圣达刀具
SANT CNC TOOLS

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SANT
CUTTING INSERTS
2018 catalogue

2018
catalogue

圣达刀具
SANT CNC TOOLS

CUTTING INSERTS

■ Turning inserts ■ Milling inserts

ZHUZHOU SANT CUTTING TOOLS CO.,LTD.

株洲圣达切削刀具
ZHUZHOU SANT CUTTING

SANT / INTRODUCTION


Zhuzhou Sant Cutting Tools Co., Ltd is a modern joint-stock company specializing in the designing, producing and selling of CNC cutting tools and cemented carbide tools. Located in Zhuzhou,one of the biggest manufacturing bases of cemented carbide cutting tools in China,our company mainly produces various cnc turning tools, milling tools, drilling tools, cnc inserts, tooling systems and various cemented carbide tools.

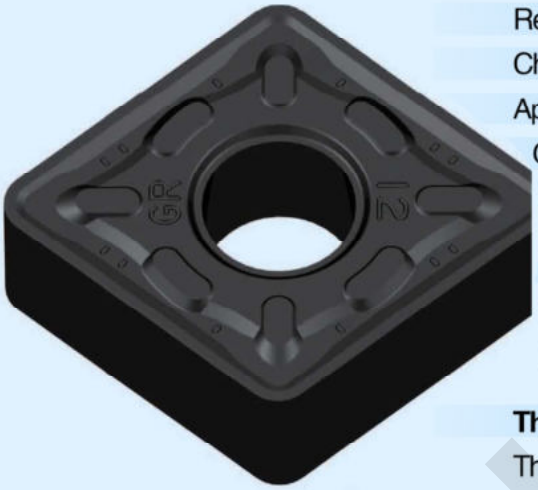
We have strong design team and complete quality-testing system and have passed the ISO9001 Certification of Quality Management System. Besides, ERP system is adopted to improve the efficient and accurate management. More importantly, we have various kinds of processing equipment, including MAZAK five-axis linkage high precision machining center, ANCA five-axis linkage high precision grinding center.In order to make sure the quality of "SANT" series products always stands at the front of the industry, we have established collaboration relationships with many outstanding suppliers including NIHONG TECHNO - the heat treatment company.

With the experience of designing and manufacturing cnc cutting tools for many years, we can provide customers with various non-standard tool holders,and can also provide a complete set of supporting scheme for required tools during the processing as well as varies carbide tools. In accordance with the principle"Quality First, Service Supreme", we have established long-term friendly cooperation relationships with many customers all over the world.

Operation Principle:

Unite and innovate, forge and progress,
trust and work, mutual benefit and win–win.

TURNING

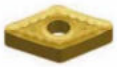


TURNING Turning inserts overview

Cemented carbide and cermet inserts

Negative inserts

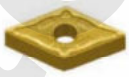
Roughing

	 CNMG-GR	 CNMM-GR	 CNMG-BR	 CNMG-ZR	 DNMG-GR	 DNMM-GR	 DNMG-BR
Cutting edge length	09,12	12,16,19,25	12,16,19	12,16,19	15	15	15

 DNMG-ZR	 SNMG-GR	 SNMM-GR	 SNMG-BR	 SNMG-ZR	 TNMG-GR	 TNMM-GR	 TNMG-BR
Cutting edge length 15	12,15,19	12,15,19,25	12,15,19	12,15,19	16,22,27	16,22,27	16,22

 TNMG-ZR	 WNMG-GR	 WNMG-BR	 WNMG-ZR
Cutting edge length 16,22	06,08	06,08	06,08

Semi–finishing

	 CNMG-GM	 CNMG-GS	 CNMG-BM	 DNMG-GM	 DNMG-GS	 DNMG-BM	 SNMG-GM
Cutting edge length	09,12	09,12	09,12	11,15	11,15	11,15	09,12,,15,19

 SNMG-GS	 SNMG-BM	 TNMG-GM	 TNMG-GS	 TNMG-BM	 VNMG-GM	 VNMG-BM	 WNMG-GM
Cutting edge length 12,15	12,15	11,16,22	16,22	11,16,22	16	16	06,08

 WNMG-BM
Cutting edge length 06,08

Finishing

	 CNMG-GF	 CNMG-BF	 DNMG-GF	 DNMG-BF	 SNMG-GF	SNMG-BF	TNMG–GF
Cutting edge length	09,12	09,12	11,15	11,15	12	09,12,15	16,22

Turning inserts overview *TURNING*

Negative inserts





	TNMG-BF	VNMG-GF	VNMG-BF	WNMG-GF	WNMG-BF
Cutting edge length	11,16,22	16	16	06,08	06,08

For profiling






	CNMG	DNMG	SNMG	TNMG	VNMG	WNMG
Cutting edge length	12,16,19	15,19	09,12,15,19,25	11,16,22,27,33	16	06,08

Without chipbreaker






	CNMA	DNMA	SNMA	TNMA	WNMA	RNMA
Cutting edge length	12,16,19	11,15	09,12,15,19	16,22,27	06,08	12

Positive inserts

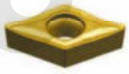
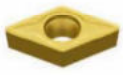
Roughing



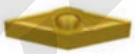

	CCMT-HR	DCMT-HR	SCMT-HR	TCMT-HR
Cutting edge length	09,12	07,11	09,12	09,11,16

Semi–finishing




	CCMT-HM	CCMT-BM	DCMT-HM	DCMT-BM	SCMT-HM	SCMT-BM	TCMT-HM
Cutting edge length	06,09,12	06,09,12	07,11	07,11	09,12	09,12	09,11,16





	TCMT-BM	VCMT-HM	VBMT-HM	VBMT-BM	CPMT-HM	DPMT-HM	SPMT-HM	TPMT-HM
Cutting edge length	09,11,16	11	11,16	11	06,09	07,11	09,12	09,11

TURNING Turning inserts overview

Negative inserts

Finishing

	CCGT-HF	CCMT-BF	DCGT-HF	DCMT-BF	SCGT-HF	SCMT-BF	TCGT-HF
Cutting edge length	06,09,12	06,09,12	07,09	07,09	09	09	06,09,11,16

	TCMT-BF	VCGT-HF	CPGT-HF	DPGT-HF	SPGT-HF	TPGT-HF	VBGT-HF	VBMT-BF
Cutting edge length	06,09,11,16	11	06,09	07,09	09	09,11	11	11

Positive inserts

For Al machining

	CCGX-AC	CCGX-AH	DCGX-AC	DCGX-AH	SCGX-AC	SCGX-AH	TCGX-AC
Cutting edge length	06,09,12	06,09,12	07,11	07,11	09,12	09,12	09,11,16

	VCGX-AC
Cutting edge length	11,16,22

Without chipbreaker

	CCGW	DCGW	SCGW	TCGW	VCGW	CPGW	DPGW
Cutting edge length	06,09,12	07,11	09,12	11,16	11	06	11

	SPGW	TPGW	VBGW
Cutting edge length	09,12	09,11,16,22	16

Parting and grooving inserts





	ZP□D-MG	ZP□S-MG	ZT□D-MG	ZT□S-MG	MGMN□□□-M
Cutting edge width	2.5,3,4,5,6	2.5,3,4,5,6	2.5,3,4,5,6	2.5,3,4,5,6	2,2.5,3,4,5,6

TURNING Turning inserts overview

Threading inserts

Right hand type shown	60° General pitch thread		55° General pitch thread		ISO metric thread	
						
	external thread	Internal thread	external thread	Internal thread	external thread	Internal thread
Pitch Number of pitch	0.5~6.0	0.5~6.0	0.5~6.0	0.5~6.0	0.35~6.0	0.35~6.0

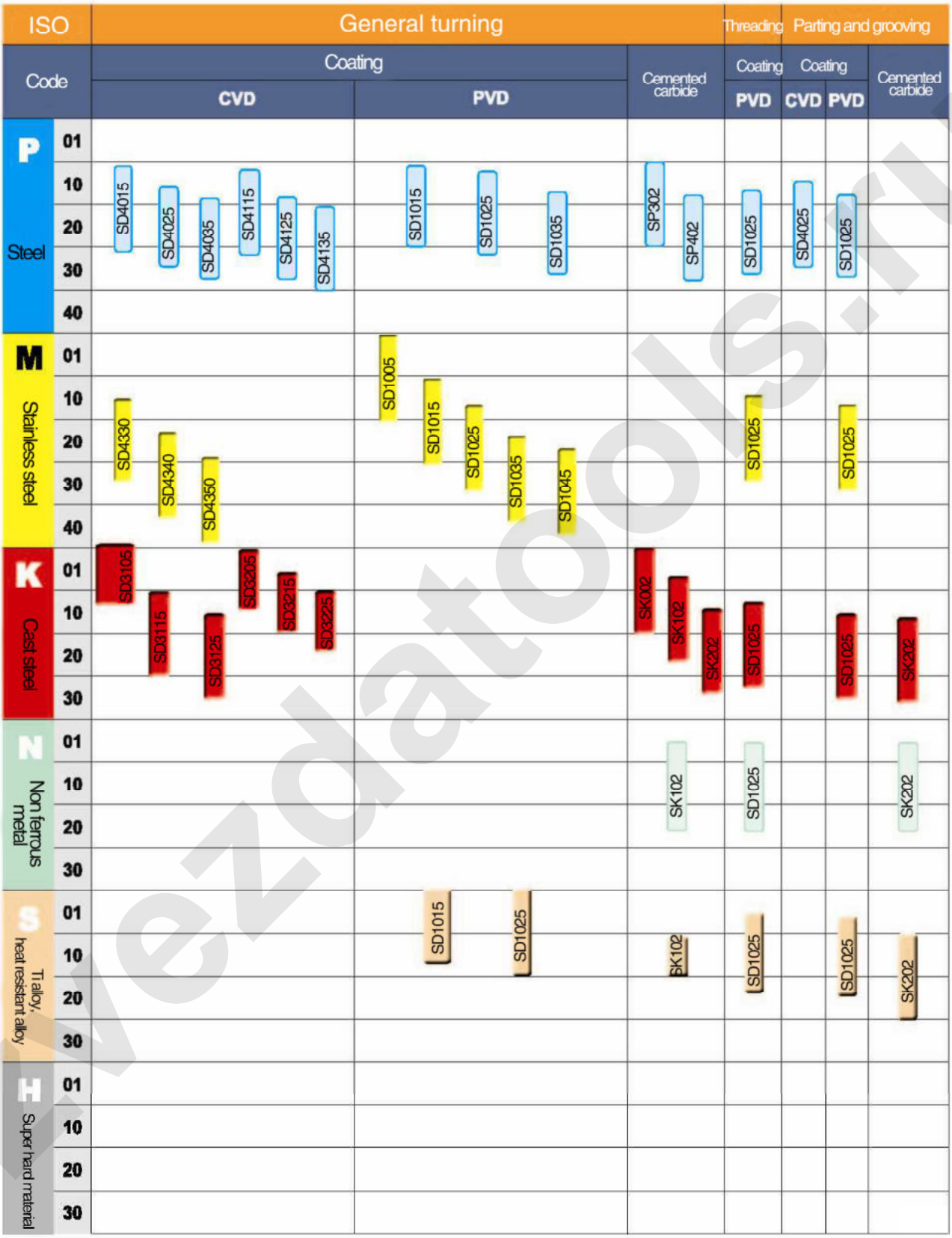
Right hand type shown	American standard pipe thread		Whitworth thread		British Standard pipe thread	
						
	external thread	Internal thread	external thread	Internal thread	external thread	Internal thread
Pitch Number of pitch	72~4	72~4	72~4	72~4	28~11	28~11

Right hand type shown	American60° Taper pipe thread NPT		American Dry seal straight pipe thread NPTF		DIN 405 crenation thread	
						
	external thread	Internal thread	external thread	Internal thread	external thread	Internal thread
Pitch Number of pitch	27~8	27~8	27~8	27~8	10~4	10~4

Right hand type shown	DIN103 trapezoid thread		American trapezoid thread ACME	
				
	external thread	Internal thread	external thread	Internal thread
Pitch Number of pitch	1.5~6.0	1.5~6.0	16~4	16~4

Recommended turning inserts grade overview

TURNING



Negative inserts with hole

Application	Chipbreaker	Precision	Recommended cutting parameters	Feature/Shape of insert
For roughing	GR Double-side	M	ap=3~12(mm) fn=0.3~0.8(mm/r)	Recommended chipbreaker for light roughing of P-type and K-type materials Double-side chipbreaker with M-level tolerance is the first choice for light roughing, can achieve high evacuation rate and efficiency of cutting edge.
	GR Single-side	M	ap=3~15(mm) fn=0.3~0.8 (mm/r)	Recommended chipbreaker for light-load roughing of P-type materials Single-side general chipbreaker with M-level tolerance, has wide chip breaking range and sharp cutting edge is designed with inclined angle, which enables it to cut lightly and easily and control the chipping flow direction. Chip-leaded-stages can reduces the contact area with chips, so that heat can easily be dissipated.
	BR	M	ap=2.5~8(mm) fn=0.2~0.6(mm/r)	Recommended chipbreaker for roughing of M-type materials Double-sided chipbreaker with M-level tolerance has good capacity of impact-resistance. It is designed to achieve balance between security and sharpness of the cutting edge and it can achieve high efficiency by preventing the problems of adhering and high cutting heat when roughing stainless steel.
	ZR	M	ap=5~15(mm) fn= 0.3~1.0(mm/r)	Recommended chipbreaker for heavy-load machining of K-type materials Double-side chipbreaker with M-level tolerance has good cutting edge strength and high security of cutting edge. Under high evacuation rate, liable to plastic deformation during machining.
For Semi-finishing	GS	M	ap=1.5~5(mm) fn=0.15~0.5(mm/r)	Recommended chip breaker for semi-finishing of P-type materials Double-side chipbreaker with M-lever tolerance produces small cutting forces and has large chip breaking range which ensures good performance for machining highly adhesive alloy steel.
	GM	M	ap=1.5~5(mm) fn=0.15~0.5(mm/r)	Recommended chip breaker for semi-finishing of P-type materials Double-sided chipbreaker with M-lever tolerance has higher strength of cutting edge than chipbreaker M. it is suitable for semi-finishing under unstable working conditions as well as machining cast iron with small cutting forces.
	BM	M	ap=0.5~1.5(mm) fn=0.1~0.3(mm/r)	Recommended chipbreaker for semi-finishing of M-type materials Double-sided chipbreaker with M-class tolerance keeps high precision after inserts are turned with good capability to prevent wear and hardening to achieve higher machining efficiency than chipbreaker BF.
	For Chipbreaker	M	ap=1.5~5(mm) fn=0.2~0.5(mm/r)	From semi-finishing to roughing of P-type, M-type, K-type materials. Double-sided chipbreaker with M-lever tolerance has good cutting edge strength and wide application.
For finishing	GF	M	ap=0.3~2(mm) fn=0.05~0.35(mm/r)	Recommended chipbreaker for finishing of P-type materials With M-lever tolerance, it is suitable for internal and external finishing of various materials. And keep the surface be good quality.
	BF	M	ap=0.05~1(mm) fn=0.05~0.3 (mm/r)	With M-level tolerance it has sharp cutting edges and is suitable for cutting adhesive materials such stainless steel soft steel etc. it achieves high quality machining surface.

TURNING General Turning Inserts Chipbreaker Introduction

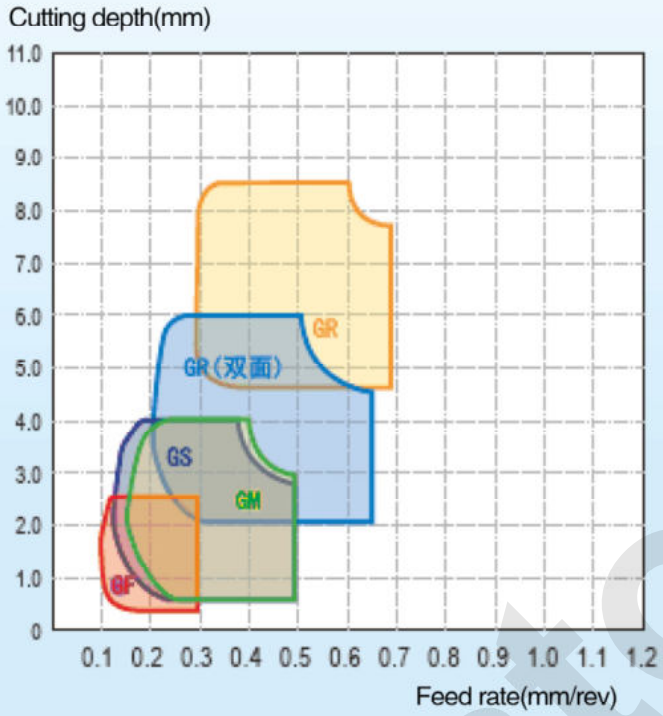
Positive inserts with hole

App-lication	Chipbreaker	Pre-cision	Recommended cutting parameters	Feature/Shape of insert
For roughing	HR 	M	ap=3~7(mm) fn=0.3~0.7(mm/r)	Recommended Universal Groove for extra finishing. With M–lever tolerance, it is suitable for the internal and external extra finishing of steel, stainless steel and iron cast materials etc. 
For Semi–finishing	HM 	M	ap=1~4(mm) fn=0.2~0.5(mm/r)	For semi–finishing universal groove in Wide application. With M–lever tolerance, it is suitable for the internal and external semi–finishing of steel, stainless steel and iron cast materials etc. 
	BM 	M	ap=1~4(mm) fn=0.2~0.5 (mm/r)	Recommended chipbreaker for semi–finishing of M–type materials With M–lever tolerance, the edge is more strength and achieved more higher machining efficiency than BF. 
For finishing	HF 	G	ap=0.1~2(mm) fn=0.05~0.3 (mm/r)	For finishing universal groove in Wide application. With M–lever tolerance, it is suitable for the internal and external finishing of steel, stainless steel and iron cast materials etc. 
	BF 	M	ap=0.1~2.0(mm) fn=0.05~0.3(mm/r)	Recommended chip breaker for fishing universal groove With M–lever tolerance, it has shap cutting edges and is suitable for cutting adhesive materials such as stainless steel soft steel etc. 
Aluminum alloy processing	AH 	G	ap=0.1~8(mm) fn=0.1~0.5(mm/r)	Recommended Aluminum alloy processing groove type. With G–level tolerance large rake angle and polishing treatment on surface. It can effectively prevent built–up edge and achieve high work piece surface quality while maintaining long life. 
	AC 	G	ap=0.02~4.8(mm) fn=0.05~0.5(mm/r)	Aluminum processing slot type With G–level tolerance large rake angle and clearance angle make the cutting edge sharper ensuring easy and fast cutting while remaining effective chip breaking. 

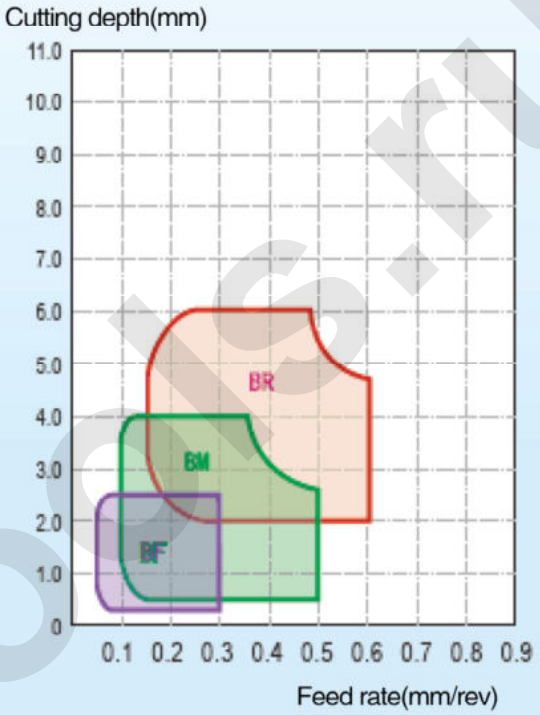
Application illustrate of the turining *TURNING*

General turning inserts

Negative inserts

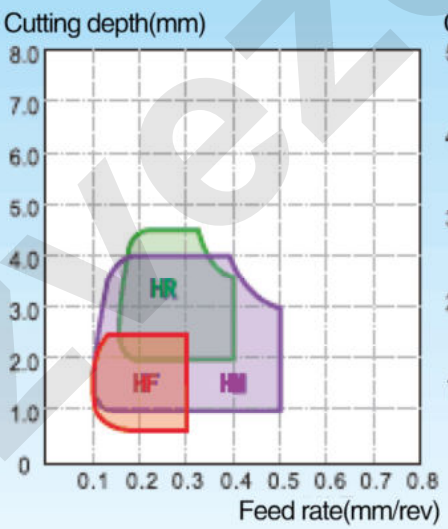


◆ Work piece material: 45° steel

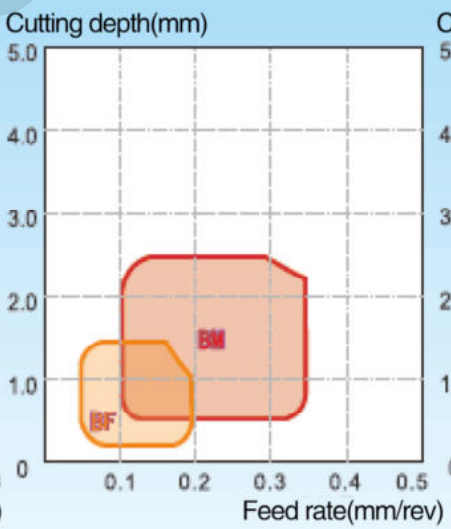


◆ Work piece material: stainless steel(1Cr18Ni9Ti)

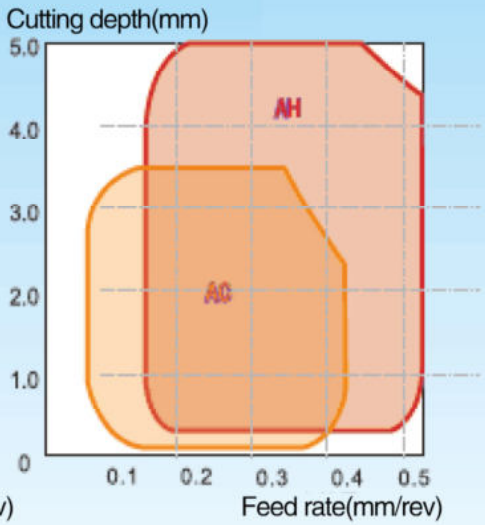
Positive inserts



◆ Work piece material: 45° steel

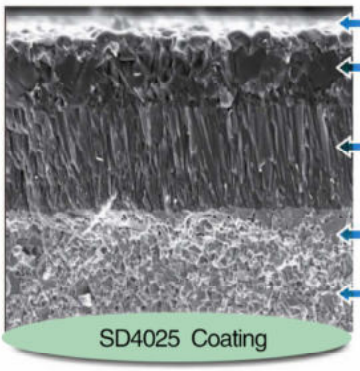


◆ Work piece material: stainless steel (1Cr18Ni9Ti)



◆ Work piece material: Aluminum alloy

Coated Cemented Carbide CVD



Golden surface of TiN can reduce friction and enable easy distinction of the variety of wear.

Special structure of Al2O3 deposit layer acts as a thermal barrier and strengthens the capability of substrate against plastic deformation under dry and high-speed cutting conditions.

TiCN layer acts against abrasion, which leads to the best wear resistance of the flank.

Thanks to the technology of gradient sintering, impact resistance of cutting edge and wear resistance are improved which lead to improved capability of cutting edge against damage.

Carbide with special crystal structure improves the Red Hardness of substrate and strengthens heat resistance of insert.

SD4015

The combination of substrate with excellent wear resistance and coating composed of MT-TiCN thick layer of Al2O3 and TiN makes it ideal grade for steel, cast iron and stainless steel in finishing and in high speed cutting conditions.

SD4025

The best combination of substrate with high wear resistance and coating composed of MT-Ti (CN) thick Al2 3 layer and TiN makes it suitable for finishing and semi-finishing of steel, cast iron and stainless steel.

SD4035

The combination of substrate with high wear resistance and coating composed of MT-Ti (CN) thick Al2 3 layer and TiN with excellent resistance against diffusive wear and plastic deformation makes it suitable for slight roughing and roughing of steel, cast and stainless steel.

SD4330

Hard substrate is suitable for process low alloy steel and non-alloyed steel for slight&heavy milling in middle&high speed, it can also be used for milling process in rather bad conditions.

SD4340

Substrate combined with wear resistance and tenacity is the general grade for coated cemented carbide, can be used in middle&low speed milling for steel, cast iron and chilled hardened steel.

SD3105

CVD coated grade, which is the combination of hard substrate and coating (e tra thick Al2 3 thick TiCN). The grade is suitable for the finishing and semi-finishing of nodular cast iron and gray cast iron.

SD3115

The best combination of substrate with excellent wear resistance and coating composed of MT-TiCN thick layer of Al2O3 and TiN, is the best grade for cutting nodular cast iron and gray cast iron, allowing rather high cutting speed.

SD3125

The best combination of substrate with excellent wear resistance and coating composed of MT-TiCN thick layer of Al2O3 and TiN, is the best grade for nodular cast iron and gray cast iron in rather heavy roughing.

SD4115

The combination of substrate with excellent wear resistance and coating composed of MT–TiCN and thick layer of Al2O3 makes it suitable for finishing of steel , cast steel and stainless steel at high speed cutting .

SD4125

The substrate with good toughness and high security of cutting edge in optimal combination with coating composed of MT–TiCN and super thin layer of Al2O3 makes it suitable for semi–finishing , finishing of steel , cast steel and stainless steel .

SD4135

The substrate with high strength and resistance against plastic deformation in combination with coating composed of MT–TiCN and super thin layer of Al 2O3 makes it suitable for light roughing and roughing of steel , cast steel and stainless steel .

Higher Cutting Speed Longer Tool Life

Black Diamond Inserts

Second generation grade for steel

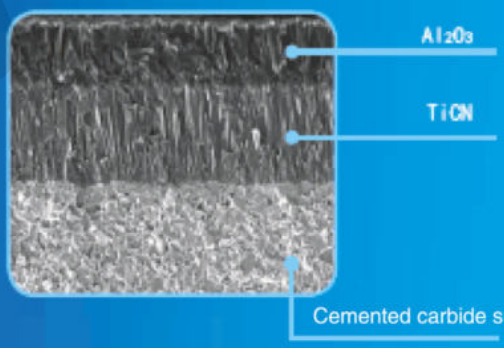
Coated Cemented Carbide CVD

Roughness of insert surface is improved after special treatment on surface which effectively educes cutting forces prevents work piece adhering to surface of inserts and improves operation stability of inserts.

Before surface treatment

After surface treatment

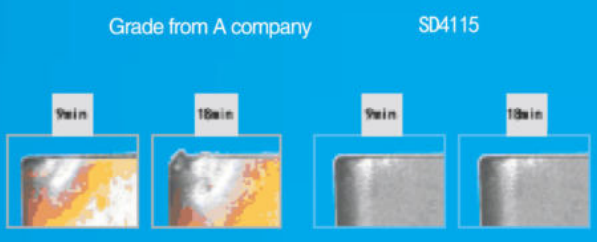
The perfect combination of fibrous TiCN and fine grain Al2O3 obviously improves abrasion resistance and anti–breakage of inserts.



Comparison of Inserts Wear–resistance

Workpiece material :42CrMo Inserts: CNMG120408–GS

Cutting parameters:Vc =390m/min ap=1mm fn=0.2mm/r



Black Whirlwind inserts

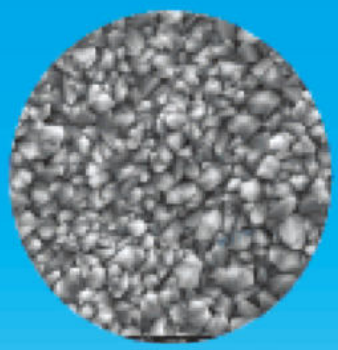
First choice for high–efficiency and high–speed machining of cast–iron

- The combination of thick Al_2O_3 coating and substrate with good hardness and impact resistance gives the inserts excellent impact resistance and stability under high temperature and improves wear resistance of inserts. Inserts also satisfy the requirements of high speed and high feed rate when machining cast iron.
- The appearance of shining full black is easily identified.

Coated cemented carbide CVD

Significant results

- Working efficiency has been improved, both the coating and the substrate are suitable for machining cast iron at high speed and high feed rate. Cutting speed can be increased by 30% to 40%.
- Cost is reduced as tool life is increased by 40%–50%.
- high machining stability.



Layer of fine grain with compact surface.

SD3205

Coated grade which is the combination of hard substrate and coating has good flaking resistance. It is suitable for finishing to semi–finishing of ductile iron, high–strength malleable cast iron and gray cast iron.

SD3215

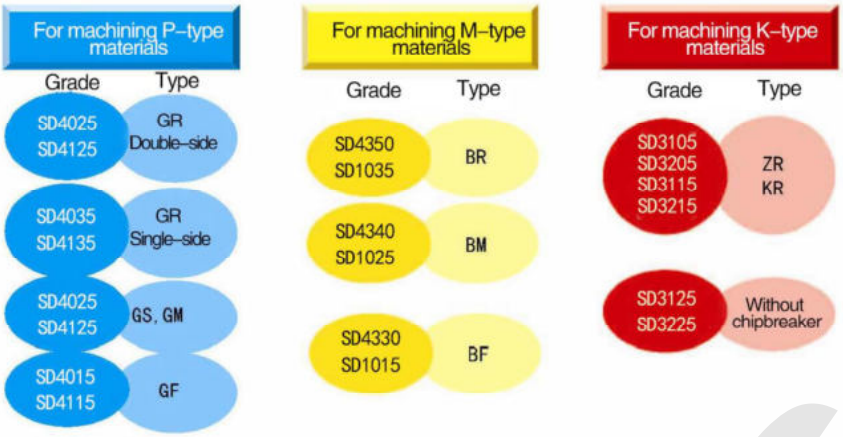
Coated grade which is the combination of hard substrate and coating(Thick Al_2O_3 thick TiN) shows excellent wear resistance and impact resistance, It is the first choice of ductile iron and gray cast iron roughing partial when machining nodular cast iron at high speed.

SD3225

Coated grade which is the combination of hard substrate and coating(medium thick Al_2O_3 thick TiCN)achieves the balance between wear resistance and toughness. It is the first choice of ductile iron and gray cast iron roughing partial and high metal removal rate.

Coated Cemented Carbide CVD

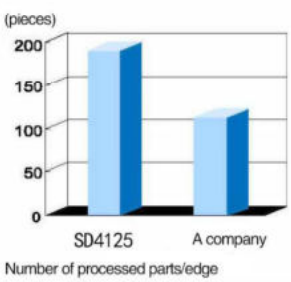
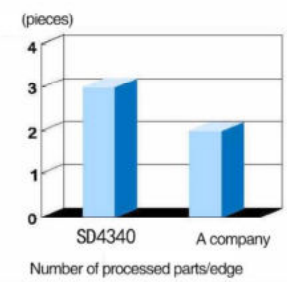
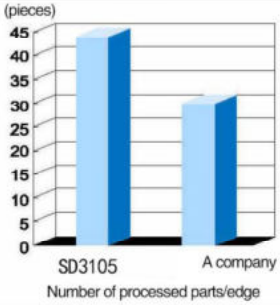
Recommended combination of the grade and groove.



Recommended cutting amount

Work piece material		Range of machining	Grade	Recommended cutting speed(m/min)
P	Steel	For finishing	SD4015	170–450
			SD4115	210–460
		For semi–finishing	SD4025	150–420
			SD4125	170–460
		Roughing	SD4035 SD4135	120–360
M	Stainless steel	For finishing For semi–finishing Roughing	SD4330 SD1015 SD4340 SD1025 SD4350 SD1035	100–270
K	resistant alloy	For finishing	SD3105	200–480
			SD3205	210–500
		For semi–finishing	SD3115	160–430
			SD3215	180–430
		Roughing	SD3125 SD3225	130–360

Processing case

Application insert	Type	CNMG120408—GM	CNMG190616-BR	TNMA220412
	Grade	SD4125	SD4340	SD3105
Workpiece shape				
Workpiece material and hardness		42CrMo HB280	1Cr13 HB270	Grey cast iron HB280
Cutting conditions	parameter	V=240m/min ap=1.5~2mm f=0.2mm/r	V=100m/min ap=1.3mm f=0.3mm/r	V_{max}=400m/min ap=1.3~2.5mm f=0.4~1.1mm/r
	Cutting style	Dry cutting	Dry cutting	Dry cutting
Comparative Results				

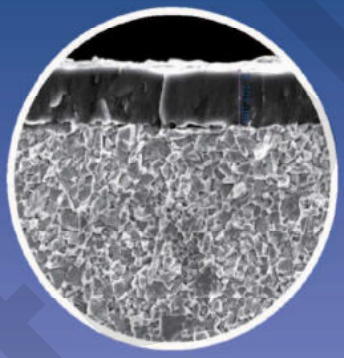
PVD Coated Cemented Carbide

Makes it easy to machining materials which are hard to be machined

New Nano coating grade

- Special coating techniques, low friction and unobstructed chip flow.
- Unique coating with Nano structure closely, higher toughness and hardness.
- Good thermal stability and chemical stability effectively protect cutting edge.

