 Series: $\phi 24.41 - \phi 35.05$

★ Select same size series between inserts and holders.

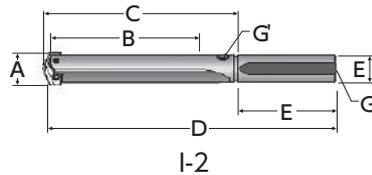
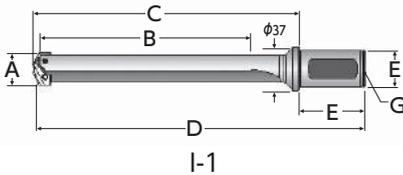
Metric system straight shank holders



(A) Insert cutting edge dia	(B) Max. machining length	P/N	Long holder	Stock	Shape	Dimensions				Parts				
						(C) Body length	(D) Overall length	(E) Shank dia. x length	(G) Screw for pipe	(H) Screw for pipe	Clamping screw	Screwdriver (Optional)		
24.41 ~ 35.05	57.2	21020S-32FMS		●	S-1	92.1	148.5	$\phi 32.0 \times 60.0$	1/4"	1/8"	7495-IP15-10	8IP-15		
30.00 ~ 35.05	92.1	21025S-32FMS		●	S-1	127.0	183.4							
24.41 ~ 35.05	85.7	22020S-32FMS		●	S-2	132.2	188.6							
30.00 ~ 35.05		22025S-32FMS		●										
24.41 ~ 35.05	136.5	23020H-32FMS		●	S-3	183.0	239.4							
30.00 ~ 35.05		23025H-32FMS		●										
24.41 ~ 35.05	187.3	24020H-32FMS		●	S-3	233.8	290.2							
30.00 ~ 35.05		24025H-32FMS		●										
24.41 ~ 35.05	288.9	25020H-32FMS	L	●	S-2	335.4	391.8							
30.00 ~ 35.05		25025H-32FMS	L	●										
24.41 ~ 35.05	400.0	26020S-32FMS	L	●	S-2	446.7	506.7							
	511.2	27020S-32FMS	XL	●		557.7	614.1							
	692.2	29020S-32FMS	3XL	●		738.7	795.1							

Use a 3/16" size wrench for the screw for pipe (H).

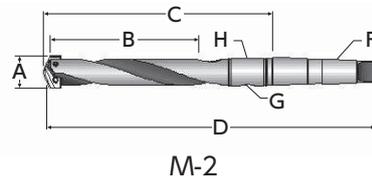
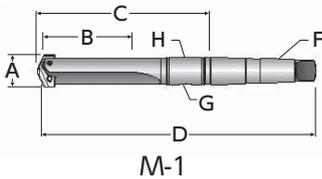
Inch system straight shank holders



(A) Insert cutting edge dia	(B) Max. machining length	P/N	Stock	Shape	Dimensions				Parts	
					(C) Body length	(D) Overall length	(E) Shank dia. x length	(G), (G') Screw for pipe	Clamping screw	Screwdriver (Optional)
24.41 ~ 35.05	85.7	22020S-125F	●	I-1	132.2	186.5	$\phi 31.75 \times 57.9$	1/4"	7495-IP15-10	8IP-15
30.00 ~ 35.05		22025S-125F	●							
24.41 ~ 35.05		22020S-100L	●							
30.00 ~ 35.05		22025S-100L	●	I-2	117.9	203.2	$\phi 25.4 \times 88.9$			
24.41 ~ 35.05		22020S-125L	●							
30.00 ~ 35.05		22025S-125L	●				$\phi 31.75 \times 88.9$			

Use a 3/16" size wrench for the screw for pipe (G').

Morse tapered shank holders



※For coolant adaptors for Morse tapered shank holders, please see page O53.

(A) Insert cutting edge dia	(B) Max. machining length	P/N	Long holder	Stock	Shape	Dimensions				Parts		
						(C) Body length	(D) Overall length	(F) MT	(G) Screw for pipe	(H) Coolant adaptor	Clamping screw	Screwdriver (Optional)
24.41 ~ 35.05	85.7	22020S-004M		●	M-1	160.4	273.8	#4	1/8"	2T-3SRM	7495-IP15-10	8IP-15
30.00 ~ 35.05		22025S-004M	●	167.6		281.0	1/4"		2T-4SRM			
24.41 ~ 35.05		23020H-004M	●	211.2		324.6	1/8"		2T-3SRM			
30.00 ~ 35.05		23025H-004M	●				218.4		331.8	1/4"		
24.41 ~ 35.05		24020H-004M	●	M-2		262.0	375.4		1/8"	2T-3SRM		
30.00 ~ 35.05		24025H-004M	●						269.2	382.6		
24.41 ~ 35.05		25020H-004M	L	L	●	363.6	477.0		1/8"	2T-3SRM		
30.00 ~ 35.05		25025H-004M	L						L	●		

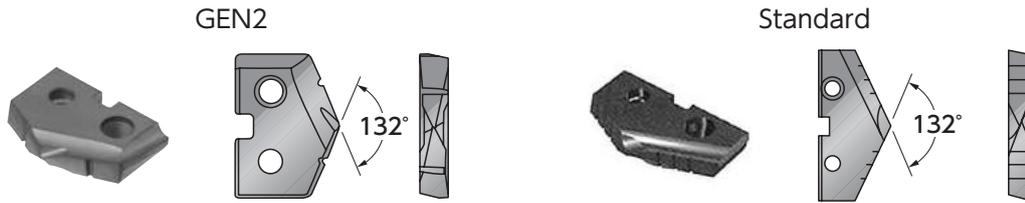
For recommended cutting conditions, please refer to pages O70 -. Before using holders of L, XL or 3XL type, please read the instructions on page O18 • O67.

Notes) Each holder comes with only 4 clamping screws and a screw releasing agent (E-Z BREAK). A screwdriver is available only as an optional item.
• Replace the holders periodically, using "every 100th insert replacement" as a guideline.

Inserts for 2, 2.5 Series: $\phi 24.41 - \phi 35.05$

★ Select same size series between inserts and holders.

<Shapes>



Please order in units of 2 as 1 package contains 2 inserts.

Edge shape	GEN2				Standard								GEN2	
Material	Powder high-speed steel (T15)				Powder high-speed steel (T15)								Carbide (K20)	
Coating	AlCrN				TiAlN		TiCN			TiN			AlCrN	
Edge dia.	P/N	Chipbreaker		P/N	Chipbreaker		P/N	Chipbreaker		P/N	Chipbreaker		P/N	Chipbreaker
		Standard	HE		Standard	HI		Standard	HI		Standard	HI		Standard
24.50	452H-24.5	●	●											
24.61	452H-0031	●	●	152A-0031	●		152N-0031	●		152T-0031	●		4C22H-0031	●
25.00	452H-25	●	●	152A-25	●	●	152N-25	●	●	152T-25	●	●	4C22H-25	●
25.40	452H-0100	●	●	152A-0100	●		152N-0100	●	●	152T-0100	●	●	4C22H-0100	●
25.50	452H-25.5	●	●											
25.80	452H-1.015	●		152A-1.015	●		152N-1.015	●		152T-1.015	●		4C22H-1.015	●
26.00	452H-26	●		152A-26	●		152N-26	●	●	152T-26	●	●	4C22H-26	●
26.19	452H-0101	●	●	152A-0101	●		152N-0101	●		152T-0101	●	●	4C22H-0101	●
26.50	452H-26.5	●	●										4C22H-26.5	●
26.59	452H-1.046	●		152A-1.046	●		152N-1.046	●		152T-1.046	●		4C22H-1.046	●
26.99	452H-0102	●	●	152A-0102	●		152N-0102	●		152T-0102	●		4C22H-0102	●
27.00	452H-27	●	●	152A-27	●		152N-27	●	●	152T-27	●		4C22H-27	●
27.50	452H-27.5	●	●											
27.78	452H-0103	●		152A-0103	●		152N-0103	●		152T-0103	●		4C22H-0103	●
28.00	452H-28	●	●	152A-28	●		152N-28	●	●	152T-28	●	●	4C22H-28	●
28.18	452H-1.109	●		152A-1.109	●		152N-1.109	●		152T-1.109	●		4C22H-1.109	●
28.50	452H-28.5	●	●											
28.58	452H-0104	●	●	152A-0104	●		152N-0104	●		152T-0104	●		4C22H-0104	●
29.00	452H-29	●	●	152A-29	●	●	152N-29	●	●	152T-29	●	●	4C22H-29	●
29.37	452H-0105	●	●	152A-0105	●		152N-0105	●		152T-0105	●		4C22H-0105	●
29.50	452H-29.5	●	●											
30.00	452H-30	●	●	152A-30	●	●	152N-30	●	●	152T-30	●	●	4C22H-30	●
30.16	452H-0106	●	●	152A-0106	●		152N-0106	●		152T-0106	●		4C22H-0106	●
30.50	452H-30.5	●	●											
30.96	452H-0107	●	●	152A-0107	●		152N-0107	●		152T-0107	●		4C22H-0107	●
31.00	452H-31	●		152A-31	●		152N-31	●		152T-31	●		4C22H-31	●
31.50	452H-31.5	●	●											
31.75	452H-0108	●	●	152A-0108	●		152N-0108	●		152T-0108	●		4C22H-0108	●
32.00	452H-32	●	●	152A-32	●	●	152N-32	●	●	152T-32	●	●	4C22H-32	●
32.50	452H-32.5	●											4C22H-32.5	●
32.54	452H-0109	●		152A-0109	●		152N-0109	●		152T-0109	●		4C22H-0109	●
33.00	452H-33	●		152A-33	●	●	152N-33	●	●	152T-33	●		4C22H-33	●
33.34	452H-0110	●	●	152A-0110	●		152N-0110	●		152T-0110	●		4C22H-0110	●
33.50	452H-33.5	●	●											
34.00	452H-34	●	●	152A-34	●		152N-34	●		152T-34	●		4C22H-34	●
34.13	452H-0111	●	●	152A-0111	●		152N-0111	●		152T-0111	●		4C22H-0111	●
34.50	452H-34.5	●	●											
34.93	452H-0112	●		152A-0112	●		152N-0112	●		152T-0112	●		4C22H-0112	●
35.00	452H-35	●	●	152A-35	●		152N-35	●		152T-35	●		4C22H-35	●

For recommended cutting conditions, please refer to pages **070** -. ※The part numbers of HI chipbreakers are followed by "-HI". (Ex.) 152A-32-HI

● : Standard stock

● : Semi-standard stock (Time required for delivery: approx. 2 weeks)production-to-order basis

No symbol: Products manufactured production-to-order basis

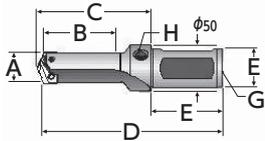
New Products
Tool Materials / Selection Guide
PCD, CBN and ceramic
Cement
PVD-coated Cement
Micro-grain Carbide, Carbide
Insert Stock List
Outside Machining Toolholders
SS
Grooving Tools
Threading Tools
Shaper
Internal machining tool range
Original Tools for Various Applications
Indexable End Milling Tools
Indexable Drill Inserts
Milling Cutters
Technical Data
Index

Indexable Drill Inserts

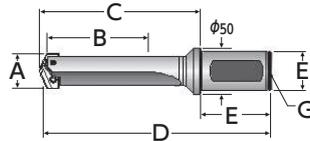
Holders for 3 Series: $\phi 34.36 - \phi 47.80$

★ Select same size series between inserts and holders.

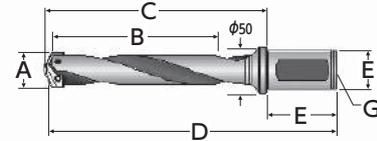
Metric system straight shank holders



S-1



S-2

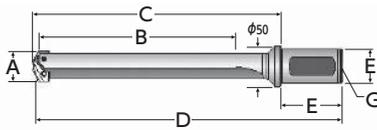


S-3

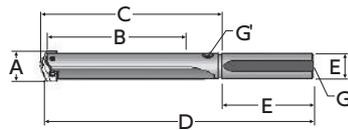
(A) Insert cutting edge dia	(B) Max. machining length	P/N	Long holder	Stock	Shape	Dimensions				Parts	
						(C) Body length	(D) Overall length	(E) Shank dia. x length	(G) Screw for pipe	(H)	Clamping screw
34.36 ~ 47.80	76.2	21030S-40FMS		●	S-1	129.8	195.0	$\phi 40.0 \times 70.0$	1/4"	7514-IP20-10	8IP-20
	120.7	22030S-40FMS		●	S-2	177.8	243.0				
	165.1	23030H-40FMS		●	S-3	222.3	287.5				
	209.6	24030H-40FMS		●		266.7	331.9				
	280.0	24530S-40FMS	L	●	S-2	337.1	407.1				
	349.3	25030S-40FMS	L	●		406.4	471.6				
	558.8	27030S-40FMS	XL	●		615.9	681.1				
	787.4	29030S-40FMS	3XL	●		844.5	909.7				

Use a 3/16" size wrench for the screw for pipe (H).

Inch system straight shank holders



I-1

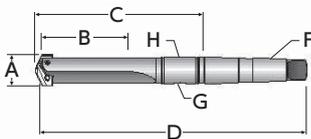


I-2

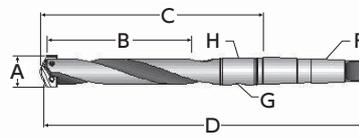
(A) Insert cutting edge dia	(B) Max. machining length	P/N	Stock	Shape	Dimensions				Parts	
					(C) Body length	(D) Overall length	(E) Shank dia. x length	(G), (G') Screw for pipe	Clamping screw	Screwdriver (Optional)
34.36 ~ 47.80	120.7	22030S-150F	●	I-1	177.8	243.1	$\phi 38.1 \times 68.3$	1/4"	7514-IP20-10	8IP-20
		22030S-125L	●	I-2	157.2	254.0	$\phi 31.75 \times 101.6$			
		22030S-150L	●				$\phi 38.1 \times 101.6$			

Use a 3/16" size wrench for the screw for pipe (G').

Morse tapered shank holders



M-1



M-2

※For coolant adaptors for Morse tapered shank holders, please see page 053.

(A) Insert cutting edge dia	(B) Max. machining length	P/N	Long holder	Stock	Shape	Dimensions				Parts		
						(C) Body length	(D) Overall length	(F) MT	(G) Screw for pipe	(H) Coolant adaptor	Clamping screw	Screwdriver (Optional)
34.36 ~ 47.80	120.6	22030S-004M		●	M-1	206.4	319.1	#4	1/4"	2T-4SRM	7514-IP20-10	8IP-20
	165.1	23030H-004M		●	M-2	250.9	363.6					
	209.5	24030H-004M		●		295.3	408.0					
	349.3	25030S-004M	L	●	M-1	435.0	547.7					
	558.8	27030S-004M	XL	●		644.6	757.3					
	787.4	29030S-004M	3XL	●		873.2	985.9					

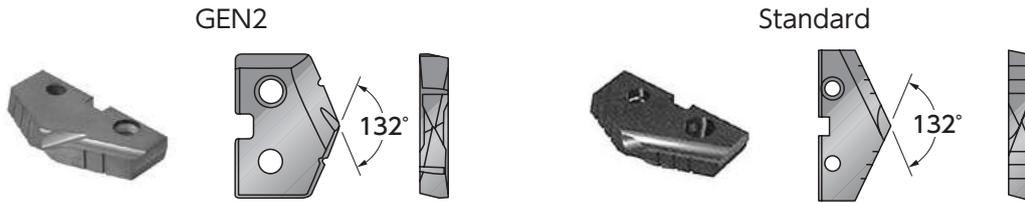
For recommended cutting conditions, please refer to pages 070 -. Before using holders of L, XL or 3XL type, please read the instructions on page 018 • 067.

Notes)•Each holder comes with only 4 clamping screws and a screw releasing agent (E-Z BREAK). A screwdriver is available only as an optional item.
•Replace the holders periodically, using "every 100th insert replacement" as a guideline.

Inserts for 3 Series: $\phi 34.36 - \phi 47.80$

★ Select same size series between inserts and holders.

<Shapes>



Order unit: 1pc (Standard)
2pcs(Special)

Edge shape	GEN2						Standard								
Material	Powder high-speed steel (T15)						Powder high-speed steel (T15)								
Coating	AlCrN			TiN			TiAlN			TiCN			TiN		
Edge dia.	P/N	Chipbreaker		P/N	Chipbreaker		P/N	Chipbreaker		P/N	Chipbreaker		P/N	Chipbreaker	
		Standard	HI		Standard	HI		Standard	HI		Standard	HI		Standard	HI
35.50	453H-35.5	●													
35.72	453H-0113	◎		453T-0113	◎								153T-0113	◎	
36.00	453H-36	●	●	453T-36	●		153A-36	●		153N-36	●	●	153T-36	◎	
36.50	453H-36.5	●													
36.51	453H-0114	◎		453T-0114	◎								153T-0114	◎	
37.00	453H-37	◎		453T-37	◎		153A-37	●		153N-37	●		153T-37	◎	
37.31	453H-0115	◎		453T-0115	◎								153T-0115	◎	
37.50	453H-37.5	●													
38.00	453H-38	●	●	453T-38	●		153A-38	●	●	153N-38	●	●	153T-38	◎	
38.10	453H-0116	◎		453T-0116	◎								153T-0116	◎	
38.50	453H-38.5	●													
38.89	453H-0117	◎		453T-0117	◎								153T-0117	◎	
39.00	453H-39	●	●	453T-39	●		153A-39	●	●	153N-39	●	●	153T-39	◎	
39.50	453H-39.5	●													
39.69	453H-0118	◎		453T-0118	◎								153T-0118	◎	
40.00	453H-40	●		453T-40	●		153A-40	●		153N-40	●	●	153T-40	◎	
40.48	453H-0119	◎		453T-0119	◎								153T-0119	◎	
40.50	453H-40.5	●													
41.00	453H-41	●		453T-41	●		153A-41	●		153N-41	●		153T-41	◎	
41.28	453H-0120	◎		453T-0120	◎								153T-0120	◎	
41.50	453H-41.5	●													
42.00	453H-42	●		453T-42	●		153A-42	●		153N-42	●	●	153T-42	◎	
42.07	453H-0121	◎		453T-0121	◎								153T-0121	◎	
42.50	453H-42.5	●													
42.86	453H-0122	◎		453T-0122	◎								153T-0122	◎	
43.00	453H-43	●		453T-43	●		153A-43	●		153N-43	●		153T-43	◎	
43.50	453H-43.5	●													
43.66	453H-0123	◎		453T-0123	◎								153T-0123	◎	
44.00	453H-44	●		453T-44	●		153A-44	●		153N-44	●	●	153T-44	◎	
44.45	453H-0124	◎		453T-0124	◎								153T-0124	◎	
44.50	453H-44.5	●													
45.00	453H-45	●		453T-45	●		153A-45	●	●	153N-45	●		153T-45	◎	
45.24	453H-0125	◎		453T-0125	◎								153T-0125	◎	
45.50	453H-45.5	●		453T-45.5	◎										
46.00	453H-46	●		453T-46	●		153A-46	●		153N-46	●		153T-46	◎	
46.04	453H-0126	◎		453T-0126	◎								153T-0126	◎	
46.50	453H-46.5	●													
46.83	453H-0127	◎		453T-0127	◎								153T-0127	◎	
47.00	453H-47	●		453T-47	●		153A-47	●		153N-47	●	●	153T-47	◎	
47.50	453H-47.5	●													
47.63	453H-0128	◎		453T-0128	◎								153T-0128	◎	

For recommended cutting conditions, please refer to pages 070 -. ※The part numbers of HI chipbreakers are followed by "HI". (Ex.) 453H-36-HI

● : Standard stock

◎ : Semi-standard stock (Time required for delivery: approx. 2 weeks)production-to-order basis

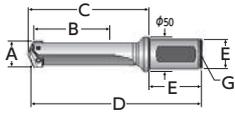
No symbol: Products manufactured production-to-order basis

Indexable Drill Inserts

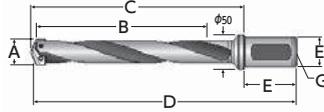
Holders for 4 Series: $\phi 46.99 - \phi 65.28$

★ Select same size series between inserts and holders.

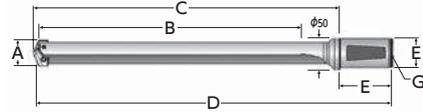
Metric system straight shank holders



S-1



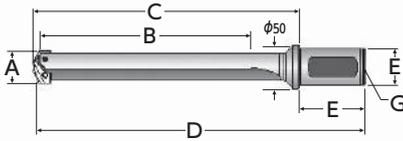
S-2



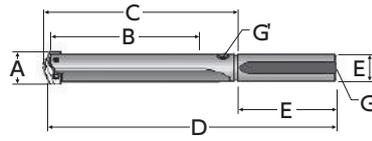
S-3

(A) Insert cutting edge dia	(B) Max. machining length	P/N	Long holder	Stock	Shape	Dimensions				Parts	
						(C) Body length	(D) Overall length	(E) Shank dia. x length	(G) Screw for pipe	Clamping screw	Screwdriver (Optional)
46.99 ~ 65.28	130.2	22040S-40FMS		●	S-1	184.2	249.4	$\phi 40.0 \times 70.0$	1/4"	7514-IP20-10	8IP-20
	231.8	24040H-40FMS		●	S-2	285.8	351.0				
	350.0	24540S-40FMSW-70	L	●	S-3	419.75	487.75	$\phi 40.0 \times 68.0$			
	422.3	25040S-40FMS	L	●		476.3	541.5	$\phi 40.0 \times 70.0$			
	525.0	26040S-40FMS	L	●		579.5	649.5				
	625.5	27040S-40FMS	XL	●		679.5	744.7				
	879.5	29040S-40FMS	3XL	●		933.5	998.7				

Inch system straight shank holders



I-1

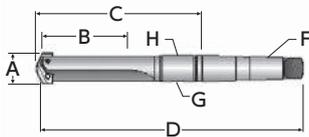


I-2

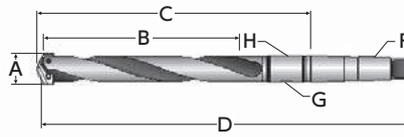
(A) Insert cutting edge dia	(B) Max. machining length	P/N	Stock	Shape	Dimensions				Parts	
					(C) Body length	(D) Overall length	(E) Shank dia. x length	(G), (G') Screw for pipe	Clamping screw	Screwdriver (Optional)
46.99 ~ 65.28	130.2	22040S-150F	●	I-1	184.2	247.7	$\phi 38.1 \times 68.3$	1/4"	7514-IP20-10	8IP-20
		22040S-150L	●	I-2	169.9	266.7	$\phi 38.1 \times 101.6$			
		22040S-175L	●				$\phi 44.45 \times 101.6$			

Use a 3/16" size wrench for the screw for pipe (G').

Morse tapered shank holders



M-1



M-2

※For coolant adaptors for Morse tapered shank holders, please see page 053.

(A) Insert cutting edge dia	(B) Max. machining length	P/N	Long holder	Stock	Shape	Dimensions					Parts	
						(C) Body length	(D) Overall length	(F) MT	(G) Screw for pipe	(H) Coolant adaptor	Clamping screw	Screwdriver (Optional)
46.99 ~ 65.28	130.1	22040S-005M		●	M-1	219.1	363.5	#5	1/4"	2T-5SRM	7514-IP20-10	8IP-20
	231.8	24040H-005M		●	M-2	320.7	465.1					
	422.3	25040S-005M	L	●	M-1	511.2	655.6					
	625.5	27040S-005M	XL	●		714.4	858.8					
	879.5	29040S-005M	3XL	●		968.4	1112.8					

For recommended cutting conditions, please refer to pages 070 -. Before using holders of L, XL or 3XL type, please read the instructions on page 018 • 067.

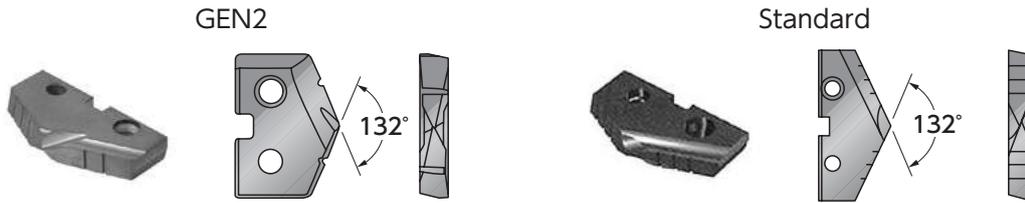
Notes)•Each holder comes with only 4 clamping screws and a screw releasing agent (E-Z BREAK). A screwdriver is available only as an optional item.

•Replace the holders periodically, using "every 100th insert replacement" as a guideline.

Inserts for 4 Series: $\phi 46.99 - \phi 65.28$

★ Select same size series between inserts and holders.

<Shapes>



Order unit: 1pc (Standard)
2pcs(Special)

Edge shape	GEN2						Standard						
	Powder high-speed steel (T15)			Powder high-speed steel (M4)			Powder high-speed steel (T15)						
	Coating		Chipbreaker	Coating		Chipbreaker	TICN			TiN			
P/N	Standard	P/N		Standard	P/N		Standard	HI	P/N	Standard	HI		
47.00	454H-47	●											
47.50	454H-47.5	●											
48.00	454H-48	●		434T-48	●					154T-48	●		
48.42	454H-0129	●		434T-0129	●					154T-0129	●		
48.50	454H-48.5	●											
49.00	454H-49	●		434T-49	●					154T-49	●		
49.21	454H-0130	●		434T-0130	●					154T-0130	●		
49.50	454H-49.5	●											
50.00	454H-50	●		434T-50	●	154N-50	●			154T-50	●		
50.01	454H-0131	●		434T-0131	●					154T-0131	●		
50.80	454H-0200	●		434T-0200	●					154T-0200	●		
51.00	454H-51	●		434T-51	●	154N-51	●			154T-51	●		
51.59	454H-0201	●		434T-0201	●					154T-0201	●		
52.00	454H-52	●		434T-52	●					154T-52	●		
52.39	454H-0202	●		434T-0202	●					154T-0202	●		
53.00	454H-53	●		434T-53	●	154N-53	●			154T-53	●		
53.18	454H-0203	●		434T-0203	●					154T-0203	●		
53.98	454H-0204	●		434T-0204	●					154T-0204	●		
54.00	454H-54	●		434T-54	●	154N-54	●			154T-54	●		
54.79	454H-0205	●		434T-0205	●					154T-0205	●		
55.00	454H-55	●		434T-55	●	154N-55	●			154T-55	●		
55.56	454H-0206	●		434T-0206	●					154T-0206	●		
56.00	454H-56	●		434T-56	●					154T-56	●		
56.36	454H-0207	●		434T-0207	●					154T-0207	●		
57.00	454H-57	●		434T-57	●					154T-57	●		
57.15	454H-0208	●		434T-0208	●					154T-0208	●		
57.94	454H-0209	●		434T-0209	●					154T-0209	●		
58.00	454H-58	●		434T-58	●	154N-58	●			154T-58	●		
58.74	454H-0210	●		434T-0210	●					154T-0210	●		
59.00	454H-59	●		434T-59	●	154N-59	●			154T-59	●		
59.53	454H-0211	●		434T-0211	●					154T-0211	●		
60.00	454H-60	●		434T-60	●	154N-60	●			154T-60	●		
60.33	454H-0212	●		434T-0212	●					154T-0212	●		
61.00	454H-61	●		434T-61	●					154T-61	●		
61.12	454H-0213	●		434T-0213	●					154T-0213	●		
61.91	454H-0214	●		434T-0214	●					154T-0214	●		
62.00	454H-62	●		434T-62	●	154N-62	●			154T-62	●		
62.71	454H-0215	●		434T-0215	●					154T-0215	●		
63.00	454H-63	●		434T-63	●					154T-63	●		
63.50	454H-0216	●		434T-0216	●					154T-0216	●		
64.00	454H-64	●		434T-64	●					154T-64	●		
64.29	454H-0217	●		434T-0217	●					154T-0217	●		
65.00	454H-65	●		434T-65	●	154N-65	●			154T-65	●		
65.09	454H-0218	●		434T-0218	●					154T-0218	●		

For recommended cutting conditions, please refer to pages 070 -. ※The part numbers of HI chipbreakers are followed by "-HI". (Ex.) 154N-59-HI

● : Standard stock

● : Semi-standard stock (Time required for delivery: approx. 2 weeks)production-to-order basis

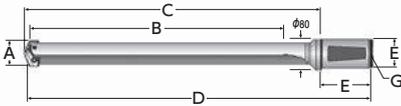
No symbol: Products manufactured production-to-order basis

Indexable Drill Inserts

Holders for 5, 6 Series: $\phi 62.38 - \phi 89.08$

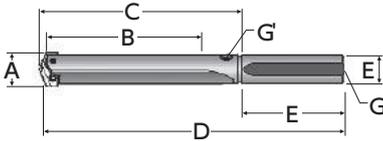
★ Select same size series between inserts and holders.

Metric system straight shank holders



(A) Insert cutting edge dia	(B) Max. machining length	P/N	Long holder	Stock	Dimensions				Parts	
					(C) Body length	(D) Overall length	(E) Shank dia. x length	(G) Screw for pipe	Clamping screw	Screwdriver (Optional)
62.38 ~ 89.08	171.5	22050S-50FMSW		●	240.0	328.0	$\phi 50 \times 88.0$	1/2"	7619-IP25-10	8IP-25
	350.0	24550S-50FMSW	L	●	431.35	519.35				
	660.0	27550S-50FMSW	XL	●	741.35	829.35				

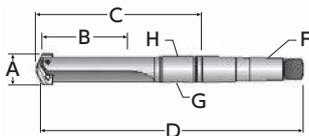
Inch system straight shank holders



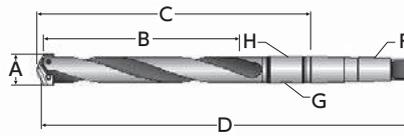
(A) Insert cutting edge dia	(B) Max. machining length	P/N	Stock	Dimensions				Parts	
				(C) Body length	(D) Overall length	(E) Shank dia. x length	(G), (G') Screw for pipe	Clamping screw	Screwdriver (Optional)
62.38 ~ 89.08	171.5	22050S-200L	●	222.3	317.5	$\phi 50.8 \times 101.6$	1/2"	7619-IP25-10	8IP-25

Use a 3/16" size wrench for the screw for pipe (G').

Morse tapered shank holders



M-1



M-2

※For coolant adaptors for Morse tapered shank holders, please see page 053.

(A) Insert cutting edge dia	(B) Max. machining length	P/N	Long holder	Stock	Shape	Dimensions				Parts		
						(C) Body length	(D) Overall length	(F) MT	(G) Screw for pipe	(H) Coolant adaptor	Clamping screw	Screwdriver (Optional)
62.38 ~ 89.08	171.5	22050S-005M		●	M-1	287.3	430.2	#5	1/2"	2T-6SRM	7619-IP25-10	8IP-25
	273.1	24050H-005M		●	M-2	388.9	531.8					
	463.6	25050S-005M	L	●	M-1	579.4	722.3					
	660.4	27050S-005M	XL	●		776.2	919.1					
	889.0	29050S-005M	3XL	●		1004.8	1148					

For recommended cutting conditions, please refer to pages 070 -. Before using holders of L, XL or 3XL type, please read the instructions on page 018 • 067.

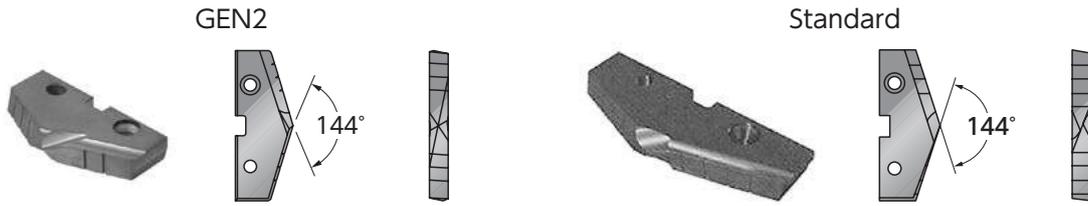
Notes)•Each holder comes with only 4 clamping screws and a screw releasing agent (E-Z BREAK). A screwdriver is available only as an optional item.

•Replace the holders periodically, using "every 100th insert replacement" as a guideline.

Inserts for 5, 6 Series: $\phi 62.38 - \phi 89.08$

★ Select same size series between inserts and holders.

<Shapes>



Order unit: 1pc (Standard)
2pcs(Special)

Size Series	Edge shape	GEN2				Standard	
	Material	Powder high-speed steel (T15)		Powder high-speed steel (M4)		Powder high-speed steel (M4)	
	Coating	AlCrN		TiN		TiN	
	Edge dia.	P/N	Chipbreaker Standard	P/N	Chipbreaker Standard	P/N	Chipbreaker Standard
5 62.38 mm ~ 76.20 mm	63.50	455H-0216	●	435T-0216	●	135T-0216	●
	64.00	455H-64	●	435T-64	●	135T-64	●
	64.29	455H-0217	●	435T-0217	●	135T-0217	●
	65.09	455H-0218	●	435T-0218	●	135T-0218	●
	65.88	455H-0219	●	435T-0219	●	135T-0219	●
	66.00	455H-66	●	435T-66	●	135T-66	●
	66.68	455H-0220	●	435T-0220	●	135T-0220	●
	67.47	455H-0221	●	435T-0221	●	135T-0221	●
	68.00	455H-68	●	435T-68	●	135T-68	●
	68.26	455H-0222	●	435T-0222	●	135T-0222	●
	69.05	455H-0223	●	435T-0223	●	135T-0223	●
	69.85	455H-0224	●	435T-0224	●	135T-0224	●
	70.00	455H-70	●	435T-70	●	135T-70	●
	70.64	455H-0225	●	435T-0225	●	135T-0225	●
	71.44	455H-0226	●	435T-0226	●	135T-0226	●
	72.00	455H-72	●	435T-72	●	135T-72	●
	72.23	455H-0227	●	435T-0227	●	135T-0227	●
	73.03	455H-0228	●	435T-0228	●	135T-0228	●
	73.82	455H-0229	●	435T-0229	●	135T-0229	●
	74.00	455H-74	●	435T-74	●	135T-74	●
74.41	455H-0230	●	435T-0230	●	135T-0230	●	
75.00	455H-75	●					
75.61	455H-0231	●	435T-0231	●	135T-0231	●	
76.00	455H-76	●	435T-76	●	135T-76	●	
76.20	455H-0300	●	435T-0300	●	135T-0300	●	
6 76.23 mm ~ 89.08 mm	76.99	456H-0301	●	436T-0301	●	136T-0301	●
	77.79	456H-0302	●	436T-0302	●	136T-0302	●
	78.00	456H-78	●	436T-78	●	136T-78	●
	78.58	456H-0303	●	436T-0303	●	136T-0303	●
	79.38	456H-0304	●	436T-0304	●	136T-0304	●
	80.00	456H-80	●	436T-80	●	136T-80	●
	80.17	456H-0305	●	436T-0305	●	136T-0305	●
	80.96	456H-0306	●	436T-0306	●	136T-0306	●
	81.76	456H-0307	●	436T-0307	●	136T-0307	●
	82.00	456H-82	●	436T-82	●	136T-82	●
	82.55	456H-0308	●	436T-0308	●	136T-0308	●
	83.34	456H-0309	●	436T-0309	●	136T-0309	●
	84.00	456H-84	●	436T-84	●	136T-84	●
	84.14	456H-0310	●	436T-0310	●	136T-0310	●
	84.93	456H-0311	●	436T-0311	●	136T-0311	●
	85.00	456H-85	●				
	85.73	456H-0312	●	436T-0312	●	136T-0312	●
	86.00	456H-86	●	436T-86	●	136T-86	●
	86.52	456H-0313	●	436T-0313	●	136T-0313	●
	87.31	456H-0314	●	436T-0314	●	136T-0314	●
88.00	456H-88	●	436T-88	●	136T-88	●	
88.11	456H-0315	●	436T-0315	●	136T-0315	●	
88.90	456H-0316	●	436T-0316	●	136T-0316	●	

For recommended cutting conditions, please refer to pages **O70** -.

● : Standard stock

◎ : Semi-standard stock (Time required for delivery: approx. 2 weeks)production-to-order basis

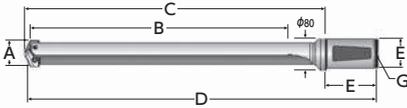
No symbol: Products manufactured production-to-order basis

Indexable Drill Inserts

Holders for 7, 8 Series: $\phi 87.76 - \phi 114.48$

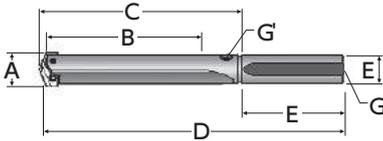
★ Select same size series between inserts and holders.

Metric system straight shank holders



(A) Insert cutting edge dia	(B) Max. machining length	P/N	Long holder	Stock	Dimensions			Parts		
					(C) Body length	(D) Overall length	(E) Shank dia. x length	(G) Screw for pipe	Clamping screw	Screwdriver (Optional)
87.76 ~ 114.48	200.0	22570S-50FMSW		●	279.99	368.0	$\phi 50.0 \times 88.0$	1/2"	7619-IP25-10	8IP-25
	400.0	24570S-50FMSW	L	●	491.35	579.35				
	800.0	27570S-50FMSW	L	●	881.35	969.35				

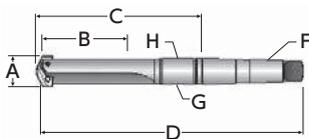
Inch system straight shank holders



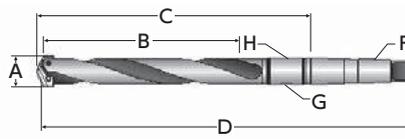
(A) Insert cutting edge dia	(B) Max. machining length	P/N	Stock	Dimensions			Parts		
				(C) Body length	(D) Overall length	(E) Shank dia. x length	(G), (G') Screw for pipe	Clamping screw	Screwdriver (Optional)
87.76 ~ 114.48	171.5	22070S-300L	●	231.8	352.4	$\phi 76.2 \times 127.0$	1/2"	7619-IP25-10	8IP-25

Use a 3/16" size wrench for the screw for pipe (G').

Morse tapered shank holders



M-1



M-2

※For coolant adaptors for Morse tapered shank holders, please see page 053.

(A) Insert cutting edge dia	(B) Max. machining length	P/N	Long holder	Stock	Shape	Dimensions			Parts			
						(C) Body length	(D) Overall length	(F) MT	(G) Screw for pipe	(H) Coolant adaptor	Clamping screw	Screwdriver (Optional)
87.76 ~ 114.48	171.5	22070S-005M		●	M-1	296.8	439.7	#5	1/2"	2T-6SRM	7619-IP25-10	8IP-25
	273.1	24070H-005M		●	M-2	398.5	541.3					
	555.6	25070S-005M	L	●	M-1	681.1	823.9					
	685.8	27070S-005M	XL	●		811.2	954.0					
	939.8	29070S-005M	3XL	●		1065.2	1208.0					

For recommended cutting conditions, please refer to pages 070 -. Before using holders of L, XL or 3XL type, please read the instructions on page 018 • 067.

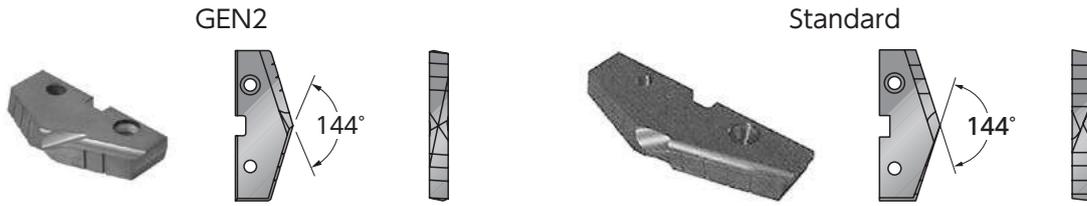
Notes)•Each holder comes with only 4 clamping screws and a screw releasing agent (E-Z BREAK). A screwdriver is available only as an optional item.

•Replace the holders periodically, using "every 100th insert replacement" as a guideline.

Inserts for 7, 8 Series: $\phi 87.76 - \phi 114.48$

★ Select same size series between inserts and holders.

<Shapes>



Order unit: 1 pc (Standard)
2pcs(Special)

Size Series	Edge shape	GEN2				Standard	
	Material	Powder high-speed steel (T15)		Powder high-speed steel (M4)		Powder high-speed steel (M4)	
	Coating	AlCrN		TiN		TiN	
	Edge dia.	P/N	Chipbreaker Standard	P/N	Chipbreaker Standard	P/N	Chipbreaker Standard
7 87.76 mm ~ 101.60 mm	89.96	457H-0317	●	437T-0317	●	137T-0317	●
	90.00	457H-90	●	437T-90	●	137T-90	●
	90.49	457H-0318	●	437T-0318	●	137T-0318	●
	91.28	457H-0319	●	437T-0319	●	137T-0319	●
	92.00	457H-92	●	437T-92	●	137T-92	●
	92.08	457H-0320	●	437T-0320	●	137T-0320	●
	92.87	457H-0321	●	437T-0321	●	137T-0321	●
	93.66	457H-0322	●	437T-0322	●	137T-0322	●
	94.00	457H-94	●	437T-94	●	137T-94	●
	94.46	457H-0323	●	437T-0323	●	137T-0323	●
	95.25	457H-0324	●	437T-0324	●	137T-0324	●
	96.00	457H-96	●	437T-96	●	137T-96	●
	96.04	457H-0325	●	437T-0325	●	137T-0325	●
	96.84	457H-0326	●	437T-0326	●	137T-0326	●
	97.63	457H-0327	●	437T-0327	●	137T-0327	●
	98.00	457H-98	●	437T-98	●	137T-98	●
	98.43	457H-0328	●	437T-0328	●	137T-0328	●
	99.22	457H-0329	●	437T-0329	●	137T-0329	●
100.00	457H-100	●	437T-100	●	137T-100	●	
100.01	457H-0330	●	437T-0330	●	137T-0330	●	
100.81	457H-0331	●	437T-0331	●	137T-0331	●	
101.60	457H-0400	●	437T-0400	●	137T-0400	●	
8 101.63 mm ~ 114.48 mm	102.00	458H-102	●	438T-102	●	138T-102	●
	103.19	458H-0402	●	438T-0402	●	138T-0402	●
	104.00	458H-104	●	438T-104	●	138T-104	●
	104.75	458H-0404	●	438T-0404	●	138T-0404	●
	106.00	458H-106	●	438T-106	●	138T-106	●
	106.36	458H-0406	●	438T-0406	●	138T-0406	●
	107.95	458H-0408	●	438T-0408	●	138T-0408	●
	108.00	458H-108	●	438T-108	●	138T-108	●
	109.54	458H-0410	●	438T-0410	●	138T-0410	●
	110.00	458H-110	●	438T-110	●	138T-110	●
	111.13	458H-0412	●	438T-0412	●	138T-0412	●
	112.00	458H-112	●	438T-112	●	138T-112	●
	112.71	458H-0414	●	438T-0414	●	138T-0414	●
	114.00	458H-114	●	438T-114	●	138T-114	●
	114.30	458H-0416	●	438T-0416	●	138T-0416	●

For recommended cutting conditions, please refer to pages **O70** -.

● : Standard stock

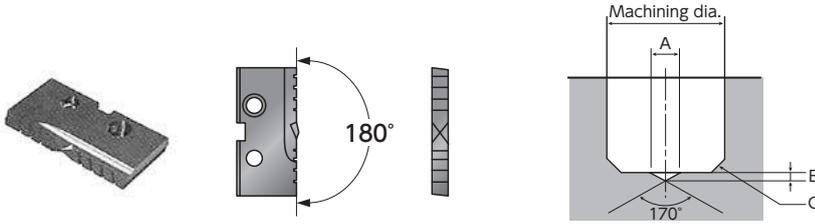
◎ : Semi-standard stock (Time required for delivery: approx. 2 weeks)production-to-order basis

No symbol: Products manufactured production-to-order basis

Flat-bottom inserts for popular Y, Z, 0, 1, 2 Series: $\phi 9.50 - \phi 35.00$

★ Select same size series between inserts and holders.

<Shapes>



Please order in units of 2 as 1 package contains 2 inserts.

Size Series	Material	Powder high-speed steel (T15)	Stock	A	B	C
	Coating	TiN				
	Cutting edge dia.	P/N				
Y	9.50	15YT-9.5-FB	●	2.9	0.13	0.4
	9.53	15YT-0012-FB	●			
	9.80	15YT-.386-FB	●			
	9.92	15YT-.390-FB	●			
	10.00	15YT-10-FB	●			
	10.20	15YT-10.2-FB	●			
	10.32	15YT-0013-FB	●			
	10.50	15YT-10.5-FB	●			
	10.72	15YT-.421-FB	●			
	10.80	15YT-10.8-FB	●			
Z	11.00	15YT-11-FB	●	2.9	0.13	0.4
	11.11	15ZT-0014-FB	●			
	11.50	15ZT-11.5-FB	●			
	11.51	15ZT-.453-FB	●			
	11.91	15ZT-0015-FB	●			
	12.00	15ZT-12-FB	●			
	12.30	15ZT-.484-FB	●			
0	12.50	15ZT-12.5-FB	●	4.1	0.18	0.4
	12.70	15ZT-0016-FB	●			
	13.00	150T-13-FB	●			
	13.10	150T-.515-FB	●			
	13.49	150T-0017-FB	●			
	13.50	150T-13.5-FB	●			
	14.00	150T-14-FB	●			
	14.29	150T-0018-FB	●			
	14.50	150T-14.5-FB	●			
	14.68	150T-.578-FB	●			
	15.00	150T-15-FB	●			
	15.08	150T-0019-FB	●			
	15.50	150T-15.5-FB	●			
	15.88	150T-0020-FB	●			
	16.00	150T-16-FB	●			
16.50	150T-16.5-FB	●				
16.67	150T-0021-FB	●				
17.00	150T-17-FB	●				
17.46	150T-0022-FB	●				
17.50	150T-17.5-FB	●				

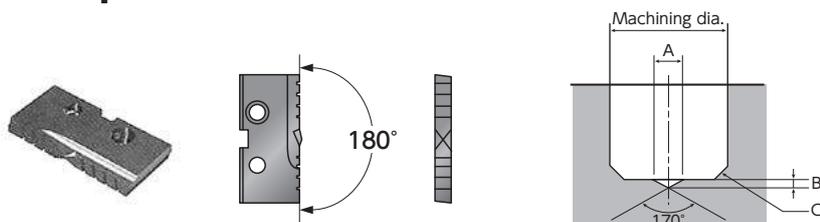
Size Series	Material	Powder high-speed steel (T15)	Stock	A	B	C
	Coating	TiN				
	Cutting edge dia.	P/N				
1	17.86	151T-.703-FB	●	4.8	0.21	0.4
	18.00	151T-18-FB	●			
	18.26	151T-0023-FB	●			
	18.50	151T-18.5-FB	●			
	18.65	151T-.734-FB	●			
	19.00	151T-19-FB	●			
	19.05	151T-0024-FB	●			
	19.45	151T-.765-FB	●			
	19.50	151T-19.5-FB	●			
	19.84	151T-0025-FB	●			
	20.00	151T-20-FB	●			
	20.50	151T-20.5-FB	●			
	20.64	151T-0026-FB	●			
	21.00	151T-21-FB	●			
	21.43	151T-0027-FB	●			
	22.00	151T-22-FB	●			
	22.23	151T-0028-FB	●			
	23.00	151T-23-FB	●			
	23.02	151T-0029-FB	●			
	23.42	151T-.921-FB	●			
23.81	151T-0030-FB	●				
2	24.00	151T-24-FB	●	6.0	0.26	0.4
	24.61	152T-0031-FB	●			
	25.00	152T-25-FB	●			
	25.40	152T-0100-FB	●			
	25.80	152T-1.015-FB	●			
	26.00	152T-26-FB	●			
	26.19	152T-0101-FB	●			
	26.99	152T-0102-FB	●			
	27.00	152T-27-FB	●			
	27.78	152T-0103-FB	●			
	28.00	152T-28-FB	●			
	28.58	152T-0104-FB	●			
	29.00	152T-29-FB	●			
	29.37	152T-0105-FB	●			
	30.00	152T-30-FB	●			
	30.16	152T-0106-FB	●			
	30.96	152T-0107-FB	●			
	31.00	152T-31-FB	●			
	31.75	152T-0108-FB	●			
	32.00	152T-32-FB	●			
	32.54	152T-0109-FB	●			
	33.00	152T-33-FB	●			
	33.34	152T-0110-FB	●			
	34.00	152T-34-FB	●			
	34.13	152T-0111-FB	●			
34.93	152T-0112-FB	●				
35.00	152T-35-FB	●				

For recommended cutting conditions, please refer to page **O72**.

Flat-bottom inserts for newly added 3, 4 Series: $\phi 36.00 - \phi 65.00$

★ Select same size series between inserts and holders.

<Shapes>



Please order in units of 2 as 1 package contains 2 inserts.

Size Series	Material	Powder high-speed steel (T15)	Stock	A	B	C
	Coating	TiN				
3	35.72	153T-0113-FB	●	8.2	0.36	0.9
	36.00	153T-36-FB	●			
	36.51	153T-0114-FB	●			
	37.00	153T-37-FB	●			
	37.31	153T-0115-FB	●			
	38.00	153T-38-FB	●			
	38.10	153T-0116-FB	●			
	38.89	153T-0117-FB	●			
	39.00	153T-39-FB	●			
	39.69	153T-0118-FB	●			
	40.00	153T-40-FB	●			
	40.48	153T-0119-FB	●			
	41.00	153T-41-FB	●			
	41.28	153T-0120-FB	●			
	42.00	153T-42-FB	●			
	42.07	153T-0121-FB	●			
	42.86	153T-0122-FB	●			
	43.00	153T-43-FB	●			
	43.66	153T-0123-FB	●			
	44.00	153T-44-FB	●			
44.45	153T-0124-FB	●				
45.00	153T-45-FB	●				
45.24	153T-0125-FB	●				
46.00	153T-46-FB	●				
46.04	153T-0126-FB	●				
46.83	153T-0127-FB	●				
47.00	153T-47-FB	●				
47.63	153T-0128-FB	●				

Size Series	Material	Powder high-speed steel (T15)	Stock	A	B	C
	Coating	TiN				
4	48.00	154T-48-FB	●	10.5	0.46	0.9
	48.42	154T-0129-FB	●			
	49.00	154T-49-FB	●			
	49.21	154T-0130-FB	●			
	50.00	154T-50-FB	●			
	50.01	154T-0131-FB	●			
	50.80	154T-0200-FB	●			
	51.00	154T-51-FB	●			
	51.59	154T-0201-FB	●			
	52.00	154T-52-FB	●			
	52.39	154T-0202-FB	●			
	53.00	154T-53-FB	●			
	53.18	154T-0203-FB	●			
	53.98	154T-0204-FB	●			
	54.00	154T-54-FB	●			
	54.77	154T-0205-FB	●			
	55.00	154T-55-FB	●			
	55.56	154T-0206-FB	●			
	56.00	154T-56-FB	●			
	56.36	154T-0207-FB	●			
	57.00	154T-57-FB	●			
	57.15	154T-0208-FB	●			
	57.94	154T-0209-FB	●			
	58.00	154T-58-FB	●			
	58.74	154T-0210-FB	●			
	59.00	154T-59-FB	●			
	59.53	154T-0211-FB	●			
	60.00	154T-60-FB	●			
	60.33	154T-0212-FB	●			
	61.00	154T-61-FB	●			
	61.12	154T-0213-FB	●			
	61.91	154T-0214-FB	●			
62.00	154T-62-FB	●				
62.71	154T-0215-FB	●				
63.00	154T-63-FB	●				
63.50	154T-0216-FB	●				
64.00	154T-64-FB	●				
64.29	154T-0217-FB	●				
65.00	154T-65-FB	●				
65.09	154T-0218-FB	●				

● : Standard stock

● : Semi-standard stock (Time required for delivery: approx. 2 weeks) production-to-order basis

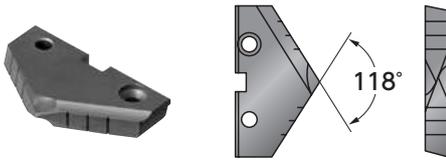
No symbol: Products manufactured production-to-order basis

For recommended cutting conditions, please refer to page **072**.

Indexable Drill Inserts

Inserts with 118° apex angle: "Fine" type newly added to "Coarse" type!

★ Select same size series between inserts and holders.



(Announcement)
Standard type will be changed to GEN2,
after the stock cleared.

e.g.) 150N-14-118 → 450H-14-118
153N-36-118 → 453H-36-118
134N-49-118 → 454H-49-118

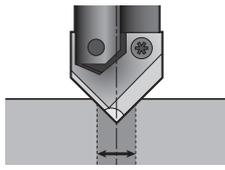
Size series **0 to 2**: Please order in units of 2 as 1 package contains 2 inserts.
Size series **3 to 8**: Please order in units of 1 as 1 package contains 1 insert.

Size Series	Edge shape	GEN2		Standard				Reference for pilot hole dia. for screws Coarse (M24) Fine (M36 x P3)
	Material	Powder high-speed steel (T15)		Powder high-speed steel (T15)	Powder high-speed steel (M4)			
	Coating	AlCrN		TiCN				
	Cutting edge dia.	P/N	Stock	P/N	Stock	P/N	Stock	
0	14.00	450H-14-118	●	150N-14-118				M16
	16.00	450H-16-118	●	150N-16-118				18×P2
	17.50	450H-17.5-118		150N-17.5-118	■			20
1	18.00	451H-18-118		151N-18-118				20×P2
	21.00	451H-21-118	●	151N-21-118				24
2	25.00	452H-25-118		152N-25-118				27×P2
	26.50	452H-26.5-118	●	152N-26.5-118				30
	27.00	452H-27-118	★	152N-27-118				30×P3
	28.00	452H-28-118	★	152N-28-118				30×P2
	29.50	452H-29.5-118	●	152N-29.5-118	■			33
	32.00	452H-32-118	●	152N-32-118				36
	33.00	452H-33-118	★	152N-33-118				36×P3
3	35.00	452H-35-118	●	152N-35-118				39×P4
	36.00	453H-36-118	★	153N-36-118				39×P3
	37.50	453H-37.5-118	●	153N-37.5-118				42
	39.00	453H-39-118	★	153N-39-118				42×P3
	40.50	453H-40.5-118	●	153N-40.5-118				42×P2
	43.00	453H-43-118	★	153N-43-118	■			48
	44.00	453H-44-118		153N-44-118	■			48×P4
4	45.00	453H-45-118	★	153N-45-118	■			48×P3
	47.00	453H-47-118	●	153N-47-118				52
	49.00	454H-49-118				134N-49-118	■	52×P3
	50.50	454H-50.5-118	●			134N-50.5-118		56
	50.80	454H-50.8-118				134N-50.8-118	■	55×P4
	52.00	454H-52-118	★			134N-52-118		56×P4
	53.00	454H-53-118	★			134N-53-118		56×P3
	54.50	454H-54.5-118	●			134N-54.5-118	■	60
	56.00	454H-56-118				134N-56-118		60×P4
	58.00	454H-58-118	●			134N-58-118		64
5	60.00	454H-60-118	●			134N-60-118		62×P2
	61.00	454H-61-118	★			134N-61-118		64×P3
	62.00	454H-62-118	●			134N-62-118		68
	64.00	454H-64-118				134N-64-118	■	68×P4
	66.00	455H-66-118	●			135N-66-118		72
	68.00	455H-68-118				135N-68-118	■	72×P4
	69.00	455H-69-118				135N-69-118	■	72×P3
	70.00	455H-70-118	●			135N-70-118	■	76
6	72.00	455H-72-118	●			135N-72-118	■	75×P3
	74.00	455H-74-118	●			135N-74-118		80
	76.00	455H-76-118				135N-76-118		78×P2
	77.00	456H-77-118	★			136N-77-118		80×P3
	79.00	456H-79-118	●			136N-79-118	■	85
	81.00	456H-81-118				136N-81-118	■	85×P4
	84.00	456H-84-118	●			136N-84-118	■	90
	86.00	456H-86-118				136N-86-118		90×P4
7	87.00	456H-87-118				136N-87-118		90×P3
	88.90	456H-88.9-118	●			136N-88.9-118		95
	89.00	456H-89-118	★			136N-89-118		95
	94.00	457H-94-118	●			137N-94-118	■	100
8	97.00	457H-97-118				137N-97-118		100×P3
	104.00	458H-104-118				138N-104-118		110
	106.00	458H-106-118				138N-106-118	■	110×P4
	107.00	458H-107-118				138N-107-118		110×P3

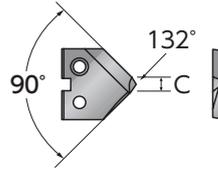
■ indicates "coarse" type.

Inserts with 90° apex angle

★ Select same size series between inserts and holders.



Min. pilot-hole diameter



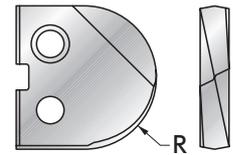
Size series **Y to 2** : Please order in units of 2 as 1 package contains 2 inserts.

Size series **3** : Please order in units of 1 as 1 package contains 1 insert.

Size Series	Material	Powder high-speed steel (T15)		Stock	C Dia (mm)	Min. pilot-hole diameter (mm)
	Coating	TiN				
	Cutting edge dia.	P/N				
Y	9.53	15YT-0012-SP	●	φ2.4	φ3.00	
	11.00	15YT-11-SP	●			
Z	12.70	15ZT-0016-SP	●	φ2.4	φ3.00	
0	15.88	150T-0020-SP	●	φ4.2	φ5.00	
	17.50	150T-17.5-SP	●			
1	19.05	151T-0024-SP	●	φ4.9	φ6.00	
	22.23	151T-0028-SP	●			
	24.00	151T-24-SP	●			
2	31.75	152T-0108-SP	●	φ6.4	φ7.00	
	35.00	152T-35-SP	●			
3	38.10	153T-0116-SP	●	φ8.8	φ10.00	
	47.63	153T-0128-SP	●			

For recommended cutting conditions, please refer to page **073**.

SR inserts with full radius

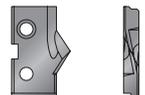


Please order in units of 2 as 1 package contains 2 inserts.

Size Series	Material		Powder high-speed steel (T15)			Stock
	Coating		TiCN		AM200	
	Cutting edge dia.	Radius	Previous Part No.	New Part No.	P/N	
Y	10.00	R5.0	SR5.0	15YN-10-SR		●
Z	11.50	R5.75	SR5.75	15ZN-11.5-SR		●
	12.00	R6.0	SR6.0	15ZN-12-SR		●
0	13.00	R6.5	SR6.5	150N-13-SR		●
	14.00	R7.0	SR7.0	150N-14-SR		●
	15.00	R7.5	SR7.5	150N-15-SR		●
	16.00	R8.0	SR8.0	150N-16-SR		●
	17.00	R8.5	SR8.5	150N-17-SR		●
1	18.00	R9.0	SR9.0	151N-18-SR		●
	19.00	R9.5	SR9.5	151N-19-SR		●
2	30.00	R15.0			152H-30-SR	★
3	40.00	R20.0			153H-40-SR	★

For recommended cutting conditions, please refer to page **074**.

Candle-shaped inserts



Please order in units of 2 as 1 package contains 2 inserts.

Size Series	Material	Powder high-speed steel (T15)	
	Coating	TiAlN	
	Cutting edge dia.	P/N	Stock
1	18.00	151A-18-TW	●
	22.00	151A-22-TW	●
	24.00	151A-24-TW	●

Holder: Please refer to page **036**.

- : Standard stock ★ : Locally Stocked
- ◎ : Semi-standard stock (Time required for delivery: approx. 2 weeks) production-to-order basis
- : Products shifting to production-to-order basis
- No symbol: Products manufactured production-to-order basis

About clamping screws and screwdrivers

Table of clamping screws and the corresponding screwdrivers

Work material	Insert cutting edge diameter (mm)	Allowable tightening torque for clamping screw (N · cm)	Clamping screw	Stock	Screw driver	Stock
Y	9.50 ~ 11.07	62	724-IP7-10	●	8IP-7	●
Z	11.11 ~ 12.95	62	7247-IP7-10	●		
0	12.98 ~ 17.65	128	72556-IP8-10	●	8IP-8	●
0.5	15.48 ~ 17.65	128	72567-IP8-10	●		
1	17.53 ~ 24.38	225	7375-IP9-10	●	8IP-9	●
1.5	21.83 ~ 24.38	225	739-IP9-10	●		
2	24.41 ~ 35.05	515	7495-IP15-10	●	8IP-15	●
2.5	30.00 ~ 35.05	515				
3	34.36 ~ 47.80	1020	7514-IP20-10	●	8IP-20	●
4	46.99 ~ 65.28	1020				
5	62.38 ~ 76.20	1750				
6	76.23 ~ 89.08	1750	7619-IP25-10	●	8IP-25	●
7	87.76 ~ 111.60	1750				
8	101.63 ~ 114.48	1750				

Note) The tightening torque is calculated by using 0.14 as the coefficient of friction ($\mu = 0.14$) and 90% of the yield point.

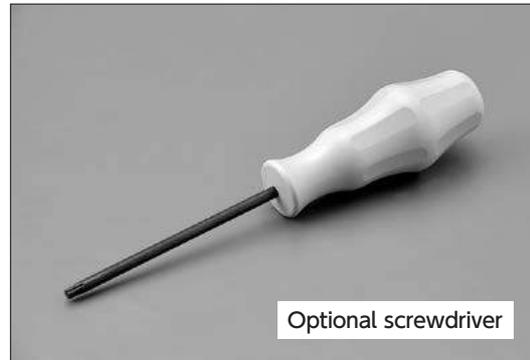
Contents of the supplied clamping screw set



10 screws and releasing agent agent

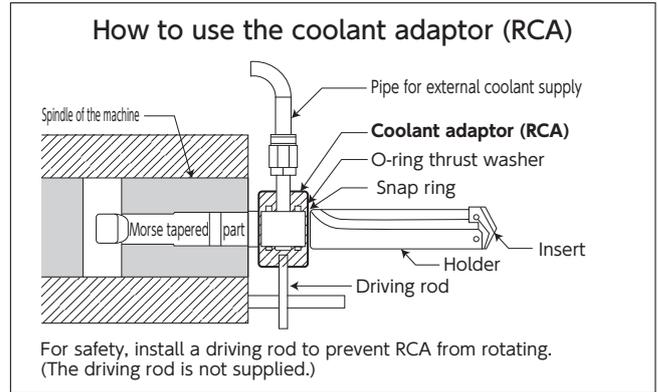
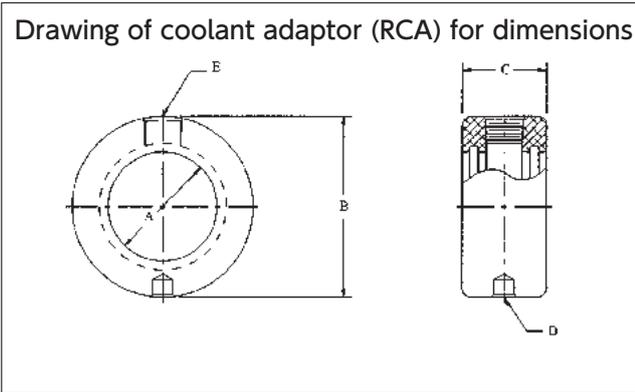
Ten clamping screws are supplied in a case. Please order by the case.

Optional screwdriver



Optional screwdriver

Coolant adaptors for Morse tapered shank holders



Coolant adaptor (RCA)

Part No.	(A) Inner diameter (mm)	(B) Outer diameter (mm)	(C) Overall length (mm)	(D) Screws for driving rod	(E) Screws for pipe	Stock
2T-2SRM	19.05	44.45	22.23	M8×1.25	1/8"	●
2T-3SRM	25.40	53.97	28.57	M8×1.25	1/8"	●
2T-4SRM	31.75	63.50	34.92	M10×1.5	1/4"	●
2T-5SRM	44.45	76.20	34.92	M10×1.5	1/4"	●
2T-6SRM	57.15	95.27	44.45	M12×1.75	1/2"	●

RCA components: 1 guide ring, 2 O-rings, 2 snap rings and 2 thrust washers



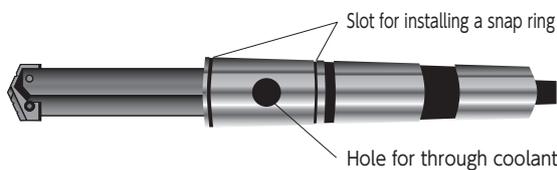
RCA repair kit

- 2 O-rings
- 2 snap rings
- 2 thrust washers

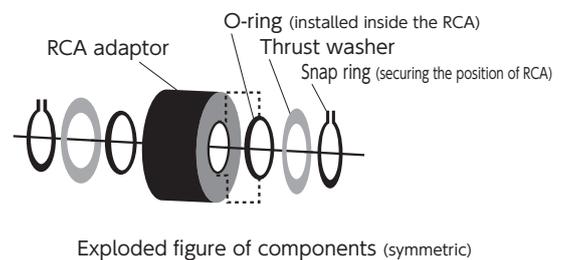
Size Series	Insert cutting edge diameter (mm)	RCA repair kit	Stock
Y	9.50 ~ 11.07	2T1-2SR	●
Z	11.11 ~ 12.95		
0	12.98 ~ 17.65		
0.5	15.48 ~ 17.65		
1	17.53 ~ 24.38	2T1-3SR	●
1.5	21.83 ~ 24.38		
2	24.41 ~ 35.05		
2.5	30.00 ~ 35.05	2T1-4SR	●
3	35.72 ~ 47.80		
4	46.99 ~ 65.28	2T1-5SR	●
5	62.38 ~ 89.08		
7	87.76 ~ 114.48	2T1-6SR	●

Installing the RCA coolant adaptor

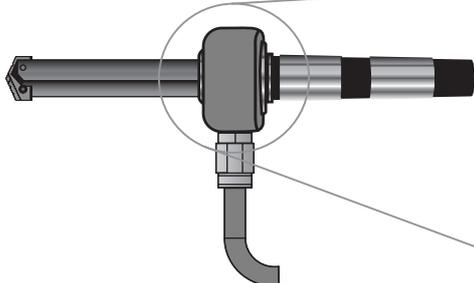
- Part of shank for installing RCA coolant adaptor



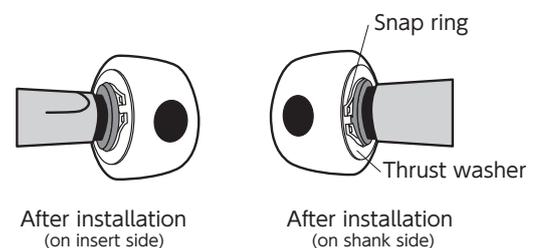
- Components



- Holder with the coolant adaptor installed



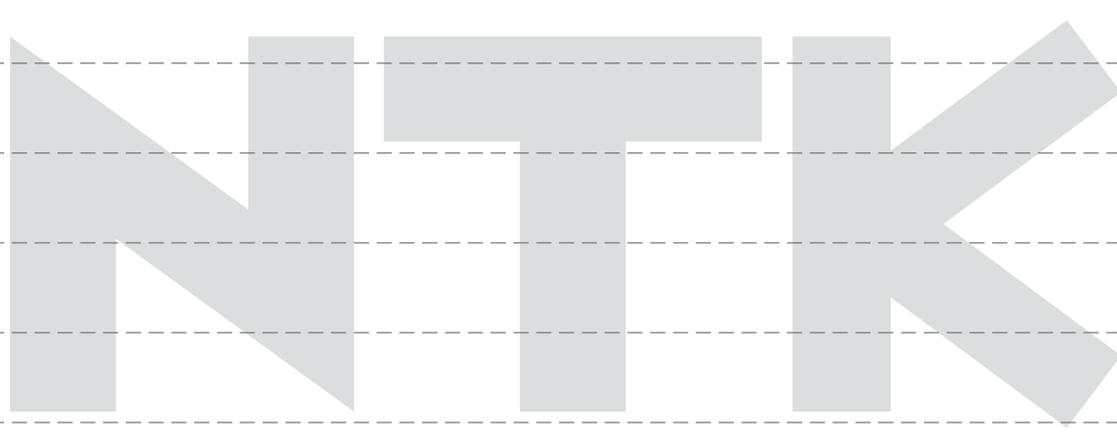
- Enlarged view



New Products
Tool Materials / Selection Guide
PCD, CBN and ceramic
Carbide
Micro-grain Carbide
Insert Stock List
Outside Machining Toolholders
SS
Grooving Tools
Threading Tools
Shaper
Internal machining tool range
Original Tools for Various Applications
Indexable End Milling Tools
Indexable Drill Inserts
Milling Cutters
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MEMO

New Products	
Tool Materials / Selection Guide	
PCD, CBN and ceramic	
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Insert Stock List	
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Appendix

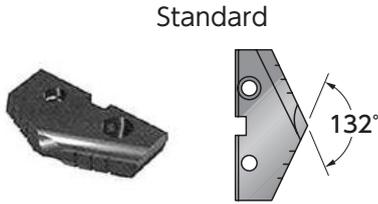
List of Semi-standard Inserts

ϕ 9.50 ~ 11.07	Inserts for Y Series	O56
ϕ 11.11 ~ 12.95	Inserts for Z Series	O57
ϕ 12.98 ~ 17.65	Inserts for 0, 0.5 Series	O58
ϕ 17.53 ~ 24.38	Inserts for 1, 1.5 Series	O60
ϕ 24.41 ~ 35.05	Inserts for 2, 2.5 Series	O62
ϕ 34.36 ~ 47.80	Inserts for 3 Series	O64
ϕ 46.99 ~ 65.28	Inserts for 4 Series	O65

Appendix: List of Semi-standard Inserts Inserts for Y Series: $\phi 9.50 - \phi 11.07$

★ Select same size series between inserts and holders.

<Shapes>



Please order in units of 2 as 1 package contains 2 inserts.

Edge shape	Standard								
Material	Powder high-speed steel (M48)								
Coating	TiAlN			TiCN			TiN		
Edge dia.	P/N	Chipbreaker		P/N	Chipbreaker		P/N	Chipbreaker	
		Standard	HI		Standard	HI		Standard	HI
9.50	18YA-9.5	●		18YN-9.5	●		18YT-9.5	●	
9.53	18YA-0012	●		18YN-0012	●		18YT-0012	●	
9.80	18YA-.386	●		18YN-.386	●		18YT-.386	●	
9.92	18YA-.390	●		18YN-.390	●		18YT-.390	●	
10.00	18YA-10	●		18YN-10	●		18YT-10	●	
10.20	18YA-10.2	●		18YN-10.2	●		18YT-10.2	●	
10.32	18YA-0013	●		18YN-0013	●		18YT-0013	●	
10.50	18YA-10.5	●		18YN-10.5	●		18YT-10.5	●	
10.72	18YA-.421	●		18YN-.421	●		18YT-.421	●	
10.80	18YA-10.8	●		18YN-10.8	●		18YT-10.8	●	
11.00	18YA-11	●		18YN-11	●		18YT-11	●	

For recommended cutting conditions, please refer to pages **O70 - O71**.

Please order in units of 2 as 1 package contains 2 inserts.

Edge shape	Standard													
Material	Carbide (K20)						Carbide (P40)						Carbide (K10)	
Coating	TiAlN		TiN		TiAlN		TiN		TiAlN					
Edge dia.	P/N	Chipbreaker		P/N	Chipbreaker		P/N	Chipbreaker		P/N	Chipbreaker			
		Standard	HI		Standard	HI		Standard	HI		Standard	HI	CI	
9.50	1C2YA-9.5	●		1C2YT-9.5	●		1C5YA-9.5	●		1C5YT-9.5	●		1C3YA-9.5	●
9.53	1C2YA-0012	●		1C2YT-0012	●		1C5YA-0012	●		1C5YT-0012	●		1C3YA-0012	●
9.80	1C2YA-.386	●		1C2YT-.386	●		1C5YA-.386	●		1C5YT-.386	●		1C3YA-.386	●
9.92	1C2YA-.390	●		1C2YT-.390	●		1C5YA-.390	●		1C5YT-.390	●		1C3YA-.390	●
10.00	1C2YA-10	●		1C2YT-10	●		1C5YA-10	●		1C5YT-10	●		1C3YA-10	●
10.20	1C2YA-10.2	●		1C2YT-10.2	●		1C5YA-10.2	●		1C5YT-10.2	●		1C3YA-10.2	●
10.32	1C2YA-0013	●		1C2YT-0013	●		1C5YA-0013	●		1C5YT-0013	●		1C3YA-0013	●
10.50	1C2YA-10.5	●		1C2YT-10.5	●		1C5YA-10.5	●		1C5YT-10.5	●		1C3YA-10.5	●
10.72	1C2YA-.421	●		1C2YT-.421	●		1C5YA-.421	●		1C5YT-.421	●		1C3YA-.421	●
10.80	1C2YA-10.8	●		1C2YT-10.8	●		1C5YA-10.8	●		1C5YT-10.8	●		1C3YA-10.8	●
11.00	1C2YA-11	●		1C2YT-11	●		1C5YA-11	●		1C5YT-11	●		1C3YA-11	●

For recommended cutting conditions, please refer to pages **O70 - O71**.

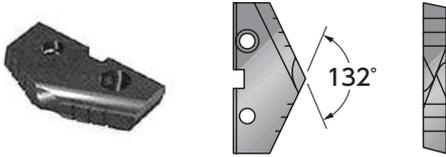
※Name of chipbreaker is put in the end of item number except for standard chipbreaker.

Appendix: List of Semi-standard Inserts Inserts for Z Series: $\phi 11.11 - \phi 12.95$

★ Select same size series between inserts and holders.

<Shapes>

Standard



Please order in units of 2 as 1 package contains 2 inserts.

Edge shape	Standard								
Material	Powder high-speed steel (M48)								
Coating	TiAlN			TiCN			TiN		
Edge dia.	P/N	Chipbreaker		P/N	Chipbreaker		P/N	Chipbreaker	
		Standard	HI		Standard	HI		Standard	HI
11.11	18ZA-0014	●		18ZN-0014	●		18ZT-0014	●	
11.50	18ZA-11.5	●		18ZN-11.5	●		18ZT-11.5	●	
11.51	18ZA-.453	●		18ZN-.453	●		18ZT-.453	●	
11.91	18ZA-0015	●		18ZN-0015	●		18ZT-0015	●	
12.00	18ZA-12	●		18ZN-12	●		18ZT-12	●	
12.30	18ZA-.484	●		18ZN-.484	●		18ZT-.484	●	
12.50	18ZA-12.5	●		18ZN-12.5	●		18ZT-12.5	●	
12.70	18ZA-0016	●		18ZN-0016	●		18ZT-0016	●	

For recommended cutting conditions, please refer to pages **O70 - O71**.

Please order in units of 2 as 1 package contains 2 inserts.

Edge shape	Standard													
Material	Carbide (K20)						Carbide (P40)						Carbide (K10)	
Coating	TiAlN			TiN			TiAlN			TiN			TiAlN	
Edge dia.	P/N	Chipbreaker		P/N	Chipbreaker									
		Standard	HI		CI									
11.11	1C2ZA-0014	●		1C2ZT-0014	●		1C5ZA-0014	●		1C5ZT-0014	●		1C3ZA-0014	●
11.50	1C2ZA-11.5	●		1C2ZT-11.5	●		1C5ZA-11.5	●		1C5ZT-11.5	●		1C3ZA-11.5	●
11.51	1C2ZA-.453	●		1C2ZT-.453	●		1C5ZA-.453	●		1C5ZT-.453	●		1C3ZA-.453	●
11.91	1C2ZA-0015	●		1C2ZT-0015	●		1C5ZA-0015	●		1C5ZT-0015	●		1C3ZA-0015	●
12.00	1C2ZA-12	●		1C2ZT-12	●		1C5ZA-12	●		1C5ZT-12	●		1C3ZA-12	●
12.30	1C2ZA-.484	●		1C2ZT-.484	●		1C5ZA-.484	●		1C5ZT-.484	●		1C3ZA-.484	●
12.50	1C2ZA-12.5	●		1C2ZT-12.5	●		1C5ZA-12.5	●		1C5ZT-12.5	●		1C3ZA-12.5	●
12.70	1C2ZA-0016	●		1C2ZT-0016	●		1C5ZA-0016	●		1C5ZT-0016	●		1C3ZA-0016	●

For recommended cutting conditions, please refer to pages **O70 - O71**.

※Name of chipbreaker is put in the end of item number except for standard chipbreaker.

● : Standard stock

◎ : Semi-standard stock (Time required for delivery: approx. 2 weeks)production-to-order basis

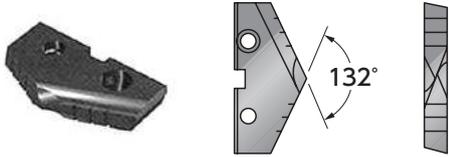
No symbol: Products manufactured production-to-order basis

Appendix: List of Semi-standard Inserts Inserts for 0, 0.5 Series: $\phi 12.98 - \phi 17.65$

★ Select same size series between inserts and holders.