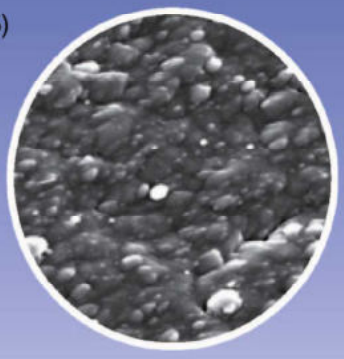
High–performance nanostructure coating guarantees good toughness and hardness of inserts. Special coating technology guarantees smooth surface and excellent wear resistance. Outstanding thermal stability and chemical stability effectively protect cutting edge.



NC–TiAlN coating(SD1025)

SD1025

2–4 micron TiAlN PVD coating and high toughness ultra–fine grain substrate makes it suitable for finishing and semi–finishing of various materials and turning of super alloy.



SD1025 coating surface

SD1015

2–4 micron TiAlN PVD coating and high toughness ultra–fine grain substrate makes it suitable for various materials and the finishing and semi–finishing of high temperature alloy, heat resistant alloy etc.

SD1125

2–4 micron of TiAlN PVD coating and high performance ultra–fine grain substrate makes it suitable for light and medium milling machining.

SD1035

PVD coating and high toughness substrate make it suitable for rough finish and semi–finishing of all kinds of materials.

SD1225

2–4 micron of AlCrN and AlCrSiN PVD coating combined with high toughness ultra–fine grain substrate make it suitable for light, medium milling machining. It also can be used in finishing and semi–finishing of stainless, high temperature and high hardness alloy.

Coated Cemented Carbide PVD

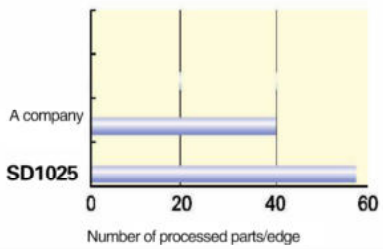
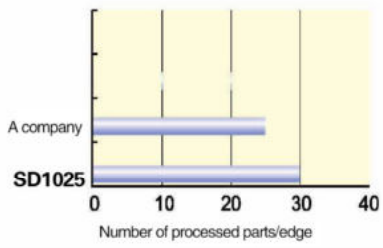
■ Recommended combination of the grade and groove.

For machining P–type materials		For machining M–type materials	
Grade	Type	Grade	Type
SD1035	GR	SD1035 SD4350	BR
SD1025	GM	SD1025 SD4340	BM
SD1015 SD1005	GF	SD1015 SD4330	BF

■ Recommended cutting amount

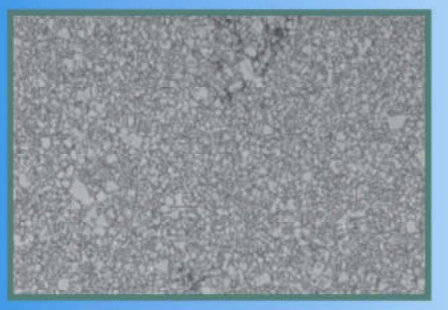
Work piece material		Range of machining	Grade	Recommended cutting speed(m/min)
P	Steel	For semi–finishing	SD1025	160–360
P / M	Stainless steel	Roughing	SD1035 SD4350	80–100
M	Stainless steel	For semi–finishing	SD1025 SD4340	120–240
M	Stainless steel	For finishing	SD1015 SD4330	150–280

■ Processing case

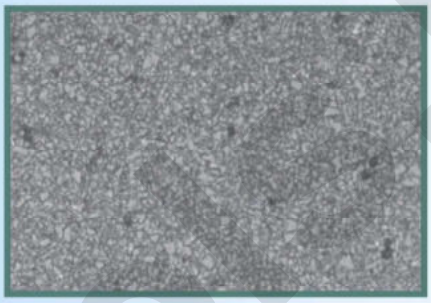
Application insert	Type	CNMG120404–GM	DNMG150404–BM
	Grade	SD1025	SD1025
Workpiece shape			
Workpiece material and hardness		40Cr HB280	1Cr18Ni9Ti HB240
Cutting conditions	parameter	V=220m/min ap=1mm f=0.15mm/r	Vc=150m/min ap=0.3mm f=0.15mm/r
	Cutting style	Dry cutting	Dry cutting
Comparative Results			

Cemented carbide grade

Uncoated cemented carbide grade is widely used for machining of non–ferrous metal, high temperature alloy,etc. It is economical and can be universally applied.



Substrate of SK102: the combination of cemented carbide phrase WC of fine grain and bonding phase Co



Substrate of SK202: the combination of cemented carbide phase WC of middle grain and bonding phase Co

SP302

It is suitable for semi–finishing of steel and cast steel at high speed with moderate、low feed rate, it is also suitable for copy turning.

SK202

It is suitable for semi–finishing of cast iron and heat resisting alloy, and also suitable for machining of non–metallic material like plastic、rubber、wood, etc. Especially for aviation industry with sharp cutting edge. With moderate speed and high feed rate,it wear good abrasive resistance and toughness.

SP402

It is suitable for heavy cutting of steel and cast steel, and machining for low–speed and high feed rate.

SK002

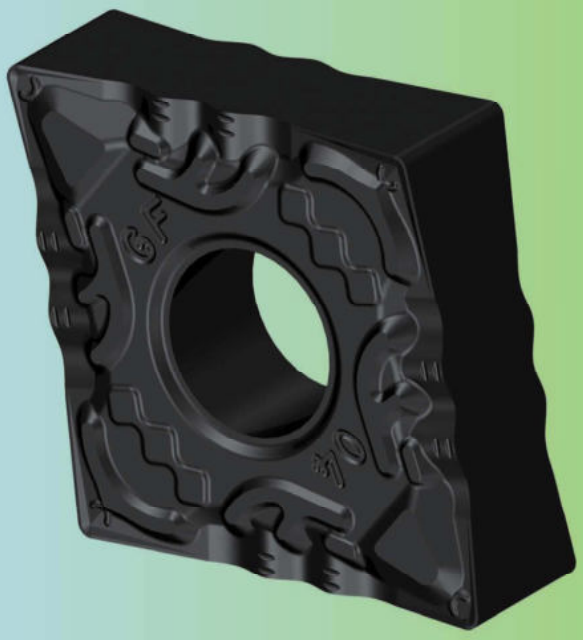
It is suitable for finishing and semi–finishing of steel and cast steel, machininig for high cutting speed and moderate、low feed rate.

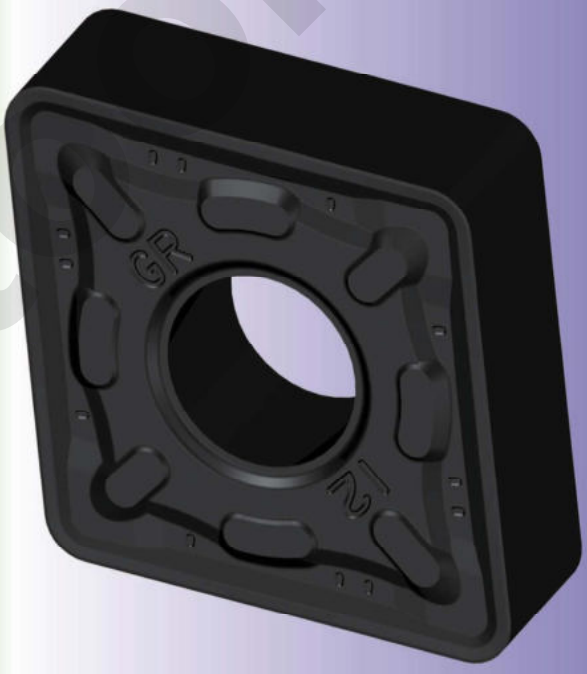
SK001

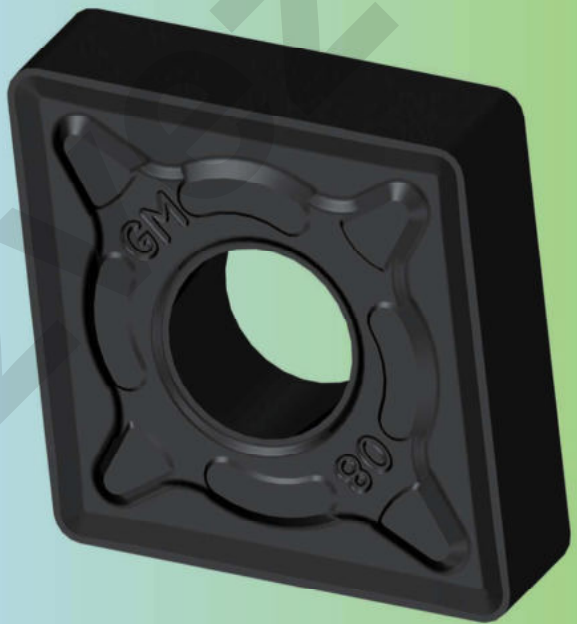
It is suitable for finishing and semi–finishing of cast iron、nonferrous metal、aluminium product，and also for manganese steel、chilled steel etc hard material.

■ Recommended cutting parameters

Workingpiece material		Range of machining	Grade	Recommended cutting speed (m/min)
P	steel	semi–finishing	SP302	120–300
		rough finishing	SP402	90–280
K	cast iron	finishing	SK002	110–160
		semi–finishing~rough finishing	SK202	70–120
N	nonferrous metal	finishing~semi–finishing	SK001	120–1800

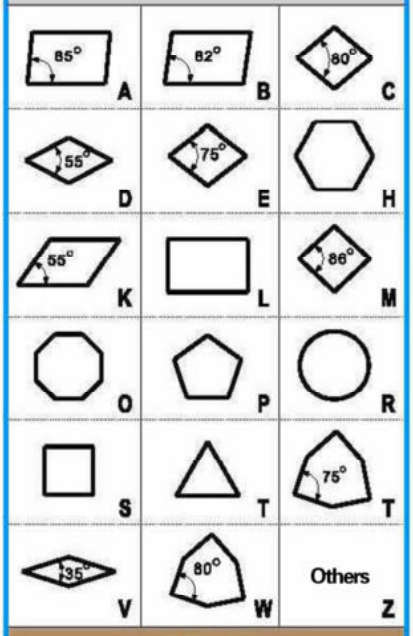






TURNING General Turning inserts code key

Insert Shape / Code



shape code key

Metric Size

Code	With/ Without hole	With/Without chipbreaker	Section plane of Insert	Code	With/ Without hole	With/Without chipbreaker	Section plane of Insert
B	With	Without	>65°	N	Without	Without	
H	With	Single-side	>65°	R	Without	Single-side	
C	With	Without	>65°	F	Without	Double-side	
J	With	Double-side	>65°	A	With	Without	
W	With	Without	<65°	M	With	Single-side	
T	With	Single-side	<65°	G	With	Double-side	
Q	With	Without	<65°	X	----	----	Special
U	With	Double-side	<65°				

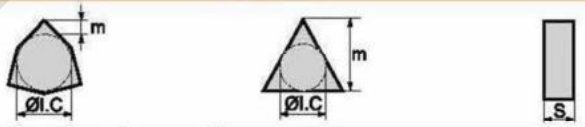
Chipbreaker and Clamping form

C N M G

Main cutting edge rear angle

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

tolerance



Code	Tools-tip height(m)	Inscribed circle tolerance ØI.C (mm)	Thickness S Tolerance(mm
A	±0.005	±0.025	±0.025
F	±0.005	±0.013	±0.025
C	±0.013	±0.025	±0.025
H	±0.013	±0.013	±0.025
E	±0.025	±0.025	±0.025
G	±0.025	±0.025	±0.13
J	±0.005	±0.05-±0.13	±0.025
K	±0.013	±0.05-±0.13	±0.025
L	±0.025	±0.05-±0.13	±0.025
M	±0.08-±0.18	±0.05-±0.13	±0.13
N	±0.08-±0.18	±0.05-±0.13	±0.025
U	±0.13-±0.38	±0.08-±0.25	±0.13

(reference) M-level precision detail(according to shape、big or small)

Nose height tolerance(mm)

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

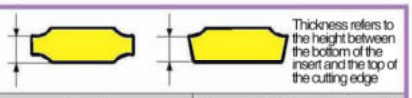
Inscribed circle ØI.C tolerance(mm)

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

General Turning inserts code key TURNING

Inscribed Circle diameter(mm)	Insert Shape							
	C	D	R	S	T	V	W	K
3.97					06			
5.0			05					
5.56					09			
6.0			06					
6.35	06	07			11	11		
8.0			08					
9.525	09	11	09	09	16	16	06	16
10.0			10					
12.0			12					
12.7	12	15	12	12	22	22	08	
15.875	16		15	15	27			
16.0		19	16					
19.05	19		19	19	33			
20.0			20					
25.0	25	25	25					
25.4			25	25				
31.75			31					
32			32					

Length of cutting edge



Code	Insert thickness(mm)
00	0.79
T0	0.99
01	1.59
T1	1.98
02	2.38
T2	2.58
03	3.18
T3	3.97
04	4.76
T4	4.96
05	5.56
T5	5.95
06	6.35
T6	6.75
07	7.94
09	9.52
T9	9.72
11	11.11
12	12.70

Insert thickness(mm)

12 04 08 - BM (ISO)

4 3 2 (Inch)

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

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

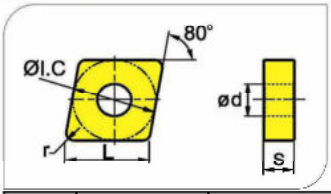
Corner radius	
Code	Corner radius (mm)
0	0.2
1	0.4
2	0.8
3	1.2
4	1.6
5	2.0
6	2.4

Corner radius	
Code	Corner radius (mm)
00	circular bead
02	0.2
04	0.4
08	0.8
12	1.2
16	1.6
20	2.0
24	2.4
32	3.2
X	others
Insert diameter Mo (the metric system)	Circular insert

Chipbreaker Code		
GF	GM	GR
HF	HM	HR
BF	BM	BR
GS	GR	ZR
AH	AC	

TURNING General Turning Inserts
Carbide inserts

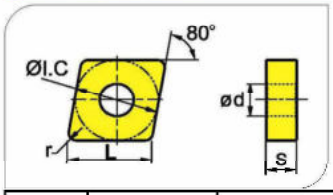
CN□□ (Negative inserts)



Inserts shape	Type	Dimensions(mm)					Coated cemented carbide																Cemented carbide				
							P						M						K								
		L	φI.C	S	φd	r	SD4015	SD4115	SD4025	SD4125	SD4035	SD4135	SD'015	SD'025	SD'035	SD'045	SD4330	SD4340	SD4350	SD3105	SD3205	SD3115	SD3215	SD3125	SD3225	SP302	SP402	SK002	SK102	SK202
GR	CNMG090304-GR	9.7	9.525	3.18	3.81	0.4	☆	☆	★	★	☆	☆		○						○		○					☆			
	CNMG090308-GR	9.7	9.525	3.18	3.81	0.8	☆	☆	★	★	☆	☆		○						○		○					☆			
	CNMG120404-GR	12.9	12.7	4.76	5.16	0.4	☆	☆	★	★	☆	☆			○					○		○					☆			
	CNMG120408-GR	12.9	12.7	4.76	5.16	0.8	☆	☆	★	★	☆	☆			○					○		○					☆			
For roughing	CNMG120412-GR	12.9	12.7	4.76	5.16	1.2	☆	☆	★	★	☆	☆			○					○		○					☆			
GR	CNMM120412-GR	12.9	12.7	4.76	5.16	1.2			☆	☆	★	★			○												☆			
	CNMM160612-GR	16.1	15.875	6.35	6.35	1.2			☆	☆	★	★			○												☆			
	CNMM160616-GR	16.1	15.875	6.35	6.35	1.6			☆	☆	★	★			○												☆			
	CNMM190612-GR	19.3	19.05	6.35	7.94	1.2			☆	☆	★	★			○												☆			
	CNMM190616-GR	19.3	19.05	6.35	7.94	1.6			☆	☆	★	★			○												☆			
	CNMM190624-GR	19.3	19.05	6.35	7.94	2.4			☆	☆	★	★			○												☆			
For roughing	CNMM250924-GR	25.79	25.400	9.525	9.12	2.4			☆	☆	★	★			○												☆			
BR	CNMG120408-BR	12.9	12.7	4.76	5.16	0.8							○	☆	★			☆	★											
	CNMG120412-BR	12.9	12.7	4.76	5.16	1.2							○	☆	★			☆	★											
	CNMG120416-BR	12.9	12.7	4.76	5.16	1.6							○		★			☆	★											
	CNMG160608-BR	16.1	15.875	6.35	6.35	0.8							○		★			☆	★											
	CNMG160612-BR	16.1	15.875	6.35	6.35	1.2							○		★			☆	★											
	CNMG160616-BR	16.1	15.875	6.35	6.35	1.6							○		★			☆	★											
	CNMG190608-BR	19.3	19.05	6.35	7.94	0.8							○		★			☆	★											
	CNMG190612-BR	19.3	19.05	6.35	7.94	1.2							○		★			☆	★											
	CNMG190616-BR	19.3	19.05	6.35	7.94	1.6							○		★			☆	★											
For roughing	CNMG190624-BR	19.3	19.05	6.35	7.94	2.4							○		★			☆	★											

★ Recommended grade (always stock available) ☆ Available grade ○ Make-to-order

CN□□ (Negative inserts)

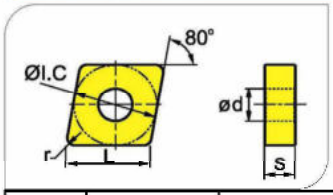


Inserts shape	Type	Dimensions(mm)					Coated cemented carbide																	Cemented carbide				
							P					M							K									
		L	φI.C	S	φd	r	SD4015	SD4115	SD4025	SD4125	SD4035	SD4135	SD1015	SD1025	SD1035	SD1045	SD4330	SD4340	SD4350	SD3105	SD3205	SD3115	SD3215	SD3125	SD3225	SP302	SP402	SK002	SK102	SK202
ZR	CNMG120404-ZR	12.9	12.7	4.76	5.16	0.4			○													★		○					
	CNMG120408-ZR	12.9	12.7	4.76	5.16	0.8			○													★		○					
	CNMG120412-ZR	12.9	12.7	4.76	5.16	1.2			○													★		○					
	CNMG120416-ZR	12.9	12.7	4.76	5.16	1.6			○													★		○					
	CNMG160612-ZR	16.1	15.875	6.35	6.35	1.2			○													★		○					
	CNMG160616-ZR	16.1	15.875	6.35	6.35	1.6			○													★		○					
	CNMG190608-ZR	19.3	19.05	6.35	7.94	0.8			○													★		○					
	CNMG190612-ZR	19.3	19.05	6.35	7.94	1.2			○													★		○					
For roughing	CNMG190616-ZR	19.3	19.05	6.35	7.94	1.6			○													★		○					
For Chipbreaker	CNMG120404	12.9	12.7	4.76	5.16	0.4	○	○	☆	★	○									○		★							
	CNMG120408	12.9	12.7	4.76	5.16	0.8	○	○	☆	★	○											★							
	CNMG120412	12.9	12.7	4.76	5.16	1.2	○	○	☆	★	○											★		○					
	CNMG160608	16.1	15.875	6.35	6.35	0.8	○	○	☆	★	○											★		○					
	CNMG160612	16.1	15.875	6.35	6.35	1.2	○	○	☆	★	○											★		○					
	CNMG160616	16.1	15.875	6.35	6.35	1.6	○	○	☆	★	○											★		○					
	CNMG190608	19.3	19.05	6.35	7.94	0.8	○	○	☆	★	○											○		★					
	CNMG190612	19.3	19.05	6.35	7.94	1.2	○	○	☆	★	○											○		★					
	CNMG190616	19.3	19.05	6.35	7.94	1.6	○	○	☆	★	○											○		★					

★ Recommended grade (always stock available) ☆ Available grade ○ Make-to-order

TURNING General Turning Inserts
Carbide inserts

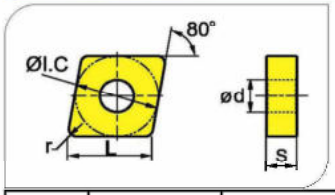
CN□□ (Negative inserts)



Inserts shape	Type	Dimensions(mm)					Coated cemented carbide																		Cemented carbide				
							P						M						K										
		L	φI.C	S	φd	r	SD4015	SD4115	SD4025	SD4125	SD4035	SD4135	SD1015	SD1025	SD1035	SD1045	SD4330	SD4340	SD4350	SD3105	SD3205	SD3115	SD3215	SD3125	SD3225	SP302	SP402	SK002	SK102	SK202
Without Chipbreaker	CNMA120404	12.9	12.7	4.76	5.16	0.4			☆	☆										☆		★		○						☆
	CNMA120408	12.9	12.7	4.76	5.16	0.8			☆	☆										☆		★		○						☆
	CNMA120412	12.9	12.7	4.76	5.16	1.2			☆	☆												★		○						☆
	CNMA120416	12.9	12.7	4.76	5.16	1.6			☆	☆												★		○						☆
	CNMA160608	16.1	15.875	6.35	6.35	0.8					☆	☆										★		○						☆
	CNMA160612	16.1	15.875	6.35	6.35	1.2					☆	☆										★		○						☆
	CNMA160616	16.1	15.875	6.35	6.35	1.6					☆	☆										★		○						☆
	CNMA160620	16.1	15.875	6.35	6.35	2.0					☆	☆										☆		★						☆
	CNMA160630	16.1	15.875	6.35	6.35	3.0					☆	☆										☆		★						☆
	CNMA190612	19.3	19.05	6.35	7.94	1.2					☆	☆										★								☆
	CNMA190616	19.3	19.05	6.35	7.94	1.6					☆	☆										☆		★						☆
GM	CNMG090304-GM	9.7	9.525	3.18	3.81	0.4	○	☆	☆	★				☆						☆		★								
	CNMG090308-GM	9.7	9.525	3.18	3.81	0.8	○	☆	☆	★	○			☆						☆		★								
	CNMG120404-GM	12.9	12.7	4.76	5.16	0.4	○	☆	☆	★				☆						☆		★								
	CNMG120408-GM	12.9	12.7	4.76	5.16	0.8	○	☆	☆	★	○			☆						☆		★								
Semi-finishing	CNMG120412-GM	12.9	12.7	4.76	5.16	1.2	○	☆	☆	★	○			☆						☆		★								
GS	CNMG090304-GS	9.7	9.525	3.18	3.81	0.4	○	☆	☆	★										○		☆								
	CNMG090308-GS	9.7	9.525	3.18	3.81	0.8	○	☆	☆	★	○									○		☆								
	CNMG120404-GS	12.9	12.7	4.76	5.16	0.4	○	☆	☆	★										○		☆								
	CNMG120408-GS	12.9	12.7	4.76	5.16	0.8	○	☆	☆	★										○		☆								
Semi-finishing	CNMG120412-GS	12.9	12.7	4.76	5.16	1.2	○	☆	☆	★	○									○		☆								

★ Recommended grade (always stock available) ☆ Available grade ○ Make-to-order

CN□□ (Negative inserts)

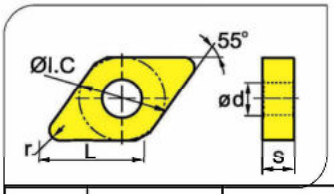


Inserts shape	Type	Dimensions(mm)					Coated cemented carbide																		Cemented carbide				
							P						M						K										
		L	ϕI.C	S	ϕd	r	SD4015	SD4115	SD4025	SD4125	SD4035	SD4135	SD1015	SD1025	SD1035	SD1045	SD4330	SD4340	SD4350	SD3105	SD3205	SD3115	SD3215	SD3125	SD3225	SP302	SP402	SK002	SK102	SK202
BM	CNMG090304-BM	9.7	9.525	3.18	3.81	0.4							○	★				☆												
	CNMG090308-BM	9.7	9.525	3.18	3.81	0.8							○	★				☆												
	CNMG120404-BM	12.9	12.7	4.76	5.16	0.4							○	★				☆												
	CNMG120408-BM	12.9	12.7	4.76	5.16	0.8							○	★				☆												
Semi-finishing	CNMG120412-BM	12.9	12.7	4.76	5.16	1.2							○	★				☆												
GF	CNMG090304-GF	9.7	9.525	3.18	3.81	0.4	☆	★	○				○																	
	CNMG090308-GF	9.7	9.525	3.18	3.81	0.8	☆	★	○																					
	CNMG120404-GF	12.9	12.7	4.76	5.16	0.4	☆	★	○				○																	
	CNMG120408-GF	12.9	12.7	4.76	5.16	0.8	☆	★	○				○																	
Finishing	CNMG120412-GF	12.9	12.7	4.76	5.16	1.2	☆	★	○																					
BF	CNMG090304-BF	9.7	9.525	3.18	3.81	0.4							○	★			☆													
	CNMG090308-BF	9.7	9.525	3.18	3.81	0.8							○	★			☆													
	CNMG120404-BF	12.9	12.7	4.76	5.16	0.4							○	★			☆													
	CNMG120408-BF	12.9	12.7	4.76	5.16	0.8							○	★			☆													
Finishing	CNMG120412-BF	12.9	12.7	4.76	5.16	1.2							○	★			☆													

★ Recommended grade (always stock available) ☆ Available grade ○ Make-to-order

TURNING General Turning Inserts
Carbide inserts

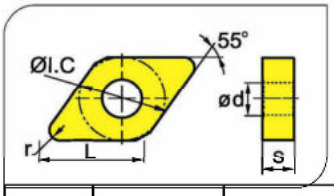
DN□□ (Negative inserts)



Inserts shape	Type	Dimensions(mm)					Coated cemented carbide																		Cemented carbide				
							P						M						K										
		L	φ I. C	S	φ d	r	SD4015	SD4115	SD4025	SD4125	SD4035	SD4135	SD1015	SD1025	SD1035	SD1045	SD4330	SD4340	SD4350	SD3105	SD3205	SD3115	SD3215	SD3125	SD3225	SP302	SP402	SK002	SK102	SK202
GR	DNMG150408-GR	15.5	12.7	4.76	5.16	0.8			○	○	☆	★															☆			
	DNMG150412-GR	15.5	12.7	4.76	5.16	1.2			○	○	☆	★															☆			
	DNMG150416-GR	15.5	12.7	4.76	5.16	1.6			○	○	☆	★															☆			
	DNMG150608-GR	15.5	12.7	4.76	5.16	0.8			○	○	☆	★															☆			
	DNMG150612-GR	15.5	12.7	6.35	5.16	1.2			○	○	☆	★															☆			
For roughing	DNMG150616-GR	15.5	12.7	6.35	5.16	1.6			○	○	☆	★															☆			
GR	DNMM150608-GR	15.5	12.7	6.35	5.16	0.8			○	○	☆	★															☆			
	DNMM150612-GR	15.5	12.7	6.35	5.16	1.2			○	○	☆	★															☆			
	DNMM150616-GR	15.5	12.7	6.35	5.16	1.6			○	○	☆	★																		
For roughing																														
BR	DNMG150608-BR	15.5	12.7	6.35	5.16	0.8								☆	★				○											
	DNMG150612-BR	15.5	12.7	6.35	5.16	1.2								☆	★				○											
For roughing	DNMG150616-BR	15.5	12.7	6.35	5.16	1.6								☆	★				○											
ZR	DNMG150608-ZR	15.5	12.7	6.35	5.16	0.8			○													☆		★						
	DNMG150612-ZR	15.5	12.7	6.35	5.16	1.2			○													☆		★						
For roughing																														
For Chipbreaker	DNMG150604	15.5	12.7	6.35	5.16	0.4	○		☆	★	○									☆		★		○						
	DNMG150608	15.5	12.7	6.35	5.16	0.8	○		☆	★	○									☆		★		○						
	DNMG150612	15.5	12.7	6.35	5.16	1.2	○		☆	★	○									☆		★		○						
	DNMG150616	15.5	12.7	6.35	5.16	1.6	○		☆	★	○									☆		★		○						
	DNMG190608	19.3	15.875	6.35	7.94	0.8	○		☆	★	○									☆		★		○						
	DNMG190612	19.3	15.875	6.35	7.94	0.8	○		☆	★	○									☆		★		○						

★ Recommended grade (always stock available) ☆ Available grade ○ Make-to-order

DN□□ (Negative inserts)

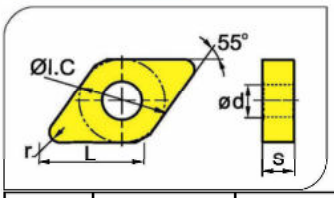


Inserts shape	Type	Dimensions(mm)					Coated cemented carbide																Cemented carbide				
							P						M						K								
		L	φ I. C	S	φ d	r	SD4015	SD4115	SD4025	SD4125	SD4035	SD4135	SD1015	SD1025	SD1035	SD1045	SD4330	SD4340	SD4350	SD3105	SD3205	SD3115	SD3215	SD3125	SD3225	SP302	SP402	SK002	SK102	SK202
Without Chipbreaker	DNMA110416	11. 6	9. 525	4. 76	3. 81	1. 6	○		☆	★												★		○						☆
	DNMA110424	11. 6	9. 525	4. 76	3. 81	2. 4	○		☆	★												★		○						☆
	DNMA150404	15. 5	12. 7	4. 76	5. 16	0. 4	○		☆	★												★								☆
	DNMA150408	15. 5	12. 7	4. 76	5. 16	0. 8			☆	★												★								☆
	DNMA150604	15. 5	12. 7	6. 35	5. 16	0. 4			☆	★												★								☆
	DNMA150608	15. 5	12. 7	6. 35	5. 16	0. 8			☆	★												★								☆
	DNMA150612	15. 5	12. 7	6. 35	5. 16	1. 2			☆	★	○											★		○						☆
	DNMA150616	15. 5	12. 7	6. 35	5. 16	1. 6			☆	★	○											★		○						☆
GM	DNMG110404-GM	11. 6	9. 525	4. 76	3. 81	0. 4	○	☆	☆	★												○								
	DNMG110408-GM	11. 6	9. 525	4. 76	3. 81	0. 8	○	☆	☆	★												○								
	DNMG110412-GM	11. 6	9. 525	4. 76	3. 81	1. 2	○	☆	☆	★												○								
	DNMG150404-GN	15. 5	12. 7	4. 76	5. 16	0. 4	○	☆	☆	★												○								
	DNMG150408-GM	15. 5	12. 7	4. 76	5. 16	0. 8	○	☆	☆	★												○								
	DNMG150412-GM	15. 5	12. 7	4. 76	5. 16	1. 2	○	☆	☆	★												○								
	DNMG150416-GM	15. 5	12. 7	4. 76	5. 16	1. 6	○	☆	☆	★												○								
	DNMG150604-GM	15. 5	12. 7	6. 35	5. 16	0. 4	○	☆	☆	★												○								
	DNMG150608-GM	15. 5	12. 7	6. 35	5. 16	0. 8	○	☆	☆	★												○								
	DNMG150612-GM	15. 5	12. 7	6. 35	5. 16	1. 2	○	☆	☆	★												○								
Semi-finishing	DNMG150616-GM	15. 5	12. 7	6. 35	5. 16	1. 6	○	☆	☆	★												○								

★ Recommended grade (always stock available) ☆ Available grade ○ Make-to-order

TURNING General Turning Inserts Carbide inserts

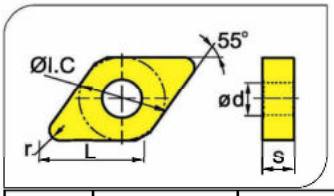
DN□□ (Negative inserts)



Inserts shape	Type	Dimensions(mm)					Coated cemented carbide																Cemented carbide				
							P						M						K									
		L	φI.C	S	φd	r	SD4015	SD4115	SD4025	SD4125	SD4035	SD4135	SD1015	SD1025	SD1035	SD1045	SD4330	SD4340	SD4350	SD3105	SD3205	SD3115	SD3215	SD3125	SD3225	SP302	SP402	SK002	SK102	SK202
GS	DNMG110412-GS	11.6	9.525	4.76	3.81	1.2	☆	☆	★	★			○							○							☆			
	DNMG150404-GS	15.5	12.7	4.76	5.16	0.4	☆	☆	★	★			○							○							☆			
	DNMG150408-GS	15.5	12.7	4.76	5.16	0.8	☆	☆	★	★			○							○							☆			
	DNMG150412-GS	15.5	12.7	4.76	5.16	1.2	☆	☆	★	★	○		○							○							☆			
	DNMG150416-GS	15.5	12.7	4.76	5.16	1.6	☆	☆	★	★	○		○							○							☆			
	DNMG150604-GS	15.5	12.7	6.35	5.16	0.4	☆	☆	★	★			○							○							☆			
	DNMG150608-GS	15.5	12.7	6.35	5.16	0.8	☆	☆	★	★			○							○							☆			
	DNMG150612-GS	15.5	12.7	6.35	5.16	1.2	☆	☆	★	★	○		○							○							☆			
Semi-finishing	DNMG150616-GS	15.5	12.7	6.35	5.16	1.6	☆	☆	★	★	○		○							○							☆			
BM	DNMG110412-BM	11.6	9.525	4.76	3.81	1.2								★	○			★	☆											
	DNMG150404-BM	15.5	12.7	4.76	5.16	0.4							○	★				★												
	DNMG150408-BM	15.5	12.7	4.76	5.16	0.8								★				★	☆											
	DNMG150412-BM	15.5	12.7	4.76	5.16	1.2								★	○			★	☆											
	DNMG150416-BM	15.5	12.7	4.76	5.16	1.6								★	○			★												
	DNMG150604-BM	15.5	12.7	6.35	5.16	0.4							○	★				★												
	DNMG150608-BM	15.5	12.7	6.35	5.16	0.8							○	★				★												
	DNMG150612-BM	15.5	12.7	6.35	5.16	1.2								★	○			★	☆											
Semi-finishing	DNMG150616-BM	15.5	12.7	6.35	5.16	1.6							○	★	○			★	☆											

★ Recommended grade (always stock available) ☆ Available grade ○ Make-to-order

DN□□ (Negative inserts)

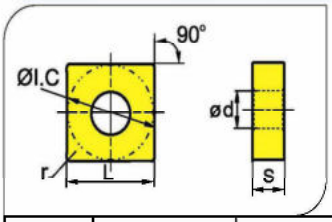


Inserts shape	Type	Dimensions(mm)					Coated cemented carbide																Cemented carbide				
							P						M						K								
		L	φI.C	S	φd	r	SD4015	SD4115	SD4025	SD4125	SD4035	SD4135	SD1015	SD1025	SD1035	SD1045	SD4330	SD4340	SD4350	SD3105	SD3205	SD3115	SD3215	SD3125	SD3225	SP302	SP402	SK002	SK102	SK202
GF	DNMG110404-GF	11.6	9.525	4.76	3.81	0.4	☆	★	○					○						○										
	DNMG110408-GF	11.6	9.525	4.76	3.81	0.8	☆	★	○					○						○										
	DNMG110412-GF	11.6	9.525	4.76	3.81	1.2	☆	★	○					○						○										
	DNMG150404-GF	15.5	12.7	4.76	5.16	0.4	☆	★	○					○						○										
	DNMG150408-GF	15.5	12.7	4.76	5.16	0.8	☆	★	○					○						○										
	DNMG150412-GF	15.5	12.7	4.76	5.16	1.2	☆	★	○					○						○										
	DNMG150604-GF	15.5	12.7	6.35	5.16	0.4	☆	★	○					○						○										
	DNMG150608-GF	15.5	12.7	6.35	5.16	0.8	☆	★	○					○						○										
Finishing	DNMG150612-GF	15.5	12.7	6.35	5.16	1.2	☆	★	○					○						○										
BF	DNMG110404-BF	11.6	9.525	4.76	3.81	0.4							★	○			☆													
	DNMG110408-BF	11.6	9.525	4.76	3.81	0.8							★	○			☆													
	DNMG110412-BF	11.6	9.525	4.76	3.81	1.2							★	○			☆													
	DNMG150404-BF	15.5	12.7	4.76	5.16	0.4							★	○			☆													
	DNMG150408-BF	15.5	12.7	4.76	5.16	0.8							★	○			☆													
	DNMG150412-BF	15.5	12.7	4.76	5.16	1.2							★	○			☆													
	DNMG150604-BF	15.5	12.7	6.35	5.16	0.4							★	○			☆													
	DNMG150608-BF	15.5	12.7	6.35	5.16	0.8							★	○			☆													
Finishing	DNMG150612-BF	15.5	12.7	6.35	5.16	1.2							★	○			☆													

★ Recommended grade (always stock available) ☆ Available grade ○ Make-to-order

TURNING General Turning Inserts
Carbide inserts

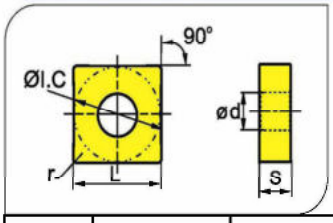
SN□□ (Negative inserts)



Inserts shape	Type	Dimensions(mm)					Coated cemented carbide																		Cemented carbide				
							P						M						K										
		L	ϕI.C	S	ϕd	r	SD4015	SD4115	SD4025	SD4125	SD4035	SD4135	SD1015	SD1025	SD1035	SD1045	SD4330	SD4340	SD4350	SD3105	SD3205	SD3115	SD3215	SD3125	SD3225	SP302	SP402	SK002	SK102	SK202
GR	SNMG120408-GR	12.7	12.7	4.76	5.15	0.8			○	☆	★	☆			○												☆			
	SNMG120412-GR	12.7	12.7	4.76	5.16	1.2			○	☆	★	☆			○												☆			
	SNMG120416-GR	12.7	12.7	4.76	5.16	1.6			○	☆	★	☆			○												☆			
	SNMG150608-GR	15.875	15.875	6.35	6.35	0.8			○	☆	★	☆			○												☆			
	SNMG150612-GR	15.875	15.875	6.35	6.35	1.2			○	☆	★	☆			○												☆			
	SNMG150616-GR	15.875	15.875	6.35	6.35	1.6			○	☆	★	☆			○												☆			
	SNMG150624-GR	15.875	15.875	6.35	6.35	2.4			○	☆	★	☆			○												☆			
	SNMG190612-GR	19.05	19.05	6.35	7.94	1.2			○	☆	★	☆			○												☆			
	SNMG190616-GR	19.05	19.05	6.35	7.94	1.6			○	☆	★	☆			○												☆			
For roughing	SNMG190624-GR	19.05	19.05	6.35	7.94	2.4			○	☆	★	☆			○												☆			
GR	SNMM120408-GR	12.7	12.7	4.76	5.15	0.8			○	☆	★	☆			○												☆			
	SNMM120412-GR	12.7	12.7	4.76	5.16	1.2			○	☆	★	☆			○												☆			
	SNMM120416-GR	12.7	12.7	4.76	5.16	1.6			○	☆	★	☆			○												☆			
	SNMM150608-GR	15.875	15.875	6.35	6.35	0.8			○	☆	★	☆			○												☆			
	SNMM150612-GR	15.875	15.875	6.35	6.35	1.2			○	☆	★	☆			○												☆			
	SNMM150616-GR	15.875	15.875	6.35	6.35	1.6			○	☆	★	☆			○												☆			
	SNMM190608-GR	19.05	19.05	6.35	7.94	0.8			○	☆	★	☆			○												☆			
	SNMM190612-GR	19.05	19.05	6.35	7.94	1.2			○	☆	★	☆			○												☆			
	SNMM190616-GR	19.05	19.05	6.35	7.94	1.6			○	☆	★	☆			○												☆			
	SNMM190624-GR	19.05	19.05	6.35	7.94	2.4			○	☆	★	☆			○												☆			
	SNMM250724-GR	25.4	25.4	7.94	9.12	2.4			○	☆	★	☆			○												☆			
For roughing	SNMM250924-GR	25.4	25.4	7.94	9.12	2.4			○	☆	★	☆			○												☆			

★ Recommended grade (always stock available) ☆ Available grade ○ Make-to-order

SN□□ (Negative inserts)

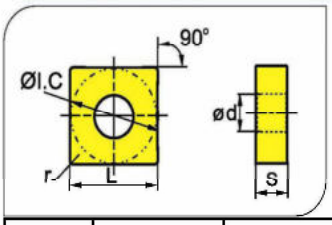


Inserts shape	Type	Dimensions(mm)					Coated cemented carbide																		Cemented carbide				
							P						M							K										
		L	ϕI.C	S	ϕd	r	SD4015	SD4115	SD4025	SD4125	SD4035	SD4135	SD1015	SD1025	SD1035	SD1045	SD4330	SD4340	SD4350	SD3105	SD3205	SD3115	SD3215	SD3125	SD3225	SP302	SP402	SK002	SK102	SK202
BR	SNMG120408-BR	12.7	12.7	4.76	5.15	0.8							○	★				☆												
	SNMG120412-BR	12.7	12.7	4.76	5.15	1.2							○	★				☆												
	SNMG150608-BR	15.875	15.875	6.35	6.35	0.8							○	★				☆												
	SNMG150612-BR	15.875	15.875	6.35	6.35	1.2							○	★				☆												
	SNMG190612-BR	19.05	19.05	6.35	7.94	1.2							○	★				☆												
For roughing	SNMG190616-BR	19.05	19.05	6.35	7.94	1.6							○	★				☆												
ZR	SNMG120412-ZR	12.7	12.7	4.76	5.16	1.2				○										○		★		☆						
	SNMG150608-ZR	15.875	15.875	6.35	6.35	0.8				○										○		★		☆						
	SNMG150612-ZR	15.875	15.875	6.35	6.35	1.2				○										○		★		☆						
	SNMM190612-ZR	19.05	19.05	6.35	7.94	1.2				○										○		★		☆						
For roughing																														
For Chipbreaker	SNMG090304	9.525	9.525	3.18	3.81	0.4	○	○	☆	★												★	☆							
	SNMG090308	9.525	9.525	3.18	3.81	0.8	○	○	☆	★												★	☆							
	SNMG120404	12.7	12.7	4.76	5.16	0.4	○	○	☆	★												★	☆							
	SNMG120408	12.7	12.7	4.76	5.16	0.8	○	○	☆	★												★	☆							
	SNMG120412	12.7	12.7	4.76	5.16	1.2	○	○	☆	★												★	☆							
	SNMG120416	12.7	12.7	4.76	5.16	1.6	○	○	☆	★												★	☆							
	SNMG150608	15.875	15.875	6.35	6.35	0.8	○	○	☆	★												★	☆							
	SNMG150612	15.875	15.875	6.35	6.35	1.2			☆	★												★	☆							
	SNMG190612	19.05	19.05	6.35	7.94	1.2			☆	★														★	☆					
	SNMG190616	19.05	19.05	6.35	7.94	1.6			☆	★	○													★	☆					
	SNMG250724	25.4	25.4	7.94	9.12	2.4			☆	★	○													★	☆					
	SNMG250924	25.4	25.4	7.94	9.525	2.4			☆	★	○													★	☆					

★ Recommended grade (always stock available) ☆ Available grade ○ Make-to-order

TURNING General Turning Inserts Carbide inserts

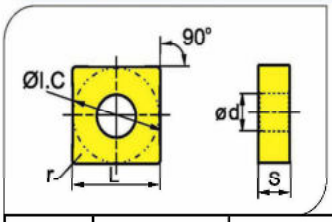
SN□□ (Negative inserts)



Inserts shape	Type	Dimensions(mm)					Coated cemented carbide																		Cemented carbide				
							P						M							K										
		L	ϕI.C	S	ϕd	r	SD4015	SD4115	SD4025	SD4125	SD4035	SD4135	SD1015	SD1025	SD1035	SD1045	SD4330	SD4340	SD4350	SD3105	SD3205	SD3115	SD3215	SD3125	SD3225	SP302	SP402	SK002	SK102	SK202
Without Chipbreaker	SNMA090304	9.525	9.525	3.18	3.81	0.4			☆		☆									○		★	☆				☆			○
	SNMA090308	9.525	9.525	3.18	3.81	0.8			☆		☆									○		★	☆				☆			○
	SNMA120404	12.7	12.7	4.76	5.16	0.4			☆		☆									○		★	☆				☆			○
	SNMA120408	12.7	12.7	4.76	5.16	0.8			☆		☆									○		★	☆		○		☆			○
	SNMA120416	12.7	12.7	4.76	5.16	1.6			☆		☆									○		★	☆				☆			○
	SNMA150608	15.875	15.875	6.35	6.35	0.8			☆		☆											★	☆		○		☆			○
	SNMA190612	19.05	19.05	6.35	7.94	1.2			☆		☆											★	☆		○		☆			○
	SNMA190616	19.05	19.05	6.35	7.94	1.6			☆		☆											★	☆		○		☆			○
GM	SNMG090304-GM	9.525	9.525	3.18	3.81	0.4	○		☆	★	○											○					☆			
	SNMG090308-GM	9.525	9.525	3.18	3.81	0.8	○		☆	★	○											○					☆			
	SNMG120404-GM	12.7	12.7	4.76	5.16	0.4	○		☆	★	○											○					☆			
	SNMG120408-GM	12.7	12.7	4.76	5.16	0.8			☆	★	○											○					☆			
	SNMG120412-GM	12.7	12.7	4.76	5.16	1.2	○		☆	★	○											○					☆			
	SNMG120416-GM	12.7	12.7	4.76	5.16	1.6			☆	★	○											○					☆			
	SNMG150608-GM	15.875	15.875	6.35	6.35	0.8			☆	★	○											○					☆			
	SNMG150612-GM	15.875	15.875	6.35	6.35	1.2			☆	★	○											○					☆			
	SNMG150616-GM	15.875	15.875	6.35	6.35	1.6			☆	★	○											○					☆			
	SNMG190612-GM	19.05	19.05	6.35	7.94	1.2			☆	★	○											○					☆			
Semi-finishing	SNMG190616-GM	19.05	19.05	6.35	7.94	1.6			☆	★	○											○					☆			
GS	SNMG120404-GS	12.7	12.7	4.76	5.16	0.4	☆		☆	★	○																☆			
	SNMG120408-GS	12.7	12.7	4.76	5.16	0.8	☆		☆	★	○																☆			
	SNMG120412-GS	12.7	12.7	4.76	5.16	1.2	☆		☆	★	○																☆			
	SNMG120416-GS	12.7	12.7	4.76	5.16	1.6	☆		☆	★	○																☆			
	SNMG150612-GS	15.875	15.875	6.35	6.35	1.2	☆		☆	★	○																☆			
Semi-finishing	SNMG150616-GS	15.875	15.875	6.35	6.35	1.6	☆		☆	★	○																☆			

★ Recommended grade (always stock available) ☆ Available grade ○ Make-to-order

SN□□ (Negative inserts)

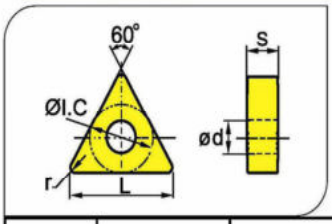


Inserts shape	Type	Dimensions(mm)					Coated cemented carbide																		Cemented carbide				
							P						M						K										
		L	ϕI.C	S	ϕd	r	SD4015	SD4115	SD4025	SD4125	SD4035	SD4135	SD1015	SD1025	SD1035	SD1045	SD4330	SD4340	SD4350	SD3105	SD3205	SD3115	SD3215	SD3125	SD3225	SP302	SP402	SK002	SK102	SK202
BM	SNMG120404-BM	12.7	12.7	4.76	5.16	0.4							○	★				☆												
	SNMG120408-BM	12.7	12.7	4.76	5.16	0.8							○	★				☆												
	SNMG120412-BM	12.7	12.7	4.76	5.16	1.2							○	★				☆												
	SNMG120416-BM	12.7	12.7	4.76	5.16	1.6							○	★				☆												
	SNMG150612-BM	15.875	15.875	6.35	6.35	1.2							○	★				☆												
Semi-finishing	SNMG150616-BM	15.875	15.875	6.35	6.35	1.6							○	★				☆												
GF	SNMG120408-GF	12.7	12.7	4.76	5.16	0.8	☆	★	○	☆										○										
	SNMG120412-GF	12.7	12.7	4.76	5.16	1.2	☆	★	○	☆										○										
finishing																														
BF	SNMG090304-BF	9.525	9.525	3.18	3.81	0.4							○	★				☆												
	SNMG090308-BF	9.525	9.525	3.18	3.81	0.8							○	★				☆												
	SNMG090312-BF	9.525	9.525	3.18	3.81	1.2							○	★				☆												
	SNMG120404-BF	12.7	12.7	4.76	5.16	0.4							○	★				☆												
	SNMG120408-BF	12.7	12.7	4.76	5.16	0.8							○	★				☆												
	SNMG120412-BF	12.7	12.7	4.76	5.16	1.2							○	★				☆												
	SNMG150608-BF	15.875	15.875	6.35	6.35	0.8							○	★				☆												
finishing	SNMG150612-BF	15.875	15.875	6.35	6.35	1.2							○	★				☆												

★ Recommended grade (always stock available) ☆ Available grade ○ Make-to-order

TURNING General Turning Inserts
Carbide inserts

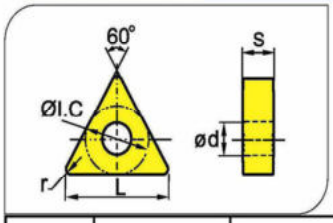
TN□□ (Negative inserts)



Inserts shape	Type	Dimensions(mm)					Coated cemented carbide																		Cemented carbide				
							P						M							K										
		L	φI.C	S	φd	r	SD4015	SD4115	SD4025	SD4125	SD4035	SD4135	SD1015	SD1025	SD1035	SD1045	SD4330	SD4340	SD4350	SD3105	SD3205	SD3115	SD3215	SD3125	SD3225	SP302	SP402	SK002	SK102	SK202
GR	TNMG160408-GR	16.5	9.525	4.76	3.81	0.8			☆	☆	☆	★															☆			
	TNMG160412-GR	16.5	9.525	4.76	3.81	1.2			☆	☆	☆	★															☆			
	TNMG220408-GR	22	12.7	4.76	5.16	0.8			☆	☆	☆	★															☆			
	TNMG220412-GR	22	12.7	4.76	5.16	1.2			☆	☆	☆	★															☆			
	TNMG220416-GR	22	12.7	4.76	5.16	1.6			○	○	☆	★															☆			
	TNMG270608-GR	27.515	15.875	6.35	6.35	0.8			○	○	☆	★															☆			
	TNMG270612-GR	27.515	15.875	6.35	6.35	1.2			○	○	☆	★															☆			
For roughing	TNMG270616-GR	27.515	15.875	6.35	6.35	1.6			○	○	☆	★															☆			
GR	TNMM160408-GR	16.5	9.525	4.76	3.81	0.8			☆	☆	☆	★															☆			
	TNMM160412-GR	16.5	9.525	4.76	3.81	1.2			☆	☆	☆	★															☆			
	TNMM220408-GR	22	12.7	4.76	5.16	0.8			☆	☆	☆	★															☆			
	TNMM220412-GR	22	12.7	4.76	5.16	1.2			☆	☆	☆	★															☆			
	TNMM220416-GR	22	12.7	4.76	5.16	1.6			○	○	☆	★															☆			
	TNMM270612-GR	27.515	15.875	6.35	6.35	1.2			○	○	☆	★															☆			
For roughing	TNMM270616-GR	27.515	15.875	6.35	6.35	1.6			○	○	☆	★																		
BR	TNMG160408-BR	16.5	9.525	4.76	3.81	0.8							○	★	☆			☆									☆			
	TNMG160412-BR	16.5	9.525	4.76	3.81	1.2							○	★	☆			☆									☆			
	TNMG220408-BR	22	12.7	4.76	5.16	0.8							○	★	☆			☆									☆			
For roughing	TNMG220412-BR	22	12.7	4.76	5.16	1.2							○	★	☆			☆												

★ Recommended grade (always stock available) ☆ Available grade ○ Make-to-order

TN□□ (Negative inserts)

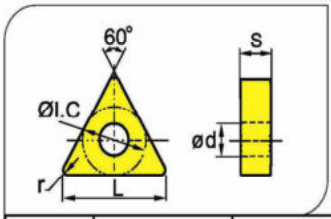


Inserts shape	Type	Dimensions(mm)					Coated cemented carbide																Cemented carbide				
							P						M						K								
		L	φI.C	S	φd	r	SD4015	SD4115	SD4025	SD4125	SD4035	SD4135	SD1015	SD1025	SD1035	SD1045	SD4330	SD4340	SD4350	SD3105	SD3205	SD3115	SD3215	SD3125	SD3225	SP302	SP402	SK002	SK102	SK202
ZR	TNMG160408-ZR	16.5	9.525	4.76	3.81	0.8			○													★		○						
	TNMG160412-ZR	16.5	9.525	4.76	3.81	1.2			○													★		○						
	TNMG220408-ZR	22	12.7	4.76	5.16	0.8			○													★		○						
	TNMG220412-ZR	22	12.7	4.76	5.16	1.2			○													★		○						
For roughing	TNMG220416-ZR	22	12.7	4.76	5.16	1.6			○													★								
Without Chipbreaker	TNMA160404	16.5	9.525	4.76	3.81	0.4	○	○	☆	★												★	☆							☆
	TNMA160408	16.5	9.525	4.76	3.81	0.8	○	○	☆	★												★	☆							☆
	TNMA160412	16.5	9.525	4.76	3.81	1.2	○	○	☆	★												★	☆							☆
	TNMA160416	16.5	9.525	4.76	3.81	1.6	○	○	☆	★												★	☆							☆
	TNMA220404	22	12.7	4.76	5.16	0.4	○	○	☆	★												★	☆							☆
	TNMA220408	22	12.7	4.76	5.16	0.8	○	○	☆	★												★	☆							☆
	TNMA270616	27.515	15.875	6.35	6.35	1.6						☆												★						☆
For Chipbreaker	TNMG110308	11	6.35	3.18	2.26	0.8	○	○	☆	★												★	☆							
	TNMG160404	16.5	9.525	4.76	3.81	0.4	○	○	☆	★												★	☆							
	TNMG160408	16.5	9.525	4.76	3.81	0.8	○	○	☆	★												★	☆							
	TNMG160412	16.5	9.525	4.76	3.81	1.2	○	○	☆	★												★	☆							
	TNMG220404	22	12.7	4.76	5.16	0.4	○	○	☆	★												★	☆							
	TNMG220408	22	12.7	4.76	5.16	0.8	○	○	☆	★												★	☆							
	TNMG220412	22	12.7	4.76	5.16	1.2	○	○	☆	★												★	☆							
	TNMG220416	22	12.7	4.76	5.16	1.6			☆	★												★	☆							
	TNMG270612	27.515	15.875	6.35	6.35	1.2			☆	★	○													★	☆					
	TNMG270616	27.515	15.875	6.35	6.35	1.6			☆	★	○													★	☆					
	TNMG330916	33	19.05	9.525	7.94	1.6			☆	★	○													★	☆					
	TNMG330924	33	19.05	9.525	7.94	2.4			☆	★	○													★	☆					

★ Recommended grade (always stock available) ☆ Available grade ○ Make-to-order

TURNING General Turning Inserts Carbide inserts

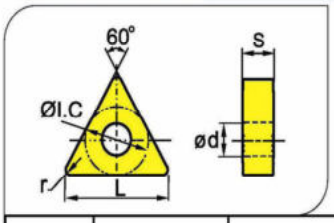
TN□□ (Negative inserts)



Inserts shape	Type	Dimensions(mm)					Coated cemented carbide																		Cemented carbide				
							P						M						K										
		L	φI.C	S	φd	r	SD4015	SD4115	SD4025	SD4125	SD4035	SD4135	SD1015	SD1025	SD1035	SD1045	SD4330	SD4340	SD4350	SD3105	SD3205	SD3115	SD3215	SD3125	SD3225	SP302	SP402	SK002	SK102	SK202
GM	TNMG110304-GM	11	6.35	3.18	2.26	0.4		☆	☆	★												☆								
	TNMG110308-GM	11	6.35	3.18	2.26	0.8		☆	☆	★	○											☆								
	TNMG160404-GM	16.5	9.525	4.76	3.81	0.4		☆	☆	★												☆								
	TNMG160408-GM	16.5	9.525	4.76	3.81	0.8		☆	☆	★												☆								
	TNMG160412-GM	16.5	9.525	4.76	3.81	1.2		☆	☆	★	○											☆								
	TNMG220408-GM	22	12.7	4.76	5.16	0.8		☆	☆	★												☆								
	TNMG220412-GM	22	12.7	4.76	5.16	1.2		○	☆	★	○											☆								
Semi-finishing	TNMG220416-GM	22	12.7	4.76	5.16	1.6		○	☆	★	○											☆								
GS	TNMG160404-GS	16.5	9.525	4.76	3.81	0.4	○	☆	☆	★																				
	TNMG160408-GS	16.5	9.525	4.76	3.81	0.8	○	☆	☆	★																				
	TNMG160412-GS	16.5	9.525	4.76	3.81	1.2	○	☆	☆	★	★																			
	TNMG220408-GS	22	12.7	4.76	5.16	0.8	○	☆	☆	★	★																			
	TNMG220412-GS	22	12.7	4.76	5.16	1.2	○	○	☆	★	★																			
Semi-finishing	TNMG220416-GS	22	12.7	4.76	5.16	1.6	○	○	☆	★	○																			
BM	TNMG110304-BM	11	6.35	3.18	2.26	0.4							○	★				★												
	TNMG110308-BM	11	6.35	3.18	2.26	0.8							○	★				★												
	TNMG160404-BM	16.5	9.525	4.76	3.81	0.4							○	★				★												
	TNMG160408-BM	16.5	9.525	4.76	3.81	0.8							○	★				★												
	TNMG160412-BM	16.5	9.525	4.76	3.81	1.2							○	★				★												
	TNMG220408-BM	22	12.7	4.76	5.16	0.8							○	★				★												
	TNMG220412-BM	22	12.7	4.76	5.16	1.2							○	★				★												
Semi-finishing	TNMG220416-BM	22	12.7	4.76	5.16	1.6							○	★				★												

★ Recommended grade (always stock available) ☆ Available grade ○ Make-to-order

TN□□ (Negative inserts)

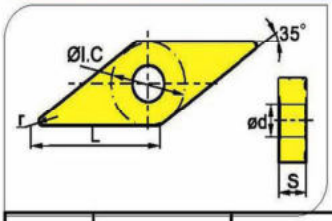


Inserts shape	Type	Dimensions(mm)					Coated cemented carbide																Cemented carbide				
							P						M						K								
		L	φI.C	S	φd	r	SD4015	SD4115	SD4025	SD4125	SD4035	SD4135	SD1015	SD1025	SD1035	SD1045	SD4330	SD4340	SD4350	SD3105	SD3205	SD3115	SD3215	SD3125	SD3225	SP302	SP402	SK002	SK102	SK202
GF	TNMG160404-GF	16.5	9.525	4.76	3.81	0.4	☆	★	○	☆																			
	TNMG160408-GF	16.5	9.525	4.76	3.81	0.8	☆	★	○	☆																			
	TNMG160412-GF	16.5	9.525	4.76	3.81	1.2	☆	★	○	☆																			
	TNMG220408-GF	22	12.7	4.76	5.16	0.8	☆	★	○	☆																			
Finishing	TNMG220412-GF	22	12.7	4.76	5.16	1.2	☆	★	○	☆																			
BF	TNMG110304-BF	11	6.35	3.18	2.26	0.4								★			☆												
	TNMG110308-BF	11	6.35	3.18	2.26	0.8								★			☆												
	TNMG160404-BF	16.5	9.525	4.76	3.81	0.4								★			☆												
	TNMG160408-BF	16.5	9.525	4.76	3.81	0.8								★			☆												
	TNMG160412-BF	16.5	9.525	4.76	3.81	1.2								★			☆												
	TNMG220404-BF	22	12.7	4.76	5.16	0.4								★			☆												
	TNMG220408-BF	22	12.7	4.76	5.16	0.8								★			☆												
Finishing	TNMG220412-BF	22	12.7	4.76	5.16	1.2								★			☆												

★ Recommended grade (always stock available) ☆ Available grade ○ Make-to-order

TURNING General Turning Inserts
Carbide inserts

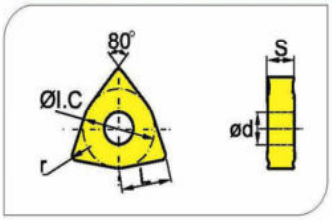
VN□□ (Negative inserts)



Inserts shape	Type	Dimensions(mm)					Coated cemented carbide																Cemented carbide				
							P						M						K								
		L	φI.C	S	φd	r	SD4015	SD4115	SD4025	SD4125	SD4035	SD4135	SD1015	SD1025	SD1035	SD1045	SD4330	SD4340	SD4350	SD3105	SD3205	SD3115	SD3215	SD3125	SD3225	SP302	SP402	SK002	SK102	SK202
For Chipbreaker	VNMG160404	16.6	9.525	4.76	3.81	0.4	○	☆	☆	★										○		★								
	VNMG160408	16.6	9.525	4.76	3.81	0.8	○	☆	☆	★										○		★								
GM	VNMG160408-GM	16.6	9.525	4.76	3.81	0.8	○	☆	☆	★																				
	VNMG160412-GM	16.6	9.525	4.76	3.81	1.2	○	☆	☆	★																				
Semi-finishing																														
BM	VNMG160404-BM	16.6	9.525	4.76	3.81	0.4							○	★				★												
	VNMG160408-BM	16.6	9.525	4.76	3.81	0.8							○	★				★												
Semi-finishing																														
GF	VNMG160404-GF	16.6	9.525	4.76	3.81	0.4	○	☆	☆	★			○																	
	VNMG160408-GF	16.6	9.525	4.76	3.81	0.8	○	☆	☆	★	○		○																	
Finishing																														
BF	VNMG160404-BF	16.6	9.525	4.76	3.81	0.4							○	★																
	VNMG160408-BF	16.6	9.525	4.76	3.81	0.8							○	★																
	VNMG160412-BF	16.6	9.525	4.76	3.81	1.2							○	★																
Finishing																														

★ Recommended grade (always stock available) ☆ Available grade ○ Make-to-order

WN□□ (Negative inserts)

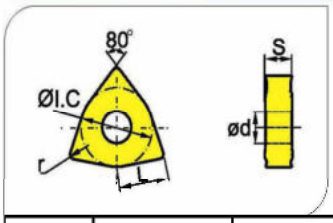


Inserts shape	Type	Dimensions(mm)					Coated cemented carbide																Cemented carbide				
							P						M						K									
		L	φI.C	S	φd	r	SD4015	SD4115	SD4025	SD4125	SD4035	SD4135	SD1015	SD1025	SD1035	SD1045	SD4330	SD4340	SD4350	SD3105	SD3205	SD3115	SD3215	SD3125	SD3225	SP302	SP402	SK002	SK102	SK202
GR	WNMG060408-GR	6.5	9.525	4.76	3.81	0.8			○	☆	☆	★																		
	WNMG060412-GR	6.5	9.525	4.76	3.81	1.2			○	☆	☆	★																		
	WNMG080408-GR	8.7	12.7	4.76	5.16	0.8			○	☆	☆	★																		
	WNMG080412-GR	8.7	12.7	4.76	5.16	1.2			○	☆	☆	★																		
For roughing	WNMG080416-GR	8.7	12.7	4.76	5.16	1.6			○	☆	☆	★																		
BR	WNMG060408-BR	6.5	9.525	4.76	3.81	0.8							○	★					☆											
	WNMG060412-BR	6.5	9.525	4.76	3.81	1.2							○	★					☆											
	WNMG080408-BR	8.7	12.7	4.76	5.16	0.8							○	★					☆											
	WNMG080412-BR	8.7	12.7	4.76	5.16	1.2							○	★					☆											
For roughing	WNMG080416-BR	8.7	12.7	4.76	5.16	1.6							○	★					☆											
ZR	WNMG060412-ZR	6.5	9.525	4.76	3.81	1.2			○													★	☆	○						
	WNMG080408-ZR	8.7	12.7	4.76	5.16	0.8			○													★	☆	○						
	WNMG080412-ZR	8.7	12.7	4.76	5.16	1.2			○													★	☆	○						
For roughing	WNMG080416-ZR	8.7	12.7	4.76	5.16	1.6			○													★	☆							
Without Chipbreaker	WNMA06T308	6.5	9.525	3.97	3.81	0.8	○	○	☆	★												★	☆	○						☆
	WNMA060404	6.5	9.525	4.76	3.81	0.4	○	○	☆	★												★	☆							☆
	WNMA060408	6.5	9.525	4.76	3.81	0.8	○	○	☆	★												★	☆							☆
	WNMA060412	6.5	9.525	4.76	3.81	1.2	○	○	☆	★												★	☆							☆
	WNMA080404	8.7	12.7	4.76	5.16	0.4	○	○	☆	★												★	☆							☆
	WNMA080408	8.7	12.7	4.76	5.16	0.8	○	○	☆	★												★	☆							☆
	WNMA080412	8.7	12.7	4.76	5.16	1.2	○	○	☆	★												★	☆							☆
	WNMA080416	8.7	12.7	4.76	5.16	1.6	○	○	☆	★												★	☆	○						☆

★ Recommended grade (always stock available) ☆ Available grade ○ Make-to-order

TURNING General Turning Inserts Carbide inserts

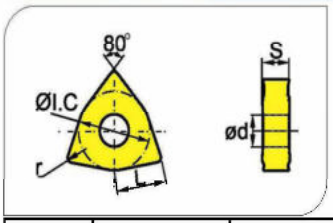
WN□□ (Negative inserts)