<Shapes>

Standard



Please order in units of 2 as 1 package contains 2 inserts.

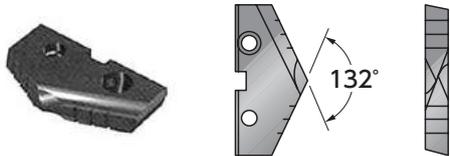
Edge shape	Standard								
	Material: Powder high-speed steel (M48)								
Coating	TiAlN			TiCN			TiN		
Edge dia.	P/N	Chipbreaker		P/N	Chipbreaker		P/N	Chipbreaker	
		Standard	HI		Standard	HI		Standard	HI
13.00	180A-13	●		180N-13	●		180T-13	●	
13.10	180A-.515	●		180N-.515	●		180T-.515	●	
13.49	180A-0017	●		180N-0017	●		180T-0017	●	
13.50	180A-13.5	●		180N-13.5	●		180T-13.5	●	
13.89	180A-.546	●		180N-.546	●		180T-.546	●	
14.00	180A-14	●		180N-14	●		180T-14	●	
14.29	180A-0018	●		180N-0018	●		180T-0018	●	
14.50	180A-14.5	●		180N-14.5	●		180T-14.5	●	
14.68	180A-.578	●		180N-.578	●		180T-.578	●	
15.00	180A-15	●		180N-15	●		180T-15	●	
15.08	180A-0019	●		180N-0019	●		180T-0019	●	
15.48	180A-.609	●		180N-.609	●		180T-.609	●	
15.50	180A-15.5	●		180N-15.5	●		180T-15.5	●	
15.88	180A-0020	●		180N-0020	●		180T-0020	●	
16.00	180A-16	●		180N-16	●		180T-16	●	
16.27	180A-.640	●		180N-.640	●		180T-.640	●	
16.50	180A-16.5	●		180N-16.5	●		180T-16.5	●	
16.67	180A-0021	●		180N-0021	●		180T-0021	●	
17.00	180A-17	●		180N-17	●		180T-17	●	
17.07	180A-.671	●		180N-.671	●		180T-.671	●	
17.46	180A-0022	●		180N-0022	●		180T-0022	●	
17.50	180A-17.5	●		180N-17.5	●		180T-17.5	●	

For recommended cutting conditions, please refer to pages **O70 - O71**.

※ Name of chipbreaker is put in the end of item number except for standard chipbreaker.

<Shapes>

Standard



Please order in units of 2 as 1 package contains 2 inserts.

Edge shape	Standard													
Material	Carbide (K20)						Carbide (P40)						Carbide (K10)	
Coating	TiAlN			TiN			TiAlN			TiN			TiAlN	
Edge dia.	P/N	Chipbreaker		P/N	Chipbreaker		P/N	Chipbreaker		P/N	Chipbreaker		P/N	Chipbreaker
		Standard	HI		Standard	HI		Standard	HI		Standard	HI		CI
13.00	1C20A-13	●		1C20T-13	●		1C50A-13	●		1C50T-13	●		1C30A-13	●
13.10	1C20A-.515	●		1C20T-.515	●		1C50A-.515	●		1C50T-.515	●		1C30A-.515	●
13.49	1C20A-0017	●		1C20T-0017	●		1C50A-0017	●		1C50T-0017	●		1C30A-0017	●
13.50	1C20A-13.5	●		1C20T-13.5	●		1C50A-13.5	●		1C50T-13.5	●		1C30A-13.5	●
13.89	1C20A-.546	●		1C20T-.546	●		1C50A-.546	●		1C50T-.546	●		1C30A-.546	●
14.00	1C20A-14	●		1C20T-14	●		1C50A-14	●		1C50T-14	●		1C30A-14	●
14.29	1C20A-0018	●		1C20T-0018	●		1C50A-0018	●		1C50T-0018	●		1C30A-0018	●
14.50	1C20A-14.5	●		1C20T-14.5	●		1C50A-14.5	●		1C50T-14.5	●		1C30A-14.5	●
14.68	1C20A-.578	●		1C20T-.578	●		1C50A-.578	●		1C50T-.578	●		1C30A-.578	●
15.00	1C20A-15	●		1C20T-15	●		1C50A-15	●		1C50T-15	●		1C30A-15	●
15.08	1C20A-0019	●		1C20T-0019	●		1C50A-0019	●		1C50T-0019	●		1C30A-0019	●
15.48	1C20A-.609	●		1C20T-.609	●		1C50A-.609	●		1C50T-.609	●		1C30A-.609	●
15.50	1C20A-15.5	●		1C20T-15.5	●		1C50A-15.5	●		1C50T-15.5	●		1C30A-15.5	●
15.88	1C20A-0020	●		1C20T-0020	●		1C50A-0020	●		1C50T-0020	●		1C30A-0020	●
16.00	1C20A-16	●		1C20T-16	●		1C50A-16	●		1C50T-16	●		1C30A-16	●
16.27	1C20A-.640	●		1C20T-.640	●		1C50A-.640	●		1C50T-.640	●		1C30A-.640	●
16.50	1C20A-16.5	●		1C20T-16.5	●		1C50A-16.5	●		1C50T-16.5	●		1C30A-16.5	●
16.67	1C20A-0021	●		1C20T-0021	●		1C50A-0021	●		1C50T-0021	●		1C30A-0021	●
17.00	1C20A-17	●		1C20T-17	●		1C50A-17	●		1C50T-17	●		1C30A-17	●
17.07	1C20A-.671	●		1C20T-.671	●		1C50A-.671	●		1C50T-.671	●		1C30A-.671	●
17.46	1C20A-0022	●		1C20T-0022	●		1C50A-0022	●		1C50T-0022	●		1C30A-0022	●
17.50	1C20A-17.5	●		1C20T-17.5	●		1C50A-17.5	●		1C50T-17.5	●		1C30A-17.5	●

For recommended cutting conditions, please refer to pages **O70 - O71**.

※Name of chipbreaker is put in the end of item number except for standard chipbreaker.

● : Standard stock

◎ : Semi-standard stock (Time required for delivery: approx. 2 weeks)production-to-order basis

No symbol: Products manufactured production-to-order basis

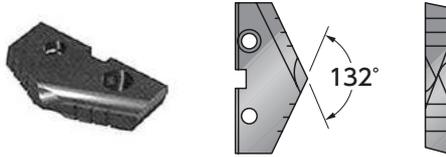
Indexable Drill Inserts

Appendix: List of Semi-standard Inserts Inserts for 1, 1.5 Series: $\phi 17.53 - \phi 24.38$

★ Select same size series between inserts and holders.

<Shapes>

Standard



Please order in units of 2 as 1 package contains 2 inserts.

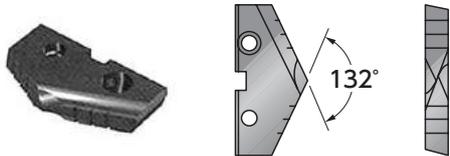
Edge shape	Standard													
Material	Powder high-speed steel (M4)							Powder high-speed steel (M48)						
Coating	TiAlN		TiCN		TiN		TiAlN		TiCN		TiN			
Edge dia.	P/N	Chipbreaker Standard HI	P/N	Chipbreaker Standard HI	P/N	Chipbreaker Standard HI	P/N	Chipbreaker Standard HI	P/N	Chipbreaker Standard HI	P/N	Chipbreaker Standard HI		
17.86	131A-.703	●	131N-.703	●	131T-.703	●	181A-.703	●	181N-.703	●	181T-.703	●		
18.00	131A-18	●	131N-18	●	131T-18	●	181A-18	●	181N-18	●	181T-18	●		
18.26	131A-0023	●	131N-0023	●	131T-0023	●	181A-0023	●	181N-0023	●	181T-0023	●		
18.50	131A-18.5	●	131N-18.5	●	131T-18.5	●	181A-18.5	●	181N-18.5	●	181T-18.5	●		
18.65	131A-.734	●	131N-.734	●	131T-.734	●	181A-.734	●	181N-.734	●	181T-.734	●		
19.00	131A-19	●	131N-19	●	131T-19	●	181A-19	●	181N-19	●	181T-19	●		
19.05	131A-0024	●	131N-0024	●	131T-0024	●	181A-0024	●	181N-0024	●	181T-0024	●		
19.45	131A-.765	●	131N-.765	●	131T-.765	●	181A-.765	●	181N-.765	●	181T-.765	●		
19.50	131A-19.5	●	131N-19.5	●	131T-19.5	●	181A-19.5	●	181N-19.5	●	181T-19.5	●		
19.84	131A-0025	●	131N-0025	●	131T-0025	●	181A-0025	●	181N-0025	●	181T-0025	●		
20.00	131A-20	●	131N-20	●	131T-20	●	181A-20	●	181N-20	●	181T-20	●		
20.24	131A-.796	●	131N-.796	●	131T-.796	●	181A-.796	●	181N-.796	●	181T-.796	●		
20.50	131A-20.5	●	131N-20.5	●	131T-20.5	●	181A-20.5	●	181N-20.5	●	181T-20.5	●		
20.64	131A-0026	●	131N-0026	●	131T-0026	●	181A-0026	●	181N-0026	●	181T-0026	●		
21.00	131A-21	●	131N-21	●	131T-21	●	181A-21	●	181N-21	●	181T-21	●		
21.43	131A-0027	●	131N-0027	●	131T-0027	●	181A-0027	●	181N-0027	●	181T-0027	●		
21.83	131A-.859	●	131N-.859	●	131T-.859	●	181A-.859	●	181N-.859	●	181T-.859	●		
22.00	131A-22	●	131N-22	●	131T-22	●	181A-22	●	181N-22	●	181T-22	●		
22.23	131A-0028	●	131N-0028	●	131T-0028	●	181A-0028	●	181N-0028	●	181T-0028	●		
22.62	131A-.890	●	131N-.890	●	131T-.890	●	181A-.890	●	181N-.890	●	181T-.890	●		
23.00	131A-23	●	131N-23	●	131T-23	●	181A-23	●	181N-23	●	181T-23	●		
23.02	131A-0029	●	131N-0029	●	131T-0029	●	181A-0029	●	181N-0029	●	181T-0029	●		
23.42	131A-.921	●	131N-.921	●	131T-.921	●	181A-.921	●	181N-.921	●	181T-.921	●		
23.81	131A-0030	●	131N-0030	●	131T-0030	●	181A-0030	●	181N-0030	●	181T-0030	●		
24.00	131A-24	●	131N-24	●	131T-24	●	181A-24	●	181N-24	●	181T-24	●		

For recommended cutting conditions, please refer to pages **070 - 071**.

※Name of chipbreaker is put in the end of item number except for standard chipbreaker.

<Shapes>

Standard



Please order in units of 2 as 1 package contains 2 inserts.

Edge shape	Standard													
Material	Carbide (K20)						Carbide (P40)						Carbide (K10)	
Coating	TiAlN		TiN				TiAlN		TiN				TiAlN	
Edge dia.	P/N	Chipbreaker		P/N	Chipbreaker		P/N	Chipbreaker		P/N	Chipbreaker		P/N	Chipbreaker
		Standard	HI		Standard	HI		Standard	HI		Standard	HI		
17.86	1C21A-.703	●		1C21T-.703	●		1C51A-.703	●		1C51T-.703	●		1C31A-.703	●
18.00	1C21A-18	●		1C21T-18	●		1C51A-18	●		1C51T-18	●		1C31A-18	●
18.26	1C21A-0023	●		1C21T-0023	●		1C51A-0023	●		1C51T-0023	●		1C31A-0023	●
18.50	1C21A-18.5	●		1C21T-18.5	●		1C51A-18.5	●		1C51T-18.5	●		1C31A-18.5	●
18.65	1C21A-.734	●		1C21T-.734	●		1C51A-.734	●		1C51T-.734	●		1C31A-.734	●
19.00	1C21A-19	●		1C21T-19	●		1C51A-19	●		1C51T-19	●		1C31A-19	●
19.05	1C21A-0024	●		1C21T-0024	●		1C51A-0024	●		1C51T-0024	●		1C31A-0024	●
19.45	1C21A-.765	●		1C21T-.765	●		1C51A-.765	●		1C51T-.765	●		1C31A-.765	●
19.50	1C21A-19.5	●		1C21T-19.5	●		1C51A-19.5	●		1C51T-19.5	●		1C31A-19.5	●
19.84	1C21A-0025	●		1C21T-0025	●		1C51A-0025	●		1C51T-0025	●		1C31A-0025	●
20.00	1C21A-20	●		1C21T-20	●		1C51A-20	●		1C51T-20	●		1C31A-20	●
20.50	1C21A-20.5	●		1C21T-20.5	●		1C51A-20.5	●		1C51T-20.5	●		1C31A-20.5	●
20.64	1C21A-0026	●		1C21T-0026	●		1C51A-0026	●		1C51T-0026	●		1C31A-0026	●
21.00	1C21A-21	●		1C21T-21	●		1C51A-21	●		1C51T-21	●		1C31A-21	●
21.43	1C21A-0027	●		1C21T-0027	●		1C51A-0027	●		1C51T-0027	●		1C31A-0027	●
22.00	1C21A-22	●		1C21T-22	●		1C51A-22	●		1C51T-22	●		1C31A-22	●
22.23	1C21A-0028	●		1C21T-0028	●		1C51A-0028	●		1C51T-0028	●		1C31A-0028	●
23.00	1C21A-23	●		1C21T-23	●		1C51A-23	●		1C51T-23	●		1C31A-23	●
23.02	1C21A-0029	●		1C21T-0029	●		1C51A-0029	●		1C51T-0029	●		1C31A-0029	●
23.42	1C21A-.921	●		1C21T-.921	●		1C51A-.921	●		1C51T-.921	●		1C31A-.921	●
23.81	1C21A-0030	●		1C21T-0030	●		1C51A-0030	●		1C51T-0030	●		1C31A-0030	●
24.00	1C21A-24	●		1C21T-24	●		1C51A-24	●		1C51T-24	●		1C31A-24	●

For recommended cutting conditions, please refer to pages **O70 - O71**.

※Name of chipbreaker is put in the end of item number except for standard chipbreaker.

● : Standard stock

◎ : Semi-standard stock (Time required for delivery: approx. 2 weeks)production-to-order basis

No symbol: Products manufactured production-to-order basis

New Products
Tool Materials / Selection Guide
PCD, CBN and ceramic
Cement
PVD-coated Carbide
Micro-grain Carbide, Carbide
Insert Stock List
Outside Machining Toolholders
SS
Grooving Tools
Threading Tools
Shaper
Internal machining tool range
Original Tools for Various Applications
Indexable End Milling Tools
Indexable Drill Inserts
Milling Cutters
Technical Data
Index

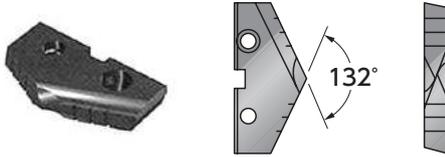
Indexable Drill Inserts

Appendix: List of Semi-standard Inserts Inserts for 2, 2.5 Series: $\phi 24.41 - \phi 35.05$

★ Select same size series between inserts and holders.

<Shapes>

Standard



Please order in units of 2 as 1 package contains 2 inserts.

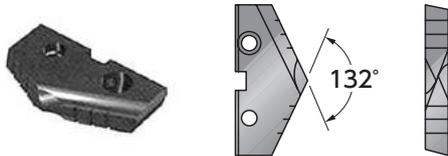
Edge shape	Standard											
Material	Powder high-speed steel (M4)						Powder high-speed steel (M48)					
Coating	TiAlN		TiCN		TiN		TiAlN		TiCN		TiN	
Edge dia.	P/N	Chipbreaker Standard HI	P/N	Chipbreaker Standard HI	P/N	Chipbreaker Standard HI	P/N	Chipbreaker Standard HI	P/N	Chipbreaker Standard HI	P/N	Chipbreaker Standard HI
24.61	132A-0031	●	132N-0031	●	132T-0031	●	182A-0031	●	182N-0031	●	182T-0031	●
25.00	132A-25	●	132N-25	●	132T-25	●	182A-25	●	182N-25	●	182T-25	●
25.40	132A-0100	●	132N-0100	●	132T-0100	●	182A-0100	●	182N-0100	●	182T-0100	●
25.80	132A-1.015	●	132N-1.015	●	132T-1.015	●	182A-1.015	●	182N-1.015	●	182T-1.015	●
26.00	132A-26	●	132N-26	●	132T-26	●	182A-26	●	182N-26	●	182T-26	●
26.19	132A-0101	●	132N-0101	●	132T-0101	●	182A-0101	●	182N-0101	●	182T-0101	●
26.59	132A-1.046	●	132N-1.046	●	132T-1.046	●	182A-1.046	●	182N-1.046	●	182T-1.046	●
26.99	132A-0102	●	132N-0102	●	132T-0102	●	182A-0102	●	182N-0102	●	182T-0102	●
27.00	132A-27	●	132N-27	●	132T-27	●	182A-27	●	182N-27	●	182T-27	●
27.78	132A-0103	●	132N-0103	●	132T-0103	●	182A-0103	●	182N-0103	●	182T-0103	●
28.00	132A-28	●	132N-28	●	132T-28	●	182A-28	●	182N-28	●	182T-28	●
28.18	132A-1.109	●	132N-1.109	●	132T-1.109	●	182A-1.109	●	182N-1.109	●	182T-1.109	●
28.58	132A-0104	●	132N-0104	●	132T-0104	●	182A-0104	●	182N-0104	●	182T-0104	●
29.00	132A-29	●	132N-29	●	132T-29	●	182A-29	●	182N-29	●	182T-29	●
29.37	132A-0105	●	132N-0105	●	132T-0105	●	182A-0105	●	182N-0105	●	182T-0105	●
30.00	132A-30	●	132N-30	●	132T-30	●	182A-30	●	182N-30	●	182T-30	●
30.16	132A-0106	●	132N-0106	●	132T-0106	●	182A-0106	●	182N-0106	●	182T-0106	●
30.96	132A-0107	●	132N-0107	●	132T-0107	●	182A-0107	●	182N-0107	●	182T-0107	●
31.00	132A-31	●	132N-31	●	132T-31	●	182A-31	●	182N-31	●	182T-31	●
31.75	132A-0108	●	132N-0108	●	132T-0108	●	182A-0108	●	182N-0108	●	182T-0108	●
32.00	132A-32	●	132N-32	●	132T-32	●	182A-32	●	182N-32	●	182T-32	●
32.54	132A-0109	●	132N-0109	●	132T-0109	●	182A-0109	●	182N-0109	●	182T-0109	●
33.00	132A-33	●	132N-33	●	132T-33	●	182A-33	●	182N-33	●	182T-33	●
33.34	132A-0110	●	132N-0110	●	132T-0110	●	182A-0110	●	182N-0110	●	182T-0110	●
34.00	132A-34	●	132N-34	●	132T-34	●	182A-34	●	182N-34	●	182T-34	●
34.13	132A-0111	●	132N-0111	●	132T-0111	●	182A-0111	●	182N-0111	●	182T-0111	●
34.93	132A-0112	●	132N-0112	●	132T-0112	●	182A-0112	●	182N-0112	●	182T-0112	●
35.00	132A-35	●	132N-35	●	132T-35	●	182A-35	●	182N-35	●	182T-35	●

For recommended cutting conditions, please refer to pages **070 - 071**.

※Name of chipbreaker is put in the end of item number except for standard chipbreaker.

<Shapes>

Standard



Please order in units of 2 as 1 package contains 2 inserts.

Edge shape	Standard													
Material	Carbide (K20)						Carbide (P40)							
Coating	TiAlN			TiN			TiAlN			TiN				
Edge dia.	P/N	Chipbreaker		P/N	Chipbreaker		P/N	Chipbreaker		P/N	Chipbreaker			
		Standard	HI		Standard	HI		Standard	HI		Standard	HI		
24.61	1C22A-0031	●		1C22T-0031	●		1C52A-0031	●		1C52T-0031	●		1C32A-0031	●
25.00	1C22A-25	●		1C22T-25	●		1C52A-25	●		1C52T-25	●		1C32A-25	●
25.40	1C22A-0100	●		1C22T-0100	●		1C52A-0100	●		1C52T-0100	●		1C32A-0100	●
26.00	1C22A-26	●		1C22T-26	●		1C52A-26	●		1C52T-26	●		1C32A-26	●
26.19	1C22A-0101	●		1C22T-0101	●		1C52A-0101	●		1C52T-0101	●		1C32A-0101	●
26.59	1C22A-1.046	●		1C22T-1.046	●		1C52A-1.046	●		1C52T-1.046	●		1C32A-1.046	●
26.99	1C22A-0102	●		1C22T-0102	●		1C52A-0102	●		1C52T-0102	●		1C32A-0102	●
27.00	1C22A-27	●		1C22T-27	●		1C52A-27	●		1C52T-27	●		1C32A-27	●
27.78	1C22A-0103	●		1C22T-0103	●		1C52A-0103	●		1C52T-0103	●		1C32A-0103	●
28.00	1C22A-28	●		1C22T-28	●		1C52A-28	●		1C52T-28	●		1C32A-28	●
28.18	1C22A-1.109	●		1C22T-1.109	●		1C52A-1.109	●		1C52T-1.109	●		1C32A-1.109	●
28.58	1C22A-0104	●		1C22T-0104	●		1C52A-0104	●		1C52T-0104	●		1C32A-0104	●
29.00	1C22A-29	●		1C22T-29	●		1C52A-29	●		1C52T-29	●		1C32A-29	●
29.37	1C22A-0105	●		1C22T-0105	●		1C52A-0105	●		1C52T-0105	●		1C32A-0105	●
30.00	1C22A-30	●		1C22T-30	●		1C52A-30	●		1C52T-30	●		1C32A-30	●
30.16	1C22A-0106	●		1C22T-0106	●		1C52A-0106	●		1C52T-0106	●		1C32A-0106	●
30.96	1C22A-0107	●		1C22T-0107	●		1C52A-0107	●		1C52T-0107	●		1C32A-0107	●
31.00	1C22A-31	●		1C22T-31	●		1C52A-31	●		1C52T-31	●		1C32A-31	●
31.75	1C22A-0108	●		1C22T-0108	●		1C52A-0108	●		1C52T-0108	●		1C32A-0108	●
32.00	1C22A-32	●		1C22T-32	●		1C52A-32	●		1C52T-32	●		1C32A-32	●
32.54	1C22A-0109	●		1C22T-0109	●		1C52A-0109	●		1C52T-0109	●		1C32A-0109	●
33.00	1C22A-33	●		1C22T-33	●		1C52A-33	●		1C52T-33	●		1C32A-33	●
33.34	1C22A-0110	●		1C22T-0110	●		1C52A-0110	●		1C52T-0110	●		1C32A-0110	●
34.00	1C22A-34	●		1C22T-34	●		1C52A-34	●		1C52T-34	●		1C32A-34	●
34.13	1C22A-0111	●		1C22T-0111	●		1C52A-0111	●		1C52T-0111	●		1C32A-0111	●
34.93	1C22A-0112	●		1C22T-0112	●		1C52A-0112	●		1C52T-0112	●		1C32A-0112	●
35.00	1C22A-35	●		1C22T-35	●		1C52A-35	●		1C52T-35	●		1C32A-35	●

For recommended cutting conditions, please refer to pages **O70 - O71**.

※Name of chipbreaker is put in the end of item number except for standard chipbreaker.

● : Standard stock

◎ : Semi-standard stock (Time required for delivery: approx. 2 weeks)production-to-order basis

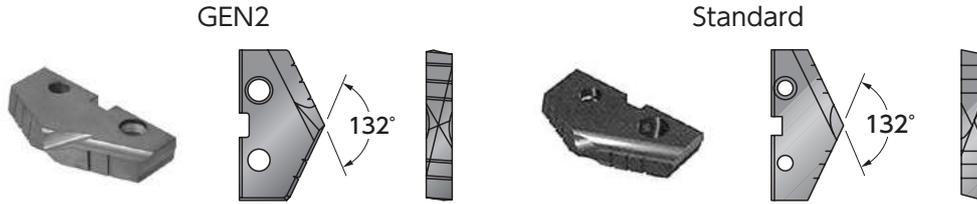
No symbol: Products manufactured production-to-order basis

New Products
Tool Materials / Selection Guide
PCD, CBN and ceramic
Cermets
Micro-grain Carbide, Carbide
Insert Stock List
Outside Machining Toolholders
SS
Grooving Tools
Threading Tools
Shaper
Internal machining tool range
Original Tools for Various Applications
Indexable End Milling Tools
Indexable Drill Inserts
Milling Cutters
Technical Data
Index

Appendix: List of Semi-standard Inserts Inserts for 3 Series: $\phi 34.36 - \phi 47.80$

★ Select same size series between inserts and holders.

<Shapes>



Please order in units of 2 as 1 package contains 2 inserts.

Edge shape	GEN2						Standard																	
Material	Powder high-speed steel (M4)						Carbide (K20)																	
Coating	TiN						TiAlN						TiN						Carbide (P40)					
Edge dia.	P/N		Chipbreaker		P/N		Chipbreaker		P/N		Chipbreaker		P/N		Chipbreaker		P/N		Chipbreaker					
			Standard	HI			Standard	HI			Standard	HI			Standard	HI			Standard	HI				
35.72	433T-0113	●			1C23A-0113	●			1C23T-0113	●			1C53A-0113	●			1C53T-0113	●						
36.00	433T-36	●			1C23A-36	●			1C23T-36	●			1C53A-36	●			1C53T-36	●						
36.51	433T-0114	●			1C23A-0114	●			1C23T-0114	●			1C53A-0114	●			1C53T-0114	●						
37.00	433T-37	●			1C23A-37	●			1C23T-37	●			1C53A-37	●			1C53T-37	●						
37.31	433T-0115	●			1C23A-0115	●			1C23T-0115	●			1C53A-0115	●			1C53T-0115	●						
38.00	433T-38	●			1C23A-38	●			1C23T-38	●			1C53A-38	●			1C53T-38	●						
38.10	433T-0116	●			1C23A-0116	●			1C23T-0116	●			1C53A-0116	●			1C53T-0116	●						
38.89	433T-0117	●			1C23A-0117	●			1C23T-0117	●			1C53A-0117	●			1C53T-0117	●						
39.00	433T-39	●			1C23A-39	●			1C23T-39	●			1C53A-39	●			1C53T-39	●						
39.69	433T-0118	●			1C23A-0118	●			1C23T-0118	●			1C53A-0118	●			1C53T-0118	●						
40.00	433T-40	●			1C23A-40	●			1C23T-40	●			1C53A-40	●			1C53T-40	●						
40.48	433T-0119	●			1C23A-0119	●			1C23T-0119	●			1C53A-0119	●			1C53T-0119	●						
41.00	433T-41	●			1C23A-41	●			1C23T-41	●			1C53A-41	●			1C53T-41	●						
41.28	433T-0120	●			1C23A-0120	●			1C23T-0120	●			1C53A-0120	●			1C53T-0120	●						
42.00	433T-42	●			1C23A-42	●			1C23T-42	●			1C53A-42	●			1C53T-42	●						
42.07	433T-0121	●			1C23A-0121	●			1C23T-0121	●			1C53A-0121	●			1C53T-0121	●						
42.86	433T-0122	●			1C23A-0122	●			1C23T-0122	●			1C53A-0122	●			1C53T-0122	●						
43.00	433T-43	●			1C23A-43	●			1C23T-43	●			1C53A-43	●			1C53T-43	●						
43.66	433T-0123	●			1C23A-0123	●			1C23T-0123	●			1C53A-0123	●			1C53T-0123	●						
44.00	433T-44	●			1C23A-44	●			1C23T-44	●			1C53A-44	●			1C53T-44	●						
44.45	433T-0124	●			1C23A-0124	●			1C23T-0124	●			1C53A-0124	●			1C53T-0124	●						
45.00	433T-45	●			1C23A-45	●			1C23T-45	●			1C53A-45	●			1C53T-45	●						
45.24	433T-0125	●			1C23A-0125	●			1C23T-0125	●			1C53A-0125	●			1C53T-0125	●						
46.00	433T-46	●			1C23A-46	●			1C23T-46	●			1C53A-46	●			1C53T-46	●						
46.04	433T-0126	●			1C23A-0126	●			1C23T-0126	●			1C53A-0126	●			1C53T-0126	●						
46.83	433T-0127	●			1C23A-0127	●			1C23T-0127	●			1C53A-0127	●			1C53T-0127	●						
47.00	433T-47	●			1C23A-47	●			1C23T-47	●			1C53A-47	●			1C53T-47	●						
47.63	433T-0128	●			1C23A-0128	●			1C23T-0128	●			1C53A-0128	●			1C53T-0128	●						

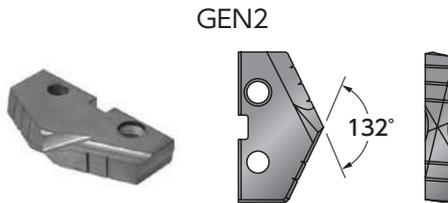
For recommended cutting conditions, please refer to pages **070 - 071**.

※Name of chipbreaker is put in the end of item number except for standard chipbreaker.

Appendix: List of Semi-standard Inserts Inserts for 4 Series: $\phi 46.99 - \phi 65.28$

★ Select same size series between inserts and holders.

<Shapes>



Please order in units of 2 as 1 package contains 2 inserts.

Edge shape	GEN2		
Material	Powder high-speed steel (T15)		
Coating	TiN		
Edge dia.	P/N	Chipbreaker	
		Standard	HI
48.00	454T-48	●	
48.42	454T-0129	●	
49.00	454T-49	●	
49.21	454T-0130	●	
50.00	454T-50	●	
50.01	454T-0131	●	
50.80	454T-0200	●	
51.00	454T-51	●	
51.59	454T-0201	●	
52.00	454T-52	●	
52.39	454T-0202	●	
53.00	454T-53	●	
53.18	454T-0203	●	
53.98	454T-0204	●	
54.00	454T-54	●	
54.79	454T-0205	●	
55.00	454T-55	●	
55.56	454T-0206	●	
56.00	454T-56	●	
56.36	454T-0207	●	
57.00	454T-57	●	
57.15	454T-0208	●	
57.94	454T-0209	●	
58.00	454T-58	●	
58.74	454T-0210	●	
59.00	454T-59	●	
59.53	454T-0211	●	
60.00	454T-60	●	
60.33	454T-0212	●	
61.00	454T-61	●	
61.12	454T-0213	●	
61.91	454T-0214	●	
62.00	454T-62	●	
62.71	454T-0215	●	
63.00	454T-63	●	
63.50	454T-0216	●	
64.00	454T-64	●	
64.29	454T-0217	●	
65.00	454T-65	●	
65.09	454T-0218	●	

For recommended cutting conditions, please refer to pages **O70 - O71**.

※Name of chipbreaker is put in the end of item number except for standard chipbreaker.

● : Standard stock

◎ : Semi-standard stock (Time required for delivery: approx. 2 weeks)production-to-order basis

No symbol: Products manufactured production-to-order basis

- New Products
- Tool Materials / Selection Guide
- PCD, CBN and ceramic
- Cermet PVD-coated Cermet
- Micro-grain Carbide, Carbide
- Insert Stock List
- Outside Machining Toolholders
- SS
- Grooving Tools
- Threading Tools
- Shaper
- Internal Machining tool range
- Original Tools for Various Applications
- Indexable End Milling Tools
- Indexable Drill Inserts
- Milling Cutters
- Technical Data
- Index

Products manufactured on the production-to-order basis

We will provide you with the following special products, catering to your needs:

Please contact our sales office for more information and let us know of the specifications of your machining operations.

● Cutting edge diameter of inserts

The cutting edge diameter of standard products ranges from $\phi 9.5$ to $\phi 114$, however, inserts with a diameter exceeding 114 may be manufactured for a common holder(s). (Please note that the minimum diameter is $\phi 9.5$.)

● Ultra long holders

Ultra long holders

Size Series	Drill holder length	
	Straight fluted	Helical fluted
Y	375.92	375.92
Z	375.92	375.92
0	508.00	508.00
1	690.88	690.88
2	966.22	966.22
3	1625.60	990.60
4	1625.60	990.60
5 • 6	1625.60	990.60
7 • 8	1625.60	990.60

※Details of your machining conditions will be requested.

※For drill holder lengths other than those listed above, please consult us.

● Staged drill holder

Application: Simultaneous Drilling + Chamfering



*Possible to mount ISO type inserts

*Possible to provide more than 2 inserts for chamfering (There is a limit in quantity.)

● Guided holders

Applications: For improved deep hole drilling, and preventing rattling when exiting slanted drill holes.

Chrome-bush guide



Carbide clamped with screws



Brazed carbide type



Thermal sprayed carbide type



※Please refer to pages O19 - 21.

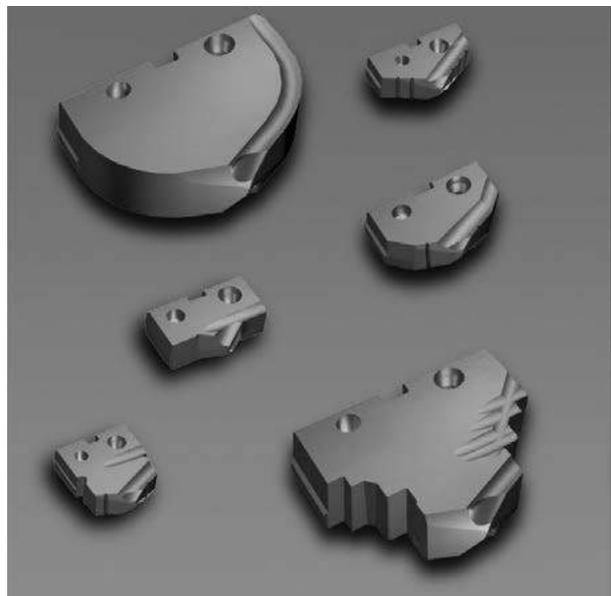
● "ACCUPORT" for machining port holes

Application: For drilling and shaping of a port hole by a single-pass



* This tool contributes to reduction of the cycle time and of the number of tools used.

● Special inserts available by production-to-order system



● Chamfering adaptor

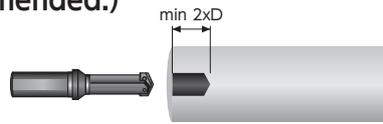
detachable adaptor for chamfering can be used for the straight fluted type holders in the size series of 1, 1.5 and 2.



Deep Hole Drilling Guideline

① Pilot Hole (NTK drills are recommended.)

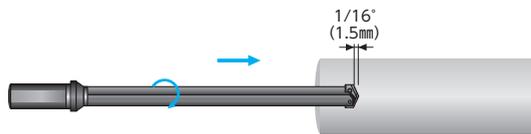
Velocity : Same as recommendation
 Feed rate : Same as recommendation
 Coolant : On
 ※In case of using competitor's tools, you need to do process ③ below.



- Establish the pilot hole using the same diameter short drill to a depth of a 2xD minimum
- Utilize a pilot drill with the same or larger included point angle

② Feed In

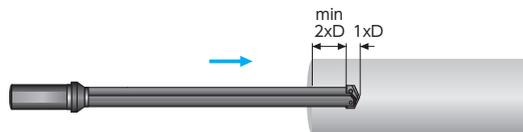
Speed : 50 RPM Max
 Feed rate : 300 mm/min
 Coolant : Off



- Feed the longer drill within 1.5 mm short of the established pilot hole bottom at a maximum of 50 RPM and 300 mm/min feed rate

③ Deep Hole Transition Drilling

Speed : 50% of recommended
 Feed rate : 75% of recommended
 Coolant : On
 ※This process can be eliminated in case of using NTK drills for guide hole.



- Drill additional 1xD passed bottom of pilot hole at 50% reduction of recommended speed and 25% reduction of recommended feed
- Minimum of 1 second dwell is required to meet full speed before feeding

④ Deep Hole Drilling - Blind

Speed : 100% of recommended
 Feed rate : 100% of recommended
 Coolant : On



- Drill to full depth at recommended speed and feed for longer drills, no peck cycle recommended

⑤ Deep Hole Drilling - Through Hole

Speed : 50% of recommended
 Feed rate : 75% of recommended
 Coolant : On



- Reduce speed by 50% and feed by 25% prior to break out
- Do not break out more than 3 mm past the full diameter of drill

⑥ Drill Retract

Speed : 50 RPM max
 Feed rate : —
 Coolant : Off



- Reduce speed to maximum of 50 RPM before retracting from hole

⚠ WARNING

- When using holders without support bushing, use a short holder to establish an initial hole that is a minimum of 2 diameters deep
- Do not rotate tool holders more than 50 RPM unless it is engaged with workpiece or fixture

Optimizing cutting conditions (Using an example case where an insert coated with high-speed steel is used)

This section describes an example of how cutting conditions were optimized by checking the chips. Please use the optimizing steps as reference when determining cutting conditions for your operations.

Machine: Machining center

Work material: Alloy steel (HB160); Holes to be drilled: $\phi 20 \times (L) 100$; (Without interference with the jig)

● Selecting the tools

Holder : **23010H-25FMS**

Insert : **151N-20**

Wrench : **8IP-9**

● Confirm the recommended cutting conditions

Confirm the recommended cutting conditions: (Cutting speed) = 48 [m/min], (Cutting feed rate) = 0.2 [mm/rev]

Recommended cutting conditions for indexable drill inserts coated with high-speed steel

Work material	Hardness (HB)	Recommended material	Cutting speed (m/min)				Cutting feed rate (mm/rev)						
			TiN	TiCN	TiAlN	AlCrN	$\phi 9.5$ $\phi 13.0$	$\phi 13.0$ $\phi 18.0$	$\phi 18.0$ $\phi 25.0$	$\phi 25.0$ $\phi 36.0$	$\phi 36.0$ $\phi 48.0$	$\phi 48.0$ $\phi 66.0$	$\phi 66.0$ $\phi 114.48$
Alloy steel SCr, SCM	125 ~ 175	HSS,SC	37	48	52	59	0.12	0.16	0.20	0.29	0.35	0.39	0.45
	175 ~ 225	HSS,SC	35	44	48	56	0.11	0.16	0.20	0.29	0.35	0.39	0.45
	225 ~ 275	275 ~ 325	32	42	44	52	0.11	0.15	0.20	0.29	0.35	0.39	0.45
	275 ~ 325	SC,PC	30	38	42	48	0.08	0.12	0.19	0.24	0.31	0.35	0.41
	325 ~ 375	SC,PC	28	36	38	44	0.07	0.12	0.19	0.24	0.31	0.35	0.41

● Determining the optimal feed rate by drilling shallow holes (1D as the reference depth)

With internal coolant supply, drill to the depth of 1D as the reference. Then, after the cutting condition was determined, drill to a depth exceeding 1D. (This is to prevent the holder from damage in case of an unexpected situation.)

① The hardness of the work material was low, however, the machining was carried out at the 80% of the recommended cutting speed, considering the elongation of the chips.

<Chips at the beginning of drilling>



<Chips after the shoulder section was inserted>



$v_c=38.4$ [m/min]、 $f=0.2$ ($n=611$ [rpm]、 v_f122 [mm/min])

Elongation of chips at entrance could not be helped. But it was desirable to make them as short as possible to avoid the tool becoming entangled by long chips.

Furthermore, since chips were still several centimeter-long after the insertion of the shoulder, it was preferable to have them broken into smaller/shorter pieces for evacuation.

② Increase the feed rate while keeping the cutting speed.

<Chips at the beginning of drilling>



<Chips after the shoulder section was inserted>

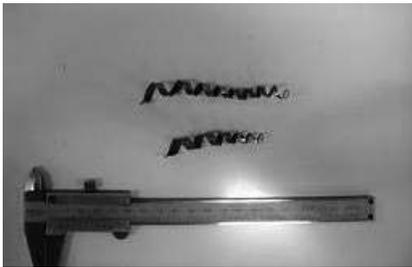


$v_c=38.4$ [m/min]、 $f=0.24$ ($n=611$ [rpm]、 v_f146 [mm/min])

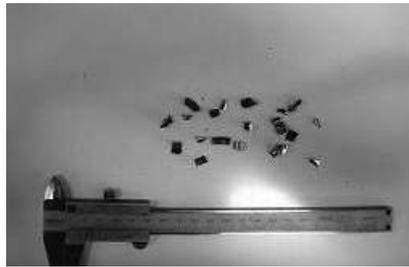
Chips became shorter both at entrance and after the shoulder insertion. The chips after the shoulder insertion had creases so that they were easily broken into pieces after evacuation. So, to get the chips broken into manageable pieces, the feed rate should be increased again slightly.

③ Increase the feed rate while keeping the cutting speed at the same level.

<Chips at the beginning of drilling>



<Chips after the shoulder section was inserted>



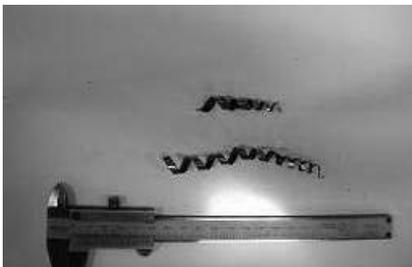
$v_c=38.4$ [m/min]、 $f=0.26$ ($n=611$ [rpm]、 v_f159 [mm/min])

Chips at entrance, too, became even shorter, lowering the possibility of entangling around the tool. Chips during machining also were broken into small pieces, allowing for smooth evacuation of the chips.

④ Optimizing the cutting speed (by drilling shallow holes not deeper than 1D)

In order to get a slightly higher machining efficiency, increase the cutting speed while maintaining the current feed rate.

<Chips at the beginning of drilling>



<Chips after the shoulder section was inserted>



$v_c=48$ [m/min]、 $f=0.26$ ($n=764$ [rpm]、 v_f198 [mm/min])

The chip control still remained excellent.

⑤ Try drilling deeper holes

As the condition of chips at $v_c=48$ and $f=0.26$ was confirmed, it was judged that there was no concern regarding the chip evacuation.

Under these conditions, drilling holes with the depth of 100D should be tried next.

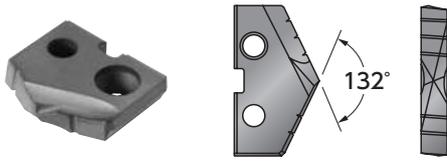
If there are instances when the chips are not evacuating smoothly, the reading of the machine load meter would jump and/or abnormal cutting noise would be generated. Start machining, with the operators hand on the stop button, so that the machine can be stopped immediately if necessary to avoid any damage.

If the drilling operation is finished without any problem, the optimum cutting condition has been achieved.

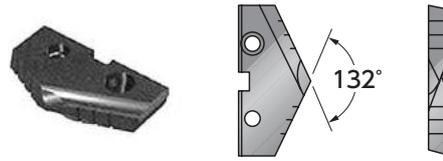
- New Products
- Tool Materials / Selection Guide
- PCD, CBN and ceramic
- Cermet PVD-coated Cermet
- Micro-grain Carbide, Carbide
- Insert Stock List
- Outside Machining Toolholders
- SS
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- Shaper
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- Indexable Drill Inserts
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Recommended Cutting Conditions

GEN2



Standard



Recommended cutting conditions for indexable drill inserts coated with high-speed steel

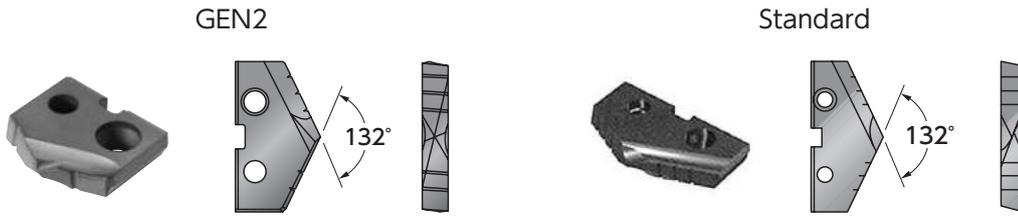
Work material	Hardness (HB)	Recommended material grade	Cutting speed (m/min)				Cutting feed rate (mm/rev)						
			TiN	TiCN	TiAlN	AlCrN	φ9.5 φ13.0	φ13.0 φ18.0	φ18.0 φ25.0	φ25.0 φ36.0	φ36.0 φ48.0	φ48.0 φ66.0	φ66.0 φ114.8
Free-cutting steel	100 ~ 150	HSS, SC	49	64	69	80	0.15	0.20	0.27	0.33	0.41	0.47	0.57
	150 ~ 200	HSS, SC	44	58	64	74	0.15	0.20	0.27	0.33	0.41	0.47	0.57
	200 ~ 250	HSS, SC	40	52	59	68	0.12	0.20	0.27	0.33	0.41	0.47	0.57
Low carbon steel S10C ~ S25C	85 ~ 125	HSS, SC	42	54	61	71	0.12	0.19	0.24	0.31	0.39	0.47	0.56
	125 ~ 175	HSS, SC	40	52	59	68	0.12	0.19	0.24	0.31	0.39	0.43	0.49
	175 ~ 225	HSS, SC	37	48	56	64	0.11	0.16	0.20	0.29	0.37	0.43	0.49
Medium carbon steel S30C ~ S50C	225 ~ 275	HSS, SC	35	44	52	60	0.11	0.16	0.20	0.29	0.37	0.39	0.45
	125 ~ 175	HSS, SC	40	52	59	68	0.12	0.19	0.24	0.31	0.39	0.47	0.56
	175 ~ 225	HSS, SC	37	48	56	64	0.11	0.16	0.20	0.29	0.37	0.43	0.49
Alloy steel SCr, SCM	225 ~ 275	HSS, SC	35	44	52	60	0.11	0.16	0.20	0.29	0.37	0.43	0.49
	275 ~ 325	SC/PC	32	42	48	56	0.08	0.15	0.19	0.24	0.33	0.39	0.45
	325 ~ 375	SC/PC	28	36	38	44	0.07	0.12	0.19	0.24	0.31	0.35	0.41
Alloy steel SNCM	125 ~ 175	HSS, SC	37	48	52	59	0.12	0.16	0.20	0.29	0.35	0.39	0.45
	175 ~ 225	HSS, SC	35	44	48	56	0.11	0.16	0.20	0.29	0.35	0.39	0.45
	225 ~ 275	HSS, SC	32	42	44	52	0.11	0.15	0.20	0.29	0.35	0.39	0.45
Structural steel SS, SM	275 ~ 325	SC/PC	30	38	42	48	0.08	0.12	0.19	0.24	0.31	0.35	0.41
	325 ~ 375	SC/PC	28	36	38	44	0.07	0.12	0.19	0.24	0.31	0.35	0.41
	225 ~ 300	SC/PC	20	25	28	30	0.11	0.15	0.19	0.20	0.29	0.35	0.41
Heat-resistant alloy Hastelloy, Inconel	300 ~ 350	SC/PC	15	20	21	24	0.08	0.15	0.19	0.20	0.29	0.35	0.41
	350 ~ 400	HSS, SC	12	16	17	20	0.07	0.12	0.16	0.19	0.24	0.31	0.37
	100 ~ 150	HSS, SC	35	44	49	58	0.12	0.20	0.24	0.29	0.37	0.43	0.53
Stainless steel SUS	150 ~ 250	HSS, SC	30	38	42	47	0.11	0.19	0.20	0.24	0.33	0.39	0.49
	250 ~ 350	SC/PC	24	32	35	39	0.08	0.16	0.19	0.20	0.29	0.35	0.41
	140 ~ 220	SC/PC	8	9	10	11	0.07	0.15	0.16	0.20	0.24	0.31	0.35
Tool steel SKD	220 ~ 310	PC	7	8	9	10	0.07	0.12	0.15	0.16	0.20	0.24	0.29
	135 ~ 185	HSS, SC	19	24	26	29	0.12	0.16	0.19	0.23	0.29	0.33	0.41
	185 ~ 275	HSS, SC	15	20	23	25	0.11	0.15	0.16	0.20	0.24	0.29	0.37
Aluminum alloy	150 ~ 200	SC	20	26	27	30	0.08	0.12	0.16	0.20	0.24	0.31	0.35
	200 ~ 250	SC/PC	15	21	22	25	0.08	0.12	0.16	0.20	0.24	0.31	0.35
	30	HSS, SC	147	184	208	—	0.16	0.27	0.33	0.40	0.45	0.52	0.52
Cast iron FC, FCD	80	HSS, SC	73	98	111	—	0.16	0.27	0.33	0.37	0.45	0.52	0.52
	120 ~ 150	HSS, SC	42	54	61	71	0.15	0.24	0.33	0.41	0.49	0.56	0.61
	150 ~ 200	HSS, SC	37	48	56	64	0.12	0.23	0.29	0.37	0.45	0.52	0.57
	200 ~ 220	HSS, SC	32	42	48	56	0.12	0.19	0.24	0.33	0.37	0.43	0.49
	220 ~ 260	SC/PC	28	36	40	47	0.11	0.15	0.19	0.24	0.29	0.35	0.41
260 ~ 320	SC/PC	22	30	33	37	0.08	0.12	0.15	0.19	0.24	0.29	0.33	

Recommended cutting conditions by holder length

Holder type	Long (L)	Extra Long (XL)	3 Extra Long (3XL)
Cutting speed	Recommended value x 0.85	Recommended value x 0.80	Recommended value x 0.75
Cutting feed rate	Recommended value x 0.95	Recommended value x 0.90	Recommended value x 0.90

※Before setting cutting conditions, please read and understand the instructions on pages O4 and O5.

⚠ If non-water soluble oil coolant is used, there may be risks of flashing or fire due to heat resulting from the chips or tool breakage (heat generated from friction between the broken tool and work piece being cut) during machining.



Recommended cutting conditions for indexable drill inserts **coated with carbide**

Work material	Hardness (HB)	Recommended material grade	Cutting speed (m/min)				Cutting feed rate (mm/rev)				
			TiN	TiCN	TiAlN	AlCrN	φ9.5 φ13.0	φ13.0 φ18.0	φ18.0 φ25.0	φ25.0 φ36.0	φ36.0 φ47.0
Free-cutting steel	100 ~ 150	P40	77	92	103	116	0.16	0.24	0.30	0.36	0.42
	150 ~ 200	P40	68	80	88	100	0.14	0.22	0.28	0.32	0.38
	200 ~ 250	P40	64	72	84	95	0.12	0.20	0.26	0.30	0.34
Low carbon steel S10C ~ S25C	85 ~ 125	P40	73	88	96	109	0.16	0.20	0.26	0.34	0.38
	125 ~ 175	P40	64	72	84	95	0.14	0.20	0.26	0.32	0.36
	175 ~ 225	P40	59	66	76	86	0.12	0.18	0.24	0.30	0.34
	225 ~ 275	P40	52	60	67	75	0.10	0.18	0.24	0.30	0.34
Medium carbon steel S30C ~ S50C	125 ~ 175	P40	64	72	84	95	0.14	0.20	0.26	0.32	0.36
	175 ~ 225	P40	59	68	76	86	0.12	0.18	0.24	0.30	0.34
	225 ~ 275	P40	54	58	67	75	0.12	0.18	0.24	0.30	0.34
	275 ~ 325	P40	44	50	56	64	0.10	0.16	0.22	0.28	0.32
Alloy steel SCr, SCM	125 ~ 175	P40	61	70	80	91	0.14	0.20	0.26	0.32	0.36
	175 ~ 225	P40	56	64	74	84	0.12	0.18	0.24	0.30	0.34
	225 ~ 275	P40	52	58	67	75	0.12	0.18	0.24	0.30	0.34
	275 ~ 325	P40	49	55	61	69	0.10	0.16	0.22	0.28	0.32
	325 ~ 375	P40	42	48	54	62	0.08	0.14	0.20	0.26	0.30
Alloy steel SNCM	225 ~ 300	P40	40	44	49	58	0.12	0.18	0.20	0.24	0.30
	300 ~ 350	P40	35	40	44	49	0.10	0.16	0.18	0.22	0.28
	350 ~ 400	P40	30	35	40	44	0.08	0.14	0.16	0.20	0.24
Structural steel SS, SM	100 ~ 150	P40	59	68	76	86	0.16	0.22	0.28	0.32	0.36
	150 ~ 250	P40	49	55	61	69	0.12	0.20	0.24	0.28	0.32
	250 ~ 350	P40	44	50	56	64	0.10	0.18	0.22	0.24	0.28
Heat-resistant alloy Hastelloy, Inconel	140 ~ 220	K20	20	23	26	28	0.08	0.14	0.18	0.22	0.26
	220 ~ 310	K20	15	18	21	23	0.08	0.12	0.16	0.20	0.24
Stainless steel SUS	135 ~ 185	K20	40	46	52	58	0.14	0.18	0.24	0.28	0.32
	185 ~ 275	K20	30	35	40	44	0.12	0.16	0.22	0.24	0.28
Tool steel SKD	150 ~ 200	P40	40	47	54	62	0.08	0.14	0.18	0.22	0.26
	200 ~ 250	P40	30	36	42	47	0.08	0.14	0.18	0.22	0.26
Aluminum alloy	30	K20	293	328	368	—	0.20	0.30	0.36	0.40	0.44
	80	K20	196	220	245	—	0.18	0.26	0.32	0.36	0.40
Cast iron FC, FCD	120 ~ 150	K20, K10	79	102	113	121	0.16	0.24	0.30	0.38	0.46
	150 ~ 200	K20, K10	66	82	98	116	0.14	0.22	0.26	0.34	0.42
	200 ~ 220	K20, K10	59	75	88	104	0.12	0.18	0.24	0.30	0.36
	220 ~ 260	K20, K10	52	64	76	90	0.10	0.16	0.22	0.26	0.30
	260 ~ 320	K20, K10	44	56	67	81	0.10	0.14	0.20	0.22	0.26

Recommended cutting conditions by holder length

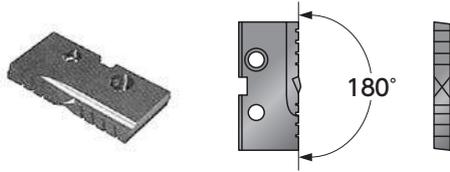
Holder type	Long (L)	Extra Long (XL)	3 Extra Long (3XL)
Cutting speed	Recommended value x 0.85	Recommended value x 0.80	Recommended value x 0.75
Cutting feed rate	Recommended value x 0.95	Recommended value x 0.90	Recommended value x 0.90

※Before setting cutting conditions, please read and understand the instructions on pages **O4** and **O5**.

⚠ If non-water soluble oil coolant is used, there may be risks of flashing or fire due to heat resulting from the chips or tool breakage (heat generated from friction between the broken tool and work piece being cut) during machining.

New Products
 Tool Materials / Selection Guide
 PCD, CBN and ceramic
 Cermet
 PVD-coated Cermet
 Micro-grain Carbide, Carbide
 Insert Stock List
 Outside Machining Toolholders
 SS
 Grooving Tools
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Recommended Cutting Conditions

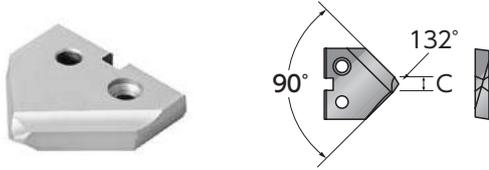


Recommended cutting conditions for flat-bottom inserts coated with high-speed steel

Work material	Hardness (HB)	Cutting speed (m/min)				Cutting feed rate (mm/rev)					
		TiN	TiCN	TiAlN	AlCrN	φ9.5 φ13.0	φ13.0 φ18.0	φ18.0 φ25.0	φ25.0 φ35.0	φ36.0 φ47.0	φ48.0 φ65.0
Free-cutting steel	100 ~ 150	42	56	61	70	0.12	0.18	0.23	0.29	0.33	0.37
	150 ~ 200	38	51	56	65	0.11	0.18	0.23	0.29	0.33	0.37
	200 ~ 250	35	46	52	59	0.10	0.18	0.23	0.29	0.30	0.34
Low carbon steel S10C ~ S25C	85 ~ 125	37	48	54	62	0.11	0.16	0.20	0.27	0.30	0.34
	125 ~ 175	35	46	52	59	0.11	0.16	0.20	0.27	0.30	0.33
	175 ~ 225	32	44	48	54	0.08	0.15	0.18	0.24	0.29	0.33
Medium carbon steel S30C ~ S50C	225 ~ 275	30	38	45	52	0.08	0.15	0.18	0.24	0.29	0.30
	125 ~ 175	35	46	52	59	0.11	0.16	0.20	0.27	0.30	0.37
	175 ~ 225	32	44	48	54	0.08	0.15	0.18	0.24	0.29	0.34
Alloy steel SCr,SCM	225 ~ 275	30	38	43	49	0.08	0.12	0.16	0.20	0.26	0.30
	125 ~ 175	32	42	45	52	0.11	0.15	0.18	0.24	0.26	0.33
	175 ~ 225	30	38	43	49	0.08	0.15	0.18	0.24	0.26	0.33
Alloy steel SNCM	225 ~ 275	28	36	38	43	0.08	0.12	0.18	0.24	0.26	0.33
	275 ~ 325	26	33	36	41	0.08	0.11	0.16	0.20	0.24	0.30
	325 ~ 375	24	31	33	38	0.07	0.11	0.16	0.20	0.24	0.29
Structural steel SS,SM	225 ~ 300	17	21	24	26	0.08	0.12	0.16	0.18	0.20	0.24
	300 ~ 350	12	17	19	22	0.07	0.12	0.16	0.18	0.20	0.24
	350 ~ 400	12	15	16	18	0.07	0.11	0.15	0.16	0.18	0.22
Heat-resistant alloy Hastelloy, Inconel	100 ~ 150	30	38	42	48	0.11	0.18	0.20	0.24	0.30	0.34
	150 ~ 250	26	33	36	41	0.08	0.16	0.18	0.20	0.26	0.33
	250 ~ 350	21	28	30	34	0.08	0.15	0.16	0.18	0.24	0.30
Stainless steel SUS	140 ~ 220	6	7	9	10	0.07	0.12	0.15	0.18	0.20	0.24
	220 ~ 310	5	6	7	8	0.07	0.11	0.12	0.15	0.16	0.20
Tool steel SKD	135 ~ 185	16	21	22	25	0.11	0.15	0.16	0.20	0.24	0.29
	185 ~ 275	12	17	20	22	0.08	0.12	0.15	0.18	0.20	0.22
Aluminum alloy	150 ~ 200	17	23	24	26	0.08	0.11	0.15	0.18	0.20	0.24
	200 ~ 250	12	19	20	22	0.08	0.11	0.15	0.18	0.18	0.22
Cast iron FC,FCD	30	129	160	183	-	0.15	0.23	0.29	0.35	0.37	0.38
	80	64	86	98	-	0.15	0.23	0.29	0.33	0.34	0.38
	120 ~ 150	37	48	54	62	0.12	0.20	0.29	0.35	0.38	0.41
	150 ~ 200	32	44	48	54	0.11	0.18	0.24	0.33	0.37	0.38
	200 ~ 220	28	37	43	49	0.11	0.16	0.20	0.29	0.33	0.34
	220 ~ 260	24	31	37	42	0.08	0.12	0.16	0.20	0.26	0.26
	260 ~ 320	20	26	30	34	0.08	0.11	0.12	0.16	0.20	0.20

※Before setting cutting conditions, please read and understand the instructions on pages O4 and O5.

⚠ If non-water soluble oil coolant is used, there may be risks of flashing or fire due to heat resulting from the chips or tool breakage (heat generated from friction between the broken tool and work piece being cut) during machining.



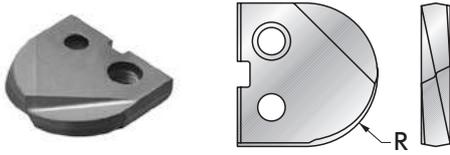
Recommended cutting conditions for inserts with 90° apex angle coated with high-speed steel

Work material	Hardness (HB)	Cutting speed (m/min)	Cutting feed rate (mm/rev)				
			TiN	φ9.5 φ13.0	φ13.0 φ18.0	φ18.0 φ25.0	φ25.0 φ36.0
Free-cutting steel	100 ~ 150	49	0.15	0.20	0.27	0.33	0.41
	150 ~ 200	44	0.15	0.20	0.27	0.33	0.41
	200 ~ 250	40	0.12	0.20	0.27	0.33	0.41
Low carbon steel S10C ~ S25C	85 ~ 125	42	0.12	0.19	0.24	0.31	0.39
	125 ~ 175	40	0.12	0.19	0.24	0.31	0.39
	175 ~ 225	37	0.11	0.16	0.20	0.29	0.37
	225 ~ 275	35	0.11	0.16	0.20	0.29	0.37
Medium carbon steel S30C ~ S50C	125 ~ 175	40	0.12	0.19	0.24	0.31	0.39
	175 ~ 225	35	0.11	0.16	0.20	0.29	0.37
	225 ~ 275	35	0.11	0.16	0.20	0.29	0.37
	275 ~ 325	32	0.08	0.15	0.19	0.24	0.33
Alloy steel SCr,SCM	125 ~ 175	37	0.12	0.16	0.20	0.29	0.35
	175 ~ 225	35	0.11	0.16	0.20	0.29	0.35
	225 ~ 275	32	0.11	0.15	0.20	0.29	0.35
	275 ~ 325	29	0.08	0.12	0.19	0.24	0.31
	325 ~ 375	27	0.07	0.12	0.19	0.24	0.31
Alloy steel SNCM	225 ~ 300	20	0.11	0.15	0.19	0.20	0.29
	300 ~ 350	15	0.08	0.15	0.19	0.20	0.29
	350 ~ 400	12	0.07	0.12	0.16	0.19	0.24
Structural steel SS,SM	100 ~ 150	35	0.12	0.20	0.24	0.29	0.37
	150 ~ 250	29	0.11	0.19	0.20	0.24	0.33
	250 ~ 350	24	0.08	0.16	0.19	0.20	0.29
Heat-resistant alloy Hastelloy, Inconel	140 ~ 220	8	0.07	0.15	0.16	0.20	0.24
	220 ~ 310	7	0.07	0.12	0.15	0.16	0.20
Stainless steel SUS	135 ~ 185	19	0.12	0.16	0.19	0.23	0.29
	185 ~ 275	15	0.11	0.08	0.16	0.20	0.24
Tool steel SKD	150 ~ 200	20	0.08	0.12	0.16	0.20	0.24
	200 ~ 250	15	0.08	0.12	0.16	0.20	0.24
Aluminum alloy	30	146	0.16	0.27	0.33	0.41	0.45
	80	73	0.16	0.27	0.33	0.37	0.45
Cast iron FC,FCD	120 ~ 150	42	0.15	0.24	0.33	0.41	0.49
	150 ~ 200	37	0.12	0.23	0.29	0.37	0.45
	200 ~ 220	32	0.12	0.19	0.24	0.33	0.37
	220 ~ 260	27	0.11	0.15	0.19	0.24	0.29
	260 ~ 320	22	0.08	0.12	0.15	0.19	0.24

※Before setting cutting conditions, please read and understand the instructions on pages **O4** and **O5**.

If non-water soluble oil coolant is used, there may be risks of flashing or fire due to heat resulting from the chips or tool breakage (heat generated from friction between the broken tool and work piece being cut) during machining.

Recommended Cutting Conditions



Recommended cutting conditions for SR inserts with full radius coated with high-speed steel

Work material	Hardness (HB)	Cutting speed (m/min)	Cutting feed rate (mm/rev)		
		TICN	$\phi 9.5$ $\phi 13.0$	$\phi 13.0$ $\phi 18.0$	$\phi 18.0$ $\phi 25.0$
Free-cutting steel	100 ~ 150	56	0.08	0.13	0.16
	150 ~ 200	51	0.08	0.13	0.16
	200 ~ 250	46	0.07	0.13	0.16
Low carbon steel S10C ~ S25C	85 ~ 125	48	0.08	0.11	0.14
	125 ~ 175	46	0.08	0.11	0.14
	175 ~ 225	44	0.06	0.11	0.13
	225 ~ 275	38	0.06	0.11	0.13
Medium carbon steel S30C ~ S50C	125 ~ 175	46	0.08	0.11	0.14
	175 ~ 225	44	0.06	0.11	0.13
	225 ~ 275	38	0.06	0.11	0.13
	275 ~ 325	37	0.06	0.08	0.11
Alloy steel SCr,SCM	125 ~ 175	42	0.08	0.11	0.13
	175 ~ 225	38	0.06	0.11	0.13
	225 ~ 275	36	0.06	0.08	0.13
	275 ~ 325	33	0.06	0.08	0.11
Alloy steel SNCM	225 ~ 300	21	0.06	0.08	0.11
	300 ~ 350	17	0.05	0.08	0.11
	350 ~ 400	15	0.05	0.08	0.11
Structural steel SS,SM	100 ~ 150	38	0.08	0.13	0.14
	150 ~ 250	33	0.06	0.11	0.13
	250 ~ 350	28	0.06	0.11	0.11
Heat-resistant alloy Hastelloy, Inconel	140 ~ 220	7	0.05	0.08	0.11
	220 ~ 310	6	0.05	0.08	0.08
Stainless steel SUS	135 ~ 185	21	0.08	0.11	0.11
	185 ~ 275	17	0.06	0.08	0.11
Tool steel SKD	150 ~ 200	23	0.06	0.08	0.11
	200 ~ 250	19	0.06	0.08	0.11
Aluminum alloy	30	160	0.11	0.16	0.20
	80	86	0.11	0.16	0.20
Cast iron FC,FCD	120 ~ 150	48	0.08	0.14	0.20
	150 ~ 200	44	0.08	0.13	0.17
	200 ~ 220	37	0.08	0.11	0.14
	220 ~ 260	31	0.06	0.08	0.11
	260 ~ 320	26	0.06	0.08	0.08

※Before setting cutting conditions, please read and understand the instructions on pages **O4** and **O5**.

⚠ If non-water soluble oil coolant is used, there may be risks of flashing or fire due to heat resulting from the chips or tool breakage (heat generated from friction between the broken tool and work piece being cut) during machining.

Table of recommended coolant pressure and quantity

Recommended coolant pressures and supply rates

Upper row: Coolant pressure (MPa) Lower row: Coolant supply rate (l/min)

Work material	Hardness (HB)	Differences in insert size										
		High-speed tool steel-coated							Carbide-coated			
		φ9.5 φ13.0	φ13.0 φ18.0	φ18.0 φ25.0	φ25.0 φ36.0	φ36.0 φ51.0	φ51.0 φ76.0	φ76.0 φ114.0	φ9.5 φ13.0	φ13.0 φ18.0	φ18.0 φ25.0	φ25.0 φ35.0
Free-cutting steel	100 ~ 250	1.4	1.3	0.8	1.0	0.8	0.4	0.6	1.4	1.0	1.1	1.0
		10	10	11	20	30	125	167	10	13	21	34
Low carbon steel S10C ~ S25C	85 ~ 275	1.3	1.2	0.6	0.7	0.6	0.3	0.5	1.3	0.7	0.7	0.8
		10	10	10	16	27	114	144	10	11	17	30
Medium carbon steel S30C ~ S50C	125 ~ 325	1.2	1.1	0.6	0.6	0.5	0.3	0.5	1.2	0.7	0.6	0.7
		10	9	10	16	23	114	144	10	11	16	27
Alloy steel SC, SCM	125 ~ 375	1.1	1.1	0.5	0.6	0.5	0.2	0.4	1.1	0.6	0.7	0.5
		9	9	9	15	23	106	125	9	10	16	23
Alloy steel SNCM	225 ~ 400	1.1	1.1	0.4	0.4	0.2	0.2	0.2	1.1	0.5	0.4	0.3
		9	9	8	12	19	87	98	9	9	12	19
Structural steel SS, SM	100 ~ 350	1.2	1.1	0.6	0.6	0.4	0.2	0.4	1.2	0.8	0.7	0.5
		10	9	10	15	23	98	125	10	11	17	23
Heat-resistant alloy Hastelloy, Inconel	140 ~ 310	1.2	1.1	0.5	0.4	0.2	0.2	—	1.2	0.7	0.7	0.7
		10	9	9	12	19	98	—	10	11	16	27
Stainless steel SUS3** SUS4**	135 ~ 275	1.5	1.2	0.6	0.5	0.4	0.2	0.3	1.5	1.0	1.0	0.9
		11	10	10	15	23	98	117	11	13	22	34
Tool steel SKD	150 ~ 250	1.1	1.1	0.4	0.4	0.2	0.2	0.2	1.1	0.4	0.4	0.3
		9	9	8	12	19	87	98	9	8	12	19
Aluminum alloy	30	2.2	1.5	1.2	1.6	1.1	0.4	0.6	2.2	1.9	2.1	1.7
	80	13	10	14	23	34	125	159	13	18	29	46
Cast iron FC, FCD	120 ~ 320	1.1	1.1	0.5	0.4	0.3	0.2	0.2	1.1	0.5	0.5	0.4
		9	9	9	13	19	98	106	9	9	13	19

Note) The coolant pressure and supply rate are very important factors relating to tool life and chip removal. 1MPa≐10kgf/cm²

Recommended coolant pressures and quantity by holder length

Holder type	Long (L)	Extra Long (XL)	3 Extra Long (3XL)
Coolant pressure	Recommended value x 1.5	Recommended value x 2.0	Recommended value x 3.0
Coolant supply rate			

New Products
 Tool Materials / Selection Guide
 PCD, CBN and ceramic
 Carbide
 Micro-grain Carbide, Carbide
 Insert Stock List
 Outside Machining Toolholders
 SS
 Grooving Tools
 Threading Tools
 Shaper
 Internal Machining tool range
 Original Tools for Various Applications
 Indexable End Milling Tools
 Indexable Drill Inserts
 Milling Cutters
 Technical Data
 Index

Weight of holders (reference)

Machining diameter	Max. machining depth (mm)	Holder Part No.	Weight (kg)
φ34.36 ~ 47.80	349.3	25030S-40FMS	2.6
	558.8	27030S-40FMS	3.5
	787.4	29030S-40FMS	4.6
φ46.99 ~ φ65.28	130.2	22040S-005M	3.4
	231.8	24040H-005M	4.2
	422.3	25040S-005M	6.0
	130.2	22040S-40FMS	2.3
	231.8	24040H-40FMS	3.2
	422.3	25040S-40FMS	4.9
	625.5	27040S-40FMS	6.7
	879.5	29040S-40FMS	9.0
	350.0	24540S-40FMSW-70	15.6
φ62.38 ~ φ89.08	171.5	22050S-005M	5.9
	273.1	24050H-005M	7.6
	463.6	25050S-005M	10.8
	350.0	24550S-50FMSW	8.4
	660.0	27550S-50FMSW	13.6
φ87.76 ~ φ114.48	171.5	22070S-005M	9.3
	273.1	24070H-005M	12.6
	555.6	25070S-005M	21.7
	400.0	24570S-50FMSW	16.8
	800.0	27570S-50FMSW	29.2

※The weight of the insert, coolant adaptor and of clamping screws are excluded from each weight listed.

※The weight of holders in the size series 2 and smaller are omitted and not indicated here.

GEN3

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Insert shapes	O79
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Actual machining examples	O82
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φ 12.00 ~ 12.99 12 Series	O85
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φ 14.00 ~ 14.99 14 Series	O87
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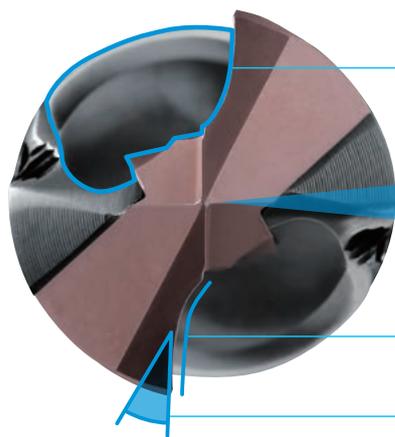
※For standard and GEN2 (common holder) types, please refer to pages **O2 to O22**.

Machining cost reduction can be achieved with high speed, high feed rate, high penetration and great chip control.



Cutting edge diameter

$\phi 11.0 \sim \phi 35.0$



- Great chip control by large pocket



- X thinning improves hole accuracy

- Excellent cutting edge shape for lower cutting force

- Radial rake angle

- Axial rake angle

Cutting depth

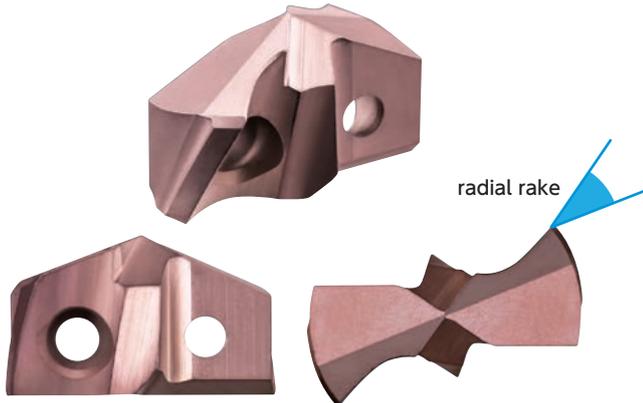
3D • 5D
7D



Insert shapes

For general steels • For nonferrous metals (standard)

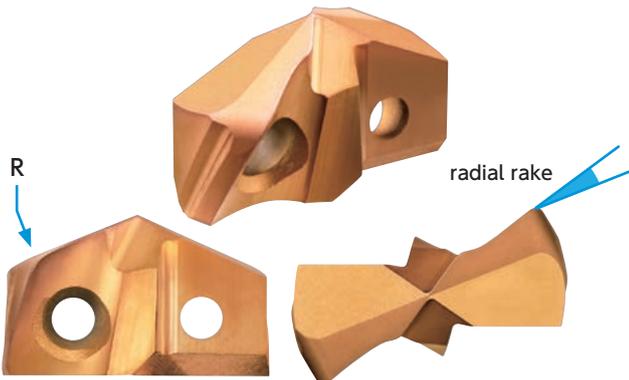
- SCM ■ Carbon steel S15C ~ S55C
- Forged aluminum ■ Copper
- Cast aluminum



Excellent chip control by cutting edge shape and its radial rake angle.

Cast iron • Ductile cast iron (CI)

- Normal cast iron FC ■ Ductile cast iron FCD



High-strength edge specification with low radial rake. Corners of insert are R shaped. Please refer to right table for R size.

Series	Diameter	R size	Series	Diameter	R size
11	11 ~ 11.99	1.2	18	18 ~ 19.99	2.0
12	12 ~ 12.99	1.6	20	20 ~ 21.99	2.4
13	13 ~ 13.99	1.6	22	22 ~ 23.99	2.4
14	14 ~ 14.99	1.6	24	24 ~ 25.99	2.8
15	15 ~ 15.99	1.6	26	26 ~ 28.99	2.8
16	16 ~ 16.99	2.0	29	29 ~ 31.99	3.2
17	17 ~ 17.99	2.0	32	32 ~ 35.00	3.2

Stainless steels • hard-to-cut materials (AS)

- Stainless steel SUS304 • 316
- heat-resistant alloy INCO718



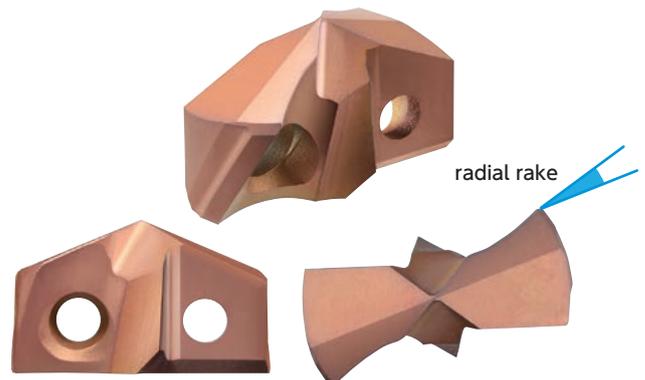
High radial rake enables to restrain wear by reducing heating during cutting.

Excellent chip control by most suitable cutting edge shape.

NEW

Hard Steels • Low rigid machine (LR)

- Hardened Steels ■ Die Steels



Low radial rake makes the insert tough and rigid. Suitable for hard steels and for drilling on low rigid machine.

Important notes and precautions

■ Tool assembly

Place drill insert into the precision ground locating pocket on holder, then tighten screws with a recommended amount of torque. Refer to page **O99** for admissible tightening torque for clamping screws.



※Gradually tighten both screws alternately after temporary tightening.

※Drill insert should not be turned rotated or twisted for locking purposes.

■ Coolant

Use internal coolant. When using external coolant, admissible drilling depth is 2D with 70% of cutting conditions. Refer to page **O99** for coolant pressure and supply rate recommendation.

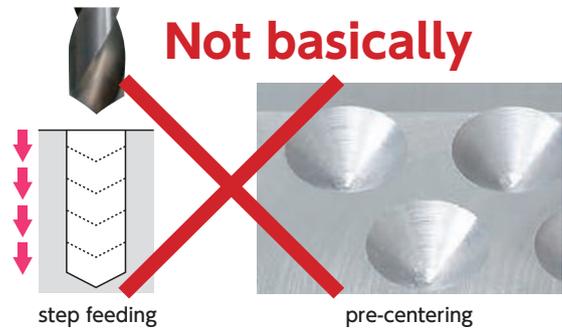
■ Recommended drilling conditions

Refer to page **O98 to O99**.

Recommended conditions depend on holder lengths.