Inserts shape	Type	Dimensions(mm)					Coated cemented carbide																		Cemented carbide				
							P						M						K										
		L	ϕI.C	S	ϕd	r	SD4015	SD4115	SD4025	SD4125	SD4035	SD4135	SD1015	SD1025	SD1035	SD1045	SD4330	SD4340	SD4350	SD3105	SD3205	SD3115	SD3215	SD3125	SD3225	SP302	SP402	SK002	SK102	SK202
For Chipbreaker	WNMG060408	6.5	9.525	4.76	3.81	0.8	○		☆	★										☆		★								
	WNMG060412	6.5	9.525	4.76	3.81	1.2			☆	★	○									☆		★								
	WNMG080408	8.7	12.7	4.76	5.16	0.8	○		☆	★										☆		★								
	WNMG080412	8.7	12.7	4.76	5.16	1.2			☆	★	○									☆		★		○						
	WNMG080416	8.7	12.7	4.76	5.16	1.6			☆	★	○									☆		★		○						
GM	WNMG060408-GM	6.5	9.525	4.76	3.81	0.8	○		☆	★										○		☆					☆			
	WNMG060412-GM	6.5	9.525	4.76	3.81	1.2	○		☆	★										○		☆					☆			
	WNMG080404-GM	8.7	12.7	4.76	5.16	0.4	○		☆	★										○		☆					☆			
	WNMG080408-GM	8.7	12.7	4.76	5.16	0.8	○		☆	★										○		☆					☆			
	WNMG080412-GM	8.7	12.7	4.76	5.16	1.2			☆	★										○		☆					☆			
	WNMG080416-GM	8.7	12.7	4.76	5.16	1.6			☆	★										○		☆					☆			
Semi-finishing	WNMG080608-GM	8.7	12.7	6.35	5.16	0.8			☆	★																				
BM	WNMG06T304-BM	6.5	9.525	3.97	3.81	0.4							○	★				☆												
	WNMG06T308-BM	6.5	9.525	3.97	3.81	0.8							○	★				☆												
	WNMG06T312-BM	6.5	9.525	3.97	3.81	1.2							○	★				☆												
	WNMG060404-BM	6.5	9.525	4.76	3.81	0.4							○	★				☆												
	WNMG060408-BM	6.5	9.525	4.76	3.81	0.8							○	★				☆												
	WNMG080404-BM	8.7	12.7	4.76	5.16	0.4							○	★				☆												
	WNMG080408-BM	8.7	12.7	4.76	5.16	0.8							○	★				☆												
Semi-finishing	WNMG080412-BM	8.7	12.7	4.76	5.16	1.2							○	★				☆												

★ Recommended grade (always stock available) ☆ Available grade ○ Make-to-order

WN□□ (Negative inserts)

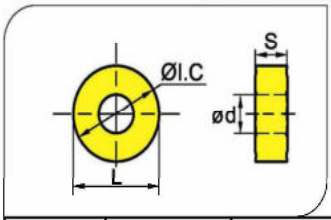


Inserts shape	Type	Dimensions(mm)					Coated cemented carbide																		Cemented carbide				
							P						M						K										
		L	φI.C	S	φd	r	SD4015	SD4115	SD4025	SD4125	SD4035	SD4135	SD1015	SD1025	SD1035	SD1045	SD4330	SD4340	SD4350	SD3105	SD3205	SD3115	SD3215	SD3125	SD3225	SP302	SP402	SK002	SK102	SK202
GF	WNMG06T304-GF	6.5	9.525	3.97	3.81	0.4	☆	★	○	☆																			
	WNMG06T308-GF	6.5	9.525	3.97	3.81	0.8	☆	★	○	☆																			
	WNMG06T312-GF	6.5	9.525	3.97	3.81	1.2	☆	★	○	☆																			
	WNMG060404-GF	6.5	9.525	4.76	3.81	0.4	☆	★	○	☆																			
	WNMG060408-GF	6.5	9.525	4.76	3.81	0.8	☆	★	○	☆																			
	WNMG060412-GF	6.5	9.525	4.76	3.81	1.2	☆	★	○	☆																			
	WNMG080404-GF	8.7	12.7	4.76	5.16	0.4	☆	★	○	☆																			
	WNMG080408-GF	8.7	12.7	4.76	5.16	0.8	☆	★	○	☆																			
Finishing	WNMG080412-GF	8.7	12.7	4.76	5.16	1.2	☆	★	○	☆																			
BF	WNMG06T304-BF	6.5	9.525	3.97	3.81	0.4							○	★			☆												
	WNMG06T308-BF	6.5	9.525	3.97	3.81	0.8							○	★			☆												
	WNMG06T312-BF	6.5	9.525	3.97	3.81	1.2							○	★			☆												
	WNMG060404-BF	6.5	9.525	4.76	3.81	0.4							○	★			☆												
	WNMG060408-BF	6.5	9.525	4.76	3.81	0.8							○	★			☆												
	WNMG080404-BF	8.7	12.7	4.76	5.16	0.4							○	★			☆												
Finishing	WNMG080408-BF	8.7	12.7	4.76	5.16	0.8							○	★			☆												

★ Recommended grade (always stock available) ☆ Available grade ○ Make-to-order

TURNING General Turning Inserts
Carbide inserts

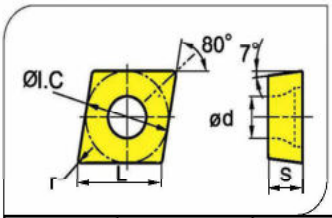
RN□□ (Negative inserts)



Inserts shape	Type	Dimensions(mm)				Coated cemented carbide																		Cemented carbide				
						P						M							K									
		L	φI.C	S	φd	SD4015	SD4115	SD4025	SD4125	SD4035	SD4135	SD1015	SD1025	SD1035	SD1045	SD4330	SD4340	SD4350	SD3105	SD3205	SD3115	SD3215	SD3125	SD3225	SP302	SP402	SK002	SK102	SK202
Without Chipbreaker	RNMA120400	12.7	12.7	4.76	5.16			☆	☆												☆		○						

★ Recommended grade (always stock available) ☆ Available grade ○ Make-to-order

CC□□ (Positive insert)

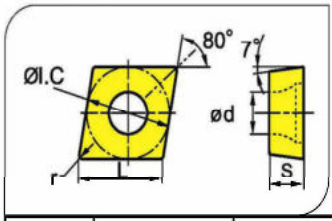


Inserts shape	Type	Dimensions(mm)					Coated cemented carbide																Cemented carbide				
							P						M						K									
		L	φI.C	S	φd	r	SD4015	SD4115	SD4025	SD4125	SD4035	SD4135	SD1015	SD1025	SD1035	SD1045	SD4330	SD4340	SD4350	SD3105	SD3205	SD3115	SD3215	SD3125	SD3225	SP302	SP402	SK002	SK102	SK202
HR	CCMT09T308-HR	9.7	9.525	3.97	4.4	0.8	○	○	☆	★														☆						
	CCMT09T312-HR	9.7	9.525	3.97	4.4	1.2	○	○	☆	★														☆						
	CCMT120408-HR	12.9	12.7	4.76	5.56	0.8	○	○	☆	★														☆						
For roughing	CCMT120412-HR	12.9	12.7	4.76	5.56	1.2	○	○	☆	★														☆						
HM	CCMT060204-HM	6.4	6.35	2.38	2.8	0.4	○	○	☆	★				○								☆								
	CCMT060208-HM	6.4	6.35	2.38	2.8	0.8	○	○	☆	★				○								☆								
	CCMT09T304-HM	9.7	9.525	3.97	4.4	0.4	○	○	☆	★				○								☆								
	CCMT09T308-HM	9.7	9.525	3.97	4.4	0.8	○	○	☆	★				○								☆								
	CCMT120404-HM	12.9	12.7	4.76	5.56	0.4	○	○	☆	★				○								☆								
	CCMT120408-HM	12.9	12.7	4.76	5.56	0.8	○	○	☆	★				○								☆								
Semi-finishing	CCMT120412-HM	12.9	12.7	4.76	5.56	1.2	○	○	☆	★				○								☆								
BM	CCMT060204-BM	6.4	6.35	2.38	2.8	0.4								★				☆												
	CCMT060208-BM	6.4	6.35	2.38	2.8	0.8								★				☆												
	CCMT09T304-BM	9.7	9.525	3.97	4.4	0.4								★				☆												
	CCMT09T308-BM	9.7	9.525	3.97	4.4	0.8								★				☆												
	CCMT120408-BM	12.9	12.7	4.76	5.56	0.8								★				☆												
Semi-finishing	CCMT120412-BM	12.9	12.7	4.76	5.56	1.2								★				☆												

★ Recommended grade (always stock available) ☆ Available grade ○ Make-to-order

General Turning Inserts
Carbide inserts

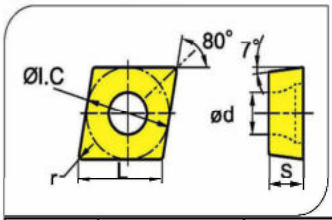
CC□□ (Positive insert)



Inserts shape	Type	Dimensions(mm)					Coated cemented carbide																Cemented carbide				
							P						M						K									
		L	φI.C	S	φd	r	SD4015	SD4115	SD4025	SD4125	SD4035	SD4135	SD1015	SD1025	SD1035	SD1045	SD4330	SD4340	SD4350	SD3105	SD3205	SD3115	SD3215	SD3125	SD3225	SP302	SP402	SK002	SK102	SK202
HF	CCGT060202-HF	6.4	6.35	2.38	2.8	0.2	☆	★	☆																				
	CCGT060204-HF	6.4	6.35	2.38	2.8	0.4	☆	★	☆																				
	CCGT060208-HF	6.4	6.35	2.38	2.8	0.8	☆	★	☆																				
	CCGT09T302-HF	9.7	9.525	3.97	4.4	0.2	☆	★	☆																				
	CCGT09T304-HF	9.7	9.525	3.97	4.4	0.4	☆	★	☆																				
	CCGT09T308-HF	9.7	9.525	3.97	4.4	0.8	☆	★	☆																				
	CCGT120404-HF	12.9	12.7	4.76		0.4	☆	★	☆																				
Finishing	CCGT120408-HF	12.9	12.7	4.76	.56	0.8	☆	★	☆																				
BF	CCGT060202-BF	6.4	6.35	2.38	2.8	0.2							☆	★				☆											
	CCGT060204-BF	6.4	6.35	2.38	2.8	0.4							☆	★				☆											
	CCGT09T302-BF	9.7	9.525	3.97	4.4	0.2							☆	★				☆											
	CCGT09T304-BF	9.7	9.525	3.97	4.4	0.4							☆	★				☆											
	CCGT09T308-BF	9.7	9.525	3.97	4.4	0.8							☆	★				☆											
	CCGT120404-BF	12.9	12.7	4.76	.56	0.4							☆	★				☆											
Finishing	CCGT120408-BF	12.9	12.7	4.76	.56	0.8							☆	★				☆											

★ Recommended grade (always stock available) ☆ Available grade ○ Make-to-order

CC□□ (Positive insert)

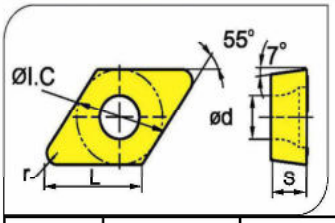


Inserts shape	Type	Dimensions(mm)					Coated cemented carbide																Cemented carbide				
							P						M						K								
		L	ϕI.C	S	ϕd	r	SD4015	SD4115	SD4025	SD4125	SD4035	SD4135	SD1015	SD1025	SD1035	SD1045	SD4330	SD4340	SD4350	SD3105	SD3205	SD3115	SD3215	SD3125	SD3225	SP302	SP402	SK002	SK102	SK202
AC	CCGX060202-AC	6.4	6.35	2.38	2.8	0.2																					☆	★	
	CCGX060204-AC	6.4	6.35	2.38	2.8	0.4																					☆	★	
	CCGX060208-AC	6.4	6.35	2.38	2.8	0.8																					☆	★	
	CCGX09T302-AC	9.7	9.525	3.97	4.4	0.2																					☆	★	
	CCGX09T304-AC	9.7	9.525	3.97	4.4	0.4																					☆	★	
	CCGX09T308-AC	9.7	9.525	3.97	4.4	0.8																					☆	★	
	CCGX120402-AC	12.9	12.7	4.76	5.56	0.2																					☆	★	
	CCGX120404-AC	12.9	12.7	4.76	5.56	0.4																					☆	★	
	CCGX120408-AC	12.9	12.7	4.76	5.56	0.8																					☆	★	
For Aluminium	CCGX120412-AC	12.9	12.7	4.76	5.56	1.2																					☆	★	
AH	CCGX060204-AH	6.4	6.35	2.38	2.8	0.4																					☆	★	
	CCGX060208-AH	6.4	6.35	2.38	2.8	0.8																					☆	★	
	CCGX09T308-AH	9.7	9.525	3.97	4.4	0.8																					☆	★	
	CCGX120402-AH	12.9	12.7	4.76	5.56	0.2																					☆	★	
	CCGX120408-AH	12.9	12.7	4.76	5.56	0.8																					☆	★	
For Aluminium	CCGX120412-AH	12.9	12.7	4.76	5.56	1.2																					☆	★	
Without Chipbreaker	CCGW060204	6.4	6.35	2.38	2.8	0.4	○	○	☆	★												★	☆						☆
	CCGW09T304	9.7	9.525	3.97	4.4	0.4	○	○	☆	★												★	☆						☆
	CCGW09T308	9.7	9.525	3.97	4.4	0.8	○	○	☆	★												★	☆						☆
	CCGW120404	12.9	12.7	4.76	5.56	0.4	○	○	☆	★												★	☆						☆
	CCGW120408	12.9	12.7	4.76	5.56	0.8	○	○	☆	★												★	☆						☆

★ Recommended grade (always stock available) ☆ Available grade ○ Make-to-order

TURNING General Turning Inserts Carbide inserts

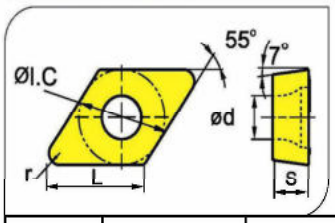
DC□□ (Positive insert)



Inserts shape	Type	Dimensions(mm)					Coated cemented carbide																		Cemented carbide				
							P						M						K										
		L	ϕI.C	S	ϕd	r	SD4015	SD4115	SD4025	SD4125	SD4035	SD4135	SD1015	SD1025	SD1035	SD1045	SD4330	SD4340	SD4350	SD3105	SD3205	SD3115	SD3215	SD3125	SD3225	SP302	SP402	SK002	SK102	SK202
HR	DCMT070208-HR	7.8	6.35	2.38	2.8	0.8	○		☆	★		☆										○							
	DCMT070212-HR	7.8	6.35	2.38	2.8	1.2	○		☆	★		☆										○							
	DCMT11T304-HR	11.6	9.525	3.97	4.4	0.4	○		☆	★		☆										○							
	DCMT11T308-HR	11.6	9.525	3.97	4.4	0.8	○		☆	★		☆	★									○							
For roughing	DCMT11T312-HR	11.6	9.525	3.97	4.4	1.2	○		☆	★		☆										○							
HM	DCMT070204-HM	7.8	6.35	2.38	2.8	0.4	○		☆	★												○							
	DCMT070208-HM	7.8	6.35	2.38	2.8	0.8	○		☆	★												○							
	DCMT11T304-HM	11.6	9.525	3.97	4.4	0.4	○		☆	★												○							
	DCMT11T308-HM	11.6	9.525	3.97	4.4	0.8	○		v	★												○							
Semi-finishing	DCMT11T312-HM	11.6	9.525	3.97	4.4	1.2	○		☆	★												○							
BM	DCMT070204-BM	7.8	6.35	2.38	2.8	0.4							○	★				★											
	DCMT070208-BM	7.8	6.35	2.38	2.8	0.8							○	★				★											
	DCMT11T304-BM	11.6	9.525	3.97	4.4	0.4							○	★				★											
Semi-finishing	DCMT11T308-BM	11.6	9.525	3.97	4.4	0.8							○	★				★											
HF	DCGT070202-HF	7.8	6.35	2.38	2.8	0.2	☆	★	☆													○							
	DCGT070204-HF	7.8	6.35	2.38	2.8	0.4	☆	★	☆													○							
	DCGT070208-HF	7.8	6.35	2.38	2.8	0.8	☆	★	☆													○							
	CCGT09T302-HF	11.6	9.525	3.97	4.4	0.2	☆	★	☆													○							
	CCGT09T304-HF	11.6	9.525	3.97	4.4	0.4	☆	★	☆													○							
finishing	CCGT09T308-HF	11.6	9.525	3.97	4.4	0.8	☆	★	☆													○							

★ Recommended grade (always stock available) ☆ Available grade ○ Make-to-order

DC□□ (Positive insert)

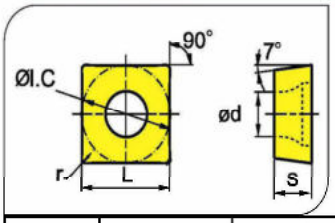


Inserts shape	Type	Dimensions(mm)					Coated cemented carbide																Cemented carbide				
							P						M						K								
		L	ϕI.C	S	ϕd	r	SD4015	SD4115	SD4025	SD4125	SD4035	SD4135	SD1015	SD1025	SD1035	SD1045	SD4330	SD4340	SD4350	SD3105	SD3205	SD3115	SD3215	SD3125	SD3225	SP302	SP402	SK002	SK102	SK202
BF	DCGT070202-BF	7.8	6.35	2.38	2.8	0.2							○	★																
	DCGT070204-BF	7.8	6.35	2.38	2.8	0.4							○	★																
	DCGT11T302-BF	11.6	9.525	3.97	4.4	0.2							○	★																
	DCGT11T304-BF	11.6	9.525	3.97	4.4	0.4							○	★																
Finishing	DCGT11T308-BF	11.6	9.525	3.97	4.4	0.8							○	★																
AC	DCGX070202-AC	7.8	6.35	2.38	2.8	0.2																						☆	★	
	DCGX070204-AC	7.8	6.35	2.38	2.8	0.4																						☆	★	
	DCGX11T302-AC	11.6	9.525	3.97	4.4	0.2																						☆	★	
	DCGX11T304-AC	11.6	9.525	3.97	4.4	0.4																						☆	★	
For Aluminium	DCGX11T308-AC	11.6	9.525	3.97	4.4	0.8																						☆	★	
AH	DCGX070204-AH	7.8	6.35	2.38	2.8	0.4																						☆	★	
	DCGX070208-AH	7.8	6.35	2.38	2.8	0.8																						☆	★	
	DCGX11T304-AH	11.6	9.525	3.97	4.4	0.4																						☆	★	
	DCGX11T308-AH	11.6	9.525	3.97	4.4	0.8																						☆	★	
For Aluminium	DCGX11T312-AH	11.6	9.525	3.97	4.4	1.2																						☆	★	
Without Chipbreaker	DCGW070204	7.8	6.35	2.38	2.8	0.4	○	○	☆	★												★		○						☆
	DCGW11T304	11.6	9.525	3.97	4.4	0.4	○	○	☆	★												★		○						☆
	DCGW11T308	11.6	9.525	3.97	4.4	0.8	○	○	☆	★												★		○						☆

★ Recommended grade (always stock available) ☆ Available grade ○ Make-to-order

TURNING General Turning Inserts Carbide inserts

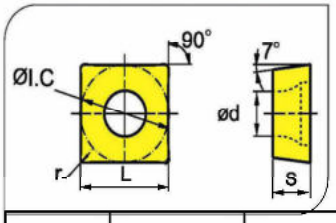
SC□□ (Positive insert)



Inserts shape	Type	Dimensions(mm)					Coated cemented carbide																Cemented carbide				
							P						M							K								
		L	ϕI.C	S	ϕd	r	SD4015	SD4115	SD4025	SD4125	SD4035	SD4135	SD1015	SD1025	SD1035	SD1045	SD4330	SD4340	SD4350	SD3105	SD3205	SD3115	SD3215	SD3125	SD3225	SP302	SP402	SK002	SK102	SK202
HR	SCMT09T308-HR	9.525	9.525	3.97	4.4	0.8			☆	★	☆	☆										○								
	SCMT09T312-HR	9.525	9.525	3.97	4.4	1.2			☆	★	☆	☆										○								
	SCMT120408-HR	12.7	12.7	4.76	5.56	0.8			☆	★	☆	☆										○								
For roughing	SCMT120412-HR	12.7	12.7	4.76	5.56	1.2			☆	★	☆	☆										○								
HM	SCMT09T304-HM	9.525	9.525	3.97	4.4	0.4	○		☆	★												○								
	SCMT09T308-HM	9.525	9.525	3.97	4.4	0.8	○		☆	★												○								
	SCMT120404-HM	12.7	12.7	4.76	5.56	0.4	○		☆	★												○								
	SCMT120408-HM	12.7	12.7	4.76	5.56	0.8	○		☆	★												○								
Semi-finishing	SCMT120412-HM	12.7	12.7	4.76	5.56	1.2	○		☆	★																				
BM	SCMT09T304-BM	9.525	9.525	3.97	4.4	0.4							○	★				☆												
	SCMT09T308-BM	9.525	9.525	3.97	4.4	0.8							○	★				☆												
	SCMT120404-BM	12.7	12.7	4.76	5.56	0.4							○	★				☆												
	SCMT120408-BM	12.7	12.7	4.76	5.56	0.8							○	★				☆												
Semi-finishing	SCMT120412-BM	12.7	12.7	4.76	5.56	1.2							○	★				☆												
HF	SCGT09T302-HF	9.525	9.525	3.97	4.4	0.2	☆	★	☆	☆										○										
	SCGT09T304-HF	9.525	9.525	3.97	4.4	0.4	☆	★	☆	☆										○										
	SCGT09T304-HF	9.525	9.525	3.97	4.4	0.8	☆	★	☆	☆										○										
finishing																														
BF	SCGT09T302-BF	9.525	9.525	3.97	4.4	0.2							○	★				☆												
	SCGT09T304-BF	9.525	9.525	3.97	4.4	0.4							○	★				☆												
	SCGT09T304-BF	9.525	9.525	3.97	4.4	0.8							○	★				☆												
finishing																														

★ Recommended grade (always stock available) ☆ Available grade ○ Make-to-order

SC□□ (Positive insert)

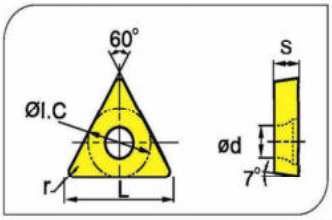


Inserts shape	Type	Dimensions(mm)					Coated cemented carbide																		Cemented carbide				
							P					M							K											
		L	φI.C	S	φd	r	SD4015	SD4115	SD4025	SD4125	SD4035	SD4135	SD1015	SD1025	SD1035	SD1045	SD4330	SD4340	SD4350	SD3105	SD3205	SD3115	SD3215	SD3125	SD3225	SP302	SP402	SK002	SK102	SK202
AC	SCGX09T302-AC	9.525	9.525	3.97	4.4	0.2																★		○				☆	★	
	SCGX09T304-AC	9.525	9.525	3.97	4.4	0.4																★		○				☆	★	
	SCGX09T308-AC	9.525	9.525	3.97	4.4	0.8																★		○				☆	★	
	SCGX120404-AC	12.7	12.7	4.76	5.56	0.4																★		○				☆	★	
For Aluminium	SCGX120408-AC	12.7	12.7	4.76	5.56	0.8																★		○				☆	★	
AH	SCGX09T304-AH	9.525	9.525	3.97	4.4	0.4																★		○				☆	★	
	SCGX09T308-AH	9.525	9.525	3.97	4.4	0.8																★		○				☆	★	
	SCGX120404-AH	12.7	12.7	4.76	5.56	0.4																★		○				☆	★	
	SCGX120408-AH	12.7	12.7	4.76	5.56	0.8																★		○				☆	★	
For Aluminium	SCGX120412-AH	12.7	12.7	4.76	5.56	1.2																★		○				☆	★	
Without Chipbreaker	SCGW09T302	9.525	9.525	3.97	4.4	0.2	○	○	☆	★												★		○						☆
	SCGW09T304	9.525	9.525	3.97	4.4	0.4	○	○	☆	★												★		○						☆
	SCGW09T308	9.525	9.525	3.97	4.4	0.8	○	○	☆	★												★		○						☆
	SCGW120404	12.7	12.7	4.76	5.56	0.4	○	○	☆	★												★		○						☆
	SCGW120408	12.7	12.7	4.76	5.56	0.8	○	○	☆	★												★		○						☆
	SCGW120412	12.7	12.7	4.76	5.56	1.2	○	○	☆	★												★		○						☆

★ Recommended grade (always stock available) ☆ Available grade ○ Make-to-order

TURNING General Turning Inserts
Carbide inserts

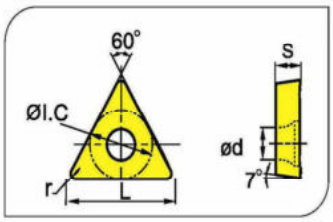
TC□□ (Positive insert)



Inserts shape	Type	Dimensions(mm)					Coated cemented carbide																		Cemented carbide				
							P						M							K										
		L	φI.C	S	φd	r	SD4015	SD4115	SD4025	SD4125	SD4035	SD4135	SD1015	SD1025	SD1035	SD1045	SD4330	SD4340	SD4350	SD3105	SD3205	SD3115	SD3215	SD3125	SD3225	SP302	SP402	SK002	SK102	SK202
HR	TCMT090208-HR	9.6	5.56	2.38	2.5	0.8			○	☆	☆	★										○								
	TCMT110208-HR	11.0	6.35	2.38	2.8	0.8			○	☆	☆	★										○								
	TCMT110212-HR	11.0	6.35	2.38	2.8	1.2			○	☆	☆	★										○								
	TCMT16T308-HR	16.5	9.525	3.97	4.4	0.8			○	☆	☆	★										○								
For roughing	TCMT16T312-HR	16.5	9.525	3.97	4.4	1.2			○	☆	☆	★										○								
HM	TCMT090204-HM	9.6	5.56	2.38	2.5	0.4	○	☆	☆	★												○								
	TCMT090208-HM	9.6	5.56	2.38	2.5	0.8	○	☆	☆	★												○								
	TCNT110204-HM	11.0	6.35	2.38	2.8	0.4	○	☆	☆	★												○								
	TCMT110208-HM	11.0	6.35	2.38	2.8	0.8	○	☆	☆	★												○								
	TCMT16T304-HM	16.5	9.525	3.97	4.4	0.4	○	☆	☆	★												○								
	TCMT16T308-HM	16.5	9.525	3.97	4.4	0.8	○	☆	☆	★												○								
Semi-finishing	TCMT16T312-HM	16.5	9.525	3.97	4.4	1.2	○	☆	☆	★												○								
BM	TCMT090204-BM	9.6	5.56	2.38	2.5	0.4							○	★				☆												
	TCMT090208-BM	9.6	5.56	2.38	2.5	0.8							○	★				☆												
	TCNT110204-BM	11.0	6.35	2.38	2.8	0.4							○	★				☆												
	TCMT110208-BM	11.0	6.35	2.38	2.8	0.8							○	★				☆												
	TCMT110212-BM	11.0	6.35	2.38	2.8	1.2							○	★				☆												
	TCMT16T304-BM	16.5	9.525	3.97	4.4	0.4							○	★				☆												
	TCMT16T308-BM	16.5	9.525	3.97	4.4	0.8							○	★				☆												
Semi-finishing	TCMT16T312-BM	16.5	9.525	3.97	4.4	1.2							○	★				☆												

★ Recommended grade (always stock available) ☆ Available grade ○ Make-to-order

TC□□ (Positive insert)

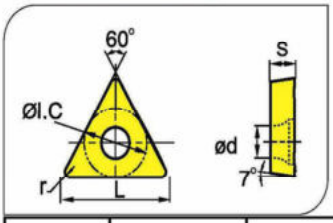


Inserts shape	Type	Dimensions(mm)					Coated cemented carbide																		Cemented carbide				
							P						M						K										
		L	φI.C	S	φd	r	SD4015	SD4115	SD4025	SD4125	SD4035	SD4135	SD1015	SD1025	SD1035	SD1045	SD4330	SD4340	SD4350	SD3105	SD3205	SD3115	SD3215	SD3125	SD3225	SP302	SP402	SK002	SK102	SK202
HF	TCGT06T104-HF	6.4	3.97	1.98	2.2	0.4	☆	★	○					○						○										
	TCGT06T108-HF	6.4	3.97	1.98	2.2	0.8	☆	★	○					○						○										
	TCGT090202-HF	9.6	5.56	2.38	2.5	0.2	☆	★	○					○						○										
	TCGT090204-HF	9.6	5.56	2.38	2.5	0.4	☆	★	○					○						○										
	TCGT090208-HF	9.6	5.56	2.38	2.5	0.8	☆	★	○					○						○										
	TCGT110202-HF	11.0	6.35	2.38	2.8	0.2	☆	★	○					○						○										
	TCGT110204-HF	11.0	6.35	2.38	2.8	0.4	☆	★	○					○						○										
	TCGT110208-HF	11.0	6.35	2.38	2.8	0.8	☆	★	○					○						○										
	TCGT16T302-HF	16.5	9.525	3.97	4.4	0.2	☆	★	○					○						○										
	TCGT16T304-HF	16.5	9.525	3.97	4.4	0.4	☆	★	○					○						○										
Finishing	TCGT16T308-HF	16.5	9.525	3.97	4.4	0.8	☆	★	○					○						○										
BF	TCGT090202-BF	9.6	5.56	2.38	2.5	0.2							○	★			☆													
	TCGT090204-BF	9.6	5.56	2.38	2.5	0.4							○	★			☆													
	TCGT110202-BF	11.0	6.35	2.38	2.8	0.2							○	★			☆													
	TCGT110204-BF	11.0	6.35	2.38	2.8	0.4							○	★			☆													
	TCGT110208-BF	11.0	6.35	2.38	2.8	0.8							○	★			☆													
	TCGT16T304-BF	16.5	9.525	3.97	4.4	0.4							○	★			☆													
Finishing	TCGT16T308-BF	16.5	9.525	3.97	4.4	0.8							○	★			☆													

★ Recommended grade (always stock available) ☆ Available grade ○ Make-to-order

TURNING General Turning Inserts
Carbide inserts

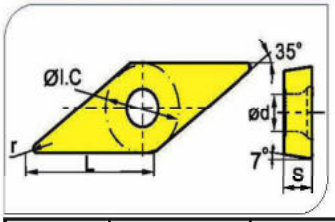
TC□□ (Positive insert)



Inserts shape	Type	Dimensions(mm)					Coated cemented carbide																		Cemented carbide			
							P						M						K										
		L	ϕI.C	S	ϕd	r	SD4015	SD4115	SD4025	SD4125	SD4035	SD4135	SD1015	SD1025	SD1035	SD1045	SD4330	SD4340	SD4350	SD3105	SD3205	SD3115	SD3215	SD3125	SD3225	SP302	SP402	SK002	SK102	SK202
AC	TCGX090202-AC	9.6	5.56	2.38	2.5	0.2																						☆	★	
	TCGX090204-AC	9.6	5.56	2.38	2.5	0.4																						☆	★	
	TCGX110202-AC	11.0	6.35	2.38	2.8	0.2																						☆	★	
	TCGX110204-AC	11.0	6.35	2.38	2.8	0.4																						☆	★	
	TCGX110208-AC	11.0	6.35	2.38	2.8	0.8																						☆	★	
	TCGX16T302-AC	16.5	9.525	3.97	4.4	0.2																						☆	★	
	TCGX16T304-AC	16.5	9.525	3.97	4.4	0.4																						☆	★	
For Aluminium	TCGX16T308-AC	16.5	9.525	3.97	4.4	0.8																						☆	★	
Without Chipbreaker	TCGW110204	11.0	6.35	2.38	2.8	0.4			☆	★	○											★	☆							
	TCGW16T304	16.5	9.525	3.97	4.4	0.4			☆	★	○											★	☆							
	TCGW16T308	16.5	9.525	3.97	4.4	0.8			☆	★	○											★	☆							
	TCGW16T312	16.5	9.525	3.97	4.4	1.2			☆	★	○											★	☆							

★ Recommended grade (always stock available) ☆ Available grade ○ Make-to-order

VC□□ (Positive insert)

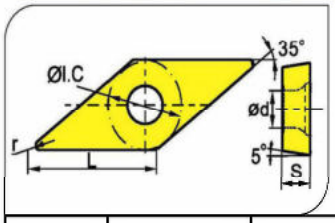


Inserts shape	Type	Dimensions(mm)					Coated cemented carbide																Cemented carbide				
							P						M						K								
		L	φI.C	S	φd	r	SD4015	SD4115	SD4025	SD4125	SD4035	SD4135	SD1015	SD1025	SD1035	SD1045	SD4330	SD4340	SD435C	SD3105	SD3205	SD3115	SD3215	SD3125	SD3225	SP302	SP402	SK002	SK102	SK202
HM	VCMT110304-HM	11	6.35	3.18	2.8	0.4	○		☆	★				○								○								
Semi-finishing																														
HF	VCGT110304-HF	11	6.35	3.18	2.8	0.4	☆	★	○					○						○										
finishing																														
AC	VCGX110202-AC	11	6.35	2.38	2.8	0.2																						☆	★	
	VCGX110204-AC	11	6.35	2.38	2.8	0.4																						☆	★	
	VCGX110301-AC	11	6.35	3.18	2.8	0.1																						☆	★	
	VCGX110302-AC	11	6.35	3.18	2.8	0.2																						☆	★	
	VCGX110304-AC	11	6.35	3.18	2.8	0.4																						☆	★	
	VCGX110308-AC	11	6.35	3.18	2.8	0.8																						☆	★	
	VCGX160402-AC	16.6	9.525	4.76	4.4	0.2																						☆	★	
	VCGX160404-AC	16.6	9.525	4.76	4.4	0.4																						☆	★	
	VCGX160408-AC	16.6	9.525	4.76	4.4	0.8																						☆	★	
	VCGX160412-AC	16.6	9.525	4.76	4.4	1.2																						☆	★	
For Aluminium	VCGX220530-AC	22	12.7	5.56	5.5	3.0																						☆	★	
Without Chipbreaker	VCGW110304	11	6.35	3.18	2.8	0.4	○		☆	★													★	☆						☆

★ Recommended grade (always stock available) ☆ Available grade ○ Make-to-order

TURNING General Turning Inserts
Carbide inserts

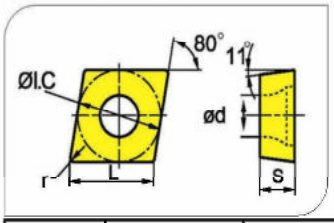
VB□□ (Positive insert)



Inserts shape	Type	Dimensions(mm)					Coated cemented carbide																Cemented carbide				
							P						M						K								
		L	ϕI.C	S	ϕd	r	SD4015	SD4115	SD4025	SD4125	SD4035	SD4135	SD1015	SD1025	SD1035	SD1045	SD4330	SD4340	SD4350	SD3105	SD3205	SD3115	SD3215	SD3125	SD3225	SP302	SP402	SK002	SK102	SK202
HM	VBMT160404-HM	16.5	9.525	4.76	4.4	0.4	○	☆	☆	★												○							
	VBMT160408-HM	16.5	9.525	4.76	4.4	0.8	○	☆	☆	★												○							
	VBMT160412-HM	16.5	9.525	4.76	4.4	1.2	○	☆	☆	★												○							
Semi-finishing																													
BM	VBMT110304-BM	11	6.35	3.18	2.8	0.4							○	★				☆											
	VBMT110308-BM	11	6.35	3.18	2.8	0.8							○	★				☆											
Semi-finishing																													
HF	VBGT110202-HF	11	6.35	2.38	2.8	0.2	☆	★	○	☆										○									
	VBGT110204-HF	11	6.35	2.38	2.8	0.4	☆	★	○	☆										○									
	VBGT110208-HF	11	6.35	2.38	2.8	0.8	☆	★	○	☆										○									
finishing																													
BF	VBMT110302-BF	11	6.35	3.18	2.8	0.2							○	★				☆											
	VBMT110304-BF	11	6.35	3.18	2.8	0.4							○	★				☆											
	VBMT110308-BF	11	6.35	3.18	2.8	0.8							○	★				☆											
	VBMT160404-BF	16.6	9.525	4.76	4.4	0.4							○	★				☆											
finishing	VBMT160408-BF	16.6	9.525	4.76	4.4	0.8							○	★				☆											
Without Chipbreaker	VBGW160404	16.6	9.525	4.76	4.4	0.4	○	○	☆	★												★							☆
	VBGW160408	16.6	9.525	4.76	4.4	0.8	○	○	☆	★												★							☆

★ Recommended grade (always stock available) ☆ Available grade ○ Make-to-order

CP□□ (Positive insert)

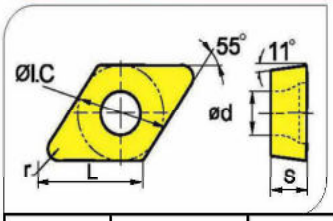


Inserts shape	Type	Dimensions(mm)					Coated cemented carbide																		Cemented carbide				
							P						M						K										
		L	φI.C	S	φd	r	SD4015	SD4115	SD4025	SD4125	SD4035	SD4135	SD1015	SD1025	SD1035	SD1045	SD4330	SD4340	SD435C	SD3105	SD3205	SD3115	SD3215	SD3125	SD3225	SP302	SP402	SK002	SK102	SK202
HM  Semi-finishing	CPMT060204-HM	6.4	6.35	2.38	2.8	0.4	○	☆	☆	★				○								○							
	CPMT09T304-HM	9.7	9.525	3.97	4.4	0.4	○	☆	☆	★				○								○							
HF  finishing	CPGT060202-HF	6.4	6.35	2.38	2.8	0.2	☆	★	○	☆			○							○										
	CPGT09T304-HF	9.7	9.525	3.97	4.4	0.4	☆	★	○	☆			○							○										
Without Chipbreaker 	CPGW060204	6.4	6.35	2.38	2.8	0.4	○	○	☆	★												★		○						☆

★ Recommended grade (always stock available) ☆ Available grade ○ Make-to-order

TURNING General Turning Inserts Carbide inserts

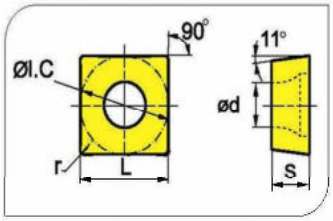
DP□□ (Positive insert)



Inserts shape	Type	Dimensions(mm)					Coated cemented carbide																		Cemented carbide				
							P						M							K										
		L	○I.C	S	⊕d	r	SD4015	SD4115	SD4025	SD4125	SD4035	SD4135	SD1015	SD1025	SD1035	SD1045	SD4330	SD4340	SD4350	SD3105	SD3205	SD3115	SD3215	SD3125	SD3225	SP302	SP402	SK002	SK102	SK202
HM	DPMT070204-HM	7.8	6.35	2.38	2.8	0.4	○	○	☆	★												○								
	DPMT070208-HM	7.8	6.35	2.38	2.8	0.8	○	○	☆	★												○								
	DPMT11T304-HM	11.6	9.525	3.97	4.4	0.4	○	○	☆	★												○								
Semi-finishing	DPMT11T308-HM	11.6	9.525	3.97	4.4	0.8	○	○	☆	★												○								
HF	DPGT070204-HF	7.8	6.35	2.38	2.8	0.4	☆	★	○	○										○										
	DPGT070208-HF	7.8	6.35	2.38	2.8	0.8	☆	★	○	○										○										
	DPGT11T304-HF	11.6	9.525	3.97	4.4	0.4	☆	★	○	○										○										
finishing	DPGT11T308-HF	11.6	9.525	3.97	4.4	0.8	☆	★	○	○										○										
Without Chipbreaker	DPGW11T304	11.6	9.525	3.97	4.4	0.4	○	○	☆	★										○		★								☆
	DPGW11T308	11.6	9.525	3.97	4.4	0.8	○	○	☆	★										○		★								☆

★ Recommended grade (always stock available) ☆ Available grade ○ Make-to-order

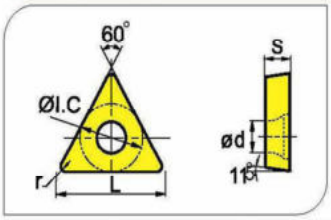
SP□□ (Positive insert)



Inserts shape	Type	Dimensions(mm)					Coated cemented carbide																		Cemented carbide				
							P						M						K										
		L	ϕI.C	S	ϕd	r	SD4015	SD4115	SD4025	SD4125	SD4035	SD4135	SD1015	SD1025	SD1035	SD1045	SD4330	SD4340	SD4350	SD3105	SD3205	SD3115	SD3215	SD3125	SD3225	SP302	SP402	SK002	SK102	SK202
HM	SPMT09T304-HM	9.525	9.525	3.97	4.4	0.4	○		☆	★																			
	SPMT09T308-HM	9.525	9.525	3.97	4.4	0.8	○		☆	★																			
	SPMT120404-HM	12.7	12.7	4.76	5.56	0.4	○		☆	★																			
	SPMT120408-HM	12.7	12.7	4.76	5.56	0.8	○		☆	★																			
Semi-finishing	SPMT120412-HM	12.7	12.7	4.76	5.56	1.2	○		☆	★																			
HF	SPGT09T302-HF	9.525	9.525	3.97	4.4	0.2	☆	★	○																				
	SPGT09T304-HF	9.525	9.525	3.97	4.4	0.4	☆	★	○																				
finishing	SPGT09T304-HF	9.525	9.525	3.97	4.4	0.8	☆	★	○																				
Without Chipbreaker	SPGW09T304	9.525	9.525	3.97	4.4	0.4			○	★												★							☆
	SPGW09T308	9.525	9.525	3.97	4.4	0.8			○	★												★							☆
	SPGW120408	12.7	12.7	4.76	5.56	0.8			○	★												★							☆

★ Recommended grade (always stock available) ☆ Available grade ○ Make-to-order

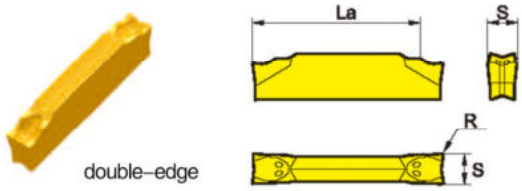
TP□□ (Positive insert)

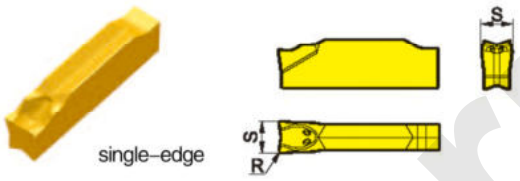


Inserts shape	Type	Dimensions(mm)					Coated cemented carbide																		Cemented carbide				
							P						M							K										
		L	ϕI.C	S	ϕd	r	SD4015	SD4115	SD4025	SD4125	SD4035	SD4135	SD1015	SD1025	SD1035	SD1045	SD4330	SD4340	SD4350	SD3105	SD3205	SD3115	SD3215	SD3125	SD3225	SP302	SP402	SK002	SK102	SK202
HM  Semi-finishing	TPMT090208-HM	9.6	5.56	2.38	2.5	0.8	○	○	☆	★												○								
	TPMT110202-HM	11.0	6.35	2.38	2.8	0.2	○	○	☆	★												○								
	TPMT110204-HM	11.0	6.35	2.38	2.8	0.4	○	○	☆	★												○								
	TPMT110208-HM	11.0	6.35	2.38	2.8	0.8	○	○	☆	★												○								
HF  finishing	TPGT090204-HF	9.6	5.56	2.38	2.5	0.4	☆	★	○	○												○								
	TPGT090208-HF	9.6	5.56	2.38	2.5	0.8	☆	★	○	○										○										
	TPGT110202-HF	11.0	6.35	2.38	2.8	0.2	☆	★	○	○										○										
	TPGT110204-HF	11.0	6.35	2.38	2.8	0.4	☆	★	○	○										○										
	TPGT110208-HF	11.0	6.35	2.38	2.8	0.8	☆	★	○	○										○										
Without Chipbreaker 	TPGW090204	9.6	6.35	2.38	2.5	0.4	○	○	☆	★										○										☆
	TPGW090208	9.6	6.35	2.38	2.5	0.8	○	○	☆	★										○		★								☆
	TPGW110304	11.0	6.350	3.18	2.8	0.4	○	○	☆	★										○		★								☆
	TPGW110308	11.0	6.350	3.18	2.8	0.8	○	○	☆	★										○		★								☆
	TPGW160308	16.5	9.525	3.18	2.8	0.8	○	○	☆	★										○		★								☆
	TPGW16T302	16.5	9.525	3.97	2.8	0.2	○	○	☆	★										○		★								☆
	TPGW220408	22.0	12.70	4.76	5.5	0.8	○	○	☆	★										○		★								☆

★ Recommended grade (always stock available) ☆ Available grade ○ Make-to-order

Cutting off inserts

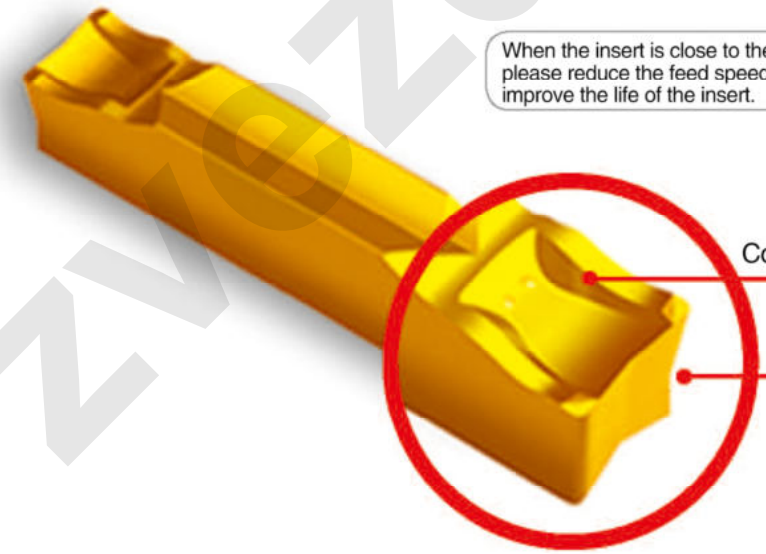




Type		Dimension(mm)			Grade				
					Coated carbide CVD		Coated carbide PVD		Non–coated carbide
		$S^{+0.1}_{0}$	R±0.1	La_{max}	YBC151	YBC251	YBG205	YBG302	YD101
double–edge	ZPED02502-MG	2.5	0.2	17		○	★	★	
	ZPFD0302-MG	3.0	0.2	17		○	★	○	
	ZPGD0402-MG	4.0	0.2	22		○	★	○	
	ZPHD0503-MG	5.0	0.3	22		○	★	○	
	ZPKD0604-MG	6.0	0.4	22		○	★	○	
single–edge	ZPES02502-MG	2.5	0.2			○	★	★	
	ZPFS0302-MG	3.0	0.2			○	★	○	
	ZPGS0402-MG	4.0	0.2			○	★	○	
	ZPHS0503-MG	5.0	0.3			○	★	○	
	ZPKS0604-MG	6.0	0.4			○	★	○	

single–edge only for the parting blade holder

★ Recommended grade (always stock available) ☆ Available grade ○ Make–to–order

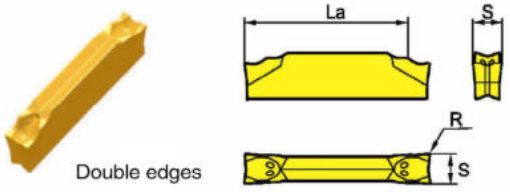


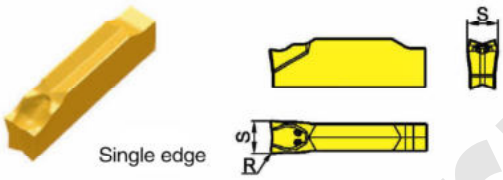
When the insert is close to the center of the workpiece, please reduce the feed speed by 30%, which will improve the life of the insert.

Control chip flow and crimp with good groove structure

Reduce cutting resistance by 20% and reduce vibration

Grooving and turning inserts

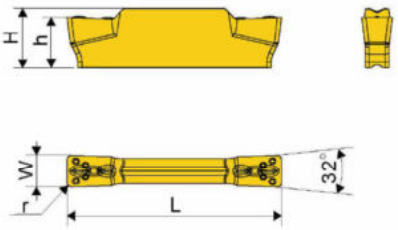




Type		Basic dimensions(mm)			Grade				
					CVD Coating		PVD Coating		Cemented Non Carbide
		$S^{+0.1}_{0}$	R±0.1	La_{max}	SD4025	SD4125	SD1015	SD1025	SK101
Double edges	ZPED02502-MG	2.5	0.2	17	●	★	●	★	○
	ZPFD0302-MG	3.0	0.2	17	●	★	●	★	○
	ZPGD0402-MG	4.0	0.2	22	●	★	●	★	○
	ZPHD0503-MG	5.0	0.3	22	●	★	●	★	○
	ZPKD0604-MG	6.0	0.4	22	●	★	●	★	○
Single edge	ZPES02502-MG	2.5	0.2		●	★	●	★	○
	ZPFS0302-MG	3.0	0.2		●	★	●	★	○
	ZPGS0402-MG	4.0	0.2		●	★	●	★	○
	ZPHS0503-MG	5.0	0.3		●	★	●	★	○
	ZPKS0604-MG	6.0	0.4		●	★	●	★	○

The single-edge insert is only mounted on parting blade.

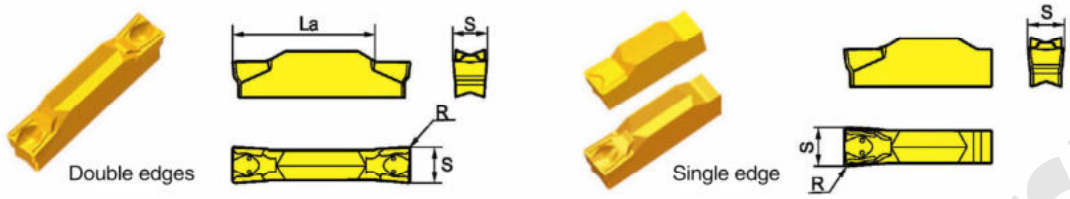
★ Recommended grade (always stock available) ☆ Available grade ○ Make-to-order



Type	Basic dimensions(mm)					Coated cemented carbide																Cemented carbide				
						P						M						K								
	L	W	r	h	H	SD4015	SD4115	SD4025	SD4125	SD4035	SD4135	SD1015	SD1025	SD1035	SD1045	SD4330	SD4340	SD4350	SD3105	SD3205	SD3115	SD3215	SD3125	SD3225	SF302	SF402	SK002	SK102	SK202
MGMN200-M	16.0	2.00	0.20	3.50	3.98			☆	★					★								★		☆		☆			
MGMN300-M	21.0	3.00	0.40	4.80	5.63			☆	★					★								★		☆		☆			
MGMN400-M	21.0	4.00	0.40	4.80	5.88			☆	★					★								★		☆					
MGMN500-M	26.00	5.00	0.80	5.85	7.05			☆	★					★								★		☆					
MGMN600-M	26.00	6.00	0.80	5.85																									

★ Recommended grade (always stock available) ☆ Available grade ○ Make-to-order

Grooving and turning inserts



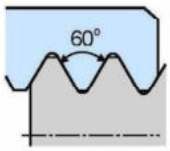
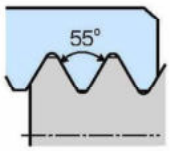
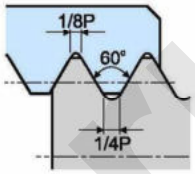
Type		Basic dimensions(mm)			Grade				
					CVD Coating		PVD Coating		Cemented Non Carbide
		$S^{+0.1}_{0}$	$R \pm 0.10$	La_{max}	SD4025	SD4225	SD1215	SD1125	SK101
Double edges	ZTED02503-MG	2.5	0.3	17	○	○	●	★	
	ZTFD0303-MG	3.0	0.3	17	○	○	●	★	
	ZTGD0404-MG	4.0	0.4	22	●	○	●	★	
	ZTHD0504-MG	5.0	0.4	22		○	●	★	
	ZTKD0608-MG	6.0	0.8	22		○	●	★	
Single edge	ZTHS0504-MG	5.0	0.4			○	○	○	
	ZTKS0608-MG	6.0	0.8			○	○	○	

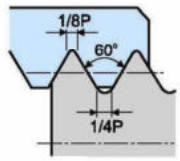
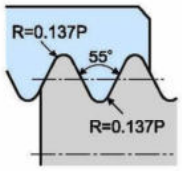
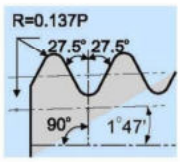
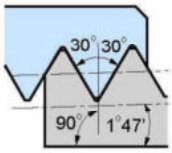
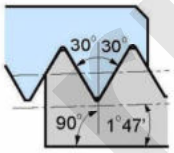
★ Recommended grade (always stock available) ☆ Available grade ○ Make-to-order

TURNING

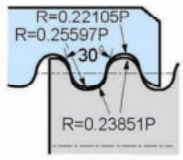
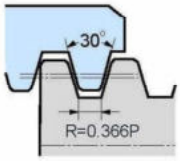
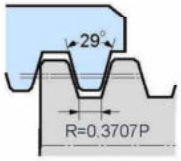
Threading

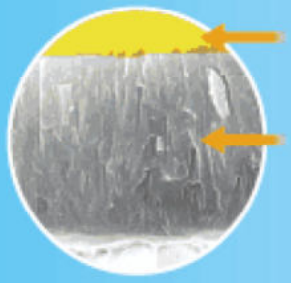
TURNING Threading Tools
Threading tools overview

Applications		for general use		
Legend				
Thread name		Partial Profile 60°	Partial Profile 55°	ISO metric
Threading pitch		**60**	**55**	**GM**
Shape of insert (length: 11, 16, 22mm)		R style shown 	R style shown 	R style shown 
Pitch / Toolholder	Dimensions (mm) (H × W × L) (Dia × L × Min.dia)	Pitch/mm (pitch/Inch)	Pitch/mm (pitch/Inch)	Pitch/mm
External thread	 R–type shown	16×16×100 20×20×125 25×25×150 32×25×170 32×32×170 40×40×250	0.5~6.0 (5~48)	0.5~6.0 (5~48)	0.35~6.0
Internal thread	 R–type shown	16×125×12 16×150×16 16×150×20 20×150×25 20×180×25 25×150×32 32×200×40 32×250×40 40×300×50 50×350×63	0.5~6.0 (5~48)	0.5~6.0 (5~48)	0.35~6.0

For aerospace industry	For general use	Heater, gas and water pipe thread	For gas and water faucet and pipe connection	For gas and water pipe thread
				
UN	**W**	**BSP**	**NPT**	**NPTF**
R–type shown 	R–type shown 	R–type shown 	R–type shown 	R–type shown 
Pitch/mm (pitch/Inch)	Pitch/mm (pitch/Inch)	Pitch/mm (pitch/Inch)	Pitch/mm (pitch/Inch)	Pitch/mm (pitch/Inch)
72~4	72~4	28~11	27~8	27~8
72~4	72~4	28~11	27~8	27~8

TURNING Threading Tools
Threading tools overview

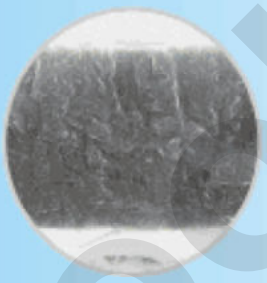
Applications		For food industry and firefighting thread	Transmission trapezoid screw thread	For transmission trapezoidal screw
Legend				
Thread name		DIN405 Round thread	DIN103 Trapezoidal thread	American Trapezoidal thread
Threading pitch		**R**	**Tr**	**ACME**
Shape of insert (length: 11, 16, 22mm)		R style shown 	R style shown 	R style shown 
Tool holder Dimensions (mm) (H × W × L) (Dia × L × Min.dia)		Pitch/mm (pitch/Inch)	Pitch/mm	Pitch/mm (pitch/Inch)
External thread	16×16×100 20×20×125 25×25×150 32×25×170 32×32×170 40×40×250	10~4	1.5~6.0	16~4
Internal thread	16×125×12 16×150×16 16×150×20 20×150×25 20×180×25 25×150×32 32×200×40 32×250×40 40×300×50 50×350×63	10~4	1.5~6.0	16~4



Advanced surface treatment techniques effectively reduce friction and allows for better wear observation.
It has excellent Anti–wear properties owing to the TIAIN coating in the Inner layer.

SD1125

Coated grade which is the combination of hard substrate and coating(thick nc–TiAIN) It is suitable for finishing to semi–finishing of turning machining and High–temperature alloy rough turning.



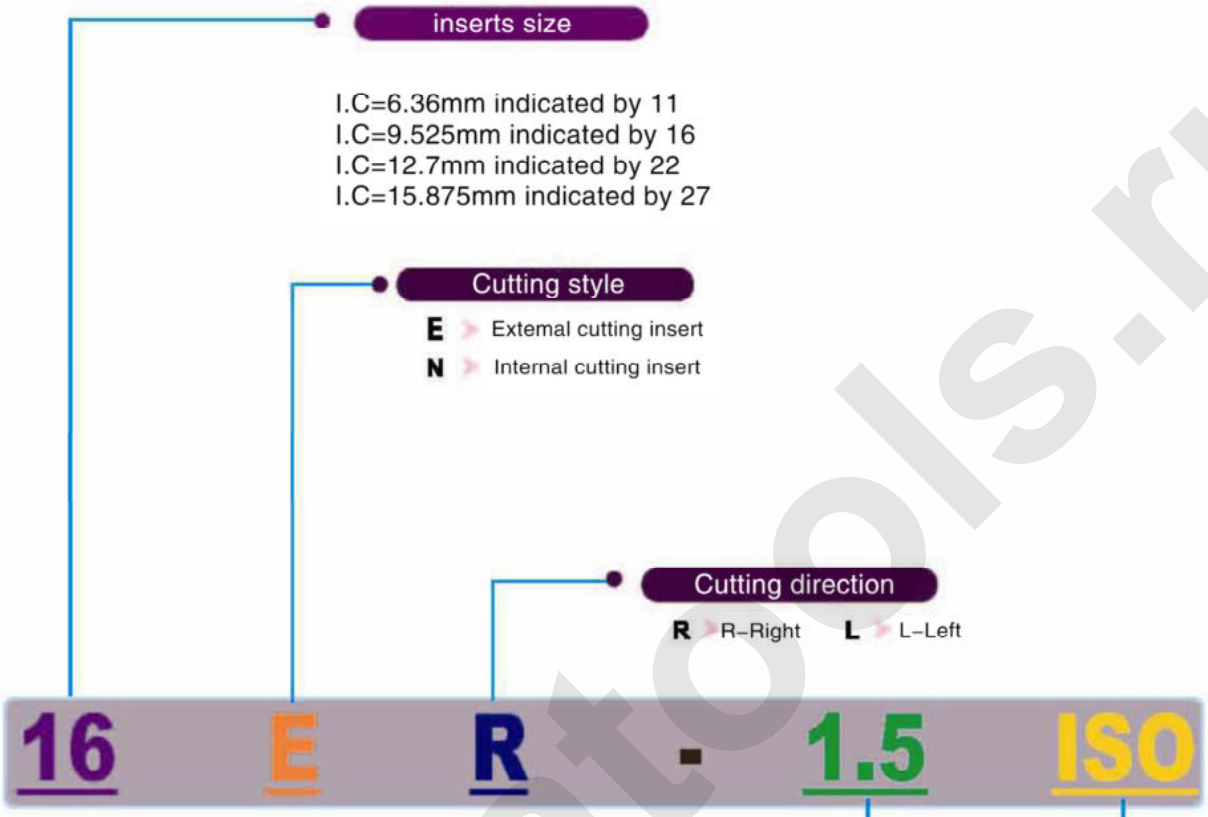
Advanced TiAIN substrate nano coating, in combination with proper coating ingredients. Improves the mechanical and thermal properties of coating. Further optimizing coating structure improving coating stress and enhancing bond strength of coating and substrate.

SD1025

Coated carbide TiN and PVD makes good Toughness and wear resistance. It is the first choice for high quality of the threading carbon steel, stainless steel and cast iron in variety of materials e.g. steel.

TURNING Threading Inserts

Threading machining inserts code key



Screw pitch

Full profile(range of screw pitch is indicated by numbers)

mm	TPI
0.35-9.0	72-2

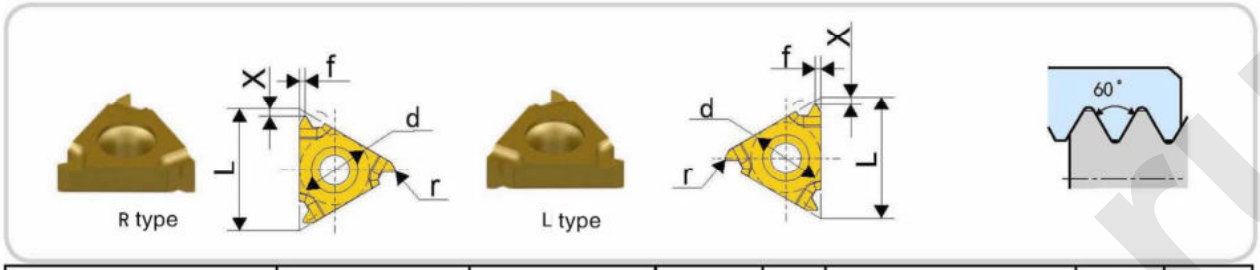
V profile
(range of screw pitch is indicated by letters)

	mm	TPI
A	0.5-1.5	48-16
AG	0.5-3.0	48-8
G	1.75-3.0	14-8
N	3.5-5.0	7-5
Q	5.5-6.0	41/2-4

Profile

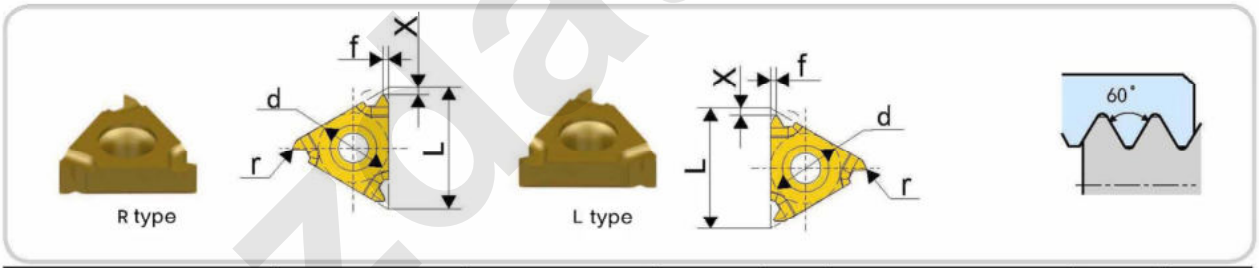
60°	60° general pitch thread
55°	55° general pitch thread
ISO	metric 60° pitch thread
UN	60° unified thread(American standard threads)
UNJ	60° American Aviation standards threads
W	55° Whitworth thread
NPT	60° American standard taper piper thread
NPTF	60° National DRYSEAL piper thread
BSPT	55° British standard taper piper thread
ACME	29° American standard Trapezoidal thread
STACME	29° American standatd Short tooth trapezoidal thread
TR	30° Standard trapezoidal thread
ABUT	American Sawtooth Thread
RD	Fire food machinery round thread
API RD	API Round thread

Generic threading



Type	Oesignnation Right	Oesignnation Left	Screw pitch (mm)	TPI	Dimensions (mm)				Recommended grade		Recommended grade	
					d	L	X	f	SD1025		SD1125	
									R	L	R	L
External	11ER-A60	11EL-A60	0.5-1.5	48-16	6.35	11	0.8	0.9	★	★	★	★
	11ER-G60	11EL-G60	1.75-3.0	14-8	9.525	16	1.2	1.7	★	★	★	★
	11ER-AG60	11EL-AG60	0.5-3.0	48-8	9.525	16	1.2	1.7	★	★	★	★
	22ER-N60	22EL-N60	3.5-5.0	7-5	12.7	22	1.7	2.5	★	★	★	★
	27ER-Q60	27EL-Q60	5.5-6.0	4.5-4	15.875	27	2.1	3.1	★	★	★	★

★ Recommended grade (always stock available) ☆ Available grade ○ Make-to-order

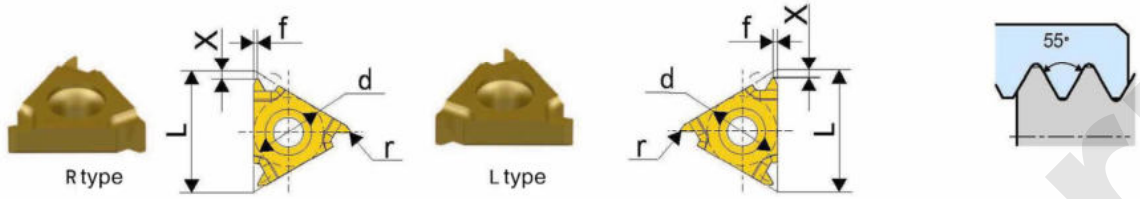


Type	Oesignnation Right	Oesignnation Left	Screw pitch (mm)	TPI	Dimensions (mm)				Recommended grade		Recommended grade	
					d	L	X	f	SD1025		SD1125	
									R	L	R	L
Internal	11NR-A60	11NL-A60	0.5-1.5	48-16	6.35	11	0.8	0.9	★	★	★	★
	11NR-G60	11NL-G60	1.75-3.0	14-8	9.525	16	1.2	1.7	★	★	★	★
	11NR-AG60	11NL-AG60	0.5-3.0	48-8	9.525	16	1.2	1.7	★	★	★	★
	22NR-N60	22NL-N60	3.5-5.0	7-5	12.7	22	1.7	2.5	★	★	★	★
	27NR-Q60	27NL-Q60	5.5-6.0	4.5-4	15.875	27	1.8	2.7	★	★	★	★

★ Recommended grade (always stock available) ☆ Available grade ○ Make-to-order

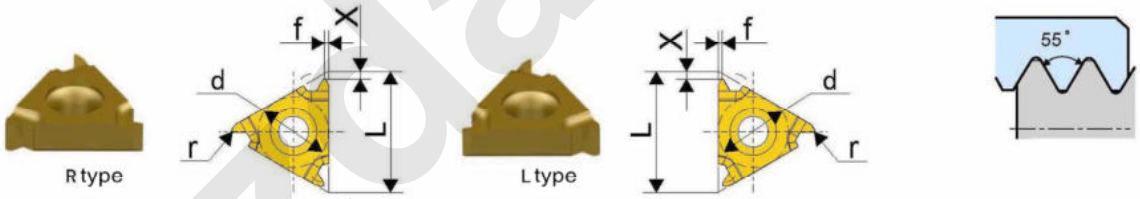
TURNING Threading Inserts

Generic threading



Type	Oesignnation Right	Oesignnation Left	Screw pitch (mm)	TPI	Dimensions (mm)				Recommended grade		Recommended grade	
					d	L	X	f	SD1025		SD1125	
									R	L	R	L
External	11ER-A55	11EL-A55	0.5-1.5	48-16	6.35	11	0.8	0.9	★	★	★	★
	11ER-G55	11EL-G55	1.75-3.0	14-8	9.525	16	1.2	1.7	★	★	★	★
	11ER-AG55	11EL-AG55	0.5-3.0	48-8	9.525	16	1.2	1.7	★	★	★	★
	22ER-N55	22EL-N55	3.5-5.0	7-5	12.7	22	1.7	2.5	★	★	★	★
	27ER-Q55	27EL-Q55	5.5-6.0	4.5-4	15.875	27	2	2.9	★	★	★	★