When coolant pressure and supply rate are lower than the recommended, try with 80% of recommended speeds and feeds. If there's no trouble with chip evacuation, then speeds and feeds can be returned to the recommended.

Step feeding or pre-centering is not basically required. (Use 140 degree or more apex type of drill when pre-centering)



■ Load-meter of machine main spindle

Check load-meter of machine main spindle during drilling.

The reading of load-meter changes rapidly when chips are not evacuated normally or chattering can be causing.



Main spindle is stable.



Stop the operation and check the shape of chips.

■ Confirmation of chip shape



1 to 3 coils



Chips extended



Chattering causing

Raise drilling speed rate by 10% when chips are extended. Check the workpiece-clamping conditions when chattering causing.

■ Accuracy in hole drilling

Enlarging allowance for holes is 0 to approx. +0.05mm even though this may vary depending on vibration of machine main spindle.

Part No. designation code system

Insert Part No.

7 C1 12 P - 12

GEN3 insert	Material grade	Series		Coating	Cutting edge diameter	Shape
5 : GEN3 7 : GEN3XT	C1 : K35 Focus on fraction resistance C2 : K20 Focus on wear resistance	11	18	P : AM300 Multilayer AlCrN For hard-to-cut material	φ 11.00 ~ φ 35.00 ※Refer to the next page	blank : Standard AS : Stainless steel Hard-to-cut material CI : Cast iron LR : Hard Steel
		13	22			
		14	24	H : AM200 AlCrN		
		15	26	Wide use		
		16	29			
		17	32			

※Refer to list shown below

Holder Part No.

6 03 12 H - 20FM

GEN3 holder	Length	Series		Flute	Shank style
	01 : 1D 03 : 3D 05 : 5D 07 : 7D	11	18	H : Helical	FM : Flanged metric with flat
		12	20		
		13	22		
		14	24		
		15	26	S : Straight	
		16	29		
		17	32		

※Longer length than 7D up to 12D available upon request

※Refer to list shown below

Size series

Size series	11	12	13	14	15	16	17	18	20	22	24	26	29	32
Corresponding diameter	11.00 } 11.99	12.00 } 12.99	13.00 } 13.99	14.00 } 14.99	15.00 } 15.99	16.00 } 16.99	17.00 } 17.99	18.00 } 19.99	20.00 } 21.99	22.00 } 23.99	24.00 } 25.99	26.00 } 28.99	29.00 } 31.99	32.00 } 35.00
Reference page	84	85	86	87	88	89	90	91	92	93	94	95	96	97

Actual machining examples

Drilling automotive part

Work piece machined	Brake part
Work material	FCD600
Machine	Vertical type machining center

	Conventional tool	NTK
Part No.	—	5C215H-15-CI
Material grade	Competitor's carbide drill	K20+AlCrN
Cutting speed	60m/min	60m/min
Feed rate	0.25mm/rev	0.25mm/rev
Machining efficiency (F)	318mm/min	318mm/min
Cutting oil	WET	WET
Step feed	Not provided	Not provided
Hole depth	87.4mm	87.4mm
Life	500 holes	1,200 holes



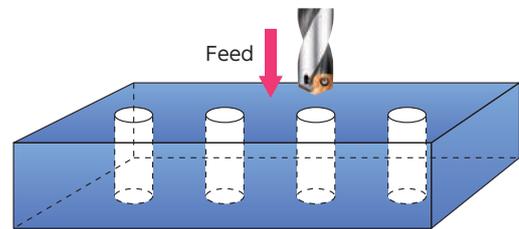
<Considerations>

- Tool life was more than twice compared to conventional tool.
- Stable drilling without any chipping was achieved.

Drilling train part

Work piece machined	Train part
Work material	SS400
Machine	Vertical type machining center

	Conventional tool	NTK
Part No.	—	5C126H-27
Material grade	Competitor's drill module	K35+AlCrN
Cutting speed	76m/min	80m/min
Feed rate	0.089mm/rev	0.18mm/rev
Machining efficiency (F)	80mm/min	170mm/min
Cutting oil	WET	WET
Step feed	2 mm per step	Not provided
Hole depth	135mm	135mm
Life	120 holes	240 holes



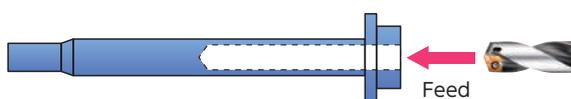
<Considerations>

- Machining efficiency improved more than twice compared to conventional tool.
- Tool life was twice as long as conventional tool.

Drilling engine part of truck

Work piece machined	Center bolt
Work material	SWCH45F
Machine	Automatic lathe

	Conventional tool	NTK
Part No.	—	5C112H-12
Material grade	Competitor's high-speed steel	K35+AlCrN
Cutting speed	30m/min	69m/min
Feed rate	0.2mm/rev	0.12mm/rev
Machining efficiency (F)	160mm/min	220mm/min
Cutting oil	WET	WET
Step feed	10 mm per step	Not provided
Hole depth	77mm	77mm
Life	150 holes	400 holes



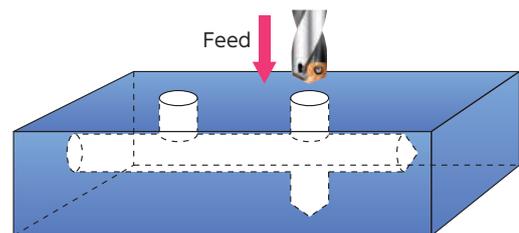
<Considerations>

- Non-step feeding enabled machining efficiency higher than competitor's tool.
- Tool life was more than twice compared to conventional tool.

Drilling hydraulic machine part

Work piece machined	Hydraulic machine part
Work material	SUS304
Machine	Vertical type machining center

	Conventional tool	NTK
Part No.	—	5C115H-15
Material grade	Competitor's drill module	K35+AlCrN
Cutting speed	57m/min	52m/min
Feed rate	0.08mm/rev	0.09mm/rev
Machining efficiency (F)	97mm/min	99mm/min
Cutting oil	WET	WET
Step feed	Not provided	Not provided
Hole depth	30mm	30mm
Life	200 holes	200 holes



<Considerations>

- Compared to competitor's tool, better chip control enabled stable machining.
- Drilling sound was reduced.

MEMO

NEW

New Products

Tool Materials / Selection Guide

PCD, CBN and ceramic

Cermet
PVD-coated Carbide

Micro-grain Carbide, Carbide

Insert Stock List

Outside Machining Toolholders

SS

Grooving Tools

Threading Tools

Shaper

Internal machining tool range

Original Tools for Various Applications

Indexable End Milling Tools

Indexable Drill Inserts

Milling Cutters

Technical Data

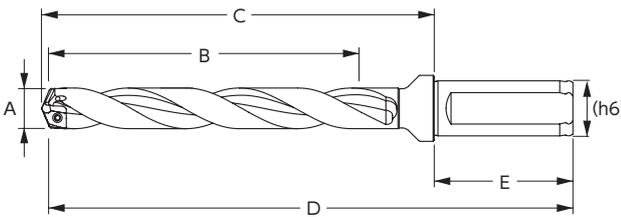
Index

φ 11.00 ~ 11.99 11 Series

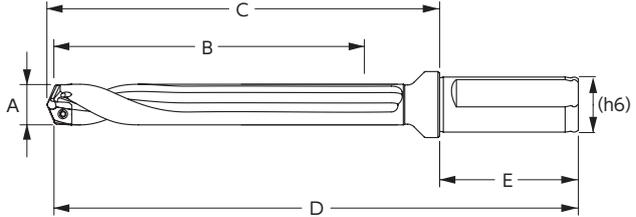
★ Select same size series between inserts and holders.

Holders (Metric system shank)

*Please use straight fluted for more than 3.5MPa coolant pressure.



① : Helical fluted

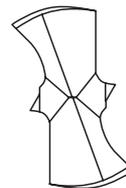
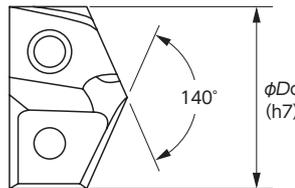


② : Straight fluted

SS	(A) Insert cutting edge dia	(B) Max. machining length	P/N	Stock	Shape	Dimensions				Parts	
						(C) Body length	(D) Overall length	(E) Shank dia. x length	Screw for pipe	Clamping screw	Screwdriver (Optional)
11.00 ~ 11.99	16.0 1D	60111H-16FM	●	①	44.7	90.7	φ 16×48	1/16"	71843-IP6-10	8IP-6	
	36.0 3D	60311H-16FM	●	①	64.7	110.6					
		60311S-16FM	●	②							
	59.9 5D	60511H-16FM	●	①	88.6	134.6					
		60511S-16FM	●	②							
	83.9 7D	60711H-16FM	●	①	112.6	158.6					
60711S-16FM		●	②								

Inserts

We take your order by 1 piece as the unit.



Shape	Standard				hard-to-cut material, stainless steel, AS		Cast Iron CI	
	Carbide (K35)		Carbide (K20)		Carbide (K20)		Carbide (K20)	
Material grade	AM300 (multilayer AlCrN)		AM300 (multilayer AlCrN)		AM300 (multilayer AlCrN)		AM300 (multilayer AlCrN)	
Coating	AM300 (multilayer AlCrN)		AM300 (multilayer AlCrN)		AM300 (multilayer AlCrN)		AM300 (multilayer AlCrN)	
φDc	Part No.		Part No.		Part No.		Part No.	
11.00	7C111P-11	●	7C211P-11	●	7C211P-11AS	●	7C211P-11CI	●
11.11	7C111P-0014	●	7C211P-0014	●	7C211P-0014AS	●	7C211P-0014CI	●
11.50	7C111P-11.5	●	7C211P-11.5	●	7C211P-11.5AS	●	7C211P-11.5CI	●
11.51	7C111P-.453	●	7C211P-.453	●	7C211P-.453AS	●	7C211P-.453CI	●
11.91	7C111P-0015	●	7C211P-0015	●	7C211P-0015AS	●	7C211P-0015CI	●

Recommended tightening torque for clamping screw:50 (N·cm)

※The tightening torque is calculated by using 0.14 as the coefficient of friction ($\mu = 0.14$) and 90% of the yield point.
*Replace the holders periodically, using "every 100th insert replacement" as a guideline.
For recommended cutting conditions, please refer to page **098 - 099**.

Notes) *Each holder comes with 4 clamping screws and a screw releasing agent (E-Z BREAK). A crewdriver is available only as an optional item.

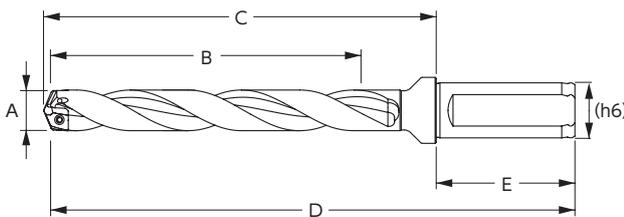
- : Standard stock
- : Semi-standard stock (Time required for delivery: approx. 2 weeks)production-to-order basis
- : Products shifting to production-to-order basis
- No symbol: Products manufactured production-to-order basis

φ 12.00 ~ 12.99 12 Series

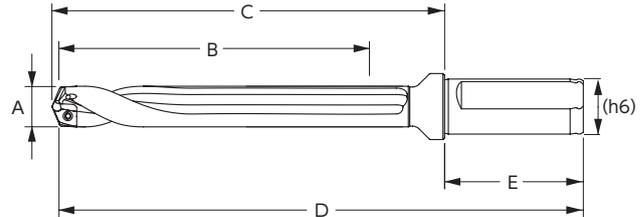
★ Select same size series between inserts and holders.

Holders (Metric system shank)

*Please use straight fluted for more than 3.5MPa coolant pressure.



① : Helical fluted

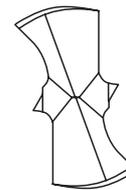
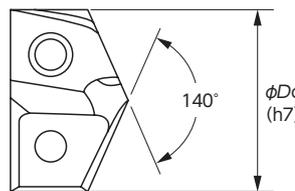


② : Straight fluted

(A) Insert cutting edge dia	(B) Max. machining length	P/N	Stock	Shape	Dimensions				Parts	
					(C) Body length	(D) Overall length	(E) Shank dia. x length	Screw for pipe	Clamping screw	Screwdriver (Optional)
12.00 ~ 12.99	16.0 1D	60112H-20FM	●	①	45.4	93.2	φ 20×50	1/8"	7247-IP7-10	8IP-7
	39.0 3D	60312H-20FM	●	①	68.8	116.6				
		60312S-20FM	●	②						
	64.9 5D	60512H-20FM	●	①	94.8	142.6				
		60512S-20FM	●	②						
	90.9 7D	60712H-20FM	●	①	120.8	168.6				
60712S-20FM		●	②							

Inserts

We take your order by 1 piece as the unit.



Shape	Standard						hard-to-cut material, stainless steel, AS		Cast Iron CI	
Material grade	Carbide (K35)				Carbide (K20)		Carbide (K20)		Carbide (K20)	
Coating	AM200 (AlCrN)	Stock	AM300 (multilayer AlCrN)	Stock	AM300 (multilayer AlCrN)	Stock	AM300 (multilayer AlCrN)	Stock	AM200 (AlCrN)	Stock
φDc	Part No.		Part No.		Part No.		Part No.		Part No.	
12.00	5C112H-12	●	7C112P-12	●	7C212P-12	●	7C212P-12AS	●	5C212H-12CI	●
12.30	5C112H-.484	●	7C112P-.484	●	7C212P-.484	●	7C212P-.484AS	●	5C212H-.484CI	●
12.50	5C112H-12.5	●	7C112P-12.5	●	7C212P-12.5	●	7C212P-12.5AS	●	5C212H-12.5CI	●
12.70	5C112H-0016	●	7C112P-0016	●	7C212P-0016	●	7C212P-0016AS	●	5C212H-0016CI	●

Recommended tightening torque for clamping screw: 84 (N·cm)

※ The tightening torque is calculated by using 0.14 as the coefficient of friction ($\mu = 0.14$) and 90% of the yield point.

*Replace the holders periodically, using "every 100th insert replacement" as a guideline.

For recommended cutting conditions, please refer to page **O98 - O99**.

Notes) *Each holder comes with 4 clamping screws and a screw releasing agent (E-Z BREAK). A screwdriver is available only as an optional item.

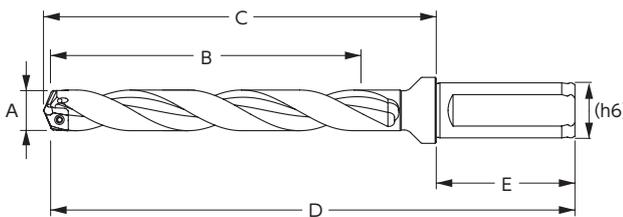
- : Standard stock
- : Semi-standard stock (Time required for delivery: approx. 2 weeks) production-to-order basis
- : Products shifting to production-to-order basis
- No symbol: Products manufactured production-to-order basis

φ 13.00 ~ 13.99 13 Series

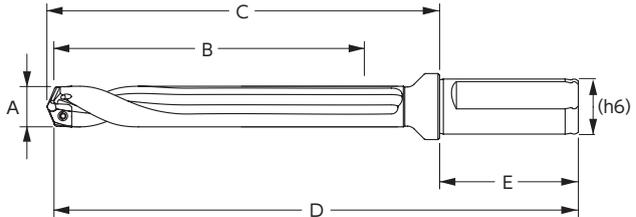
★ Select same size series between inserts and holders.

Holders (Metric system shank)

*Please use straight fluted for more than 3.5MPa coolant pressure.



① : Helical fluted

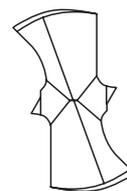
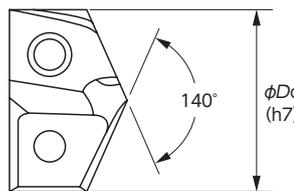


② : Straight fluted

	(A) Insert cutting edge dia	(B) Max. machining length	P/N	Stock	Shape	Dimensions				Parts				
						(C) Body length	(D) Overall length	(E) Shank dia. x length	Screw for pipe	Clamping screw	Screwdriver (Optional)			
13.00 ~ 13.99	16.0 1D	60113H-20FM	●	①	45.2	93.0	φ 20×50	1/8"	7247-IP7-10	8IP-7				
					71.5	119.3								
					99.5	147.3								
					127.5	175.3								
					70.0 5D	60513H-20FM					●	①	71.5	119.3
					60513S-20FM	●					②	99.5	147.3	
60713H-20FM	●	①	127.5	175.3										
60713S-20FM	●	②												

Inserts

We take your order by 1 piece as the unit.



Shape	Standard				hard-to-cut material, stainless steel, AS		Cast Iron CI				Hard Steels/Low rigid machine LR
	Carbide (K35)		Carbide (K20)		Carbide (K20)		Carbide (K20)		Carbide (K35)		Carbide (K35)
Material grade	AM200 (AlCrN)		AM300 (multilayer AlCrN)		AM300 (multilayer AlCrN)		AM200 (AlCrN)		AM300 (multilayer AlCrN)		AM300 (multilayer AlCrN)
Coating	Stock	Stock	Stock	Stock	Stock	Stock	Stock	Stock	Stock	Stock	Stock
φDc	Part No.	Part No.	Part No.	Part No.	Part No.	Part No.	Part No.	Part No.	Part No.	Part No.	Part No.
13.00	5C113H-13	● 7C113P-13	● 7C213P-13	● 7C213P-13AS	● 5C213H-13CI	● 7C213P-13CI	● 7C113P-13LR				
13.08	5C113H-.515	● 7C113P-.515	● 7C213P-.515	● 7C213P-.515AS	● 5C213H-.515CI	● 7C213P-.515CI	● 7C113P-.515LR				
13.49	5C113H-0017	● 7C113P-0017	● 7C213P-0017	● 7C213P-0017AS	● 5C213H-0017CI	● 7C213P-0017CI	● 7C113P-0017LR				
13.50	5C113H-13.5	● 7C113P-13.5	● 7C213P-13.5	● 7C213P-13.5AS	● 5C213H-13.5CI	● 7C213P-13.5CI	● 7C113P-13.5LR				
13.89	5C113H-.546	● 7C113P-.546	● 7C213P-.546	● 7C213P-.546AS	● 5C213H-.546CI	● 7C213P-.546CI	● 7C113P-.546LR				

Recommended tightening torque for clamping screw: 84 (N·cm)

※The tightening torque is calculated by using 0.14 as the coefficient of friction ($\mu = 0.14$) and 90% of the yield point.
*Replace the holders periodically, using "every 100th insert replacement" as a guideline.
For recommended cutting conditions, please refer to page **O98 - O99**.

Notes) *Each holder comes with 4 clamping screws and a screw releasing agent (E-Z BREAK). A screwdriver is available only as an optional item.

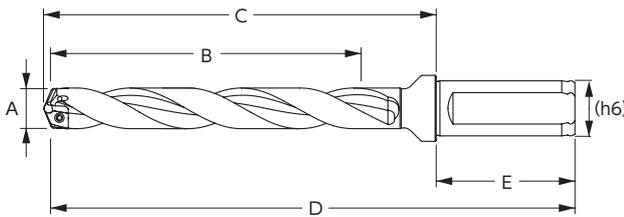
- : Standard stock
- ◎ : Semi-standard stock (Time required for delivery: approx. 2 weeks) production-to-order basis
- : Products shifting to production-to-order basis
- No symbol: Products manufactured production-to-order basis

φ 14.00 ~ 14.99 14 Series

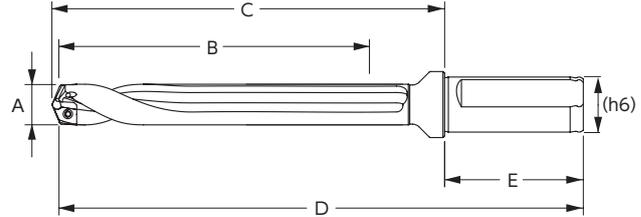
★ Select same size series between inserts and holders.

Holders (Metric system shank)

*Please use straight fluted for more than 3.5MPa coolant pressure.



① : Helical fluted

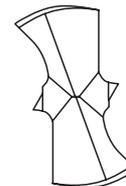
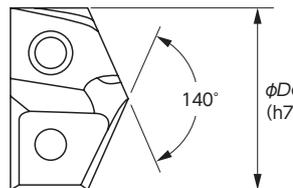


② : Straight fluted

(A) Insert cutting edge dia	(B) Max. machining length	P/N	Stock	Shape	Dimensions				Parts	
					(C) Body length	(D) Overall length	(E) Shank dia. x length	Screw for pipe	Clamping screw	Screwdriver (Optional)
14.00 ~ 14.99	17.5 1D	60114H-20FM	●	①	47.2	94.6	φ 20×50	1/8"	7247-IP7-10	8IP-7
	45.0 3D	60314H-20FM	●	①	75.0	122.4				
		60314S-20FM	●	②						
	75.0 5D	60514H-20FM	●	①	104.9	152.4				
		60514S-20FM	●	②						
	104.9 7D	60714H-20FM	●	①	134.9	182.4				
60714S-20FM		●	②							

Inserts

We take your order by 1 piece as the unit.



Shape	Standard						hard-to-cut material, stainless steel, AS		Cast Iron CI				Hard Steels/Low rigid machine LR	
	Carbide (K35)			Carbide (K20)			Carbide (K20)		Carbide (K20)		Carbide (K35)		Carbide (K35)	
Coating	AM200 (AlCrN)	Stock	AM300 (multilayer AlCrN)	Stock	AM300 (multilayer AlCrN)	Stock	AM300 (multilayer AlCrN)	Stock	AM200 (AlCrN)	Stock	AM300 (multilayer AlCrN)	Stock	AM300 (multilayer AlCrN)	Stock
φDc	Part No.		Part No.		Part No.		Part No.		Part No.		Part No.		Part No.	
14.00	5C114H-14	●	7C114P-14	●	7C214P-14	●	7C214P-14AS	●	5C214H-14CI	●	7C214P-14CI	●	7C114P-14LR	●
14.29	5C114H-0018	●	7C114P-0018	●	7C214P-0018	●	7C214P-0018AS	●	5C214H-0018CI	●	7C214P-001CI	●	7C114P-0018LR	●
14.50	5C114H-14.5	●	7C114P-14.5	●	7C214P-14.5	●	7C214P-14.5AS	●	5C214H-14.5CI	●	7C214P-14.5CI	●	7C114P-14.5LR	
14.68	5C114H-.578	●	7C114P-.578	●	7C214P-.578	●	7C214P-.578AS	●	5C214H-.578CI		7C214P-.578CI		7C114P-.578LR	
14.80	5C114H-14.8	●	7C114P-14.8	●	7C214P-14.8	●	7C214P-14.8AS	●	5C214H-14.8CI		7C214P-14.8CI		7C114P-14.8LR	

Recommended tightening torque for clamping screw:84 (N·cm)

※The tightening torque is calculated by using 0.14 as the coefficient of friction ($\mu = 0.14$) and 90% of the yield point.
*Replace the holders periodically, using "every 100th insert replacement" as a guideline.
For recommended cutting conditions, please refer to page **O98 - O99**.

Notes) *Each holder comes with 4 clamping screws and a screw releasing agent (E-Z BREAK). A crewdriver is available only as an optional item.

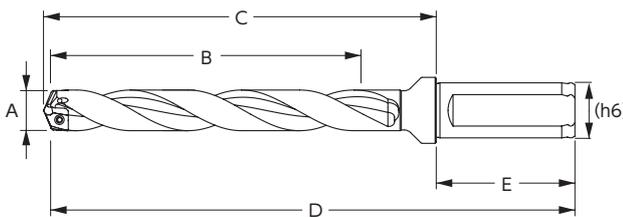
- : Standard stock
- : Semi-standard stock (Time required for delivery: approx. 2 weeks)production-to-order basis
- : Products shifting to production-to-order basis
- No symbol: Products manufactured production-to-order basis

φ 15.00 ~ 15.99 15 Series

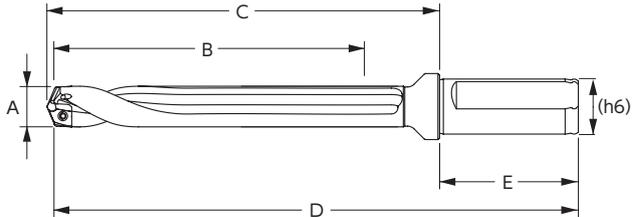
★ Select same size series between inserts and holders.

Holders (Metric system shank)

*Please use straight fluted for more than 3.5MPa coolant pressure.



① : Helical fluted

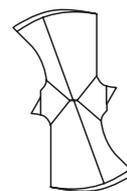
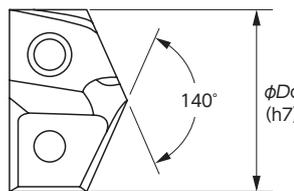


② : Straight fluted

SS	(A) Insert cutting edge dia	(B) Max. machining length	P/N	Stock	Shape	Dimensions				Parts	
						(C) Body length	(D) Overall length	(E) Shank dia. x length	Screw for pipe	Clamping screw	Screwdriver (Optional)
15.00 ~ 15.99	17.5 1D	60115H-20FM	●	①	46.8	94.3	φ 20×50	1/8"	7247-IP7-10	8IP-7	
	48.0 3D	60315H-20FM	●	①	77.6	125.1					
		60315S-20FM	●	②							
	80.0 5D	60515H-20FM	●	①	109.6	157.0					
		60515S-20FM	●	②							
	111.9 7D	60715H-20FM	●	①	141.6	189.0					
60715S-20FM		●	②								

Inserts

We take your order by 1 piece as the unit.



Shape	Standard				Cast Iron CI				Hard Steels/Low rigid machine LR	
	Carbide (K35)		Carbide (K20)		Carbide (K20)		Carbide (K35)		Carbide (K35)	
Material grade	AM200 (AlCrN)		AM300 (multilayer AlCrN)		AM300 (multilayer AlCrN)		AM200 (AlCrN)		AM300 (multilayer AlCrN)	
Coating	Stock	Stock	Stock	Stock	Stock	Stock	Stock	Stock	Stock	Stock
φDc	Part No.	Part No.	Part No.	Part No.	Part No.	Part No.	Part No.	Part No.	Part No.	Part No.
15.00	5C115H-15	● 7C115P-15	● 7C215P-15	● 7C215P-15AS	● 5C215H-15CI	● 7C215P-15CI	● 7C115P-15LR			
15.08	5C115H-0019	● 7C115P-0019	● 7C215P-0019	● 7C215P-0019AS	● 5C215H-0019CI	● 7C215P-0019CI	● 7C115P-0019LR			
15.25	5C115H-15.25	● 7C115P-15.25	● 7C215P-15.25	● 7C215P-15.25AS	● 5C215H-15.25CI	● 7C215P-15.25CI	● 7C115P-15.25LR			
15.48	5C115H-.609	● 7C115P-.609	● 7C215P-.609	● 7C215P-.609AS	● 5C215H-.609CI	● 7C215P-.609CI	● 7C115P-.609LR			
15.50	5C115H-15.5	● 7C115P-15.5	● 7C215P-15.5	● 7C215P-15.5AS	● 5C215H-15.5CI	● 7C215P-15.5CI	● 7C115P-15.5LR			
15.70	5C115H-.618	● 7C115P-.618	● 7C215P-.618	● 7C215P-.618AS	● 5C215H-.618CI	● 7C215P-.618CI	● 7C115P-.618LR			
15.88	5C115H-0020	● 7C115P-0020	● 7C215P-0020	● 7C215P-0020AS	● 5C215H-0020CI	● 7C215P-0020CI	● 7C115P-0020LR			

Recommended tightening torque for clamping screw: 84 (N·cm)

※The tightening torque is calculated by using 0.14 as the coefficient of friction ($\mu = 0.14$) and 90% of the yield point.
*Replace the holders periodically, using "every 100th insert replacement" as a guideline.
For recommended cutting conditions, please refer to page 098 - 099.

Notes) *Each holder comes with 4 clamping screws and a screw releasing agent (E-Z BREAK). A crewdriver is available only as an optional item.

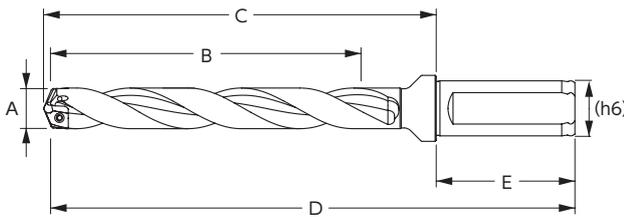
- : Standard stock
- : Semi-standard stock (Time required for delivery: approx. 2 weeks) production-to-order basis
- : Products shifting to production-to-order basis
- No symbol: Products manufactured production-to-order basis

φ 16.00 ~ 16.99 16 Series

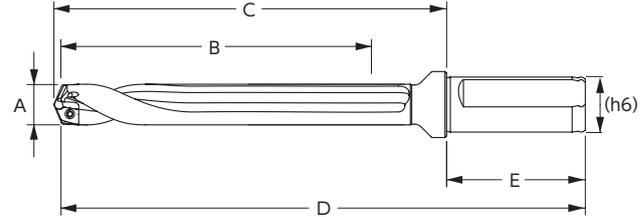
★ Select same size series between inserts and holders.

Holders (Metric system shank)

*Please use straight fluted for more than 3.5MPa coolant pressure.



① : Helical fluted

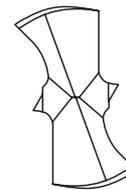
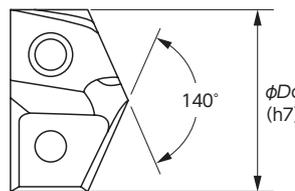


② : Straight fluted

(A) Insert cutting edge dia	(B) Max. machining length	P/N	Stock	Shape	Dimensions				Parts	
					(C) Body length	(D) Overall length	(E) Shank dia. x length	Screw for pipe	Clamping screw	Screwdriver (Optional)
16.00 ~ 16.99	21.0 1D	60116H-20FM	●	①	53.7	100.8	φ 20×50	1/8"	72556-IP8-10	8IP-8
	51.0 3D	60316H-20FM	●	①	84.2	131.3				
		60316S-20FM	●	②						
	84.9 5D	60516H-20FM	●	①	118.2	165.8				
		60516S-20FM	●	②						
	118.9 7D	60716H-20FM	●	①	152.2	199.3				
60716S-20FM		●	②							

Inserts

We take your order by 1 piece as the unit.



Shape	Standard						hard-to-cut material, stainless steel, AS		Cast Iron CI				Hard Steels/Low rigid machine LR	
Material grade	Carbide (K35)			Carbide (K20)			Carbide (K20)		Carbide (K20)		Carbide (K35)		Carbide (K35)	
Coating	AM200 (AlCrN)	Stock	AM300 (multilayer AlCrN)	Stock	AM300 (multilayer AlCrN)	Stock	AM300 (multilayer AlCrN)	Stock	AM200 (AlCrN)	Stock	AM300 (multilayer AlCrN)	Stock	AM300 (multilayer AlCrN)	Stock
φDc	Part No.		Part No.		Part No.		Part No.		Part No.		Part No.		Part No.	
16.00	5C116H-16	●	7C116P-16	●	7C216P-16	●	7C216P-16AS	●	5C216H16CI	●	7C216P16CI	●	7C116P-16LR	●
16.08	5C116H-16.08		7C116P-16.08		7C216P-16.08		7C216P-16.08AS		5C216H16.08CI		7C216P16.08CI		7C116P-16.08LR	
16.27	5C116H-.640	●	7C116P-.640	●	7C216P-.640	●	7C216P-.640AS	●	5C216H.640CI	●	7C216P.640CI	●	7C116P-.640LR	
16.50	5C116H-16.5	●	7C116P-16.5	●	7C216P-16.5	●	7C216P-16.5AS	●	5C216H16.5CI	●	7C216P16.5CI	●	7C116P-16.5LR	
16.67	5C116H-0021	●	7C116P-0021	●	7C216P-0021	●	7C216P-0021AS	●	5C216H0021CI	●	7C216P0021CI	●	7C116P-0021LR	

Recommended tightening torque for clamping screw:175 (N·cm)

※The tightening torque is calculated by using 0.14 as the coefficient of friction (μ = 0.14) and 90% of the yield point.
*Replace the holders periodically, using "every 100th insert replacement" as a guideline.
For recommended cutting conditions, please refer to page **O98** - **O99**.

(Notes) *Each holder comes with 4 clamping screws and a screw releasing agent (E-Z BREAK). A crewdriver is available only as an optional item.

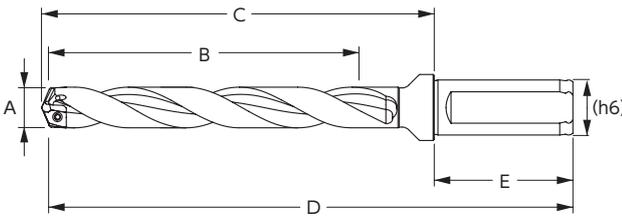
- : Standard stock
- : Semi-standard stock (Time required for delivery: approx. 2 weeks)production-to-order basis
- : Products shifting to production-to-order basis
- No symbol: Products manufactured production-to-order basis

φ17.00 ~ 17.99 17 Series

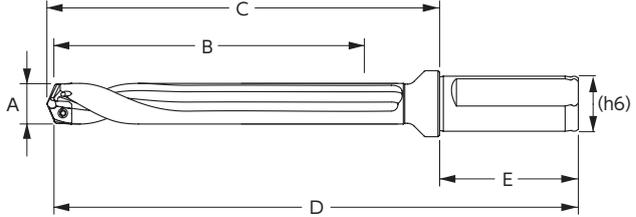
★ Select same size series between inserts and holders.

Holders (Metric system shank)

*Please use straight fluted for more than 3.5MPa coolant pressure.



① : Helical fluted

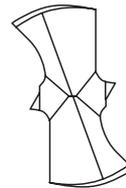
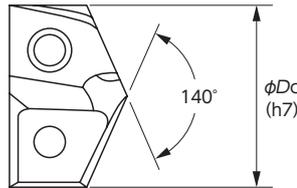


② : Straight fluted

(A) Insert cutting edge dia	(B) Max. machining length	P/N	Stock	Shape	Dimensions				Parts	
					(C) Body length	(D) Overall length	(E) Shank dia. x length	Screw for pipe	Clamping screw	Screwdriver (Optional)
17.00 ~ 17.99	21.0 1D	60117H-20FM	●	①	53.4	100.5	φ20×50	1/8"	72567-IP8-10	8IP-8
	54.0 3D	60317H-20FM	●	①	87.0	134.1				
		60317S-20FM	●	②						
	89.9 5D	60517H-20FM	●	①	122.9	170.1				
		60517S-20FM	●	②						
	125.9 7D	60717H-20FM	●	①	158.9	206.0				
60717S-20FM		●	②							

Inserts

We take your order by 1 piece as the unit.



Shape	Standard						hard-to-cut material, stainless steel, AS		Cast Iron CI			Hard Steels/Low rigid machine LR		
Material grade	Carbide (K35)			Carbide (K20)			Carbide (K20)		Carbide (K20)		Carbide (K35)		Carbide (K35)	
Coating	AM200 (AlCrN)	AM300 (multilayer AlCrN)	AM200 (AlCrN)	AM300 (multilayer AlCrN)	AM200 (AlCrN)	AM300 (multilayer AlCrN)	AM300 (multilayer AlCrN)	AM300 (multilayer AlCrN)	AM300 (multilayer AlCrN)	AM300 (multilayer AlCrN)				
φDc	Part No.	Part No.	Part No.	Part No.	Part No.	Part No.	Part No.	Part No.	Part No.	Part No.	Part No.	Part No.	Part No.	Part No.
17.00	5C117H-17	7C117P-17	7C217P-17	7C217P-17AS	7C217P-17CI	7C217P-17CI	7C217P-17CI	7C217P-17CI	7C217P-17CI	7C217P-17CI	7C217P-17CI	7C217P-17CI	7C217P-17CI	7C217P-17CI
17.07	5C117H-.671	7C117P-.671	7C217P-.671	7C217P-.671AS	7C217P-.671CI	7C217P-.671CI	7C217P-.671CI	7C217P-.671CI	7C217P-.671CI	7C217P-.671CI	7C217P-.671CI	7C217P-.671CI	7C217P-.671CI	7C217P-.671CI
17.10	5C117H-17.1	7C117P-17.1	7C217P-17.1	7C217P-17.1AS	7C217P-17.1CI	7C217P-17.1CI	7C217P-17.1CI	7C217P-17.1CI	7C217P-17.1CI	7C217P-17.1CI	7C217P-17.1CI	7C217P-17.1CI	7C217P-17.1CI	7C217P-17.1CI
17.20	5C117H-17.2	7C117P-17.2	7C217P-17.2	7C217P-17.2AS	7C217P-17.2CI	7C217P-17.2CI	7C217P-17.2CI	7C217P-17.2CI	7C217P-17.2CI	7C217P-17.2CI	7C217P-17.2CI	7C217P-17.2CI	7C217P-17.2CI	7C217P-17.2CI
17.46	5C117H-0022	7C117P-0022	7C217P-0022	7C217P-0022AS	7C217P-0022CI	7C217P-0022CI	7C217P-0022CI	7C217P-0022CI	7C217P-0022CI	7C217P-0022CI	7C217P-0022CI	7C217P-0022CI	7C217P-0022CI	7C217P-0022CI
17.50	5C117H-17.5	7C117P-17.5	7C217P-17.5	7C217P-17.5AS	7C217P-17.5CI	7C217P-17.5CI	7C217P-17.5CI	7C217P-17.5CI	7C217P-17.5CI	7C217P-17.5CI	7C217P-17.5CI	7C217P-17.5CI	7C217P-17.5CI	7C217P-17.5CI
17.86	5C117H-.703	7C117P-.703	7C217P-.703	7C217P-.703AS	7C217P-.703CI	7C217P-.703CI	7C217P-.703CI	7C217P-.703CI	7C217P-.703CI	7C217P-.703CI	7C217P-.703CI	7C217P-.703CI	7C217P-.703CI	7C217P-.703CI
17.90	5C117H-17.9	7C117P-17.9	7C217P-17.9	7C217P-17.9AS	7C217P-17.9CI	7C217P-17.9CI	7C217P-17.9CI	7C217P-17.9CI	7C217P-17.9CI	7C217P-17.9CI	7C217P-17.9CI	7C217P-17.9CI	7C217P-17.9CI	7C217P-17.9CI
17.95	5C117H-.17.95	7C117P-17.95	7C217P-17.95	7C217P-17.95AS	7C217P-17.95CI	7C217P-17.95CI	7C217P-17.95CI	7C217P-17.95CI	7C217P-17.95CI	7C217P-17.95CI	7C217P-17.95CI	7C217P-17.95CI	7C217P-17.95CI	7C217P-17.95CI

Recommended tightening torque for clamping screw:175 (N·cm)

※The tightening torque is calculated by using 0.14 as the coefficient of friction (μ = 0.14) and 90% of the yield point.
*Replace the holders periodically, using "every 100th insert replacement" as a guideline.
For recommended cutting conditions, please refer to page **098 - 099**.

Notes) *Each holder comes with 4 clamping screws and a screw releasing agent (E-Z BREAK). A crewdriver is available only as an optional item.

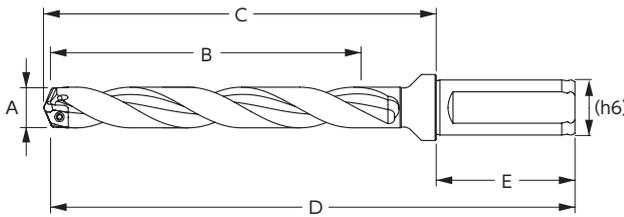
- : Standard stock
- ◎ : Semi-standard stock (Time required for delivery: approx. 2 weeks)production-to-order basis
- : Products shifting to production-to-order basis
- No symbol: Products manufactured production-to-order basis

φ 18.00 ~ 19.99 18 Series

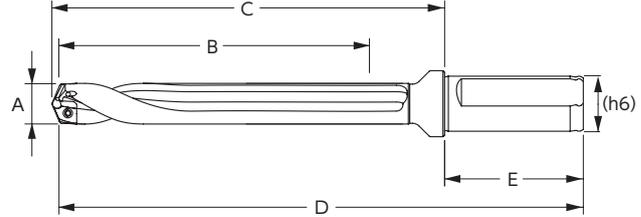
★ Select same size series between inserts and holders.

Holders (Metric system shank)

*Please use straight fluted for more than 3.5MPa coolant pressure.



① : Helical fluted

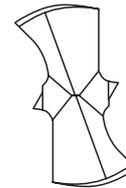
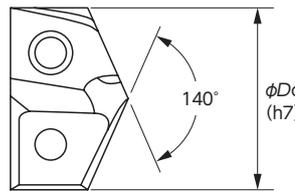


② : Straight fluted

(A) Insert cutting edge dia	(B) Max. machining length	P/N	Stock	Shape	Dimensions			Parts		
					(C) Body length	(D) Overall length	(E) Shank dia. x length	Screw for pipe	Clamping screw	Screwdriver (Optional)
18.00 ~ 19.99	22.0 1D	60118H-25FM	●	①	58.8	111.9	φ 25×56	1/8"	7375-IP9-10	8IP-9
	60.0 3D	60318H-25FM	●	①	96.8	150.0				
		60318S-25FM	●	②						
	99.9 5D	60518H-25FM	●	①	136.8	190.0				
		60518S-25FM	●	②						
	139.9 7D	60718H-25FM	●	①	176.8	230.0				
60718S-25FM		●	②							

Inserts

We take your order by 1 piece as the unit.



Shape	Standard				hard-to-cut material, stainless steel, AS				Cast Iron CI				Hard Steels/Low rigid machine LR			
Material grade	Carbide (K35)		Carbide (K20)		Carbide (K20)		Carbide (K20)		Carbide (K35)		Carbide (K35)		Carbide (K35)		Carbide (K35)	
Coating	AM200 (AlCrN)	Stock	AM300 (multilayer AlCrN)	Stock	AM300 (multilayer AlCrN)	Stock	AM300 (multilayer AlCrN)	Stock	AM200 (AlCrN)	Stock	AM300 (multilayer AlCrN)	Stock	AM300 (multilayer AlCrN)	Stock	AM300 (multilayer AlCrN)	Stock
φDc	Part No.		Part No.		Part No.		Part No.		Part No.		Part No.		Part No.		Part No.	
18.00	5C118H-18	●	7C118P-18	●	7C218P-18	●	7C218P-18AS	●	5C218H-18CI	●	7C218P-18CI	●	7C118P-18LR	●		
18.26	5C118H-0023	●	7C118P-0023	●	7C218P-0023	●	7C218P-0023AS	●	5C218H-0023CI	●	7C218P-0023CI	●	7C118P-0023LR			
18.50	5C118H-18.5	●	7C118P-18.5	●	7C218P-18.5	●	7C218P-18.5AS	●	5C218H-18.5CI	●	7C218P-18.5CI	●	7C118P-18.5LR			
18.65	5C118H-.734	●	7C118P-.734	●	7C218P-.734	●	7C218P-.734AS	●	5C218H-.734CI		7C218P-.734CI		7C118P-.734LR			
19.00	5C118H-19	●	7C118P-19	●	7C218P-19	●	7C218P-19AS	●	5C218H-19CI	●	7C218P-19CI	●	7C118P-19LR			
19.05	5C118H-0024	●	7C118P-0024	●	7C218P-0024	●	7C218P-0024AS	●	5C218H-0024CI	●	7C218P-0024CI	●	7C118P-0024LR			
19.25	5C118H-.758	●	7C118P-.758	●	7C218P-.758	●	7C218P-.758AS	●	5C218H-.758CI	●	7C218P-.758CI	●	7C118P-.758LR	●		
19.45	5C118H-.765	●	7C118P-.765	●	7C218P-.765	●	7C218P-.765AS	●	5C218H-.765CI		7C218P-.765CI		7C118P-.765LR	●		
19.50	5C118H-19.5	●	7C118P-19.5	●	7C218P-19.5	●	7C218P-19.5AS	●	5C218H-19.5CI	●	7C218P-19.5CI	●	7C118P-19.5LR			
19.80	5C118H-19.8		7C118P-19.8		7C218P-19.8		7C218P-19.8AS		5C218H-19.8CI		7C218P-19.8CI		7C118P-19.8LR			
19.85	5C118H-0025	●	7C118P-0025	●	7C218P-0025	●	7C218P-0025AS	●	5C218H-0025CI	●	7C218P-0025CI	●	7C118P-0025LR	●		

Recommended tightening torque for clamping screw:305 (N·cm)

※The tightening torque is calculated by using 0.14 as the coefficient of friction ($\mu = 0.14$) and 90% of the yield point.

*Replace the holders periodically, using "every 100th insert replacement" as a guideline.
For recommended cutting conditions, please refer to page **O98 - O99**.

Notes) *Each holder comes with 4 clamping screws and a screw releasing agent (E-Z BREAK). A crewdriver is available only as an optional item.

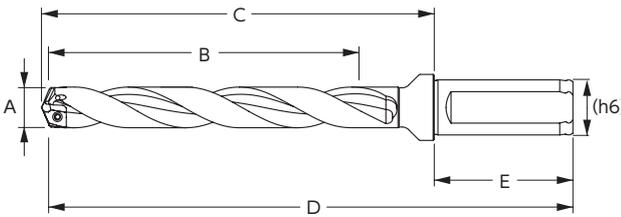
- : Standard stock
- : Semi-standard stock (Time required for delivery: approx. 2 weeks)production-to-order basis
- : Products shifting to production-to-order basis
- No symbol: Products manufactured production-to-order basis

φ 20.00 ~ 21.99 20 Series

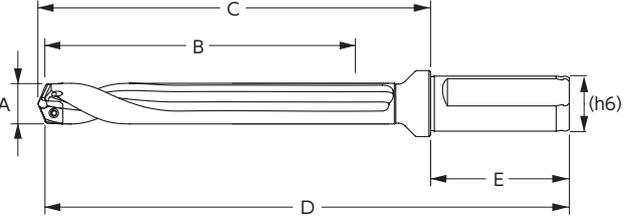
★ Select same size series between inserts and holders.

Holders (Metric system shank)

*Please use straight fluted for more than 3.5MPa coolant pressure.



① : Helical fluted

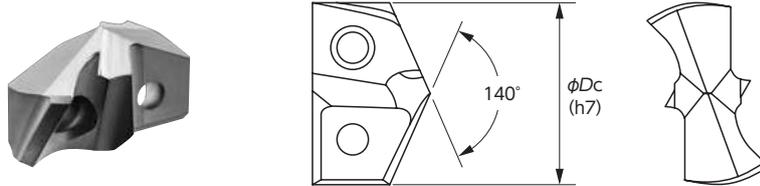


② : Straight fluted

(A) Insert cutting edge dia	(B) Max. machining length	P/N	Stock	Shape	Dimensions				Parts	
					(C) Body length	(D) Overall length	(E) Shank dia. x length	Screw for pipe	Clamping screw	Screwdriver (Optional)
20.00 ~ 21.99	24.0 1D	60120H-25FM	●	①	60.4	113.6	φ25×56	1/8"	7375-IP9-10	8IP-9
	66.0 3D	60320H-25FM	●	①	102.9	156.1				
		60320S-25FM	●	②						
	110.0 5D	60520H-25FM	●	①	146.9	200.1				
		60520S-25FM	●	②						
	153.9 7D	60720H-25FM	●	①	190.9	244.0				
		60720S-25FM	●	②						

Inserts

We take your order by 1 piece as the unit.



Shape	Standard					hard-to-cut material, stainless steel, AS		Cast Iron CI			Hard Steels/Low rigid machine LR	
	Carbide (K35)		Carbide (K20)		Carbide (K20)	Carbide (K20)		Carbide (K20)		Carbide (K35)		
Material grade	AM200 (AlCrN)		AM300 (multilayer AlCrN)		AM300 (multilayer AlCrN)	AM300 (multilayer AlCrN)		AM200 (AlCrN)		AM300 (multilayer AlCrN)		
Coating	Stock	Stock	Stock	Stock	Stock	Stock	Stock	Stock	Stock	Stock	Stock	
φDc	Part No.	Part No.	Part No.	Part No.	Part No.	Part No.	Part No.	Part No.	Part No.	Part No.	Part No.	
20.00	5C120H-20	7C120P-20	7C220P-20	7C220P-20AS	5C220H-20CI	7C220P-20CI	7C120P-20LR					
20.24	5C120H-.796	7C120P-.796	7C220P-.796	7C220P-.796AS	5C220H-.796CI	7C220P-.796CI	7C120P-.796LR					
20.50	5C120H-20.5	7C120P-20.5	7C220P-20.5	7C220P-20.5AS	5C220H-20.5CI	7C220P-20.5CI	7C120P-20.5LR					
20.64	5C120H-0026	7C120P-0026	7C220P-0026	7C220P-0026AS	5C220H-0026CI	7C220P-0026CI	7C120P-0026LR	●				
21.00	5C120H-21	7C120P-21	7C220P-21	7C220P-21AS	5C220H-21CI	7C220P-21CI	7C120P-21LR					
21.43	5C120H-0027	7C120P-0027	7C220P-0027	7C220P-0027AS	5C220H-0027CI	7C220P-0027CI	7C120P-0027LR					
21.50	5C120H-21.5	7C120P-21.5	7C220P-21.5	7C220P-21.5AS	5C220H-21.5CI	7C220P-21.5CI	7C120P-21.5LR					
21.83	5C120H-.859	7C120P-.859	7C220P-.859	7C220P-.859AS	5C220H-.859CI	7C220P-.859CI	7C120P-.859LR					

Recommended tightening torque for clamping screw:305 (N·cm)

※The tightening torque is calculated by using 0.14 as the coefficient of friction ($\mu = 0.14$) and 90% of the yield point.
*Replace the holders periodically, using "every 100th insert replacement" as a guideline.
For recommended cutting conditions, please refer to page 098 - 099.

Notes) *Each holder comes with 4 clamping screws and a screw releasing agent (E-Z BREAK). A crewdriver is available only as an optional item.

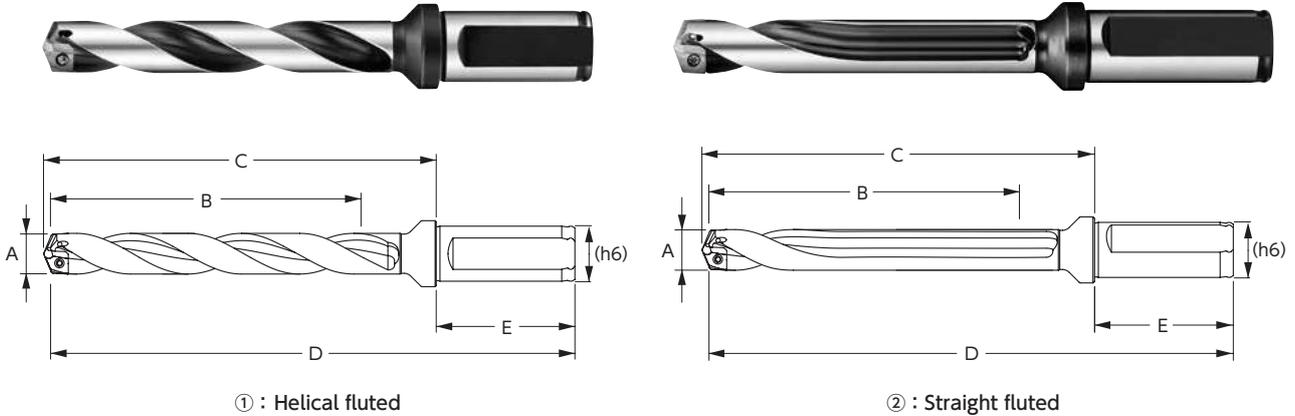
- : Standard stock
- ◐ : Semi-standard stock (Time required for delivery: approx. 2 weeks)production-to-order basis
- : Products shifting to production-to-order basis
- No symbol: Products manufactured production-to-order basis

φ 22.00 ~ 23.99 22 Series

★ Select same size series between inserts and holders.

Holders (Metric system shank)

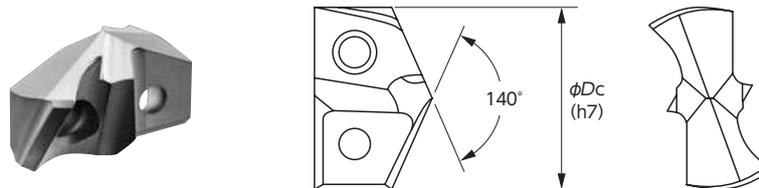
*Please use straight fluted for more than 3.5MPa coolant pressure.



(A) Insert cutting edge dia	(B) Max. machining length	P/N	Stock	Shape	Dimensions			Parts		
					(C) Body length	(D) Overall length	(E) Shank dia. x length	Screw for pipe	Clamping screw	Screwdriver (Optional)
22.00 ~ 23.99	27.0 1D	60122H-25FM	●	①	63.0	116.1	φ 25 × 56	1/8"	739-IP9-10	8IP-9
	72.0 3D	60322H-25FM	●	①	108.3	161.3				
		60322S-25FM	●	②						
	119.9 5D	60522H-25FM	●	①	156.2	209.3				
		60522S-25FM	●	②						
	167.9 7D	60722H-25FM	●	①	204.2	257.3				
		60722S-25FM	●	②						

Inserts

We take your order by 1 piece as the unit.



Shape	Standard						hard-to-cut material, stainless steel, AS		Cast Iron CI				Hard Steels/Low rigid machine LR	
Material grade	Carbide (K35)				Carbide (K20)		Carbide (K20)		Carbide (K20)				Carbide (K35)	
Coating	AM200 (AlCrN)		AM300 (multilayer AlCrN)		AM300 (multilayer AlCrN)		AM300 (multilayer AlCrN)		AM200 (AlCrN)		AM300 (multilayer AlCrN)		AM300 (multilayer AlCrN)	
φDc	Part No.		Part No.		Part No.		Part No.		Part No.		Part No.		Part No.	
22.00	5C122H-22	●	7C122P-22	●	7C222P-22	●	7C222P-22AS	●	5C222H-22CI	●	7C222P-22CI	●	7C122P-22LR	●
22.23	5C122H-0028	●	7C122P-0028	●	7C222P-0028	●	7C222P-0028AS	●	5C222H-0028CI	●	7C222P-0028CI	●	7C122P-0028LR	●
22.61	5C122H-.890	●	7C122P-.890	●	7C222P-.890	●	7C222P-.890AS	●	5C222H-.890CI	●	7C222P-.890CI	●	7C122P-.890LR	●
23.00	5C122H-23	●	7C122P-23	●	7C222P-23	●	7C222P-23AS	●	5C222H-23CI	●	7C222P-23CI	●	7C122P-23LR	●
23.02	5C122H-0029	●	7C122P-0029	●	7C222P-0029	●	7C222P-0029AS	●	5C222H-0029CI	●	7C222P-0029CI	●	7C122P-0029LR	●
23.42	5C122H-.921	●	7C122P-.921	●	7C222P-.921	●	7C222P-.921AS	●	5C222H-.921CI	●	7C222P-.921CI	●	7C122P-.921LR	●
23.80	5C122H-23.8	●	7C122P-23.8	●	7C222P-23.8	●	7C222P-23.8AS	●	5C222H-23.8CI	●	7C222P-23.8CI	●	7C122P-23.8LR	●
23.81	5C122H-0030	●	7C122P-0030	●	7C222P-0030	●	7C222P-0030AS	●	5C222H-0030CI	●	7C222P-0030CI	●	7C122P-0030LR	●
23.85	5C122H-23.85	●	7C122P-23.85	●	7C222P-23.85	●	7C222P-23.85AS	●	5C222H-23.85CI	●	7C222P-23.85CI	●	7C122P-23.85LR	●

Recommended tightening torque for clamping screw: 305 (N·cm)

※ The tightening torque is calculated by using 0.14 as the coefficient of friction ($\mu = 0.14$) and 90% of the yield point.

*Replace the holders periodically, using "every 100th insert replacement" as a guideline.

For recommended cutting conditions, please refer to page **O98 - O99**.

(Notes) *Each holder comes with 4 clamping screws and a screw releasing agent (E-Z BREAK). A screwdriver is available only as an optional item.

- : Standard stock
- ◎ : Semi-standard stock (Time required for delivery: approx. 2 weeks) production-to-order basis
- : Products shifting to production-to-order basis
- No symbol: Products manufactured production-to-order basis

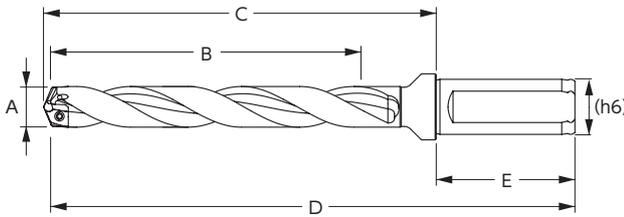
New Products
 Tool Materials / Selection Guide
 PCD, CBN and ceramic
 Cermet
 PVD-coated Cermet
 Micro-grain Carbide, Carbide
 Insert Stock List
 Outside Machining Toolholders
 SS
 Grooving Tools
 Threading Tools
 Shaper
 Internal machining tool range
 Original Tools for Various Applications
 Indexable End Milling Tools
 Indexable Drill Inserts
 Milling Cutters
 Technical Data
 Index

φ 24.00 ~ 25.99 24 Series

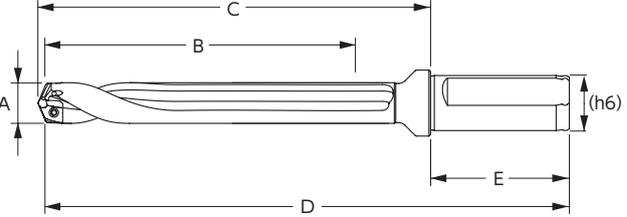
★ Select same size series between inserts and holders.

Holders (Metric system shank)

*Please use straight fluted for more than 3.5MPa coolant pressure.



① : Helical fluted

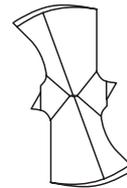
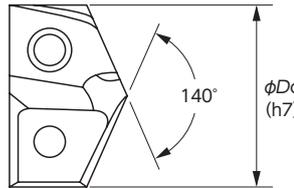


② : Straight fluted

(A) Insert cutting edge dia	(B) Max. machining length	P/N	Stock	Shape	Dimensions				Parts	
					(C) Body length	(D) Overall length	(E) Shank dia. x length	Screw for pipe	Clamping screw	Screwdriver (Optional)
24.00 ~ 25.99	28.5 1D	60124H-25FM	●	①	67.1	120.1	φ25×56	1/8"	739-IP9-10	8IP-9
	78.0 3D	60324H-25FM	●	①	116.8	169.8				
		60324S-25FM	●	②						
	129.9 5D	60524H-25FM	●	①	168.7	221.8				
		60524S-25FM	●	②						
	181.9 7D	60724H-25FM	●	①	220.7	273.8				
		60724S-25FM	●	②						

Inserts

We take your order by 1 piece as the unit.



Shape	Standard					hard-to-cut material, stainless steel, AS		Cast Iron CI			Hard Steels/Low rigid machine LR	
	Carbide (K35)		Carbide (K20)		Carbide (K20)	Carbide (K20)		Carbide (K20)		Carbide (K35)		
Material grade	AM200 (AlCrN)		AM300 (multilayer AlCrN)		AM300 (multilayer AlCrN)	AM300 (multilayer AlCrN)		AM200 (AlCrN)		AM300 (multilayer AlCrN)		
Coating	Stock	Stock	Stock	Stock	Stock	Stock	Stock	Stock	Stock	Stock	Stock	
φDc	Part No.	Part No.	Part No.	Part No.	Part No.	Part No.	Part No.	Part No.	Part No.	Part No.	Part No.	
24.00	5C124H-24	7C124P-24	7C224P-24	7C224P-24AS	5C224H-24CI	7C224P-24CI	7C124P-24LR	●	●	●	●	
24.61	5C124H-0031	7C124P-0031	7C224P-0031	7C224P-0031AS	5C224H-0031CI	7C224P-0031CI	7C124P-0031LR	●	●	●	●	
25.00	5C124H-25	7C124P-25	7C224P-25	7C224P-25AS	5C224H-25CI	7C224P-25CI	7C124P-25LR	●	●	●	●	
25.40	5C124H-0100	7C124P-0100	7C224P-0100	7C224P-0100AS	5C224H-0100CI	7C224P-0100CI	7C124P-0100LR	●	●	●	●	
25.50	5C124H-25.5	7C124P-25.5	7C224P-25.5	7C224P-25.5AS	5C224H-25.5CI	7C224P-25.5CI	7C124P-25.5LR	●	●	●	●	
25.60	5C124H-1.008	7C124P-1.008	7C224P-1.008	7C224P-1.008AS	5C224H-1.008CI	7C224P-1.008CI	7C124P-1.008LR	●	●	●	●	
25.78	5C124H-1.015	7C124P-1.015	7C224P-1.015	7C224P-1.015AS	5C224H-1.015CI	7C224P-1.015CI	7C124P-1.015LR	●	●	●	●	

Recommended tightening torque for clamping screw:305 (N·cm)

※The tightening torque is calculated by using 0.14 as the coefficient of friction ($\mu = 0.14$) and 90% of the yield point.
*Replace the holders periodically, using "every 100th insert replacement" as a guideline.
For recommended cutting conditions, please refer to page **O98 - O99**.

Notes) *Each holder comes with 4 clamping screws and a screw releasing agent (E-Z BREAK). A crewdriver is available only as an optional item.

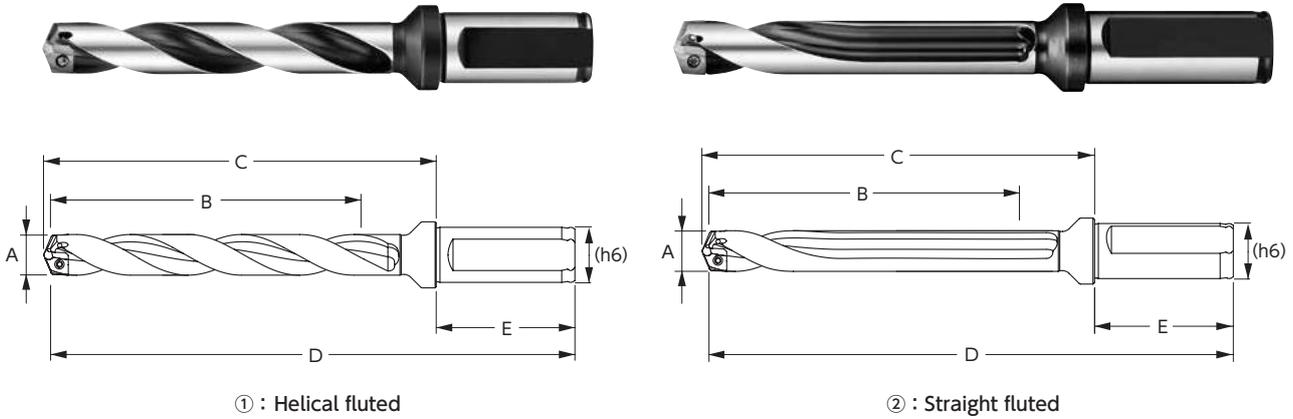
- : Standard stock
- ◎ : Semi-standard stock (Time required for delivery: approx. 2 weeks)production-to-order basis
- : Products shifting to production-to-order basis
- No symbol: Products manufactured production-to-order basis

φ 26.00 ~ 28.99 26 Series

★ Select same size series between inserts and holders.

Holders (Metric system shank)

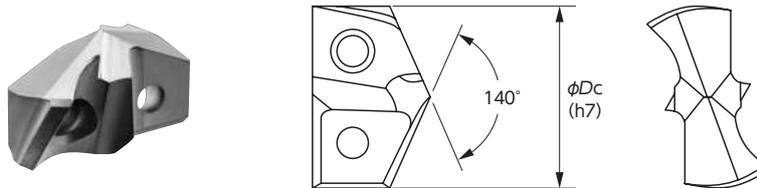
*Please use straight fluted for more than 3.5MPa coolant pressure.



(A) Insert cutting edge dia	(B) Max. machining length	P/N	Stock	Shape	Dimensions			Parts		
					(C) Body length	(D) Overall length	(E) Shank dia. x length	Screw for pipe	Clamping screw	Screwdriver (Optional)
26.00 ~ 28.99	32.0 1D	60126H-32FM	●	①	75.7	133.0	φ 32×60	1/8"	7495-IP15-10	8IP-15
	87.0 3D	60326H-32FM	●	①	130.9	188.1				
		60326S-32FM	●	②						
	145.0 5D	60526H-32FM	●	①	188.8	246.1				
		60526S-32FM	●	②						
	202.9 7D	60726H-32FM	●	①	246.8	304.1				
60726S-32FM		●	②							

Inserts

We take your order by 1 piece as the unit.



Shape	Standard						hard-to-cut material, stainless steel, AS		Cast Iron CI			Hard Steels/Low rigid machine LR		
	Carbide (K35)			Carbide (K20)			Carbide (K20)		Carbide (K20)			Carbide (K35)		
Coating	AM200 (AlCrN)	Stock	AM300 (multilayer AlCrN)	Stock	AM300 (multilayer AlCrN)	Stock	AM300 (multilayer AlCrN)	Stock	AM200 (AlCrN)	Stock	AM300 (multilayer AlCrN)	Stock	AM300 (multilayer AlCrN)	Stock
	Part No.		Part No.		Part No.		Part No.		Part No.		Part No.			
26.00	5C126H-26	●	7C126P-26	●	7C226P-26	●	7C226P-26AS	●	5C226H-26CI	●	7C226P-26CI	●	7C126P-26LR	●
26.20	5C126H-0101	●	7C126P-0101	●	7C226P-0101	●	7C226P-0101AS	●	5C226H-0101CI	●	7C226P-0101CI	●	7C126P-0101LR	●
26.59	5C126H-1.046	●	7C126P-1.046	●	7C226P-1.046	●	7C226P-1.046AS	●	5C226H-1.046CI	●	7C226P-1.046CI	●	7C126P-1.046LR	●
26.99	5C126H-0102	●	7C126P-0102	●	7C226P-0102	●	7C226P-0102AS	●	5C226H-0102CI	●	7C226P-0102CI	●	7C126P-0102LR	●
27.00	5C126H-27	●	7C126P-27	●	7C226P-27	●	7C226P-27AS	●	5C226H-27CI	●	7C226P-27CI	●	7C126P-27LR	●
27.78	5C126H-0103	●	7C126P-0103	●	7C226P-0103	●	7C226P-0103AS	●	5C226H-0103CI	●	7C226P-0103CI	●	7C126P-0103LR	●
28.00	5C126H-28	●	7C126P-28	●	7C226P-28	●	7C226P-28AS	●	5C226H-28CI	●	7C226P-28CI	●	7C126P-28LR	●
28.17	5C126H-1.109	●	7C126P-1.109	●	7C226P-1.109	●	7C226P-1.109AS	●	5C226H-1.109CI	●	7C226P-1.109CI	●	7C126P-1.109LR	●
28.50	5C126H-28.5	●	7C126P-28.5	●	7C226P-28.5	●	7C226P-28.5AS	●	5C226H-28.5CI	●	7C226P-28.5CI	●	7C126P-28.5LR	●
28.58	5C126H-0104	●	7C126P-0104	●	7C226P-0104	●	7C226P-0104AS	●	5C226H-0104CI	●	7C226P-0104CI	●	7C126P-0104LR	●

Recommended tightening torque for clamping screw:690 (N·cm)

※The tightening torque is calculated by using 0.14 as the coefficient of friction ($\mu = 0.14$) and 90% of the yield point.

*Replace the holders periodically, using "every 100th insert replacement" as a guideline.

For recommended cutting conditions, please refer to page **O98 - O99**.

(Notes) *Each holder comes with 4 clamping screws and a screw releasing agent (E-Z BREAK). A crewdriver is available only as an optional item.

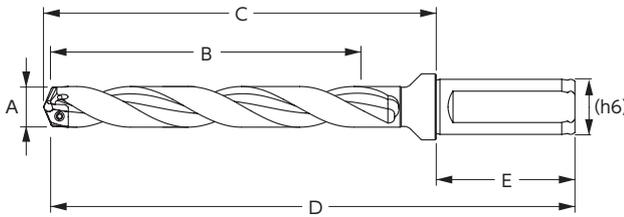
- : Standard stock
- : Semi-standard stock (Time required for delivery: approx. 2 weeks)production-to-order basis
- : Products shifting to production-to-order basis
- No symbol: Products manufactured production-to-order basis

φ 29.00 ~ 31.99 29 Series

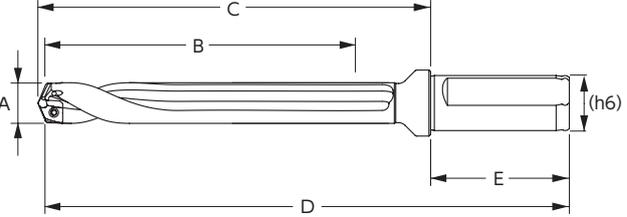
★ Select same size series between inserts and holders.

Holders (Metric system shank)

*Please use straight fluted for more than 3.5MPa coolant pressure.



① : Helical fluted

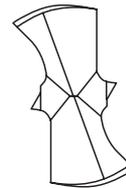
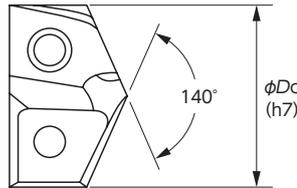


② : Straight fluted

(A) Insert cutting edge dia	(B) Max. machining length	P/N	Stock	Shape	Dimensions				Parts	
					(C) Body length	(D) Overall length	(E) Shank dia. x length	Screw for pipe	Clamping screw	Screwdriver (Optional)
29.00 ~ 31.99	35.0 1D	60129H-32FM	●	①	78.2	135.2	φ32×60	1/4"	7495-IP15-10	8IP-15
	96.0 3D	60329H-32FM	●	①	139.1	196.2				
		60329S-32FM	●	②						
	159.9 5D	60529H-32FM	●	①	203.1	260.1				
		60529S-32FM	●	②						
	223.9 7D	60729H-32FM	●	①	267.1	324.1				
60729S-32FM		●	②							

Inserts

We take your order by 1 piece as the unit.



Shape	Standard						Cast Iron CI				Hard Steels/Low rigid machine LR		
Material grade	Carbide (K35)			Carbide (K20)			Carbide (K20)				Carbide (K35)		
Coating	AM200 (AlCrN)		AM300 (multilayer AlCrN)		AM300 (multilayer AlCrN)		AM200 (AlCrN)		AM300 (multilayer AlCrN)		AM300 (multilayer AlCrN)		
φDc	Part No.	Stock	Part No.	Stock	Part No.	Stock	Part No.	Stock	Part No.	Stock	Part No.	Stock	
29.00	5C129H-29	●	7C129P-29	●	7C229P-29	●	7C229P-29AS	●	5C229H-29CI	●	7C229P-29CI	●	7C129P-29LR
29.37	5C129H-0105	●	7C129P-0105	●	7C229P-0105	●	7C229P-0105AS	●	5C229H-0105CI	●	7C229P-0105CI	●	7C129P-0105LR
30.00	5C129H-30	●	7C129P-30	●	7C229P-30	●	7C229P-30AS	●	5C229H-30CI	●	7C229P-30CI	●	7C129P-30LR
30.16	5C129H-0106	●	7C129P-0106	●	7C229P-0106	●	7C229P-0106AS	●	5C229H-0106CI	●	7C229P-0106CI	●	7C129P-0106LR
30.50	5C129H-30.5	●	7C129P-30.5	●	7C229P-30.5	●	7C229P-30.5AS	●	5C229H-30.5CI	●	7C229P-30.5CI	●	7C129P-30.5LR
30.96	5C129H-0107	●	7C129P-0107	●	7C229P-0107	●	7C229P-0107AS	●	5C229H-0107CI	●	7C229P-0107CI	●	7C129P-0107LR
31.00	5C129H-31	●	7C129P-31	●	7C229P-31	●	7C229P-31AS	●	5C229H-31CI	●	7C229P-31CI	●	7C129P-31LR
31.75	5C129H-0108	●	7C129P-0108	●	7C229P-0108	●	7C229P-0108AS	●	5C229H-0108CI	●	7C229P-0108CI	●	7C129P-0108LR
31.80	5C129H-31.8	●	7C129P-31.8	●	7C229P-31.8	●	7C229P-31.8AS	●	5C229H-31.8CI	●	7C229P-31.8CI	●	7C129P-31.8LR

Recommended tightening torque for clamping screw:690 (N·cm)

※The tightening torque is calculated by using 0.14 as the coefficient of friction (μ = 0.14) and 90% of the yield point.

*Replace the holders periodically, using "every 100th insert replacement" as a guideline.
For recommended cutting conditions, please refer to page 098 - 099.

(Notes) *Each holder comes with 4 clamping screws and a screw releasing agent (E-Z BREAK). A crewdriver is available only as an optional item.

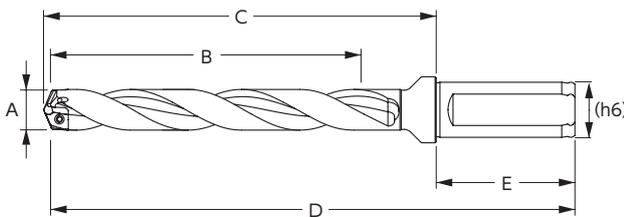
- : Standard stock
- ◎ : Semi-standard stock (Time required for delivery: approx. 2 weeks)production-to-order basis
- : Products shifting to production-to-order basis
- No symbol: Products manufactured production-to-order basis

φ 32.00 ~ 35.00 32 Series

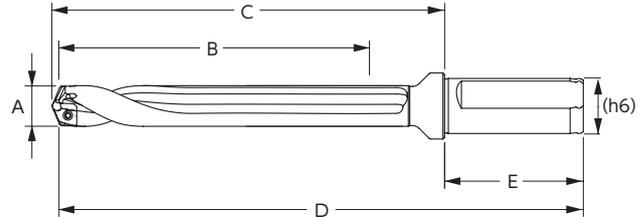
★ Select same size series between inserts and holders.

Holders (Metric system shank)

*Please use straight fluted for more than 3.5MPa coolant pressure.



① : Helical fluted

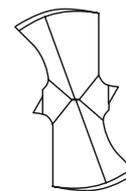
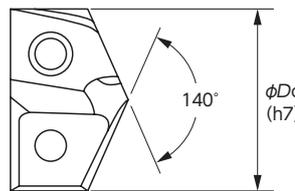


② : Straight fluted

(A) Insert cutting edge dia	(B) Max. machining length	P/N	Stock	Shape	Dimensions			Parts		
					(C) Body length	(D) Overall length	(E) Shank dia. x length	Screw for pipe	Clamping screw	Screwdriver (Optional)
32.00 ~ 35.00	38.0 1D	60132H-40FM	●	①	94.2	160.7	φ 40×70	1/4"	7495-IP15-10	8IP-15
	105.0 3D	60332H-40FM	●	①	161.3	227.7				
		60332S-40FM	●	②						
	175.0 5D	60532H-40FM	●	①	231.3	297.7				
		60532S-40FM	●	②						
	244.9 7D	60732H-40FM	●	①	301.3	367.7				
		60732S-40FM	●	②						

Inserts

We take your order by 1 piece as the unit.



Shape	Standard				hard-to-cut material, stainless steel, AS		Cast Iron CI		Hard Steels/Low rigid machine LR	
Material grade	Carbide (K35)		Carbide (K20)		Carbide (K20)		Carbide (K20)		Carbide (K35)	
Coating	AM300 (multilayer AlCrN)	Stock	AM300 (multilayer AlCrN)	Stock	AM300 (multilayer AlCrN)	Stock	AM300 (multilayer AlCrN)	Stock	AM300 (multilayer AlCrN)	Stock
φDc	Part No.		Part No.		Part No.		Part No.		Part No.	
32.00	7C132P-32	●	7C232P-32	●	7C232P-32AS	●	7C232P-32CI	●	7C132P-32LR	
32.15	7C132P-32.15	●	7C232P-32.15	●	7C232P-32.15AS	●	7C232P-32.15CI	●	7C132P-32.15LR	
32.50	7C132P-32.5	●	7C232P-32.5	●	7C232P-32.5AS		7C232P-32.5CI		7C132P-32.5LR	
32.55	7C132P-0109	●	7C232P-0109	●	7C232P-0109AS		7C232P-0109CI		7C132P-0109LR	
33.00	7C132P-33	●	7C232P-33	●	7C232P-33AS	●	7C232P-33CI	●	7C132P-33LR	●
33.34	7C132P-0110	●	7C232P-0110	●	7C232P-0110AS	●	7C232P-0110CI	●	7C132P-0110LR	●
33.50	7C132P-33.5	●	7C232P-33.5	●	7C232P-33.5AS		7C232P-33.5CI		7C132P-33.5LR	
34.00	7C132P-34	●	7C232P-34	●	7C232P-34AS	●	7C232P-34CI	●	7C132P-34LR	
34.13	7C132P-0111	●	7C232P-0111	●	7C232P-0111AS		7C232P-0111CI		7C132P-0111LR	
34.50	7C132P-34.5	●	7C232P-34.5	●	7C232P-34.5AS		7C232P-34.5CI		7C132P-34.5LR	
34.93	7C132P-0112	●	7C232P-0112	●	7C232P-0112AS	●	7C232P-0112CI	●	7C132P-0112LR	
35.00	7C132P-35	●	7C232P-35	●	7C232P-35AS	●	7C232P-35CI	●	7C132P-35LR	

Recommended tightening torque for clamping screw: 690 (N·cm)

※ The tightening torque is calculated by using 0.14 as the coefficient of friction ($\mu = 0.14$) and 90% of the yield point.

*Replace the holders periodically, using "every 100th insert replacement" as a guideline.

For recommended cutting conditions, please refer to page **O98 - O99**.

(Notes) *Each holder comes with 4 clamping screws and a screw releasing agent (E-Z BREAK). A screwdriver is available only as an optional item.

- : Standard stock
- : Semi-standard stock (Time required for delivery: approx. 2 weeks) production-to-order basis
- : Products shifting to production-to-order basis
- No symbol: Products manufactured production-to-order basis

Recommended Cutting Conditions

Recommended cutting conditions for GEN3

Work material	Hardness	Recommended material grade	Cutting speed (m/min)		Cutting feed rate (mm/rev)								
			AM200	AM300	φ11.00	φ12.00	φ13.00	φ14.00	φ15.00	φ16.00	φ17.00	φ18.00	φ20.00
					φ11.99	φ12.99	φ13.99	φ14.99	φ15.99	φ16.99	φ17.99	φ19.99	φ21.99
Free-cutting steel	100 ~ 150	K35	146	168	0.28	0.30	0.33	0.36	0.38	0.41	0.43	0.48	0.53
	150 ~ 200	K35	127	145	0.25	0.28	0.30	0.33	0.36	0.38	0.41	0.43	0.48
	200 ~ 250	K35	119	130	0.20	0.23	0.25	0.28	0.30	0.33	0.36	0.41	0.46
Low carbon steel S10C ~ S25C	85 ~ 125	K35	137	158	0.28	0.30	0.33	0.36	0.38	0.41	0.43	0.48	0.53
	125 ~ 175	K35	119	137	0.25	0.28	0.30	0.33	0.36	0.38	0.41	0.46	0.48
	175 ~ 225	K35	108	125	0.23	0.25	0.28	0.30	0.33	0.36	0.38	0.43	0.46
Medium carbon steel S30C ~ S50C	225 ~ 275	K35	95	107	0.18	0.20	0.23	0.25	0.28	0.30	0.33	0.38	0.41
	125 ~ 175	K35	119	137	0.25	0.28	0.30	0.33	0.36	0.38	0.41	0.46	0.51
	175 ~ 225	K35	108	125	0.23	0.25	0.28	0.30	0.33	0.36	0.38	0.43	0.48
Alloy steel SCr, SCM	225 ~ 275	K35	95	107	0.20	0.23	0.25	0.28	0.30	0.33	0.36	0.41	0.46
	275 ~ 325	K35	81	91	0.18	0.20	0.23	0.25	0.28	0.30	0.33	0.38	0.41
	125 ~ 175	K35	114	126	0.25	0.28	0.30	0.33	0.36	0.38	0.41	0.46	0.51
Alloy steel SS	175 ~ 225	K35	105	116	0.23	0.25	0.28	0.30	0.33	0.36	0.38	0.43	0.48
	225 ~ 275	K35	95	104	0.20	0.23	0.25	0.28	0.30	0.33	0.36	0.41	0.46
	275 ~ 325	K35	87	94	0.15	0.18	0.20	0.23	0.25	0.28	0.30	0.36	0.38
	325 ~ 375	K35	78	85	0.15	0.15	0.18	0.20	0.23	0.25	0.28	0.33	0.36
Alloy steel SS	225 ~ 300	K35	70	76	0.20	0.23	0.25	0.28	0.28	0.30	0.33	0.36	0.38
	300 ~ 350	K35	63	69	0.15	0.18	0.20	0.23	0.25	0.28	0.28	0.30	0.33
	350 ~ 400	K35	56	61	0.13	0.15	0.18	0.20	0.23	0.25	0.25	0.28	0.30
Structural steel SS, SM	100 ~ 150	K35	108	125	0.25	0.28	0.30	0.33	0.33	0.38	0.38	0.43	0.48
	150 ~ 250	K35	87	101	0.20	0.23	0.25	0.28	0.30	0.33	0.36	0.38	0.43
	250 ~ 350	K35	81	93	0.18	0.20	0.23	0.25	0.28	0.30	0.33	0.36	0.38
Heat-resistant alloy Hastelloy, Inconel	140 ~ 220	K20	37	40	0.15	0.18	0.18	0.20	0.20	0.23	0.23	0.25	0.28
	220 ~ 310	K20	29	30	0.13	0.15	0.15	0.18	0.18	0.20	0.20	0.23	0.25
Stainless steel SUS	135 ~ 185	K35	64	67	0.10	0.13	0.13	0.15	0.15	0.18	0.18	0.20	0.20
	185 ~ 275	K35	47	49	0.08	0.10	0.10	0.13	0.13	0.15	0.15	0.18	0.18
Tool steel SKD	150 ~ 200	K35	78	81	0.15	0.18	0.18	0.20	0.20	0.23	0.23	0.25	0.28
	200 ~ 250	K35	59	62	0.13	0.15	0.15	0.18	0.18	0.20	0.20	0.23	0.25
Cast iron FC, FCD	120 ~ 150	K20	152	175	0.30	0.33	0.36	0.38	0.41	0.43	0.48	0.53	0.56
	150 ~ 200	K20	146	168	0.28	0.30	0.33	0.36	0.38	0.41	0.46	0.51	0.53
	200 ~ 220	K20	131	151	0.25	0.28	0.30	0.33	0.36	0.38	0.43	0.48	0.51
	220 ~ 260	K20	113	130	0.23	0.25	0.28	0.30	0.33	0.36	0.41	0.46	0.48
Forging aluminum	260 ~ 320	K20	102	116	0.23	0.25	0.28	0.30	0.33	0.36	0.38	0.43	0.46
	30	K20	425	488	0.33	0.38	0.40	0.43	0.45	0.48	0.50	0.55	0.58
Cast aluminum	180	K20	300	351	0.30	0.35	0.38	0.40	0.43	0.45	0.48	0.50	0.55
	30	K20	300	351	0.30	0.33	0.35	0.38	0.40	0.43	0.45	0.48	0.50
Titanium alloy	180	K20	225	262	0.28	0.30	0.33	0.35	0.38	0.40	0.43	0.45	0.48
	140 ~ 220	K20	42	43	0.13	0.15	0.17	0.20	0.20	0.22	0.22	0.25	0.28
	220 ~ 310	K20	33	34	0.10	0.12	0.15	0.17	0.17	0.20	0.20	0.22	0.25

Recommended cutting conditions by holder length

Holder type	1D ~ 5D	7D
Cutting speed	Recommended value	Recommended value × 0.8
Cutting feed rate	Recommended value	Recommended value × 0.8

 If non-water soluble oil coolant is used, there may be risks of flashing or fire due to heat resulting from the chips or tool breakage (heat generated from friction between the broken tool and work piece being cut) during machining.

Recommended coolant pressure and supply

● ~ 5D Holder

Cutting feed rate (mm/rev)				
φ 22.00 }	φ 24.00 }	φ 26.00 }	φ 29.00 }	φ 32.00 }
φ 23.99	φ 25.99	φ 28.99	φ 31.99	φ 35.00
0.56	0.58	0.61	0.64	0.66
0.51	0.53	0.56	0.58	0.61
0.48	0.51	0.53	0.56	0.58
0.56	0.58	0.61	0.64	0.66
0.51	0.53	0.56	0.58	0.61
0.48	0.51	0.53	0.56	0.58
0.43	0.46	0.48	0.51	0.53
0.53	0.56	0.58	0.61	0.64
0.51	0.53	0.56	0.58	0.61
0.48	0.51	0.53	0.56	0.58
0.43	0.46	0.48	0.51	0.53
0.53	0.56	0.58	0.61	0.64
0.51	0.53	0.56	0.58	0.61
0.48	0.51	0.53	0.56	0.58
0.41	0.43	0.46	0.48	0.51
0.38	0.41	0.43	0.46	0.48
0.41	0.43	0.46	0.48	0.51
0.36	0.38	0.41	0.43	0.46
0.33	0.36	0.38	0.41	0.43
0.53	0.56	0.58	0.61	0.64
0.48	0.51	0.53	0.56	0.58
0.43	0.48	0.51	0.52	0.56
0.28	0.30	0.30	0.33	0.36
0.25	0.28	0.28	0.30	0.33
0.23	0.23	0.25	0.25	0.28
0.20	0.20	0.23	0.23	0.25
0.30	0.33	0.36	0.38	0.41
0.28	0.30	0.33	0.36	0.38
0.58	0.61	0.64	0.66	0.69
0.56	0.58	0.61	0.64	0.66
0.53	0.56	0.58	0.61	0.64
0.51	0.53	0.56	0.58	0.61
0.48	0.51	0.53	0.56	0.58
0.61	0.66	0.68	0.74	0.76
0.58	0.63	0.66	0.71	0.74
0.53	0.56	0.58	0.61	0.64
0.51	0.53	0.56	0.58	0.58
0.28	0.30	0.30	0.33	0.33
0.25	0.28	0.28	0.30	0.30

Insert cutting edge dia. (mm)	Coolant pressure (MPa)	Coolant supply rate (L/min)
11.00 ~ 13.99	3.5	19
14.00 ~ 15.99	3.1	23
16.00 ~ 17.99	2.8	30
18.00 ~ 19.99	2.5	34
20.00 ~ 21.99	2.1	38
22.00 ~ 25.99	2.1	42
26.00 ~ 35.00	2.1	46

Note) Please multiply above by 1.5 when using 7D holder.

Clamping screws and the corresponding screwdrivers

Size Series	Insert cutting edge dia. (mm)	Allowable tightening torque for clamping screws (N·cm)	Clamping screw	Stock	Screw driver	Stock
11	11.00 ~ 11.99	50	71843-IP6-10	●	8IP-6	●
12 ~ 15	12.00 ~ 15.99	84	7247-IP7-10	●	8IP-7	●
16	16.00 ~ 16.99	175	72556-IP8-10	●	8IP-8	●
17	17.00 ~ 17.99	175	72567-IP8-10	●	8IP-8	●
18	18.00 ~ 21.99	305	7375-IP9-10	●	8IP-9	●
22 ~ 24	22.00 ~ 25.99	305	739-IP9-10	●	8IP-9	●
26 ~ 32	26.00 ~ 35.00	690	7495-IP15-10	●	8IP-15	●

Note) *The tightening torque is calculated by using 0.14 as the coefficient of friction ($\mu = 0.14$) and 90% of the yield point.

Ten clamping screws are supplied in a case. Please order by the case.

P

Milling Cutters for Machining Centers

- Cutters for machining of aluminum P2
- Cutters for machining of cast iron and heat-resistant alloys . . P18
- Arbor specification table for NTK milling cutters . . P32

※ Please refer to page **Q22** for technical data.

The Experts in High Speed Milling of Aluminum Components, Leading

Four types of cutter are available to accommodate your specific needs and requirements.

SFC

uper-peed utter



Please refer to page P4.

HPC

igh-erformance utter



Please refer to page P10.

ALWC

uminum ight-eight utter



Please refer to page P10.

HSC

igh-peed utter



Please refer to page P14.

New Products
Tool Materials / Selection Guide
PCD, CBN and ceramic
Cement, PVD-coated Carbide
Micro-grain Carbide, Carbide
Insert Stock List
Outside Machining Toolholders
SS
Grooving Tools
Threading Tools
Shaper
Internal Machining Tool Range
Original Tools for Various Applications
Indexable End Milling Tools
Indexable Drill Inserts
Milling Cutters
Technical Data
Index

to Higher Efficiency in Production and Further Cost Reduction!!

Highly Efficient Machining

Multi-edge specifications can bring about efficient machining.

Various Types of Insert Shape

Many different insert shapes are available for a wide range of applications, enabling one single milling cutter to work in many varied operations. High-quality surface finish and machining with lower cutting forces allow controlled deflection of parts and excellent burr control.

Smaller Diameters

The minimum diameter available for this series is $\phi 20$.

Decreasing Running Costs

For the HPC and ALWC series, lower cost inserts are available as standard. In addition for the SFC series, we offer reconditioned inserts which are priced very reasonably.

Higher Accuracy

New Products
Tool Materials / Selection Guide
PCD, CBN and ceramic
Cermet / PVD-coated Cermet
Micro-grain Carbide, Carbide
Insert Stock List
Outside Machining Toolholders
SS
Grooving Tools
Threading Tools
Shaper
Internal Machining tool range
Original Tools for Various Applications
Indexable End Milling Tools
Indexable Drill Inserts
Milling Cutters
Technical Data
Index

SFC Series

Fixed type/Adjustable type



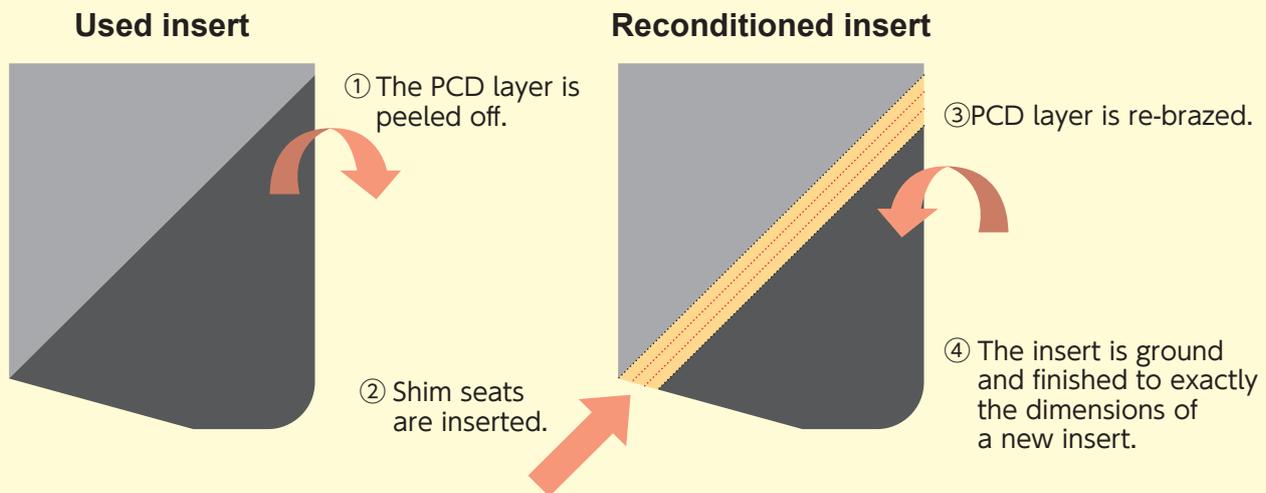
<Outline>

The SFC series is lighter in weight, having an aluminum body. The machining diameters range from $\phi 63$ up to $\phi 250$ as standard. Dedicated PCD inserts allow high efficiency production and longer tool life.

Features

- **Multi-edge specifications**
High efficiency machining and reduced running cost
- **Reconditioned insert service**
Used inserts are collected and reconditioned for reuse as an aid to environmentally friendly production. We offer reconditioned inserts which have the same production performance as new at reasonable prices. (Both new and reconditioned inserts have the exactly same dimensions but differ only in the PCD cutting edge length.) *Recycling is optional.
- **A wide variety of insert shapes.**
You can select the inserts most suitable for your particular application and requirements from our extensive range. This brings many and varied solutions to your production.
- **A larger, stronger brazed area.**
As the brazed area is larger and has higher brazing strength, you can use the cutter for machining operations where depth of cut is relatively high.

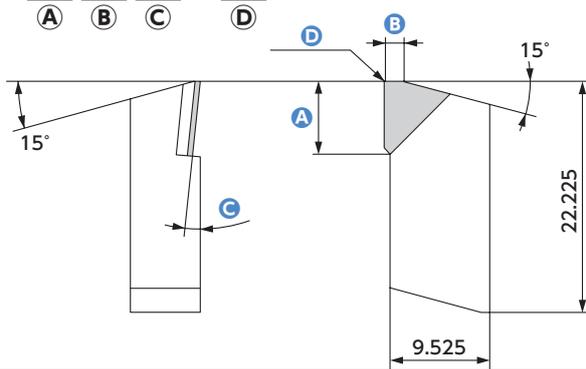
● What is a reconditioned insert?



★Please return used inserts for the renewal process to NTK.
★As we supply both new and reconditioned inserts from stock without discrimination, we can offer such mixed (new and reground inserts) supply at reasonable prices.

● Insert selection guide for SFC

HCD55 15 00 R 04 B



- A** : Length of cutting edge
- B** : Length of wiper
- C** : A.R. (Axial rake)
- D** : Nose radius

15 and 08 indicate types without wiper.
 ※21 and 40 for (B) indicate types with an arced wiper.

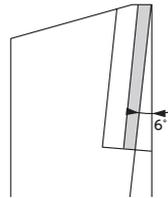
Basic shape

①HCD551500R04B

For burr control

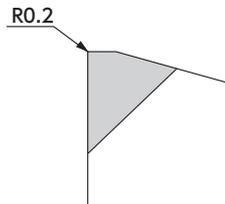
- C** Select an insert having a larger A. R. (Axial rake)
 $0^\circ \Rightarrow 6^\circ$

HCD551506R04B



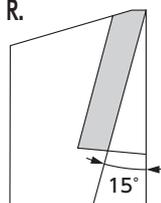
- D** Select an insert having a smaller nose radius.
 $R0.4 \Rightarrow R0.2$

HCD551506R02B



- C** Select an insert having a even larger A. R.
 $6^\circ \Rightarrow 15^\circ$

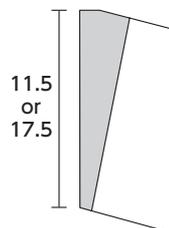
HCD301515R02N
 HCD301515R04N



For greater depth of cut

- A** Select an insert with a longer cutting edge
 $5.5\text{mm} \Rightarrow 11.5\text{mm}, 17.5\text{mm}$

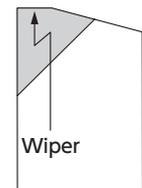
HCD121500R04B
 HCD191500R04B
 HCD121506R02B
 HCD121506R04B
 HCD122106R04B



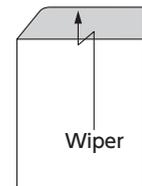
For better surface finish

- B** Select an insert having an arced wiper

HCD552106R02B
 HCD552106R04B
 HCD552106R12B



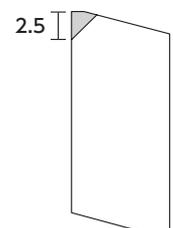
- B** Select an insert with a wiper
 HCD254006R32N



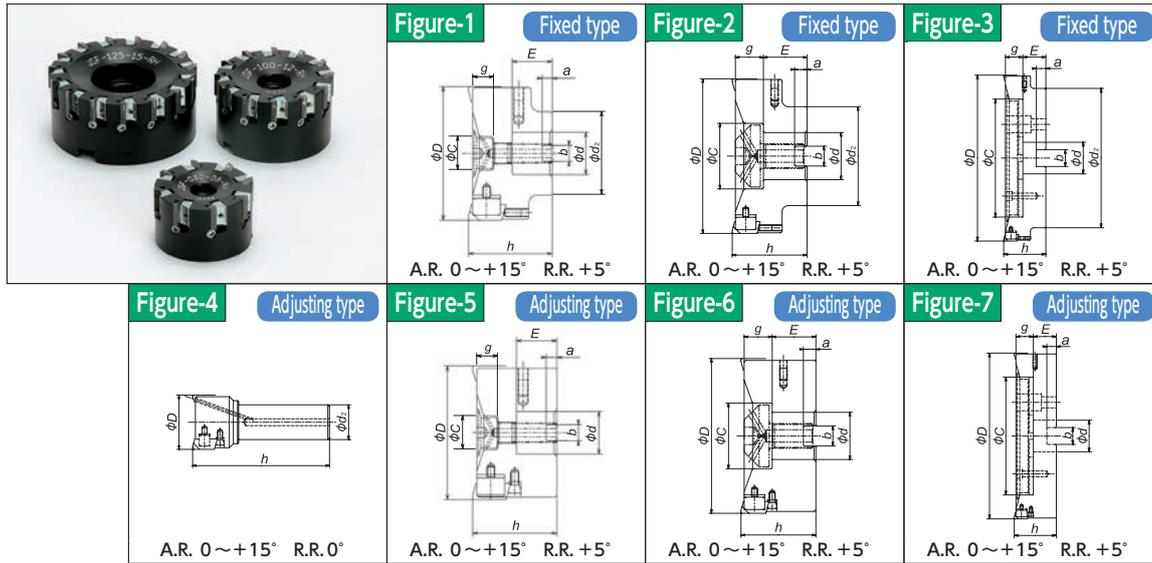
For lower depth of cut and for lower cost

- A** Select an insert with a shorter cutting edge
 $5.5\text{mm} \Rightarrow 2.5\text{mm}$

HCD280800R04N



Cutters for machining of aluminum components



*Please use the dedicated clamping bolt supplied in the package.

Body for SFC

	Shape	Code No.	Part No.	Stock	No. of blades	Dimensions (mm)								Weight (kg)	Allowable revolution (min ⁻¹)	
						ϕD	h	ϕd	E	a	b	ϕd_2	ϕC			g
Fixed type	Figure-1	5645205	JSF-063-06-RH/NS-S ^{*1}	●	6	63	40	22.0	20	6	10	44	20	12.1	0.77	20,000
		5612569	JSF-080-08-RH/NS	●	8	80	50	25.4	24	6	9.6	50	20	12.4	0.55	18,000
	Figure-2	5612544	JSF-100-12-RH/NS	●	12	100	60	31.75	32	8	12.8	60	28	14.4	0.94	16,000
		5645478	JSF-125-15-RH/NS30		15	125	60	31.75	35	8	12.8	80	53	22.4	1.40	15,000
		5612551	JSF-125-15-RH/NS					10		16.13					1.37	
	5636931	JSF-160-18-RH/NS		18	160	60	50.8	38	11	19	120	63	19.4	3.18	13,000	
	Figure-3	5635719	JSF-200-24-RH/NS		24	200	63	47.625	—	14	25.4	160	139.7	26	4.22	11,000
5635727		JSF-250-30-RH/NS		30	250	63	47.625	—	14	25.4	210	177.8	26	6.58	10,000	
Adjustable type	Figure-4	5711676	JSF-050-05-RHT32 ^{*1}		5	50	125	—	—	—	—	32	—	—	0.8	18,000
	Figure-5	5645197	JSF-063-06-RH-S ^{*1}	●	6	63	40	22.0	20	6	10.4	—	20	12.1	0.95	20,000
		5897475	JSF-063-08-RH NEW	●	8	63	40	22.0	20	6	10.4	—	20	12.1	0.45	20,000
		5592795	JSF-080-08-RH	●	8	80	50	25.4	24	6	9.6	—	20	12.4	0.63	20,000
		5885728	JSF-080-10-RH NEW	●	10	80	50	25.4	24	6	9.6	—	20	12.4	0.63	20,000
	Figure-6	5589841	JSF-100-12-RH	●	12	100	60	31.75	32	8	12.8	—	28	14.4	1.13	18,000
		5916788	JSF-100-14-RH-S ^{*1} NEW	●	14	100	60	31.75	32	8	12.8	—	28	14.4	2.2	18,000
		5645460	JSF-125-15-RH30		15	125	60	31.75	35	8	12.8	—	53	22.4	2.36	16,000
	5589833	JSF-125-15-RH		10				16.0		2.31						
	Figure-7	5918099	JSF-125-18-RH-S ^{*1} NEW	●	18	125	60	38.1	35	10	16	—	53	22.4	3.44	16,000
		5625454	JSF-160-18-RH	●	18	160	60	50.8	38	11	19	—	63	19.1	3.20	15,000
		5664362	JSF-200-24-RH		24	200	63	47.625	—	14	25.45	—	139.7	26	4.21	13,000
		5664370	JSF-250-30-RH		30	250	63	47.625	—	14	25.45	—	177.8	26	6.57	12,000

● : Semi-Standard Stock

*1 The part number has a steel body.

*2 JSF-050-05-RHT32 is a shank type.

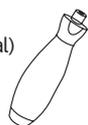
*3 the weight includes parts (insert, wedge, clamp bolt, etc)

■ Torque required for the clamping bolts (N·m) ... $\phi 63$: 35 × 1 bolt, $\phi 80$: 50 × 1 bolt, $\phi 100$: 60 × 1 bolt, $\phi 125/160$: 80 × 1 bolt, $\phi 200/250$: 20 × 4 bolt

Body parts

Body Part No.	Wedge	Axial setscrew	Wedge setscrew	Balancing screw	Handle (optional)	4 mm-Hex screwdriver(optional)	Clamping bolt For internal lubrication	Weight of clamping bolt
JSF-050-05-RHT32	HDW-M55 (5799044)	Body Part No. Adjusting type SWS-M5-15 (5613898)	Body Part No. LS103 (5613906)	—	Body Part No. 2814HS (5441142)	Body Part No. U104-40 (5441126)	—	—
JSF-063-06/08-RH-S/NS-S	Body Part No. HDWM5-EU4DD (5628656)	Fixed type NSWS-M5-15 (5614680)	Sales quantity 10pcs/case	Sales quantity 10pcs/case	Sales quantity 1pc/case	Sales quantity 1pc/case	SALS-063 (5636881)	45g
JSF-080-08/10-RH/NS							RTS-M12 (5592803)	46.5g
JSF-100-12/14-RH/NS	Sales quantity 1pc/case	Sales quantity 10pcs/case	Sales quantity 10pcs/case	Sales quantity 10pcs/case	Sales quantity 1pc/case	Sales quantity 1pc/case	RTS-M16 (5592829)	100g
JSF-125-15/18-RH/NS							RTS-M20 (5592811)	253g
JSF-125-15-RH30/NS30							RTS-M16-125 (5647862)	260g
JSF-160-18-RH/NS	Sales quantity 1pc/case	Sales quantity 10pcs/case	Sales quantity 10pcs/case	Sales quantity 10pcs/case	Sales quantity 1pc/case	Sales quantity 1pc/case	RTS-M24 (5627351)	364g
JSF-200-24-RH/NS							SSP08 (5635123)	720g
JSF-250-30-RH/NS	Sales quantity 1pc/case	Sales quantity 10pcs/case	Sales quantity 10pcs/case	Sales quantity 10pcs/case	Sales quantity 1pc/case	Sales quantity 1pc/case	SSP10 (5635115)	1170g

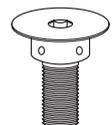
■ For setting wedges
4N · m torque-wrench (optional)
2850F3.8 (5674379)
Sales quantity
1pc/case



■ For torque-wrench
2.5tip bit (optional)
2859H2.5 (5613922)
Sales quantity
1pc/case



■ One off clamping bolt as listed above
Sales quantity
1pc/case



*We recommend the use of the above torque-wrench for tightening wedges. Tightening wedges with excessive torque may cause thread damage

Blended insert supply for SFC

※Always return the used inserts to NTK

Shape	Code No.	P/N (Code No.)	Corner angle	Cutting edge length(mm)	A.R.	r_{ϵ}	Wiper width	Stock	
	5630223	PD1 HCD551500R04B	0°	5.5	0°	0.4	None	●	
	5639273	PD1 HCD121500R04B		11.5				●	
	5639281	PD1 HCD191500R04B		17.5				●	
	5703061	PD1 HCD551506R02B		5.5	11.5	+6°	0.2	Provided	●
	5634803	PD1 HCD551506R04B					0.4		●
	5844204	PD1 HCD551506R08B					0.8		●
	5703970	PD1 HCD121506R02B					0.2		●
	5703962	PD1 HCD121506R04B					0.4		●
	5662697	PD1 HCD552106R02B					0.2		●
	5630298	PD1 HCD552106R04B		5.5	11.5	+6°	0.4	Provided	●
	5889357	PD1 HCD552106R08B					0.8		●
	5639299	PD1 HCD552106R12B					1.2		●
	5782966	PD1 HCD552106C05B					C0.5		●
	5639257	PD1 HCD122106R04B					0.4		●
	5630231	PD1 HCD254006R32N Wiper insert					0°		2.5
	5643473	PD1 HCD280800R04N	2.8	0°	0.4	●			
	5662689	PD1 HCD301515R02N	5.5	+15°	0.2	None	●		
	5634795	PD1 HCD301515R04N					●		
	5636337	KM3 HCD228500R00N Dummy carbide insert. ※Not for actual cutting only used for balance adjustment.	—	0°	0.4	●			

※Inserts for machining two different work materials simultaneously are available and for cavity removal. Please contact us for more information.

Inserts for SFC (Non-returnable)

※Return of used inserts is not required for the products listed below.

Shape	Code No.	P/N (Code No.)	Corner angle	Cutting edge length(mm)	A.R.	r_{ϵ}	Wiper width	Stock
	5697115	PD1 HCA551500R04	0°	6	0°	0.4	None	●
	5697081	PD1 HCA121500R04		12				●
	5697107	PD1 HCA191500R04		19				●
	5697032	PD1 HCA551506R04		6	+6°	0.2	Provided	●
	5697123	PD1 HCA552106R02						●
	5697131	PD1 HCA552106R04		12	+6°	0.4	Provided	●
	5697099	PD1 HCA122106R04						●
	5697099	PD1 HCA122106R04						●

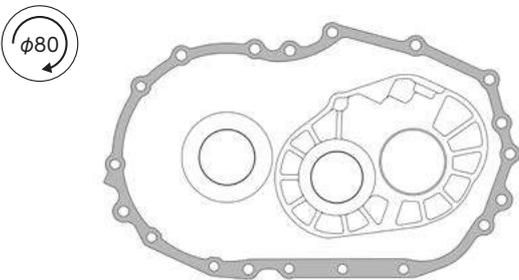
Cutters for machining of aluminum components

Actual examples of machining with the SFC

Machining of transmission case

- Work material : ADC12
- Surface finish required : Max. 12.5S
- Machine : Vertical machining center

	Current tool	NTK
Material grade	Competitor's PCD	PD1
Cutter specification	$\phi 80 \times 6$ blades	$\phi 80 \times 8$ blades
Cutting speed (m/min)	Roughing : 700 Finishing : 2,000	Roughing : 1,500 Finishing : 2,000
No. of revolutions (min^{-1})	Roughing : 2,785 Finishing : 7,958	Roughing : 5,971 Finishing : 7,958
Feed rate per blade (mm/t)	Roughing : 0.17 Finishing : 0.08	Roughing : 0.15 Finishing : 0.08
Table feed rate (mm/min)	Roughing : 2,785 Finishing : 3,979	Roughing : 7,165 Finishing : 5,305
Depth of cut (mm)	Roughing : 2.0 Finishing : 0.5	←
Cutting oil	Internal coolant	←
Life (pcs/corner)	10,000	15,000

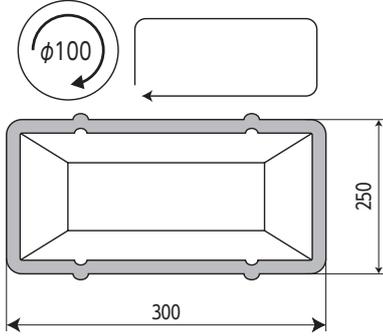


The cycle time was reduced by 10 seconds for roughing and by 3 seconds for finishing. The tool life was 1.5 times higher than the competitor's product.

Machining of oil pan

- Work material : ADC12
- Surface finish required : Max. 6.3S
- Machine : Vertical machining center

	Current tool	NTK
Material grade	Competitor's PCD	PD1
Cutter specification	$\phi 100 \times 8$ blades	$\phi 100 \times 12$ blades
Cutting speed (m/min)	2,513	←
No. of revolutions (min^{-1})	8,000	←
Feed rate per blade (mm/t)	0.063	←
Table feed rate (mm/min)	4,000	6,000
Depth of cut (mm)	1 ~ 3 (for roughing)	←
Cutting oil	Internal coolant	←
Life (pcs/corner)	15,000	15,000



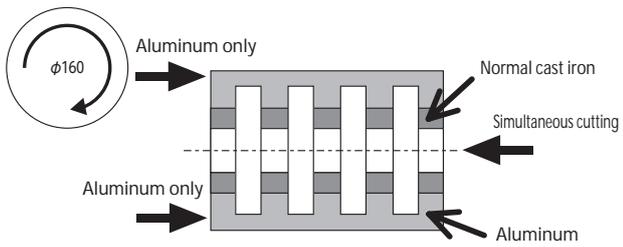
The machining efficiency was improved by 50%. The surface finish was 1.8S compared with 5S with the competitor's product.

Machining of lower block

- Work material : ADC12, Die-cast normal cast iron (FC250)
- Surface finish required : Max. 6.35S
- Machine : Horizontal machining center

	Existing tool	NTK
Material grade	Competitor's PCD	PD1 (wiper) (leading edge)
Cutter specification	$\phi 160 \times 10$ blades	$\phi 160 \times 18$ blades
Cutting speed (m/min)	452	Aluminum only : 1,760 Simultaneous : 251
No. of revolutions (min^{-1})	900	Aluminum only : 3,500 Simultaneous : 500
Feed rate per blade (mm/t)	0.06	Aluminum only : 0.10 Simultaneous : 0.24
Table feed rate (mm/min)	550	Aluminum only : 6,300 Simultaneous : 2,200
Depth of cut (mm)	0.3	←
Cutting oil	External coolant	Internal through coolant
Life (pcs/corner)	150	1,500

The machining efficiency was increased approximately 5 times with 10 times longer tool life.

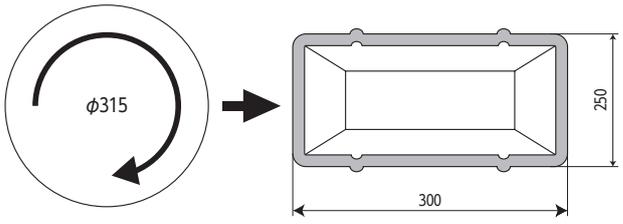


With the competitor's product, two passes of simultaneous bi-metal cutting were carried out while two passes for aluminum and one pass for simultaneous bi-metal cutting were performed by NTK's SFC.

Machining of oil pan

- Work material : ADC12
- Surface finish required : Max. 12.5S
- Machine : Vertical machining center

	Existing tool	NTK
Material grade	Competitor's PCD	PD1
Cutter specification	$\phi 315 \times 18$ blades	$\phi 315 \times 36$ blades
Cutting speed (m/min)	4,750	←
No. of revolutions (min^{-1})	4,800	←
Feed rate per blade (mm/t)	0.04	0.046
Table feed rate (mm/min)	3,500	8,000
Depth of cut (mm)	2.5 (for roughing) + 0.5 (for finishing)	2.8 (for roughing) + 0.2 (for finishing)
Cutting oil	DRY	←
Life (pcs/corner)	30,000	30,000



The larger the diameter of the cutter, the greater the advantage of the multi-blade design becomes. Although the number of blades in the SFC is high, no presetting is required as this is a fixed type cutter. The cycle time was reduced by 11 seconds.

● Procedure for presetting/setting the inserts in the adjustable type SFC

■ Be sure to clean all insert pockets prior to the following steps

● Step 1: Pre-clamping

Install each insert, then, lightly clamp the wedge by 1 N·m with the wedge set screw.

● Step 2: Adjusting run out (Rough adjustment)

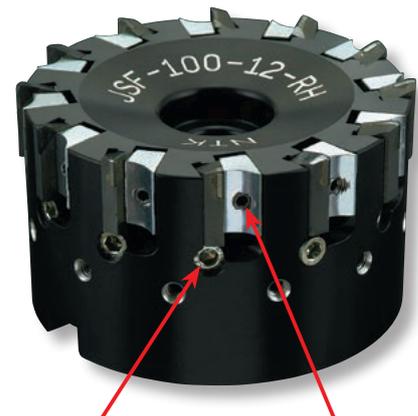
By turning the axial set screw, set the height of the cutting edge at a level 0.1 mm lower than that indicated on the drawing.

● Step 3: Clamping

Tighten the wedge by 4 N·m.

● Step 4: Adjusting run out (Finishing adjustment)

For the final adjustment, set the height of the cutting edge of every insert at a level 0.05 mm lower than that indicated on the drawing.



Axial set screw

Wedge set screw

■ Caution

※To set inserts into a fixed type SFC, you only have to tighten the wedge set screws at N·m by using the optional 2.5mm-Hex torque-wrench (2859H2.5).

● Notes on Fixed type SFC

No need for pre-setting

Not need for cutting edge adjustment!

(The only step required is unclamping and clamping with the clamping bolt.)



【Note】

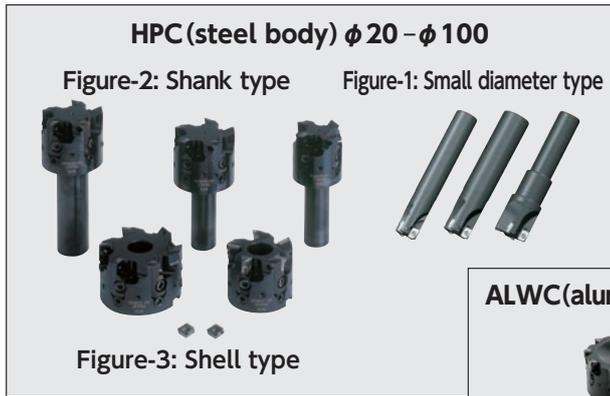
The holes for the axial setscrews and balance adjusting screws are filled with a special material, thus, no screwdrivers and hex-wrenches can be inserted in them.

※The color of the special material is different from the color of the actual product body.

- New Products
- Tool Materials / Selection Guide
- PCD, CBN and ceramic
- Carbide
- Micro-grain Carbide, Carbide
- Insert Stock List
- Outside Machining Toolholders
- SS
- Grooving Tools
- Threading Tools
- Shaper
- Internal Machining tool range
- Original Tools for Various Applications
- Indexable End Milling Tools
- Indexable Drill Inserts
- Milling Cutters
- Technical Data
- Index

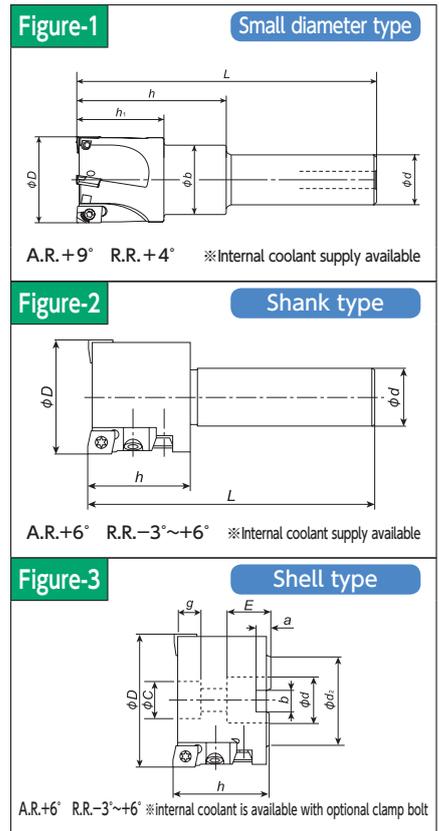
HPC and ALWC Series

Fixed type/Adjustable type



Features

- **A wide range of sizes.**
The diameters range from $\phi 20$ - $\phi 100$ for the HPC series, and $\phi 80$ - $\phi 125$ for the ALWC as standard.
- **Same inserts for HPC and ALWC**
For $\phi 40$ to $\phi 125$, HPC and ALWC share the same types of inserts.
- **High rigidity (HPC)**
The material for the HPC body is steel, achieving very high reliability.
- **Reduced main spindle load (ALWC)**
With the aluminum body, ALWC can reduce load to the main spindle unit.



HPC/ALWC Body

Shape	Code No.	Part No.	Stock	No. of blades	Dimensions (mm)													Weight (kg)	Allowable no. of revolutions (min ⁻¹)	P/N of applicable insert
					ϕD	h	ϕd	L	h_1	E	ϕb	a	b	ϕd_2	ϕc	g				
Figure-1	5520341	RD020T20070R03	●	3	20	30	20	100	30	-	-	-	-	-	-	-	-	0.23	18,000	HDA type
	5520333	RD025T25070R03	●	3	25	40	25	110	40	-	-	-	-	-	-	-	-	0.37		
	5518519	RD030T20060R04	●	4	30	60	20	120	35	-	25	-	-	-	-	-	-	0.33		
	5518501	RD032T20060R04	●	4	32	60	20	120	35	-	26	-	-	-	-	-	-	0.36		
	5518493	RD035T20060R04	●	4	35	60	20	120	35	-	28	-	-	-	-	-	-	0.36		
Figure-2 Fixed type	5449384	RA040T20060R04K	●	4	40	45	20	105	-	-	-	-	-	-	-	-	-	0.45	18,000	
	5449400	RA040T25080R04K	●	4	40	45	25	125	-	-	-	-	-	-	-	-	-	0.6		
	5449442	RA050T20060R05K	●	5	50	45	20	105	-	-	-	-	-	-	-	-	-	0.6		
	5449467	RA050T25080R05K	●	5	50	45	25	125	-	-	-	-	-	-	-	-	-	0.75		
	5449483	RA050T32080R05K	●	5	50	45	32	125	-	-	-	-	-	-	-	-	-	0.9		
Figure-3 Fixed type	5449509	RA050C22.00R05K	●	5	50	45	22	-	-	20	-	6.3	10.4	42	18	11	0.4	18,000		
	5449525	RA063C22.00R06K	●	6	63	45	22	-	-	20	-	6.3	10.4	42	18	11	0.73			
	5477252	RA080A25.40R07K	●	7	80	43	25.4	-	-	26	-	6	9.5	50	38.9	15	0.95			
Figure-2 Adjustable type	54486212	RA100A31.75R09K	●	9	100	45	31.75	-	-	32	-	8	12.7	60	61	11	1.6	10,000	HAL type HAT type HRT type HAN type HLA type	
	5441050	RA040T20060R04	●	4	40	45	20	105	-	-	-	-	-	-	-	-	-	0.45		
	5441043	RA040T25080R04	●	4	40	45	25	125	-	-	-	-	-	-	-	-	-	0.6		
	5441035	RA050T20060R05	●	5	50	45	20	105	-	-	-	-	-	-	-	-	-	0.6		
	5441027	RA050T25080R05	●	5	50	45	25	125	-	-	-	-	-	-	-	-	-	0.75		
Figure-3 Adjustable type	5441019	RA050T32080R05	●	5	50	45	32	125	-	-	-	-	-	-	-	-	-	0.9		
	5441001	RA050C22.00R05	●	5	50	45	22	-	-	20	-	6.3	10.4	42	18	11	0.4	18,000		
	5440995	RA063C22.00R06	●	6	63	45	22	-	-	20	-	6.3	10.4	42	18	11	0.73			
	5456223	RA080A25.40R07	●	7	80	43	25.4	-	-	26	-	6	9.5	50	38.9	15	0.95			
	5486220	RA100A31.75R09	●	9	100	45	31.75	-	-	32	-	8	12.7	60	61	11	1.6			
Figure-3 Fixed type	5608476	RS080A25.40R06K	●	6	80	48	25.4	-	-	24	-	6	9.5	50	20	13	0.5		14,000	
	5608427	RS080A25.40R07K	●	7	80	48	25.4	-	-	24	-	6	9.5	50	20	13	0.5	14,000		
	5608435	RS100A31.75R08K	●	8	100	58	31.75	-	-	32	-	8	12.4	60	28	15	0.84	12,500		
	5608443	RS125A38.10R10K	●	10	125	58	38.1	-	-	35	-	10	12.7	80	53	21	1.27	11,000		
	5608518	RS080A25.40R06	●	6	80	48	25.4	-	-	24	-	6	9.5	50	20	13	0.5	14,000		
Figure-3 Adjustable type	5608450	RS080A25.40R07	●	7	80	48	25.4	-	-	24	-	6	9.5	50	20	13	0.5	14,000		
	5684907	RS080C27.00R06	●	6	80	48	27.0	-	-	24	-	7	12.4	50	20	13	0.5	14,000		
	5608500	RS100A31.75R08	●	8	100	58	31.75	-	-	32	-	8	12.7	60	28	15	0.84	12,500		
	5661632	RS100C32.00R08	●	8	100	58	32	-	-	32	-	8	14.4	60	28	15	0.84	12,500		
	5608468	RS125A38.10R10	●	10	125	58	38.1	-	-	35	-	10	15.9	80	53	21	1.27	11,000		
	5661608	RS125C40.00R10	●	10	125	58	40	-	-	35	-	9	16.4	80	53	21	1.27	11,000		

● : Stock
● : Semi-Standard Stock

Inserts for HPC/ALWC

Shape	Code No.	Part No.	Corner angle	w	T	Cutting edge length (mm)	A.R. [※]	R.R. [※]	r _ε	Wiper	PCD	PVD-coated micro grain carbide	Applicable body
											PD1	TM1	
	5518485	PD1 HDA4015R04	0°	6.7	3.4	4.0	+9°	+4°	0.4	Provided	●		Figure-1
	5722350	TM1 HDA4505R04 W/chipbreaker		6.7	3.4	Min.5.0					●	●	
	5461041	PD1 HAL3515R04		10	4.0	3.5	0°	0.4	C0.5	●		Figure-2	
	5889480	PD1 HAL3515C05								●			
	5733977	PD1 HRL3515R04 Regr indable		Min.3.5	10.2	6.0	+6°	C0.5	●		Figure-3		
	5461058	PD1 HAT6021R04		●									
	5889498	PD1 HAT6021C05		●									
	5471164	PD1 HRT6021R04 Regr indable		10.2	10	Min.6.0	-3°	0.4	●				
	5722368	TM1 HAN9521R04N		●									
	5722376	TM1 HLA8521R04		10.078			+6°		●				

※angles on cutters

HPC/ALWC Body accessories

	Cartridge	Axial setscrew	Cartridge setscrew	Insert clamping screw	Handle (optional)	Torx screwdriver (optional)	Hex-screwdriver (optional)	Clamping bolt (optional)														
	Sales quantity 1pc/case	Sales quantity 10pcs/case	Sales quantity 10pcs/case	Sales quantity 10pcs/case	Sales quantity 1pc/case	Sales quantity 1pc/case	Sales quantity 1pc/case	Sales quantity 1pc/case														
HPC	RD020T20070R03	Part No. RA06P03NC (5440987)	Part No. CS0510A (5440961)	Part No. CS0510T (5804273)	Part No. FS10306A (5519350)	Part No. 2814HS (5441142)	Part No. U107T10 (5519343)	Part No. U104-40 (5441126) <Hex>														
	RD025T25070R03				Part No. FS10307A (5490602)	Part No. 2814HS (5441142)	Part No. U107T15 (5441134) <Torx>															
	RD030T20060R04				Part No. FS1035104A (5440953)				Part No. 2814HS (5441142)	Part No. U107T15 (5441134) <Torx>												
	RD032T20060R04										Part No. 2814HS (5441142)	Part No. U107T15 (5441134) <Torx>										
	RD035T20060R04												Part No. 2814HS (5441142)	Part No. U107T15 (5441134) <Torx>								
	RA040T20060R04/K														Part No. 2814HS (5441142)	Part No. U107T15 (5441134) <Torx>						
	RA040T25080R04/K																Part No. 2814HS (5441142)	Part No. U107T15 (5441134) <Torx>				
	RA050T20060R05/K																		Part No. 2814HS (5441142)	Part No. U107T15 (5441134) <Torx>		
	RA050T25080R05/K																				Part No. 2814HS (5441142)	Part No. U107T15 (5441134) <Torx>
	RA050T32080R05/K																					
RA050C22.00R05/K	Part No. 2814HS (5441142)	Part No. U107T15 (5441134) <Torx>																				
RA063C22.00R06/K			Part No. 2814HS (5441142)	Part No. U107T15 (5441134) <Torx>																		
RA080A25.40R07/K					Part No. 2814HS (5441142)	Part No. U107T15 (5441134) <Torx>																
RA100A31.75R09/K							Part No. 2814HS (5441142)	Part No. U107T15 (5441134) <Torx>														
ALWC									RS080A25.40R06/K	Part No. CS0514A (5609433)	Part No. CS0510T (5804273)	Part No. FS1035104A (5440953)	Part No. 2814HS (5441142)	Part No. U107T15 (5441134) <Torx>	Part No. U104-40 (5441126) <Hex>							
									RS080A25.40R07/K													
									RS100A31.75R08/K													
									RS125A38.10R10/K													

New Products
Tool Materials / Selection Guide
PCD, CBN and ceramic
Cement
PVD-coated Carbide
Micro-grain Carbide, Carbide
Insert Stock List
Outside Machining Toolholders
SS
Grooving Tools
Threading Tools
Shaper
Internal machining tool range
Original Tools for Various Applications
Indexable End Milling Tools
Indexable Drill Inserts
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Cutters for machining of aluminum components

Actual examples of machining with HPC/ALWC

Machining of rocker shaft holder		
<ul style="list-style-type: none"> ●Work material : ADC12 ●Surface finish required : 12.5S ●Roughness of surface to be machined : 1.5S 		
	Current tool	NTK
Insert material grade	Competitor's carbide ($\phi 32 \times 2$ pcs)	PD1 ($\phi 32 \times 4$ pcs)
Cutting speed (m/min)	600	800
No. of revolutions (min^{-1})	6,000	8,000
Feed rate per blade (mm/t)	0.025	0.05
Table feed rate (mm/min)	300	1,600
Depth of cut (mm)	MAX1.0	←
Cutting oil	WET (through coolant)	←
Life (pcs/corner)	8,000	15,000 (still cutting)

The total cycle time was reduced by 3 minutes.

Machining of under holder			
<ul style="list-style-type: none"> ●Work material : A7000 type ●Surface finish required : 12.5S ●Roughness of surface to be machined : 6S 			
	Current tool	Current tool	NTK
Insert material grade	Competitor's carbide ($\phi 32 \times 3$ pcs)	Competitor's carbide: 3 pcs PCD: 1 pc ($\phi 50 \times 4$ pcs)	PD1 ($\phi 30 \times 4$ pcs)
Cutting speed (m/min)	700	785	750
No. of revolutions (min^{-1})	7,000	5,000	8,000
Feed rate per blade (mm/t)	0.1		←
Table feed rate (mm/min)	2,100	2,000	3,200
Depth of cut (mm)	$d=3, d=3, d=1.5$ 3 PASS	$d=0.4$ 1 PASS	$a_p=3, d=3, d=1.5$ 3 PASS
Cutting oil	WET (External coolant)		←
Life (pcs/corner)	2,500	10,000	24,000 (still cutting)

Burrs free machining.
As the tool performance was excellent, cutters of $\phi 32$ and $\phi 50$ were replaced with our single $\phi 30$ cutter.

Machining of rail frame (for motor bikes)		
<ul style="list-style-type: none"> ●Work material : W2K ●Machine : Compact type machining center (BT30) 		
	Existing tool	NTK
Insert material grade	Competitor's PCD	PD1
Cutter specification	$\phi 40 \times 3$ blades Steel body	$\phi 40 \times 4$ blades
Cutting speed (m/min)	314	753
No. of revolutions (min^{-1})	2,500	6,000
Feed rate per blade (mm/t)	0.08	0.05
Table feed rate (mm/min)	600	1,200
Depth of cut (mm)	2~4 (Machining several times)	←
Cutting oil	WET	←
Life (pcs/corner)	10~20	30,000

Tool life and efficiency were both improved greatly.

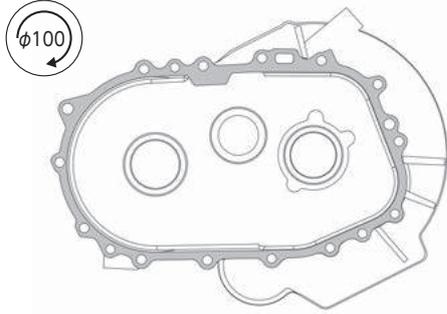
Machining of transfer case		
<ul style="list-style-type: none"> ●Work material : ADC12 ●Surface finish required : 1.6a ●Machine : Machining center (BT40) 		
	Existing tool	NTK
Insert material grade	Competitor's PCD	PD1
Cutter specification	$\phi 100 \times 6$ blades	$\phi 80 \times 7$ blades
Cutting speed (m/min)	1,885~2,200	2,510
No. of revolutions (min^{-1})	6,000~7,000	10,000
Feed rate per blade (mm/t)	Roughing : 0.12 (mm/t) 4,320~5,040 (mm/min)	Roughing: 0.142 (mm/t) 9,940 (mm/min)
	Finishing : 0.1 (mm/t) 3,600~4,200 (mm/min)	Finishing: 0.1 (mm/t) 7,000 (mm/min)
Depth of cut (mm)	Roughing : 3.0 Finishing : 0.5	←
Life (pcs/corner)	100	20,000

Tool life determined by: burring

Tool life and efficiency were both improved greatly.

Machining of converter housing		
	Existing tool	NTK
material grade	Competitor's PCD	PD1
Cutter specification	φ100×9 blades	φ100×8 blades
Cutting speed (m/min)	3,140	←
No. of revolutions (min ⁻¹)	10,000	←
Feed rate per blade (mm/t)	0.167	0.188
Table feed rate (mm/min)	15,000	←
Depth of cut (mm)	1.2	←
Cutting oil	External coolant	←
Life (pcs/corner)	20,000	20,000

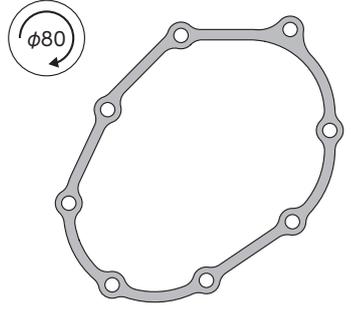
●Work material : ADC12
●Standard for surface roughness : Max. 12.5S
●Machine : Horizontal machining center



The load factor for the spindle motor was reduced by 20%

Machining of transfer case		
	Existing tool	NTK
material grade	Competitor's PCD	PD1
Cutter specification	φ80×6 blades	φ80×7 blades
Cutting speed (m/min)	3,014	←
No. of revolutions (min ⁻¹)	12,000	←
Feed rate per blade (mm/t)	0.1	←
Table feed rate (mm/min)	7,200	8,400
Depth of cut (mm)	1~4 (down gate)	←
Cutting oil	Internal coolant	←
Life (pcs/corner)	20,000	20,000

●Work material : ADC12
●Standard for surface roughness : Max.6.3S



The machining efficiency was improved by 17%.

Insert Presetting and PCD Damage Preventive Measures for HSC, HPC and ALWC

■Be sure to clean all the insert pockets before carrying out the following steps:

Step1: Preventative measures against insert chipping

Attach a piece of adhesive tape (preferably, a tape low in adhesion) to the end of a dial gauge's probe.

Step2: Mounting inserts

For HPC and ALWC: First, install the cartridges to the body, then, tighten each insert with the insert clamping screw at 3 N·m.

[Caution: If you mount inserts in a cartridge first, it's not possible to install the cartridges to the body.]

For HSC: Remove the wedges from all the cutting edges of the inserts. After installing inserts, mount each by tightening the cartridge set screw first and then the wedge set screw.

Step3: Temporary tightening (using a torque-wrench)

Tighten set screw (1) first, and then, setscrew (3) at 4 N·m. For HPC and ALWC, as set screw (3) is not provided, skip tightening set screw (3).

Step4: Setting

While watching the reading on the dial gauge, rotate set screw (2) so that the insert with the highest cutting edge is lifted by +0.03 mm. Next, with this position as the reference, set the cutting edges of all other inserts with variations in run out to stay within +/- 5 microns (10 microns in terms of range).

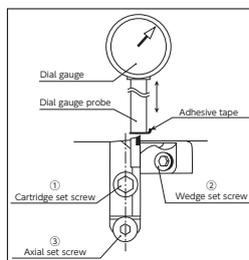
Step5

Remove the probe from the dial gauge.

Step6: Tightening set screws (using a torque wrench)

For HSC, tighten set screw (1) at 10 N·m, then, setscrew (3) at 6 N·m.

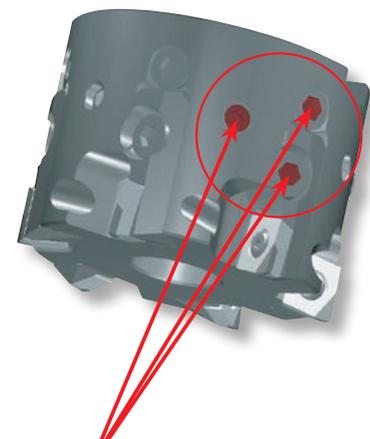
For HPC and ALWC, tighten set screw (1) at 8 N·m. Skip tightening set screw (3) for HPC and ALWC as a set screw (3) is not provided for HPC and ALWC.



HPC and ALWC Fixed Type No need for pre-setting

No need for cutting edge adjustments!

(The only requirement is clamping and unclamping of the inserts with the clamping bolt)



[Note]

The holes for the axial setscrews and balance adjusting screws are filled with a special material, thus, no screwdrivers and hex-wrenches can be inserted in them.

※The color of the special material is different from the color of the actual product body.

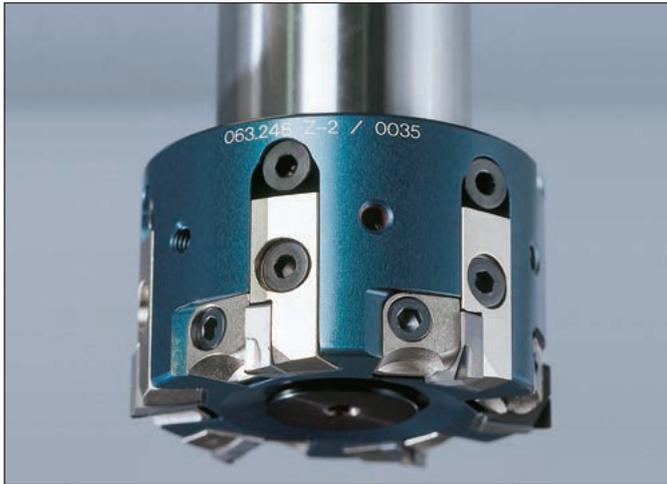
Supplemental explanation

1. Even after the set screws have been tightened, the run out of the cutting edges should stay within approximately +/- 10 microns (20 microns in terms of range).
2. In the above case, NTK standard inserts (excluding some of them; see the note below for details.) and re-ground NTK inserts will not affect the tool life and surface finish.
※Note: To use ZT8489R or ZT8490R for HSC for machining operations that require high surface quality, NTK recommends that a special wiper insert be built into the tool.

HSC Series

Fixed type/Adjustable type

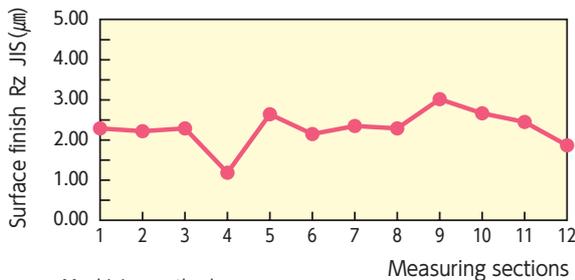
New Products
Tool Materials / Selection Guide
PCD, CBN
Cermet, PVD-coated Cermet
Micro-grain Carbide, Carbide
Insert Stock List
Outside Machining Toolholders
SS
Grooving Tools
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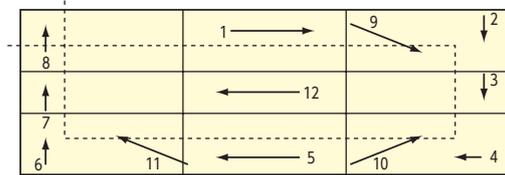
Features

- **High reliability**
Sales performance more than a decade
- **Low cutting force**
Feasible by good balancing among A.R, R.R and number of inserts
- **Wide range of line-up**
Standard cutter diameter from 80mm to 250mm
Standard inserts with 8 kinds of configuration

● Surface finish



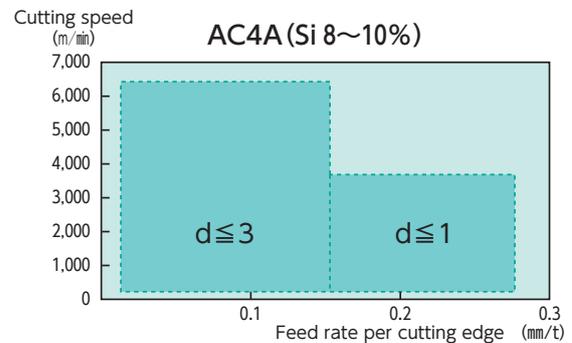
Machining method



Cutting conditions

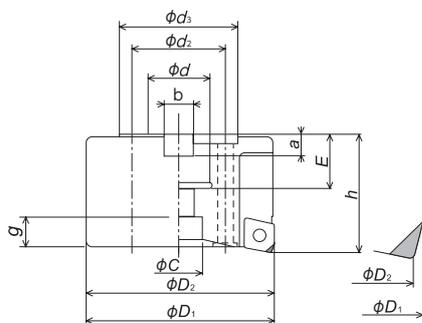
Work material : AC4A Cutter used : 80,6 blades
No. of revolutions : 10,000 min⁻¹ (rpm)
Table feed rate : 3,000 mm/min Depth of cut : 2.0 mm, WET

● Operating ranges



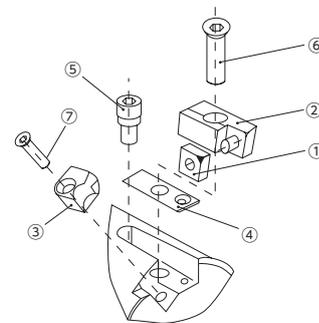
Drawing

A.R.+6° R.R.+6°



※The drawing shows a right-handed cutter and its parts.

Names of parts



- ① Throw-away insert
- ② Cartridge
- ③ Wedge
- ④ Thrust pad
- ⑤ Axial set screw
- ⑥ Cartridge set screw
- ⑦ Wedge set screw

HSC body

Code No.	Part No. (Product name)	Stock	No. of blades	Dimensions (mm)										Weight (kg)	Allowable no. of revolutions (min ⁻¹)	Part No. of applicable insert	
				ϕD_1	ϕD_2	h	ϕd	E	a	b	ϕd_2	ϕd_3	ϕc				g
5203096	63.248Z-2 (1D-HSC-MK08006R.J)	●	6	80	78.3	52	25.40	22.2	6	9.6	—	50	19.5	11	0.75	20,000	Refer to the above table (Inserts dedicated for HSC)
5218268	64.113Z-2 (1D-HSC-MK10006R.J)		6	100	98.3	65	31.75	31.0	8	12.8	—	58	27	15	1.00		
5218169	64.026Z-2 (1D-HSC-MK10008R.J)	●	8												1.10		
5218276	64.116Z-2 (1D-HSC-MK12508R.J)	●	8	125	123.3	65	38.10	34.5	10	16.0	—	70	56	26	1.80	16,000	
5218284	64.118Z-2 (1D-HSC-MK12510R.J)	●	10												0.36		
5302278	67.688Z-1 (1D-HSC-MK16010R.J)	●	10	160	158.3	65	50.80	38.0	11	19.0	—	104	70	22.5	2.90	12,500	
5309810	66.934Z-1 (1D-HSC-MK16012R.J)		12												3.00		
5576137	65.750Z-1 (1D-HSC-MK20012R.J)		12	200	198.3	65	47.625	—	14	25.4	101.6	130	—	—	4.40	10,000	
5309836	65.751Z-1 (1D-HSC-MK20016R.J)		16												4.60		
5503891	65.752Z-1 (1D-HSC-MK25016R.J)		16	250	248.3	65	47.625	—	14	25.4	101.6	130	—	—	6.90	8,000	
5553789	65.753Z-1 (1D-HSC-MK25020R.J)		20												7.10		

■ 10N · m ≒ 1kgf · m

● : About 2weeks

■ Excessive clamping torque may damage the cutters. Tightening with excessive torque may cause damage to the screws, wedges, helical inserts

Inserts dedicated for HSC

Shape	Code No.	Part No.	Corner angle θ	Cutting edge length (mm)	r_ϵ (mm)	A.R.	R.R.	Wiper width	Stock	
	5371968	PD1 KH4RE-04B-003	15°	6.0	0.4	+6°	+6°	1.4	●	
	5386479	PD1 ZT8490R angular type		5.0				—	●	
	5308614	PD1 KH4RP-02S	0°	3.0	0.2			1.6	●	
	5416227	PD1 KH4RP-04S-012		4.0				●		
	5309778	PD1 KH4RP-04B	0°	6.0	0.4			2.1	●	
	5371976	PD1 KH4RP-04B-002						—	●	
	5386461	PD1 ZT8489R						5.0	●	
	5332614	PD1 KH4REW02 Wiper insert	15°	2.0	0.2			0°	5.0	●

Note) The depth of cut should be limited to a maximum of 2/3 the length of the cutting edge.

● : Stocked item

HSC body accessories

Part No. (Product name)	Cartridge Sales quantity 1pc/case	Wedge Sales quantity 1pc/case	Thrust pad Sales quantity 1pc/case	Axial setscrew Sales quantity 10pcs/case	Cartridge setscrew Sales quantity 10pcs/case	Wedge setscrew Sales quantity 10pcs/case	Camping bolt Sales quantity 1pc/case		
							For internal lubrication		Qty
1D-HSC-MK08006R.J	P/N	P/N	P/N	P/N	P/N	P/N	5331319	FAS 080 27A	1pc
1D-HSC-MK10006R.J	MKH 1NR 02	MKL 1R 01	AU 32 13R	ST 5R 01B	BS 6R 01	BS 5R 02	5331327	FAS 100 32A	1pc
1D-HSC-MK10008R.J	5324058	5331301	5331301	5218219	5218201	5218235	5331293	FAS 100 32A	1pc
1D-HSC-MK12508R.J							5331293	FAS 125 40A	1pc
1D-HSC-MK12510R.J							5331293	FAS 125 40A	1pc
1D-HSC-MK16010R.J							5331285	FAS 160 50A	1pc
1D-HSC-MK16012R.J							5331285	FAS 160 50A	1pc
1D-HSC-MK20012R.J							5615315	71. 857E-2	4 pcs (commercially available)
1D-HSC-MK20016R.J							5328323	71. 857E-2	4 pcs (commercially available)
1D-HSC-MK25016R.J							Sales quantity 1pc/case	71. 857E-2	4 pcs (commercially available)
1D-HSC-MK25020R.J							Sales quantity 4pcs/case	71. 857E-2	4 pcs (commercially available)

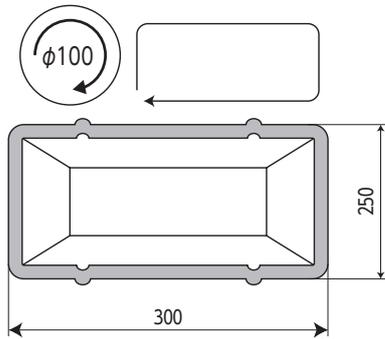
Cutters for machining of aluminum components

Actual examples of machining with HSC

Machining of oil pan

- Work material : ADC12
- Surface finish required : Max. 12.5S
- Machine : Vertical type machining center

	Initial use of HSC	NTK
Insert material grade	ZT8076R-E1	PD1
Cutter specification	φ100×8 blades	←
Cutting speed (m/min)	4,712	←
No. of revolution (min ⁻¹)	15,000	←
Feed rate per blade (mm/t)	0.0583	←
Table feed rate (mm/min)	7,000	←
Depth of cut (mm)	1.5-4.0(down gate)	←
Cutting oil	Internally supplied	←
Surface roughness	4S	←
Life (pcs/corner)	6,600	34,000

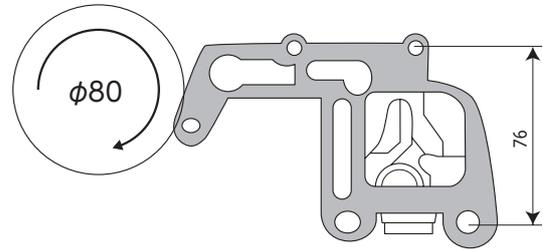


As the machining allowance for roughing was large, chipping was caused to the inserts. By taking measures to strengthen the insert edge, the tool life became approximately 5 times longer.

Machining of water passage

- Work material : Equivalent to ADC12
- Surface finish required : Max. 12.5S
- Surface levelness : Max. 0.08

	Existing tool	NTK
Insert material grade	Competitor's carbide	PD1
Cutter specification	φ80×5 blades	φ80×6 blades
Cutting speed (m/min)	1,633	2,512
No. of revolution (min ⁻¹)	6,500	10,000
Feed rate per blade (mm/t)	0.028~0.07	0.032~0.08
Table feed rate (mm/min)	910~2,275	1,920~4,800
Depth of cut (mm)	0.5	←
Cutting oil	Externally supplied	Internally supplied
Surface roughness	6.3S	3.8S
Surface levelness (mm)	0.01or less	0.001or less
Total cycle time (sec)	86	82
Life (pcs/corner)	Approx. 1 month	←

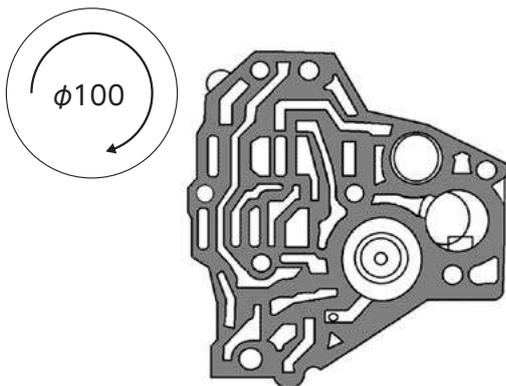


The replacement interval for both tools is once a month. However, the machining efficiency of the NTK's HSC was approximately 2.1 times higher, making the tool life double.

Machining of automatic transmission components

- Work material : ADC12

	Existing tool	NTK
Insert material grade	Competitor's PCD	PD1
Cutter specification	φ100×6 blades	φ100×8 blades
Cutting speed (m/min)	2,513	←
No. of revolutions (min ⁻¹)	8,000	←
Feed rate per blade (mm/t)	0.05	←
Table feed rate (mm/min)	2,400	3,200
Depth of cut (mm)	0.2	←
Cutting oil	WET	←
Life (pcs/corner)	2,000	10,000

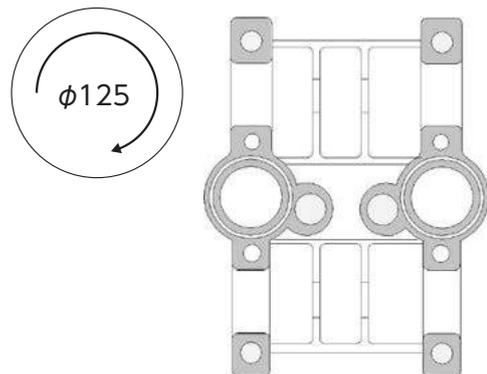


Uneven faces on the machined work pieces were few and the tool life was improved greatly.

Machining of cam holder

- Work material : ADC12
- Machine : Machining center(BT30)

	Existing tool	NTK
Insert material grade	Newly established line	PD1
Cutter specification		φ125×10blades
Cutting speed (m/min)		1,570
No. of revolutions (min ⁻¹)		4,000
Feed rate per blade (mm/t)		0.07
Table feed rate (mm/min)		2,800
Depth of cut (mm)		1.0
Cutting oil		WET
Life (pcs/corner)		24,000



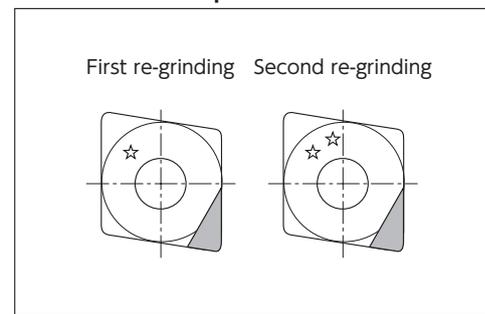
The operation single-pass by HSC with φ125.

● Re-grinding inserts dedicated for HSC

- For the first re-grinding operation, grind both the end-cutting edge and side cutting edge by 0.2 mm and assign a mark designating the first regrind.
- For the second re-grinding operation, further grind by 0.2 mm (a total of 0.4 mm from the initial product) and assign a mark designating the second regrind.
- Only equip cutters wholly with inserts with the same number of regrinds.
- In order to prevent problems such as deterioration of brazing strength and interference with the flank, limit the total amount of re-grinding to 0.4 mm for both the end cutting edge and side cutting edge.
- Before re-grinding inserts, please contact NTK for safety precautions.

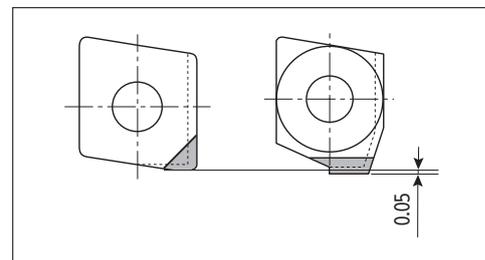
Note) When using re-ground inserts, pay careful attention to reduction in the diameter of the cutter and to the correction of axial dimensions.

<Sample marks>



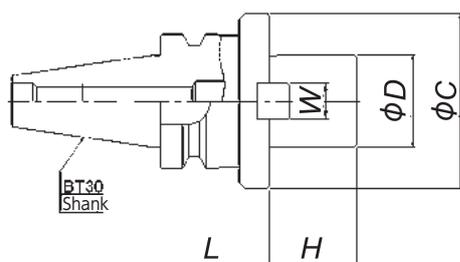
● Method of combining inserts for the HSC

When mounting a finishing wiper insert to a cutter, set the position of its cutting edge around +0.05 mm lower than the other inserts.



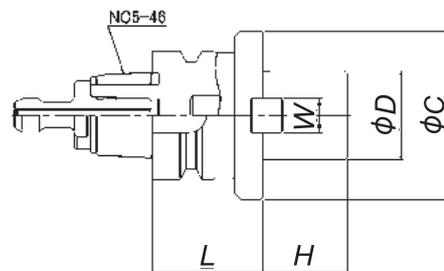
Arbors

BT30type



※ Internal coolant supply available

NC5type



※ Internal coolant supply available

Code No.	Part No.	Stock	ϕD (mm)	L (mm)	H (mm)	ϕC (mm)	W (mm)	Weight (kg)	Clamping bolt (optional)
5649199	BT30-FMNC22-32	●	22	32	18	46	10.4	0.6	SALS-063
5612502	BT30-FMNA25.4-40	●	25.4	40	22	50	9.5	0.7	RTS-M12
5612510	BT30-FMNA31.75-39	●	31.75	39	30	60	12.7	0.8	RTS-M16
5649207	NC5-46-FMNC22-32F	●	22	32	18	46	10.4	0.6	SALS-063
5612528	NC5-46-FMNA25.4-40F	●	25.4	40	22	50	9.5	0.7	RTS-M12
5612536	NC5-46-FMNA31.75-39F	●	31.75	39	30	60	12.7	0.8	RTS-M16

For BT30 type, use pull-stud bolts suitable for the machine.
For NC5 type, pull-stud bolts for FUNAC are supplied as standard.

● : Standard stock

Super low cutting force milling cutter

Features

FU-HA MILL

Stable gray cast iron milling with lower cutting force !

- Maximizes ceramic insert potential and can mill faster than 1,000m/min !



A.R. 5°
R.R. 4°, 7°, 10°



→ P20

HCC High-Speed Ceramic Milling Cutters

Primary use is with ceramic grade inserts in mind, the HCC can enhance the advantageous properties of ceramic grade inserts through high-speed machining. The series can lead to a much reduced cycle time and highly stable operation. We offer a range of 5 series, JXTM, JFDX, JSDW, JQTE/JATS, and JR.

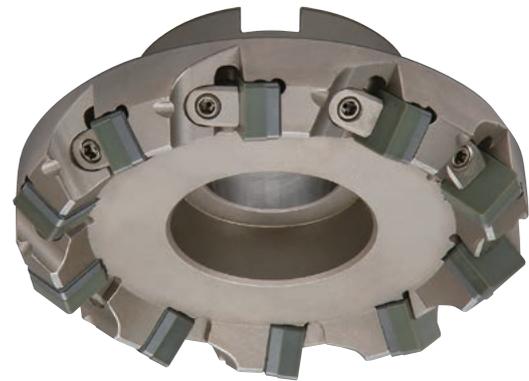
Features

JFDX Series

- Extremely economical as SNGN1204 style inserts with 8 cutting edges can be used !
- Capable of producing excellent surface finish, by utilising inserts with a chipbreakers and wiper facets !



A.R.-6°
R.R.-10°



→ P22

JSDW Series

- Reduces cutting force greatly with positive rake SDCW inserts !
- Can also use cermet grade inserts !



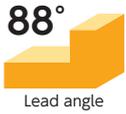
A.R.+12°
R.R.0°



→ P24

JXTM Series

- Offers high efficiency machining due to the multi-blade design and possibility for greater depth of cut !
- Offers a reduction in cutting force via our special chipbreaker design !