★ Recommended grade (always stock available) ☆ Available grade ○ Make-to-order

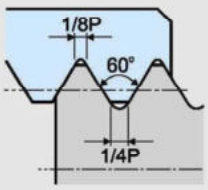


Type	Oesignnation Right	Oesignnation Left	Screw pitch (mm)	TPI	Dimensions (mm)				Recommended grade		Recommended grade	
					d	L	X	f	SD1025		SD1125	
									R	L	R	L
Internal	11NR-A55	11NL-A55	0.5-1.5	48-16	6.35	11	0.8	0.9	★	★	★	★
	11NR-G55	11NL-G55	1.75-3.0	14-8	9.525	16	1.2	1.7	★	★	★	★
	11NR-AG55	11NL-AG55	0.5-3.0	48-8	9.525	16	1.2	1.7	★	★	★	★
	22NR-N55	22NL-N55	3.5-5.0	7-5	12.7	22	1.7	2.5	★	★	★	★
	27NR-Q55	27NL-Q55	5.5-6.0	4.5-4	15.875	27	2	2.9	★	★	★	★

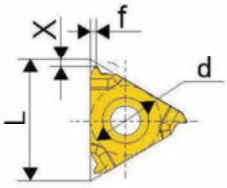
★ Recommended grade (always stock available) ☆ Available grade ○ Make-to-order

ISO Threading

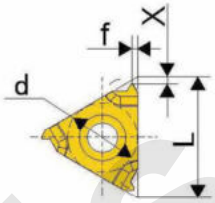
ISO 965-1980 DIN 13
GB/T 197-2003 Tolerance level: 6g/6H



R type



L type



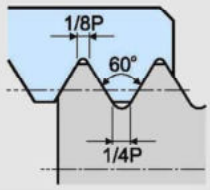
Type	Oesignnation Right	Oesignnation Left	TPI	Dimensions (mm)				Recommended grade		Recommended grade	
				d	L	X	f	SD1025		SD1125	
								R	L	R	L
External	11ER-0.35ISO	11EL-0.35ISO	0.35	6.35	11	0.8	0.4	★	★	★	★
	11ER-0.4ISO	11EL-0.4ISO	0.4	6.35	11	0.7	0.4	★	★	★	★
	11ER-0.45ISO	11EL-0.45ISO	0.45	6.35	11	0.7	0.4	★	★	★	★
	11ER-0.5ISO	11EL-0.5ISO	0.5	6.35	11	0.6	0.4	★	★	★	★
	11ER-0.6ISO	11EL-0.6ISO	0.6	6.35	11	0.6	0.6	★	★	★	★
	11ER-0.7ISO	11EL-0.7ISO	0.7	6.35	11	0.6	0.6	★	★	★	★
	11ER-0.75ISO	11EL-0.75ISO	0.75	6.35	11	0.6	0.6	★	★	★	★
	11ER-0.8ISO	11EL-0.8ISO	0.8	6.35	11	0.6	0.6	★	★	★	★
	11ER-1.0ISO	11EL-1.0ISO	1	6.35	11	0.7	0.7	★	★	★	★
	11ER-1.25ISO	11EL-1.25ISO	1.25	6.35	11	0.8	0.9	★	★	★	★
	11ER-1.5ISO	11EL-1.5ISO	1.5	6.35	11	0.8	1	★	★	★	★
	11ER-1.75ISO	11EL-1.75ISO	1.75	6.35	11	0.8	1.1	★	★	★	★
	16ER-0.35ISO	16EL-0.35ISO	0.35	9.525	16	0.8	0.4	★	★	★	★
	16ER-0.4ISO	16EL-0.4ISO	0.4	9.525	16	0.7	0.4	★	★	★	★
	16ER-0.45ISO	16EL-0.45ISO	0.45	9.525	16	0.7	0.4	★	★	★	★
	16ER-0.5ISO	16EL-0.5ISO	0.5	9.525	16	0.6	0.4	★	★	★	★
	16ER-0.6ISO	16EL-0.6ISO	0.6	9.525	16	0.6	0.6	★	★	★	★
	16ER-0.7ISO	16EL-0.7ISO	0.7	9.525	16	0.6	0.6	★	★	★	★
	16ER-0.75ISO	16EL-0.75ISO	0.75	9.525	16	0.6	0.6	★	★	★	★
	16ER-0.8ISO	16EL-0.8ISO	0.8	9.525	16	0.6	0.6	★	★	★	★

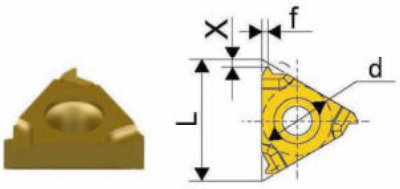
★ Recommended grade (always stock available) ☆ Available grade ○ Make-to-order

TURNING Threading Inserts

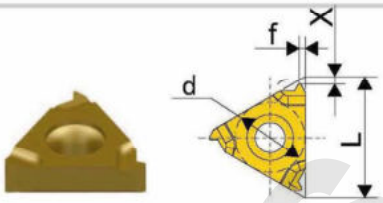
ISO Threading

ISO 965-1980 DIN 13
GB/T 197-2003 tolerance grade: 6g/6H





R type



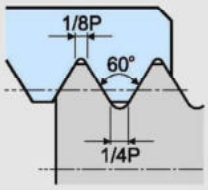
L type

Type	Oesignnation Right	Oesignnation Left	TPI	Dimensions (mm)				Recommended grade		Recommended grade	
				d	L	X	f	SD1025		SD1125	
								R	L	R	L
External	16ER-1.0ISO	16EL-1.0ISO	1	9.525	16	0.7	0.7	★	★	★	★
	16ER-1.25ISO	16EL-1.25ISO	1.25	9.525	16	0.8	0.9	★	★	★	★
	16ER-1.5ISO	16EL-1.5ISO	1.5	9.525	16	0.8	1	★	★	★	★
	16ER-1.75ISO	16EL-1.75ISO	1.75	9.525	16	0.9	1.2	★	★	★	★
	16ER-2.0ISO	16EL-2.0ISO	2	9.525	16	1	1.3	★	★	★	★
	16ER-2.5ISO	16EL-2.5ISO	2.5	9.525	16	1.1	1.5	★	★	★	★
	16ER-3.0SO	16EL-3.0ISO	3	9.525	16	1.2	1.6	★	★	★	★
	22ER-3.5ISO	22EL-3.5ISO	3.5	12.7	22	1.6	2.3	★	★	★	★
	22ER-4.0ISO	22EL-4.0ISO	4	12.7	22	1.6	2.3	★	★	★	★
	22ER-4.5ISO	22EL-4.5ISO	4.5	12.7	22	1.7	2.4	★	★	★	★
	22ER-5.0ISO	22EL-5.0ISO	5	12.7	22	1.7	2.5	★	★	★	★
	27ER-5.5ISO	27EL-5.5ISO	5.5	15.875	27	1.9	2.7	★	★	★	★
	27ER-6.0ISO	27EL-6.0ISO	6	15.875	27	2	2.9	★	★	★	★

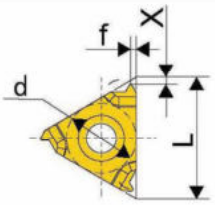
★ Recommended grade (always stock available) ☆ Available grade ○ Make-to-order

ISO Threading

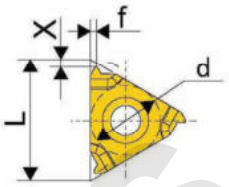
ISO 965-1980 DIN 13
GB/T 197-2003 Tolerance level: 6g/6H



Rtype



Ltype



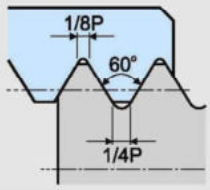
Type	Oesignnation Right	Oesignnation Left	TPI	Dimensions (mm)				Recommended grade		Recommended grade	
				d	L	X	f	SD1025		SD1125	
								R	L	R	L
Internal	11NR-0.35ISO	11NL-0.35ISO	0.35	6.35	11	0.8	0.3	★	★	★	★
	11NR-0.4ISO	11NL-0.4ISO	0.4	6.35	11	0.8	0.4	★	★	★	★
	11NR-0.45ISO	11NL-0.45ISO	0.45	6.35	11	0.8	0.4	★	★	★	★
	11NR-0.5ISO	11NL-0.5ISO	0.5	6.35	11	0.6	0.4	★	★	★	★
	11NR-0.6ISO	11NL-0.6ISO	0.6	6.35	11	0.6	0.6	★	★	★	★
	11NR-0.7ISO	11NL-0.7ISO	0.7	6.35	11	0.6	0.6	★	★	★	★
	11NR-0.75ISO	11NL-0.75ISO	0.75	6.35	11	0.6	0.6	★	★	★	★
	11NR-0.8ISO	11NL-0.8ISO	0.8	6.35	11	0.6	0.6	★	★	★	★
	11NR-1.0ISO	11NL-1.0ISO	1	6.35	11	0.6	0.7	★	★	★	★
	11NR-1.25ISO	11NL-1.25ISO	1.25	6.35	11	0.8	0.9	★	★	★	★
	11NR-1.5ISO	11NL-1.5ISO	1.5	6.35	11	0.8	1	★	★	★	★
	11NR-1.75ISO	11NL-1.75ISO	1.75	6.35	11	0.9	1.1	★	★	★	★
	11NR-2.0ISO	11NL-2.0ISO	2	6.35	11	0.9	1.1	★	★	★	★
	11NR-2.5ISO	11NL-2.5ISO	2.5	6.35	11	0.8	1.1	★	★	★	★
	16NR-0.35ISO	16NL-0.35ISO	0.35	9.525	16	0.8	0.3	★	★	★	★
	16NR-0.4ISO	16NL-0.4ISO	0.4	9.525	16	0.8	0.4	★	★	★	★
	16NR-0.45ISO	16NL-0.45ISO	0.45	9.525	16	0.8	0.4	★	★	★	★
	16NR-0.5ISO	16NL-0.5ISO	0.5	9.525	16	0.6	0.4	★	★	★	★
	16NR-0.6ISO	16NL-0.6ISO	0.6	9.525	16	0.6	0.6	★	★	★	★
	16NR-0.7ISO	16NL-0.7ISO	0.7	9.525	16	0.6	0.6	★	★	★	★

★ Recommended grade (always stock available) ☆ Available grade ○ Make-to-order

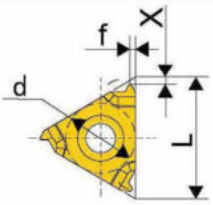
TURNING Threading Inserts

ISO Threading

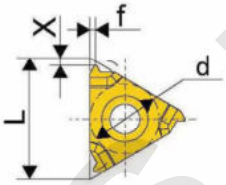
ISO 965-1980 DIN 13
GB/T 197-2003 tolerance grade: 6g/6H



R type



L type

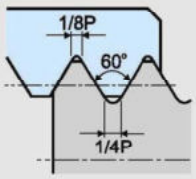


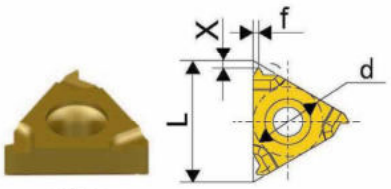
Type	Oesignnation Right	Oesignnation Left	TPI	Dimensions (mm)				Recommended grade SD1025		Recommended grade SD1125	
				d	L	X	f	R	L	R	L
Internal	16NR-0.75ISO	16NL-0.75ISO	0.75	9.525	16	0.6	0.6	★	★	★	★
	16NR-0.8ISO	16NL-0.8ISO	0.8	9.525	16	0.6	0.6	★	★	★	★
	16NR-1.0ISO	16NL-1.0ISO	1	9.525	16	0.6	0.7	★	★	★	★
	16NR-1.25ISO	16NL-1.25ISO	1.25	9.525	16	0.8	0.9	★	★	★	★
	16NR-1.5ISO	16NL-1.5ISO	1.5	9.525	16	0.8	1	★	★	★	★
	16NR-1.75ISO	16NL-1.75ISO	1.75	9.525	16	0.9	1.2	★	★	★	★
	16NR-2.0ISO	16NL-2.0ISO	2	9.525	16	1	1.3	★	★	★	★
	16NR-2.5ISO	16NL-2.5ISO	2.5	9.525	16	1.1	1.5	★	★	★	★
	16NR-3.0SO	16NL-3.0ISO	3	9.525	16	1.1	1.5	★	★	★	★
	22NR-3.5ISO	22NL-3.5ISO	3.5	12.7	22	1.6	2.3	★	★	★	★
	22NR-4.0ISO	22NL-4.0ISO	4	12.7	22	1.6	2.3	★	★	★	★
	22NR-4.5ISO	22NL-4.5ISO	4.5	12.7	22	1.6	2.4	★	★	★	★
	22NR-5.0ISO	22NL-5.0ISO	5	12.7	22	1.6	2.3	★	★	★	★
	27NR-5.5ISO	27NL-5.5ISO	5.5	15.875	27	1.6	2.3	★	★	★	★
	27NR-6.0ISO	27NL-6.0ISO	6	15.875	27	1.8	2.5	★	★	★	★

★ Recommended grade (always stock available) ☆ Available grade ○ Make-to-order

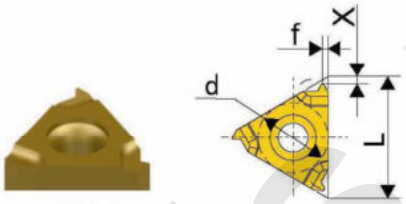
American standard thread

ASME B1.1-1989
tolerance grade: 2A/2B





Rtype



Ltype

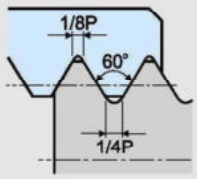
Type	Oesignnation Right	Oesignnation Left	TPI	Dimensions (mm)				Recommended grade		Recommended grade	
				d	L	X	f	SD1025		SD1125	
								R	L	R	L
Extemal	11ER-72UN	11EL-72UN	72	6.35	11	0.8	0.4	★	★	★	★
	11ER-64UN	11EL-64UN	64	6.35	11	0.8	0.4	★	★	★	★
	11ER-56UN	11EL-56UN	56	6.35	11	0.7	0.4	★	★	★	★
	11ER-48U	11EL-48UN	48	6.35	11	0.6	0.6	★	★	★	★
	11ER-44UN	11EL-44UN	44	6.35	11	0.6	0.6	★	★	★	★
	11ER-40UN	11EL-40UN	40	6.35	11	0.6	0.6	★	★	★	★
	11ER-36UN	11EL-36UN	36	6.35	11	0.6	0.6	★	★	★	★
	11ER-32UN	11EL-32UN	32	6.35	11	0.6	0.6	★	★	★	★
	11ER-28UN	11EL-28UN	28	6.35	11	0.6	0.7	★	★	★	★
	11ER-27UN	11EL-27UN	27	6.35	11	0.7	0.8	★	★	★	★
	11ER-24UN	11EL-24UN	24	6.35	11	0.7	0.8	★	★	★	★
	11ER-20UN	11EL-20UN	20	6.35	11	0.8	0.9	★	★	★	★
	11ER-18UN	11EL-18UN	18	6.35	11	0.8	1	★	★	★	★
	11ER-16UN	11EL-16UN	16	6.35	11	0.9	1.1	★	★	★	★
	11ER-14UN	11EL-14UN	14	6.35	11	0.9	1.1	★	★	★	★
	16ER-72UN	16EL-72UN	72	9.525	16	0.8	0.4	★	★	★	★
	16ER-64UN	16EL-64UN	64	9.525	16	0.8	0.4	★	★	★	★
	16ER-56UN	16EL-56UN	56	9.525	16	0.7	0.4	★	★	★	★
	16ER-48UN	16EL-48UN	48	9.525	16	0.6	0.6	★	★	★	★
	16ER-44UN	16EL-44UN	44	9.525	16	0.6	0.6	★	★	★	★
	16ER-40UN	16EL-40UN	40	9.525	16	0.6	0.6	★	★	★	★

★ Recommended grade (always stock available) ☆ Available grade ○ Make-to-order

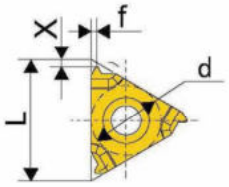
TURNING Threading Inserts

American standard thread

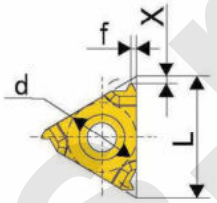
ASME B1.1-1989
tolerance grade: 2A/2B



Rtype



Ltype

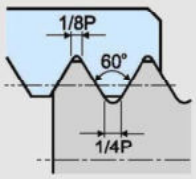


Type	Oesignnation Right	Oesignnation Left	TPI	Dimensions (mm)				Recommended grade SD1025		Recommended grade SD1125	
				d	L	X	f	R	L	R	L
Extemal	16ER-36UN	16EL-36UN	36	9.525	16	0.6	0.6	★	★	★	★
	16ER-32UN	16EL-32UN	32	9.525	16	0.6	0.6	★	★	★	★
	16ER-28UN	16EL-28UN	28	9.525	16	0.6	0.7	★	★	★	★
	16ER-27UN	16EL-27UN	27	9.525	16	0.7	0.8	★	★	★	★
	16ER-24UN	16EL-24UN	24	9.525	16	0.7	0.8	★	★	★	★
	16ER-20UN	16EL-20UN	20	9.525	16	0.8	0.9	★	★	★	★
	16ER-18UN	16EL-18UN	18	9.525	16	0.8	1	★	★	★	★
	16ER-16UN	16EL-16UN	16	9.525	16	0.9	1.1	★	★	★	★
	16ER-14UN	16EL-14UN	14	9.525	16	1	1.2	★	★	★	★
	16ER-13UN	16EL-13UN	13	9.525	16	1	1.3	★	★	★	★
	16ER-12UN	16EL-12UN	12	9.525	16	1.1	1.4	★	★	★	★
	16ER-11.5UN	16EL-11.5UN	11.5	9.525	16	1.1	1.5	★	★	★	★
	16ER-11UN	16EL-11UN	11	9.525	16	1.1	1.5	★	★	★	★
	16ER-10UN	16ENL-10UN	10	9.525	16	1.1	1.5	★	★	★	★
	16ER-9UN	16EL-9UN	9	9.525	16	1.2	1.7	★	★	★	★
	16ER-8UN	16NEL-8UN	8	9.525	16	1.2	1.6	★	★	★	★
	22ER-7UN	22EL-7UN	7	12.7	22	1.6	2.3	★	★	★	★
	22ER-6UN	22EL-6UN	6	12.7	22	1.6	2.3	★	★	★	★
	22ER-5UN	22EL-5UN	5	12.7	22	1.7	2.5	★	★	★	★
	27ER-4.5UN	27EL-4.5UN	4.5	15.875	27	1.9	2.7	★	★	★	★
	27ER-4UN	27EL-4UN	4	15.875	27	2.1	3	★	★	★	★

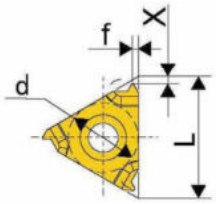
★ Recommended grade (always stock available) ☆ Available grade ○ Make-to-order

American standard thread

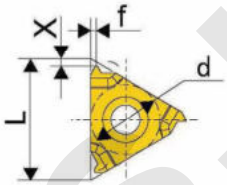
ASME B1.1-1989
tolerance grade: 2A/2B



R type



L type



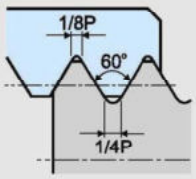
Type	Oesignnation Right	Oesignnation Left	TPI	Dimensions (mm)				Recommended grade SD1025		Recommended grade SD1125	
				d	L	X	f	R	L	R	L
Internal	11NR-72W	11NL-72W	72	6.35	11	0.7	0.4	★	★	★	★
	11NR-64W	11NL-64W	64	6.35	11	0.7	0.4	★	★	★	★
	11NR-56UN	11NL-56UN	56	6.35	11	0.7	0.4	★	★	★	★
	11NR-48U	11NL-48UN	48	6.35	11	0.6	0.6	★	★	★	★
	11NR-44UN	11NL-44UN	44	6.35	11	0.6	0.6	★	★	★	★
	11NR-40UN	11NL-40UN	40	6.35	11	0.6	0.6	★	★	★	★
	11NR-36UN	11NL-36UN	36	6.35	11	0.6	0.6	★	★	★	★
	11NR-32UN	11NL-32UN	32	6.35	11	0.6	0.6	★	★	★	★
	11NR-28UN	11NL-28UN	28	6.35	11	0.6	0.7	★	★	★	★
	11NR-27UN	11NL-27UN	27	6.35	11	0.7	0.8	★	★	★	★
	11NR-24UN	11NL-24UN	24	6.35	11	0.7	0.8	★	★	★	★
	11NR-20UN	11NL-20UN	20	6.35	11	0.8	0.9	★	★	★	★
	11NR-18UN	11NL-18UN	18	6.35	11	0.8	1	★	★	★	★
	11NR-16UN	11NL-16UN	16	6.35	11	0.9	1.1	★	★	★	★
	11NR-14UN	11NL-14UN	14	6.35	11	0.9	1.1	★	★	★	★
	11NR-12UN	11NL-12UN	12	6.35	11	0.8	1.1	★	★	★	★
	11NR-11UN	11NL-11UN	11	6.35	11	0.8	1.1	★	★	★	★
	16NR-72UN	16NL-72UN	72	9.525	16	0.8	0.4	★	★	★	★
	16NR-64UN	16NL-64UN	64	9.525	16	0.8	0.4	★	★	★	★
	16NR-56UN	16NL-56UN	56	9.525	16	0.7	0.4	★	★	★	★
	16NR-48UN	16NL-48UN	48	9.525	16	0.6	0.6	★	★	★	★
	16NR-44UN	16NL-44UN	44	9.525	16	0.6	0.6	★	★	★	★

★ Recommended grade (always stock available) ☆ Available grade ○ Make-to-order

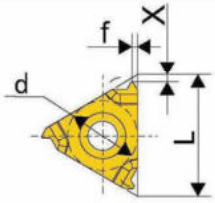
TURNING Threading Inserts

American standard thread

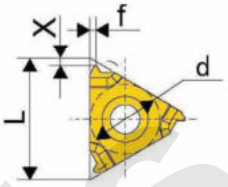
ASME B1.1-1989
tolerance grade: 2A/2B



Rtype



Ltype

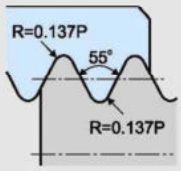


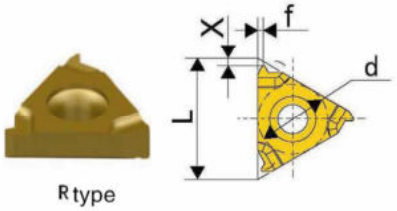
Type	Oesignnation Right	Oesignnation Left	TPI	Dimensions (mm)				Recommended coating grade		Recommended coating grade	
				d	L	X	f	SD1025		SD1125	
								R	L	R	L
Internal	16NR-40UN	16NL-40UN	40	9.525	16	0.6	0.6	★	★	★	★
	16NR-36UN	16NL-36UN	36	9.525	16	0.6	0.6	★	★	★	★
	16NR-32UN	16NL-32UN	32	9.525	16	0.6	0.6	★	★	★	★
	16NR-28UN	16NL-28UN	28	9.525	16	0.6	0.7	★	★	★	★
	16NR-27UN	16NL-27UN	27	9.525	16	0.7	0.8	★	★	★	★
	16NR-24UN	16NL-24UN	24	9.525	16	0.7	0.8	★	★	★	★
	16NR-20UN	16NL-20UN	20	9.525	16	0.8	0.9	★	★	★	★
	16NR-18UN	16NL-18UN	18	9.525	16	0.8	1	★	★	★	★
	16NR-16UN	16NL-16UN	16	9.525	16	0.9	1.1	★	★	★	★
	16NR-14UN	16NL-14UN	14	9.525	16	1	1.2	★	★	★	★
	16NR-13UN	16NL-13UN	13	9.525	16	1	1.3	★	★	★	★
	16NR-12UN	16NL-12UN	12	9.525	16	1.1	1.4	★	★	★	★
	16NR-11.5UN	16NL-11.5UN	11.5	9.525	16	1.1	1.5	★	★	★	★
	16NR-11UN	16NL-11UN	11	9.525	16	1.1	1.5	★	★	★	★
	16NR-10UN	16NL-10UN	10	9.525	16	1.1	1.5	★	★	★	★
	16NR-9UN	16NL-9UN	9	9.525	16	1.2	1.7	★	★	★	★
	16NR-8UN	16NL-8UN	8	9.525	16	1.2	1.5	★	★	★	★
	22NR-7UN	22NL-7UN	7	12.7	22	1.6	2.3	★	★	★	★
	22NR-6UN	22NL-6UN	6	12.7	22	1.6	2.3	★	★	★	★
	22NR-5UN	22NL-5UN	5	12.7	22	1.7	2.3	★	★	★	★
	27NR-4.5UN	27NL-4.5UN	4.5	15.875	27	1.9	2.4	★	★	★	★
	27NR-4UN	27NL-4UN	4	15.875	27	2.1	2.7	★	★	★	★

★ Recommended grade (always stock available) ☆ Available grade ○ Make-to-order

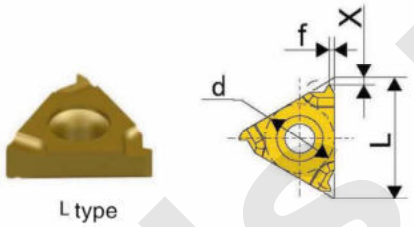
American standard thread

ISO 228/1:1982,
DIN 259, B.S.84:1956
tolerance grade: Medium class A





R type



L type

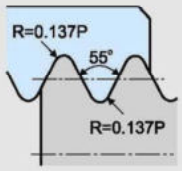
Type	Oesignnation Right	Oesignnation Left	TPI	Dimensions (mm)				Recommended grade SD1025		Recommended grade SD1125	
				d	L	X	f	R	L	R	L
External	11ER-72W	11EL-72W	72	6.35	11	0.7	0.4	★	★	★	★
	11ER-64W	11EL-64W	64	6.35	11	0.7	0.4	★	★	★	★
	11ER-56W	11EL-56W	56	6.35	11	0.7	0.4	★	★	★	★
	11ER-48W	11EL-48W	48	6.35	11	0.6	0.6	★	★	★	★
	11ER-44W	11EL-44W	44	6.35	11	0.6	0.6	★	★	★	★
	11ER-40W	11EL-40W	40	6.35	11	0.6	0.6	★	★	★	★
	11ER-36W	11EL-36W	36	6.35	11	0.6	0.6	★	★	★	★
	11ER-32W	11EL-32W	32	6.35	11	0.6	0.6	★	★	★	★
	11ER-28W	11EL-28W	28	6.35	11	0.6	0.7	★	★	★	★
	11ER-26W	11EL-26W	27	6.35	11	0.7	0.8	★	★	★	★
	11ER-24W	11EL-24W	24	6.35	11	0.7	0.8	★	★	★	★
	11ER-22W	11EL-22W	24	6.35	11	0.8	0.9	★	★	★	★
	11ER-20W	11EL-20W	20	6.35	11	0.8	0.9	★	★	★	★
	11ER-19W	11EL-19W	19	6.35	11	0.8	1	★	★	★	★
	11ER-18W	11EL-18W	18	6.35	11	0.8	1	★	★	★	★
	11ER-16W	11EL-16W	16	6.35	11	0.9	1.1	★	★	★	★
	11ER-14W	11EL-14W	14	6.35	11	1	1.2	★	★	★	★
	16ER-72W	16EL-72W	72	9.525	16	0.7	0.4	★	★	★	★
	16ER-60W	16EL-60W	60	9.525	16	0.7	0.4	★	★	★	★
	16ER-56W	16EL-56W	56	9.525	16	0.7	0.4	★	★	★	★
	16ER-48W	16EL-48W	48	9.525	16	0.6	0.6	★	★	★	★
	16ER-44W	16EL-44W	44	9.525	16	0.6	0.6	★	★	★	★

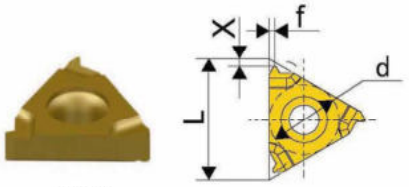
★ Recommended grade (always stock available) ☆ Available grade ○ Make-to-order

TURNING Threading Inserts

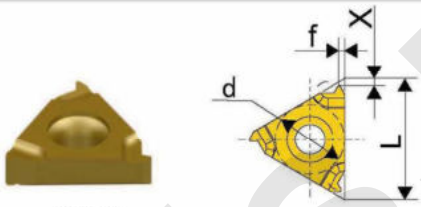
American standard thread

ISO 228/1:1982,
DIN 259, B.S.84:1956
tolerance grade: Medium class A





Rtype



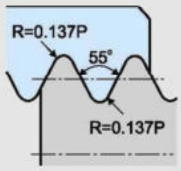
Ltype

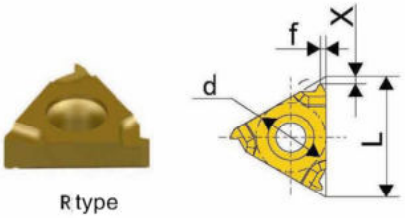
Type	Oesignnation Right	Oesignnation Left	TPI	Dimensions (mm)				Recommended coating grade		Recommended coating grade	
				d	L	X	f	SD1025		SD1125	
								R	L	R	L
External	16ER-40W	16EL-40W	40	9.525	16	0.6	0.6	★	★	★	★
	16ER-36W	16EL-36W	36	9.525	16	0.6	0.6	★	★	★	★
	16ER-32W	16EL-32W	32	9.525	16	0.6	0.6	★	★	★	★
	16ER-28W	16EL-28W	28	9.525	16	0.6	0.7	★	★	★	★
	16ER-26W	16EL-26W	26	9.525	16	0.7	0.8	★	★	★	★
	16ER-24W	16EL-24W	24	9.525	16	0.7	0.8	★	★	★	★
	16ER-22W	16EL-22W	22	9.525	16	0.7	0.8	★	★	★	★
	16ER-20W	16EL-20W	20	9.525	16	0.8	0.9	★	★	★	★
	16ER-18W	16EL-18W	18	9.525	16	0.8	1	★	★	★	★
	16ER-16W	16EL-16W	16	9.525	16	0.9	1.1	★	★	★	★
	16ER-14W	16EL-14W	14	9.525	16	1	1.2	★	★	★	★
	16ER-12W	16EL-12W	12	9.525	16	1.1	1.4	★	★	★	★
	16ER-11W	16EL-11W	11	9.525	16	1.1	1.5	★	★	★	★
	16ER-10W	16ENL-10W	10	9.525	16	1.1	1.5	★	★	★	★
	16ER-9W	16EL-9W	9	9.525	16	1.2	1.7	★	★	★	★
	16ER-8W	16NEL-8W	8	9.525	16	1.2	1.5	★	★	★	★
	22ER-7W	22EL-7W	7	12.7	22	1.6	2.3	★	★	★	★
	22ER-6W	22EL-6W	6	12.7	22	1.6	2.3	★	★	★	★
	22ER-5W	22EL-5W	5	12.7	22	1.7	2.4	★	★	★	★
	27ER-4.5W	27EL-4.5W	4.5	15.875	27	1.8	2.6	★	★	★	★
	27ER-4UN	27EL-4UN	4	15.875	27	2.1	2.9	★	★	★	★

★ Recommended grade (always stock available) ☆ Available grade ○ Make-to-order

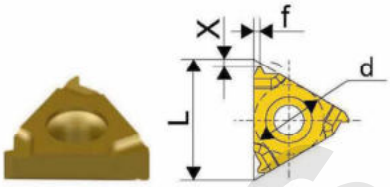
American standard thread

ISO 228/1:1982,
DIN 259, B.S.84:1956
tolerance grade: Medium class A





R type



L type

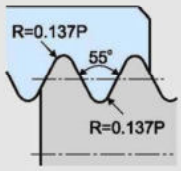
Type	Oesignnation Right	Oesignnation Left	TPI	Dimensions (mm)				Recommended grade SD1025		Recommended grade SD1125	
				d	L	X	f	R	L	R	L
Internal	11NR-72W	11NL-72W	72	6.35	11	0.7	0.4	★	★	★	★
	11NR-64W	11NL-64W	64	6.35	11	0.7	0.4	★	★	★	★
	11NR-56W	11NL-56W	56	6.35	11	0.7	0.4	★	★	★	★
	11NR-48W	11NL-48W	48	6.35	11	0.6	0.6	★	★	★	★
	11NR-40W	11N-40W	40	6.35	11	0.6	0.6	★	★	★	★
	11NR-36W	11NL-36W	36	6.35	11	0.6	0.6	★	★	★	★
	11NR-32W	11NL-32W	32	6.35	11	0.6	0.6	★	★	★	★
	11NR-28W	11NL-28W	28	6.35	11	0.6	0.7	★	★	★	★
	11NR-26W	11NL-26W	27	6.35	11	0.7	0.8	★	★	★	★
	11NR-24W	11NL-24W	24	6.35	11	0.7	0.8	★	★	★	★
	11NR-22W	11NL-22W	24	6.35	11	0.8	0.9	★	★	★	★
	11NR-20W	11NL-20W	20	6.35	11	0.8	0.9	★	★	★	★
	11NR-19W	11NL-19W	19	6.35	11	0.8	1	★	★	★	★
	11NR-18W	11NL-18W	18	6.35	11	0.8	1	★	★	★	★
	11NR-16W	11NL-16W	16	6.35	11	0.9	1.1	★	★	★	★
	11NR-14W	11NL-14W	14	6.35	11	0.9	1.1	★	★	★	★
	11NR-12W	11NL-12W	12	6.35	11	0.9	1.2	★	★	★	★
	16NR-72W	16NL-72W	72	9.525	16	0.7	0.4	★	★	★	★
	16NR-60W	16NL-60W	60	9.525	16	0.7	0.4	★	★	★	★
	16NR-56W	16NL-56W	56	9.525	16	0.7	0.4	★	★	★	★
	16NR-48W	16NL-48W	48	9.525	16	0.6	0.6	★	★	★	★
	16NR-40W	16NL-40W	40	9.525	16	0.6	0.6	★	★	★	★