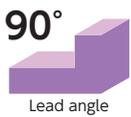
A.R.-4°
R.R.0°



→ P25

JQTE/JQTS Series

- Ceramic milling cutter capable of shoulder milling now released !
- Accommodates from $\phi 20$ up to $\phi 63$ cutters !



→ P26



→ P26

JR Series

- The cutters exclusively for use with round insert shapes ideal for heavy duty cutting !



→ P29



→ P28



→ P28

New Products
Tool Materials / Selection Guide
PCD, CBN and ceramic
Cermet / PVD-coated Cermet
Micro-grain Carbide, Carbide
Insert Stock List
Outside Machining Toolholders
SS
Grooving Tools
Threading Tools
Shaper
Internal Machining tool range
Original Tools for Various Applications
Indexable End Milling Tools
Indexable Drill Inserts
Milling Cutters
Technical Data
Index

FU-HA MILL

Features

● **Stable gray cast iron milling with lower cutting force**



● **Maximizes ceramic insert potential and can mill faster than 1,000m/min**

Thanks to lower cutting forces, work piece chipping is reduced
Apply up to A_p 6mm

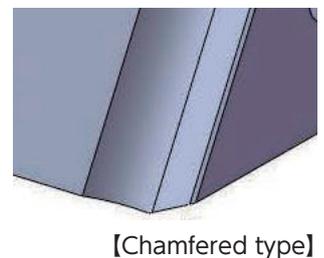
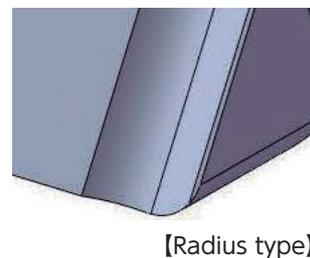
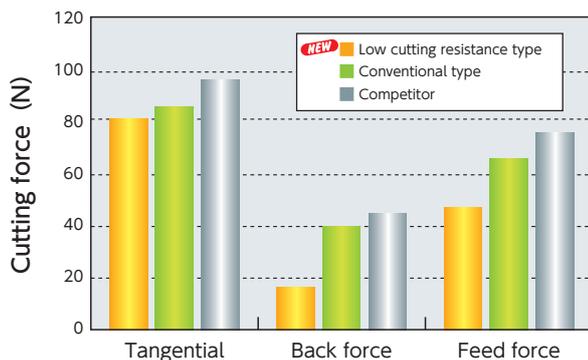
Silicon Nitride grade is the best choice for roughing cast iron with scale. Tool pressure is reduced because of the sharper cutting edge and the ground-in chipbreaker



Available cutter dia. $\phi 63 - \phi 160$

Very cost efficient with a unique 6 cutting edge design

Thanks to low-cutting resistance, over machine load is avoided



Two edge preparation are available.
Radius type is good for high feed milling.
Chamfered type is with excellent edge sharpness.

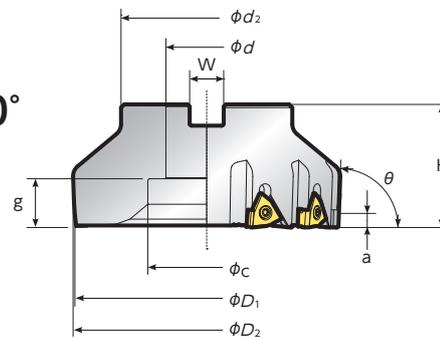
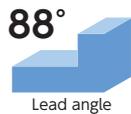
Cycle time reduction with single pass and achieve longer tool life.
Lesser machine horsepower required.

Cutting condition

$v_c=800\text{m/min}$ $f_z=0.10\text{mm/t}$ $a_p=3.0\text{mm}$ $a_e=80.0\text{mm}$



A. R. +5°
R. R. +4°, +7°, +10°



JWNXM type milling body

θ	Code No.	Part number	Stock	No of inserts	Dimensions (mm)										Weight (kg)	Rake angle (°)		Centering location type	
					φD ₁	φD ₂	H	a※1	a※2	φd ₁	W	φd ₂	φc	g		A.R.	R.R.		
88°	5851415	JWNXM063C2200R06	●	6	63	63	50	5.5	4.5	22	10.4	60	18	15.5	0.9	+5	+4	FMC	
	5851423	080A2540R08	●	8	80	80				25.4	9.5		36	15			1.1		+7
	5851431	100A3175R10	●	10	100	100				31.75	12.7		50	18			1.8		+10
	5851449	125A3810R12	●	12	125	125				38.1	15.9		55	23			3		
	5851456	160A5080R16	●	16	160	160				50.8	19.0		72	22			4.9		

※1 Dimension when set the insert [WNX44-C10T01020]
※2 Dimension when set the insert [WNX44-R12T01020]

Parts	
<p>Clamping Screw FSI 26-4.0×12-LH 5861935 Sales quantity 10pcs/case</p>	<p>Wrench LLR-T15 5701909 Sales quantity 5pcs/case</p>

Insert

Shape	Dimensions (mm)	Part number	C or r _ε	Grade	
		WNX44-C10T01020	C1.0	SX6	●
				SP9	●
		WNX44-R12T01020	R1.2	SX6	●
				SP9	●

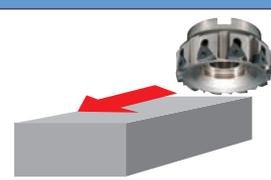
● : New standard stock items

Recommended cutting conditions

Grade	Work material	Cutting speed (m/min)											Feed (mm/t)					Depth of cut (mm)
		400	500	600	700	800	900	1000	1100	1200	1300	1400	0.05	0.1	0.15	0.2	0.25	
SX6	Gray cast iron																	~ 6 (mm)
SP9	Ductile cast iron																	

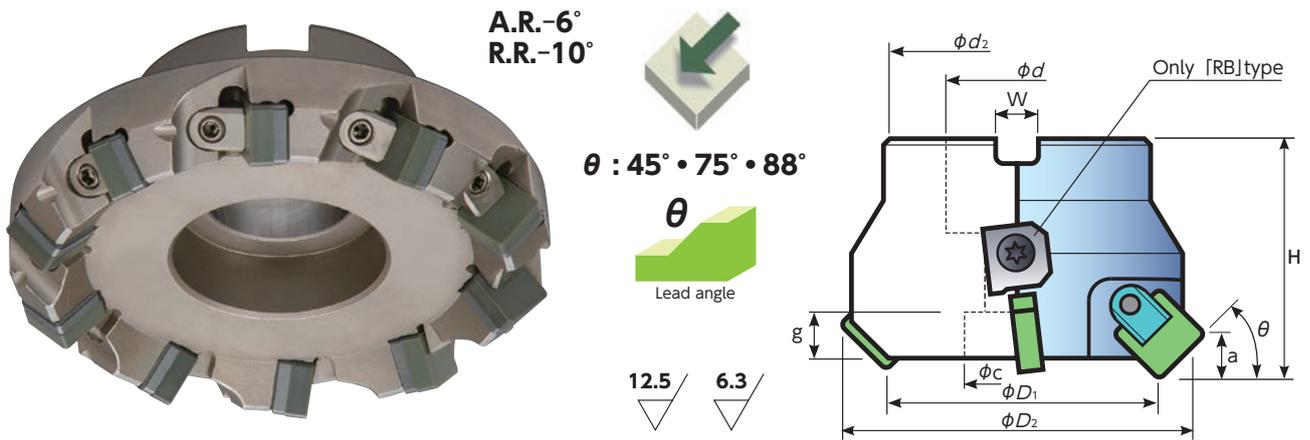
Case study

Transmission case			●Work material : FC230		
	current tool		NTK		
Holder	Competitor		JWNXM125A3810R12		
Insert	Ceramic insert		SX6 WNX44-R12T01020		
Cutting speed	(m/min)	500	←		
Feed per tooth	(mm/t)	0.13	←		
Depth of cut	(mm)	1	←		
Coolant		DRY	←		
Tool life	(pcs/coner)	60	120		



As for competitor's milling cutter, we needed to change inserts to new ones due to the wear progress and lower clamping force of work material after machining 60 pcs. This was caused by increasing cutting force. NTK NEW Milling cutter "FU-HA MILL" achieved 2 times longer competitor's. Low cutting force avoided the problem occurred by competitor's milling cutter.

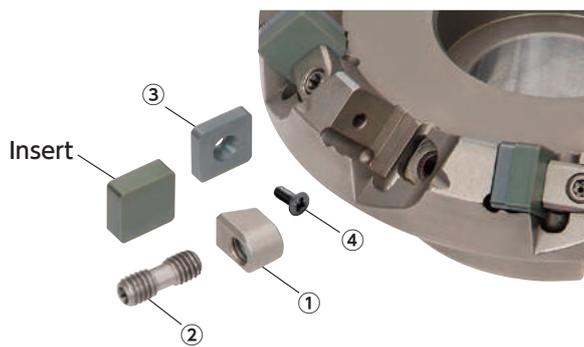
JFDX Series



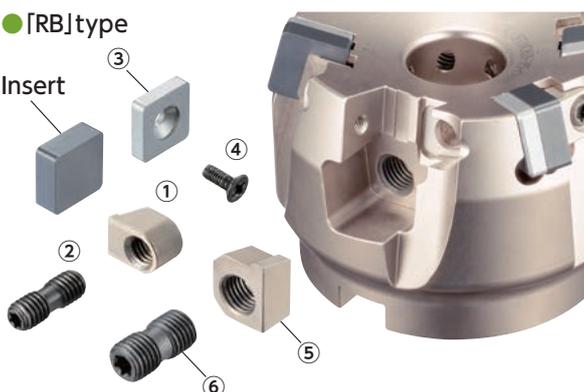
JFDX body

θ	Code No.	Part No.	Stock	N.O.B	Dimensions (mm)									Weight (kg)
					ϕD_1	ϕD_2	H	a	ϕd	W	ϕd_2	ϕc	g	
45°	5727458	JFDX063-45-06R	●	6	63	72	50	8	22	10.4	58	18	10.5	0.93
	5727441	JFDX080-45-08R	●	8	80	95	50	8	25.4	9.5	62	36	10.5	1.21
	5727433	JFDX100-45-10R	●	10	100	120	50	8	31.75	12.7	62	45	8.5	1.66
	5727425	JFDX125-45-12R	●	12	125	146	58	8	38.1	15.9	83	55	13.5	2.80
75°	5729884	JFDX063-75-06R	●	6	63	70	50	12	22	10.4	58	18	18.5	0.79
	5909767	JFDX063-75-06RB	●	6	63	70	50	12	22	10.4	58	18	18.5	0.97
	5729892	JFDX080-75-08R	●	8	80	87	50	12	25.4	9.5	62	36	15.5	1.06
	5909775	JFDX080-75-08RB	●	8	80	87	50	12	25.4	9.5	62	36	15.5	1.36
	5729900	JFDX100-75-10R	●	10	100	107	50	12	31.75	12.7	62	45	16.5	1.39
	5909791	JFDX100-75-10RB	●	10	100	107	50	12	31.75	12.7	62	45	16.5	1.83
	5729918	JFDX125-75-12R	●	12	125	132	58	12	38.1	15.9	83	55	21.5	2.56
	5909809	JFDX125-75-12RB	●	12	125	132	58	12	38.1	15.9	83	55	21.5	3.34
88°	5766894	JFDX160-75-16R	●	16	160	166	60	12	50.8	19	100	72	20.5	4.1
	5909817	JFDX160-75-16RB	●	16	160	166	60	12	50.8	19	100	72	20.5	5.47
	5729926	JFDX063-88-06R	●	6	63	64	50	12	22	10.4	58	18	13	0.79
	5729934	JFDX080-88-08R	●	8	80	81	50	12	25.4	9.5	62	36	13.5	1.03
88°	5729942	JFDX100-88-10R	●	10	100	101	50	12	31.75	12.7	62	45	16.5	1.38
	5729959	JFDX125-88-12R	●	12	125	126	58	12	38.1	15.9	83	55	21.5	2.61
	5766498	JFDX160-88-16R	●	16	160	156	60	12	50.8	19	100	72	20.5	4.1

※[RB] type has only 1 height adjustable pocket.



Parts				
① Clamp HLW175 5768536 Sales quantity 1pc/case	② Clamping screw T15 WS0616-T15 5779483 Sales quantity 10pcs/case	③ Shim seat ASN423 5060827 Sales quantity 10pcs/case	④ Shim screw M3×8 5225453 Sales quantity 10pcs/case	Wrench T15 T-15A 5757588 Sales quantity 5pcs/case



Parts		
⑤ Wedge HLW177 5795638 Sales quantity 1pc/case	⑥ Double screw WS0816-T25 5798004 Sales quantity 10pcs/case	Wrench T25 LLR-T25 5662143 Sales quantity 5pcs/case

Applicable inserts

Shape	Dimensions	Part No.	Material grade
		Standard product SNGN 120412 T02020	SX6 ●
			SP9 ●
		With chipbreaker SNGF 120412 TRC-C	SX6 ●
			SP9 ●

Ceramic wiper inserts

※When using ceramic wiper inserts, please put all the same inserts in all pockets on a cutter.

SNGN 1204 ANTW	SNGN 1204 ENT01025	SNEN 1204 ZNT01025	Material grade
<p>For $\theta = 45^\circ$</p>	<p>For $\theta = 75^\circ$</p>	<p>For $\theta = 88^\circ$</p>	SX6 ● SP9 ●

● : Standard stock

CBN wiper inserts

※※ Use 1 or 2 inserts on a cutter.

FDX 1204-45-50R	FDX 1204-75-50R	FDX 1204-88-50R	Material grade
<p>For $\theta = 45^\circ$</p>	<p>For $\theta = 75^\circ$</p>	<p>For $\theta = 88^\circ$</p>	B30 ● B52 ●

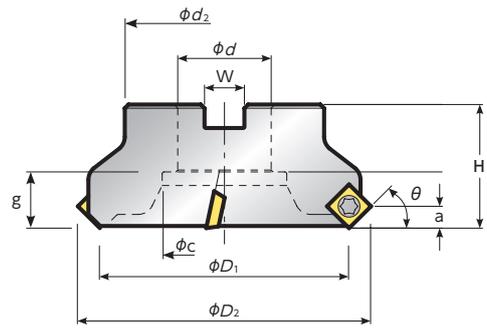
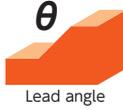
Recommended cutting conditions																	
Insert material grade	Work material	Cutting speed (m/min)								Feed rate (mm/tooth)			Depth of cut (mm)				
		400	500	600	700	800	900	1000	1100	0.05	0.1	0.15		0.2	0.25	0.3	
SX6	Normal cast iron																~ 6 (mm)
SP9	Ductile cast iron																

JSDW Series



A.R.12°
R.R.0°

$\theta : 45^\circ \cdot 75^\circ$



JSDW body

θ	Code No.	Part No.	Stock	N.O.B	Dimensions (mm)									Weight (kg)
					ϕD_1	ϕD_2	H	a	ϕd	W	ϕd_2	ϕc	g	
45°	5729967	JSDW080-45-06R	●	6	80	95.0	50	6.6	25.4	9.5	62	36	18	1.10
	5729975	JSDW100-45-07R	●	7	100	120.4	50	6.6	31.75	12.7	58	45	16	1.39
	5729983	JSDW125-45-08R	●	8	125	145.8	58	6.6	38.1	15.9	79	55	21	2.55
75°	5729991	JSDW063-75-04R	●	4	63	70.6	50	9.1	22	10.4	58	18	14	0.82
	5730007	JSDW080-75-05R	●	5	80	83.3	50	9.1	25.4	9.5	62	36	15.5	1.04
	5730015	JSDW100-75-06R	●	6	100	108.7	50	9.1	31.75	12.7	58	45	16.5	1.33
	5730106	JSDW125-75-07R	●	7	125	134.1	58	9.1	38.1	15.9	79	55	21.5	2.54
	5784152	JSDW160-75-10R	●	10	160	165	68	9.1	50.8	19	100	72	28.5	4.0

Parts	
Clamping screw	Wrench
FSI21-5.0 * 12.45 5768084 Sales quantity 10pcs/case	T-20 5286984 Sales quantity 10pcs/case

CBN wiper inserts

SDW1204-45-50R	SDW1204-75-50R	Material grade
		B30 ●
		B52 ●

Applicable inserts

Shape	Part No.	Dimensions (mm)						SX6	SP9	C7X (Cermet)	DM4 (微粒子超硬)
		IC	T	R	D	$m(\theta=45^\circ)$	$m(\theta=75^\circ)$				
	Fig.-1 SDCW120408T01020	12.7	4.76	0.8	5.5	2.301	1.249	●	●		
	SDCW120408TNCE-Z	12.7	4.76	0.8	5.5	2.301	1.249			●	
Fig.-2	SDCW1204AET01020	12.7	4.76	—	5.5	1.430		●	●		
	SDCW43AETNCEE02	12.7	4.76	—	5.5	1.430				●	●
Fig.-3	SDCW1204EETR	12.7	4.76	—	5.5	0.921	0.921	●	●	●	●

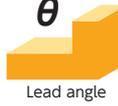
● : Standard stock

Insert material grade	Work material	Recommended cutting conditions												Depth of cut (mm)					
		Cutting speed (m/min)						Feed rate (mm/tooth)											
K · P		100	200	300	400	500	600	700	800	1000	1200	1400	0.05	0.1	0.15	0.2	0.25	0.3	
SX6	Normal cast iron																		
SP9	Ductile cast iron																		
DM4	Steel																		

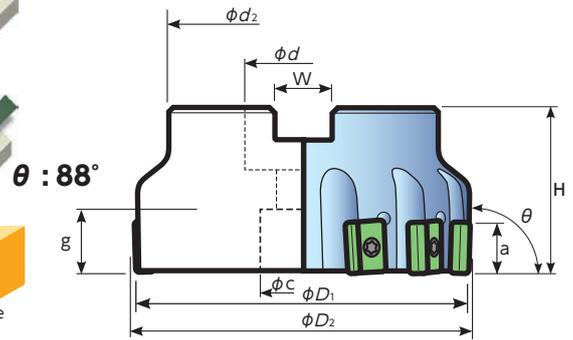
JXTM Series



A.R.-4°
R.R.0°



Lead angle
12.5



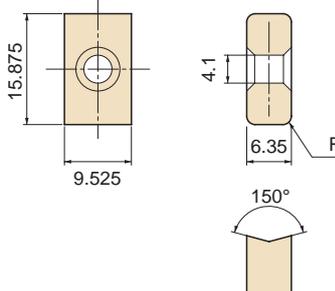
JXTM body

θ	Code No.	Part No.	Stock	N.O.B	Dimensions (mm)									Weight (kg)
					ϕD_1	ϕD_2	H	a	ϕd	W	ϕd_2	ϕc	g	
88°	5729652	JXTM080-88-10R	●	10	80	83	50	14	25.4	9.5	58	36	14	1.1
	5729660	JXTM100-88-13R	●	13	100	103	50	14	31.75	12.7	77	50	17	1.8
	5729678	JXTM125-88-16R	●	16	125	128	58	14	38.1	15.9	77	55	22	3.1

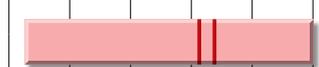
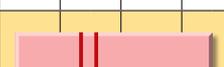
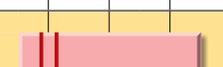
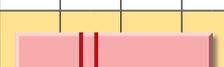
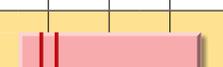
Parts	
Clamping screw 	Wrench 
LRIS-4 * 12 5684105 Sales quantity 10pcs/case	LLR-25S 5364930 Sales quantity 10pcs/case

Screwdrivers (optional)		
Replacement bit 	Handle with magnet 	Handle & replacement bit 
HLR-25S 5485214 Sales quantity 1pc/case	XX2815-04 5485172 Sales quantity 1pc/case	XX2815-04-25S 5485255 Sales quantity 1pc/case

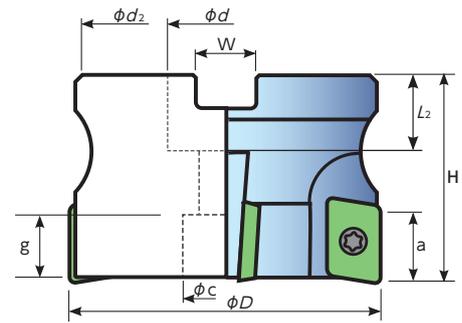
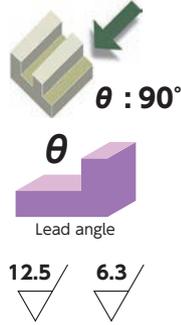
Applicable inserts

Shape	Dimensions	Part No.	R	Material grade
		LNX 324-08T01020	0.8	SX6 ●
				SP9 ●
		LNX 324-12T01020	1.2	SX6 ●
				SP9 ●
		LNX 324-16T01020	1.6	SX6 ●
				SP9 ●

● : Standard stock

Recommended cutting conditions													
Insert material grade	Work material	Cutting speed (m/min)						Feed rate (mm/tooth)					Depth of cut (mm)
		400	500	600	700	800	900	1000	1100	0.05	0.1	0.15	
SX6	Normal cast iron												~ 8 (mm)
													
SP9	Ductile cast iron												

JQTS Series (shell type)



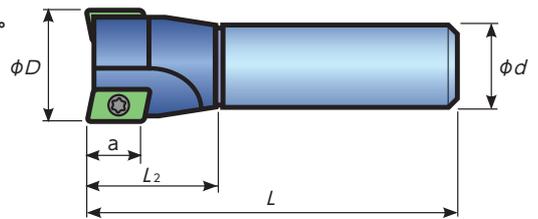
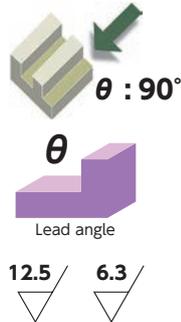
JQTS body

θ	Code No.	Part No.	Stock	N.O.B	Dimensions (mm)									Weight (kg)	A.R.	R.R.
					ϕD	H	L_2	a	ϕd	W	ϕd_2	ϕc	g			
90°	5730155	JQTS040-90-4R	●	4	40	40	18	14	16	8.4	35	12	4.2	0.2	+6°	-13°
	5730189	JQTS050-90-5R	●	5	50	40	22	14	22	10.4	45	18	10.7	0.32	+6°	-13°
	5730197	JQTS063-90-6R	●	6	63	50	22	14	22	10.4	58	18	14.5	1.40	+6°	-12°
	5765573	JQTS080-90-8R	●	8	80	50	25	14	25.4	9.5	58	36	17	1.9	+6°	-12°

Parts	
Clamping screw  T15 FSI22-4.0*11 5768163 Sales quantity 10pcs/case	Wrench  T15 T-15A 5757588 Sales quantity 10pcs/case

Parts	
Clamping screw  T15 For 20&25: FSI23-4.0*7 For 32&40: FSI22-4.0*11 Sales quantity 10pcs/case	Wrench  T15 T-15A 5757588 Sales quantity 10pcs/case

JQTE Series (shank type)



JQTE body

θ	Code No.	Part No.	Stock	N.O.B	Dimensions (mm)					Weight (kg)	A.R.	R.R.
					ϕD	L	L_2	a	ϕd			
90°	5730114	JQTE020-90-1R	●	1	20	100	30	14	20	0.22	+3°	-8°
	5730122	JQTE025-90-2R	●	2	25	100	30	14	25	0.32	+6°	-13°
	5730130	JQTE032-90-3R	●	3	32	110	35	14	32	0.53	+6°	-13°
	5730148	JQTE040-90-4R	●	4	40	110	37	14	32	0.64	+6°	-13°

Recommended cutting conditions														
Insert material grade	Work material	Cutting speed (m/min)								Feed rate (mm/tooth)				Depth of cut (mm)
		400	500	600	700	800	900	1000	1100	0.05	0.1	0.15	0.2	
SX6	Normal cast iron	[Bar chart showing cutting speed range for SX6 on Normal cast iron]								[Bar chart showing feed rate range for SX6 on Normal cast iron]				~ 8 (mm)
		[Bar chart showing cutting speed range for SP9 on Ductile cast iron]								[Bar chart showing feed rate range for SP9 on Ductile cast iron]				
SP9	Ductile cast iron	[Bar chart showing cutting speed range for SP9 on Ductile cast iron]								[Bar chart showing feed rate range for SP9 on Ductile cast iron]				

Applicable inserts

Shape	Dimensions	Part No.	R	m	Material grade
		APCW 160408 T01020	0.8	7.314	SX6 ● SP9 ●
		APCW 160412 T01020	1.2	7.278	SX6 ● SP9 ●
		APCW 160420 T01020	2.0	7.205	SX6 ● SP9 ●
		<div style="background-color: #800080; color: white; padding: 5px; display: inline-block;">Wiper</div> APCW 1604 PDTR	—	7.163	SX6 ● SP9 ●

● : Standard stock

CBN wiper inserts

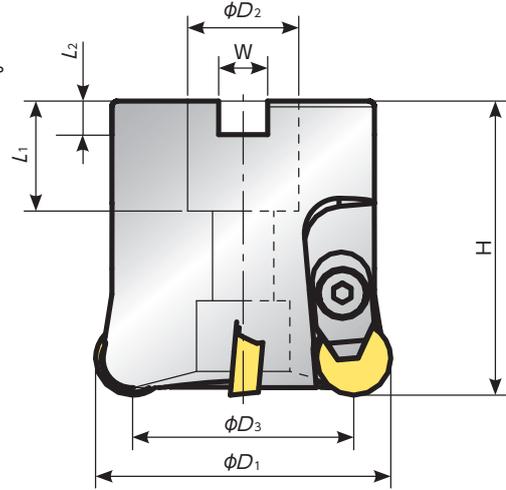
Dimensions	Part No.	Material grade
	APCW 1604 PDSRCE	B30 ● B52 ●

JR Series

JRPMW



A.R. +5°
R.R. -2° 30' ~ -5°



Shell type (for positive inserts) body

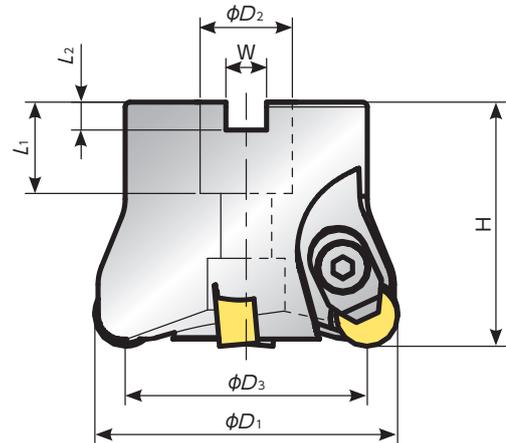
Code No.	Cutter P/N	Stock	N.O.B	ϕD_1	ϕD_3	Dimensions (mm)					Shim seat	Shim screw	Clamp	Clamping screw	Applicable insert	A.R.	R.R.	Weight (kg)
						H	ϕD_2	W	L_1	L_2								
5719935	JRPMW050S220R04	●	4	50	37.3	50	22	10.4	20	6.3	ARP42A	M3*8	AMS-5T	AOB-5S-T25	RPGN 1204	+5°	+5°	0.35
5726096	JRPMW063S220R04	●	4	63	50.3	50	22	10.4	20	6.3	5660659 Sales quantity 10pcs/case	5225453 Sales quantity 10pcs/case	5060132 Sales quantity 1pc/case	5660667 Sales quantity 10pcs/case		+5°	+5°	0.55
5719943	JRPMW080S254R05	●	5	80	67.3	50	25.4	9.5	25	6.0						+5°	+2° 30'	0.87

● : Standard stock

JRNMW



A.R. -5°
R.R. -10°



Shell type (for negative inserts) body

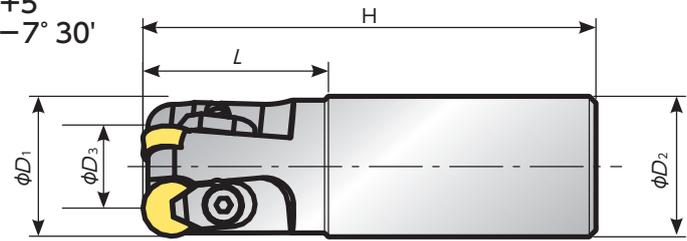
Code No.	Cutter P/N	Stock	N.O.B	ϕD_1	ϕD_3	Dimensions (mm)					Clamp	Clamping screw	Applicable insert	Weight (kg)
						H	ϕD_2	W	L_1	L_2				
5719950	JRNMW050S220R03	●	3	50	37.3	50	22	10.4	20	6.3	AMS-6T 5060116 Sales quantity 1pc/case	AOB-6S-T30 5660683 Sales quantity 10pcs/case	RNGN 1207	0.42
5719968	JRNMW063S220R04	●	4	63	50.3									0.55
5719976	JRNMW080S254R05	●	5	80	67.3									25.4

● : Standard stock

JRPMW



A.R.+5°
R.R.-7° 30'



Shell type (for positive inserts) body

Code No.	Cutter P/N	Stock	N.O.B	ϕD_1	ϕD_2	ϕD_3	H	L_2	Clamp	Clamping screw	Applicable insert	Weight (kg)
5720719	JRPMW032E250R03	●	3	32	25	19.3	120	40	AMS-5T 5060132 Sales quantity 1pc/case	AOB-5S-T25 5660667 Sales quantity 10pcs/case	RPGN1204	0.42
5719919	JRPMW032E320R03	●		32	32	19.3						0.60
5719927	JRPMW040E320R03	●		40	32	27.3						0.72

● : Standard stock

Applicable inserts

Shape	NTK Part No.		Inscribed circle (mm)	Thickness (mm)	Nose radius (mm)	Material grade		
	P/N for metric type	Cutting edge process				SX7	SX9	WA1
	RNGN 120700	E002*	12.7	7.94	—		●	
		E004				●		
		T00520					●	●
		T00820				●		
		T01020						●
	RPGN 120400	E004	12.7	4.76	—	●		
		EX0004*					●	
		T00520						●
		T00820				●		
		T01020					●	●

※E002 • EX0004 : Round honing

● : Standard stock

Recommended cutting conditions													
Insert material grade	Work material	Cutting speed (m/min)						Feed rate (mm/tooth)					Depth of cut (mm)
		400	600	800	1000	1200	1400	0.05	0.08	0.10	0.12	0.15	
SX7/SX9	Heat-resistant alloy												~ 4 (mm)
WA1													

New Products
Tool Materials / Selection Guide
PCD, CBN and ceramic
Cermets
Micro-grain Carbide, Carbide
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Outside Machining Toolholders
SS
Grooving Tools
Threading Tools
Shaper
Internal Machining tool range
Original Tools for Various Applications
Indexable End Milling Tools
Indexable Drill Inserts
Milling Cutters
Technical Data
Index

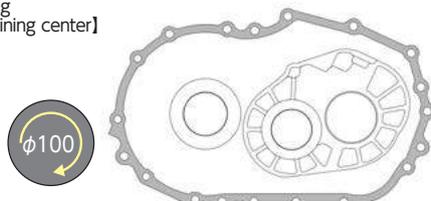
Cutters for machining of cast iron and heat-resistant alloy components

New Products
Tool Materials / Selection Guide
PCD, CBN and ceramic
Cermet, PVD-coated Carbide
Micro-grain Carbide, Carbide
Insert Stock List
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Machining of transmission case ●Work material : FCA250

	Existing tool	NTK
Holder	Competitor's cutter (φ100×6blades)	JFDX100-88-10R
Insert	Competitor's carbide grade (Triangle, positive)	SX6 SNGN1204012T02020
Cutting speed (m/min)	200	1000
No. of revolutions (min ⁻¹)	637	3185
Feed rate per blade (mm/t)	0.17	0.05
Feed rate (mm/min)	650	1593
Depth of cut (mm)	0.5	←
Cutting oil	Residual WET	←
Life (pcs/corner)	35	110
Machining time (min)	1.9	0.8

Tooling [Machining center]

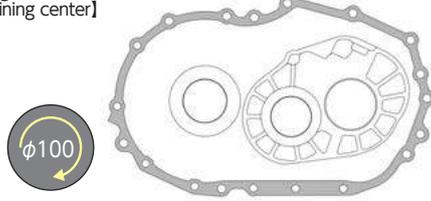


High-speed machining with the HCC reduced the cycle time significantly compared with the competitor's carbide tooling, enabling the tool life to be three times longer.

Machining of transmission case cover ●Work material : FC250

	Existing tool	NTK
Holder	Competitor's cutter (φ100×6blades)	JFDX100-88-10R
Insert	Competitor's carbide grade (Triangle, positive)	SX6 SNGN1204012T02020
Cutting speed (m/min)	120	600
No. of revolutions (min ⁻¹)	382	1910
Feed rate per blade (mm/t)	0.1	0.05
Feed rate (mm/min)	229	955
Depth of cut (mm)	3	←
Cutting oil	DRY	←
Machining time (min)	5.4	1.3

Tooling [Machining center]

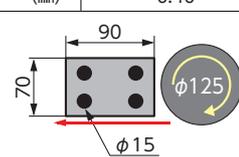


High-speed machining with the HCC reduced the cycle time significantly compared with the competitor's carbide tool.

Machining of unit ●Work material : FC270

	Existing tool	NTK
Holder	Competitor's cutter (φ125×8blades)	JFDX125-45-12R
Insert	Competitor's carbide grade (Square, positive)	SX6 SNGN1204012T02020
Cutting speed (m/min)	137	800
No. of revolutions (min ⁻¹)	350	2038
Feed rate per blade (mm/t)	0.20	0.057
Feed rate (mm/min)	560	1400
Depth of cut (mm)	1.5 × 3PASS	←
Cutting oil	WET	DRY
Life (pcs/corner)	264	360
Machining time (min)	0.40	0.15

Tooling [Machining center]

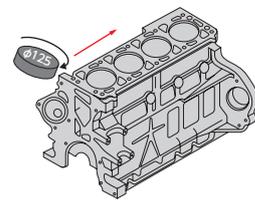


High-speed machining with the HCC reduced the cycle time significantly when compared with the competitor's carbide tool. (By single pass machining piece time was reduced from 0.40 to 0.15 min.) With the tool life 1.4 times longer and the increased number of cutting edges on the negative inserts, the total cost also will be reduced.

Machining of cylinder block ●Work material : FC250

	Existing tool	NTK
Holder	Competitor's cutter (φ125×12blades)	JFDX125-45-12R
Insert	Competitor's solid CBN	SX6 SNGN120412T02020
Cutting speed (m/min)	703	←
No. of revolutions (min ⁻¹)	1400	←
Feed rate per blade (mm/t)	0.1	←
Feed rate (mm/min)	2464	←
Depth of cut (mm)	2 + 2 + 1 (cutting 3 times)	←
Cutting oil	Residual WET	←
Life (pcs/corner)	50	60

Tooling [Machining center]

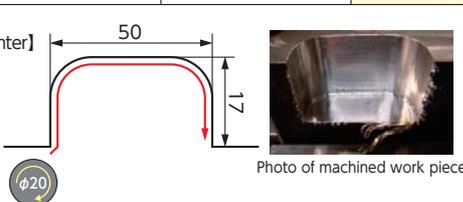


The combined use of the HCC and the ceramic grade SX6 prolonged the tool life by 20% compared with the competitor's carbide tool. By changing the insert material grade from CBN to ceramic, a significant cost reduction resulted.

Machining of test piece ●Work material : Inconel 718

	Existing tool	NTK
Holder	—	JQTE025-90-2R
Insert	—	SX9 APCW160420E004
Cutting speed (m/min)	—	800
No. of revolutions (min ⁻¹)	—	10191
Feed rate per blade (mm/t)	—	0.08
Feed rate (mm/min)	—	1630
Depth of cut (mm)	—	1 × 30PASS
Cutting oil	—	DRY
Life (pcs/corner)	—	—
Machining time (sec)	—	65

Tooling [Machining center]

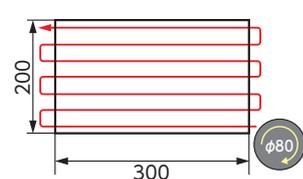


The high-speed machining with the HCC reduced the machining time significantly compared with the carbide tools. (An estimated machining time with a carbide tool is approx. 6 minutes per unit area, assuming that [Vc = 30 m/min, fz = 0.2 mm/tooth, ap = 2.0 mm, with the same number of blades].)

Machining of block ●Work material : SKD material (HRC63)

	Existing tool	NTK
Holder	Competitor's end milling cutter (φ16×4blades)	JRPMW080S254R05
Insert	—	HC4 RPGN120400Z02025
Cutting speed (m/min)	70	80
No. of revolutions (min ⁻¹)	1400	318
Feed rate per blade (mm/t)	0.16	0.3
Feed rate (mm/min)	896	477
Depth of cut (mm)	1.5	0.3
Width of cutting (mm)	0.32	24.0
Cutting oil	DRY	←
Machining time (min)	232.9	43.6

Tooling [Machining center]



The use of our HCC reduced the cycle time significantly compared with the competitor's end milling tool. (reduced to approximately 1/5) A larger cutting area enables stabilized machining operations, preventing fractures.

Machine power requirements ~ Quick Check Table ~

Calculation ※Assuming that normal cast iron is machined at a cutting speed of 800 m/min ($v_c = 800$ m/min)

$$\text{Required mechanical power(kW)} = \text{○○\%} \times \text{○○kW}$$

Width of cutting $a_e = \text{__\%}$ of the cutter diameter

The value __kW determined from the applicable table below

(Example of calculation)

Cutter used : JFDX $\phi 100$ -10 blades Width of cutting $a_e = 30\text{mm}$ → This is 30% of the cutter diameter

Cutting conditions : $v_c = 800\text{m/min}$ $f = 0.2\text{mm/tooth}$ and $a_p = 3.0\text{mm}$ → The value 40 kW in the table (JFDX $\phi 100$ x 10 blades) is located.

→ The required power (kW) = 30% × 40kW = 12kW

JFDX Series 					JSDW Series 					JXTM Series 																																																																																																	
JFDX $\phi 63$ - 6blades					JSDW $\phi 63$ - 4blades					JXTM $\phi 80$ - 10blades																																																																																																	
<table border="1"> <thead> <tr> <th colspan="2" rowspan="2"></th> <th colspan="4">Feed rate per blade (mm/t)</th> </tr> <tr> <th>0.1</th> <th>0.2</th> <th>0.3</th> <th>0.4</th> </tr> </thead> <tbody> <tr> <th rowspan="4">Depth of cut (mm)</th> <th>1</th> <td>4</td> <td>6</td> <td>7</td> <td>9</td> </tr> <tr> <th>2</th> <td>7</td> <td>11</td> <td>14</td> <td>17</td> </tr> <tr> <th>3</th> <td>11</td> <td>16</td> <td>22</td> <td>26</td> </tr> <tr> <th>4</th> <td>14</td> <td>22</td> <td>29</td> <td>35</td> </tr> </tbody> </table>							Feed rate per blade (mm/t)				0.1	0.2	0.3	0.4	Depth of cut (mm)	1	4	6	7	9	2	7	11	14	17	3	11	16	22	26	4	14	22	29	35	<table border="1"> <thead> <tr> <th colspan="2" rowspan="2"></th> <th colspan="4">Feed rate per blade (mm/t)</th> </tr> <tr> <th>0.1</th> <th>0.2</th> <th>0.3</th> <th>0.4</th> </tr> </thead> <tbody> <tr> <th rowspan="4">Depth of cut (mm)</th> <th>1</th> <td>3</td> <td>4</td> <td>6</td> <td>7</td> </tr> <tr> <th>2</th> <td>6</td> <td>9</td> <td>12</td> <td>14</td> </tr> <tr> <th>3</th> <td>9</td> <td>13</td> <td>18</td> <td>22</td> </tr> <tr> <th>4</th> <td>12</td> <td>18</td> <td>24</td> <td>29</td> </tr> </tbody> </table>							Feed rate per blade (mm/t)				0.1	0.2	0.3	0.4	Depth of cut (mm)	1	3	4	6	7	2	6	9	12	14	3	9	13	18	22	4	12	18	24	29	<table border="1"> <thead> <tr> <th colspan="2" rowspan="2"></th> <th colspan="4">Feed rate per blade (mm/t)</th> </tr> <tr> <th>0.1</th> <th>0.2</th> <th>0.3</th> <th>0.4</th> </tr> </thead> <tbody> <tr> <th rowspan="4">Depth of cut (mm)</th> <th>5</th> <td>36</td> <td>55</td> <td>76</td> <td>93</td> </tr> <tr> <th>6</th> <td>43</td> <td>66</td> <td>91</td> <td>111</td> </tr> <tr> <th>7</th> <td>50</td> <td>76</td> <td>106</td> <td>130</td> </tr> <tr> <th>8</th> <td>57</td> <td>87</td> <td>121</td> <td>148</td> </tr> </tbody> </table>							Feed rate per blade (mm/t)				0.1	0.2	0.3	0.4	Depth of cut (mm)	5	36	55	76	93	6	43	66	91	111	7	50	76	106	130	8	57	87	121	148
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Tips for utilizing the above tables

Unit : kW

- ① The assumption is that normal cast iron is machined at a cutting speed of 800 m/min ($v_c = 800$ m/min), with the cutter diameter shown as the width of cut ($a_e = 100\%$ of the cutter diameter).
- ② The required power becomes approximately half (50%) if the cutting width a_e or depth of cut a_p is halved. (The power is proportional to a_e or a_p .)
- ③ The required power is reduced to approximately 60% if the number of blades is halved.
- ④ Machines that have an output of 22 kW or greater are recommended.

※Please make use of the above tables, understanding that they are approximations as only a guide.

Arbor specification table for NTK milling cutters.

Cutters for machining of aluminum components
SFC, HPC, ALWC, HSC

Tool	Applicable standard allowing cutter installation	
	Standard for counter lock type	Counter lock diameter
SFC	φ 50	Sleeve with grip diameter of φ32
	φ 63	FMC
	φ 80	FMA
	φ 100	FMA
	φ 125	FMA
	φ 125	FMA
	φ 160	FMA
	φ 200	FMA
HPC ALWC	φ 50	FMC
	φ 63	FMC
	φ 80	FMA
	φ 80	FMC
	φ 100	FMA
	φ 100	FMC
	φ 125	FMA
	φ 125	FMC
HSC	φ 80	FMA
	φ 100	FMA
	φ 125	FMA
	φ 160	FMA
	φ 200	FMA
	φ 250	FMA

...indicates a shank-type body.

Cutters for machining of cast iron and heat-resistant alloy components
FU-HA MILL, HCC

Tool	Applicable standard allowing cutter installation	
	Standard for counter lock type	Counter lock diameter
JWNXM	φ 63	FMC
	φ 80	FMA
	φ 100	FMA
	φ 125	FMA
	φ 160	FMA
JFDX	φ 63	FMC
	φ 80	FMA
	φ 100	FMA
	φ 125	FMA
JSDW	φ 63	FMC
	φ 80	FMA
	φ 100	FMA
	φ 125	FMA
JXTM	φ 80	FMA
	φ 100	FMA
	φ 125	FMA
JQTS	φ 40	SMA-16, SM1-16
	φ 50	FMC
	φ 63	FMC
JQTE	φ 20	Sleeve with grip diameter of φ 20
	φ 25	Sleeve with grip diameter of φ 25
	φ 32	Sleeve with grip diameter of φ 32
	φ 40	Sleeve with grip diameter of φ 32
JRPWW	φ 32	Sleeve with grip diameter of φ 25
	φ 32	Sleeve with grip diameter of φ 32
	φ 40	Sleeve with grip diameter of φ 32
	φ 50	FMC
	φ 63	FMC
	φ 80	FMA

...indicates a shank-type body.

DANGER

Be sure to observe the following precautions in order to use NTK cutters safely:

For NTK cutter series in general

- If a cutter body has been inadvertently damaged, be sure to scrap or dispose of the body. If a damaged cutter body is used, it could break during rotation.
- Always observe the following to avoid a cutter and its parts from breakage and flying apart during rotation.
 - Always use the manufacturer's genuine cutter parts (screws, wedges, cartridges, etc.). Provided that these genuine parts are used, there is no need to re-balance the cutter ever after part replacement (except for thrust pads). (Even when genuine parts are used, do not mix parts of different part nos. Otherwise, an out of balance situation may result.)
 - As the HPC and HCC series cutter bodies are made of steel, it is possible to use them with a decreased number of blades, because those cutters can keep their balance under such a condition. However, before using a cutter with a decreased number of blades, always remove its parts (screws, wedges and cartridges and the likes) from the empty locations where no inserts are mounted.
 - Periodically inspect the cutter body and its parts for any deformation or wear. If deformed or worn, be sure to replace them.
 - Always use the cutter under the appropriate cutting condition. Cutters for machining aluminum components, in particular, should be used at a feed rate per blade of 0.3 mm/tooth or less ($f_z = 0.3$ mm/tooth or lower), and at a rotation speed of the maximum speed or lower as indicated on the cutter body and in the catalog.
- Always use machines having sufficient guarding against the likelihood of flying debris.
- If vibration, abnormal operating sounds or other unusual events occur during use, be sure to confirm countermeasures and safe operation.
- Use chucks and jigs strong enough for purpose.

For the NTK cutter series for machining of aluminum components

- When installing a cutter other than a HPC series, please refer to the "Table of clamping torque for installation to arbor" contained in this catalogue for the correct torque required to tighten the clamping bolt.
 - Excessive tightening may not only damage the cutter, but may damage the screws, wedges, helical inserts and/or other parts.
 - $10\text{N} \cdot \text{m} \doteq 1\text{kgf} \cdot \text{m}$
- Strictly observe the following precautions to maintain the dynamic balance of the cutter body:
 - Keep hands away from the screw holes, Loctites, and screws located on the outermost surface of the cutter body.
 - Use the manufacturer's genuine inserts.
 - Setting the cutter body without the necessary parts or inserts unbalances the body, resulting in a dangerous imbalance.
 - For HSC cutters, up to two wiper inserts may be mounted and they should be mounted symmetrically.
 - Use arbors and holders that have been adjusted for a balance grade of G2.5 or less.
 - To check for the allowable rotation speed, confirm the maximum rotation speed of the arbor with the arbor manufacture before use.
- Before mounting inserts, please refer to and follow the instructions in "Pre-setting inserts and chip prevention measures for PCD inserts" on page P13 and "Re-grinding of inserts" on page P17.
 - It is particularly important to use the specified/appropriate clamping torque and to prevent stress concentration on the cutter body.
- Only aluminum alloys or other non ferrous metals can be used as work pieces. Steels, cast irons cannot be machined.

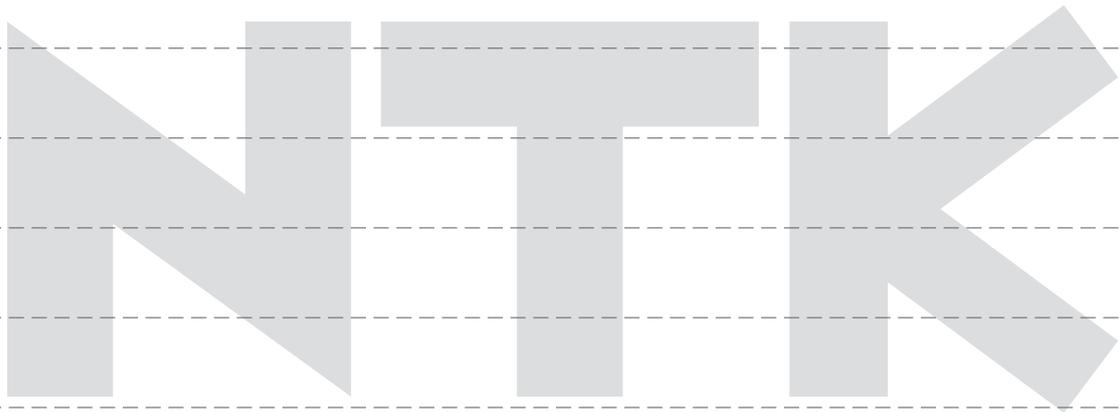
WARNING

For the NTK cutter series for machining of aluminum components

- Always use the recommended coolant pressure (2 MPa).
- Do not use re-brazed inserts.

MEMO

New Products
Tool Materials / Selection Guide
PCD, CBN and ceramic
Cermet, PVD-coated Carbide
Micro-grain Carbide, Carbide
Insert Stock List
Outside Machining Toolholders
SS
Grooving Tools
Threading Tools
Shaper
Internal machining tool range
Original Tools for Various Applications
Indexable End Milling Tools
Indexable Drill Inserts
Milling Cutters
Technical Data
Index





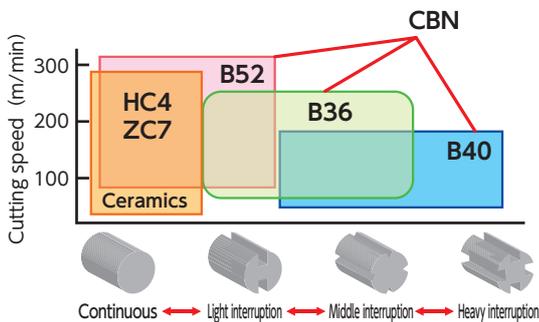
Technical Data

- Technical data for machining of hardened steels · · Q2
- Technical data for machining of heat-resistant alloy by cermics · · Q4
- Tooling terminology · · · · · Q14
- Calculations and troubleshooting case studies · · Q18
- Approximate data conversions for Brinell hardness scale · · Q30
- Symbols used for machining, SI unit conversion table · · Q31
- Changes in JIS Surface Roughness Standards · · Q32
- Insert nose radius tool compensation · · Q34
- Wrench specifications · · · · · Q36
- List of screws and wrenches for screw type holders · · Q37
- Materials and grades comparison table by cutting tool manufacturer · · Q38
- Corresponding table for metal materials and symbols · · Q40
- Ordinary tolerances for shape and position accuracy · · Q42
- Useful tips · · · · · Q43
- List of automatic lathes · · · · · Q46
- Recommended Cutting Parameter Chart · · Q52

Machining of hardened steels

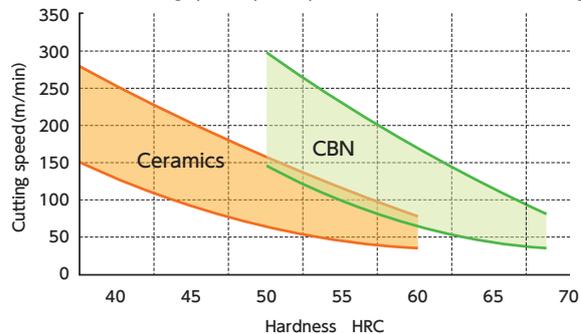
Selection guide of NTK insert for hardened steels machining

Application map



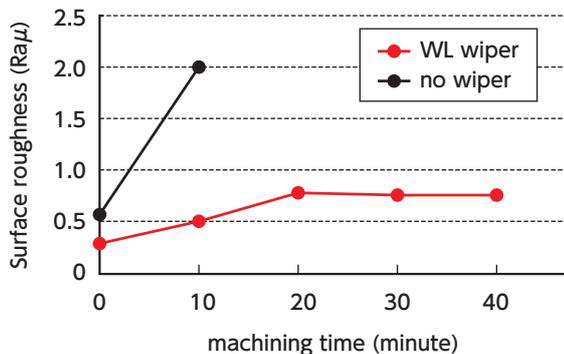
Recommended cutting speed

[Recommended cutting speed by workpiece hardness (continuous cutting)]



Effect of wiper flat on cutting edge

CNGA120412WL $v_c=100\text{m/min}$ $f=0.1\text{mm/rev}$ $a_p=0.5\text{mm}$

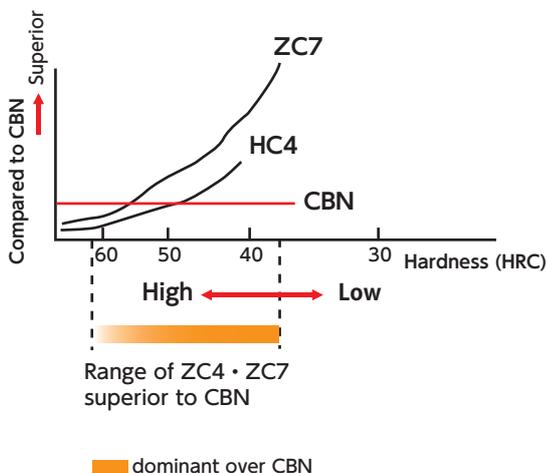


Recommended depth of cut and feed rate

[Recommended depth of cut and feed rate by corner R dimension]

corner R	depth of cut (mm)	feed rate (mm/rev)
R0.4	0.15	0.05 ~ 0.08
R0.8	0.3	0.08 ~ 0.10
R1.2	0.4	0.10 ~ 0.13
R1.6	0.5	0.13 ~ 0.16
R6.35	2.0	0.16 ~ 0.25

Superiority of ceramics



Chip control

“ZC7” with “AG chipbreaker” solves rough surface and machine stop caused by poor chip control, which enables long-time continuously operation.

w/o chipbreaker



AG chipbreaker



Work material : SCM415 Carburized and quenched HRC50
Insert : ZC7 CNGA(G) 120408

$v_c=150\text{m/min}$ $f=0.2\text{mm/rev}$ $a_p=0.2\text{mm}$

Potential problem and action required ~ Machining of hardened steels by ceramics ~

	Case	Possible cause	Action required
Insert	VB wear 	<ul style="list-style-type: none"> ●Cutting speed is too high ●Feed rate is too low ●Unproper nose radius 	<ul style="list-style-type: none"> ●Decrease cutting speed ●Increase feed rate ●Enlarge nose radius
	Wear on face 	<ul style="list-style-type: none"> ●Unproper cutting condition ●Unproper honed edge 	<ul style="list-style-type: none"> ●Decrease cutting speed ●Reduce angle of honed edge
	Flaking 	<ul style="list-style-type: none"> ●Unproper cutting condition ●Unproper honed edge 	<ul style="list-style-type: none"> ●Reduce honed edge ●Use insert without round honing ●Decrease feed rate ●Increase cutting speed
	Fracture 	<ul style="list-style-type: none"> ●Unproper cutting condition ●Unproper honed edge ●Use of coolant 	<ul style="list-style-type: none"> ●Decrease feed rate ●Enlarge honed edge ●Put round honing on edge ●Stop coolant
Workpiece	Chattering 	<ul style="list-style-type: none"> ●Too high cutting force ●Shortage of workpiece and/or tool rigidity ●Cutting speed is too low 	<ul style="list-style-type: none"> ●Decrease feed rate ●Reduce honed edge ●Enlarge relief angle ●Shorten the length of tool overhang ●Increase cutting speed
	Surfacefinish 	<ul style="list-style-type: none"> ●Feed rate is too high ●Nose radius is too small ●Wear of insert 	<ul style="list-style-type: none"> ●Decrease feed rate ●Enlarge nose radius ●Use insert with wiper flat ●Decrease cutting speed

- New Products
- Tool Materials / Selection Guide
- PCD, CBN and ceramic
- Carbide
- Micro-grain Carbide, Carbide
- Insert Stock List
- Outside Machining Toolholders
- SS
- Grooving Tools
- Threading Tools
- Shaper
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Solutions for Aerospace Industry

SX7 SiAlON Ceramic

■ Features

- Can run at same cutting condition vs whisker ceramics
- Better notching resistance compared to whisker ceramics
- No need to program ramping when compared to whisker ceramics
- Better flank wear resistance compared to competitor's SiAlON ceramics
- Best grade for pre-machined Waspaloy
- Best grade for high-speed milling

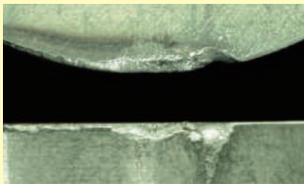
■ Recommended Work Materials

- Inco 718
- Waspaloy
- Inco 625
- Udimet 720

■ Recommended Applications

- Semi-Finish
- Profiling

■ Profiling of Inco 718



Competitor's Whisker Ceramic



SX7



Turbine Disk

Tool Life : 4.5min

RCGX120700, $v_c = 240\text{m/min}$, $f = 0.15\text{mm/rev}$, $a_p = 1.00\text{mm}$, WET

Inco 718 (pre-machined)

	SX5
Notching	○
Flank Wear	
Toughness	○
Heat Shock	

SX5 SiAlON Ceramic ※受注生産品

■ Features

- Best grade for scale and interruptions
- Best grade for machining high-cobalt alloys

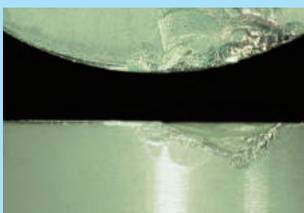
■ Recommended Work Materials

- Waspaloy
- 718Plus
- Udimet 720
- Rene 41

■ Recommended Applications

- Rough Turning with scale and interruptions

■ Rough Turning of Waspaloy with Scale



Competitor's Whisker Ceramic



SX5



turbine case

Tool Life : 2.0min

RNGN190700, $v_c = 285\text{m/min}$, $f = 0.30\text{mm/rev}$, $a_p = 3.80\text{mm}$, WET

Waspaloy with Scale



WA5, WA1 Whisker-Reinforced Ceramic

■ Features

- Versatile grade for machining of high temperature alloys
- Better flank wear resistance compared to SiAlON ceramics
- Better notching resistance compared to competitor's whisker ceramics

■ Recommended Work Materials

- Inco 718
- Inco 625

■ Recommended Applications

- Semi-Finish
- Grooving
- Profiling

SX7	SX9	WA5
○	○	
○		○
	○	
○	○	

■ Profiling of Inco 718



Competitor's Whisker Ceramic



WA5



Turbine Case

Tool Life : 5.0min

RPGX120700, $v_c = 240\text{m/min}$, $f = 0.15\text{mm/rev}$, $a_p = 1.00\text{mm}$, WET
Inco 718 (pre-machined)



SX9 SiAlON Ceramic

■ Features

- Tougher when compared to whisker ceramics
- Extreme toughness makes higher feed and heavier DOC machining possible
- Best grade for machining Inco 718 with scale

■ Recommended Work Materials

- Inco 718
- Inco 706
- Inco 713

■ Recommended Applications

- Rough turning with scale
- Milling

■ Rough Turning of Inco 718 with Scale



Competitor's Whisker Ceramic



SX9



Cover Shield

Tool Life : 3.0min

RNGN190700, $v_c = 240\text{m/min}$, $f = 0.25\text{mm/rev}$, $a_p = 3.80\text{mm}$, WET
Inco 718 with Scale

Choosing the most suitable ceramic inserts

1) Selecting insert shapes that offer the highest edge strength

Choose the insert that has the highest edge strength as much as possible.



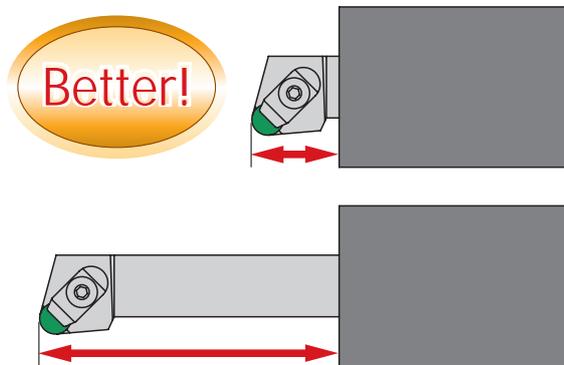
2) Selecting inserts with the largest corner radius possible

The greater the corner radius of an insert is, the higher the strength of the cutting edge and the longer the life of the insert becomes. However, please note that the greater the corner radius, the greater the cutting pressure.

In the case of machining of general heat-resistant alloys, inserts **RNGN1207** are used for rough machining while **CNGN1204** inserts are used for finishing.

3) Minimizing the tool overhang

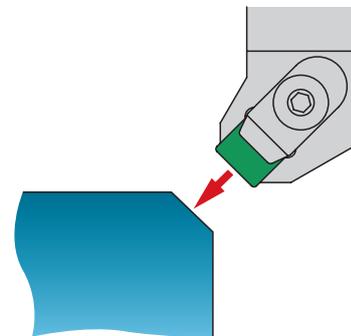
If the amount of the tool overhang is too long, chatter and insert fracture can occur.



4) Countermeasures against insert fracture

Before starting the main cut, it is advisable to chamfer the corners of the work pieces.

This is to ensure the subsequent inserts enter clean, true running material, so eliminating premature insert breakage.



5) Avoid leaving the insert to dwell on the workpiece

Be careful not to dwell. If the insert remains in contact with the workpiece with zero feed, the insert can wear significantly.

6) Coolant

When **turning** with **WA5, WA1, SX9, SX7, ZM3** or **QM3**, a significant supply of coolant is advisable. In the cases of heavy-duty interrupted turning, good results may be obtained with the cutting oil supply stopped to avoid thermal shock.

When **milling** with **WA5, WA1, SX9, SX7**, always machine without coolant.

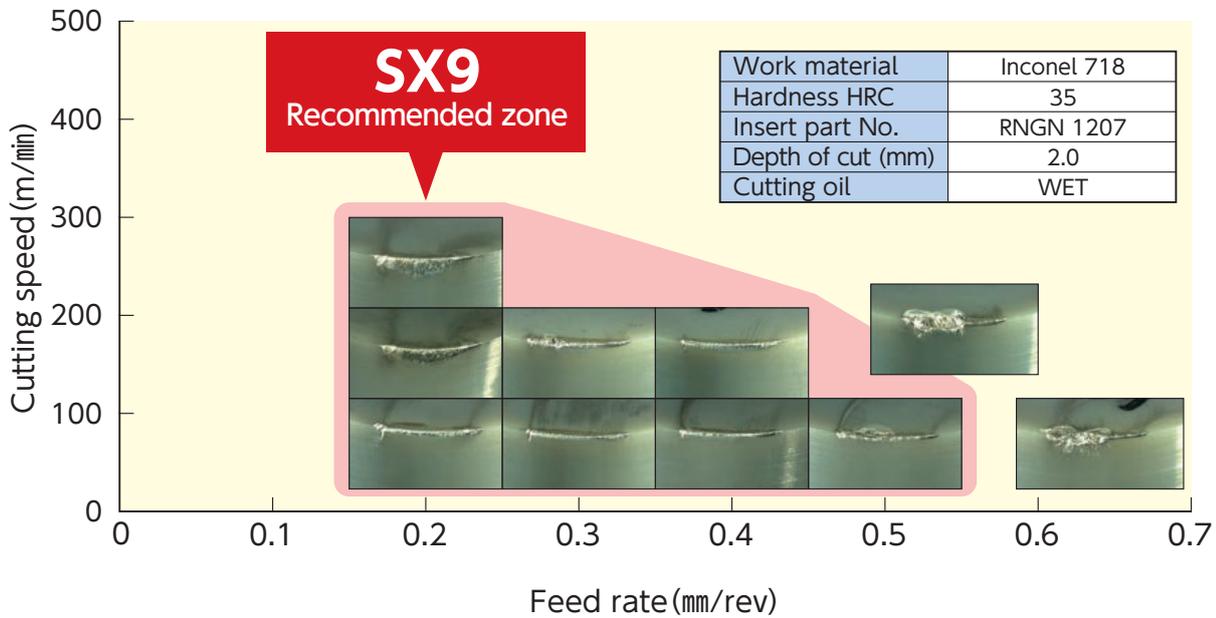
7) Cutting edge treatment

For machining of heat-resistant alloys, the insert edge condition is generally light. However, in some cases the addition of a honed edge produces better resistant to wear, especially to boundary wear.

A cutting condition suitable for turning of nickel-based heat-resistant alloys

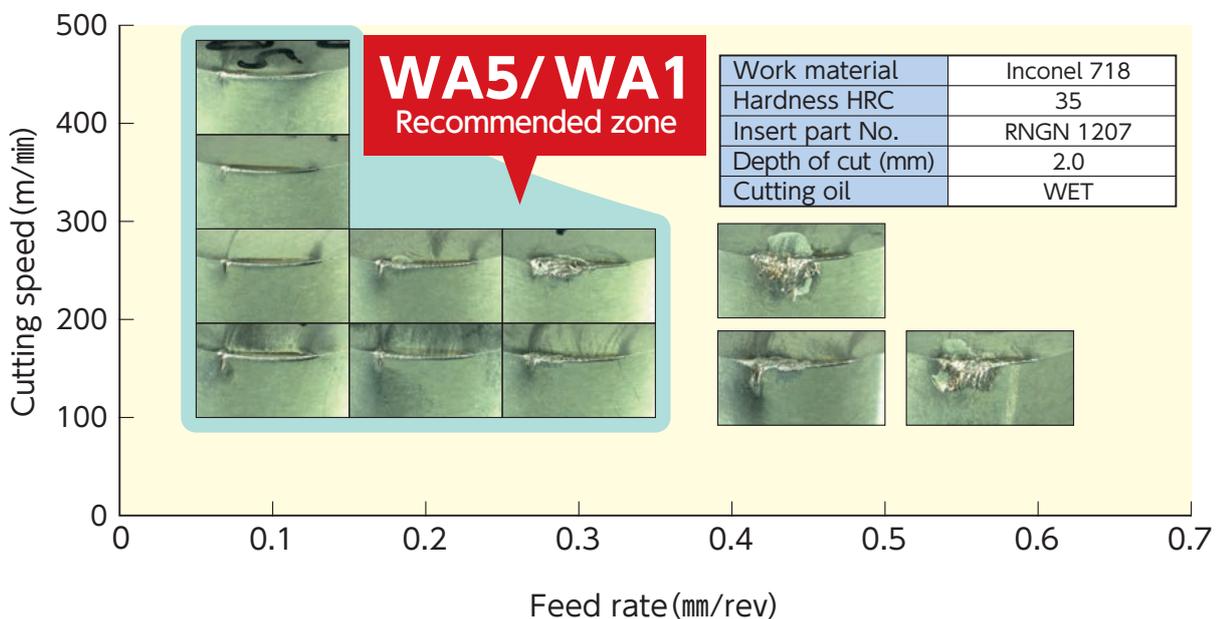
● SX9

The wear resistance of **SX9** becomes lower at higher cutting speed, but improves at a higher feed rates.



● WA5 / WA1

Whisker-based ceramic inserts tend to fracture at a high feed rates, however their wear resistance becomes higher at higher cutting speeds



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Technical Data of Machining Heat-Resistant Alloy with Ceramic Cutting Tools

How to use ceramic inserts and increase their fracture resistance.

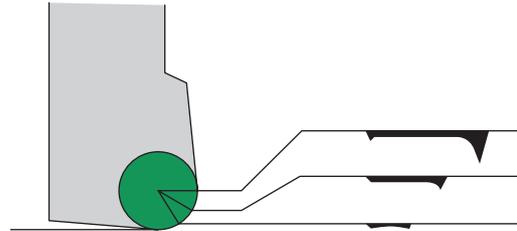
In many sites where heat-resistant alloys are machined, we often find that the progression of “boundary wear” on inserts results in fracture.

In this section, several ways are introduced to make the life of cutting tools longer by decreasing the boundary wear.

1) Depth of cut

As shown in the figure at the right, the greater the depth of cut becomes, the greater the amount of wear, especially the amount of boundary wear becomes.

In order to make the life of cutting tools longer by decreasing the amount of boundary wear, it is necessary to control the depth of cut.



Recommended depth of cut

Size of round insert	Max. depth of cut	*Nose radius	Max. depth of cut
φ6.35mm	1.5mm or less	0.8	0.2mm
φ9.525mm	2.3mm or less	1.2	0.3mm
φ12.7mm	3.2mm or less	1.6	0.4mm
φ25.4mm	6.4mm or less	2.4	0.6mm

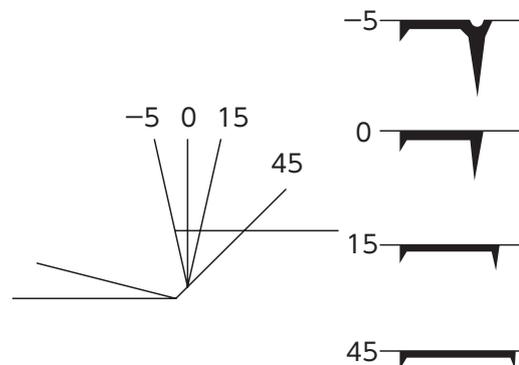
The most appropriate depth of cut is 5 - 15% of the insert diameter. *With the 0-degree lead angle

2) Lead angle

In the machining of heat-resistant alloys, there is a tendency for wear to be reduced when a large lead angle is used. Furthermore, the larger the lead angle the lower the boundary wear, the longer the tool life and the better the surface finish on the work become, because the cutting resistance is distributed over a wider area on the insert.

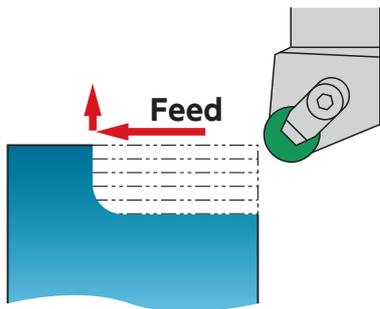
In addition, the larger the lead angle the better the chip control becomes. In the case of **SX9** with its excellent fracture resistance, the wear becomes less as the feed rate is raised, and machining time can be shortened.

● Influence of lead angle on the form of wear



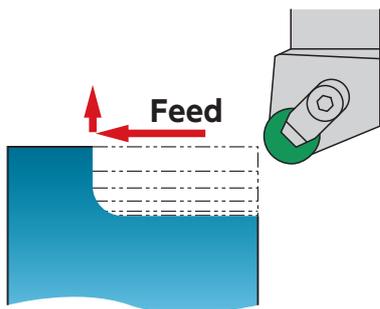
3) Effective method for rough machining

With a constant depth of cut



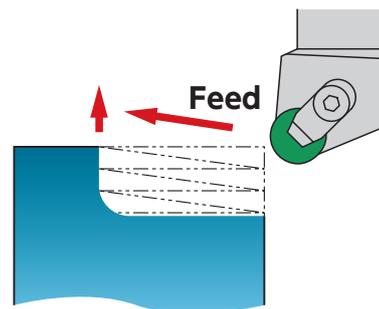
If rough machining is repeated with a constant depth of cut, as shown above, boundary notch wear progresses within a short period of time, making the tool life significantly shorter. The following two machining methods are effective for prolonging the tool life by controlling the boundary notch wear:

Machining by changing the depth of cut



Rough machining with a different depth of cut each pass can cause the boundary notch wear to happen at different contact points, thus the boundary notch wear is spread over a larger area.

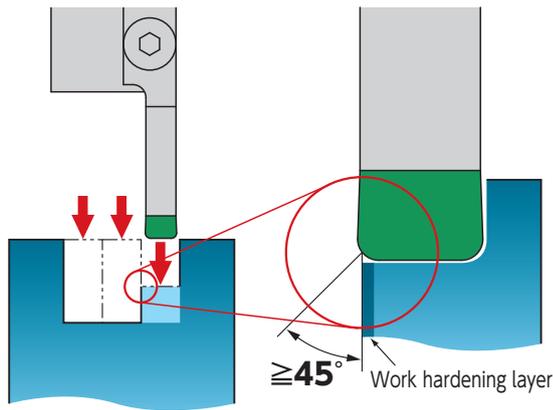
Machining by ramping



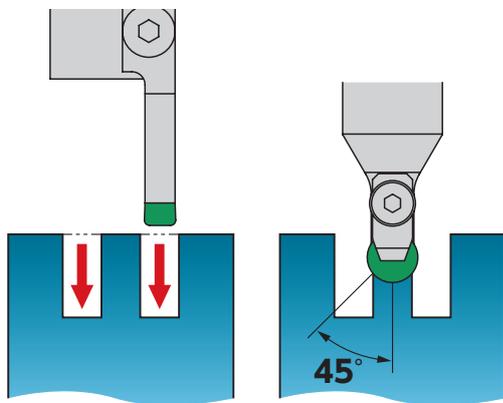
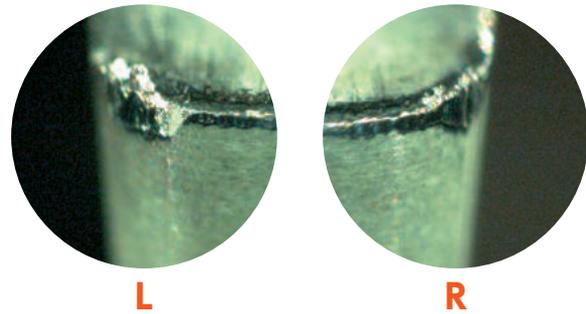
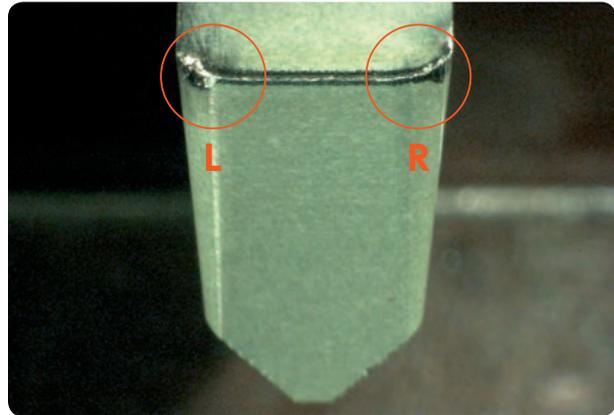
By ramping the insert into cut, the wear is distributed all over the cutting edge as the depth of cut is changed continuously. This method is most suitable for roughing of heat-resistant alloys.

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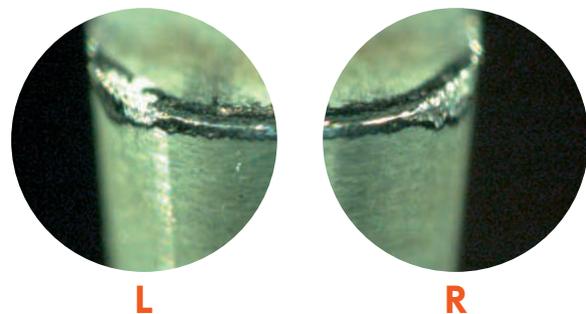
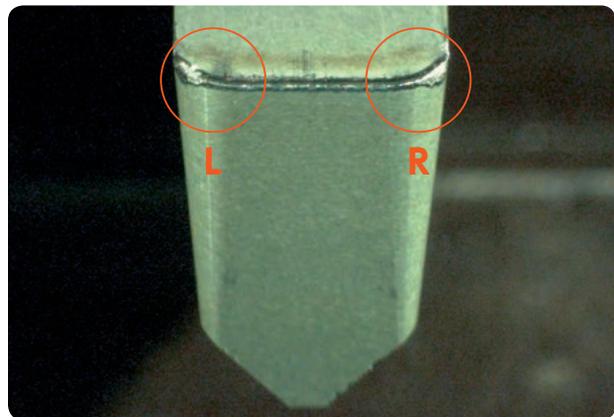
4) Effective method for grooving



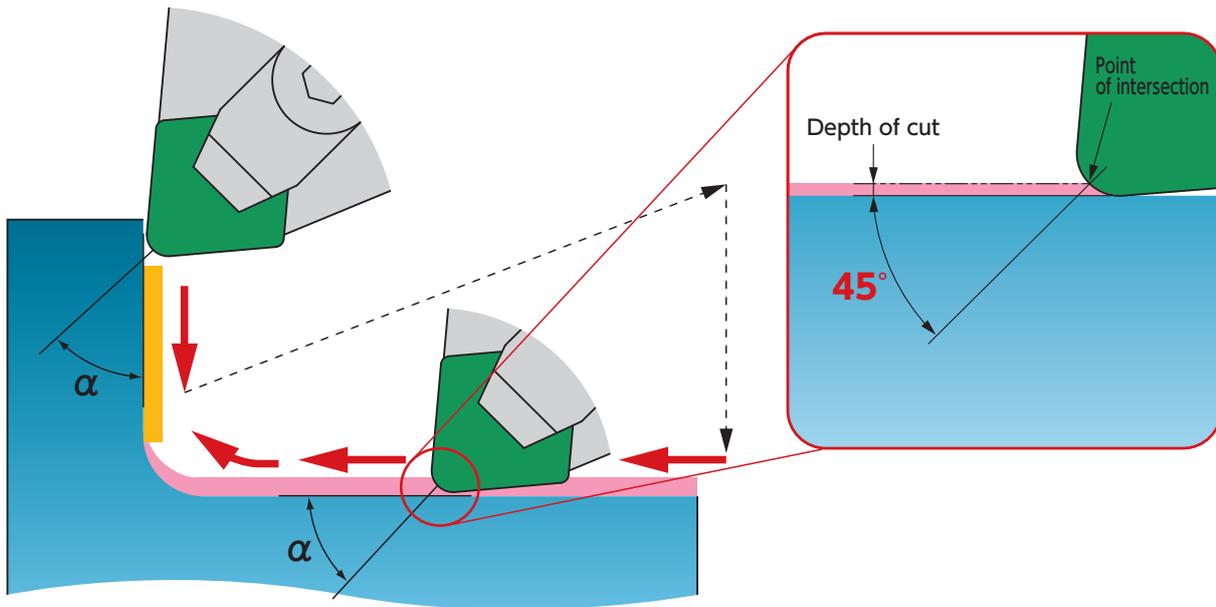
When grooving operations are carried out as shown above, the corner of the insert will strike the area where work hardening has occurred. Grooving in this way may make the tool life unstable, causing chipping or boundary notch wear, as shown in the photo "L". The following figures describe a better grooving method:



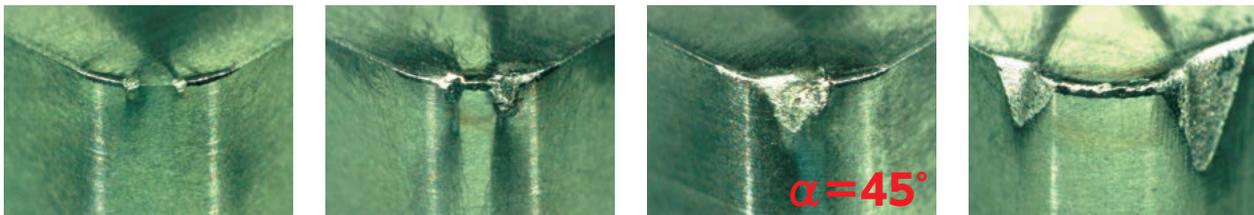
As illustrated above, grooving on each side first does not cause abnormal wear on the corner of the insert (photo "R"). Then, cut and remove the remaining center area. We recommend that RCGX-shape inserts, the strength of which is the higher, be used for this.



5) Effective method for finishing



Depth of cut



Better condition

First, cut and remove as much material as possible during the roughing operation. Then, set the depth of cut for finishing so that the depth becomes less as shown in the illustration above. This way will stabilize the tool life, decreasing boundary notch wear and avoid overlap of areas where boundary notch wear tends to occur during facing or outside diameter machining.

$\alpha = 45^\circ$

Nose radius		Depth of cut	
(mm)	(Inch)	(mm)	(Inch)
0.4	0.0157	0.12	0.0047
0.8	0.0315	0.23	0.0091
1.2	0.0472	0.35	0.0138
1.6	0.0630	0.47	0.0185
2.0	0.0787	0.59	0.0232
2.4	0.0945	0.70	0.0276
3.2	0.1260	0.94	0.0370

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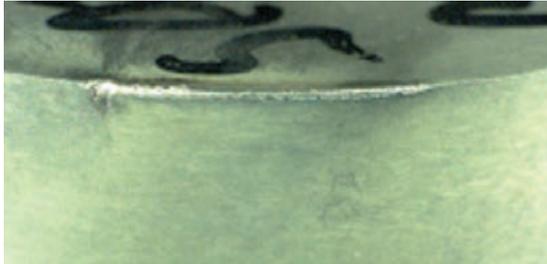
Method for increasing the wear resistance of ceramic inserts

● WA5 / WA1

Cutting speed

A higher cutting speed increases the wear resistance, significantly decreasing the boundary notch wear.

500m/min



100m/min



● SX9

1) Cutting speed

A lower cutting speed increases the wear resistance.

100m/min

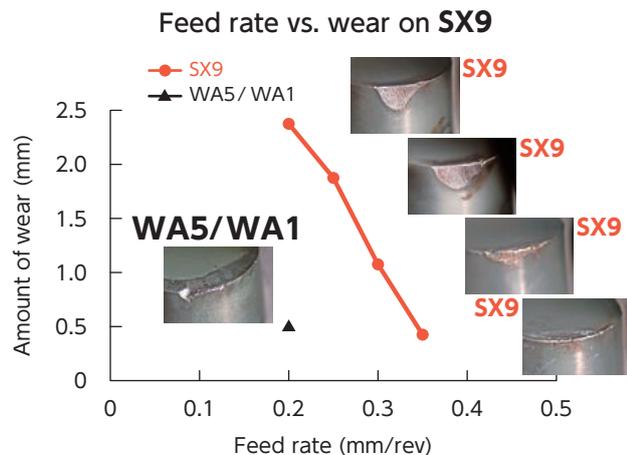


400m/min



2) Feed rate

The wear resistance of **SX9** increases with a higher feed rate. As **SX9** excels in fracture resistance, fracture may not occur if a higher feed rate is used. Thus, it is possible to make the cycle time shorter, productivity better with less production cost.



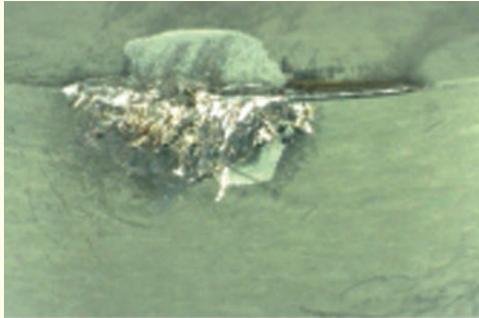
■ Cutting conditions

Work material : Inconel 718
 Insert Part No. : **RNGN120700**
 Cutting speed : 250 m/min (constant)

Depth of cut : 2 mm
 Cutting oil : WET

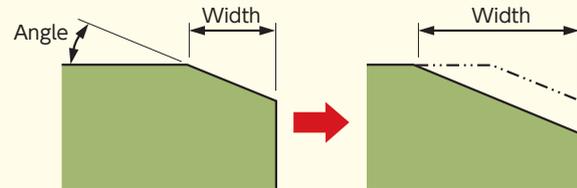
Troubleshooting

Flaking



Countermeasures

- Decrease the feed rate.
- Change the treatment of the cutting edge so that the width is slightly increased.



Fracture



Countermeasures

- Decrease the cutting speed and feed rate.
- Change the insert to the one that is higher in strength.



If the hardness of the work material is not known, it would take quite a long time before determining the most suitable cutting conditions. Generally, it is effective to decrease the cutting speed when handling a harder work material.

Countermeasures for chatter

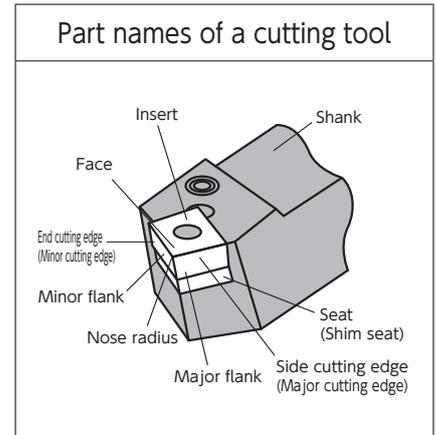
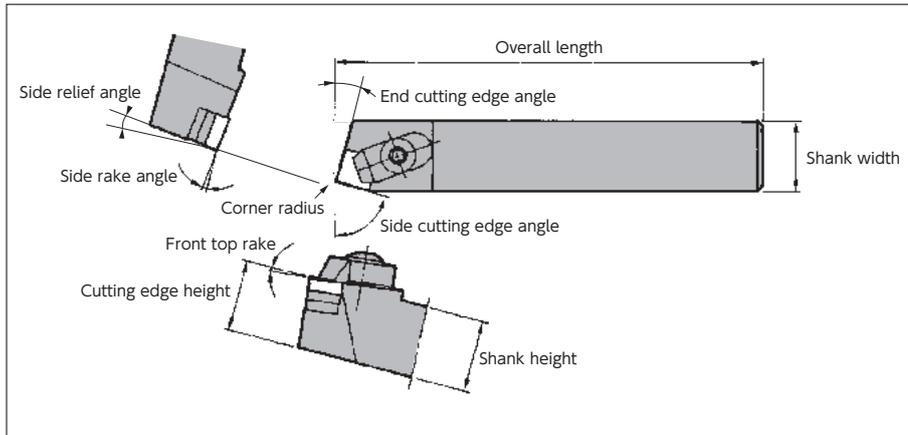
In many cases of machining of nickel-based heat-resistant alloys, it is common to have chatter marks due to an increased cutting pressure. Chatter may easily occur especially when a holder with a long overhang is used for profiling, grooving or cutting a thin-walled material or when a machine having low rigidity is used, making abnormal wear or sudden fracture on the inserts occur.

Generally, chatter would become less significant or would not occur if the cutting speed is raised and feed rate is lowered. The following countermeasures also are effective:

- Change the insert grade to WA5/WA1 from SX9 and increase the cutting speed.
- Change the insert to a smaller diameter or smaller nose radius.
- Change to sharper edge condition.
- Change to a positive-type insert.
- Make the lead angle smaller.
- Make the overhang shorter.
- Change the holder to a type using vibration proofed material.

Turning tool terminology

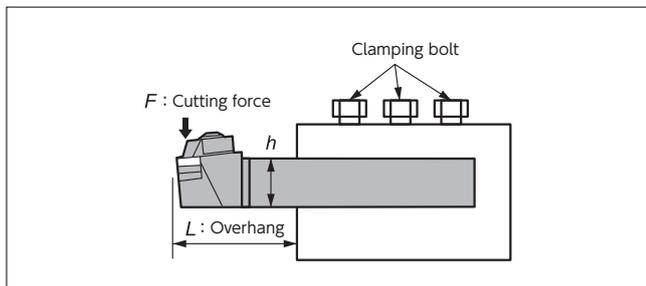
Toolholder part names



Holder rigidity

Toolholder deflection

$$\delta = \frac{4 \times F \times L^3}{E \times b \times h^3} = \frac{4 \times k_c \times f \times L^3}{E \times b \times h^3}$$

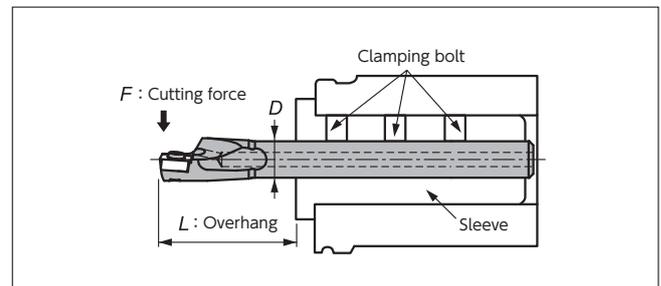


Symbol	Term	Unit
δ	Deflection amount	mm
b	Shank width	mm
h	Shank height	mm
E	Young's modulus	N/mm ²
a_p	Depth of cut	mm
f	Feed amount	mm/rev
k_c	Specific cutting force	N/mm ²
L	Overhang	mm
F	Cutting force	N

$$(F = k_c \times a_p \times f)$$

Boring bar deflection

$$\delta = \frac{64 \times F \times L^3}{3 \times E \times \pi \times D^4} = \frac{64 \times k_c \times a_p \times f \times L^3}{3 \times E \times \pi \times D^4}$$



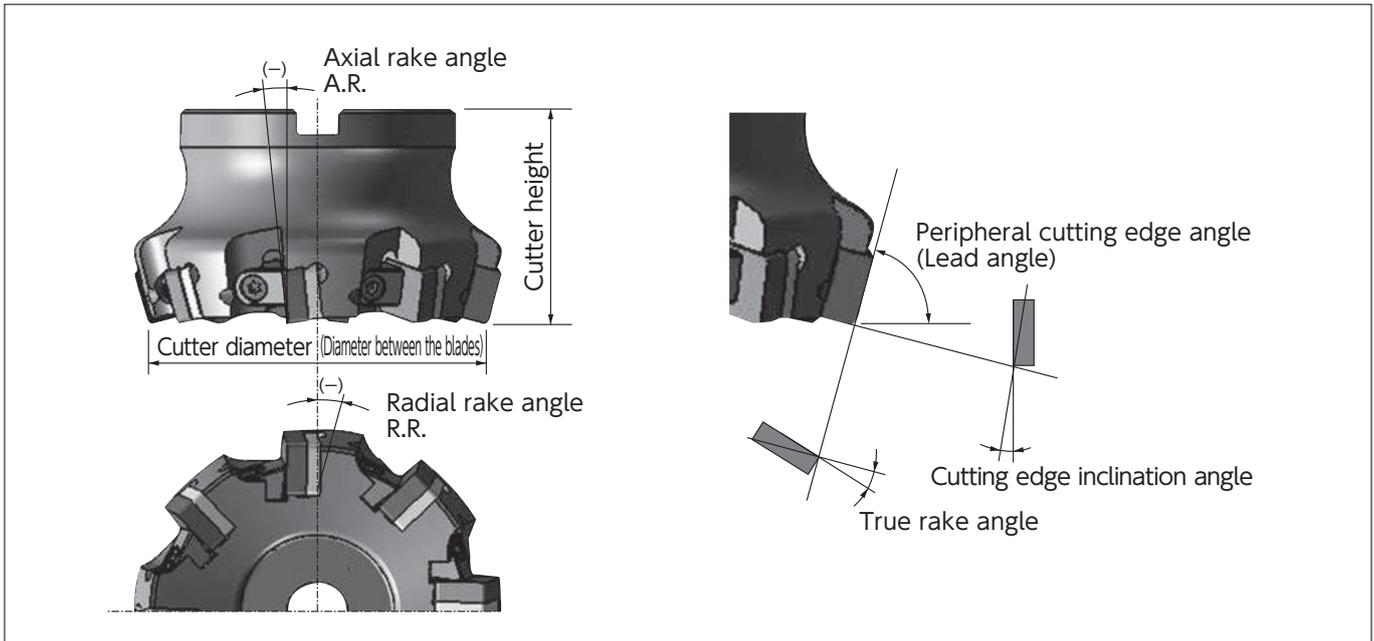
Symbol	Term	Unit
δ	Deflection amount	mm
D	Shank width	mm
E	Young's modulus	N/mm ²
a_p	Depth of cut	mm
f	Feed amount	mm/rev
k_c	Specific cutting force	N/mm ²
L	Overhang	mm
F	Cutting force	N

$$(F = k_c \times a_p \times f)$$

An important factor in improving the rigidity of a toolholder is to ensure the overhang of the tool shank is as short as possible.

Milling cutter terminology

Milling cutter terminology



Functions of each cutting edge angle

Name	Function	Effects
Radial rake angle: R.R.	Controls the direction of chip evacuation and cutting force	Negative (-): Excels in chip control performance
Axial rake angle: A.R.	Controls the direction of chip evacuation and cutting force	Positive (+): Excels in cutting performance and deposition resistance
Lead angle	Controls the thickness and evacuation direction of chips	Larger lead angles decrease the thickness of chips and relieves cutting load
True rake angle	Actual rake angle	Larger angles excels in cutting performance and deposition resistance, but lowers the cutting edge strength Lesser angles increase the cutting edge strength but lowers the deposition resistance
Cutting edge tilt angle	Controls the direction of chip evacuation	Larger angles excel in chip control performance and relieves cutting load, but lowers the strength of the insert corner

Functions of each angle

《Lead angle》: Relationship of this angle and chip thickness

Lead angle : 45 degrees	
Lead angle : 75 degrees	
Lead angle : 90 degrees	

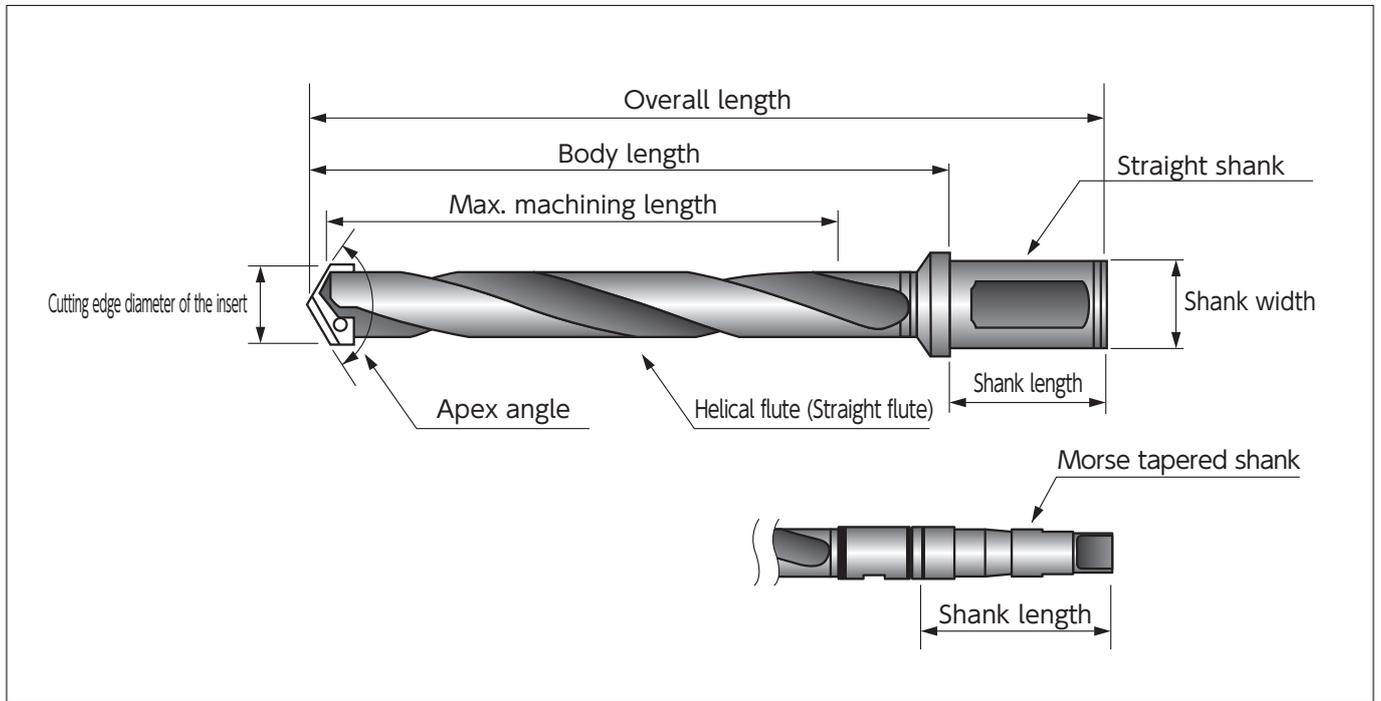
《Rake angle》: Combinations and the characteristic

Combinations of the angles for basic cutting edge shapes		(+) Axial rake angle : positive	(-) Axial rake angle : negative	(+) Axial rake angle : positive
		Radial rake angle : positive (+)	Radial rake angle : negative (-)	Radial rake angle : negative (-)
		Double-positive cutting edge shape (DP edge shape)	Double-negative cutting edge shape (DN edge shape)	Negative-positive cutting edge shape (NP edge shape)
Radial rake angle (R.R.)		Positive (+)	Negative (-)	Negative (-)
Axial rake angle (A.R.)		Positive (+)	Negative (-)	Positive (+)
Insert specification		Positive (single side used)	Negative (both sides used)	Positive (single side used)
Work material	Steel	●	—	●
	Cast iron	—	●	●
	Aluminum alloy	●	—	—

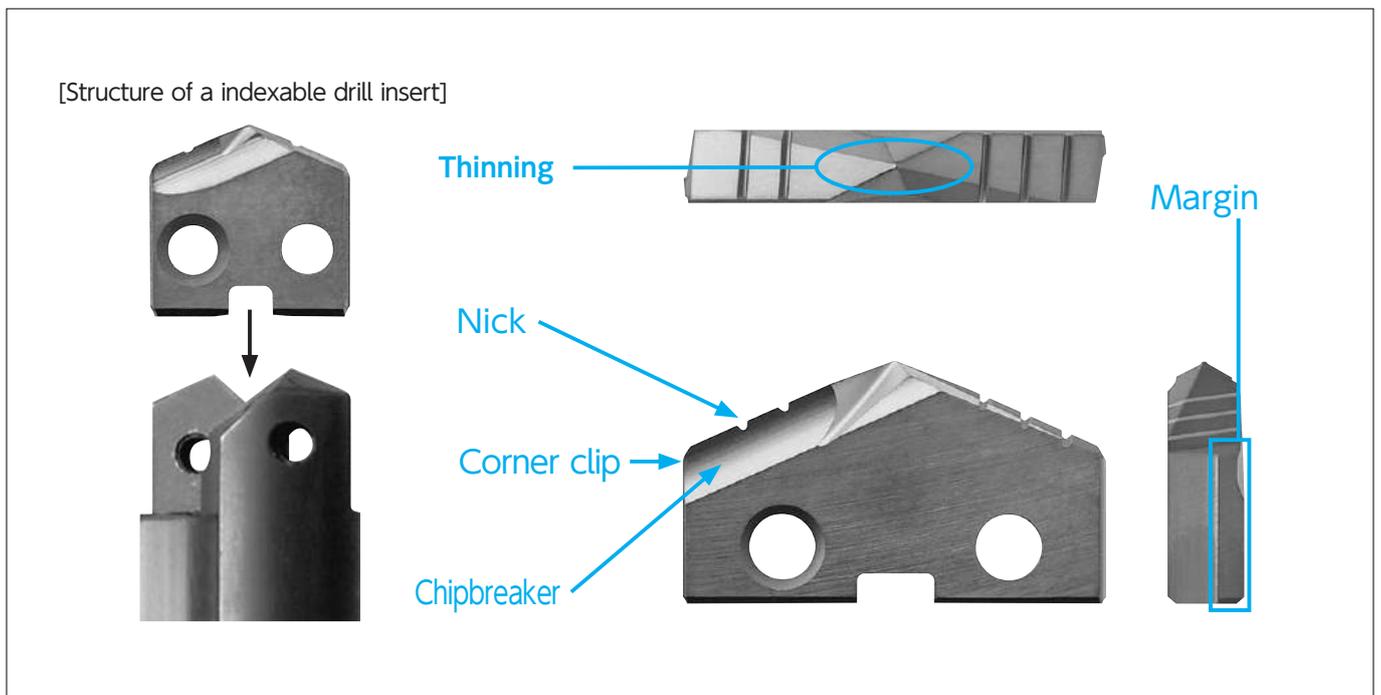
Drill terminology

Drill terminology

《Drill holder》



《Drilling insert》



- New Products
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Selective use of guided holders

Type	Features
1. Chrome-bush guide 	<ul style="list-style-type: none"> ● First choice for general deep hole drilling ● Superior lubrication to carbide guide ● Ideal choice for seizure prevention on guide portion at deep hole drilling
2. Thermal sprayed carbide type 	<ul style="list-style-type: none"> ● Superior wear resistance to chrome guide
3. Brazed carbide type 	<ul style="list-style-type: none"> ● More resistant to wear than the thermal sprayed carbide type ● Re-brazing is possible ● Applicable for diameters of $\Phi 15$ and over
4. Carbide clamped with screws 	<ul style="list-style-type: none"> ● Easy to replace pads ※ Please send the holder to NTK to change the pad. NTK assembles and regrinds it. ● Applicable for diameters of $\Phi 24$ and over

Keys: ◎: Excellent ○: Good △: Acceptable X: Unacceptable

	Chrome-bush guide	Thermal sprayed carbide	Brazed carbide	Carbide clamped with screws
Low friction	◎	○	○	○
Wear resistance	△	○	◎	◎
Repeated used	○	○	○	◎
Dimensional accuracy	○	○	○	△

※ Holders are designed specially for actual insert diameter.

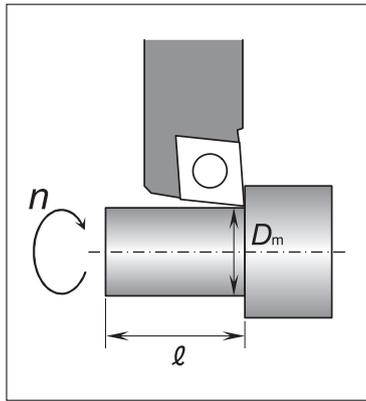
Inserts with different diameters can't be put on the holders.

※ You can decide the length of guide area and number of coolant holes.
(around 30mm to 50mm for deep hole drilling)

※ Reuse may be impossible in case of big damage on the holders.

Calculations used for turning

Calculating the cutting speed



Calculating the cutting speed from the rotation speed

$$v_c = \frac{\pi \times D_m \times n}{1000}$$

v_c : Cutting speed (m/min)
 D_m : Machining diameter (mm)
 n : Speed of revolution (min^{-1})
 π : Circular constant (3.14)

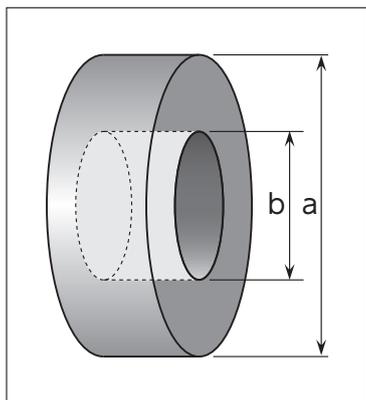
Calculating a revolution speed from the cutting speed

$$n = \frac{1000 \times v_c}{\pi \times D_m}$$

Example : Obtaining a cutting speed for machining a work piece of 200 mm diameter at the revolution speed of 1,000 min^{-1} :

$$v_c = \frac{\pi \times 200 \times 1000}{1000} = \underline{628 \text{ (m/min)}}$$

Calculating the cutting time



Calculating the cutting time for OD (ID) machining

$$T = \frac{l}{f \times n}$$

T : Cutting time (min)
 l : Cutting length (mm)
 f : Feed amount (mm/rev)
 n : Speed of revolution (min^{-1})

Calculating a cutting time for facing

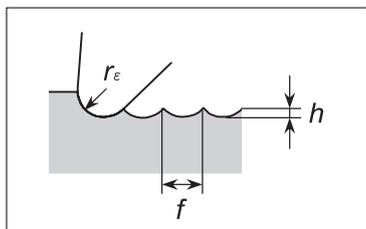
$$T = \frac{\pi \times (a^2 - b^2)}{4000 \times v_c \times f}$$

T : Cutting time (min)
 v_c : Cutting speed (m/min)
 f : Feed amount (mm/rev)
 π : Circular constant (3.14)

Example : Obtaining a cutting time for machining of work to be cut 100 mm long at the revolution speed of 1,000 min^{-1} and at a feed rate of 0.1 mm/rev:

$$T = \frac{100}{0.1 \times 1000} = \underline{1 \text{ (min)}}$$

Calculating the theoretical surface roughness



$$h = \frac{f^2}{8 r_\epsilon} \times 1000$$

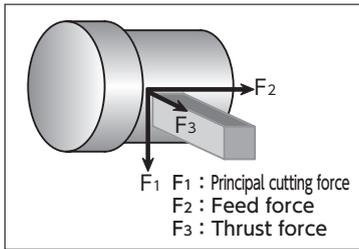
h : Theoretical surface roughness (μm)
 f : Feed amount (mm/rev)
 r_ϵ : Nose radius (mm)

Example : Obtaining the theoretical surface roughness when machining with an insert having 0.8 mm nose radius at a feed rate of 0.1 mm/rev:

$$h = \frac{0.1^2}{8 \times 0.8} \times 1000 = \underline{1.56 \text{ (}\mu\text{m)}}$$

[Guidelines for actually finished surface roughness]
 Steel type work: Theoretical surface roughness $\times 1.5$ to 3
 Cast iron type work: Theoretical surface roughness $\times 3$ to 5

Calculating the cutting force



$$F = k_c \times a_p \times f$$

(N)

F : Cutting force (N)

k_c : Specific cutting force (N/mm²) *See the table below.

a_p : Depth of cut (mm)

f : Feed amount (mm/rev)

Example : Calculating the cutting force for grey cast iron cut at the feed rate of 0.2 mm/rev and with a depth of cut of 3 mm:

$$F = 1800 \times 3 \times 0.2 = \underline{1080 \text{ (N)}}$$

Calculating the power required

$$P_c = \frac{v_c \times f \times a_p \times k_c}{60 \times 10^3 \times \eta}$$

(kW)

P_c : Required power (kW)

v_c : Cutting speed (m/min)

f : Feed amount (mm/rev)

a_p : Depth of cut (mm)

k_c : Specific cutting force (N/mm²) *See the table below.

η : Mechanical efficiency (0.7 ~ 0.8)

Example : Calculating the cutting power for the machining of grey cast iron at a cutting speed of 700 m/min, feed rate of 0.4 mm/rev and with a depth of cut of 2 mm (with 0.8 set as the mechanical efficiency):

$$P_c = \frac{700 \times 0.4 \times 2 \times 1400}{60 \times 10^3 \times 0.8} = \underline{16.33 \text{ (kW)}}$$

Specific cutting force

Work material		Tensile strength or hardness	Specific cutting force (N/mm ²) "k _c " to cutting feed rate (mm/rev)				
			0.1mm/rev	0.2mm/rev	0.3mm/rev	0.4mm/rev	0.6mm/rev
Soft steel		520	3610	3100	2720	2500	2280
Medium steel		620	3080	2700	2570	2450	2300
Hard steel		720	4500	3600	6250	2950	2640
Tool steel	SKD	670	3040	2800	2630	2500	2400
		770	3150	2850	2620	2450	2340
Cr-Mo steel	SCM	600	3610	3200	2880	2700	2500
		730	4500	3900	3400	3150	2850
Alloy steel	SNCM	900	3070	2650	2350	2200	1980
		HB350	3310	2900	2580	2400	2200
Grey cast iron	FC	HB200	2110	1800	1600	1400	1330

Calculating the volume of chips produced

$$Q = v_c \times f \times a_p$$

(cm³/min)

Q : Volume of evacuated chips (cm³/min)

v_c : Cutting speed (m/min)

a_p : Depth of cut (mm)

f : Feed amount (mm/rev)

Example : Obtaining the volume of chips evacuated per minute for machining at a cutting speed of 700 m/min, feed of 0.4 mm/rev and a depth of cut of 2mm

$$Q = 700 \times 0.4 \times 2 = \underline{560 \text{ (cm}^3\text{/min)}}$$

Troubleshooting for turning

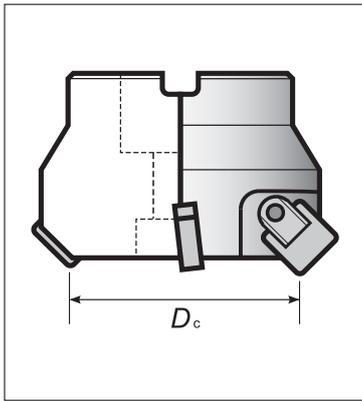
Type of problem		Material/grade selection				Cutting conditions				Tool shape				Machine/installation						
		Change to a harder material/grade	Change to a tougher material/grade	Change to a material/grade more resistant to thermal shock	Change to a material/grade more resistant to deposition	Cutting speed	Feed rate	Depth of cut	Coolant		Review the type of chipbreaker	Rake angle	Nose radius of the insert	Side cutting edge angle	Cutting edge strength, honing	Improve the accuracy of insert	Improve the rigidity of the holder	Improve the installation accuracy of the cutting tool	Review the overhang of the cutting tool	Prevent vibration of the machine, improve the machine rigidity
									Use non-water-soluble type	Review dry or wet operation										
Possible cause		Corrective measures				Decrease	Increase			Decrease		Increase								
Short tool life	Excessive insert wear	Unsuitable tool material/grade	●																	
		Unsuitable cutting edge shape									●	↗	↘	↘	↘					
		Improper cutting conditions					↘	↗			Wet									
	Fracture/chipping of the cutting edge	Unsuitable tool material/grade		●																
		Improper cutting conditions						↘	↘											
		Insufficient cutting edge strength									●		↗		↗					
		Thermal shock			●		↘	↘	↘	●	Dry									
		Built-up edge				●	↗	↗		●	Wet									
Insufficient toughness															●	●	●	●		
Poor dimensional accuracy	Variation in dimensions during cutting	Improper accuracy of insert													●					
		Clearance/relief of the work/tool									●	↗	↘	↘	↘	●	●	●	●	
	Need for offsetting during cutting	Increased flank wear	●										↗							
		Built-up edge				●	↗													
		Improper cutting conditions					↘	↗												
Poor surface finish	Poor surface roughness	Deposition				↗			●	Wet										
		Unsuitable cutting edge shape								●		↗								
		Chatter					↘	↘	↘						●	●	●	●		
Heat	Deterioration in tool life/accuracy due to excessive heat generation	Improper cutting conditions				↘	↘	↘												
		Unsuitable cutting edge shape								●	↗			↘						
Burring, chipping, scuffing	Burring	Boundary wear	●																	
		Improper cutting conditions					↘	↕		Wet										
		Unsuitable cutting edge shape									●	↗	↘	↘	↘					
	Chipping	Improper cutting conditions						↘	↘											
		Unsuitable cutting edge shape									●	↗	↗	↗	↘					
		Vibration														●	●	●	●	
	Scuffing	Unsuitable tool material/grade			●															
		Improper cutting conditions					↗			●	Wet									
Unsuitable cutting edge shape										●	↗		↘							
Vibration															●	●	●	●		
Chip control	Elongated chips	Improper cutting conditions				↘	↗	↗		Wet										
		Chipbreaker's effective chip control range									●									
		Unsuitable cutting edge shape											↘	↘						

Troubleshooting case studies: Turning

	Case/Symptom	Possible causes	Corrective measures
Insert	VB wear	<ul style="list-style-type: none"> ●The material / grade is too soft ●Cutting speed is too high ●Relief angle is too small 	<ul style="list-style-type: none"> ●Use a coated grade ●Choose a material/grade highly resistant to wear ●Decrease the cutting speed
	Wear on face	<ul style="list-style-type: none"> ●High temperature causes chemical reactions between the insert material and chips 	<ul style="list-style-type: none"> ●Use a coated grade ●Decrease both of the cutting speed and feed rate ●Widen the rake angle
	Flank boundary wear	<ul style="list-style-type: none"> ●The work surface is too hard ●Boundary area has been oxidized ●Burs, caused by chips in the sheared form, have been cut 	<ul style="list-style-type: none"> ●Widen the side cutting edge angle ●Make the nose radius larger so that cutting is performed within the radius ●Use a round insert
	Chipping/ fracture	<ul style="list-style-type: none"> ●Feed rate is too high ●Chips have become trapped ●Chatter resulting in vibration 	<ul style="list-style-type: none"> ●Enlarge the honed edge ●Make the nose radius larger ●Narrow the rake angle to secure the cutting edge strength
	Flaking	<ul style="list-style-type: none"> ●This is due compressive forces being applied to the cutting edge due to elastic deformation in the area being cut ●This occurs when deposited/adhered material is peeled off 	<ul style="list-style-type: none"> ●Change the cutting conditions by checking the cutting edge ●Choose a material/grade highly resistant to fracture ●Increase the coolant rate and pressure ●Improve the run-out of the main spindle of the machine
	Plastic deformation	<ul style="list-style-type: none"> ●High cutting force and excessive heat is applied to the cutting edge 	<ul style="list-style-type: none"> ●Choose a material/grade highly resistant to wear ●Decrease both of the cutting speed and feed rate ●Make the nose radius larger ●Use coolant
	Built-up edge	<ul style="list-style-type: none"> ●This occurs because the cutting temperature is lower than the recrystallization temperature of the work material 	<ul style="list-style-type: none"> ●Increase the cutting speed ●Use coolant with excellent lubrication performance ●Change to a grade with less affinity to the work material
	Deposition	<ul style="list-style-type: none"> ●The deposition is caused to the face by a chemical reactions of the work material due to heat generation 	<ul style="list-style-type: none"> ●Increase the cutting speed ●Widen the relief angle ●Hone the face with a mirror-like-surface finish ●Change to a grade with less affinity to the work material
	Clamping crack	<ul style="list-style-type: none"> ●The insert was clamped under improper seating condition 	<ul style="list-style-type: none"> ●Clean the clamping areas and install the insert in the recommended way ●Tighten to the specified torque
Work piece	Chipping	<ul style="list-style-type: none"> ●The feed rate is too high ●An unsuitable insert is selected 	<ul style="list-style-type: none"> ●Decrease the feed rate ●Use a smaller edge preparation ●Change to a grade highly resistant to boundary wear ●Change the cutting edge angle of the holder
	Burring	<ul style="list-style-type: none"> ●The feed rate is incorrect ●The shape of insert is not suitable 	<ul style="list-style-type: none"> ●Decrease the feed rate ●Use a smaller edge preparation
	Chatter mark	<ul style="list-style-type: none"> ●The cutting force is too great ●The rigidity of the work piece and cutting tool is insufficient 	<ul style="list-style-type: none"> ●Decrease the feed rate ●Use a smaller edge preparation ●Ensure tool overhang is minimised ●Change the cutting edge angle of the holder
	Gouging	<ul style="list-style-type: none"> ●Vibration of the cutting edge due to deposition/built-up edge 	<ul style="list-style-type: none"> ●Increase the cutting speed ●Use cutting oil excellent in lubrication performance ●Change to a grade with less affinity to the work material

Calculations for milling processes

Calculating the cutting speed



Calculating the cutting speed from the rotation speed

$$v_c = \frac{\pi \times D_c \times n}{1000}$$

(m/min)

v_c : Cutting speed (m/min)

D_c : Cutter diameter (mm)

n : Speed of revolution (min^{-1})

π : Circular constant (3.14)

Calculating the revolution speed from the cutting speed

$$n = \frac{1000 \times v_c}{\pi \times D_c}$$

(min^{-1})

Example : Obtaining the cutting speed for machining with a cutter of 200 mm diameter at the revolution speed of $1,000 \text{ min}^{-1}$:

$$v_c = \frac{\pi \times 200 \times 1000}{1000} = \underline{628 \text{ (m/min)}}$$

Calculating the feeding speed and feed rate

Calculating the feed rate per blade

$$f_z = \frac{v_f}{z \times n}$$

(mm/t)

f_z : In-feed amount per blade (mm/t)

v_f : Feed rate (mm/min)

z : Number of blades

n : Speed of revolution (min^{-1})

Calculating the feeding speed per minute

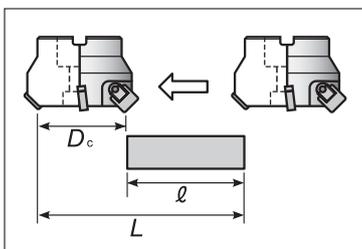
$$v_f = f_z \times z \times n$$

(mm/min)

Example : Obtaining the feed rate for milling with a 10-blade cutter at the in-feed amount of 0.2 mm/t and the revolution speed of $1,000 \text{ min}^{-1}$

$$v_f = 0.2 \times 10 \times 1000 = \underline{2000 \text{ (mm/min)}}$$

Calculating the machining time



$$T = \frac{L}{v_f}$$

(min)

T : Cutting time (min)

L : Total length of table feed
($l + D_c$)

v_f : Feed rate (mm/min)

Example : Obtaining the machining time for milling 200 mm on a work piece fed at the rate of $1,000 \text{ mm/min}$:

$$T = \frac{200}{1000} = \underline{0.2 \text{ (min)}}$$

Calculating the cutting power

$$P_c = \frac{a_e \times a_p \times v_f \times k_c}{60 \times 10^6 \times \eta} \quad (\text{kW})$$

- P_c : Required power (kW)
- a_e : Cutting length (mm)
- a_p : Depth of cut (mm)
- v_f : Feed rate (mm/min)
- k_c : Specific cutting force (N/mm²) *See the table below.
- η : Mechanical efficiency (0.7 ~ 0.8)

Example : Calculating the required power for machining grey cast iron for a length of 150 mm, at a feed rate of 1,100 mm/min and with a depth of cut of 3 mm (with 0.8 set as the mechanical efficiency and 0.2 mm as the feed per tooth/blade)

$$P_c = \frac{150 \times 3 \times 1100 \times 1400}{60 \times 10^6 \times 0.8} = 14.44 \text{ (kW)}$$

Specific cutting force

Work material	Tensile strength or hardness	Specific cutting force (N/mm ²) * k_c to cutting feed amount (mm/rev)					
		0.1mm/t	0.2mm/t	0.3mm/t	0.4mm/t	0.6mm/t	
Soft steel	520	2200	1950	1820	1700	1580	
Medium steel	620	1980	1800	1730	1600	1570	
Hard steel	720	2520	2200	2040	1850	1740	
Tool steel	SKD	670	1980	1800	1730	1700	1600
		770	2030	2030	1800	1750	1700
Cr-Mo steel	SCM	600	2180	2000	1860	1800	1670
		730	2540	2250	2140	2000	1800
Alloy steel	SNCM	900	2000	1800	1680	1600	1500
		HB350	2100	1900	1760	1700	1530
Grey cast iron	FC	HB200	1750	1400	1240	1050	970
Aluminum alloy	AC,ADC	160	580	480	400	350	320

*For power required for NTK HCC, please refer to page P31.

Calculating the volume of evacuated chips

$$Q = a_e \times a_p \times v_f \quad (\text{cm}^3/\text{min})$$

- Q : Volume of evacuated chips (cm³/min)
- a_e : Cutting length (mm)
- a_p : Depth of cut (mm)
- v_f : Feed rate (mm/min)

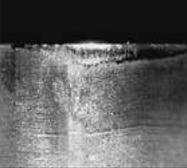
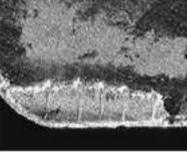
Example : Obtaining the volume of chips evacuated per minute for machining at a cutting speed of 1100 m/min, cutting length of 150mm, and with a 3 mm depth of cut:

$$Q = 150 \times 3 \times 1100 = 495 \text{ (cm}^3/\text{min)}$$

Troubleshooting for milling

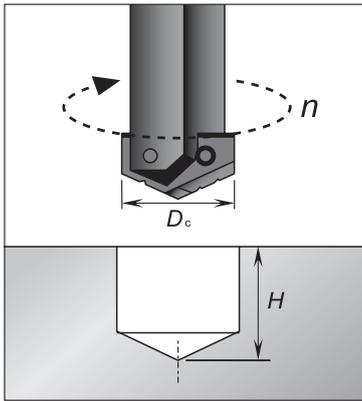
Type of problem		Material/grade selection				Cutting conditions					Tool shape									
		Change to a harder material/grade	Change to a tougher material/grade	Change to a material/grade more resistant to thermal shock	Change to a material/grade more resistant to deposition	Cutting speed ↓	Feed rate ↑	Depth of cut ↑	Review cutter diameter and cutting width	Review tool path	Coolant		Relief angle of insert ↓	Nose radius of cutting edge ↑	Cutting edge strength, honing ↑	Number of teeth/blades	Enlarge the chip pocket	Check the wiper shape	Improve accuracy of cutting edge run-out	Improve rigidity of tool
											Wet	Dry								
Possible cause		Corrective measures				↓	↑				Wet	Dry	↓	↑						
Damaged or broken cutting edge of the insert	Increased flank wear	Improper cutting conditions					↓				●									
		Unsuitable cutting edge shape	●										↓		↓			●		
	Increased wear on face	Improper cutting conditions					↓	↓	↓			●								
		Unsuitable cutting edge shape	●											↓	↓	↓				
	Fracture/chipping on cutting edge	Improper cutting conditions						↓	↓			●								
		Unsuitable cutting edge shape		●										↓	↓	↓		●	●	
	Thermal shock	Improper cutting conditions					↓	↓	↓				●							
		Unsuitable cutting edge shape			●									↓	↓					
	Built-up edge	Improper cutting conditions					↓	↓				●								
		Unsuitable cutting edge shape				●								↓	↓					
	Machining accuracy	Poor surface finish	Improper cutting conditions					↓	↓	↓			●							
			Unsuitable cutting edge shape	●			●								↓	↓		●	●	
Burring		Improper cutting conditions						↓	↓	●	●						●			
		Unsuitable cutting edge shape											↓	↓	↓		●			
Chipping		Improper cutting conditions						↓	↓			●					●			
		Unsuitable cutting edge shape											↓	↓	↓	↓	●			
Poor flatness and parallelism	Improper cutting conditions						↓	↓			●		↓	↓	↓	↓	●	●		
Others	Increased chatter/vibration	Improper cutting conditions					↓	↓	↓	●	●			↓	↓	↓				
		Unsuitable tool/blade edge shape						↓		●		●				↓	●			
	Poor chip evacuation	Improper cutting conditions					↓	↓		●		●								

Troubleshooting case studies: Milling

	Case/Symptom	Possible causes	Corrective measures
Insert	VB wear 	<ul style="list-style-type: none"> ●Cutting speed is too high. ●Feed rate is too low. ●The shape of the insert is not suitable. ●The material / grade of the insert is not suitable. 	<ul style="list-style-type: none"> ●Decrease the cutting speed. ●Increase the feed rate. ●Make the nose radius larger. ●Change to a grade highly resistant to boundary wear.
	Boundary wear 	<ul style="list-style-type: none"> ●The material / grade of the inserts is not suitable. ●The shape of the cutter is not suitable ●The shape of insert is not suitable. 	<ul style="list-style-type: none"> ●Change to a grade highly resistant to boundary wear. ●Widen the rake angle. ●Change the Insert shape to a different one.
	Chipping / fracture 	<ul style="list-style-type: none"> ●The cutting speed is incorrect. ●The shape of the cutter is not suitable ●The shape of insert is not suitable. 	<ul style="list-style-type: none"> ●Decrease the feed rate and depth of cut in order to reduce the cutting force. ●Use a smaller edge preparation. ●Prepare the cutting edge to give it a round honing. ●Change to a grade highly resistant to fracture.
	Thermal crack 	<ul style="list-style-type: none"> ●The cutting conditions are incorrect ●The material / grade of insert is not suitable 	<ul style="list-style-type: none"> ●Decrease the cutting speed. ●Change to dry cutting from wet cutting. ●Use a material / grade highly resistant to thermal shock
Work piece	Chipping 	<ul style="list-style-type: none"> ●The feed rate is too high. ●An unsuitable insert is selected. ●The shape of the cutter is not suitable. 	<ul style="list-style-type: none"> ●Decrease the feed rate. ●Use a smaller edge preparation ●Change to a grade highly resistant to boundary wear. ●Set the lead angle at 45 degrees.
	Burring 	<ul style="list-style-type: none"> ●The feed rate is incorrect. ●The shape of insert is not suitable. ●The shape of the cutter is not suitable. 	<ul style="list-style-type: none"> ●Adjust the feed rate. ●Use a smaller edge preparation. ●Make the lead angle narrower.

Calculations used for drilling

Calculating the cutting speed



Calculating the cutting speed from the rotation speed:

$$v_c = \frac{\pi \times D_c \times n}{1000}$$

- v_c : Cutting speed (m/min)
- D_c : Diameter (mm)
- n : Speed of revolution (min^{-1})
- π : Circular constant (3.14)

Calculating the speed of revolution from the cutting speed:

$$n = \frac{1000 \times v_c}{\pi \times D_c}$$

Example : Obtaining a cutting speed for drilling with a 20 mm diameter drill at a revolution speed of 1,000 min^{-1} :

$$v_c = \frac{\pi \times 20 \times 1000}{1000} = \underline{62.8 \text{ (m/min)}}$$

Calculating the feed rate

$$v_f = f \times n$$

- v_f : Feed rate (mm/min)
- f : Feed amount (mm/rev)
- n : Speed of revolution (min^{-1})

Example : Obtaining the feed rate for drilling at feed rate of 0.2 mm/rev and revolution speed of 1,000 min^{-1} :

$$v_f = 0.2 \times 1000 = \underline{200 \text{ (mm/min)}}$$

Calculating the cutting time

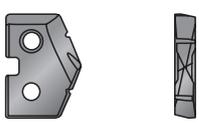
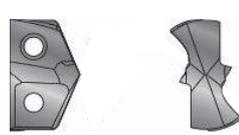
$$T = \frac{H}{v_f}$$

- T : Cutting time (min)
- H : Depth of the hole (mm)
- v_f : Feed rate (mm/min)

Example : Obtaining the cutting time for drilling a 100 mm deep hole at a feed rate of 200 mm/min:

$$T = \frac{100}{200} = \underline{0.5 \text{ (min)}}$$

Calculating the cutting power and thrust

Insert shape	GEN2 Standard	GEN3
		
Cutting power (kW)	$P_c = \frac{n \times f \times D_c^2 \times k_c}{240442.4}$	$P_c = \frac{n \times f \times D_c^2 \times k_c}{218604.8}$
Thrust (kN)	$T = 0.1366 \times f \times D_c \times k_c$	$T = 0.1571 \times f \times D_c \times k_c$

Specific cutting force

Work material		Hardness of work material	Specific cutting force (N/mm ²)
Carbon steel and alloy steel	S〇〇C	HB 85 ~ 200	5.45
	SCr	HB200 ~ 275	6.48
	SCM	HB275 ~ 375	6.89
	SNCM etc...	HB375 ~ 425	7.93
Heat-resistant alloy	Term	—	9.93
Stainless steel	SUS	HB137 ~ 275	6.48
		HRC30 ~ 40	7.45
Grey cast iron	FC	HB200 ~ 275	5.45
Copper alloy		HRB20 ~ 80	2.96
		HRB80 ~ 100	4.96
Titanium alloy		—	4.96
Aluminum alloy	AC,ADC	—	1.52

P_c : Required power (kW)

T : Thrust (kN)

n : Speed of revolution (min⁻¹)

f : Feed amount (mm/rev)

D_c : Diameter of drilling tool (mm)

k_c : Specific cutting force (N/mm²) *See the table at the left.

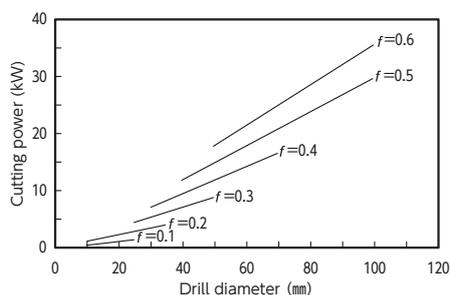
Example : Obtaining the thrust and power required for drilling grey cast iron with a 20 mm-diameter GEN drill at a revolution speed of 800 min⁻¹ and in-feed rate of 0.3 mm/rev:

$$P_c = \frac{800 \times 0.3 \times 20^2 \times 5.45}{240442.4} = 2.18 \text{ (kW)}$$

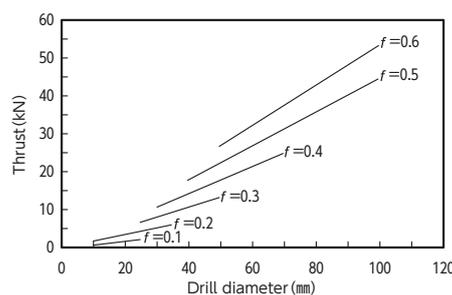
$$T = 0.1366 \times 0.3 \times 20 \times 5.45 = 4.467 \text{ (kN)}$$

Referential values (of the cutting power and thrust)

Cutting power (kW)



Thrust (kN)

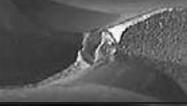
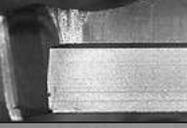
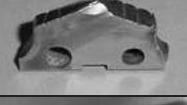
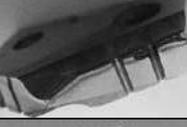
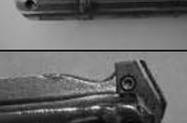


Work material : SCM420 (HB200)
 Cutting speed : $v_c = 70\text{m/min}$
 Coolant : internally supplied

Troubleshooting for drilling

Corrective measures	Type of problem	Possible cause	Cutting conditions						Tool shape				Machine/ installation						
			Cutting speed		Feed rate	Provide step feed	Tool shape			Chisel width	Width of hone	Center thickness	Shorten the fluted groove length	Use an X-thinning type	Improve the installation accuracy of the drilling tool	Review the overhang of the drilling tool	Level the work surface to be cut	Improve the rigidity of the workpiece	
			Decrease	Increase			Increase the density	Increase the supply rate	Decrease the supply pressure										
			Decrease	Increase	Decrease the feed rate for the in-feed of the cutting edge	Decrease the feed rate for exiting from a through hole	Improve the accuracy and depth of pilot holes	Increase the density	Increase the supply rate	Decrease the supply pressure	Decrease	Increase	Shorten the fluted groove length	Use a drilling tool with internal coolant supply	Use an X-thinning type	Improve the installation accuracy of the drilling tool	Review the overhang of the drilling tool	Level the work surface to be cut	Improve the rigidity of the workpiece
Poor tool life	Drill breakage	Improper drilling rigidity										→	●						
		Improper cutting conditions		→															
		Greater run-out of holder													●				●
		Slanted work surface															●		
	Chipping on peripheral cutting edge	Improper cutting conditions		→			●												
		Greater run-out of holder												●					●
		Chatter/vibration									→				●			●	●
	Greater wear on peripheral cutting edge/margin	Improper cutting conditions		→															
		Cutting heat at the drilling point too high							●	●				●					
		Poor run-out accuracy													●				
	Chipping on chisel	Width of chisel too wide									→								
		Poor performance in biting/in-feed					●												
Chattering/vibration											→				●		●	●	
Poor dimensional accuracy of hole	Larger hole diameter	Insufficient rigidity of drill										→	●						
		Unsuitable drilling tool shape																	
	Smaller hole diameter	Cutting heat at the drilling point too high							●	●				●					
		Improper cutting conditions		→															
	Poor geometric straightness	Unsuitable drilling tool shape																	
		Insufficient rigidity of drill										→	●						
		Greater run-out of holder													●				●
	Poor positioning accuracy, roundness and surface finish of hole	Insufficient guiding performance							●										
		Insufficient rigidity of drill										→	●						
		Poor performance when in-feed												●					
		Improper cutting conditions					●												
	Burring at exit	Greater run-out of holder													●				●
Unsuitable drilling tool shape											→								
Chip control	Elongated chips	Improper cutting conditions		→				●											
		Insufficient chip evacuation							●	●		→		●					
	Jammed chips	Improper cutting conditions		→	→				●										
		Insufficient chip evacuation							●	●		→		●					

Troubleshooting case studies: Drilling

	Case/Symptom	Possible causes	Corrective measures
Insert	Chisel wear 	<ul style="list-style-type: none"> ● The hardness of the work material is too high. ● Excessive feed ● Run-out of the main spindle of the machine 	<ul style="list-style-type: none"> ● Change to a grade highly resistant to heat or a coated type. ● Adjust to high cutting speed and low feed rate conditions ● Correct the run-out of the machine's main spindle.
	Nose wear 	<ul style="list-style-type: none"> ● The work material is one of those which promote abrasion. ● Run-out of the main spindle of the machine 	<ul style="list-style-type: none"> ● Change to a grade highly resistant to wear or a coated type. ● Adjust so that a low cutting speed and high feed rate are used ● Correct the run-out of the machine's main spindle.
	Margin wear 	<ul style="list-style-type: none"> ● Excessive heat ● Deposition ● Insufficient coolant supply ● Run-out of the main spindle of the machine 	<ul style="list-style-type: none"> ● Adjust so that a low cutting speed and high feed rate are used ● Change to a grade highly resistant to heat or a coated type. ● Increase the coolant feed rate. ● Correct the run-out of the machine's main spindle.
	Margin wear 	<ul style="list-style-type: none"> ● Excessive heat ● Jammed chips ● Insufficient coolant supply 	<ul style="list-style-type: none"> ● Adjust so that a low cutting speed and high feed rate are used ● Change to a grade highly resistant to wear or a coated type. ● Increase the coolant feed rate.
	Chipping on cutting edge 	<ul style="list-style-type: none"> ● Deposition is caused to the cutting edge. ● Insufficient strength of the insert ● Jammed chips ● Run-out of the main spindle of the machine 	<ul style="list-style-type: none"> ● Change the cutting conditions by checking the cutting edge. ● Change to a grade highly resistant to fracture. ● Increase the coolant feed rate and pressure. ● Correct the run-out of the machine's main spindle.
	Fractured cutting edge 	<ul style="list-style-type: none"> ● There is a pilot hole. ● The hardness of the work material is too high. ● The angle for centering is too acute. 	<ul style="list-style-type: none"> ● Decrease the feed rate at the entrance of the pilot hole. ● Change the insert grade to a stronger one. ● Carry out centering with an insert whose apex angle is 132 degrees or greater.
	Deposition on cutting edge 	<ul style="list-style-type: none"> ● The density of the coolant is too high. ● Insufficient lubrication due to mist or dry cutting condition ● The hardness of the work material is too high. 	<ul style="list-style-type: none"> ● Check the coolant density. ● Adjust so that a high cutting speed and low feed rate are used ● Internally supply coolant of a water-soluble type. ● Use a coated insert of a grade highly resistant to deposition.
Holder	Breakage 	<ul style="list-style-type: none"> ● Excessive torque ● Excessive feed ● Jammed chips 	<ul style="list-style-type: none"> ● Decrease the settings for cutting. ● Provide stepped feed. ● Increase the coolant feed rate and pressure.
	Warped slit 	<ul style="list-style-type: none"> ● Excessive feed 	<ul style="list-style-type: none"> ● Lower the feed rate. ● Use a holder of a larger diameter.
	Entangled chips 	<ul style="list-style-type: none"> ● Improper cutting conditions ● The shape of the chipbreaker is not suitable. 	<ul style="list-style-type: none"> ● Adjust so that a low cutting speed and high feed rate are used ● Use a HI-chipbreaker.
	Wear on side surfaces 	<ul style="list-style-type: none"> ● Jammed chips ● The cutting speed is too high. ● The clearance between the drill bush and holder is insufficient. 	<ul style="list-style-type: none"> ● Decrease the cutting speed. ● Review the clearance between the drill bush and holder.
	Wear 	<ul style="list-style-type: none"> ● Wear due to contact with work materials and chips 	<ul style="list-style-type: none"> ● Replace the holder with a new one periodically. (guideline: every 100th replacement insert)
Work piece	Spiral shaped gouges on inner surface 	<ul style="list-style-type: none"> ● The holder is too long. ● Run-out of the main spindle of the machine ● Run out at the time of engagement 	<ul style="list-style-type: none"> ● Optimize the holder length. ● Correct the run-out of the machine's main spindle. ● Decrease the settings for in-feed/engagement. ● Use a notch-point type insert.
	Scratches on inside surface 	<ul style="list-style-type: none"> ● Deposition ● Poor chip evacuation ● Insufficient coolant feed rate and pressure 	<ul style="list-style-type: none"> ● Decrease the cutting speed. ● Use a HI-chipbreaker. ● Increase the coolant feed rate and pressure.
	Burrs at the exit of hole 	<ul style="list-style-type: none"> ● The hardness of the work material is low. ● The corner clip is not suitable. ● The feed rate at the exit is too high. 	<ul style="list-style-type: none"> ● Decrease the feed rate for exiting from the hole. ● Use a CR chipbreaker.

Approximate data conversions of Brinell hardness.

Brinell hardness, 10 mm balls, 3000 kgf load	Rockwell hardness					Shore hardness	Tensile strength Kgf/mm ² [N/m ²] Approximate value MPa ⁽¹⁾
	Standard ball	Tungsten carbide ball	Vickers Hardness (HV)	Scale A Load : 60 kgf brale indenter (HRA)	Scale B Load : 100 kgf Diameter 1/16" indenter (HRB)		
-	-	940	85.6	-	68	97	
-	-	920	85.3	-	67.5	96	
-	-	900	85	-	67	95	
-	(767)	880	84.7	-	66.4	93	
-	(757)	860	84.4	-	65.9	92	
-	(745)	840	84.1	-	65.3	91	
-	(733)	820	83.8	-	64.7	90	
-	(722)	800	83.4	-	64	88	
-	(710)	780	83	-	63.3	87	
-	(698)	760	82.6	-	62.5	86	
-	(684)	740	82.2	-	61.8	84	
-	(670)	720	81.8	-	61	83	
-	(656)	700	81.3	-	60.1	81	
-	(647)	690	81.1	-	59.7	-	
-	(638)	680	80.8	-	59.2	80	
-	630	670	80.6	-	58.8	-	
-	620	660	80.3	-	58.3	79	
-	611	650	80	-	57.8	-	
-	601	640	79.8	-	57.3	77	
-	591	630	78	-	56.8	-	
-	582	620	79.2	-	56.3	75	
-	573	610	78.9	-	55.7	-	
-	564	600	78.6	-	55.2	74	
-	554	590	78.4	-	54.7	-	
-	545	580	78	-	54.1	72	
-	535	570	77.8	-	53.6	-	
-	525	560	77.4	-	53	71	
-	517	550	77	-	52.3	-	
-	507	540	76.7	-	51.7	69	
-	497	530	76.4	-	51.1	-	
-	488	520	76.1	-	50.5	67	
-	479	510	75.7	-	49.8	-	
-	471	500	75.3	-	49.1	66	
-	460	490	74.9	-	48.4	-	
-	452	480	74.5	-	47.7	64	
-	442	470	74.1	-	46.9	-	
-	433	460	73.6	-	46.1	62	
-	425	450	73.3	-	45.3	-	
-	415	440	72.8	-	44.5	59	
-	405	430	72.3	-	43.6	-	

Brinell hardness, 10 mm balls, 3000 kgf load	Rockwell hardness					Shore hardness	Tensile strength Kgf/mm ² [N/m ²] Approximate value MPa ⁽¹⁾
	Standard ball	Tungsten carbide ball	Vickers Hardness (HV)	Scale A Load : 60 kgf brale indenter (HRA)	Scale B Load : 100 kgf Diameter 1/16" indenter (HRB)		
-	397	420	71.8	-	42.7	57	
-	388	410	71.4	-	41.8	-	
-	379	400	70.8	-	40.8	55	
-	369	390	70.3	-	39.8	-	
-	360	380	69.8	(110.0)	38.8	52	
-	350	370	69.2	-	37.7	-	
-	341	360	68.7	-	36.6	50	
-	331	350	62.1	-	35.5	-	
-	322	340	67.6	-	34.4	47	
-	313	330	67	-	33.3	-	
247	247	260	62.4	(101.0)	24	37	825
243	243	255	62	-	23.1	-	805
238	238	250	61.6	99.5	22.2	36	795
233	233	245	61.2	-	21.3	-	780
228	228	240	60.7	98.1	20.3	34	765
219	219	230	-	96.7	(18.0)	33	730
209	209	220	-	95	(15.7)	32	695
200	200	210	-	93.4	(13.4)	30	670
190	190	200	-	91.5	(11.0)	29	635
181	181	190	-	89.5	(8.5)	28	605
171	171	180	-	87.1	(6.0)	26	580
162	162	170	-	85	(3.0)	25	545
152	152	160	-	81.7	(0.0)	24	515
143	143	150	-	78.7	-	22	490
133	133	140	-	75	-	21	455
124	124	130	-	71.2	-	20	425
114	114	120	-	66.7	-	-	390
105	105	110	-	62.3	-	-	-
95	95	100	-	56.2	-	-	-
90	90	95	-	52	-	-	-
86	86	90	-	48	-	-	-
81	81	85	-	41	-	-	-

(1) 1MPa=1N/mm²

(2) This table is an excerpt from the JIS Iron and Steel Handbook.

(3) Values in parentheses in the above table are not usually used.

Symbols used for machining, SI unit conversion table

■ Symbols used for cutting

■ Turning

Item	New symbol	Old symbol	Unit
Cutting speed	v_c	v	m/min
Feed rate	f	f	mm/rev
Depth of cut	a_p	d	mm
Width of cutting edge	W	W	mm
Diameter of work	D_m	D	mm
Cutting power	P_c	P_{kw}	kW
Specific cutting force	k_c	k_s	MPa
Theoretical surface finish	h	R_z	μm
Nose radius	r_ϵ	R	mm
Revolution speed	n	N	min^{-1}

■ Drilling

Item	New symbol	Old symbol	Unit
Cutting speed	v_c	v	m/min
Feeding speed	v_f	F	mm/min
Feed rate	f	f	mm/rev
Diameter	D_c	$D(D_s)$	mm
Cutting power	P_c	P_{kw}	kW
Specific cutting force	k_c	K_s	MPa
Drilling depth	H	d	mm
Revolution speed	n	N	min^{-1}

■ Milling

Item	New symbol	Old symbol	Unit
Cutting speed	v_c	v	m/min
Feeding speed	v_f	F	mm/min
In-feed rate per blade	f_z	f	mm/t
Feed rate	f	f	mm/rev
Number of blades	z	z	piece
Axial depth of cut	a_p	d	mm
Radial depth of cut	a_e	w	mm
Pick feed	P_f	P_f	mm
Cutting power	P_c	P_{kw}	kW
Specific cutting force	k_c	K_s	MPa
Vol of evacuated chips	Q	Q	cm^3/min
Revolution speed	n	N	min^{-1}

■ SI unit conversion table (SI units are indicated in bold line columns.) (The tables below are excerpts from the JIS Iron and Steel Handbook)

■ Force

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

■ Stress

1Pa=1N/m², 1MPa=1N/mm²

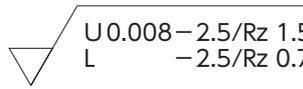
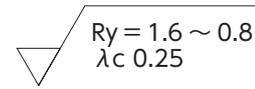
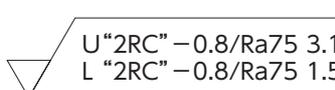
Pa or N/m ²	MPa or N/mm ²	kgf/mm ²	kgf/cm ²	kgf/m ²
1	1×10^{-6}	1.01972×10^{-7}	1.01972×10^{-5}	1.01972×10^{-1}
1×10^6	1	1.01972×10^{-1}	1.01972×10	1.01972×10^5
9.80665×10^6	9.80665	1	1×10^2	1×10^6
9.80665×10^4	9.80665×10^{-2}	1×10^{-2}	1	1×10^4
9.80665	9.80665×10^{-6}	1×10^{-6}	1×10^{-4}	1

■ Pressure

1Pa=1N/m²

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

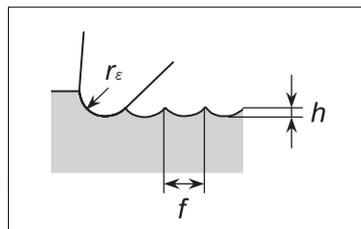
Changes in JIS Surface Roughness Standards

		JIS B0601 (2001) ISO 4287(1997) / ISO 1302 (2002)	JIS B0601 (1994) JIS B0031 (1982)	
Cross-section curve		No filter, digital signal	No filter, digital signal	
	Evaluation length	Shape length	—	
	Maximum height	Pt	—	
	10-point average roughness	—	—	
Roughness curve		Phase correction, band $\lambda_s - \lambda_c$	Phase correction, short wavelength λ_c	
	Evaluation length	Determine individually for each standard length λ_c .	Average for λ_n , calculated for each standard length λ_c	
	Maximum height	Maximum height Rz	Maximum height Ry	
	Set standard length based on height parameters Rz, Rmax, and Ry.	0.25mm	0.1 ~ 0.5 μ m	0.1 ~ 0.5 μ m
		0.8mm	0.5 ~ 10 μ m	0.5 ~ 10 μ m
		2.5mm	10 ~ 50 μ m	10 ~ 50 μ m
	Dimension indicated in drawing	 U 0.008-2.5/Rz 1.5 L -2.5/Rz 0.7	 Ry = 1.6 ~ 0.8 λ_c 0.25	
	10-point average roughness	Rz_{JIS}	Rz	
	Center line average roughness	Ra ₇₅	Ra75	
	Arithmetic average roughness	Arithmetic average roughness Ra	Arithmetic average roughness Ra	
	Set standard length based on height parameters Rz, Rmax, and Ry.	0.25mm	0.1 ~ 0.5 μ m	0.1 ~ 0.5 μ m
		0.8mm	0.5 ~ 10 μ m	0.5 ~ 10 μ m
2.5mm		10 ~ 50 μ m	10 ~ 50 μ m	
Dimension indicated in drawing	 U "2RC" -0.8/Ra75 3.1 L "2RC" -0.8/Ra75 1.5	1.6 ~ 3.2 		

Theoretical surface roughness

The theoretical surface roughness for lathe machining is the minimum value which can be obtained under the set machining conditions, and can be expressed by the following formula.

$$h_{(\mu\text{m})} = \frac{f^2}{8 r_\epsilon} \times 1000$$



- h : Theoretical surface roughness (μm)
- f : Feed amount (mm/rev)
- r_ϵ : Nose radius (mm)

Actual surface roughness

- When machining steel: Theoretical surface roughness x 1.5-3
- When machining cast iron: Theoretical surface roughness x 3-5

Surface finish improvement measures

- Increase the nose radius.
- Use a wiper insert.
- Adjust the cutting speed and/or feed amount.
- Change the material and/or shape of the insert

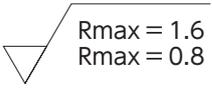
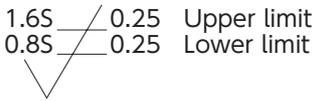
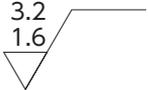
Relationship with triangle symbols

Arithmetic average roughness Ra (μm)	Maximum height Rz (μm)	10-point average roughness Rz _{JIS} (μm)	※ (Triangle symbol)
0.025	0.1	0.1	
0.05	0.2	0.2	
0.1	0.4	0.4	
0.2	0.8	0.8	
0.4	1.6	1.6	
0.8	3.2	3.2	
1.6	6.3	6.3	
3.2	12.5	12.5	
6.3	25	25	
12.5	50	50	
25	100	100	

• Examples of reading

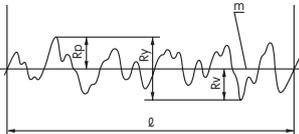
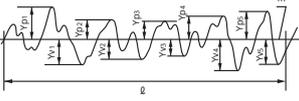
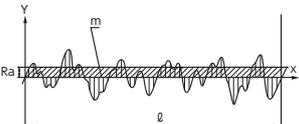
- (i) When Ra = 1.6 μm → 1.6 μm Ra
- (ii) When Rz = 6.3 μm → 6.3 μm Rz
- (iii) When Rz_{JIS} = 6.3 μm → 6.3 μm Rz_{JIS}

※ The finishing symbols (triangle symbol ∇ and symbol \sim) are no longer used in JIS pursuant to the 1994 revision.

JIS B0601 (1982) JIS B0031 (1982)	JIS B0601 (1970) JIS B0031 (1970)	JIS B0601 (1970)
No filter, analog signal	No filter, analog signal	No filter, analog signal
One standard length	One standard length	One standard length
R _{max}	R _{max} (S indication)	H _{max} (S)
R _z	R _z (Z indication)	—
2RC, short wavelength cut-off λ _c	2RC, short wavelength cut-off λ _c	—
One measured length ≥ 3λ _c	One measured length ≥ 3λ _c	—
—	—	—
0.8μm or less	0.8μm or less	Select from 0.3, 1, 3, 5 and 10mm
0.8 ~ 6.3μm	0.8 ~ 6.3μm	Select from 0.3, 1, 3, 5 and 10mm
6.3 ~ 25μm	6.3 ~ 25μm	Select from 0.3, 1, 3, 5 and 10mm
	Surface symbol or triangle symbol	Triangle symbol
		0.8S or less 
		1.5S ~ 6S 
		12S ~ 25S 
		35S or higher
—	—	—
R _a	R _a ("a" indication)	—
—	—	—
—	—	—
R _a shall be 12.5μm or less.	λ _c shall be 0.8 mm.	—
12.5 ~ 100μm	—	—
	Surface symbol or triangle symbol	
	0.2a or less 	
	0.4a ~ 1.6a 	—
	3.2a ~ 6.3a 	
	12.5a to 25a or more	

New Products
 Tool Materials / Selection Guide
 PCD, CBN and ceramic
 Cermet
 PVD-coated Cermet
 Micro-grain Carbide, Carbide
 Insert Stock List
 Outside Machining Toolholders
 SS
 Grooving Tools
 Threading Tools
 Shaper
 Internal machining tool range
 Original Tools for Various Applications
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Obtaining the surface roughness

Type	New symbol JIS B0601:01	Old symbol JIS B0601:94	Calculation	Obtaining method (example)
Max. height (Peak)	R _z	R _y	The addition of the max. value for the depth R _v and the max. height R _p on the roughness curve for the reference length: $R_z = R_p + R_v$	
Average roughness of 10 points	R _{Z_{JIS}}	R _z	The addition of the average of the maximum to fifth highest vales and the average of the deepest to the fifth deepest values on the roughness curve for the reference length: $R_{Z_{JIS}} = \frac{(Y_{p1} + Y_{p2} + Y_{p3} + Y_{p4} + Y_{p5}) + (Y_{v1} + Y_{v2} + Y_{v3} + Y_{v4} + Y_{v5})}{5}$	
Arithmetic average of roughness	R _a	R _a	The average of absolute values on the roughness curve f(x) for the reference length: $R_a = \frac{1}{l} \int_0^l f(x) dx$	

Conditions for measuring R parameters

Non-cyclic wave form (random wave form)		Settings for measuring	
Range of R _a (μm)	Range of R _z (μm)	Reference length l _r (mm) = cut-off λ _c (mm)	Evaluated length l _n (mm) = l _r × 5
0.006 < R _a ≤ 0.2	0.025 < R _z ≤ 0.1	0.08	0.4
0.02 < R _a ≤ 0.1	0.1 < R _z ≤ 0.5	0.25	1.25
0.1 < R _a ≤ 2	0.5 < R _z ≤ 10	0.8	4
2 < R _a ≤ 10	10 < R _z ≤ 50	2.5	12.5
10 < R _a ≤ 80	50 < R _z ≤ 200	8	40

Cutting edge positional dimension list for each nose radius

Edge code	Shape of the edge	Dimensions (mm)			Edge code	Shape of the edge	Dimensions (mm)		
		r_ϵ	X	Y			r_ϵ	X	Y
K	80 degree rhombic insert (100° corner) 	0.4	0.007	0.028	Q	35 degree rhombic insert 	0.4	0.537	0.537
		0.8	0.015	0.055			0.8	1.073	1.073
		1.2	0.022	0.083			1.2	1.610	1.610
		1.6	0.029	0.110			1.6	2.146	2.146
		2.4	0.044	0.165			2.4	3.218	3.218
L	80 degree rhombic insert [Type 31] 	0.4	0.040	0.040	S	Square insert [Type 12] 	0.4	0.164	0.164
		0.8	0.079	0.079			0.8	0.329	0.329
		1.2	0.119	0.119			1.2	0.493	0.493
		1.6	0.159	0.159			1.6	0.658	0.658
		2.4	0.238	0.238			2.4	0.986	0.986
P	55 degree rhombic insert 	0.4	0.463	—	V	35 degree rhombic insert 	0.4	0.923	—
		0.8	0.925	—			0.8	1.846	—
		1.2	1.389	—			1.2	2.769	—
		1.6	1.851	—			1.6	3.692	—
		2.4	2.776	—			2.4	5.538	—
Q	55 degree rhombic insert 	0.4	0.211	0.211	Y	Square insert [Type 17] 	0.4	0.003	0.033
		0.8	0.422	0.422			0.8	0.006	0.066
		1.2	0.633	0.633			1.2	0.009	0.099
		1.6	0.844	0.844			1.6	0.012	0.132
		2.4	1.265	1.265			2.4	0.017	0.132

※The above values of X and Y in this list are based on a rake angle of 0 degrees. Therefore, these values slightly differ from actual ones.
 “[Type _ _]” denotes the type number of a standard C-type holder.