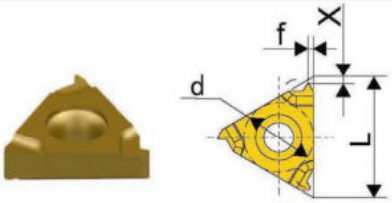
★ Recommended grade (always stock available) ☆ Available grade ○ Make-to-order

TURNING Threading Inserts

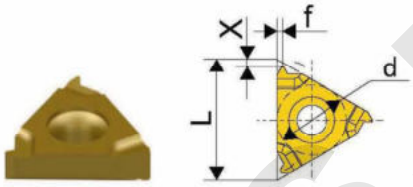
Whitworth thread

ISO 228/1:1982,
DIN 259, B.S.84:1956
tolerance grade: Medium class A





Rtype



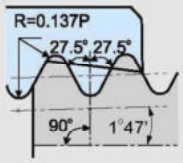
Ltype

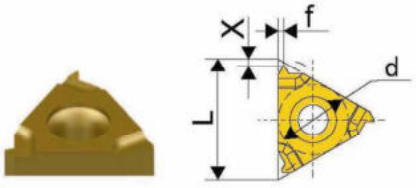
Type	Oesignnation Right	Oesignnation Left	TPI	Dimensions (mm)				Recommended coating grade		Recommended coating grade	
				d	L	X	f	SD1025		SD1125	
								R	L	R	L
Internal	16NR-36W	16NL-36W	36	9.525	16	0.6	0.6	★	★	★	★
	16NR-32W	16NL-32W	32	9.525	16	0.6	0.6	★	★	★	★
	16NR-30W	16NL-30W	30	9.525	16	0.6	0.7	★	★	★	★
	16NR-28W	16NL-28W	28	9.525	16	0.6	0.7	★	★	★	★
	16NR-26W	16NL-26W	26	9.525	16	0.7	0.8	★	★	★	★
	16NR-24W	16NL-24W	24	9.525	16	0.7	0.8	★	★	★	★
	16NR-22W	16NL-22W	22	9.525	16	0.8	0.9	★	★	★	★
	16NR-20W	16NL-20W	20	9.525	16	0.8	0.9	★	★	★	★
	16NR-19W	16NL-19W	20	9.525	16	0.8	1	★	★	★	★
	16NR-18W	16NL-18W	18	9.525	16	0.8	1	★	★	★	★
	16NR-16W	16NL-16W	16	9.525	16	0.9	1.1	★	★	★	★
	16NR-14W	16NL-14W	14	9.525	16	1	1.2	★	★	★	★
	16NR-12W	16NL-12W	12	9.525	16	1.1	1.4	★	★	★	★
	16NR-11W	16NL-11W	11	9.525	16	1.1	1.5	★	★	★	★
	16NR-10W	16NL-10W	10	9.525	16	1.1	1.5	★	★	★	★
	16NR-9W	16NL-9W	9	9.525	16	1.2	1.7	★	★	★	★
	16NR-8W	16NL-8W	8	9.525	16	1.2	1.5	★	★	★	★
	22NR-7W	22NL-7W	7	12.7	22	1.6	2.3	★	★	★	★
	22NR-6W	22NL-6W	6	12.7	22	1.6	2.3	★	★	★	★
	22NR-5W	22NL-5W	5	12.7	22	1.7	2.4	★	★	★	★
	27NR-4.5W	27NL-4.5W	4.5	15.875	27	1.8	2.6	★	★	★	★
	27NR-4W	27NL-4W	4	15.875	27	2.1	2.9	★	★	★	★

★ Recommended grade (always stock available) ☆ Available grade ○ Make-to-order

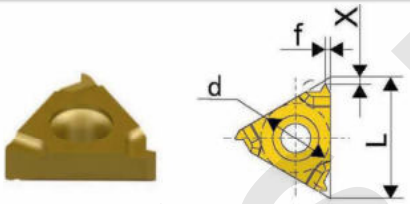
BSP inch thread

ISO 7/1:1994
B.S.21:1985
Standard BSPT





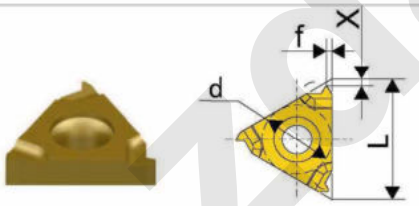
Rtype



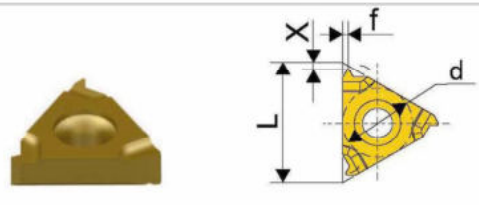
Ltype

Type	Oesignnation Right	Oesignnation Left	TPI	Dimensions (mm)				Recommended grade SD1025		Recommended grade SD1125	
				d	L	X	f	R	L	R	L
External	11ER-28BSPT	11NL-28BSPT	28	6.35	11	0.6	0.6	★	★	★	★
	11ER-19BSPT	11NL-28BSPT	19	6.35	11	0.8	0.9	★	★	★	★
	11ER-14BSPT	11NL-14BSPT	14	6.35	11	0.9	1	★	★	★	★
	16ER-28BSPT	16NL-28BSPT	28	9.525	16	0.6	0.6	★	★	★	★
	16ER-19BSPT	16NL-19BSPT	19	9.525	16	0.8	0.9	★	★	★	★
	16ER-14BSPT	16NL-14BSPT	14	9.525	16	1	1.2	★	★	★	★
	16ER-11BSPT	11NL-11BSPT	11	9.525	16	1.1	1.5	★	★	★	★

★ Recommended grade (always stock available) ☆ Available grade ○ Make-to-order



Rtype



Ltype

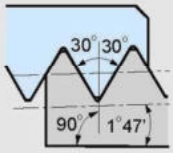
Type	Oesignnation Right	Oesignnation Left	TPI	Dimensions (mm)				Recommended grade SD1025		Recommended grade SD1125	
				d	L	X	f	R	L	R	L
Internal	11NR-28BSPT	11NL-28BSPT	28	6.35	11	0.6	0.6	★	★	★	★
	11NR-19BSPT	11NL-28BSPT	19	6.35	11	0.8	0.9	★	★	★	★
	11NR-14BSPT	11NL-14BSPT	14	6.35	11	0.9	1	★	★	★	★
	16NR-28BSPT	16NL-28BSPT	28	9.525	16	0.6	0.6	★	★	★	★
	16NR-19BSPT	16NL-19BSPT	19	9.525	16	0.8	0.9	★	★	★	★
	16NR-14BSPT	16NL-14BSPT	14	9.525	16	1	1.2	★	★	★	★
	16NR-11BSPT	11NL-11BSPT	11	9.525	16	1.1	1.5	★	★	★	★

★ Recommended grade (always stock available) ☆ Available grade ○ Make-to-order

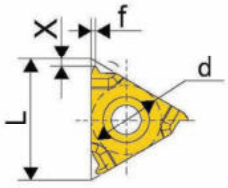
TURNING Threading Inserts

U. S. 60° spinal canal thread NPT

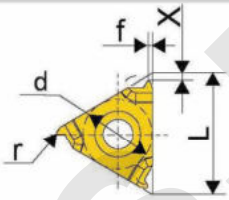
ASME B1. 20. 1-1983
Standard NPT




Rtype



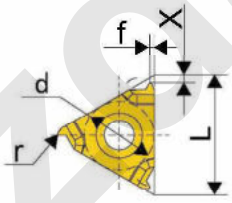

Ltype



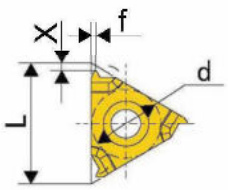
Type	Oesignnation Right	Oesignnation Left	TPI	Dimensions (mm)				Recommended coating grade		Recommended coating grade	
				d	L	X	f	SD1025		SD1125	
								R	L	R	L
External	11ER-27NPT	11EL-27NPT	27	6. 35	11	0. 7	0. 8	★	★	★	★
	11ER-18NPT	11EL-18NPT	18	6. 35	11	0. 8	1	★	★	★	★
	11ER-14NPT	11EL-14NPT	14	6. 35	11	0. 8	1	★	★	★	★
	16ER-28NPT	16EL-28NPT	28	9. 525	16	0. 7	0. 8	★	★	★	★
	16ER-18NPT	16EL-18NPT	18	9. 525	16	0. 8	1	★	★	★	★
	16ER-14NPT	16EL-14NPT	14	9. 525	16	0. 9	1. 2	★	★	★	★
	16ER-11. 5NPT	11EL-11. 5NPT	11. 5	9. 525	16	1. 1	1. 5	★	★	★	★
	16ER-8NPT	11EL-8NPT	8	9. 525	16	1. 3	1. 8	★	★	★	★

★ Recommended grade (always stock available) ☆ Available grade ○ Make-to-order


Rtype




Ltype

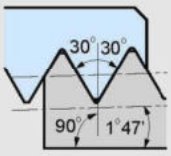


Type	Oesignnation Right	Oesignnation Left	TPI	Dimensions (mm)				Recommended coating grade		Recommended coating grade	
				d	L	X	f	SD1025		SD1125	
								R	L	R	L
Internal	11NR-27NPT	11NL-27NPT	27	6. 35	11	0. 7	0. 8	★	★	★	★
	11NR-18NPT	11NL-18NPT	18	6. 35	11	0. 8	1	★	★	★	★
	11NR-14NPT	11NL-14NPT	14	6. 35	11	0. 8	1	★	★	★	★
	16NR-28NPT	16NL-28NPT	28	9. 525	16	0. 7	0. 8	★	★	★	★
	16NR-18NPT	16NL-18NPT	18	9. 525	16	0. 8	1	★	★	★	★
	16NR-14NPT	16NL-14NPT	14	9. 525	16	0. 9	1. 2	★	★	★	★
	16NR-11. 5NPT	11NL-11. 5NPT	11. 5	9. 525	16	1. 1	1. 5	★	★	★	★
	16NR-8NPT	11NL-8NPT	8	9. 525	16	1. 3	1. 8	★	★	★	★

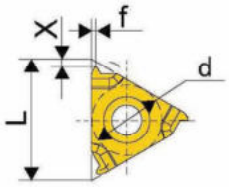
★ Recommended grade (always stock available) ☆ Available grade ○ Make-to-order

American dry sealing straight pipe thread NPTF

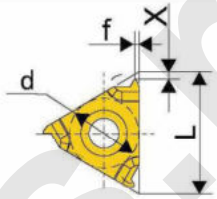
NPTF60°
Standard: ANSI B1.20.1-1983
tolerance grade: two grades



Rtype



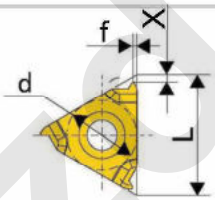
Ltype



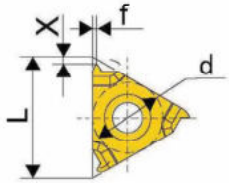
Type	Oesignnation Right	Oesignnation Left	TPI	Dimensions (mm)				Recommended grade		Recommended grade	
				d	L	X	f	SD1025		SD1125	
								R	L	R	L
External	11ER-27NPTF	11EL-27NPTF	27	6.35	11	0.7	0.8	★	★	★	★
	11ER-18NPTF	11EL-18NPTF	18	6.35	11	0.8	1	★	★	★	★
	11ER-14NPTF	11EL-14NPTF	14	6.35	11	0.8	1	★	★	★	★
	16ER-28NPTF	16EL-28NPTF	28	9.525	16	0.7	0.8	★	★	★	★
	16ER-18NPTF	16EL-18NPTF	18	9.525	16	0.8	1	★	★	★	★
	16ER-14NPTF	16EL-14NPTF	14	9.525	16	0.9	1.2	★	★	★	★
	16ER-11.5NPTF	11EL-11.5NPTF	11.5	9.525	16	1.1	1.5	★	★	★	★
	16ER-8NPTF	11EL-8NPTF	8	9.525	16	1.3	1.8	★	★	★	★

★ Recommended grade (always stock available) ☆ Available grade ○ Make-to-order

Rtype



Ltype



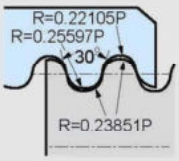
Type	Oesignnation Right	Oesignnation Left	TPI	Dimensions (mm)				Recommended grade		Recommended grade	
				d	L	X	f	SD1025		SD1125	
								R	L	R	L
Internal	11NR-27NPTF	11NL-27NPTF	27	6.35	11	0.7	0.8	★	★	★	★
	11NR-18NPTF	11NL-18NPTF	18	6.35	11	0.8	1	★	★	★	★
	11NR-14NPTF	11NL-14NPTF	14	6.35	11	0.8	1	★	★	★	★
	16NR-28NPTF	16NL-28NPTF	28	9.525	16	0.7	0.8	★	★	★	★
	16NR-18NPTF	16NL-18NPTF	18	9.525	16	0.8	1	★	★	★	★
	16NR-14NPTF	16NL-14NPTF	14	9.525	16	0.9	1.2	★	★	★	★
	16NR-11.5NPTF	11NL-11.5NPTF	11.5	9.525	16	1.1	1.5	★	★	★	★
	16NR-8NPTF	11NL-8NPTF	8	9.525	16	1.3	1.8	★	★	★	★

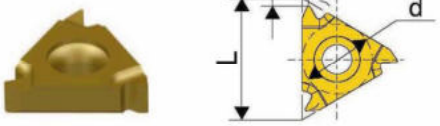
★ Recommended grade (always stock available) ☆ Available grade ○ Make-to-order

TURNING Threading Inserts

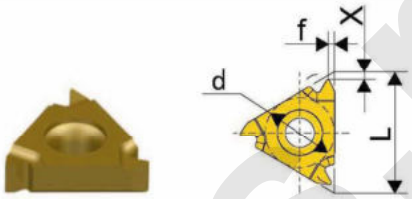
DIN405 Round tooth thread

DIN 405
tolerance grade: 7级





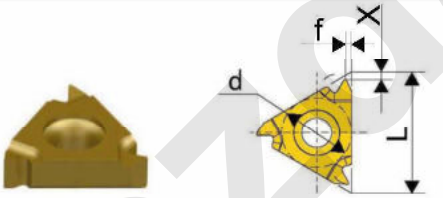
R type



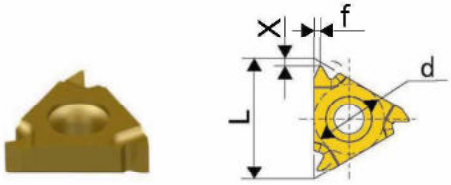
L type

Type	Designation Right	Designation Left	TPI	Dimensions (mm)				Recommended coating grade		Recommended coating grade	
				d	L	X	f	SD1025		SD1125	
								R	L	R	L
External	16ER-10RD	16EL-10RD	10	9.525	16	1.1	1.2	★	★	★	★
	16ER-8RD	16EL-8RD	8	9.525	16	1.4	1.3	★	★	★	★
	16ER-6RD	16EL-6RD	6	9.525	16	1.5	1.7	★	★	★	★
	22ER-6RD	22EL-6RD	6	12.7	22	1.5	1.7	★	★	★	★
	22ER-4RD	22EL-4RD	4	12.7	22	2.2	2.3	★	★	★	★
	27ER-4RD	27EL-4RD	4	15.875	27	2.2	2.3	★	★	★	★

★ Recommended grade (always stock available) ☆ Available grade ○ Make to order



R type



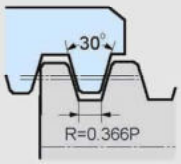
L type

Type	Designation Right	Designation Left	TPI	Dimensions (mm)				Recommended coating grade		Recommended coating grade	
				d	L	X	f	SD1025		SD1125	
								R	L	R	L
Internal	16ER-10RD	16EL-10RD	10	9.525	16	1.1	1.2	★	★	★	★
	16ER-8RD	16EL-8RD	8	9.525	16	1.4	1.3	★	★	★	★
	16ER-6RD	16EL-6RD	6	9.525	16	1.5	1.7	★	★	★	★
	22ER-6RD	22EL-6RD	6	12.7	22	1.5	1.7	★	★	★	★
	22ER-4RD	22EL-4RD	4	12.7	22	2.2	2.3	★	★	★	★
	27ER-4RD	27EL-4RD	4	15.875	27	2.2	2.3	★	★	★	★

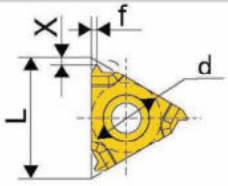
★ Recommended grade (always stock available) ☆ Available grade ○ Make-to-order

DINI103 Acme screw thread

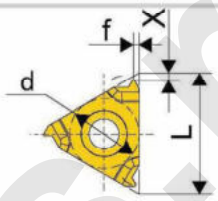
ISO 2901-2904
tolerance grade: 7级




Rtype



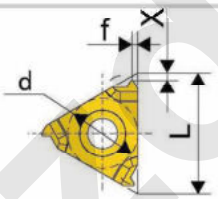

Ltype



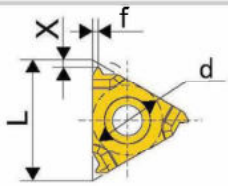
Type	Oesignnation Right	Oesignnation Left	TPI	Dimensions (mm)				Recommended grade		Recommended grade	
				d	L	X	f	SD1025		SD1125	
								R	L	R	L
External	11ER-1.5TR	11EL-1.5TR	1.5	6.35	11	0.8	0.9	★	★	★	★
	16ER-1.5TR	16EL-1.5TR	1.5	9.525	16	1	1.1	★	★	★	★
	16ER-2.0TR	16EL-2.0TR	2	9.525	16	1.1	1.3	★	★	★	★
	16ER-3.0TR	16EL-3.0TR	3	9.525	16	1.3	1.5	★	★	★	★
	22ER-4.0TR	22EL-4.0TR	4	12.7	22	1.7	1.9	★	★	★	★
	22ER-5.0TR	22EL-5.0TR	5	12.7	22	2.1	2.5	★	★	★	★
	27ER-6.0TR	27ER-6.0TR	6	15.875	27	2.3	2.7	★	★	★	★

★ Recommended grade (always stock available) ☆ Available grade ○ Make-to-order


R type




L type



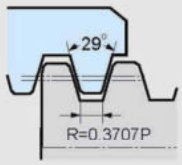
Type	Oesignnation Right	Oesignnation Left	TPI	Dimensions (mm)				Recommended grade		Recommended grade	
				d	L	X	f	SD1025		SD1125	
								R	L	R	L
Internal	11NR-1.5TR	11NL-1.5TR	1.5	6.35	11	0.8	0.9	★	★	★	★
	16NR-1.5TR	16NL-1.5TR	1.5	9.525	16	1	1.1	★	★	★	★
	16NR-2.0TR	16NL-2.0TR	2	9.525	16	1.1	1.3	★	★	★	★
	16NR-3.0TR	16NL-3.0TR	3	9.525	16	1.3	1.5	★	★	★	★
	22NR-4.0TR	22NL-4.0TR	4	12.7	22	1.7	1.9	★	★	★	★
	22NR-5.0TR	22NL-5.0TR	5	12.7	22	2.1	2.5	★	★	★	★
	27NR-6.0TR	27NR-6.0TR	6	15.875	27	2.3	2.7	★	★	★	★

★ Recommended grade (always stock available) ☆ Available grade ○ Make-to-order

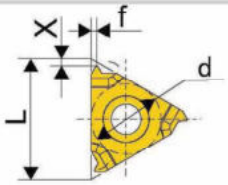
TURNING Threading Inserts

Whitworth thread

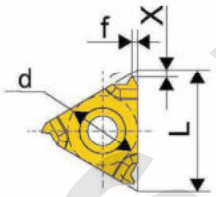
ANSI B1.5-1988 ANSI B1.5-1988
tolerance grade: 2G




Rtype



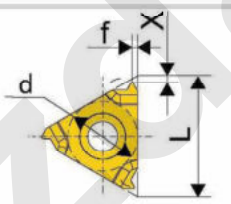

Ltype



Type	Oesignnation Right	Oesignnation Left	TPI	尺寸Dimensions (mm)				Recommended coating grade SD1025		Recommended coating grade SD1125	
				d	L	X	f	R	L	R	L
External	11ER-16ACME	11EL-16ACMT	16	6.35	11	1	1.1	★	★	★	★
	16ER-16ACME	16EL-16ACME	16	9.525	16	1	1.1	★	★	★	★
	16ER-14ACME	16EL-14ACME	14	9.525	16	1	1.2	★	★	★	★
	16ER-12ACME	16EL-12ACME	12	9.525	16	1.1	1.2	★	★	★	★
	16ER-10ACME	16EL-10ACME	10	9.525	16	1.3	1.4	★	★	★	★
	16ER-8CME	16EL-8ACME	8	9.525	16	1.4	1.5	★	★	★	★
	16ER-6ACME	16EL-6ACME	6	9.525	16	1.7	1.9	★	★	★	★
	22ER-6ACME	22EL-6ACME	6	12.7	22	1.8	2.1	★	★	★	★
	22ER-5ACME	22EL-5ACME	5	12.7	22	2	2.3	★	★	★	★
	27ER-4ACME	27EL-4ACME	4	15.875	27	2.4	2.7	★	★	★	★

★ Recommended grade (always stock available) ☆ Available grade ○ Make-to-order


Rtype

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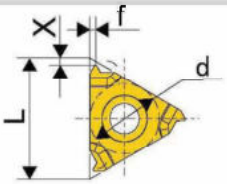


Type	Oesignnation Right	Oesignnation Left	TPI	Dimensions (mm)				Recommended coating grade SD1025		Recommended coating grade SD1125	
				d	L	X	f	R	L	R	L
Internal	11NR-16ACME	11NL-16ACMT	16	6.35	11	1	1.1	★	★	★	★
	16NR-16ACME	16NL-16ACME	16	9.525	16	1	1.1	★	★	★	★
	16NR-14ACME	16NL-14ACME	14	9.525	16	1	1.2	★	★	★	★
	16NR-12ACME	16NL-12ACME	12	9.525	16	1.1	1.2	★	★	★	★
	16NR-10ACME	16NL-10ACME	10	9.525	16	1.3	1.4	★	★	★	★
	16NR-8CME	16NL-8ACME	8	9.525	16	1.4	1.5	★	★	★	★
	16NR-6ACME	16NL-6ACME	6	9.525	16	1.7	1.9	★	★	★	★
	22NR-6ACME	22NL-6ACME	6	12.7	22	1.8	2.1	★	★	★	★
	22NR-5ACME	22NL-5ACME	5	12.7	22	2	2.3	★	★	★	★
	27NR-4ACME	27NL-4ACME	4	15.875	27	2.3	2.6	★	★	★	★

★ Recommended grade (always stock available) ☆ Available grade ○ Make-to-order

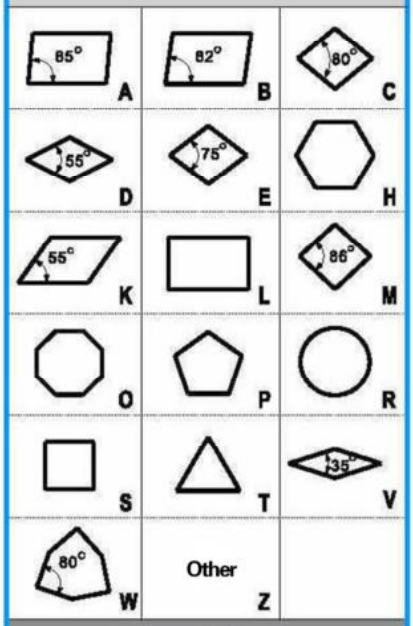
MILLING

Indexable Milling Tools

MILLING Indexable milling tools overview

Indexable Milling Inserts Code Key

Insert Shape / Code



Insert shape

Metric Size

Code	With/ Without hole	With/Without chipbreaker	Section plane of Insert	Code	With/ Without hole	With/Without chipbreaker	Section plane of Insert
B	With	Without	>65°	N	Without	Without	
H	With	Single-side	>65°	R	Without	Single-side	
C	With	Without	>65°	F	Without	Double-side	
J	With	Double-side	>65°	A	With	Without	
W	With	Without	≤65°	M	With	Single-side	
T	With	Single-side	≤65°	G	With	Double-side	
Q	With	Without	≤65°	X	---	---	Special
U	With	Double-side	≤65°				

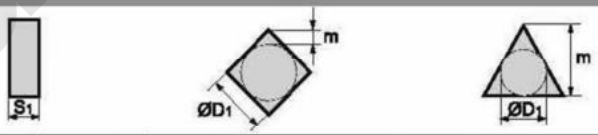
Chipbreaker and clamping system

S P K N

Clearance angle of main cutting edge

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

Tolerance



Code	Nose height M Tolerance(mm)	Inscribed circle ØD1 Tolerance(mm)	Thickness S Tolerance(mm)
A	±0.005	±0.025	±0.025
F	±0.005	±0.013	±0.025
C	±0.013	±0.025	±0.025
H	±0.013	±0.013	±0.025
E	±0.025	±0.025	±0.025
G	±0.025	±0.025	±0.13
J	±0.005	±0.05-±0.13	±0.025
K	±0.013	±0.05-±0.13	±0.025
L	±0.025	±0.05-±0.13	±0.025
M	±0.08-±0.18	±0.05-±0.13	±0.13
N	±0.08-±0.18	±0.05-±0.13	±0.025
U	±0.13-±0.38	±0.08-±0.25	±0.13

(Reference) details of M-class tolerance (identified by shape and size)

● Nose height tolerance(mm)

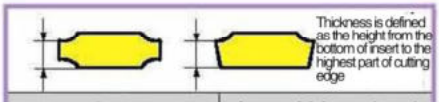
Inscribed circle	Regular triangle	Square	Diamond with 80°	Diamond with 55°	Diamond with 35°	Round
6.35	±0.08	±0.08	±0.08	±0.11	±0.16	—
9.525	±0.08	±0.08	±0.08	±0.11	±0.16	—
12.7	±0.13	±0.13	±0.13	±0.15	—	—
15.875	±0.15	±0.15	±0.15	±0.18	—	—
19.05	±0.15	±0.15	±0.15	±0.18	—	—
25.4	—	±0.18	—	—	—	—

● Tolerance of Inscribed Circle D1(mm)

Inscribed circle	Regular triangle	Square	Diamond with 80°	Diamond with 55°	Diamond with 35°	Round
6.35	±0.05	±0.05	±0.05	±0.05	±0.05	—
9.525	±0.05	±0.05	±0.05	±0.05	±0.05	±0.0
12.7	±0.08	±0.08	±0.08	±0.08	—	±0.0
15.875	±0.10	±0.10	±0.10	±0.10	—	±0.1
19.05	±0.10	±0.10	±0.10	±0.10	—	±0.1
25.4	—	±0.13	—	—	—	±0.1

Diameter of IC (mm)	Insert Shape C	D	R	S	T	V	W
3.97					06		
5.0			05				
5.56					09		
6.0			06				
6.35	06	07			11	11	
8.0			08				
9.525	09	11	09	09	16	16	08
10.0			10				
12.0			12				
12.7	12	15	12	12	22	22	08
15.875	16		15	15	27		
16.0		19	16				
19.05	19		19	19	33		
20.0			20				
25.0	25	25	25				
25.4			25	25			
31.75			31				
32			32				

Length of cutting edge



Code	Insert thickness(mm)
00	0.79
T0	0.99
01	1.59
T1	1.98
02	2.38
T2	2.58
03	3.18
T3	3.97
04	4.76
T4	4.96
05	5.56
T5	5.95
06	6.35
T6	6.75
07	7.94
09	9.52
T9	9.72
11	11.11
12	12.70

Insert thickness(mm)

15 04 ED S32 L - SM

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

Chamfer (mm)			
F	0-5°	0-0.10	K
	1-10°	1-0.15	
E	2-15°	2-0.20	P
	3-20°	3-0.25	
T	4-25°	4-0.30	W
	5-30°	5-0.35	
		6-0.40	
S		7-0.45	No mark

Chipbreaker code

Cutting direction	
R	Right hand
L	Left hand
N	Neutral

Operating pattern	Series/Shape	Approach angle/Max. cuttiing(mm)	Applicable insert	Application overview	Features
Face milling	**AF01** 	Kr=45° a_{pmax}=6.0	SEET12T3-SF/SM/SR SEET12T3-ZF/ZM/ZR SEET12T3-BF/BM SEET12T3-AH/W	General face milling of the following materials: steel, alloy steel, stainless steel, cast iron, aluminum alloy, high-temperature alloy	Diameter range Ø50-Ø315 Large rake angle makes cutting easier and faster.Wide applications can be achieved by using available inserts with different chipbreakers. Adopting inserts with wiper can improve surface quality.
	AF02 	Kr=45° a_{pmax} =6.0	SEET12T3-SF/SM/SR SEET12T3-ZF/ZM/ZR SEET12T3-BF/BM SEET12T3-AH/W	General face milling of the following materials: steel, alloy steel, stainless steel, cast iron, aluminum alloy, high-temperature alloy	Diameter range Ø50-Ø125 Large rake angle makes cutting easier and faster. Wide applications can be achieved by using available inserts with different chipbreakers. Coarse and different pitch, reducing vibration.
	AF03 	Kr=45° a_{pmax}=5.5	SE□N1203AF□□ SE□R1203AF□□	General face milling of steel, stainless steel, cast iron.	Diameter range Ø80-Ø315 Large rake angle makes cutting easier and faster. Top clamping achieves better vibration resistance.
		Kr=45° a_{pmax}=7.5	SE□N1504AF□□ SE□R1504AF□□		
	AF04 	Kr=45° a_{pmax}=3.5	OFKT05T3-SF/SM OFKT05T3-AH	Face milling of steel, alloy steel, cast iron, aluminum alloy.	Diameter range Ø50-Ø160 High-economy milling tool with 8 cutting edges. Screw clamping, high precision.
		Kr=45° a_{pmax} =5.0	OFKR0704-SF/SM	Face milling of steel, alloy steel and cast iron.	Diameter range Ø125-Ø315 High-economy milling tool with 8 cutting edges. Top clamping makes it easy to assemble and disassemble.
	AF06 	Kr=45° a_{pmax}=4.0	ONHU060408-GF/GM/W	General face milling of steel and cast iron.	Diameter range Ø25-Ø50 High-economy milling tool with 16 cutting edges.
		Kr=45° a_{pmax}=5.0	ONHU08T508-GF/GM/W	General face milling of steel and cast iron.	Diameter range Ø50-Ø315 High-economy milling tool with 16 cutting edges.
	DF01 	Kr=67° a_{pmax}=5.0	PNEG110512R-ZF/ZM/ZR PNEG110512R-GF/GM/GR	General face milling of steel and cast iron.	Diameter range Ø50-Ø315 High-economy milling tool with 10 cutting edges.
		Kr=55° a_{pmax}=6.0	HNEX090512-SF/SM HNEX090512-SR	General face milling of cast iron.	Diameter range Ø80-Ø315 High-economy milling tool with 12 cutting edges. Top clamping makes it easy to assemble and disassemble.