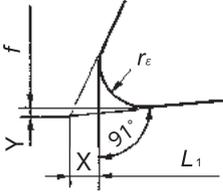
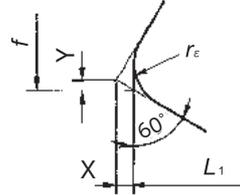
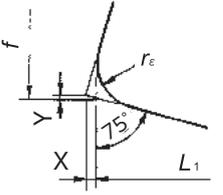
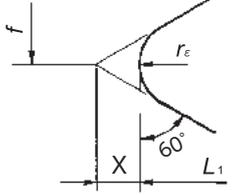
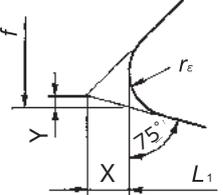
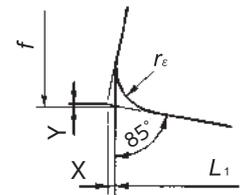
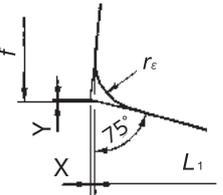
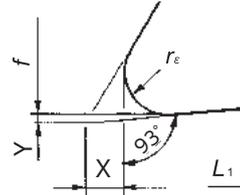
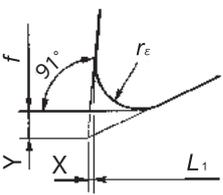
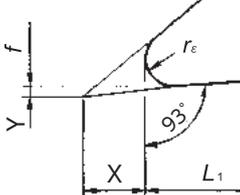
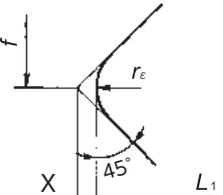
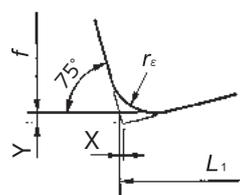
Determining the position of the insert nose

Calculating the position of the nose (mm)

Shape	Calculation expression
	$m = \frac{3}{2}d - r_\epsilon$
	$m = (\sqrt{2} - 1) \times \left(\frac{d}{2} - r_\epsilon\right)$
	$m = \left(\frac{1}{\sin\frac{\theta}{2}} - 1\right) \times \left(\frac{d}{2} - r_\epsilon\right)$

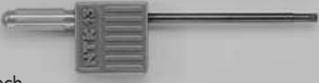
Values of “ ϕd ” and “ r_ϵ ” used to calculate “m” (mm)

Inscribed circle code	Calculation value(ϕd)	Nose code	Nominal value	Calculation value(r_ϵ)
—	5	Y	0.2	0.2032
—	6	1	0.4	0.3969
—	7	2	0.8	0.7938
2	8	3	1.2	1.1906
—	0	4	1.6	1.5875
3	—	6	2.4	2.3812
4	—			
5	—			
6	—			
8	—			

Edge code	Shape of the edge	Dimensions (mm)			Edge code	Shape of the edge	Dimensions (mm)		
		r_e	X	Y			r_e	X	Y
A (G)	Triangular insert [Type 21, 22] 	0.4	0.283	0.012	E (T)	Square insert [Type 13] 	0.4	0.145	0.043
		0.8	0.567	0.024			0.8	0.291	0.084
		1.2	0.850	0.036			1.2	0.436	0.168
		1.6	1.134	0.048			1.6	0.581	0.252
		2.4	1.701	0.072			2.4	0.872	0.503
B (R)	Square insert [Type 11, 16] 	0.4	0.089	0.024		Triangular insert [Type 24] 	0.4	0.397	—
		0.8	0.178	0.048			0.8	0.794	—
		1.2	0.268	0.072			1.2	1.191	—
		1.6	0.357	0.096			1.6	1.587	—
		2.4	0.535	0.143			2.4	2.381	—
	Triangular insert [Type 23] 	0.4	0.370	0.099	H	Square insert 	0.4	0.033	0.003
		0.8	0.740	0.198			0.8	0.066	0.006
		1.2	1.110	0.297			1.2	0.099	0.009
		1.6	1.480	0.397			1.6	0.132	0.012
		2.4	2.219	0.595			2.4	0.089	0.017
80 degree rhombic insert 	0.4	0.028	0.007	J	55 degree rhombic insert 	0.4	0.344	0.039	
	0.8	0.055	0.015			0.8	0.687	0.079	
	1.2	0.083	0.022			1.2	1.031	0.118	
	1.6	0.110	0.029			1.6	1.375	0.157	
	2.4	0.165	0.044			2.4	2.062	0.236	
C (F)	Triangular insert [Type 25] 	0.4	0.012		0.283	35 degree rhombic insert 	0.4	0.839	0.065
		0.8	0.024		0.567		0.8	1.679	0.131
		1.2	0.036		0.850		1.2	2.518	0.196
		1.6	0.048		1.134		1.6	3.357	0.261
		2.4	0.072		1.701		2.4	5.036	0.392
D	Square insert [Type 14] 	0.4	0.164	—	K	Square insert [Type 15] 	0.4	0.024	0.089
		0.8	0.329	—			0.8	0.048	0.178
		1.2	0.493	—			1.2	0.072	0.268
		1.6	0.658	—			1.6	0.096	0.357
		2.4	0.986	—			2.4	0.143	0.535

Wrench specifications

Standard part

Part No.	Shape
CLR-13S Previous P/N RLR-13S	 RECO wrench
CLR-15S Previous P/N RLR-15S	 RECO wrench
RLR-20S	
LLR-25S	
LLR-25S-20*65	
LLR-28S	

◆ The wrenches below among L-shaped wrenches can be supplied as options.

Optional part

〈LLR type〉

Part No.	Shape
LLR-13S	
LLR-15S	
LLR-20S	

- RECO wrenches can be disassembled to dispose of each part separately.
- ※ Do not disassemble except for disposal purpose.

◆ To further improve your operation, screwdriver-type wrenches are also available.

〈Screwdriver type〉

Part No.	Handle with magnet
XX2815-04	

Part No.	Changeable bits
HLR-13S	
HLR-15S	
HLR-20S	
HLR-25S	

〈Combinations and the part numbers〉

Part No.	Description
XX2815-04-13S	Handle with bit (HLR-13S)
XX2815-04-15S	Handle with bit (HLR-15S)
XX2815-04-20S	Handle with bit (HLR-20S)
XX2815-04-25S	Handle with bit (HLR-25S)



List of screws and wrenches for screw type holders

Clamping screw				Dimensions (mm)			Angle (degrees)	Standard wrench		
Shape	Code	Part No.	Stock	a	b	c	θ	Code	Part No.	Stock
	5704739	LR-S-2*3.5	○	M2×P0.4	3.1	3.5	82	5681994	CLR-13S	●
	5907704	LR-S-2*3.7	●	M2×P0.4	3.1	3.7	82			
	5907712	LR-S-2*4.4	●	M2×P0.4	3.1	4.4	82			
	5907720	LR-S-2*5.5	●	M2×P0.4	3.0	5.5	90			
	5907738	LR-S-2.5*4.8	●	M2.5×P0.45	3.6	4.8	82	5681978	CLR-15S	●
	5704747	LR-S-2.5*5.5	○	M2.5×P0.45	3.6	5.5	82			
	5907746	LR-S-2.5*6	●	M2.5×P0.45	3.5	6.0	90			
	5907753	LR-S-2.5*6.8	●	M2.5×P0.45	3.5	6.8	90			
	5773619	LR-S-3*5.8	○	M3×P0.5	4.1	5.8	90			
	5907761	LR-S-3*6.2	●	M3×P0.5	5.2	6.2	82			
5907779	LR-S-3*7.8	●	M3×P0.5	4.0	7.8	90	5485164	RLR-20S	●	
5907787	LR-S-4*5.8	●	M4×P0.7	5.8	6.0	82				
5907795	LR-S-4*9	○	M4×P0.7	5.8	9.0	82				
	5116991	LR-S-4*10PW	●	M4×P0.7	5.8	10.0	90	5681978	CLR-15S	●
	5534029	LRIS-2*6	○	M2×P0.4	2.6	6.0	60	5681994	CLR-13S	●
	5907803	LRIS-2.2*6	●	M2.2×P0.45	3.15	6.0	60			
	5989181	LRIS-2.5*5	●	M2.5×P0.45	3.6	5.0	60	5681978	CLR-15S	●
	5907811	LRIS-2.5*7	●	M2.5×P0.45	3.6	7.0	60			
	5907829	LRIS-3*6	○	M3×P0.5	4.0	6.0	60	5485164	RLR-20S	●
	5428156	LRIS-3*8	●	M3×P0.5	4.2	8.0	60			
	5477328	LRIS-4*5	●	M4×P0.7	5.85	5.0	60	5364930 5794698	LLR-25S LLR-25S-20*65	●
	5907837	LRIS-4*6	○	M4×P0.7	5.85	6.0	60			
	5977566	LRIS-4*8	●	M4×P0.7	5.85	8.0	60			
	5907845	LRIS-4*10	●	M4×P0.7	5.85	10.0	60			
5684105	LRIS-4*12	●	M4×P0.7	5.85	12.0	60				
5907852	LRIS-5*10	○	M5×P0.8	7.0	9.5	60				
5116983	LRIS-4*10PW	●	M4×P0.7	5.7	10.0	60	5681978	CLR-15S	●	
5090576	LRIS-4*12PW	●	M4×P0.7	5.7	12.0	60				

Cautions to be observed during the tightening process

- Before starting tightening, make sure there is no deformation at the tip end portion of the wrench and the wrench hole of the screw.
- The wrench should be vertically aligned to the screw before it is tightened, as shown below.



- Please exercise precautions because a clamping torque exceeding the guaranteed torque may result in breakage of the wrench.

※Please order wrenches and bits by the unit of 5.
 ※Please order clamping screws by the unit of 10.

Guaranteed tightening torque of the wrench

Wrench/bit P/N	Guaranteed tightening torque (N·m)
CLR LLR HLR 13S	0.7
// 15S	1.4
RLR LLR HLR 20S	3.0
LLR HLR 25S	5.0
// 28S	7.0

New Products
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 PCD, CBN and ceramic
 Cermet
 Micro-grain Carbide, Carbide
 Insert Stock List
 Outside Machining Toolholders
 SS
 Grooving Tools
 Threading Tools
 Shaper
 Internal machining tool range
 Original Tools for Various Applications
 Indexable End Milling Tools
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Materials and grade comparison table by cutting tool manufacturer

CBN

Classification	NTK	Sumitomo	Tungalloy	Mitsubishi materials	Kyocera
K (for cast iron)	B16	BN500		MB710	KBN60M KBN900
	B23 B30	BN600 BN700 BNS800	BX930 BX950 BX90S BXC90	MB730 MBS140	
H (for hardened materials)	B52	BNX10 BNC80 BNC160 BNC200 BN250	BX310 BXC30 BX330 BXC50 BXA30 BXA40	MBC010 MBC020 MB810 MB825 MB8025 MB835 MB820	KBN510 KBN10C KBN10M KBN25C KBN525 KBN900 KBN25M KBN25C KBN05M KBN30M KBN35M
	B36 B40	BNX10 BNX20 BNC300 BN300 BNX25	BX360 BX380 BX530		

Ceramic

Classification	NTK	Sumitomo	Tungalloy	Kyocera	Nippon Tungsten
K (for cast iron)	HC1 HW2 SE1 HC2 HC6 HC7 ZC7	NB90S NB90M	LX11 LX21	KA30	NPC-H2 NPC-A2
	WA1 SX6	NS260C NS260 WX120	WG300	A65 A66N PT600M KT66	NX NXA Whiskal Win
	SX9 SP9		FX105 CX710	KS6000	
S (for heat-resistant alloy)	WA1 SX9 WA5 SX7	WX120	WG300		Whiskal Win
H (for hardened materials)	HC4 HC7 ZC7	NB100C	LX11	A65 A66N KT66 PT600T	NPC-A2 Win
	WA1 WA5				

Cermet

Classification	NTK	Sumitomo	Tungalloy	Mitsubishi materials	Kyocera
P (for steel)	Z15 T15 Q15	T110A T2000Z	NS520 GT720 NS710 NS720 AT530		TN30 PV30
		T1200A		NX2525 AP25N	TN60 TN6010 PV60 TN6020
	C7X C7Z	T3000Z	NS730 NS530 GT530 GT730	NX3035 UP35N	TN90 PV7020 PV90 PV7010 TN100M
	N40	T250A	GT520 NS740	NX4545 VP45N	
M (for stainless steel)	T15	T110A T2000Z	NS520 GT720 AT530 GT730 GT530	NX2525 AP25N	TN60 TN6020 PV60 PV7020
	C7X	T1200A	NS530 NS730	NX3035	TN90 TN100M PV90
	N40	T3000Z T250A	NS740	NX4545	
K (for cast iron)	T15	T110A T2000Z T1200A	NS520 AT520 NS530 GT720 GT520 GT730 GT530	NX1010 NX2525 AP25N	TN30 TN6010 PV30 TN6020 TN60 PV7005 PV60 PV7020

PVD-coated materials

Classification	NTK	Sumitomo	Tungalloy	Mitsubishi materials	Kyocera	Sandvik
P (for steel)	VM1 TM1 ZM3 DT4 QM3 DM4 TM4	AC530U ACZ150 ACZ310 AC520U ACZ330 ACP200 ACP300	AH710 GH330 AH730 AH140 AH120 AH740	VP10MF VP20MF VP15TF UP20M VP20RT VP30RT	PR915 PR1005 PR930 PR1115 PR1025 PR1225	GC1010 GC2145 GC1020 GC4125 GC1025 GC1120 GC1030 GC1125
M (for stainless steel)	VM1 TM1 DT4 DM4 ZM3 QM3 TM4	AC510U AC520U AC530U ACZ150 EH150Z EH520Z ACP200 ACP300	AH710 GH330 GH730 SH730 AH730 AH120 AH140	VP10MF VP20MF VP15TF UP20M	PR915 PR1025 PR1225 PR930 PR1125	GC1005 GC1105 GC1020 GC2030 GC1025 GC4125 GC1120 GC1125 GC2035 GC2145
K (for cast iron)	DM4 QM3	EH10Z EH20Z ACZ310 EH510Z AC510U ACK300	AH110 GH110 AH120	VP05RT VP10RT VP15TF	PR905	GC1010 GC1020 GC1120 GC1425

CVD-coated materials

Classification	NTK	Sumitomo	Tungalloy	Mitsubishi materials	Kyocera	Sandvik
P (for steel)	CP5 CP7	AC700G AC820P AC2000 AC830P AC3000 AC630M	T9005 T9015 T9025 T9035 T3130	UE6005 UE6110 UE6010 UC6010 UE6020 F7030 UH6400 UE6035	CA5505 CA5515 CA5025 CA5525 CR9025 CA5535	GC4205 GC4215 GC3115 GC4225 GC4220 GC2015 GC1515 GC1515 GC4235 GC4230 GC2025 GC2135 GC235
M (for stainless steel)	CP5	AC610M AC630M	T9015 T3130 T6020 T9025 T6030	US7020 UC7020 F7030 US735	CA6515 CA6525	GC2015 GC2025 GC2040 GC2135 GC235
K (for cast iron)	CP1 CP5	AC410K AC300G AC700G AC820P	T5010 T5105 T5020 T1015 T5115 T5125	UC5115 UC5005 UE6010	CA4010 CA5505 CA4115 CA4120	GC3205 GC3210 GC3205 GC3210 GC3115 GC3215 K20W K20D K15W GC3040

The data above is based on estimations from the respective competitors' catalogs and other documents. Therefore, the listed data is not always the latest data nor was it approved by these manufacturers.

Corresponding table for metal materials and symbols

ISO	Country	Japan	U.S.A.	Germany	ISO	Country	Japan	U.S.A.	Germany
	Standard	JIS	AISI / SAE	DIN		Standard	JIS	AISI / SAE	DIN
Stainless steel M	Ferrite/Martensite				Castings K	Malleable cast iron			
	SUS403	403	X6Cr13	FCMB310		—	—		
	SUS416	416	X7Cr14	FCMW330		32510	EN-GJMB350-10		
	SUS430	430	X12CrS13	FCMW370		40010	EN-GJMB450-6		
	SUS410	410	X6Cr17	FCMW490		50005	EN-GJMB550-4		
	SUS420J2	405	X10Cr13	FCMP540		70003			
		420	X46Cr13	FCMP590		A220-70003	EN-GJMB650-2		
	SUS431	431	X6CrAl13	FCMP690		A220-80002	EN-GJMB700-2		
	SUS430F	430F	X20Cr13	Grey cast iron					
	SUS434	434	X19CrNi17-2	FC100		No 20 B	EN-GJL-100		
	SCS5	CA6-	X14CrMoS17	FC150		No 25 B	EN-GJL-150		
	SUS405	405	X6CrMoS17-2	FC200		No 30 B	EN-GJL-200		
	SUH4	HNV6	X3CrNiMo13-4	FD250		No 35 B	EN-GJL-250		
	SUH446	446	X10CrAl13	—		No 40 B	—		
	SUH35,SUH36	EV8	X85CrMoV18-2	FC300		No 45 B	EN-GJL-300		
		S44400	X10CrAL2-4	FC350		No 50 B	EN-GJL-350		
		630	X53CrMnNiN21-9	—		No 55 B	EN-JLZ		
			X1CrMoTi18-2	—		A436 Type 2	GGL-NiCr20-2		
			X20CrMoV12-1	Ductile cast iron					
			X5CrNiCuNb16-4	FCD400		60-40-18	EN-GJL-400-15		
	Austenite				—	—	EN-GJL-400-18-LT		
	SUS304	304L	X2CrNi19-11	FCD500	80-55-06	EN-GJL-500-7			
	SUS303	303	X5CrNi18-10	—	A43D2	EN-GJSA-500			
	SUS304L		X8CrNiS18-9	FCD600	—	EN-GJS-600-3			
	SCS19	304L	X2CrNi19-11	FCD700	100-70-03	EN-GJS-700-2			
	SUS301	301	X9CrNi18-8	Nonferrous materials N					
	SUS304LN	304LN	X2CrNi18-10	C4BS	SC64D	G-ALSi9MGWA			
	SUS316	316	X5CrNiMo17-2-2	AC4A	GD-AISI12	G-ALMG5			
	SUS316LN	316LN	X2CrNiMo17-13-3	A5052	356.1				
		316L	X2CrNiMo17-12-2	A6061	A413.0	GD-ALSi12			
	SCS16	316L	X2CrNiMo18-14-3	A7075	A380.1	GD-ALSi8Cu3			
	SUS316L			ADC12	A413.1	G-ALSi12(Cu)			
	SUS317L	317L	X2CrNiMo18-15-4		A413.2	G-ALSi12			
	UNS	X1NiCrMoCu25-20-5		A360.2	G-ALSi10Mg(Cu)				
	V 0890A		Heat-resistant alloy S						
SUS321	321	X6CrNiTi18-10	SUH330	330	X12NiCrSi36 16				
SUS347	347	X10CrNiNb18-10	SCH15	5390A	G-X40NiCrSi36-18				
	316Ti	X6CrNiMoTi17-12-2		5666	NiCr22Mo9Nb				
SUH309	309	X10CrNiMoNb 18-12		5660	NiCr20Ti				
SUH310	310S	X15CrNiSi20-12		5391	NiFe35Cr14MoTi				
SCS17	308	X8CrNi25-21		5383	S-NiCr13A16MoNb				
	17-7PH	X2CrNiMoN17-11-2		4676	NiCr19Fe19NbMo				
	N08028	X7CrNiAL 17-7			NiCu30AL3Ti				
Austenite/Ferrite (2 phase)					NiCr20TiAk				
	S31500	X2CrNiN23-4		AMS 5399	NiCr19Co11MoTi				
	S32900	X8CrNiMo27-5		AMS 5544	NiCr19Fe19NbMo				
	S32304	X2CrNiN23-4		AMS 5397	NiCo15Cr10MoAl				
	S31803	X2CrNiMoN22-53		5537C	CoCr20W15Ni				
				AMS 5772	CoCr22W14Ni				
				Titanium alloy					
Hardened material H	SCr430H	5130H	34Cr4		AMS R54520	TiAl5Sn2.5			
	SCr435H	5135H	37Cr4		AMS R56400	TiAl6V4			
	SCM435H	4135H	34CrMo4		AMS R56401	TiAl6V4ELI			
	SCM440H	4140H	42CrMo4			TiAl4Mo4Sn4Si0.5			

ISO	Country	Japan	U.S.A.	Germany	ISO	Country	Japan	U.S.A.	Germany
	Standard	JIS	AISI / SAE	DIN		Standard	JIS	AISI / SAE	DIN
Steel P	Carbon steel				Steel P	Low alloy steel			
	STKM12A;C	A570.36	S235JRG2	SM400A;B;C		A573-81	S275J2G3		
		1115	GC16E	SM490A;B;C;YA;YB			S355J2G3+C2		
		A573-8165	S235J2G3			5120	DS355J2G3		
		1015	C15			9255	55Si7		
		1020	C22			9262	S340MGC		
	SUM22	1213	11SMn30	SUJ2		52100	100Cr6		
	SUM22L	12L13	11SMnPb30			ASTM	16Mo3		
			10SPb20			4520	16Mo5		
			11SMn37			ASTM	14Ni6		
	S15C	12L14	11SMnPb37	SNCM220(H)		8620	21NiCrMo2		
	S25C	1015	Ck15E	SNCM240		8740	40NiCrMo22		
		1025	Ck25E				17CrNiMo6		
		A572-60	S380N	SCr415(H)		5015	15Cr3		
		A572-60	17MnV7	SCr440		5140	42Cr4		
		1035	C35	SUP9(A)		5155	55Cr3		
		1045	C45	SCM415(H)			15CrMo5		
		1040	35S20	SNCM240		8740	40NiCrMo8-4		
		1039	40Mn4	SCr415(H)		5015	15Cr3		
	SMn438(H)	1335	36Mn5			ASTMA182	13CrMo5		
	SCMn1	1330	28Mn6			ASTMA182	13CrMo4-5		
	S35C	1035	C35G				14MoV63		
	S45C	1045	C45E				31CrMo12		
	S50C	1050	C53G				39CrMoV13		
		1055	C55			L1	41CrS4		
		1060	C60E			8620	22Mo4		
	S55C	1055	C55E				50CoMo4		
	S58C	1060	C60E				16MnCr5		
		1095	C101E				31NiCrMo14		
	SK3	W1	C101u			L6	50NiCr13		
	SUP4	W210	C105W1	SNC236		3135	36NiCr6		
		High alloy steel				SNC415(H)	3415	14NiCr10	
			ASTMA353	X8Ni9		SNC815(H)	3415;3310	14NiCr14	
			2515	12Ni19			9255		
				14NiCrMo13			9840	36CrNiMo4	
	SKD1	D3		X210Cr12			4340	34CrNiMo6	
						SCr430(H)	5132	34Cr4	
	SKD61	H13		X40CrMo134		SCr440(H)	5140	41Cr4	
							5115	16MnCr5	
	SKD12	A2		X100CrMoV51		SCM420;SCM430	4130	25CrMo4	
	SKD2			X210CrW12		SCM432;SCCRM3	4137;4135	34CrMo4	
				45WCrV7		SCM440	4140;4142	41CrMo4	
SKD5	S1		X30WCrV9	SCM440(H)	4140	42CrMo4			
			X30WCrV9			32CrMo12			
			X165CrMoV12	SUP10	6150	51CrV4			
SUH1	HW3		X45GrSi93			41CrMo7			
SUH3	D3		S6-5-2		L3	100Cr6			
SKH51	M2		S6-5-2	SKS31		105WCr6			
SKH55	M35		S6-5-2-5	SKS2,SKS3					
	M7		S6-9-2	SKT4	L6	55NiCrMoV6			
	HNV3		X210Cr12G						
				Cast steel					
				SEMnH1					
				SCMnH/1		G-X120Mn12			

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Ordinary Tolerances for Shape and Position Accuracy (Machining)

(Excerpted from JIS B 0419-1991)

No.	Drawing symbol	Type	Ordinary tolerance (machining)	Remarks
1		Linearity	0.05/500	Does not apply to thin items where $L/t \geq 20$.
2		Flatness	0.10/500	Does not apply to thin items where $L/t \geq 20$.
3		Roundness	0.05 up to $\phi 500$	Does not apply to thin items where $D/t \geq 10$ mp. Does not apply to drill holes.
			0.10 for $\phi 500$ or more	
4		Cylindricity	0.20/300	Does not apply to thin items where $D/t \geq 10$ mp. Does not apply to drill holes.
5		Profile of a line	0.5	Includes slotter machining with marking standard
6		Profile of a plane	0.5	Includes slotter machining with marking standard
7		Parallelism	0.20/300	Includes slotter machining with marking standard Does not apply to machining of drill holes or tap holes
8		Perpendicularity	0.20/300	Includes slotter machining with marking standard Does not apply to machining of drill holes or tap holes
9		Gradient	1.0/100	Equivalent to ordinary angle tolerance ($\pm 0.5^\circ$)
10		Position	$\phi 1.0/300$	Includes drill holes and tap holes with marking standard
11		Concentricity	0.1	Applies to lathe turning and boring. Does not apply to drill and tap holes.
12		Symmetry	0.3/300	Includes machining with marking standard.
13		Run out	0.3	
14		Level difference	0.1	
15		Waviness	0.1	Measurement length shall be 80 mm or less.

Notes : (1)*This indicates the accuracy which is ordinarily expected when a shape tolerance is not otherwise indicated in the drawing. The tolerance value does not simply indicate the machine tool accuracy. It has been set to 2 - 3 times the machine tool accuracy with consideration for machining warp, heat deformation, marking accuracy, and other factors.
 (2)As a general rule, applies to finished surfaces of $\nabla \nabla$ or more, and does not apply to parts which are welded or heat treated after machining.
 (3)The subject dimension ranges are diameter 50 - 1000 mm and length 50 - 5000 mm.
 (4)If the part dimensions exceed the standard dimensions (for example 500 mm for diameter), in general a multiplier of (Part dimension / Standard dimension) is applied to the value of the ordinary tolerance. However if the part dimension is smaller than the standard dimensions, the value in the above table is used without correction.

Ordinary dimension tolerances

(Excerpted from JIS B 0405-1991)

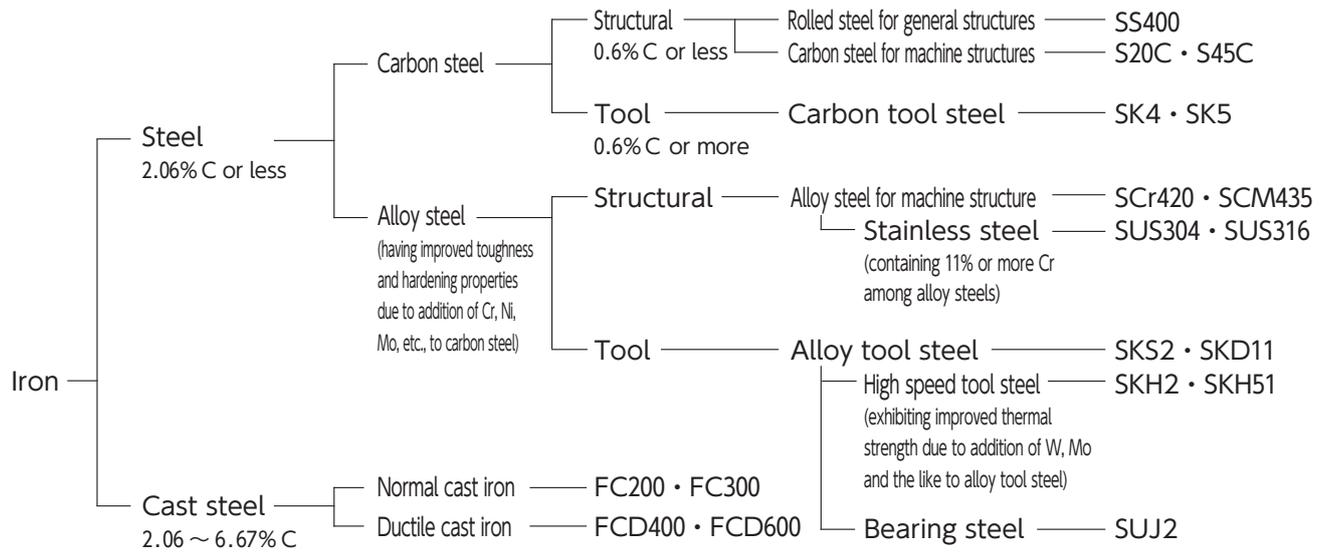
Type	Tolerance grade		Standard dimensions category and tolerance (units:mm)								
	Symbol	Explanation	0.5 to 3 ⁽¹⁾	More than 3 to 6	More than 6 to 30	More than 30 to 120	More than 120 to 400	More than 400 to 1000	More than 1000 to 2000	More than 2000 to 4000	
Tolerance for length dimensions (except chamfered parts)	f	Fine	± 0.05	± 0.05	± 0.1	± 0.15	± 0.2	± 0.3	± 0.5	—	
	m	Medium	± 0.1	± 0.1	± 0.2	± 0.3	± 0.5	± 0.8	± 1.2	± 2	
	c	Coarse	± 0.2	± 0.3	± 0.5	± 0.8	± 1.2	± 2	± 3	± 4	
	v	Very coarse	—	± 0.5	± 1	± 1.5	± 2.5	± 4	± 6	± 8	
	Tolerance for length dimensions of chamfered parts	f	Fine	± 0.2	± 0.5	± 1					
m		Medium									
c		Coarse	± 0.4	± 1	± 2						
v		Very coarse									
Tolerance for angles	Tolerance grade		Length category of shorter edge of subject angle (units:mm)								
	Symbol	Explanation	10 or smaller	More than 10 to 50	More than 50 to 120	More than 120 to 400	More than 400				
			Tolerance								
	f	Fine	$\pm 1^\circ$	$\pm 30'$	$\pm 20'$	$\pm 10'$	$\pm 5'$				
	m	Medium	$\pm 1^\circ 30'$	$\pm 1^\circ$	$\pm 30'$	$\pm 15'$	$\pm 10'$	$\pm 5'$			
	c	Coarse									
v	Very coarse	$\pm 3^\circ$	$\pm 2^\circ$	$\pm 1^\circ$	$\pm 30'$	$\pm 20'$					

Note(1) : For standard dimensions smaller than 0.5mm, the tolerance shall be indicated individually following each standard dimension.



Classification of iron

Iron and carbon Iron contains carbon (C) which is the hard and basic element making up diamond. The higher the content of carbon in the iron becomes, the harder the iron gets while the lower the carbon content, the softer and tougher the iron becomes. In this way, the characteristics of iron change greatly depending on the content of carbon in it.



Standards for carbon steels

Generally, carbon steel containing 0.6% C or less carbon is used as structural materials while that containing 0.6% C or higher carbon is used as materials for tools. Therefore, it is largely categorized into structural carbon steel and tool carbon steel based on the applications as follows:

Example of symbol	Steel type	Typical steel code	Application
0.6% C or less	Structural	SS400	Used as structural materials for buildings, bridges, ships, railway vehicles and other structures
	Structural	S30C	Used as structural materials for machines and equipment including shafts and gears, with higher reliability than the above steel for general structures
0.6% C or higher	Tool	SK1	High-carbon steel with less impurities; The steels with lower carbon content is used for pressing and stamping dies while those with higher carbon content are used for cutting tools including bits and blades.

Material designation code for rolled steel for general structures

(Example) S S 400 — Minimum tensile strength (N/mm²)
 Capital letter of Steel — Symbol indicating the application (Structural)

Material designation code for carbon steel for machine structures

(Example) S 30 C — Indicates the element symbol (Carbon)
 Capital letter of Steel — Value indicating the product of typical carbon content (percentage) multiplied by 100

Material designation code for carbon steel for tools

(Example) S K 1 — The 7-scale number indicating a standardized carbon content ranging from 1.5% to 0.6%; the smaller the number, the higher the carbon content.
 Capital letter of Steel — The symbol indicating the tool steel

Standards for alloy steels

Steel type	Element added to carbon steel and its content(%)			Feature	Application
	Ni (Nickel)	Cr (Chromium)	Mo (Molybdenum)		
Chromium steel (SCR)	—	0.9 ~ 1.2	—	Has better quenching characteristics in addition to improved mechanical properties through tempering; The toughness further improves when quickly cooled during tempering. The tensile strength is 800 N/mm ² or higher.	Bolts, shafts, keys
Cr-Mo steel (SCM)	—	0.9 ~ 1.5	0.15 ~ 0.3	An alloy steel for which lowering the hardness by quenching and tempering has been improved; easily processed at high temperature and highly weldable and malleable. The tensile strength is 850 N/mm ² or higher.	Bolt, shafts, pins, gears and fittings
Ni-Cr steel (SNC)	1.0 ~ 3.5	0.5 ~ 1.0	—	Improved toughness due to the addition of Ni and better in quenching characteristics due to Cr. Quickly cooled to avoid brittleness, instead of gradual cooling. The tensile strength is 750 N/mm ² .	Bolts, pins, shafts, gears and crank shafts
Ni-Cr-Mo steel (SNCM)	0.4 ~ 3.5	0.4 ~ 3.5	0.15 ~ 0.7	Exhibits better quenching characteristics because of the addition of Mo to Ni-Cr steel. High in toughness as brittleness caused by tempering has been improved. The tensile strength is 850 N/mm ² .	Shafts, gears, crank shafts and vanes/ blades of turbines

Material designation code for alloy steel for machine structures

(Example) **S CM 4 20 H** ——— Denotes quenching guaranteed.
 Capital letter of Steel ——— Typical value of carbon content
 Symbols of major elements added ——— Code indicating the content of major elements added

Standards for stainless steels

Stainless steel is actually corroded !

Though the name, stainless steel, means free of rusty stains, the surface of stainless steel is covered with a substance chromium dioxide (Cr₂O₃), which means it is actually corroded. Stainless steel always contains 11% or more chromium, which is necessary to cover the material entirely.

	Base	Structure	Suffix following SUS	Feature	Application
Chromium alloy steel	Ferrite	18Cr	430	A general-purpose steel type excellent in corrosion resistance	Building interior and home tools/appliances
	Martensite	18Cr-1C	440C	The hardest of all the stainless steels and heat-resistant steels	Nozzles, bearings
Cr-Ni alloy steel	Austenite	18Cr-8Ni	304	The most frequently used type as stainless steel and heat-resistant steel	Food-related equipment, nuclear power-related and general chemical facilities
		18Cr-12Ni-2.5Mo	316	More resistant to various substances including sea water than SUS304	For materials required to be resistant to pitting corrosion

Material designation code for stainless steel SUS4

(Example) **SUS 4 10 L-B** ——— Shape (Bar)
 Code indicating stainless steel ——— Alloy type ——— Symbol indicating property or element added

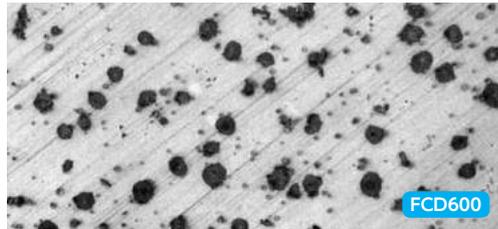
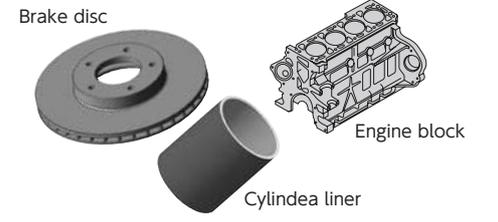
2	Cr-Ni-Mn alloys	L	Least carbon	A,B,C	High in carbon content in this order among the similar types
3	Cr-Ni alloys	S	Low carbon	J	Japan-specific steel type
4	Chromium alloys	F	Free-cutting steel	XM	Steel type similar to U.S. standard
5	Alloys containing 5% of chromium	Se	Se added		
6	High-temperature, high-strength alloys	N	Nitride added		

There are no coding rules for these two digits.

Standard for cast irons

Cast iron is an alloy containing carbon and silicon as the major components, iron is called cast iron when the carbon content is 2.06% or higher. The cast iron is categorized into gray cast iron, ductile cast iron, malleable cast iron, special cast iron and so on depending on the content ratio of such component elements. Cast iron is a collective name for these. Generally, cast iron means gray cast iron as it is most widely used.

Outline

	Gray cast iron «FC»	Ductile cast iron «FCD»
Structure		
Feature	As the graphite shape looks like a thin flower-petal like flake, this iron is called "flake graphite cast iron." As it is excellent in damping capacity, wear resistance and the likes, it is frequently used for abrasion resistant components including bearings, gears, and, brake discs.	As the graphite shape is spherical, this iron is called "spheroidal graphite cast iron." Since ductile cast iron has strength and toughness several times higher than gray cast iron, it is mostly used for automotive parts and iron pipes for which strength is especially required.
Codes categorized by JIS	FC100 ~ FC350	FCD300 ~ FCD800
Strength	Low	High
Brittleness	Brittle	Tough
Workability	Good	Poor
Damping capacity	High	Low
Shape of graphite	Flake graphite	Spheroidal graphite
Representative products	 <p>Brake disc Engine block Cylinder liner</p>	 <p>Differential case Iron pipe Roll</p>

Mechanical properties (The data below are excerpts from JIS G 5501 and G 5502.)

	Code	Tensile strength	Proof stress at 0.2%	Elongation	Brinell hardness
		N/mm ²	N/mm ²	%	HB
Gray cast iron	FC100	100 or higher	—	—	201 or lower
	FC150	150 or higher	—	—	212 or lower
	FC200	200 or higher	—	—	223 or lower
	FC250	250 or higher	—	—	241 or lower
	FC300	300 or higher	—	—	262 or lower
	FC350	350 or higher	—	—	277 or lower
Ductile cast iron	FCD350	350 or higher	220 or higher	22 or higher	150以下
	FCD400	400 or higher	250 or higher	18 or higher	130 ~ 180
	FCD450	450 or higher	280 or higher	10 or higher	140 ~ 210
	FCD500	500 or higher	320 or higher	7 or higher	150 ~ 230
	FCD600	600 or higher	370 or higher	3 or higher	170 ~ 270
	FCD700	700 or higher	420 or higher	2 or higher	180 ~ 300
	FCD800	800 or higher	480 or higher	2 or higher	200 ~ 330

Auto Lathe Machine List

Citizen Machinery Co., Ltd. (Citizen Machinery Miyano Co., Ltd.)

Cincom products

Machine name	Cutting tool shank (Gang) (Height × width × length)	No. of tools	Cutting tool shank (Turret) (Height × width × length)	No. of tools	Type of hand	Diameter of sleeve	Max. work diameter
A12	10×10×100	5			R	φ 19.05/φ 20	φ 12
A16	10×10×100	5			R	φ 19.05/φ 20	φ 16
A20	12(13)×12(13)×120 ^{※1}	5 ~ 7			R	φ 25.4	φ 20
A25	12(13)×12(13)×120	5/6			R	φ 25.4	φ 25
A32	16×16×150				R	φ 25.4	φ 32
B12,B12E	10×10×100	5			R	φ 19.05/φ 20	φ 12
B16E	10×10×10	5			R	φ 19.05/φ 20	φ 16
B20	12(13)×12(13)×120	6			R	φ 19.05/φ 20	φ 20
BL12	10×10×60 ~ 120	5			R	φ 20(φ 19.05)	φ 12
BL20	12(13)×12(13)×120	7			R	φ 20(φ 19.05)	φ 20
BL25	12(13)×12(13)×120	7			R	φ 20(φ 19.05)	φ 25
C12	10×10×120	6			R	φ 19.05	φ 12
C16	10×10×120	6			R	φ 19.05	φ 16
C32	16×16×130	5			R	φ 25.4	φ 32
E32			16(19)×16(13)×90	20	R	φ 25.4	φ 32
F10			10×10×60	10	R	φ 19.05	φ 10
F12			10×10×60	10	R	φ 19.05	φ 12
F16			10×10×60	10	R	φ 19.05	φ 16
F20			16(19)×16(13)×90	10	R	φ 25.4	φ 20
F25			16(19)×16(13)×90	10	R	φ 25.4	φ 25
FL25			16×16×90	12	R	φ 16	φ 25
FL42			16×16×90	12	R	φ 16	φ 42
G10			10×10×60	8	R	—	φ 10
G16			10×10×60	8	R	—	φ 16
G32			16(19)×16(13)×90	10	R	—	φ 32
K12,K12E	10×10×100	7			R	φ 20	φ 12
K16,K16E	12×12×100	6			R	φ 20	φ 16
L10	8×8×100 ~ 130	5			R	φ 15.875	φ 10
L12	10×10×10	6			R	φ 19.05	φ 20
L16,L16E	12(10)×12(10)×130	7			R	φ 19.05	φ 16
L20,L20E	12×12×130	7			R	φ 19.05	φ 20
L25	16×16×130	5			R	φ 25.4	φ 25
L32	16×16×130	5			R	φ 25.4	φ 32
M₂12,M₃12	10×10×120	5	10×10×60	10	R	φ 19.05	φ 12
M₂16,M₃16,M₄16	10×10×120	5	10×10×60	10	R	φ 19.05	φ 16
M₂20,M₃20	12×12×130	5	16×16×90	10	R	φ 25.4	φ 20
M₂32,M₃32,M₄32	16×16×130	5	16×16×90	10	R	φ 25.4	φ 32
M20	13(12)×13(12)×150		10×10×60	10	R	φ 19.05	φ 20
MSL12	10×10×120				R	—	φ 12
R04	8×8×120	7			R	φ 15.875	φ 4
R07	8×8×120	5			R	φ 15.875	φ 7
RL02	16×16×60 ~ 150	max6 ^{※2}			L	φ 16/φ 20	φ 25
RL21	10(12)×10(12)×90				R	φ 19.05	φ 35

※1 : Tools with shank size of 16 x 16 x 120 as a set of 7 is also available

※2 : The total number including the sleeves; up to six tools available with the φ 16 sleeve.

Miyano products

Machine name	Shank (Turret)	No. of tools 上/下	Type of hand	Diameter of sleeve	Max. work diameter
ABX-51TH3	20×20×100	12+12/12	R	φ25	φ51
ABX-64TH3	20×20×100	12+12/12	R	φ25	φ64
ABX-51THY	20×20×100	12+12/12	R	φ20, 25, 40	φ51
ABX-64THY	20×20×100	12+12/12	R	φ20, 25, 40	φ64
ABX-51SYY	20×20×100	12/12	R	φ20, 25, 40	φ51
ABX-64SYY	20×20×100	12/12	R	φ20, 25, 40	φ64
ABX-51SY	20×20×100	12/12	R	φ25	φ51
ABX-64SY	20×20×100	12/12	R	φ25	φ64
BNA-34C	20×20×100	8(16)/-	R	φ25	φ34
BNA-42C	20×20×100	8(16)/-	R	φ25	φ42
BNA-34S	20×20×100	8(16)/-	R	φ25	φ34
BNA-42S	20×20×100	8(16)/-	R	φ25	φ42
BNA-34DHY	20×20×100	8(16)/6	R	φ25	φ34
BNA-42DHY	20×20×100	8(16)/6	R	φ25	φ42
BNA-34MSY	20×20×100	8(16)/-	R	φ25	φ34
BNA-42MSY	20×20×100	8(16)/-	R	φ25	φ42
BNC-34C5	20×20×100	8/-	R	φ25	φ34
BNC-34S6	20×20×100	8/-	R	φ25	φ34
BNC-42C5	20×20×100	8/-	R	φ25	φ42
BNC-42S6	20×20×100	8/-	R	φ25	φ42
BND-51C2/S2/SY2	20×20×100	12/-	R	φ25	φ51
BNE-34S5/SY5	20×20×100	12/12	R	φ25	φ34
BNE-42S6/SY6	20×20×100	12/12	R	φ25	φ42
BNE-51S5/SY5	20×20×100	12/12	R	φ25	φ51
BNE-51S6/SY6	20×20×100	12/12	R	φ25	φ51
BNJ-34S3/SY3	20×20×100	12/6	R	φ25	φ34
BNJ-42S3/SY3	20×20×100	12/6	R	φ25	φ42
BNJ-51SY3	20×20×100	12/6	R	φ25	φ51
BNX-42SY	20×20×100	12/-	R	φ25	φ42
BX-20S	16×16×100	8/-	R	φ20	φ20
BX-26S	16×16×100	10/-	R	φ20	φ26
BX-26T	16×16×100	8/-	R	φ20	φ26

※On the side of sub-spindle, left hand tools are usable with inversion.

Ocean Cincom products

Machine name	Cutting tool shank (Gang) (Height × width × length)	No. of tools	Type of hand	Diameter of sleeve	Max. work diameter
RL01	10×10×60 ~ 120	4※1	L	φ16/φ20	φ12
RL03	10×10×100※2 12×12×100 16×16×100	max5	L	φ20	collet chuck static type φ35 pull type φ40
GN-3200	10×10×100※2 12×12×100 16×16×101	max5	L	φ20	collet chuck static type φ35 pull type φ40
GN-3200W	10×10×100※2 12×12×100 16×16×102	max10	L	φ20	collet chuck static type φ35 pull type φ40
GN-4200	10×10×100※2 12×12×100 16×16×103	max6	L	φ20	collet chuck static type φ35 pull type φ40

※1 : The total number including the sleeves
 ※2 : Selectable shank size

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Technical Data

Star Micronics Co., Ltd.

Machine name	Cutting tool shank (Gang) (Height × width × length)	No. of tools	Cutting tool shank (Turret) (Height × width × length)	No. of tools	Type of hand	Diameter of sleeve	Max. work diameter
ECAS-12	10×10×95 ~ 150	6			R	φ 22	φ 13
ECAS-20	12(16)×12(16)×80 ~ 144	6			R	φ 22	φ 20
ECAS-20T			12(16)×12(16)×80	8 stations×3 turrets (Max. 3 tools per station)	R	φ 22	φ 20
ECAS-32T	16×16×80 ~ 120	4	16×16×60 ~ 78	10 stations×2 turrets (Max. 2 tools per station)	R	φ 22/32	φ 32
JNC-10			8×8×65	6	L	—	φ 10
JNC-16			10×10×80	6	L	—	φ 16
JNC-25/32			16×16×78 ~ 120	10 stations×1 turret	R	φ 22	φ 25/φ 32
KJR-16B/25B			16×16×78	12/16 stations×1 turret	R	φ 22	φ 16/φ 25
KNC-16/20			16×16×68	16 stations×1 turret	R	φ 22	φ 16/φ 20
KNC-25 II /32 II			16×16×78	20 stations×1 turret	R	φ 22/32	φ 25/φ 32
RNC-10/16	10×10×80 ~ 120	5			R	φ 22	φ 10/φ 16
RNC-16 II /16B II	10×10×80 ~ 120	5			R	φ 22	φ 16
SA-16R	10×10×95 ~ 120	6			R	φ 22	φ 16
SB-12 II /12R/16 II	12(10)×12(10)×95 ~ 130	6(7)			R	φ 22	φ 12/φ 13/φ 16
SB-16/16R	12(10)×12(10)×95 ~ 130	6(7)			R	φ 22	φ 16
SB-20/20R	12(10)×12(10)×95 ~ 130	6(7)			R	φ 22	φ 20
SR-20J	12×12×100 ~ 135	6			R	φ 22	φ 20
SR-20RIV	12×12×100 ~ 130	7			R	φ 22	φ 20
SC-20	12×12×95 ~ 130	6			R	φ 22	φ 20
SE-12/12B · 16/16B	10×10×95 ~ 120	5			R	φ 22	φ 13/φ 16
SF-25			16×16×73 ~ 98	10 stations (Max. 2 tools per station)	R	φ 22/32	φ 25
SG-42			16(20)×16(20)×84 ~ 88	10 stations (Max. 2 tools per station)	R	φ 22/32	φ 42
SH-7	8×8×95 ~ 120	5			R	φ 22	φ 7
SH-12/16	10×10×95 ~ 120	5			R	φ 22	φ 13/φ 16
SI-12/12C	10×10×80 ~ 130	6			R	φ 22	φ 13
SR-16/20	12×12×95 ~ 120	5			R	φ 22	φ 16/φ 20
SR-32	16×16×100 ~ 135	6			R	φ 22	φ 32
SR-20R/20R II /20R III	12×12×100 ~ 135	6			R	φ 22	φ 20
SR-10J	8×8×67 ~ 110	6			R	φ 16	φ 10
SR-25J/32J	16×16×95 ~ 155	6			R	φ 22/32	φ 25/φ 32
SST-16	12×12×95 ~ 115	5			R	φ 22	φ 16
ST-20		5	12(16)×12(16)×80	8 stations×3 turrets (Max. 3 tools per station)	R	φ 22	φ 20
ST-38			16×16×85	10 stations×3 turrets (Max. 2 tools per station)	R	φ 22/32	φ 38
SV-12/20	12×12×95 ~ 135	4	12×12×70 ~ 78	8 stations (Max. 3 tools per station)	R	φ 22	φ 13/φ 20
	16×16×95 ~ 135	5	16×16×65 ~ 70	8 stations (1 tool per station)	R		
SV-32	16×16×95 ~ 135	4	16×16×80 ~ 88	10 stations (Max. 2 tools per station)	R	φ 22/32	φ 32
SV-32J/32J II	16×16×95 ~ 135	4	16×16×65 ~ 70	8 stations×1 turret	R	φ 22/32	φ 32
SV-38R	16×16+20×20	4+1	16(20)×16(20)×84 ~ 88	10 stations (Max. 2 tools per station)	R	φ 22/32	φ 38
SW-7	8×8×80 ~ 120	6			R		φ 7
SW-12R II	10×10				R	φ 16	φ 13
SW-20	12(16)×12(16)×80 ~ 144	6			R	φ 22	φ 20

Tsugami Corporation

Machine name	Cutting tool shank (Gang) (Height × width × length)	No. of tools	Cutting tool shank (Turret) (Height × width × length)	No. of tools	Type of hand	Diameter of sleeve	Max. work diameter
P013H/P014H	8×8×100 ~ 120	6	—	—	R	φ16	φ1
P033H/P034H	8×8×100 ~ 120	6	—	—	R	φ16	φ3
B007-III	7(8)(10)×7(8)(10)×85	8	—	—	R	φ25	φ7
B073-II	8×8×85	9	—	—	R	φ20	φ7
B074/B07-V	8×8×85	9	—	—	R	φ20	φ7
B0123/B0124/B0125/B0126	12×12×85	9	—	—	R	φ20	φ20
B012F/B012-V/BE12-V	12×12×85	9	—	—	R	φ20	φ12
B020M-II/SS20M/SS20M-5AX	10×10×46 attachable to tool spindle	2	BT15 tool spindle	24 tools	R	φ20	φ20
B016MF	12×12×85	9	—	—	R	φ20	φ16
B018-III	12×12×85	9	—	—	R	φ20	φ18
B0203/B0204/B0205/ B0205-II/B0205-III/B0206-II	12×12×85	9	—	—	R	φ20	φ20
B020F/B020-V/BE20-V	12×12×85	9	—	—	R	φ20	φ20
B026-V	12(16)×12(16)×85	6	—	—	R	φ25	φ26
B0265/B0266-II	16×16×100	12	—	—	R	φ25	φ26
B0325/B0326-II	16×16×100	12	—	—	R	φ25	φ32
B038T	16×16×125	3	20×20×125	8 stations	R	φ25/φ32	φ38
B0385/B0385L	16×16×125	8	—	—	R	φ32	φ38
BA20-III	12×12×85	6	—	—	R	φ25	φ20
BA26-III	12(16)×12(16)×85	6	—	—	R	φ25	φ26
BC18	12×12×85	10	—	—	R	φ25	φ18
BC25	12×12×85	10	—	—	R	φ10/φ25	φ25
BE18	12×12×85	9	—	—	R	φ20	φ18
BH20/BH20Z	12×12×85	4	12×12×85	12 stations	R	φ25/φ32	φ20
BH38	16×16×125	7	20×20×125	12 stations	R	φ25/φ32	φ38
BM07	8×8×85	9	—	—	R	φ20	φ7
BM163/BM164/BM165	12×12×85	9	—	—	R	φ20	φ16
BM20-V	12×12×85	9	—	—	R	φ20	φ20
BN12-III	12×12×85	7	—	—	R	φ20	φ12
BN20-III	12(16)×12(16)×85	7	—	—	R	φ20	φ20
BS12-V	12×12×85	8or12	—	—	R	φ20/φ25	φ12
BS18-III	12×12×85	7or10	—	—	R	φ14/φ25	φ18
BS20-V	12×12×85	8or12	—	—	R	φ20/φ25	φ20
BS26 (ABC)-V	16×16×100	7or10	—	—	R	φ16/φ25	φ26
BS32C-V	16×16×100	6	—	—	R	φ16/φ25	φ32
BU12	12×12×85	4	12×12×80	8 stations	R	φ20	φ51
BU20	12×12×85	4	12×12×80	8 stations	R	φ20	φ20
BU26	16×16×100	7	20×20×80	8 stations	R*	φ20/φ32	φ26
BU38	16×16×100	7	20×20×80	8 stations	R*	φ20/φ32	φ38
BW07-III	12×12×85	7	—	—	R	φ20	φ7
BW12-III	12×12×85	7	—	—	R	φ20	φ12
BW20-III	12(16)×12(16)×85	7	—	—	R	φ20	φ20
C004-III	13×13×60 ~ 100	6 ~ 8	—	—	R/L	~ φ10	φ120
C150	10×10×60 ~ 100	4 ~ 6	—	—	R/L	~ φ8	φ80
C180	12×12×60 ~ 100	4 ~ 6	—	—	R/L	~ φ10	φ120
C220	13×13×60 ~ 100	6 ~ 8	—	—	R/L	~ φ10	φ120
C300-III	16×16×100 ~ 130	6 ~ 10	—	—	R/L	~ φ14	φ170
CH154	12×12×60 ~ 100	~ 16	—	—	R/L	~ φ10	φ15
M06J/M06SY/M06JC	—	—	(M06JC) 20×20×125 (M06J/M06SY) 25×25×150	(M06J/M06JC) 8 stations (M06SY) 12 stations	R	φ32/φ40	φ260
M08J/M08SY/ M08D/M08SD	—	—	25×25×150	(M08J) 8 stations (M08SY/M08D/M08SD) 12 stations	R	φ32/φ40	φ280
M34J	—	—	20×20×125	12 stations	R	φ20/φ32	φ34
M42J/M42D/M42SD	—	—	20×20×125	12 stations	R	φ25/φ32	φ42
M50SY-III	—	—	20×20×100	12 stations	R	φ32	φ51
M50J	—	—	20×20×100	12 stations	R	φ20/φ32	φ51
MB25	—	—	20×20×80	2×8 stations	R	φ20/φ32	φ25
MB35-III	—	—	20×20×80	2×8 stations	R	φ20/φ32	φ35
MB38-III	—	—	20×20×80	2×8 stations	R*	φ20/φ32	φ38
MB50-III	—	—	20×20×80	2×8 stations	R	φ20/φ32	φ50
MU26	—	—	20×20×80	2×8 stations	R	φ20/φ32	φ26
MU38	—	—	20×20×80	2×8 stations	R	φ20/φ32	φ38
NU50-III	—	—	20×20×100	12 stations	R	φ20/φ32	φ51
S205/S206	12(16)×12(16)×100	8	—	—	R	φ20/φ22	φ20
SS20	16×16×100	8	—	—	R	φ20/φ22	φ20
SS207/SS207-5AX	12(16)×12(16)×100	8	—	—	R	φ20/φ22 Back/Front	φ20
SS26	16×16×100	7	—	—	R	φ20/φ22	φ26
SS267/SS267-5AX	16×16×100	8	—	—	R	φ25	φ26
SS32/SS32L	16×16×100	7	—	—	R	φ20/φ22	φ32
SS327/SS327-5AX	16×16×100	8	—	—	R	φ25	φ32
TMA8-IV/TMA8J	20×20×100 attachable to tool spindle	—	KM40 tool spindle	30 tools	R	—	φ220
TMB2	—	—	20×20×125	16 stations	R	φ32	φ51
TMU1	—	—	20×20×125	16 stations	R	φ32	φ38

*Left-hand used on sub-spindle side. (Note) In some cases, left-hand type should be used even with the indication of right-hand.

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Technical Data

Nomura VTC Automatic Lathe Co., Ltd.

Machine name	Cutting tool shank (Gang) (Height × width × length)	No. of tools	Type of hand	Diameter of sleeve	No. of tools	Max. work diameter
NS-P1053A	9.5×9.5×130	5	R	—		φ 10
NN-10C	10×10×130	6	R	φ 17		φ 10
NN-10E	10×10×130	6	R	φ 16	5	φ 10
NN-10C2	10×10×130	6	R	φ 17		φ 10
NN-10CS	10×10×130	6	R	φ 17	4	φ 10
NN-10CS (No rotary tools)	10×10×130	5	R	φ 17	4	φ 10
NN-10S II	10×10×130	5	R	φ 23		φ 10
NN-10T	10×10×130	7	R	φ 23		φ 10
NN-10SB5	10×10×130	5	R	φ 23		φ 10
NN-16SB5	10×10×130	5	R	φ 23		φ 16
NN-16SB6type1	12.7×12.7×130	5	R	φ 17(φ 22)	4(3)	φ 16
NN-16SB6type2	12.7×12.7×130	5	R	φ 17(φ 22)	4(3)	φ 16
NN-16SB6type2.5	12.7×12.7×130	5	R	φ 17(φ 22)	5	φ 16
NN-16SB6type3	12.7×12.7×130	5	R	φ 17(φ 22)	4(3)	φ 16
NN-16HIII	12×12×130	6	R	φ 23		φ 16
NN-20HIII	12×12×130	6	R	φ 23		φ 20
NN-16UIII	12×12×130	5	R	φ 23		φ 16
NN-20UIII	12×12×130	5	R	φ 23		φ 20
NN-20CS	12.7×12.7×130	5(6)	R	φ 22	4	φ 20(φ 25)
NN-20U5	12.7×12.7×130	5(6)	R	φ 22	4	φ 20(φ 25)
NN-16UB5	12×12×130	5	R	φ 23		φ 16
NN-20UB5	12×12×130	5	R	φ 23		φ 20
NN-20UB7	12×12×130	6	R	φ 23		φ 20
NN-20UB8	12.7×12.7×130	5(6)	R	φ 22	4	φ 20(φ 25)
NN-20YB	12×12×130	8	R	φ 23		φ 20
NN-25YB/32YB	16×16×130	8	R	φ 23/φ 32		φ 25
NN-32YB2	16×16×130	5	R	φ 22/φ 32	4	φ 32
NN-16J	12.7×12.7×130	6	R	φ 23		φ 16
NN-20J	12.7×12.7×130	6	R	φ 23		φ 20
NN-20J2	12.7×12.7×130	6	R	φ 22	4	φ 20

※The data listed above was approved by the respective companies.
 ※The companies are listed in the order of Japanese alphabets.

MEMO

NEW

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SS Tools Front Turning Recommended Cutting Condition

Material classification	JIS Common grade	Equivalent grade	NTK Recommended grade		area	Recommended chipbreaker	Cutting speed (m/min)	feed speed (mm/rev)	
			1	2					
Low carbon steel	S10C S15C S20C		DM4 QM3	DT4 TM4 C7Z	Ultra precision finish	AMX, KHG	80(50-130) carbide 180(120-250) cermet	0.04 (0.01-0.12)	
					finish	AM3, AT, AZ7 CL, S, UL			
					middle cut	AM3, CL, S, ZP			
Carbon steel	S30C S40C S45C S50C S55C		DM4 QM3	TM4 C7X C7Z	Ultra precision finish	AMX, KHG	90(50-150) carbide 180(120-250) cermet	0.04 (0.01-0.12)	
					finish	AM3, AT, AZ7 CL, S, UL			
					middle cut	CL, AM3, S			
Alloy steel	Chrome steel	SCr415 SCr430 SCr435 SCr440	DM4 QM3	TM4 DT4 C7X C7Z	Ultra precision finish	AMX, KHG	90(50-150) carbide 180(120-250) cermet	0.04 (0.01-0.12)	
	Chrome molybdenum steel	SCM415 SCM430 SCM435 SCM440			finish	AM3, CL, S, UL, ZP ZR			
Stainless steel	Austenitic	SUS303	ASK-8000	DT4 VM1	TM1 TM4	Ultra precision finish	KHG, UHG	90(50-180) carbide	0.04 (0.01-0.12)
						finish	AM3, AZ7, CL, S, U/U1, UL		
						middle cut	AM3, CL, S, U/U1		
		SUS304 SUS316 SUS316F		DM4 QM3	TM4	Ultra precision finish	AMX, KHG, UHG	70(40-100) carbide	0.04 (0.01-0.12)
						finish	U/U1, S		
						middle cut	CL, S		
	Ferritic	SUS430 SUS430F	DHS-1	DT4 VM1	TM1 ZM3	Ultra precision finish	KHG, UHG	90(50-180) carbide	0.04 (0.01-0.12)
						finish	S, U/U1		
						middle cut	CL, S		
	Martensitic	SUS420J2 SUS420F		DT4 VM1	TM4 ZM3	Ultra precision finish	AMX, KHG, UHG	70(30-120) carbide	0.04 (0.01-0.12)
						finish	AZ7, CL, S, U/U1, U2 UL, ZP		
		SUS440A SUS440B SUS440C SUS440F		DM4 QM3	DT4 TM4	Ultra precision finish	AMX, KHG	60(30-100) carbide	0.04 (0.01-0.12)
finish						CL, S, UL, ZP			
Precipitation hardened	SUS630				middle cut	CL, S, UL, ZP			

Material classification	JIS Common grade	Equivalent grade	NTK Recommended grade		area	Recommended chipbreaker	Cutting speed (m/min)	feed speed (mm/rev)
			1	2				
Sulfurate free-cutting steel	SUM22L SUM23L SUM24L	SF20T	DT4 VM1	TM1 C7X C7Z	Ultra precision finish	KHG, UHG	100 (50-200) carbide 180 (120-250) cermet	0.04 (0.01-0.12)
					finish	AM3, AZ7, S, ZR		
					middle cut	AM3, S, UL, ZR		
	SUM22 SUM23	DT4 TM1	ZM3 C7X C7Z	Ultra precision finish	KHG, UHG			
				finish	AM3, AZ7, S, ZR			
				middle cut	AM3, S, ZR			
High carbon chromic bearing steel	SUJ2 SUJ3		DM4 TM4	QM3 C7X C7Z	Ultra precision finish	AMX, KHG	90 (50-180) carbide 180 (120-250) cermet	0.04 (0.01-0.12)
					finish	AT, CL, S, UL, U2, ZP		
					middle cut	AT, CL, S, ZP		
Electromagnetic soft iron	SUY-0 SUY-1 SUY-2	ELCH2 ELCH2S ME1F MES3F	DM4 QM3	TM1	Ultra precision finish	KHG	100 (50-200) carbide	0.04 (0.01-0.12)
					finish	CL, S, ZP		
					middle cut	CL, S, ZP		
Electromagnetic stainless steel		KM35FL KM57	DM4 QM3	TM4	Ultra precision finish	AMX, KHG	90 (50-150) carbide	0.04 (0.01-0.12)
					finish	AM3, CL, S, UL, ZP		
					middle cut	AM3, CL, S, UL, ZP		
True titanium			TM1	TM4 ZM3	Ultra precision finish	AMX, KHG	100 (50-150) carbide	0.04 (0.01-0.12)
					finish	AT, CL, S, UL		
					middle cut	AT, CL, S		
Titanium Alloy	6Al-4V 6Al-4VELI		DM4 DT4	TM1	Ultra precision finish	KHG	70 (50-100) carbide	0.04 (0.01-0.12)
					finish	AT, CL, S		
					middle cut	AT, CL, S		
Aluminum Alloy	A6061		PD1	KM1 TM4	Ultra precision finish	CL, U/U1 without chipbreaker	carbide 100 (50-200) PCD 200 (100-350)	0.04 (0.01-0.12)
					finish			
					middle cut			

*Cutting speed (m/min) is listed as meaning of "Recommended speed (Lowest-Highest)."

*Feed rate (mm/rev) is listed as meaning of "Recommended feed rate (Lowest-Highest)."

SS Tools Back Turning Recommended Cutting Condition

Material classification	JIS Common grade	Equivalent grade	CSV Type (~φ5)			TBDP/TBMH/TBP/TBPA/TBPS/TBVC Type (φ5 ~ φ20)			TB32 Type (φ10 ~)			TB42 43Type (φ20 ~)		
			Recommended grade	Cutting speed (m/min)	feed speed (mm/rev)	Recommended grade	Cutting speed (m/min)	feed speed (mm/rev)	Recommended grade	Cutting speed (m/min)	feed speed (mm/rev)	Recommended grade	Cutting speed (m/min)	feed speed (mm/rev)
Low carbon steel	S10C		DT4 VM1	60 (30-90) carbide	X0.02 (0.01-0.03)	DM4 DT4 QM3 ZM3	80 (50-130) carbide	X0.02 (0.01-0.04)	ZM3	80 (50-150) carbide	X0.03 (0.01-0.05)	ZM3	80 (50-150) carbide	X0.03 (0.01-0.05)
	S15C				Z0.03 (0.01-0.04)			Z0.04 (0.02-0.08)			Z0.08 (0.04-0.12)			Z0.08 (0.04-0.15)
Carbon steel	S30C		VM1 DT4	60 (30-90) carbide	X0.02 (0.01-0.03)	DM4 QM3 TM4 ZM3	90 (50-150) carbide	X0.02 (0.01-0.04)	ZM3	90 (50-150) carbide	X0.03 (0.01-0.05)	ZM3	90 (50-150) carbide	X0.03 (0.01-0.05)
	S40C				Z0.03 (0.01-0.04)			Z0.04 (0.02-0.08)			Z0.08 (0.04-0.12)			Z0.08 (0.04-0.15)
Alloy steel	Chrome steel		VM1 DT4	60 (30-90) carbide	X0.02 (0.01-0.03)	DM4 QM3 DT4 TM4	90 (50-150) carbide	X0.02 (0.01-0.04)	ZM3	90 (50-150) carbide	X0.03 (0.01-0.05)	ZM3	90 (50-150) carbide	X0.03 (0.01-0.05)
	Chromenickelsteel				SCr415			Z0.03 (0.01-0.04)			Z0.04 (0.02-0.08)			Z0.08 (0.04-0.12)
Stainless steel	Austenitic	ASK-8000	DT4 VM1	60 (30-90) carbide	X0.02 (0.01-0.03)	DT4 TM4 ZM3	90 (50-180) carbide	X0.02 (0.01-0.04)	ZM3	90 (50-200) 超硬	X0.03 (0.01-0.05)	ZM3	90 (50-200) carbide	X0.03 (0.01-0.05)
					SUS303			Z0.03 (0.01-0.04)			Z0.04 (0.02-0.08)			Z0.08 (0.04-0.12)
Stainless steel	Austenitic		DT4 VM1	50 (30-70) carbide	X0.02 (0.01-0.03)	DM4 QM3 DT4 ZM3	70 (40-100) carbide	X0.02 (0.01-0.03)	ZM3	70 (40-100) carbide	X0.03 (0.01-0.05)	ZM3	70 (40-100) carbide	X0.03 (0.01-0.05)
					SUS304			Z0.03 (0.01-0.04)			Z0.03 (0.02-0.06)			Z0.05 (0.04-0.08)
Stainless steel	Ferritic	DHS-1	DT4 VM1	60 (30-90) carbide	X0.02 (0.01-0.03)	DT4 VM1 ZM3	90 (50-180) carbide	X0.02 (0.01-0.04)	ZM3	90 (50-200) carbide	X0.03 (0.01-0.05)	ZM3	90 (50-200) carbide	X0.03 (0.01-0.05)
					SUS430			Z0.03 (0.01-0.04)			Z0.04 (0.02-0.08)			Z0.08 (0.04-0.12)
Stainless steel	Martensitic		DT4 VM1	50 (30-70) carbide	X0.02 (0.01-0.03)	DT4 VM1 ZM3	70 (40-100) carbide	X0.02 (0.01-0.03)	ZM3	70 (40-100) carbide	X0.03 (0.01-0.05)	ZM3	70 (40-100) carbide	X0.03 (0.01-0.05)
					SUS420J2			Z0.03 (0.01-0.04)			Z0.03 (0.02-0.06)			Z0.05 (0.04-0.08)
Stainless steel	Martensitic		DT4 VM1	40 (30-60) carbide	X0.02 (0.01-0.03)	DM4 DT4 QM3	60 (40-80) carbide	X0.02 (0.01-0.03)	ZM3	60 (40-80) carbide	X0.03 (0.01-0.05)	ZM3	60 (40-80) carbide	X0.03 (0.01-0.05)
					SUS440A			Z0.03 (0.01-0.04)			Z0.03 (0.02-0.06)			Z0.05 (0.04-0.08)
Stainless steel	Precipitation hardened		DT4 VM1	40 (30-60) carbide	X0.02 (0.01-0.03)	DM4 DT4 QM3	60 (40-80) carbide	X0.02 (0.01-0.03)	ZM3	60 (40-80) carbide	X0.03 (0.01-0.05)	ZM3	60 (40-80) carbide	X0.03 (0.01-0.05)
					SUS630			Z0.03 (0.01-0.04)			Z0.03 (0.02-0.06)			Z0.05 (0.04-0.08)

Material classification	JIS Common grade	Equivalent grade	CSV Type (~φ5)			TBDP/TBMH/TBP/TBPA/TBPS/TBVC Type (φ5 ~ φ20)			TB32 Type (φ10 ~)			TB42 43Type (φ20 ~)		
			Recommended grade	Cutting speed (m/min)	feed speed (mm/rev)	Recommended grade	Cutting speed (m/min)	feed speed (mm/rev)	Recommended grade	Cutting speed (m/min)	feed speed (mm/rev)	Recommended grade	Cutting speed (m/min)	feed speed (mm/rev)
Sulfurate free-cutting steel	SUM22L SUM23L SUM24L	SF20T	DT4 VM1	60 (30-90) carbide	X0.02 (0.01-0.03) Z0.03 (0.01-0.04)	VM1 ZM3	100 (50-200) carbide	X0.02 (0.01-0.04) Z0.05 (0.02-0.1)	ZM3 Z15	100 (50-200) carbide	X0.03 (0.01-0.05) Z0.08 (0.04-0.12)	ZM3 Z15	100 (50-200) carbide	X0.03 (0.01-0.05) Z0.08 (0.04-0.15)
	SUM22 SUM23		DT4 VM1	60 (30-90) carbide	X0.02 (0.01-0.03) Z0.03 (0.01-0.04)	VM1 TM4 ZM3	90 (50-180) carbide	X0.02 (0.01-0.04) Z0.05 (0.02-0.1)	ZM3 Z15	90 (50-200) carbide	X0.03 (0.01-0.05) Z0.08 (0.04-0.12)	ZM3 Z15	90 (50-200) carbide	X0.03 (0.01-0.05) Z0.08 (0.04-0.15)
High carbon chromic bearing steel	SUJ2 SUJ3		DT4 VM1	60 (30-90) carbide	X0.02 (0.01-0.03) Z0.03 (0.01-0.04)	DM4 TM4 QM3 ZM3	90 (50-150) carbide	X0.02 (0.01-0.04) Z0.04 (0.02-0.08)	ZM3	90 (50-150) carbide	X0.03 (0.01-0.05) Z0.05 (0.04-0.08)	ZM3	90 (50-150) carbide	X0.03 (0.01-0.05) Z0.05 (0.04-0.08)
Electromagnetic soft iron	SUY-0 SUY-1 SUY-2	ELCH2 ELCH2S METF MES3F	DT4 VM1	60 (30-90) carbide	X0.02 (0.01-0.03) Z0.03 (0.01-0.04)	DM4 QM3 DT4	100 (50-200) carbide	X0.02 (0.01-0.04) Z0.04 (0.02-0.08)	ZM3	100 (50-200) carbide	X0.03 (0.01-0.05) Z0.05 (0.04-0.08)	ZM3	100 (50-200) carbide	X0.03 (0.01-0.05) Z0.05 (0.04-0.08)
Electromagnetic stainless steel		KM35FL KM57	DT4 VM1	60 (30-90) carbide	X0.02 (0.01-0.03) Z0.03 (0.01-0.04)	DM4 DT4 TM4 ZM3	90 (50-150) carbide	X0.02 (0.01-0.04) Z0.04 (0.02-0.08)	ZM3	90 (50-150) carbide	X0.03 (0.01-0.05) Z0.05 (0.04-0.08)	ZM3	90 (50-150) carbide	X0.03 (0.01-0.05) Z0.05 (0.04-0.08)
True titanium			DT4 VM1	60 (30-90) carbide	X0.02 (0.01-0.03) Z0.03 (0.01-0.04)	DT4 TM4 ZM3	90 (50-150) carbide	X0.02 (0.01-0.04) Z0.05 (0.02-0.1)	ZM3	90 (50-150) carbide	X0.03 (0.01-0.05) Z0.08 (0.04-0.12)	ZM3	90 (50-150) carbide	X0.03 (0.01-0.05) Z0.08 (0.04-0.15)
Titanium Alloy	6Al-4V 6Al-4VELI		DT4 VM1	50 (30-70) carbide	X0.02 (0.01-0.03) Z0.03 (0.01-0.04)	DM4 DT4 QM3	70 (40-100) carbide	X0.02 (0.01-0.03) Z0.03 (0.02-0.06)	ZM3	70 (40-100) carbide	X0.03 (0.01-0.05) Z0.05 (0.04-0.08)	ZM3	70 (40-100) carbide	X0.03 (0.01-0.05) Z0.05 (0.04-0.08)
Aluminum Alloy	A6061		DT4 VM1	60 (30-100) carbide	X0.02 (0.01-0.03) Z0.03 (0.01-0.04)	PD1 KM1 ZM3	100 (50-200) carbide 200 (100-350) PCD	X0.03 (0.01-0.05) Z0.1 (0.02-0.15)	ZM3	100 (50-200) carbide	X0.05 (0.01-0.07) Z0.1 (0.04-0.2)	ZM3	100 (50-200) carbide	X0.05 (0.01-0.07) Z0.15 (0.04-0.25)

*Cutting speed (m/min) is listed as meaning of "Recommended speed (Lowest-Highest)."

*Feed rate (mm/rev) is listed as meaning of "Recommended feed rate (Lowest-Highest)."

*Please refer to page **H36**, "Selection guide for back turning tools," for available depth of cut.

SS Tools Cut-off Recommended Cutting Condition

Material classification	JIS Common grade	Equivalent grade	CSV Type (~φ5)			CTP/CTPA/CTPS/CTPW Type (φ5 ~ φ20)			CTDP/CTV/NTG/NTGW Type (φ10 ~)		
			Recommended grade	Cutting speed (m/min)	feed speed (mm/rev)	Recommended grade	Cutting speed (m/min)	feed speed (mm/rev)	Recommended grade	Cutting speed (m/min)	feed speed (mm/rev)
Low carbon steel	S10C S15C S20C		DT4 VM1	60 (30-90) carbide	0.03 (0.01-0.05)	DT4 QM3 ZM3	80 (50-130) carbide	0.04 (0.02-0.06)	DM4 QM3 ZM3	80 (50-150) carbide	0.08 (0.04-0.12)
Carbon steel	S30C S40C S45C S50C S55C		VM1 DT4	60 (30-90) carbide	0.03 (0.01-0.05)	QM3 DT4 ZM3	90 (50-150) carbide	0.04 (0.02-0.06)	DM4 QM3 ZM3	90 (50-150) carbide	0.08 (0.04-0.12)
Alloy steel	Chrome steel SCr415 SCr430 SCr435 SCr440		VM1 DT4	60 (30-90) carbide	0.03 (0.01-0.05)	QM3 DT4 ZM3	90 (50-150) carbide	0.04 (0.02-0.06)	DM4 QM3 ZM3	90 (50-150) carbide	0.08 (0.04-0.12)
	Chrome molybdenum steel SCM415 SCM430 SCM435 SCM440										
Stainless steel	Austenitic SUS303	ASK-8000	DT4 VM1	60 (30-90) carbide	0.03 (0.01-0.05)	DT4 ZM3	90 (50-180) carbide	0.04 (0.02-0.06)	TM4 ZM3	90 (50-200) carbide	0.08 (0.04-0.12)
			DT4 VM1	50 (30-70) carbide	0.02 (0.01-0.03)	QM3 DT4 ZM3	70 (40-100) carbide	0.03 (0.02-0.05)	QM3 DM4 TM4	70 (40-100) carbide	0.05 (0.03-0.08)
	Ferritic SUS430 SUS430F	DHS-1	DT4 VM1	60 (30-90) carbide	0.03 (0.01-0.05)	DT4 VM1 ZM3	90 (50-180) carbide	0.04 (0.02-0.06)	DM4 TM4 ZM3	90 (50-200) carbide	0.08 (0.04-0.12)
			DT4 VM1	50 (30-70) carbide	0.02 (0.01-0.03)	VM1 ZM3	70 (40-100) carbide	0.03 (0.02-0.05)	ZM3 QM3	70 (40-100) carbide	0.05 (0.03-0.08)
	Martensitic SUS440A SUS440B SUS440C SUS440F		DT4 VM1	40 (30-60) carbide	0.03 (0.01-0.05)	DT4 QM3	60 (40-80) carbide	0.03 (0.02-0.05)	DM4 QM3	60 (40-80) carbide	0.05 (0.03-0.08)
		Precipitation hardened SUS630									

Material classification	JIS Common grade	Equivalent grade	CSV Type (~φ5)			CTP/CTPA/CTPS/CTPW Type (φ5 ~ φ20)			CTDP/CTV/NTG/NTGW Type (φ10 ~)		
			Recommended grade	Cutting speed (m/min)	feed speed (mm/rev)	Recommended grade	Cutting speed (m/min)	feed speed (mm/rev)	Recommended grade	Cutting speed (m/min)	feed speed (mm/rev)
Sulfurate free-cutting steel	SUM22L SUM23L SUM24L	SF20T	DT4 VM1	60 (30-90) carbide	0.03 (0.01-0.05)	VM1 ZM3	100 (50-200) carbide	0.05 (0.03-0.08)	QM3 ZM3	100 (50-200) carbide	0.08 (0.04-0.12)
	SUM22 SUM23		DT4 VM1	60 (30-90) carbide	0.03 (0.01-0.05)	VM1 ZM3	90 (50-180) carbide	0.05 (0.03-0.08)	QM3 ZM3	90 (50-200) carbide	0.08 (0.04-0.12)
High carbon chromic bearing steel	SUJ2 SUJ3		DT4 VM1	60 (30-90) carbide	0.03 (0.01-0.05)	TM4 QM3 ZM3	90 (50-150) carbide	0.05 (0.03-0.08)	TM4 QM3 ZM3	90 (50-150) carbide	0.08 (0.04-0.12)
Electromagnetic soft iron	SUY-0 SUY-1 SUY-2	ELCH2 ELCH2S ME1F MES3F	DT4 VM1	60 (30-90) carbide	0.03 (0.01-0.05)	QM3 DT4	100 (50-200) carbide	0.05 (0.03-0.08)	DM4 QM3	100 (50-200) carbide	0.08 (0.04-0.12)
Electromagnetic stainless steel		KM35FL KM57	DT4 VM1	60 (30-90) carbide	0.03 (0.01-0.05)	DT4 TM4 ZM3	90 (50-150) carbide	0.05 (0.03-0.08)	DM4 QM3 ZM3	90 (50-150) carbide	0.08 (0.04-0.12)
True titanium			DT4 VM1	60 (30-90) carbide	0.03 (0.01-0.05)	DT4 TM4 ZM3	90 (50-150) carbide	0.05 (0.03-0.08)	TM4 ZM3	90 (50-150) carbide	0.08 (0.04-0.12)
Titanium Alloy	6Al-4V 6Al-4VELI		DT4 VM1	50 (30-70) carbide	0.02 (0.01-0.03)	DT4 QM3	70 (40-100) carbide	0.03 (0.02-0.05)	TM4 QM3	70 (40-100) carbide	0.05 (0.03-0.08)
Aluminum Alloy	A6061		DT4 VM1	60 (30-100) carbide	0.03 (0.01-0.05)	PD1 KM1 ZM3	100 (50-200) carbide 200 (100-350) PCD	0.05 (0.03-0.08)	TM4 ZM3	100 (50-200) carbide	0.1 (0.05-0.2)

*Cutting speed (m/min) is listed as meaning of "Recommended speed (Lowest-Highest)."

*Feed rate (mm/rev) is listed as meaning of "Recommended feed rate (Lowest-Highest)."

SS Tools Grooving Recommended Cutting Condition

■ CSV, GTG, GTM, GTMH, GTMT, GTMX, GTPS, SBG

Material classification	JIS Common grade	Equivalent grade	NTK Recommended grade		Cutting speed (m/min)	①feed speed at grooving (mm/rev) ②feed speed at cross cutting (mm/rev) ③Depth of cut at cross cutting (mm)				
			1	2		groove width				
						0.25 ~ 0.5	0.5 ~ 1.0	1.0 ~ 2.0	2.0 or more	
Low carbon steel	S10C S15C S20C		DM4 QM3	VM1 DT4 ZM3 C7Z	80 (50-130) carbide 180 (120-250) cermet	①0.005 ~ 0.03 ②0.002 ~ 0.005 ③max. 0.2 (Cross cutting is impossible with below 0.4mm groove width)	①0.02 ~ 0.07 ②0.005 ~ 0.01 ③max. 0.2	①0.03 ~ 0.08 ②0.03 ~ 0.06 ③max. 0.2	①0.03 ~ 0.2 ②0.03 ~ 0.06 ③max. 0.2	
										Carbon steel
Alloy steel	Chrome steel	SCr415 SCr430 SCr435 SCr440	DM4 QM3	VM1 C7Z	90 (50-150) carbide 180 (120-250) cermet	①0.005 ~ 0.03 ②0.002 ~ 0.005 ③max. 0.2 (Cross cutting is impossible with below 0.4mm groove width)	①0.02 ~ 0.06 ②0.005 ~ 0.01 ③max. 0.2	①0.03 ~ 0.07 ②0.02 ~ 0.05 ③max. 0.2	①0.03 ~ 0.2 ②0.03 ~ 0.06 ③max. 0.2	
	Chrome molybdenum steel	SCM415 SCM430 SCM435 SCM440								90 (50-150) carbide 180 (120-250) cermet
Stainless steel	Austenitic	SUS303	ASK-8000	DT4	TM4 ZM3	90 (50-180) carbide	①0.005 ~ 0.03 ②0.002 ~ 0.005 ③max. 0.2 (Cross cutting is impossible with below 0.4mm groove width)	①0.02 ~ 0.06 ②0.005 ~ 0.01 ③max. 0.2	①0.03 ~ 0.07 ②0.02 ~ 0.05 ③max. 0.2	①0.03 ~ 0.2 ②0.03 ~ 0.06 ③max. 0.2
		SUS304 SUS316 SUS316F		DM4 DT4	QM3 VM1 ZM3	70 (40-100) carbide	①0.005 ~ 0.03 ②0.002 ~ 0.005 ③max. 0.2 (Cross cutting is impossible with below 0.4mm groove width)	①0.02 ~ 0.06 ②0.005 ~ 0.01 ③max. 0.2	①0.03 ~ 0.07 ②0.02 ~ 0.05 ③max. 0.2	①0.03 ~ 0.2 ②0.03 ~ 0.06 ③max. 0.2
	Ferritic	SUS430 SUS430F	DHS-1	DT4 VM1	TM4 ZM3	90 (50-180) carbide	①0.005 ~ 0.03 ②0.002 ~ 0.005 ③max. 0.2 (Cross cutting is impossible with below 0.4mm groove width)	①0.02 ~ 0.06 ②0.005 ~ 0.01 ③max. 0.2	①0.03 ~ 0.07 ②0.02 ~ 0.05 ③max. 0.2	①0.03 ~ 0.2 ②0.03 ~ 0.06 ③max. 0.2
	Martensitic	SUS420J2 SUS420F		DT4 TM4	DM4 QM3 VM1	70 (30-120) carbide	①0.005 ~ 0.03 ②0.002 ~ 0.005 ③max. 0.2 (Cross cutting is impossible with below 0.4mm groove width)	①0.02 ~ 0.06 ②0.005 ~ 0.01 ③max. 0.2	①0.03 ~ 0.07 ②0.02 ~ 0.05 ③max. 0.2	①0.03 ~ 0.2 ②0.03 ~ 0.06 ③max. 0.2
		SUS440A SUS440B SUS440C SUS440F		DM4 QM3	DT4	60 (30-100) carbide	①0.005 ~ 0.03 ②0.002 ~ 0.005 ③max. 0.2 (Cross cutting is impossible with below 0.4mm groove width)	①0.02 ~ 0.06 ②0.005 ~ 0.01 ③max. 0.2	①0.03 ~ 0.07 ②0.02 ~ 0.05 ③max. 0.2	①0.03 ~ 0.2 ②0.03 ~ 0.06 ③max. 0.2
Precipitation hardened	SUS630		DM4 QM3	DT4	60 (30-100) carbide	①0.005 ~ 0.03 ②0.002 ~ 0.005 ③max. 0.2 (Cross cutting is impossible with below 0.4mm groove width)	①0.02 ~ 0.06 ②0.005 ~ 0.01 ③max. 0.2	①0.03 ~ 0.07 ②0.02 ~ 0.05 ③max. 0.2	①0.03 ~ 0.2 ②0.03 ~ 0.06 ③max. 0.2	

Material classification	JIS Common grade	Equivalent grade	NTK Recommended grade		Cutting speed (m/min)	①feed speed at grooving (mm/rev) ②feed speed at cross cutting (mm/rev) ③Depth of cut at cross cutting (mm)			
			1	2		groove width			
						0.25 ~ 0.5	0.5 ~ 1.0	1.0 ~ 2.0	2.0 or more
Sulfurate free-cutting steel	SUM22L SUM23L SUM24L	SF20T	DM4 DT4 VM1	QM3 ZM3	100 (50-200) carbide	①0.005 ~ 0.03 ②0.002 ~ 0.005 ③max. 0.2 (Cross cutting is impossible with below 0.4mm groove width)	①0.02 ~ 0.07 ②0.005 ~ 0.01 ③max. 0.2	①0.03 ~ 0.08 ②0.03 ~ 0.06 ③max. 0.2	①0.03 ~ 0.2 ②0.03 ~ 0.06 ③max. 0.2
	SUM22 SUM23		DM4 DT4	ZM3	180 (120-250) cermet	①0.005 ~ 0.03 ①0.03 ~ 0.05 ②0.002 ~ 0.005 ③max. 0.2 (Cross cutting is impossible with below 0.4mm groove width)	①0.02 ~ 0.07 ②0.005 ~ 0.01 ③max. 0.2	①0.03 ~ 0.08 ②0.03 ~ 0.06 ③max. 0.2	①0.03 ~ 0.2 ②0.03 ~ 0.06 ③max. 0.2
High carbon chromic bearing steel	SUJ2 SUJ3		DM4 DT4	QM3 VM1 C7Z	90 (50-180) carbide 180 (120-250) cermet	①0.005 ~ 0.03 ②0.002 ~ 0.005 ③max. 0.2 (Cross cutting is impossible with below 0.4mm groove width)	①0.02 ~ 0.07 ②0.005 ~ 0.01 ③max. 0.2	①0.03 ~ 0.08 ②0.03 ~ 0.06 ③max. 0.2	①0.03 ~ 0.2 ②0.03 ~ 0.06 ③max. 0.2
Electromagnetic soft iron (純鉄)	SUY-0 SUY-1 SUY-2	ELCH2 ELCH2S ME1F MES3F	DM4 QM3	DT4 VM1	100 (50-200) carbide	①0.005 ~ 0.03 ②0.002 ~ 0.005 ③max. 0.2 (Cross cutting is impossible with below 0.4mm groove width)	①0.02 ~ 0.07 ②0.005 ~ 0.01 ③max. 0.2	①0.03 ~ 0.08 ②0.03 ~ 0.06 ③max. 0.2	①0.03 ~ 0.2 ②0.03 ~ 0.06 ③max. 0.2
Electromagnetic stainless steel		KM35FL KM57	DM4 QM3	DT4 VM1	90 (50-150) carbide	①0.005 ~ 0.03 ②0.002 ~ 0.005 ③max. 0.2 (Cross cutting is impossible with below 0.4mm groove width)	①0.02 ~ 0.06 ②0.005 ~ 0.01 ③max. 0.2	①0.03 ~ 0.07 ②0.02 ~ 0.05 ③max. 0.2	①0.03 ~ 0.2 ②0.03 ~ 0.06 ③max. 0.2
True titanium			DM4 QM3	DT4 VM1	100 (50-150) carbide	①0.005 ~ 0.03 ②0.002 ~ 0.005 ③max. 0.2 (Cross cutting is impossible with below 0.4mm groove width)	①0.02 ~ 0.06 ②0.005 ~ 0.01 ③max. 0.2	①0.03 ~ 0.07 ②0.02 ~ 0.05 ③max. 0.2	①0.03 ~ 0.2 ②0.03 ~ 0.06 ③max. 0.2
Titanium Alloy	6Al-4V 6Al-4VELI		DT4	ZM3	70 (50-100) carbide	①0.005 ~ 0.03 ②0.002 ~ 0.005 ③max. 0.2 (Cross cutting is impossible with below 0.4mm groove width)	①0.02 ~ 0.06 ②0.005 ~ 0.01 ③max. 0.2	①0.03 ~ 0.07 ②0.02 ~ 0.05 ③max. 0.2	①0.03 ~ 0.2 ②0.03 ~ 0.06 ③max. 0.2
Aluminum Alloy	A6061		PD1	KM1	carbide 100 (50-200) PCD 200 (100-350)	①0.005 ~ 0.03 ②0.002 ~ 0.005 ③max. 0.2 (Cross cutting is impossible with below 0.4mm groove width)	①0.02 ~ 0.07 ②0.005 ~ 0.01 ③max. 0.2	①0.03 ~ 0.08 ②0.03 ~ 0.06 ③max. 0.2	①0.05 ~ 0.25 ②0.04 ~ 0.1 ③max. 0.5

*Cutting speed (m/min) is listed as meaning of "Recommended speed (Lowest-Highest)."

*Feed rate (mm/rev) is listed as a range of the recommended.

*Please refer to page 132 for FGV type.

Technical Data

GTV, GEV, GVMB, GVMN, GVW, GWP, TWG

Material classification	JIS Common grade	Equivalent grade	NTK Recommended grade		Cutting speed (m/min)	①feed speed at grooving (mm/rev) ②feed speed at cross cutting (mm/rev) ③Depth of cut at cross cutting (mm)			
			1	2		groove width			
						2.0 ~ 3.0	3.0 ~ 4.0	4.0 ~ 5.0	5.0 or more
Low carbon steel	S10C S15C S20C		QM3	TM1 N40 C7X	80 (50-130) carbide 180 (120-250) cermet	①0.04 ~ 0.2	①0.04 ~ 0.2	①0.04 ~ 0.2	①0.04 ~ 0.2
						②0.03 ~ 0.15	②0.03 ~ 0.15	②0.03 ~ 0.15	②0.03 ~ 0.15
						③max. 3.5	③max. 3.5	③max. 3.5	③max. 3.5
Carbon steel	S30C S40C S45C S50C S55C		QM3	TM1 N40 C7X	90 (50-150) carbide 180 (120-250) cermet	①0.04 ~ 0.2	①0.04 ~ 0.2	①0.04 ~ 0.3	①0.04 ~ 0.3
						②0.03 ~ 0.15	②0.03 ~ 0.15	②0.03 ~ 0.15	②0.03 ~ 0.15
						③max. 3.5	③max. 3.5	③max. 3.5	③max. 3.5
Alloy steel	Chrome steel SCr415 SCr430 SCr435 SCr440		QM3	TM1 N40 C7X	90 (50-150) carbide 180 (120-250) cermet	①0.04 ~ 0.2	①0.04 ~ 0.2	①0.04 ~ 0.3	①0.04 ~ 0.3
						②0.03 ~ 0.15	②0.03 ~ 0.15	②0.03 ~ 0.15	②0.03 ~ 0.15
						③max. 3.5	③max. 3.5	③max. 3.5	③max. 3.5
	Chrome molybdenum steel SCM415 SCM430 SCM435 SCM440				90 (50-150) carbide 180 (120-250) cermet	①0.04 ~ 0.2	①0.04 ~ 0.2	①0.04 ~ 0.3	①0.04 ~ 0.3
						②0.03 ~ 0.15	②0.03 ~ 0.15	②0.03 ~ 0.15	②0.03 ~ 0.15
						③max. 3.5	③max. 3.5	③max. 3.5	③max. 3.5
Austenitic	SUS303	ASK-8000	QM3	TM1	90 (50-180) carbide	①0.04 ~ 0.2	①0.04 ~ 0.2	①0.04 ~ 0.2	①0.04 ~ 0.2
						②0.03 ~ 0.15	②0.03 ~ 0.15	②0.03 ~ 0.15	②0.03 ~ 0.15
						③max. 3.5	③max. 3.5	③max. 3.5	③max. 3.5
Ferritic	SUS304 SUS316 SUS316F		QM3	TM1	70 (40-100) carbide	①0.04 ~ 0.2	①0.04 ~ 0.2	①0.04 ~ 0.2	①0.04 ~ 0.2
						②0.03 ~ 0.15	②0.03 ~ 0.15	②0.03 ~ 0.15	②0.03 ~ 0.15
						③max. 3.5	③max. 3.5	③max. 3.5	③max. 3.5
Martensitic	SUS430 SUS430F	DHS-1	QM3	TM1	90 (50-180) carbide	①0.04 ~ 0.2	①0.04 ~ 0.2	①0.04 ~ 0.2	①0.04 ~ 0.2
						②0.03 ~ 0.15	②0.03 ~ 0.15	②0.03 ~ 0.15	②0.03 ~ 0.15
						③max. 3.5	③max. 3.5	③max. 3.5	③max. 3.5
Precipitation hardened	SUS420J2 SUS420F		QM3	TM1	70 (30-120) carbide	①0.04 ~ 0.2	①0.04 ~ 0.2	①0.04 ~ 0.2	①0.04 ~ 0.2
						②0.03 ~ 0.15	②0.03 ~ 0.15	②0.03 ~ 0.15	②0.03 ~ 0.15
						③max. 3.5	③max. 3.5	③max. 3.5	③max. 3.5
Martensitic	SUS440A SUS440B SUS440C SUS440F		QM3	TM1	60 (30-100) carbide	①0.04 ~ 0.2	①0.04 ~ 0.2	①0.04 ~ 0.2	①0.04 ~ 0.2
						②0.03 ~ 0.15	②0.03 ~ 0.15	②0.03 ~ 0.15	②0.03 ~ 0.15
						③max. 3.5	③max. 3.5	③max. 3.5	③max. 3.5
Precipitation hardened	SUS630				60 (30-100) carbide	①0.04 ~ 0.2	①0.04 ~ 0.2	①0.04 ~ 0.2	①0.04 ~ 0.2
						②0.03 ~ 0.15	②0.03 ~ 0.15	②0.03 ~ 0.15	②0.03 ~ 0.15
						③max. 3.5	③max. 3.5	③max. 3.5	③max. 3.5

Material classification	JIS Common grade	Equivalent grade	NTK Recommended grade		Cutting speed (m/min)	①feed speed at grooving (mm/rev) ②feed speed at cross cutting (mm/rev) ③Depth of cut at cross cutting (mm)			
			1	2		groove width			
						2.0 ~ 3.0	3.0 ~ 4.0	4.0 ~ 5.0	5.0 or more
Sulfurate free-cutting steel	SUM22L SUM23L SUM24L	SF20T	QM3	TM1	100 (50-200) carbide	①0.04 ~ 0.2 ②0.03 ~ 0.15 ③max. 3.5	①0.04 ~ 0.2 ②0.03 ~ 0.15 ③max. 3.5	①0.04 ~ 0.3 ②0.03 ~ 0.15 ③max. 3.5	①0.04 ~ 0.3 ②0.03 ~ 0.15 ③max. 3.5
	SUM22 SUM23		QM3	TM1	180 (120-250) cermet	①0.04 ~ 0.2 ②0.03 ~ 0.15 ③max. 3.5	①0.04 ~ 0.2 ②0.03 ~ 0.15 ③max. 3.5	①0.04 ~ 0.3 ②0.03 ~ 0.15 ③max. 3.5	①0.04 ~ 0.3 ②0.03 ~ 0.15 ③max. 3.5
High carbon chromic bearing steel	SUJ2 SUJ3		QM3	TM1 N40 C7X	90 (50-180) carbide 180 (120-250) cermet	①0.04 ~ 0.2 ②0.03 ~ 0.15 ③max. 3.5	①0.04 ~ 0.2 ②0.03 ~ 0.15 ③max. 3.5	①0.04 ~ 0.2 ②0.03 ~ 0.15 ③max. 3.5	①0.04 ~ 0.2 ②0.03 ~ 0.15 ③max. 3.5
Electromagnetic soft iron (純鉄)	SUY-0 SUY-1 SUY-2	ELCH2 ELCH2S ME1F MES3F	QM3	TM1	100 (50-200) carbide	①0.04 ~ 0.2 ②0.03 ~ 0.15 ③max. 3.5	①0.04 ~ 0.2 ②0.03 ~ 0.15 ③max. 3.5	①0.04 ~ 0.2 ②0.03 ~ 0.15 ③max. 3.5	①0.04 ~ 0.2 ②0.03 ~ 0.15 ③max. 3.5
Electromagnetic stainless steel		KM35FL KM57	QM3	TM1	90 (50-150) carbide	①0.04 ~ 0.2 ②0.03 ~ 0.15 ③max. 3.5	①0.04 ~ 0.2 ②0.03 ~ 0.15 ③max. 3.5	①0.04 ~ 0.2 ②0.03 ~ 0.15 ③max. 3.5	①0.04 ~ 0.2 ②0.03 ~ 0.15 ③max. 3.5
True titanium			QM3	TM1	100 (50-150) carbide	①0.04 ~ 0.2 ②0.03 ~ 0.15 ③max. 3.5	①0.04 ~ 0.2 ②0.03 ~ 0.15 ③max. 3.5	①0.04 ~ 0.2 ②0.03 ~ 0.15 ③max. 3.5	①0.04 ~ 0.2 ②0.03 ~ 0.15 ③max. 3.5
Titanium Alloy	6Al-4V 6Al-4VELI		QM3	TM1	70 (50-100) carbide	①0.04 ~ 0.2 ②0.03 ~ 0.15 ③max. 3.5	①0.04 ~ 0.2 ②0.03 ~ 0.15 ③max. 3.5	①0.04 ~ 0.2 ②0.03 ~ 0.15 ③max. 3.5	①0.04 ~ 0.2 ②0.03 ~ 0.15 ③max. 3.5
Aluminum Alloy	A6061		PD1	KM1	carbide 100 (50-200) PCD 200 (100-350)	①0.04 ~ 0.2 ②0.03 ~ 0.15 ③max. 3.5	①0.04 ~ 0.2 ②0.03 ~ 0.15 ③max. 3.5	①0.04 ~ 0.2 ②0.03 ~ 0.15 ③max. 3.5	①0.04 ~ 0.2 ②0.03 ~ 0.15 ③max. 3.5

*Cutting speed (m/min) is listed as meaning of "Recommended speed (Lowest-Highest)."
 *Feed rate (mm/rev) is listed as a range of the recommended.
 *Please refer to page **I32** for FGV type.

GTPA

Material classification	JIS Common grade	Equivalent grade	NTK Recommended grade		Cutting speed (m/min)	①feed speed at grooving (mm/rev) ②feed speed at cross cutting (mm/rev) ③Depth of cut at cross cutting (mm)	
			1	2		groove width	
						2.0	2.5
Aluminum Alloy	A6061		PD1	KM1	carbide 100(50-200) PCD 200(100-350)	①0.05 ~ 0.15 ②0.05 ~ 0.15 ③max.(groove width×0.8)	①0.05 ~ 0.15 ②0.05 ~ 0.15 ③max.(groove width×0.8)

*Cutting speed (m/min) is listed as meaning of "Recommended speed (Lowest-Highest)."
 *Feed rate (mm/rev) is listed as a range of the recommended.

SS Tools Threading Recommended Cutting Condition

Material classification	JIS Common grade	Equivalent grade	NTK Recommended grade		Cutting speed (m/min)	
			1	2		
Low carbon steel	S10C S15C S20C		QM3 ZM3 C7X	VM1	50	
Carbon steel	S30C S40C S45C S50C S55C		QM3 ZM3 C7X	VM1	50	
Alloy steel	Chrome steel SCr415 SCr430 SCr435 SCr440		QM3 ZM3 C7X	VM1	50	
	Chrome molybdenum steel SCM415 SCM430 SCM435 SCM440					
Stainless steel	Austenitic	SUS303	ASK-8000	VM1 ZM3	QM3	50
		SUS304 SUS316 SUS316F		VM1 ZM3	QM3	40
	Ferritic	SUS430 SUS430F	DHS-1	VM1 ZM3	QM3	50
	Martensitic	SUS420J2 SUS420F		VM1 ZM3	QM3	50
		SUS440A SUS440B SUS440C SUS440F		VM1 ZM3 QM3		50
Precipitation hardened	SUS630					
Sulfurate free-cutting steel	SUM22L SUM23L SUM24L	SF20T	VM1 ZM3	QM3	50	
	SUM22 SUM23		VM1 ZM3	QM3	50	
High carbon chromic bearing steel	SUJ2 SUJ3		VM1 ZM3	QM3	50	
Electromagnetic soft iron	SUY-0 SUY-1 SUY-2	ELCH2 ELCH2S ME1F MES3F	VM1 ZM3	QM3	60	
Electromagnetic stainless steel		KM35FL KM57	VM1 ZM3	QM3	60	
True titanium			VM1 ZM3	KM3	50	
Titanium Alloy	6Al-4V 6Al-4VELI		ZM3 VM1	KM3	40	
Aluminum Alloy	A6061		KM3 ZM3	VM1	60	

*Please refer to **J7**(for OD), **J19**(for ID) for information of number of pass and depth of cut.
*Feed is equal to pitch.

(Reference)

① Calculating revolution speed

$$n = \frac{v_c \times 1000}{\pi \times (\text{nominal diameter})}$$

n : Revolution speed (min⁻¹)
 v_c : Cutting speed (m/min)
 π : Circular constant (3.14)

② Calculating feed speed per minute

$$v_f = n \times (\text{pitch})$$

Example : SUS303, M10×P1.5, v_c=50

$$n = \frac{50 \times 1000}{\pi \times M10} = 1592$$

$$v_f = 1592 \times P1.5 = 2388$$

v_f : Feed speed (mm/min)
 n : Revolution speed (min⁻¹)

Inperfect thread can be generated under the condition over

V_f = 2000 (mm/min).

Then threading with lower revolution speed is recommended.

New Products
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PCD, CBN and ceramic
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Micro-grain Carbide, Carbide
Insert Stock List
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SS Tools ID Turning Recommended Cutting Condition

Material classification	JIS Common grade	Equivalent grade	Machining diameter $\sim \phi 6$						Machining diameter $\phi 6 \sim$					
			NTK Recommended grade		Cutting speed (m/min)	Depth of cut a_p (mm)	feed speed (mm/rev)	NTK Recommended grade		Cutting speed (m/min)	Depth of cut a_p (mm)	feed speed (mm/rev)		
			1	2				1	2					
Low carbon steel	S10C S15C S20C		VM1	TM4 ZM3	60 (30-90)	0.08 (0.05-0.10)	0.05 (0.03-0.07)	TM1 ZM3	QM3 C7Z	90 (50-150) carbide 180 (120-250) cermet	0.50 (0.10-2.0)	0.04 (0.01-0.12)		
Carbon steel	S30C S40C S45C S50C S55C		VM1	TM4 ZM3	60 (30-90)	0.08 (0.05-0.10)	0.05 (0.03-0.07)	TM1 ZM3	QM3 C7Z	90 (50-150) carbide 180 (120-250) cermet	0.50 (0.10-2.0)	0.04 (0.01-0.12)		
Alloy steel	Chrome steel SCr415 SCr430 SCr435 SCr440		VM1	TM4 ZM3	60 (30-90)	0.08 (0.05-0.10)	0.05 (0.03-0.07)	TM1 ZM3	QM3 C7Z	90 (50-150) carbide 180 (120-250) cermet	0.50 (0.10-2.0)	0.04 (0.01-0.12)		
	Chrome molybdenum steel SCM415 SCM430 SCM435 SCM440													
Stainless steel	Austenitic SUS303	ASK-8000	TM4	ZM3 VM1	60 (30-90)	0.08 (0.05-0.10)	0.05 (0.03-0.07)	DT4 TM1	TM4	90 (50-180)	0.50 (0.10-2.0)	0.04 (0.01-0.12)		
			TM4	ZM3 VM1	50 (20-70)	0.08 (0.05-0.10)	0.05 (0.03-0.07)	DT4 TM1	TM4	70 (40-100)	0.50 (0.10-2.0)	0.04 (0.01-0.12)		
	Ferritic SUS430 SUS430F	DHS-1	TM4	ZM3 VM1	60 (30-90)	0.08 (0.05-0.10)	0.05 (0.03-0.07)	DT4 TM1	TM4	90 (50-180)	0.50 (0.10-2.0)	0.04 (0.01-0.12)		
			TM4	ZM3 VM1	60 (30-90)	0.08 (0.05-0.10)	0.05 (0.03-0.07)	DT4 TM1	TM4	90 (50-180)	0.50 (0.10-2.0)	0.04 (0.01-0.12)		
	Martensitic SUS440A SUS440B SUS440C SUS440F		TM4	ZM3 VM1	50 (20-70)	0.08 (0.05-0.10)	0.05 (0.03-0.07)	DT4 TM1	TM4	70 (40-100) carbide	0.50 (0.10-2.0)	0.04 (0.01-0.12)		
Precipitation hardened SUS630														

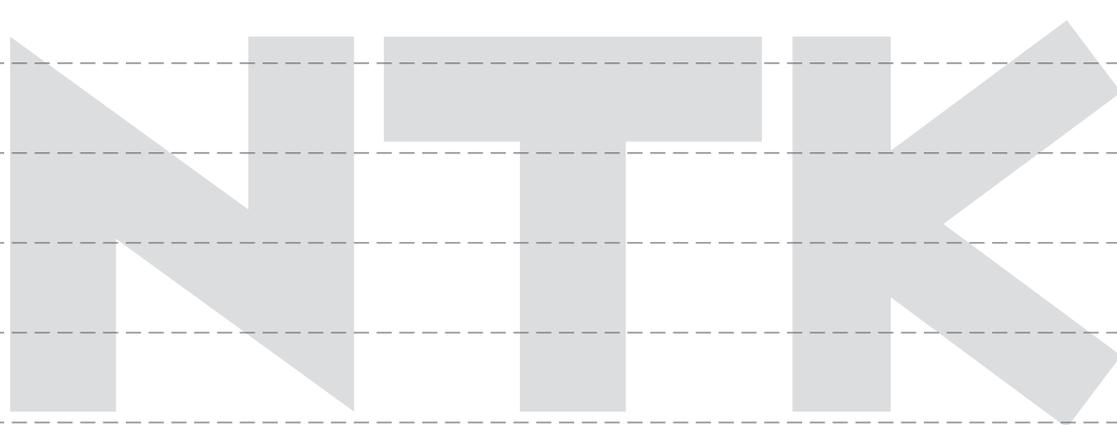
Material classification	JIS Common grade	Equivalent grade	Machining diameter $\sim \phi 6$					Machining diameter $\phi 6 \sim$				
			NTK Recommended grade		Cutting speed (m/min)	Depth of cut a_p (mm)	feed speed (mm/rev)	NTK Recommended grade		Cutting speed (m/min)	Depth of cut a_p (mm)	feed speed (mm/rev)
			1	2				1	2			
Sulfurate free-cutting steel	SUM22L SUM23L SUM24L	SF20T	VM1	TM4 ZM3	60 (30-90)	0.08 (0.05-0.10)	0.05 (0.03-0.07)	VM1	TM1 DT4	100 (50-200) carbide	0.50 (0.10-2.0)	0.04 (0.01-0.12)
	SUM22 SUM23		VM1	TM4 ZM3	60 (30-90)	0.08 (0.05-0.10)	0.05 (0.03-0.07)	DT4 TM4	ZM3	180 (120-250) cermet	0.50 (0.10-2.0)	0.04 (0.01-0.12)
High carbon chromic bearing steel	SUJ2 SUJ3		TM4	VM1 ZM3	60 (30-90)	0.08 (0.05-0.10)	0.05 (0.03-0.07)	DT4 TM4	QM3 C7X C7Z	90 (50-180) carbide 180 (120-250) cermet	0.50 (0.10-2.0)	0.04 (0.01-0.12)
Electromagnetic soft iron (純鉄)	SUY-0 SUY-1 SUY-2	ELCH2 ELCH2S ME1F MES3F	VM1	TM4 ZM3	80 (50-100)	0.08 (0.05-0.10)	0.05 (0.03-0.07)	QM3	DT4 TM1 TM4	100 (50-200) carbide	0.50 (0.10-2.0)	0.04 (0.01-0.12)
Electromagnetic stainless steel		KM35FL KM57	VM1	TM4	60 (30-90)	0.08 (0.05-0.10)	0.05 (0.03-0.07)	QM3	DT4 TM4	90 (50-150) carbide	0.50 (0.10-2.0)	0.04 (0.01-0.12)
True titanium			TM4	ZM3 VM1	60 (30-90)	0.08 (0.05-0.10)	0.05 (0.03-0.07)	TM1	DT4 TM4	100 (50-150) carbide	0.50 (0.10-2.0)	0.04 (0.01-0.12)
Titanium Alloy	6Al-4V 6Al-4VELI		TM4	ZM3 VM1	50 (30-70)	0.08 (0.05-0.10)	0.05 (0.03-0.07)	DT4	TM1	70 (50-100) carbide	0.50 (0.10-2.0)	0.04 (0.01-0.12)
Aluminum Alloy	A6061		TM4	ZM3	60 (30-90)	0.08 (0.05-0.10)	0.05 (0.03-0.07)	PD1	KM1 ZM3	100 (50-200) carbide 200 (100-350) PCD	0.50 (0.10-2.0)	0.04 (0.01-0.12)

*Cutting speed (m/min) is listed as meaning of "Recommended speed (Lowest-Highest)."

*Feed rate (mm/rev) is listed as meaning of "Recommended feed rate (Lowest-Highest)."

MEMO

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(○ represents a number and □ represents a letter)

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010703-103	O32	Holder
010703-104	O34	Holder
010703-105	O36	Holder
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1/4-20UNC * 11/4	M4	Part
131A-○○	O60	Insert
131N-○○	O60	Insert
131T-○○	O60	Insert
132A-○○	O62	Insert
132N-○○	O62	Insert
132T-○○	O62	Insert
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135N-○○-118	O50	Insert
135T-○○	O45	Insert
136N-○○-118	O50	Insert
136T-○○	O45	Insert
137N-○○-118	O50	Insert
137T-○○	O47	Insert
138N-○○-118	O50	Insert
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151A-○○	O37	Insert
151A-○○-TW	O51	Insert
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151N-○○-118	O50	Insert
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151T-○○-FB	O48	Insert
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152T-○○-FB	O48	Insert
153A-○○	O39	Insert
153N-○○	O39	Insert
153N-○○-118	O48	Insert
153T-○○	O41	Insert
153T-○○-FB	O48	Insert
154N-○○	O43	Insert
154T-○○	O43	Insert

Part No.	Listed on	Part name
154T-○○-FB	O48	Insert
15YA-○○	O31	Insert
15YN-○○	O31	Insert
15YN-○○-SR	O51	Insert
15YT-○○	O31	Insert
15YT-○○-FB	O48	Insert
15ZA-○○	O33	Insert
15ZN-○○	O33	Insert
15ZN-○○-SR	O51	Insert
15ZT-○○	O33	Insert
15ZT-○○-FB	O48	Insert
15ZT-○○-SP	O51	Insert
180A-○○	O58	Insert
180N-○○	O58	Insert
180T-○○	O58	Insert
181A-○○	O60	Insert
181N-○○	O60	Insert
181T-○○	O60	Insert
182A-○○	O62	Insert
182N-○○	O62	Insert
182T-○○	O62	Insert
18YA-○○	O56	Insert
18YN-○○	O56	Insert
18YT-○○	O56	Insert
18ZA-○○	O57	Insert
18ZN-○○	O57	Insert
18ZT-○○	O57	Insert
1C20A-○○	O59	Insert
1C20T-○○	O59	Insert
1C21A-○○	O61	Insert
1C21T-○○	O61	Insert
1C22A-○○	O63	Insert
1C22T-○○	O63	Insert
1C23A-○○	O64	Insert
1C23T-○○	O64	Insert
1C2YA-○○	O56	Insert
1C2YT-○○	O56	Insert
1C2ZA-○○	O57	Insert
1C2ZT-○○	O57	Insert
1C30A-○○	O59	Insert
1C31A-○○	O61	Insert
1C32A-○○	O63	Insert
1C3YA-○○	O56	Insert
1C3ZA-○○	O57	Insert
1C50A-○○	O59	Insert
1C50T-○○	O59	Insert
1C51A-○○	O61	Insert
1C51T-○○	O61	Insert
1C52A-○○	O63	Insert
1C52T-○○	O63	Insert

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Part No.	Listed on	Part name
1C53A-○○	O64	Insert
1C53T-○○	O64	Insert
1C5YA-○○	O56	Insert
1C5YT-○○	O56	Insert
1C5ZA-○○	O57	Insert
1C5ZT-○○	O57	Insert
1D-HSC-MK○○○○○RJ	P15	Cutter
2*8AW	M4	Part
2.5*8AW	M4	Part
2100○S-○○FMS	O34	Holder
2100○S-○○M	O34	Holder
2101○S-○○FMS	O36	Holder
2102○S-○○FMS	O38	Holder
2103○S-○○FMS	O40	Holder
210Y0S-○○FMS	O30	Holder
210Y0S-○○M	O22	Holder
210Z0S-○○FMS	O32	Holder
210Z0S-○○M	O22	Holder
2200○S-○○○□	O32	Holder
2200○S-20FMS	O32	Holder
2201○S-○○○□	O34	Holder
2201○S-25FMS	O34	Holder
2202○S-○○○□	O38	Holder
2202○S-32FMS	O38	Holder
22030S-○○○□	O40	Holder
22030S-40FMS	O38	Holder
22040S-○○○□	O42	Holder
22040S-40FMS	O42	Holder
22050S-○○○□	O44	Holder
22050S-50FMSW	O44	Holder
22070S-○○○□	O46	Holder
220Y0S-○○○□	O30	Holder
220Y0S-20FMS	O30	Holder
220Z0S-○○○□	O32	Holder
220Z0S-20FMS	O32	Holder
22570S-50FMSW	O46	Holder
23000S-22M	O34	Holder
2301○H-003M	O36	Holder
2301○H-25FMS	O36	Holder
2302○H-004M	O38	Holder
2302○H-32FMS	O38	Holder
23030H-004M	O40	Holder
23030H-40FMS	O40	Holder
230Y0S-22M	O30	Holder
230Z0S-22M	O32	Holder
2400○H-002M	O34	Holder
2400○H-20FMS	O34	Holder
2401○H-003M	O36	Holder
2401○H-25FMS	O36	Holder
2402○H-004M	O38	Holder

Part No.	Listed on	Part name
2402○H-32FMS	O38	Holder
24030H-004M	O40	Holder
24030H-40FMS	O40	Holder
24040H-005M	O42	Holder
24040H-40FMS	O42	Holder
24050H-005M	O44	Holder
24070H-005M	O44	Holder
240Y0H-002M	O30	Holder
240Y0H-20FMS	O30	Holder
240Z0H-002M	O32	Holder
240Z0H-20FMS	O32	Holder
24530S-40FMS	O40	Holder
24540S-40FMSW-70	O42	Holder
24550S-50FMSW	O44	Holder
24570S-50FMSW	O46	Holder
2500○H-002M	O34	Holder
2500○H-20FMS	O34	Holder
2501○H-003M	O36	Holder
2501○H-25FMS	O36	Holder
2502○H-004M	O38	Holder
2502○H-32FMS	O38	Holder
25030S-004M	O40	Holder
25030S-40FMS	O40	Holder
25040S-005M	O42	Holder
25040S-40FMS	O42	Holder
25050S-005M	O44	Holder
25070S-005M	O44	Holder
250Y0H-002M	O30	Holder
250Y0H-20FMS	O30	Holder
250Z0H-002M	O32	Holder
250Z0H-20FMS	O32	Holder
2600○H-20FMS	O34	Holder
26010S-25FMS	O36	Holder
26020S-32FMS	O38	Holder
26040S-40FMS	O42	Holder
260Y0S-20FMS	O30	Holder
260Z0S-20FMS	O32	Holder
26500S-20FMS	O34	Holder
27000S-20FMS	O34	Holder
27010S-25FMS	O36	Holder
27020S-32FMS	O38	Holder
27030S-004M	O40	Holder
27030S-40FMS	O40	Holder
27040S-005M	O42	Holder
27040S-40FMS	O42	Holder
27050S-005M	O44	Holder
27070S-005M	O46	Holder
270Y0S-20FMS	O30	Holder
270Z0S-20FMS	O32	Holder
27550S-50FMSW	O44	Holder

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27570S-50FMSW	O46	Holder
2814HS	P6 ,etc	Part
29000S-20FMS	O34	Holder
29010S-25FMS	O36	Holder
29020S-32FMS	O38	Holder
29030S-004M	O40	Holder
29030S-40FMS	O40	Holder
29040S-005M	O42	Holder
29040S-40FMS	O42	Holder
29050S-005M	O44	Holder
29070S-005M	O46	Holder
290Y0S-20FMS	O30	Holder
290Z0S-20FMS	O32	Holder
2T-2SRM	O32 ,etc	Part
2T-3SRM	O36 ,etc	Part
2T-4SRM	O38 ,etc	Part
2T-5SRM	O42 ,etc	Part
2T-6SRM	O44 ,etc	Part
3/8-16UNC * 11/2	M4	Part
433T-○○	O64	Insert
434T-○○	O43	Insert
435T-○○	O45	Insert
436T-○○	O45	Insert
437T-○○	O47	Insert
438T-○○	O47	Insert
450H-○○	O35	Insert
450H-○○-118	O50	Insert
451H-○○	O37	Insert
451H-○○-118	O50	Insert
452H-○○	O39	Insert
452H-○○-118	O50	Insert
453H-○○	O41	Insert
453H-○○-118	O50	Insert
453T-○○	O41	Insert
454H-○○	O43	Insert
454H-○○-118	O50	Insert
454T-○○	O65	Insert
455H-○○	O45	Insert
455H-○○-118	O50	Insert
456H-○○	O45	Insert
456H-○○-118	O50	Insert
457H-○○	O47	Insert
457H-○○-118	O50	Insert
458H-○○	O47	Insert
458H-○○-118	O50	Insert
45YH-○○	O31	Insert
45ZH-○○	O33	Insert
4C20H-○○	O35	Insert
4C21H-○○	O37	Insert
4C22H-○○	O39	Insert

Part No.	Listed on	Part name
4C2YH-○○	O31	Insert
4C2ZH-○○	O33	Insert
5C112H-○○	O85	Insert
5C113H-○○	O86	Insert
5C114H-○○	O87	Insert
5C115H-○○	O88	Insert
5C116H-○○	O89	Insert
5C117H-○○	O90	Insert
5C118H-○○	O91	Insert
5C120H-○○	O92	Insert
5C122H-○○	O93	Insert
5C124H-○○	O94	Insert
5C126H-○○	O95	Insert
5C129H-○○	O96	Insert
5C212H-○○	O85	Insert
5C213H-○○	O86	Insert
5C214H-○○	O87	Insert
5C215H-○○	O88	Insert
5C216H-○○	O89	Insert
5C217H-○○	O90	Insert
5C218H-○○	O91	Insert
5C220H-○○	O92	Insert
5C222H-○○	O93	Insert
5C224H-○○	O94	Insert
5C226H-○○	O95	Insert
5C229H-○○	O96	Insert
60312□-20FM	O85	Holder
60313□-20FM	O86	Holder
60314□-20FM	O87	Holder
60315□-20FM	O88	Holder
60316□-20FM	O89	Holder
60317□-20FM	O90	Holder
60318□-25FM	O91	Holder
60320□-25FM	O92	Holder
60322□-25FM	O93	Holder
60324□-25FM	O94	Holder
60326□-32FM	O95	Holder
60329□-32FM	O96	Holder
60512□-20FM	O85	Holder
60513□-20FM	O86	Holder
60514□-20FM	O87	Holder
60515□-20FM	O88	Holder
60516□-20FM	O89	Holder
60517□-20FM	O90	Holder
60518□-25FM	O91	Holder
60520□-25FM	O92	Holder
60522□-25FM	O93	Holder
60524□-25FM	O94	Holder
60526□-32FM	O95	Holder
60529□-32FM	O96	Holder

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Part No.	Listed on	Part name
60712□-20FM	O85	Holder
60713□-20FM	O86	Holder
60714□-20FM	O87	Holder
60715□-20FM	O88	Holder
60716□-20FM	O89	Holder
60717□-20FM	O90	Holder
60718□-25FM	O91	Holder
60720□-25FM	O92	Holder
60722□-25FM	O93	Holder
60724□-25FM	O94	Holder
60726□-32FM	O95	Holder
60729□-32FM	O96	Holder
63.○○○Z-○	P15	Cutter
64.○○○Z-○	P15	Cutter
65.○○○Z-○	P15	Cutter
66.○○○Z-○	P15	Cutter
67.○○○Z-○	P15	Cutter
7247-IP7-10	O99 ,etc	Part
724-IP7-10	O30 ,etc	Part
72556-IP8-10	O34 ,etc	Part
72567-IP8-10	O34 ,etc	Part
7375-IP9-10	O36 ,etc	Part
739-IP9-10	O36 ,etc	Part
7495-IP15-10	O38 ,etc	Part
7514-IP20-10	O40 ,etc	Part
7619-IP25-10	O44 ,etc	Part
8IP-15	O52 ,etc	Part
8IP-20	O52 ,etc	Part
8IP-25	O42 ,etc	Part
8IP-7	O42 ,etc	Part
8IP-8	O42 ,etc	Part
8IP-9	O42 ,etc	Part
A		
ABS○○	M11	Part
ACN422	G7 ,etc	Part
ACN423	G7 ,etc	Part
ADN422	G11 ,etc	Part
ADN423	G11 ,etc	Part
AM-612L-9	M17	Part
AMS-5T	P28 ,etc	Part
AOB-5 * 14	I24 ,etc	Part
AOB-5 * 16	I24 ,etc	Part
AOB-5C	I31 ,etc	Part
AOB-5S-T25	P28 ,etc	Part
AOB-6C	I36 ,etc	Part
AOB-6S-T30	P28	Part
AOS-5 * 16	I26 ,etc	Part
AOS-5 * 20	I26 ,etc	Part
AOS-5 * 25	I11	Part

Part No.	Listed on	Part name
AOS-5 * 26W	G23 ,etc	Part
AOS-6 * 26W	L41	Part
AOS-6 * 30	I16 ,etc	Part
AOS-6 * 30W	G7 ,etc	Part
APCW1604	P27	Insert
ARN42	G14	Part
ARP42A	P28	Part
ASG-5	H50	Part
ASG-6	I16 ,etc	Part
ASGL4	G29 ,etc	Part
ASGL5	G29 ,etc	Part
ASGL5-D	G23 ,etc	Part
ASGL6-D	G17 ,etc	Part
ASN○○○	G17 ,etc	Part
ATN○○○	G23 ,etc	Part
AU 32 13R	P15	Part
AVN323	G27	Part
AWN423-W	G28	Part
AZT659D	M18	Part
B		
B○○□-STZCR-○○	L40	Holder
B○○□-STZPR-○○	L40	Holder
BBR○○○○	M17	Holder
BG○○	I30	Holder
BG○○-○○S	I30	Holder
BS○○○○	G29 ,etc	Part
BSOR○○	P6	Part
BS0520	H74	Part
BS0620	H74	Part
BS0829W	G7 ,etc	Part
BS0835W	G7 ,etc	Part
BSGF53	M11	Insert
BSM55	P6	Part
BSMF○○	M11 ,etc	Insert
BT○○-FMNA○○-○○	P17	Arbor
BT○○-FMNC○○-○○	P17	Arbor
C		
C○○□-MBR	L32	Holder
C○○□-MBRD○○-OH	L32	Holder
C○○□-MSBR	L33	Holder
C○○□-SCLC□○○□○○-OH	L36	Holder
C○○□-SCLP□○○□○○-OH	L36	Holder
C○○□-SCLP-○○	L37	Holder
C○○□-SEXR□○○□○○-OH	L35	Holder
C○○□-SRC○○F	M16	Holder
C○○□-STUC□○○□○○-OH	L38	Holder
C○○□-STUP□○○□○○-OH	L38	Holder
C○○□-STZC□○○-OH	L40	Holder

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C○○□-STZP□○○-OH	L40	Holder
C11-○○	G19	Holder
C12-○○	G17	Holder
C13-○○	G19	Holder
C14M-○○	G17	Holder
C15-○○	G21	Holder
C16-○○	G19	Holder
C17-○○	G21	Holder
C21-○○	G23	Holder
C22-○○	G23	Holder
C23-○○	G24	Holder
C24-○○	G24	Holder
C25-○○	G25	Holder
C31-○○	G7	Holder
C54M-○○	G14	Holder
C55-○○	G14	Holder
CB○	M11 ,etc	Part
CBG○○□○○□	M11	Holder
CBN○○□○○□	M12	Holder
CBS○○□○○□	M11	Holder
CBU○○□○○□	M11	Holder
CC○○0602	F33 · F34 · F35	Insert
CC○○0602PD	F20	Insert
CC○○09T3	F33 · F34 · F35	Insert
CC○○09T3PD	F20	Insert
CC08M□	G7 ,etc	Part
CC08W□	G7 ,etc	Part
CCBN□2525M12	G9	Holder
CCET06020○○KHG	F34	Insert
CCET09T30○○KHG	F34	Insert
CCKN□2525M12	G9	Holder
CCLN12	G7	Holder
CDH○○	M4	Insert
CDH○○PN	M5	Insert
CDJN○○○○□○○	G11	Holder
CH-FGV○○○○	I34	Holder
CH-GTT○○□○○	H53	Holder
CH-LBML○○○○H	L6	Holder
CH-SDUC○○□○○	H19	Holder
CH-STUC○○□○○	H28	Holder
CH-SVUP○○□○○	H27	Holder
CH-SVXCL○○	A42 · H46	Holder
CH-TBPA○○	H44	Holder
CLH04○○	N6	Insert
CLH05○○	N8	Insert
CLR-13S	Q36 · Q37	Part
CLR-15S	Q36 · Q37	Part
CNGA1204○○	F4 · F25	Insert
CNGA1204○○PQ	F16	Insert
CNGA1204○○PQW	F16	Insert

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CNGG○○○○	F4 · F24	Insert
CNGN○○○○	F5	Insert
CNGX1207○○	F5	Insert
CNMA○○○○PQ	F16	Insert
CNMG○○○○	F24 · F25	Insert
CNMN○○○○	F5	Insert
COUP-M10 * 1	L14	Part
COUP-R1/8	L14	Part
CP%○○	I11	Part
CPGB080204TN	F36	Insert
CPGD031-TN	F36	Insert
CPGH○○○○	F36	Insert
CPGM○○○○	F36	Insert
CPGP○○○○	F36	Insert
CPGT0602○○	F35	Insert
CPGT09T3○○	F35	Insert
CPMH0602○○	F36	Insert
CPMH0802○○	F36	Insert
CPMH0903○○	F36	Insert
CPMM○○○○	F36	Insert
CPMP○○○○	F36	Insert
CRDCN○○	M4	Holder
CRDNN○○	G14	Holder
CRGN○○	G14	Holder
CRN4	M4	Part
CRN5	M4	Part
CRXC○○	M4	Holder
CS03○○	M4	Part
CS04○○	M4	Part
CS0415	H91	Part
CS05○○	M4 ,etc	Part
CS0515	H91	Part
CS0516LSH	H73	Part
CS0520	H77	Part
CS0520W	I24	Part
CS06○○	M4 ,etc	Part
CS0625W	I24	Part
CS1040A	P11	Part
CSDNN○○	G17	Holder
CSHN○○	G19	Holder
CSSN○○	G17	Holder
CSV○○	H81 ,etc	Holder
CSV○○GX	H81 ,etc	Holder
CSV○○GXNC	H81 ,etc	Holder
CSV○○NC	H81 ,etc	Holder
CSVB11F	H82 ,etc	Insert
CSVC11F	H83 ,etc	Insert
CSVF11F	H82 ,etc	Insert
CSVG11F	H83 ,etc	Insert
CSVT11F	H83 ,etc	Insert

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CTDP○○	H73 ,etc	Holder
CTP○○	H63	Holder
CTP%○○H-OH	A17 · H63	Holder
CTPA○○	H67 ,etc	Holder
CTPAL○○□□-SUB	H67	Holder
CTPAR○○□□-SUB	H67	Holder
CTPL○○□□-SUB	H62	Holder
CTPR○○□□-SUB	H62	Holder
CTPS○○	H84 ,etc	Holder
CTPW○○	H70	Holder
CTPX○○	H65 ,etc	Insert
CTV○○	H71 ,etc	Holder
CTVN○○K2	H71	Holder
CV%○○	I26	Part
CVS%○○	I26	Part
CZH○○	N5	Insert
D		
DC○○0702	F21 · F37 · F38 · F39	Insert
DC○○11T3	F21 · F37 · F38 · F39	Insert
DC5TN	G23 ,etc	Part
DC6CN	G7 ,etc	Part
DC6DN	G11 ,etc	Part
DC6VN	G27	Part
DCET0702○○	F38	Insert
DCET11T3○○	F38	Insert
DCGW0702○○	F21	Insert
DCGW11T3○○	F21	Insert
DNGA○○○	F6 · F17 · F26	Insert
DNGG○○○	F26	Insert
DNGN○○○	F6	Insert
DNGX1507○○	F6	Insert
DNMA○○○PQ	F17	Insert
DNMG○○○	F25 · F26	Insert
DPGT0702○○	F39	Insert
DS-FGV○○	I34	Holder
DS-GTT○○	H53	Holder
DS-LBMBL○○	L6	Holder
DS-PTX○○-33	H13 · H31	Holder
DS-SCLL○○	H13	Holder
DS-SDU○○	H13 · H21	Holder
DS-SDX○○	H21	Holder
DS-STT○○	J15	Holder
DS-SVVPN○○	H13	Holder
DS-SVXL○○	H25	Holder
DS-SVXPL○○	H27	Holder
DS-TBP○○	H43	Holder
DS-TTP○○	J10	Holder

Part No.	Listed on	Part name
E		
ELSR42C	M15	Part
ENGN○○○	F6	Insert
ERGH301○○	F41	Insert
ERGP52	F41	Insert
F		
FAS○○○○○A	P15	Part
FBV40R○D8AM3	I35	Insert
FDX1204-○○-50R	P23	Insert
FGV○○○□B○○D6	I35	Insert
FGV○○○○	I34	Holder
FSI01-2.5 * 5	N8	Part
FSI02-2.2 * 4.0	N5	Part
FSI02-2.2 * 4.3	N6	Part
FSI03○○A	P11	Part
FSI04-2.0 * 4.3	N8	Part
FSI17-2.2 * 6.0	J25	Part
FSI21-5.0 * 12.45	P24	Part
FSI22-4.0 * 11	P26	Part
FSI23-4.0 * 7	P26	Part
FSI26-4.0 * 12-LH	P21	Part
FSS10-5.0 * 14	I19	Part
FSS15-3.0 * 12	G7 ,etc	Part
FSS16-3.0 * 8	L41	Part
FSS25-5.0 * 10	I19	Part
G		
GEV○○○N(04)	I21	Insert
GFV○○-6	I36	Holder
GFV600N○○	I36	Insert
GKV○○	I20	Holder
GKWP○○	A33 · I25	Holder
GSV○○	I36	Holder
GTG10○○	I30	Insert
GTG14○○	I30	Insert
GTG20○○	I30	Insert
GTM32○○	I15	Insert
GTM43○○	I17	Insert
GTMA43○○J	I17	Insert
GTMH32○○	I12 · I13 · I14 · I15	Insert
GTMH32○○GX	A6 · I12	Insert
GTMH32○○J	I15	Insert
GTMH32○○VT	I13	Insert
GTMT43○○	I16	Insert
GTMX32○○	I13	Insert
GTMX43○○J	I18	Insert
GTPA○○	I27	Holder
GTPA○○FRN01	I27	Insert

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(○ represents a number and □ represents a letter)

Part No.	Listed on	Part name
GTPS○○○FR	I37	Insert
GTT○○□○○	H53	Holder
GTTR○○H00-OH	A16 · I8	Holder
GTV○○○□	I21	Insert
GTV○○-○□	I20	Holder
GTVW○○-○	I26	Holder
GTWP○○○	A32 · I24	Holder
GVGN○○○○○□	I22	Insert
GVMB○○○○○□	I22	Insert
GVMN○○○○○□	I22	Insert
GVW○○○	I26	Insert
GWPG○○○-GV	I25	Insert
GWPG○○○-GW	I25	Insert
GWPM○○○-GW	I25	Insert
H		
HACDH○○	M4	Part
HAL3515R04	P11	Insert
HAN9521R04	P11	Insert
HAR○○Y	M4	Part
HARCGX○○	M4	Part
HAT6021R04	P11	Insert
HAZT1255A	M18	Part
HC35KR-○○	M4	Part
HC59/60TS-4	M18	Part
HC6CN	G7 ,etc	Part
HC6DN	G11 ,etc	Part
HC6SN	G17	Part
HCA○○○○□○○	P7	Insert
HCD○○○○□○○	P7	Insert
HCLN○○○○□○○	G7	Holder
HDA○○○○□○○	P11	Insert
HDHN○○○○□○○	G13	Holder
HDJN○○○○□○○	G11	Holder
HDNNN○○○○□○○	G13	Holder
HDWM5-EU4DD	P6	Part
HLA8521R04	P11	Insert
HLR-25S	P36 · P37	Part
HLW175	P22	Part
HN○○/○○□□-○○□	M18	Holder
HOSE-CN-CN-○○○	A22 · L12	Part
HOSE-R1/8-CN-○○○	A22 · L12	Part
HOSE-ST-M8	L14	Part
HOSE-AN-M8	L14	Part
HRCd-○○	M4	Holder
HRT6021R04	P11	Insert
HSDNN○○○○□○○	G17	Holder
HSSN○○○○□○○	G17	Holder
HVJN○○○○□○○	G27	Holder
HVPN○○○○□○○	G27	Holder

Part No.	Listed on	Part name
HVVNN○○○○□○○	G27	Holder
HY-NBH○○○○○□	L18	Holder
HY-NBH○○○○○□-OH	A20 · L10	Holder
J		
JFDX○○○	P22	Cutter
JOINT-ST-R1/8	A23 · L13	Part
JOINT-AN-R1/8	A23 · L13	Part
JQTE○○○	P26	Cutter
JQTS○○○	P26	Cutter
JRNMW○○○	P28	Cutter
JRPMW○○○E	P28	Cutter
JRPMW○○○S	P28	Cutter
JSDW○○○	P24	Cutter
JSF-○○○-○○	P6	Cutter
JWNXM○○○	A41 · P21	Cutter
JXTM○○○	P25	Cutter
K		
KBR○○○○PB	L27	Insert
KH4□□	P15	Insert
KTN○○J	H76	Insert
KTNW○○J	H76	Insert
KTR○○J○○D	H77	Insert
KTRW○○JS○○D	H76	Insert
L		
LBM○○○○	L7	Insert
LBMAR○○	L6	Holder
LBMCO○	L7	Insert
LBMD○○	L7	Insert
LBME○○	L7	Insert
LCL3	G23 ,etc	Part
LCL33N	H31	Part
LCL3C	G15	Part
LCL4	G7 ,etc	Part
LCL4C	G15 ,etc	Part
LCS2	G15	Part
LCS3	G15 ,etc	Part
LCS33	H31	Part
LCS4	H31	Part
LCS4CA	H31	Part
LLR-25S	Q36 · Q37	Part
LLR-28S	Q36 · Q37	Part
LLR-T10	L41	Part
LLR-T15	G23 ,etc	Part
LLR-T20	L41	Part
LNMO○○○	M5 ,etc	Insert
LNx○○○	P25	Insert
LRIS-2*6	Q37 ,etc	Part

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Part No.	Listed on	Part name
LRIS-2.2 * 6	Q37 ,etc	Part
LRIS-2.5 * 5	Q37 ,etc	Part
LRIS-2.5 * 7	Q37 ,etc	Part
LRIS-3 * 6	Q37 ,etc	Part
LRIS-3 * 8	Q37 ,etc	Part
LRIS-4 * 10	Q37 ,etc	Part
LRIS-4 * 10PW	Q37 ,etc	Part
LRIS-4 * 12	Q37 ,etc	Part
LRIS-4 * 12PW	Q37 ,etc	Part
LRIS-4 * 5	Q37 ,etc	Part
LRIS-4 * 6	Q37 ,etc	Part
LRIS-4 * 8	Q37 ,etc	Part
LRIS-5 * 10	Q37 ,etc	Part
LR-S-2 * 3.5	Q37 ,etc	Part
LR-S-2 * 3.7	Q37 ,etc	Part
LR-S-2 * 4.4	Q37 ,etc	Part
LR-S-2 * 5.5	Q37 ,etc	Part
LR-S-2.5 * 4.8	Q37 ,etc	Part
LR-S-2.5 * 5.5	Q37 ,etc	Part
LR-S-2.5 * 6	Q37 ,etc	Part
LR-S-2.5 * 6.8	Q37 ,etc	Part
LR-S-3 * 5.8	Q37 ,etc	Part
LR-S-3 * 6.2	Q37 ,etc	Part
LR-S-3 * 7.8	Q37 ,etc	Part
LR-S-4 * 10PW	Q37 ,etc	Part
LR-S-4 * 5.8	Q37 ,etc	Part
LR-S-4 * 9	Q37 ,etc	Part
LS103	P6	Part
LSC42	G7	Part
LSD42	G11	Part
LSP3	G15 ,etc	Part
LSP4	G7 ,etc	Part
LSR32C	G15	Part
LSR42	G15	Part
LSR42C	G15	Part
LSS42	G17 ,etc	Part
LST317	G23	Part
LW-2	G7 ,etc	Part
LW-2.5	G7 ,etc	Part
LW-2.5	H31	Part
LW-2.5S	H71	Part
LW-3	G7 ,etc	Part
LW-4	G7 ,etc	Part
LW-4 * 104	L11	Part
LW-5	H73 ,etc	Part
LWU-4	M4	Part
LWU-5	M4	Part
M		
M2 * 6	M11 ,etc	Part

Part No.	Listed on	Part name
M2 * 8	M11 ,etc	Part
M3 * 12	G7 ,etc	Part
M3 * 5.5	M18 ,etc	Part
M3 * 8	M18 ,etc	Part
M4 * 10	M11	Part
M4 * 5.5	M18	Part
M4 * 8	M18	Part
MBC-M12	P11	Part
MBC-M16	P11	Part
MBL○○○	L33	Insert
MKH 1NR 02	P15	Part
MKL 1R 01	P15	Part
N		
NBH○○○○○□	L22 · L23	Holder
NBH○○○○○□K-MET	L23	Holder
NBPR○	L27	Holder
NC5-46-FMNA25.4-40F	P17	Arbor
NC5-46-FMNA31.75-39F	P17	Arbor
NC5-46-FMNC22-32F	P17	Arbor
NGBBR○○○○	I18	Holder
NGTA○○○○	I11	Holder
NGTB○○○○	I11 · I16	Holder
NGTN○○○○	I11 · I16	Holder
NTG○○○○	H77	Holder
NTGW○○○○	H76	Holder
NTTB○○○○	J15	Holder
P		
PCLN○○○○□43	G7 ,etc	Holder
PCLN○○○○X43N	H32	Holder
PDJN○○○○□43	G11 ,etc	Holder
PLUG-RC1/8	A23 · L13	Part
PRFP○○□	M15	Holder
PRGC○○○○□○○	G15	Holder
PRGN○○○○□○○	G15	Holder
PRGP○○□○○○○	M15	Holder
PRXC○○○○□○○	G15	Holder
PSBN○○○○□○○	G19	Holder
PSDNN○○○○□○○	G17	Holder
PSKN○○○○□○○	G21	Holder
PTAN○○○○□○○	H31	Holder
PTLN○○○○□○○	G23 ,etc	Holder
PTXN○○○○□○○	H31	Holder
R		
RA○○○□○○	P10	Cutter
RA06P03NC	P11	Part
RBGX○○□	M5	Insert
RCGX09○○	M5 ,etc	Insert

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RCGX12○○	M5 ,etc	Insert
RCGY09○○	M5 ,etc	Insert
RCGY12○○	M5 ,etc	Insert
RCL○○○□	N8	Holder
RCMX12	F41	Insert
RCMX32	G15	Insert
RCMX43	G15 ,etc	Insert
RD○○○□	P10	Cutter
REL○○○□	N6	Holder
REZ○○○□	N5	Holder
RLR-20S	Q36 · Q37	Part
RNGN○○○	F7 · F18	Insert
RNMG○○○	F26	Insert
RNMN○○○	G15 ,etc	Insert
RPGN○○○	F13	Insert
RPGX○○○	F14 ,etc	Insert
RPMT0602	M16 ,etc	Insert
RPMT0802	M16 ,etc	Insert
RPMT10T2	M16 ,etc	Insert
RPMT1203	M16 ,etc	Insert
RPMT1604	F41	Insert
RPMT2004	F41	Insert
RPMX1203	F41	Insert
RS○○○	P10 · P11	Cutter
RTS-M○○	P6 ,etc	Part
S		
S○○□-BGR○○□○○	I34	Holder
S○○□-HCLN○○	L41	Holder
S○○□-HDUN○○	L42	Holder
S○○□-HSKN○○	L43	Holder
S○○□-MBRD○○-OH	L32	Holder
S○○□-SCLC□○○□○○-OH	L36	Holder
S○○□-SCLP□○○□○○-OH	L36	Holder
S○○□-SEXR□□○○○○-OH	L34	Holder
S○○□-SRC○○□	M16 ,etc	Holder
S○○□-STUC□○○□○○-OH	L39	Holder
S○○□-STUP□○○□○○-OH	L38	Holder
S○○□-TCLN○○	L41	Holder
S○○□-TSKN○○	L43	Holder
S○○□-TWGR○○	I19	Holder
S○○□-WCLN○○	L41	Holder
S○○□-WDUN○○	L42	Holder
S○○□-WSKN○○	L43	Holder
S○○□-WWLN○○	L44	Holder
SALS-063	P6 ,etc	Part
SBB○○○□□○○○	L24	Insert
SBB○○○□□○○○-S	L24	Insert
SBFB○○○	L24	Insert
SBFS○○○	L24	Insert

Part No.	Listed on	Part name
SBG○○○○	I28	Insert
SBT○○○	J18	Insert
SCAC○○○○	H17	Holder
SCJ-M6-○○	L12	Part
SCJ-R1/8-○○	L12	Part
SCJ-R1/8-○○-L	A23	Part
SCLC○○○○	H17	Holder
SCLCR○○○○□○○□-F02OH	A15 · H16	Holder
SCMT○○	F42	Insert
SDCW1204○○	P24	Insert
SDCW43	P24	Insert
SDEW0602	F42	Insert
SDJC○○○○	H19	Holder
SDJCR○○○○□○○□-F02OH	A15 · H18	Holder
SDK○○	F42	Insert
SDKN1203	F42	Insert
SDKN1504	F42	Insert
SDNCN○○-X○○	H21	Holder
SDQC○○-X○○	H19	Holder
SDW1204	P24	Insert
SDXC○○○○	H19	Holder
SEK42	F42	Insert
SEKN1203	F42	Insert
SFG○○○□○○○□	I28	Insert
SHFB○○○○	L20	Insert
SHFS○○○○	L20	Insert
SNEN1204	P23	Insert
SNGA○○○	F8 · F9	Insert
SNGA○○○PE	F18	Insert
SNGF1204○○	P23	Insert
SNGG○○○	F27 · F28	Insert
SNGN○○○	F8 · F9	Insert
SNGX1207○○	F9	Insert
SNMA○○○	F8	Insert
SNMA○○○PE	F18	Insert
SNMG○○○	F27	Insert
SNMN○○○	F9 · F18	Insert
SPGN○○○	F13 · F22 · F42	Insert
SPGR○○○	F42	Insert
SPMH0903○○	M17 ,etc	Insert
SPMH326	M17 ,etc	Insert
SPMH328	F42	Insert
SPMN1204○○	F42	Insert
SPMN1904○○	F42	Insert
SPMN4310	M17 ,etc	Insert
SPMN632	F42	Insert
SPMR1204○○	M17 ,etc	Insert
SPMR4310	M17 ,etc	Insert
SPR1/8	A15	Part
SR○○	J24	Insert

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Part No.	Listed on	Part name
SR08	G7 ,etc	Part
SR-16-○○○	H76 · H77	Part
SRF○○□○○□	M14 ,etc	Holder
SRG○○□○○□	M14 ,etc	Holder
SR-M5 * 6	L25	Part
SS○○○○□	L21 ,etc	Part
SS04045FS	L16	Part
SS0406F	L16	Part
SS0605SC	L11	Part
SS0806F	L11	Part
SS0811R-OH	L11	Part
SS0806F-OH	L11	Part
SS-DSU-B8L23	H91	Holder
SS-DSU-L23	H91	Holder
SS-DSU-SK	H91	Holder
SSP○○	P6	Part
SSP○○○N○○○○H	A24 · K2	Insert
SSP○○○N○○○○S	A24 · K2	Insert
ST 5R B01B	P15	Part
STAC○○	H28	Holder
STTN○○○○	J15	Holder
SVAC○○○○	H54	Holder
SVJC○○○○	H23	Holder
SVQC○○○○	H25	Holder
SVQP○○○○	H27	Holder
SVVC○○○○	H25	Holder
SVXC○○○○	H23	Holder
SVXP○○○○	H27	Holder
SW 4 * 60	P15	Part
SWS-M5-15	P6	Part
T		
T-07	N5 · N6	Part
T-15A	P22 ,etc	Part
T-20	P24	Part
TB○○	H50	Holder
TB○○○○	H51	Insert
TBDP○○○	H49	Holder
TBDP○○○	H49	Insert
TBGE521	F14	Insert
TBGE522	F43	Insert
TBGN0601○○	F43 · F12 · F22	Insert
TBMH32○○○	H53	Insert
TBP○○	H43	Holder
TBP ^R ○○○H-OH	A16 · H42	Holder
TBP72FR○○○-BM	H43	Insert
TBPA○○	H45	Insert
TBPA70FR○○○-BM	H45	Insert
TBPS60FR○○	H84	Insert
TBT○○□	H50	Holder

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TBVC11FR○○	H46	Insert
TBVCRO○	H46	Holder
TC○○0902	F43 · F44	Insert
TC○○1102	F43 · F44	Insert
TC5TN	G23 ,etc	Part
TC6CN	G7 ,etc	Part
TCBN○○○○	G9	Holder
TCGB0601○○	F44	Insert
TCGD521	F44	Insert
TCGD52Y	F44	Insert
TCGH0601○○	F43	Insert
TCGP521	F43	Insert
TCGP52Y	F43	Insert
TCGT0902○○	F43	Insert
TCGT1102○○	F43	Insert
TCGT16T3○○	F43	Insert
TCGW06○○	F44	Insert
TCGW0902○○	F44	Insert
TCLN○○○○	G7	Holder
TCMT1102○○	F43	Insert
TCMT16T3○○	F43	Insert
TEEN2204PFTR	F45	Insert
TF33○○	H29	Insert
TFD○○	F40	Insert
TFT○○	H29	Holder
TFT09	F46	Insert
TFT11	F46	Insert
TFV11	F49	Insert
TGC10T○○	J20	Holder
TMN○○	J20	Insert
TNEG1604○○	F30	Insert
TNGA○○○	F10 · F19 · F30	Insert
TNGA○○○PH	F19	Insert
TNGA○○○TN	F30	Insert
TNGG○○○	F29 · F30	Insert
TNGN○○○	F10 · F11	Insert
TNMA○○○	F10 · F19	Insert
TNMA○○○PH	F19	Insert
TNMG○○○	F29 · F30	Insert
TNMN○○○	F11 · F19	Insert
TNMN○○○STN	F19	Insert
TNMN333STNF	F11	Insert
TORX-T○○	H76	Part
TPGB0802○○	F45	Insert
TPGB0902○○	F45	Insert
TPGD○○○	F45	Insert
TPGE○○○	F14 · F45	Insert
TPGH○○○	F44 · F45	Insert
TPGN○○○	F14 · F45	Insert
TPGN○○○PT	F22	Insert

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TPGP○○○	F44 · F45	Insert
TPGR○○○	F44 · F45	Insert
TPGS731	F45	Insert
TPGW1103○○PT	F22	Insert
TPKN1603PDTR	F45	Insert
TPKN2204PDTR	F45	Insert
TSDNN○○○○□○○	G17	Holder
TSN○○-○○	M19	Insert
TSSN○○○○□○○	G17	Holder
TTFN○○○○□○○	G25	Holder
TTGN○○○○□○○	G23	Holder
TTMA4360	J15	Insert
TTMH3260	J15	Insert
TTP(S)○○F○□	J11	Insert
TTP○○	J10	Holder
TTP○○□○○	J11	Insert
TW○○	J23	Insert
TWC○○○○	J24	Cutter
TWG○○○○□	I19	Holder
TWG○○○○○	I19	Insert
U		
U104-40	P6 ,etc	Part
U107T○○	P11	Part
V		
VBGT○○○	F47	Insert
VBGW○○○	F23	Insert
VBMT○○○	F47	Insert
VCET○○○	F47	Insert
VCGT○○○	F47 · F48	Insert
VCGT1303○F2M	H54	Insert
VCGW1103○○H	F48	Insert
VCGW1103○○PD	F23	Insert
VCGW1604○○PD	F23	Insert
VCMT1103○○T□AS	F47 · F48	Insert
VCMW1103○○	F23	Insert
VGW○○	M5 ,etc	Insert
VNGA○○○	F12	Insert
VNGA○○○PQ	F20	Insert
VNGG○○○	F31	Insert
VNMA○○○	F12	Insert
VNMG○○○	F31	Insert
VPET○○○	F48	Insert
VPGT1103○○	F48	Insert
W		
W○○○	G29 ,etc	Part
WCBN○○○○□○○	G9	Holder
WCGT0402○○	F49	Insert

Part No.	Listed on	Part name
WCLN○○○○□○○	G7	Holder
WDHN○○○○□○○	G13	Holder
WDJN○○○○□○○	G11	Holder
WDNNN○○○○□○○	G13	Holder
WNGA○○○	F12	Insert
WNGG○○○	F32	Insert
WNGM○○○	F32	Insert
WNX44-C10T010120	A41 · P21	Insert
WNX44-R10T010120	A41 · P21	Insert
WS0616	M17 ,etc	Part
WS0616-T15	P22	Part
WS0620	M18 ,etc	Part
WS-4	G29 ,etc	Part
WS-5	G29 ,etc	Part
WS-6	G29 ,etc	Part
WSDNN○○○○□○○	G17	Holder
WSSN○○○○□○○	G17	Holder
WTFN○○○○□○○	G25	Holder
WTGN○○○○□○○	G23	Holder
WVJN○○○○□○○	G27	Holder
WVPN○○○○□○○	G27	Holder
WVVNN○○○○□○○	G27	Holder
WWLN○○○○□○○	G29	Holder
X		
XX2815-04-○○□	Q36	Part
Y		
Y-GTPA○○	I27	Holder
Y-GTPA○○-OH	A17 · I27	Holder
Y-GTT○○□	I11	Holder
Y-GTT○○□-OH	A17 · H53 · I11	Holder
Y-SDJCR○○○○□	H21	Holder
Y-SDJCR○○□○○-OH	A15 · H21	Holder
Y-SDNCN○○○○□	H21	Holder
Y-SVXCL12-11S	H23	Holder
Y-TBP○○	H43	Holder
Y-TBP○○□-OH	A16 · H43	Holder
Z		
ZT○○○○□	P15	Insert

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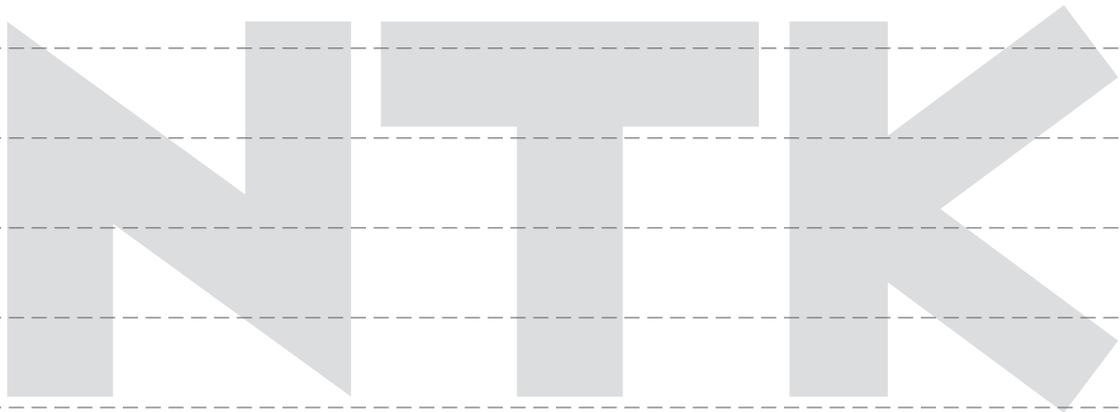
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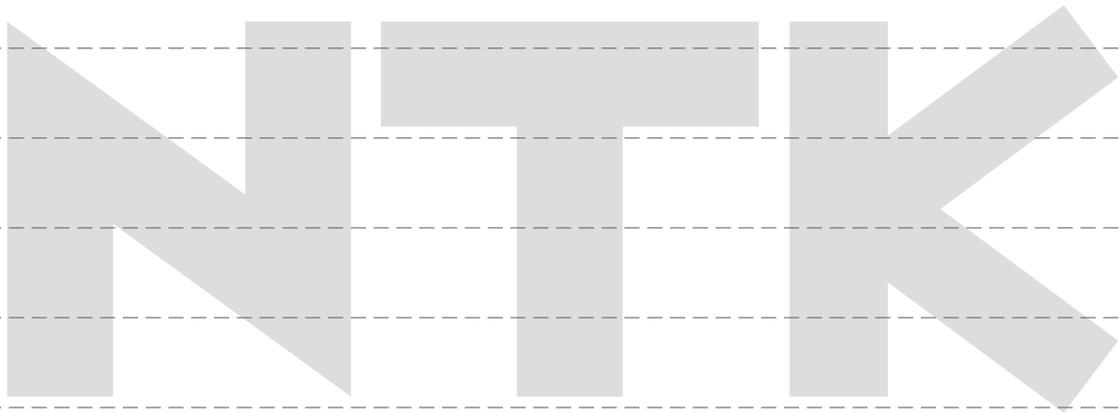
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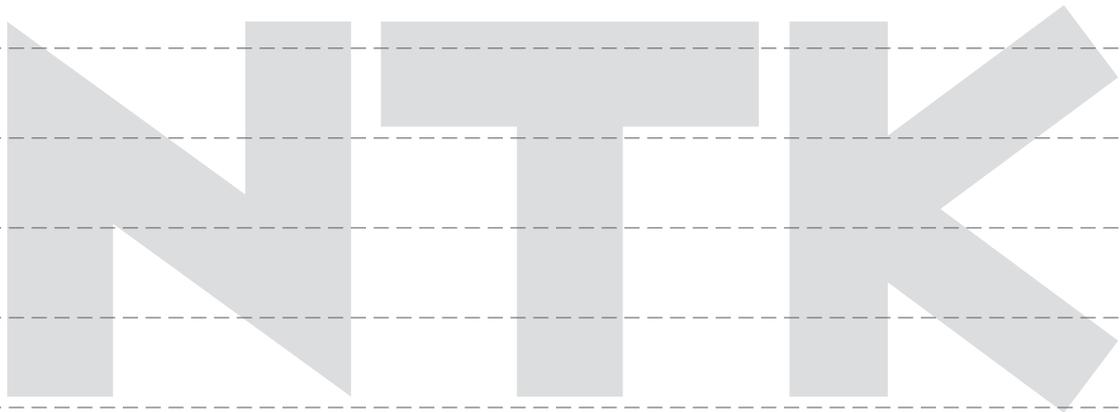
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