MILLING Indexable milling tools overview

Operating pattern	Series/Shape	Approach angle/Max. cuttiing(mm)	Applicable insert	Application overview	Features
Face milling	**EF04** 	Kr=75° a_{pmax}=6.0	SPKW1204EDFR SPKW1204EDSR SPKT1204EDR	Face milling of steel, alloy steel and cast iron	Diameter range Ø50-Ø125 Kr75° ,general face milling Wide applications can be achieved by using inserts with different chipbreakers
	EF03 	Kr=75° a_{pmax}=6.0	SP□N1203(1504)ED□□ SP□R1203(1504)ED□□	Face milling of steel, alloy steel and cast iron	Diameter range Ø80-Ø315 Kr75° ,general face milling Top clamping makes it easy to assemble and disassemble
		Kr=75° a_{pmax}=8.0	SP□N1504ED□□ SP□R1504ED□□		
	PF01 	Kr=90° a_{pmax}=18.0	TP□N2204PD□ TPKN2204PDF□ TPKN2204PDT□	Face milling of steel, alloy steel and cast iron	Diameter range Ø80-Ø315 Kr90° , for square shoulder milling Top clamping makes it easy to assemble and disassemble.
	PF02 	Kr=90° a_{pmax}=6.7	SEET09T308PER-GF/GM SEET09T308PER-GR	Face milling of steel, alloy steel, stainless steel and cast iron	Diameter range Ø50-Ø315 Kr90° , for square shoulder milling Different pitches:coarse pitch,close pitch and extra close pitch High precision insert,high work–piece surface quality Optimized chipbeaker and grade,suitable for finishing, semi–finishing and roughing
		Kr=90° a_{pmax}=10.8	SEET120308PER-GF/GM SEET120308PER-GR		
	RF01 	a_{pmax}=5.0	RCKT10T3MO-SM	Cavity profile milling of steel, alloy steel, stainless steel and cast iron	Diameter range Ø25-Ø50 R–type inserts have extra–strong cutting edgesSuitable for machining of curved surface of die Economical milling tools with screw clamping
		a_{pmax}=6.0	RCKT1204MO-SM/SR/BR		
		a_{pmax}=6.0	RCKT1204MO-SM/SR/BR	ace milling and cavity profile milling of steel, alloy steel, stainless steel and cast iron	Diameter range Ø63-Ø200 R–type inserts have extra–strong cutting edges Suitable for machining of curved surface of die Economical milling tools with screw clamping
		a_{pmax}=8.0	RCKT1606MO-SM/SR/BR		
		a_{pmax}=10.0	RCKT2006MO-SR/BR		
	RF02 	a_{pmax}=4.0	RDKW0803MO	Cavity profile milling of steel, alloy steel, stainless steel and cast iron	Diameter range Ø25-Ø50 R–type inserts have extra–strong cutting edges Suitable for machining of curved surface of die Economical milling tools with screw clamping
		a_{pmax}=5.0	RDKW10T3MO		
		a_{pmax}=6.0	RDKW1204MO		

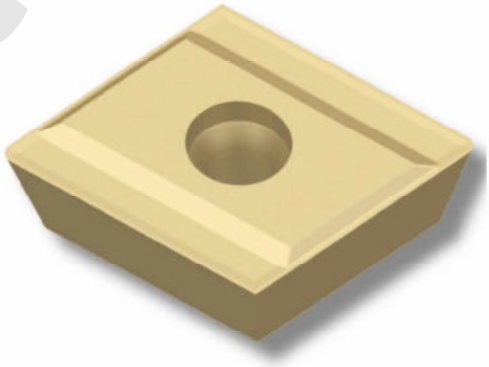
Operating pattern	Series/Shape	Approach angle/Max. cuttiing(mm)	Applicable insert	Application overview	Features
Face milling	**RF02** 	a_{pmax}=6.0	RDKW1204MO	Face milling and cavity profile milling of steel, alloy steel, stainless steel and cast iron	Diameter range Ø50-Ø160 R–type inserts have extra–strong cutting edges Suitable for machining of curved surface of die
		a_{pmax}=8.0	RDKW1605MO		
		a_{pmax}=10.0	RDKW2006MO		
Square shoulder milling	**PE01** 	Kr=90° a_{pmax}=10.5	APKT11T3□□-GF/GM/GR APKT11T3□□-AH	Multi–function milling of steel, alloy steel, stainless steel, cast iron and aluminum alloy	Two mounting styles: Straight shank and Weldon shank, diameter range Ø12-Ø63 Kr90°, for square shoulder milling, slot milling, ramp milling, etc. Inserts with wiper, also suitable for face milling. Inserts with 3D helical cutting edge, less cutting force
		Kr=90° a_{pmax}=15.5	APKT160408- GF/GM/GR APKT160408-AH		
		Kr=90° a_{pmax}=10.5	APKT11T3□□- GF/GM/GR APKT11T3□□-AH	Face milling and cavity profile milling of steel, alloy steel, stainless steel cast iron and Al alloy	Diameter range Ø50-Ø160 Kr90° ,for square shoulder milling Inserts with wiper, also suitable for face milling. Inserts with 3D helical cutting edge, less cutting force
		Kr=90° a_{pmax}=15.5	APKT160408- GF/GM/GR APKT160408-AH		
	PE02 	Kr=90° a_{pmax}=39.0	APKT11T3□□- GF/GM/GR APKT11T3□□-AH	Milling of steel, alloy steel, stainless steel, cast iron and aluminum alloy at high cutting depth	Diameter range Ø50-Ø100 End mills with positive helical angle, good chip removal For side face milling and slot machining Close pitch, high machining efficiency
		Kr=90° a_{pmax}=58.0	APKT11T3□□- GF/GM/GR APKT11T3□□-AH	Milling of steel, alloy steel, stainless steel, cast iron and aluminum alloy at high cutting depth	Diameter range Ø20-Ø40 End mills with positive helical angle, good chip removal For side face milling and slot machining Close pitch, high machining efficiency
	PE03 	Kr=90° a_{pmax}=40.0	APMT1135PDR APMT160408PDER	Face milling and cavity profile milling of steel, alloy steel, stainless steel cast iron and Al alloy	Diameter range Ø25-Ø40 End edge over center, for drilling directly

MILLING Indexable milling tools overview

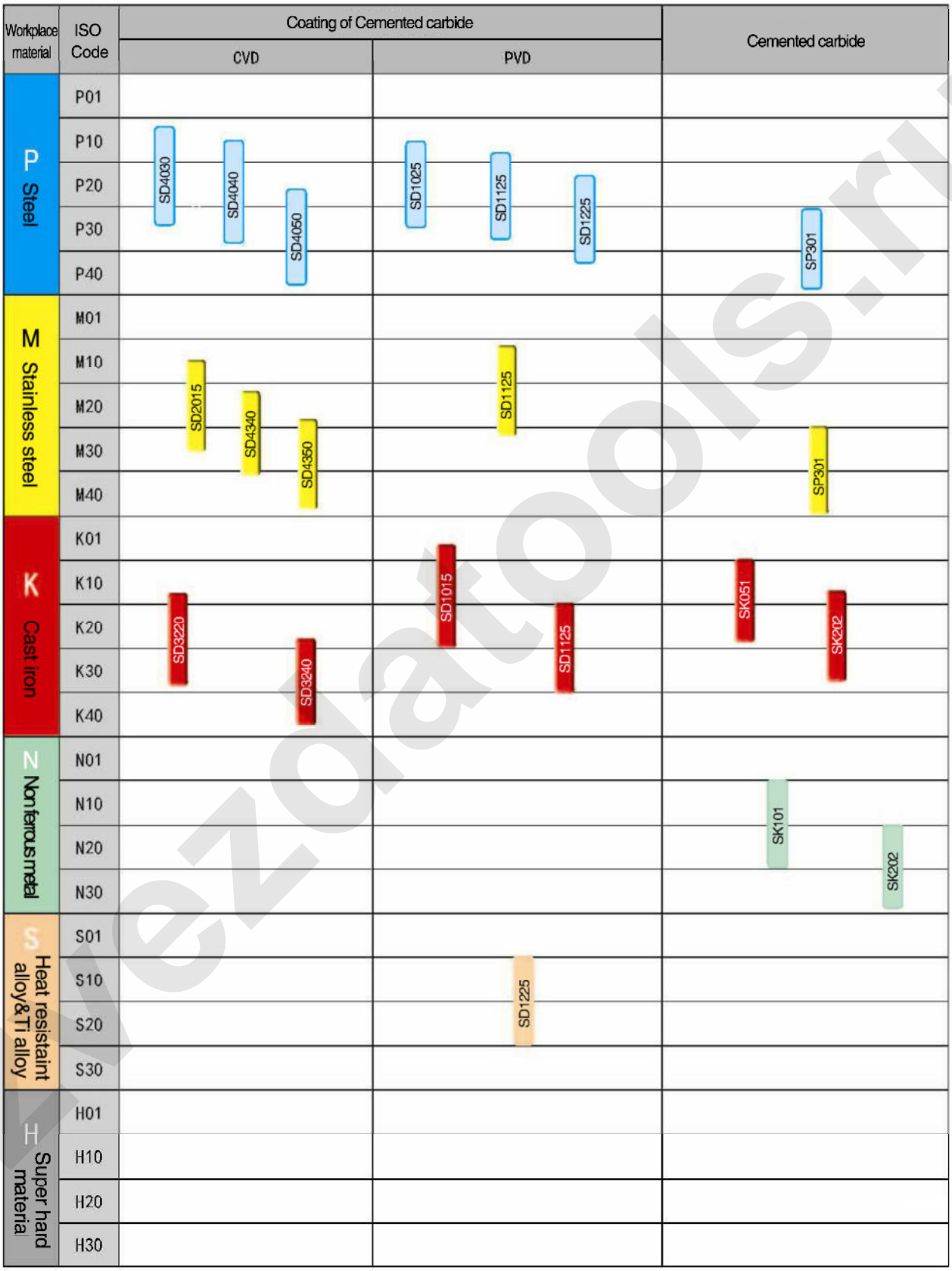
Operating pattern	Series/Shape	Approach angle/Max. cuttiing(mm)	Applicable insert	Application overview	Features
Side and face milling	**PT02** 	Cutting depth: see the detailed information about tool specifications	XSEQ12□□	Slot milling of steel, stainless steel and cast iron	Diameter range Ø100-Ø250 Two mounting style: mounting by keyway and arbor mounting. Groove width tange4、5、6、7、8mm
	PT01 	Cutting depth: see the detailed information about tool specifications	MPHT□□	Slot milling of steel, stainless steel and cast iron	Diameter range Ø80-Ø250 Two mounting style: mounting by keyway and arbor mounting. Groove width tange10、12、16、18、20mm
T-slot milling	**PT01** 	Kr=90°	MPHT□□	Machining T slot in cast iron	Diameter range Ø21-Ø60 Machining T-slot with normal size 12、14、18、22、28、36.
Special milling(high feed)	**XK01** 	Cutting depth: see the detailed information about tool specifications	SDMT□□-SM/GM	Slot milling of steel, stainless steel and cast iron	Diameter range Ø25-Ø100 Two mounting types: straight shank and arbor mounting. Cutting forces are resolved effectively. achieving cutting with high feed rate. For plunge milling Double clamping, firm and reliable.
	XK02 		WPGT□□ZSR WPGT□□ZSR-GM	Face and cavity profile milling of steel, stainless steel and cast iron in cavity applications.	Diameter rangeØ20-Ø100 Two mounting types: straight shank and arbor mounting. Cutting forces are resolved effectively. achieving cutting with high feed rate. For plunge milling Double clamping, firm and reliable.

Indexable milling tools overview MILLING

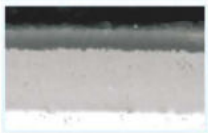
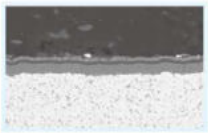
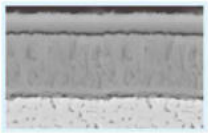
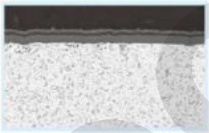
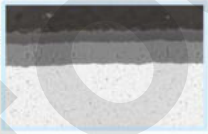
Operating pattern	Series/Shape	Approach angle/Max. cuttiing(mm)	Applicable insert	Application overview	Features
Helical end mills	**PH01** 	Kr=90° a_{pmax}=55	APKT150412-GM/ZM SPMT120408-GM/ZM	Milling of steel alloy steel and cast iron at high cutting depth	Diameter range Ø40、Ø80 Coarse and differential pitch, less vibration Holistic structure with good rigidity. interchangeable heads achieve high economical efficiency
		Kr=90° a_{pmax}=144			
Chamfer milling	**ZC01** 	Kr=30°	SPMT120408	SPMT120408 Chamfer machining of steel, alloy steel stainless steel and cast iron	Diameter range Ø12、Ø25、Ø32、Ø36 With the function of milling small surface.
	AC01 	Kr=45°			
	DC01 	Kr=60°			



Milling insert grades overview



CVD Coating of cemented carbide

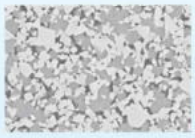
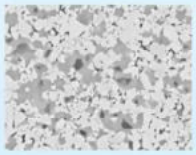
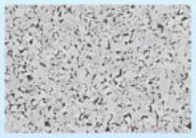
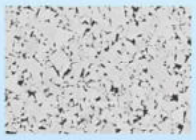
Material	Coating structure	Micro structure	ISO applied range	Application field
SD4030	Combination of high–toughness,high–strength substrate and coating composed of TiCN, thin Al_2O_3 and TiN		P15~35	Suitable for semi–finish and rough milling of P–type material.
SD4040	Combination of high toughness, high strength substrate and coating composed of TiCN, thin Al_2O_3 and TiN		P15~35 M10~30	Suitable for rough and semi–finish milling of P–type M–type. whose hardness is below HRC15 and under.
SD4050	Combination of high toughness, high strength substrate and coating composed of TiCN, thin Al_2O_3 and TiN		P15~40 M10~30	Suitable for semi–finish and rough milling of P and M–type. material.
SD4330	Combination of high toughness, gradent high substrate and coating composed of TiCN, and ultra fine Al_2O_3		M10~30	Suitable for rough milling of M–type material.
SD4340	Combination of high toughness, substrate and coating composed of TiCN, thin Al_2O_3 and TiN.		P25~40 M20~35	Suitable for rough milling of P and M–type material.
SD3115	Good combination of substrate with high wear–resistance and coating composed of TiCN and thick Al_2O_3		K05~25	Suitable for finish and semi–finish milling of K–type material.
SD3125	Good combination of substrate with high wear–resistance and coating composed of TiCN and thick Al_2O_3		K15~35	Suitable for rough and semi–finish milling of K–type material.

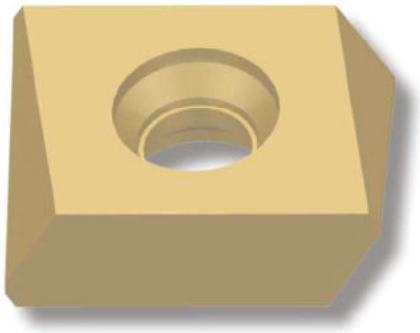
PVD Coating of cemented carbide

Material	Coating structure	ISO applied range	Application field
SD1015	Fine carbide substrate +Nano coating	K05~K20	Suitable for finish and semi–finish milling of K–type material
SD1025	Substrate with excellent deformation resistance +Nano coating.	P10~30 M10~30 S05~20	PVD grade with wide application widely applied in semi–finish milling P and M and S–type material.
SD1035	Ultra fine carbide substrate+Nano coating	M10~30	Suitable for rough milling of M–type material.
SD1125	substrate with good toughness and strength+Nano coating	P25~40 M25~40	Suitable for finish and semi–finish milling of P and M–type material.
SD1135	substrate with moderate hardness and strength+Nano coating.	K20~35	Suitable for rough and milling of K–type material

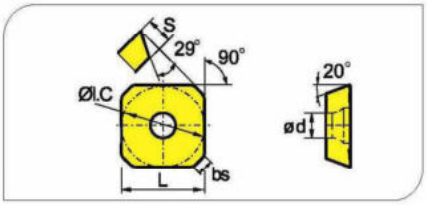
MILLING Grade classification for milling inserts

cemented carbide

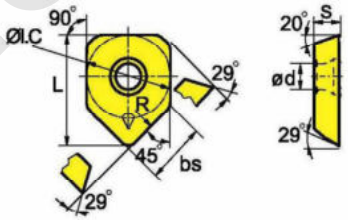
Material	Micro structure	ISO applied range	Application field
SP302		P25~40 M25~40	Suitable for rough milling of P– and M–type material.
SK051		K05~20	Suitable for finish and semi–finish milling of K–type material
SK101		N05~25	Suitable for finish and semi–finish milling N–type material.
SK202		K15~35 N15~30	Suitable for rough and semi–finish milling of K–type material. and rough miilling of N–type material.



AF01/02 Selection of inserts



Insert shape	Type	Basic dimensions(mm)						CVD Coating						PVD Coating						Cermet	Cemented carbide			
		L	ØI.C	S	ød	bs	R	SD4030	SD4040	SD4050	SD4330	SD4340	SD4350	SD1015	SD1025	SD1035	SD1115	SD1125	SD1135		SP302	SK001	SK101	SK201
	SEET12T3-SF	13.4	13.4	3.97	4.1	2.55		●			★	○		★	○		○							
	SEET12T3-MF	13.4	13.4	3.97	4.1	2.55		●			★	○		★	○		○							
	SEET12T3-BF	13.4	13.4	3.97	4.1	2.55		●			★	○		★	○		○							
	SEET12T3-FM	13.4	13.4	3.97	4.1	2.55		●	●		○	★			★			○						
	SEET12T3-MM	13.4	13.4	3.97	4.1	2.55			●		○	★			★			○						
	SEET12T3-BM	13.4	13.4	3.97	4.1	2.55			●	●	○	★			★			○						
	SEET12T3-SR	13.4	13.4	3.97	4.1	2.55				●		○	★		○	★			○					
	SEET12T3-MR	13.4	13.4	3.97	4.1	2.55				●		○	★		○	★			○					
	SEET12T3-AH	13.4	13.4	3.97	4.1	2.55																	○	★
	SEET12T3-W	17.82	13.4	3.97	4.1	9.46	500			●		★			★									



★ Recommended grade (always stock available) ● Available grade (always stock available) ○ Make-to-order

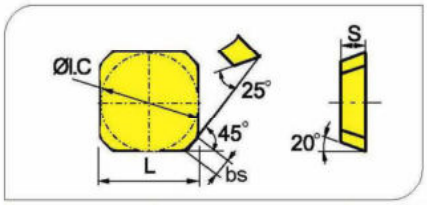
Chipbreaker selection for AF01 AF02 milling inserts

Classification \ Function	For finishing	For semi-finishing	For rough
P	-SF	-FM	-SR
M, S	-BF	-BM	
K	-MF	-MM	-MR
N	-AH		

Recomend cutting parameters

Workpiece material		Hardness HB	Insert grade	Cutting parameters			
				V(m/min)	f(mm/z)		
					-SF	-FM	-SR
P	Low-carbon steel soft steel	≤180	SD2025 SD4130	270(220-350)	0.15(0.1-0.2)	0.2 (0.1-0.3)	0.3(0.2-0.4)
			SD1125	270(200-360)	0.15(0.1-0.2)	0.2 (0.1-0.3)	0.3(0.2-0.4)
			SD1135	230(170-350)	0.15(0.1-0.2)	0.2 (0.1-0.3)	0.3(0.2-0.4)
	High-carbon steel Alloy steel	180-280	SD2025 SD4130	240 (200-320)	0.15(0.1-0.2)	0.2 (0.1-0.3)	0.3(0.2-0.4)
			SD1125	240 (180-350)	0.15(0.1-0.2)	0.2 (0.1-0.3)	0.3(0.2-0.4)
			SD1135	220 (150-330)	0.15(0.1-0.2)	0.2 (0.1-0.3)	0.3(0.2-0.4)
	Alloy tool steel	280-350	SD2025 SD4130	220 (180-300)	0.15(0.1-0.2)	0.2 (0.1-0.3)	0.3(0.2-0.4)
			SD1125	220 (170-340)	0.15(0.1-0.2)	0.2 (0.1-0.3)	0.3(0.2-0.4)
			SD1135	190 (130-300)	0.15(0.1-0.2)	0.2 (0.1-0.3)	0.3(0.2-0.4)
M					-BF	-BM	
	Stainless steel	≤270	SD2025	150 (120-240)	0.15(0.1-0.2)	0.2 (0.1-0.3)	
			SD1125	160 (110-270)	0.15(0.1-0.2)	0.2 (0.1-0.3)	
			SD1135	140 (100-250)	0.15(0.1-0.2)	0.2 (0.1-0.3)	
K					-MF	-MM	-MR
	Cast iron	180-250	SD1105	210 (120-300)	0.15(0.1-0.2)	0.2 (0.1-0.3)	0.3(0.2-0.4)
			SD3315	240 (180-300)	0.15(0.1-0.2)	0.2 (0.1-0.3)	0.3(0.2-0.4)
N					-AH		
	Alluminium alloy	-	SK101	300-	0.25 (0.1-0.4)		
			SK201	300-			
S					-BF	-BM	
	high temperature alloy	≤400	SD1105	50(20-60)	0.1 (0.1-0.2)	0.15 (0.1-0.3)	
			SD1125	40(20-50)	0.1 (0.1-0.2)	0.15 (0.1-0.3)	

AF03 Selection of inserts



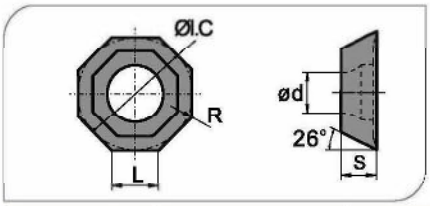
Insert shape	Type	Basic dimensions(mm)				CVD Coating						PVD Coating						Cermet	Cemented carbide			
		L	Ø I. C	S	bs	SD4030	SD4040	SD4050	SD4330	SD4340	SD4350	SD1015	SD1025	SD1035	SD1115	SD1125	SD1135		SP302	SK001	SK101	SK202
	SEEN1203AFTN	12. 7	12. 7	3. 18	1. 8	○				●			★									●
	SEKN1203AFFN	12. 7	12. 7	3. 18	1. 8	○				●												●
	SEKN1203AFN	12. 7	12. 7	3. 18	1. 8	○				●			★									●
	SEKN1203AFTN	12. 7	12. 7	3. 18	1. 8	○				●			★									●
	SEKR1203AFN	12. 7	12. 7	3. 18	1. 8	○				●			★									
	SEKN1504AFN	15. 875	15. 875	4. 76	1. 6	○				●			★									●
	SEKN1504AFTN	15. 875	15. 875	4. 76	1. 6	○				●			★									●
	SEKR1504AFN	15. 875	15. 875	4. 76	1. 6	○				●			★									

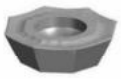
★ Recommended grade (always stock available) ● Available grade (always stock available) ○ Make-to-order

Recomend cutting parameters

Workpiece material		Hardness HB	Insert grade	Cutting parameters	
				V(m/min)	f(mm/z)
P	Low-carbon steel soft steel	≤180	SD1125	270 (200-360)	0.2 (0.1-0.3)
			SD2025 SD4130	270 (220-350)	0.2 (0.1-0.4)
			SD4140	220 (180-300)	0.25 (0.15-0.3)
			SP301	140 (100-220)	0.27 (0.1-0.4)
	High-carbon steel Alloy steel	180-280	SD1125	240 (180-350)	0.2 (0.1-0.3)
			SD2025 SD4130	240 (200-320)	0.2 (0.1-0.4)
			SD4140	200 (160-280)	0.25 (0.15-0.3)
			SP301	120 (80-200)	0.27 (0.1-0.4)
	Alloy tool steel	280-350	SD1125	220 (170-340)	0.2 (0.1-0.3)
			SD2025 SD4130	220 (180-300)	0.2 (0.1-0.4)
			SP4140	180 (150-250)	0.25 (0.15-0.3)
			SP301	100 (60-180)	0.27 (0.1-0.4)
M	Stainless steel	≤270	SD1125	140 (100-250)	0.2 (0.1-0.3)
			SD2025	130 (100-220)	0.2 (0.1-0.4)
			SD4130	140 (100-240)	0.25 (0.15-0.3)
K	Cast iron	180-250	SD1105	210 (120-300)	0.2 (0.1-0.3)
			SD3125	200 (150-250)	0.2 (0.1-0.4)
			SK201	100 (80-160)	0.25 (0.1-0.4)

AF04 Selection of inserts



Insert shape	Type	Basic dimensions(mm)					CVD Coating						PVD Coating						Cermet	Cemented carbide			
		L	ØI.C	S	ød	R	SD4130	SD4040	SD4050	SD4330	SD4340	SD4350	SD1015	SD1025	SD1035	SD1115	SD1125	SP1135		SP302	SK001	SK101	SK201
	0FKT05T3-SF	5.26	12.7	3.97	4.4	0.5					○			★						○			○
	0FKT05T3-SM	5.26	12.7	3.97	4.4	0.5					○			★						○			○
	0FKT05T3-AH	5.26	12.7	3.97	4.4	0.5					○											○	

★ Recommended grade (always stock available) ● Available grade (always stock available) ○ Make-to-order

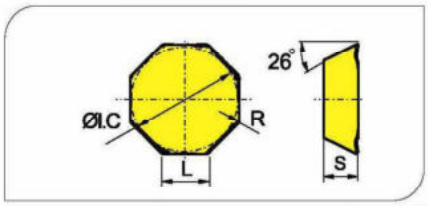
Chipbreaker selection for AF04 milling inserts

Classification \ Function	For finishing	For semi-finishing
P	-SF	-SM
M		
K		
N	-AH	

Recomend cutting parameters

Workpiece material		Hardness HB	Insert grade	Cutting parameters		
				V(m/min)	f(mm/z)	
					-SF	-SM
P	Low-carbon steel soft steel	≤180	SD2025	270 (220-350)	0.2 (0.1-0.3)	0.25 (0.1-0.4)
			SD1125	270 (200-360)	0.2 (0.1-0.3)	0.25 (0.1-0.4)
			SD4140	220 (180-300)	0.2 (0.1-0.3)	0.25 (0.1-0.4)
			SD1135	230 (170-350)	0.2 (0.1-0.3)	0.25 (0.1-0.4)
	High-carbon stee Alloy steel	180-280	SD2025	240 (200-320)	0.15 (0.1-0.3)	0.2 (0.1-0.4)
			SD1125	240 (180-350)	0.15 (0.1-0.3)	0.2 (0.1-0.4)
			SD4140	200 (160-280)	0.2 (0.1-0.3)	0.25 (0.1-0.4)
			SD1135	220 (150-330)	0.2 (0.1-0.3)	0.25 (0.1-0.4)
	Alloy tool steel	280-350	SD2025	220 (180-300)	0.15 (0.1-0.3)	0.2 (0.1-0.4)
			SD1125	220 (170-340)	0.15 (0.1-0.3)	0.2 (0.1-0.4)
			SD4140	180 (150-250)	0.2 (0.1-0.3)	0.25 (0.1-0.4)
			SD1135	190 (130-300)	0.2 (0.1-0.3)	0.25 (0.1-0.4)
M	Stainless steel	≤270	SD1125	160 (110-270)	0.15 (0.1-0.3)	0.2 (0.1-0.4)
			SD1135	140 (100-250)	0.15 (0.1-0.3)	0.2 (0.1-0.4)
			SD2025	150 (120-250)	0.15 (0.1-0.3)	0.2 (0.1-0.4)
K	Cast iron	180-250	SD1105	210 (120-300)	0.2 (0.1-0.3)	0.25 (0.1-0.4)
N					-AH	
	Aluminum alloy	-	SK101	300-	0.15 (0.05-0.3)	

AF04 Selection of inserts



Insert shape	Type	Basic dimensions(mm)				CVD Coating						PVD Coating						Cermet	Cemented carbide			
		L	ØI.C	S	R	SD4030	SD4040	SD4050	SD4330	SD4340	SD4350	SD1015	SD1025	SD1035	SD1115	SD1125	SD1135		SP302	SK001	SK101	SK202
	0FKR0704-SF	7.45	17.94	4.76	0.8				○	●		○	★									
	0FKR0704-SM	7.45	17.94	4.76	0.8				○	●		○	★									

★ Recommended grade (always stock available) ● Available grade (always stock available) ○ Make-to-order

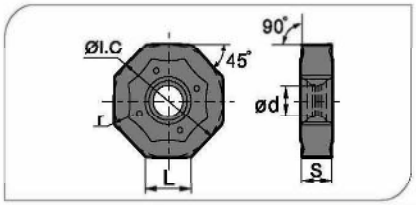
Chipbreaker selection for AF04 milling inserts

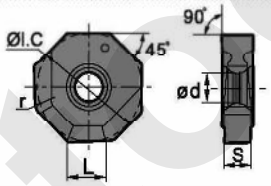
Classification \ Function	For finishing	For semi-finishing
P	-SF	-SM
M		
K		

Recomend cutting parameters

Workpiece material		Hardness HB	Insert grade	Cutting parameters		
				V (m/min)	f (mm/z)	
					-SF	-SM
P	Low-carbon steel soft steel	≤180	SD2025 SD2035	270 (220-350)	0.2 (0.1-0.3)	0.25 (0.1-0.4)
			SD1125	270 (200-360)	0.2 (0.1-0.3)	0.25 (0.1-0.4)
			SD4140	220 (180-300)	0.2 (0.1-0.3)	0.25 (0.1-0.4)
			SD1135	230 (170-350)	0.2 (0.1-0.3)	0.25 (0.1-0.4)
	High-carbon stee Alloy steel	180-280	SD2025 SD2035 SD4130	240 (200-320)	0.15 (0.1-0.3)	0.2 (0.1-0.4)
			SD1125	240 (180-350)	0.15 (0.1-0.3)	0.2 (0.1-0.4)
			SD4140	200 (160-280)	0.2 (0.1-0.3)	0.25 (0.1-0.4)
			SD1135	220 (150-330)	0.2 (0.1-0.3)	0.25 (0.1-0.4)
	Alloy tool steel	280-350	SD2025 SD2035 SD4130	220 (180-300)	0.15 (0.1-0.3)	0.2 (0.1-0.4)
			SD1125	220 (170-340)	0.15 (0.1-0.3)	0.2 (0.1-0.4)
			SD4140	180 (150-250)	0.2 (0.1-0.3)	0.25 (0.1-0.4)
			SD1135	190 (130-300)	0.2 (0.1-0.3)	0.25 (0.1-0.4)
M	Stainless steel	≤270	SD1125	160 (110-270)	0.15 (0.1-0.3)	0.2 (0.1-0.4)
			SD1135	140 (100-250)	0.15 (0.1-0.3)	0.2 (0.1-0.4)
			SD2025	150 (120-250)	0.15 (0.1-0.3)	0.2 (0.1-0.4)
			SD2035	230 (180-300)	0.15 (0.1-0.3)	0.2 (0.1-0.4)
K	Cast iron	180-250	SD1105	210 (120-300)	0.2 (0.1-0.3)	0.25 (0.1-0.4)
			SD3125	200 (150-250)	0.2 (0.1-0.3)	0.25 (0.1-0.4)

AF06 Selection of inserts



Insert shape	Type	Basic dimensions(mm)					CVD Coating						PVD Coating						Cermet	Cemented carbide			
		L	ØI.C	S	ød	r	SD4030	SD4040	SD4050	SD4330	SD4340	SD4350	SD1015	SD1025	SD1035	SD1115	SD1125	SD1135		SP302	SK001	SK101	SK202
	ONHU060408-GF	6.58	15.875	4.76	4.4	0.83					★			★									
	ONHU08T508-GF	8.37	20.2	5.77	5.3	0.83					★			★									
	ONHU060408-GM	6.58	15.875	4.76	4.4	0.83					★												
	ONHU08T508-GM	8.37	20.2	5.79	5.3	0.83					★												
	ONHU08T508-W	6.9	20.5	6.00	5.3	0.80					★			★									
																							

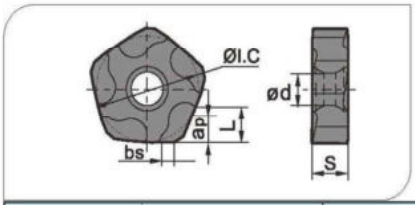
★ Recommended grade (always stock available) ● Available grade (always stock available) ○ Make-to-order

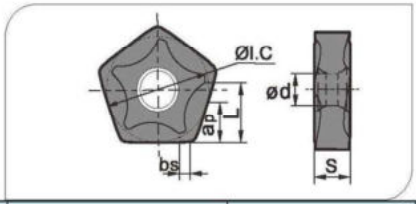
Recomend cutting parameters

Workpiece material		Hardness HB	Insert grade	Cutting parameters			
				V_c (m/min)	f_z (mm/z)	a_{pmax} (mm)	
						ONHU06□□□□-GF/GM	ONHU08□□□□-GF/GM/W
P	Low-carbon steel soft steel	≤180	SD1105 SD2035 SD1125 SD4230	270 (220-350)	0.2 (0.1-0.4)	4	5
P	High-carbon stee Alloy steel	180-280	SD1105 SD2035 SD1125 SD4230	260 (200-320)	0.2 (0.1-0.4)	4	5
P	Alloy tool steel	280-350	SD1105 SD2035 SD1125 SD4230	240 (180-300)	0.2 (0.1-0.4)	4	5
M	Stainless steel	≤270	SD2035	230 (180-300)	0.2 (0.1-0.3)	4	5
K	Cast iron	180-250	SD3315	270 (150-300)	0.4 (0.1-0.5)	4	5

Note: The recommended feed rate per tooth for inserts with wiper $f_z \leq 0.25$mm/z.

DF01 Selection of inserts





Insert shape	Type	Basic dimensions(mm)						CVD Coating						PVD Coating						Cermet	Cemented carbide			
		L	ØI.C	S	ød	bs	a_{Pmax}	SD4030	SD4040	SD4050	SD4330	SD4340	SD4350	SD1015	SD1025	SD1035	SD1115	SD1125	SD1135		SP302	SK001	SK101	SK201
	PNEG110512R-ZF	5.4	15.875	5.56	4.64	1.6	5						●		★									
	PNEG110512L-ZF	5.4	15.875	5.56	4.64	1.6	5						●		★									
	PNEG110512R-ZM	5.4	15.875	5.56	4.64	1.6	5						●		★									
	PNEG110512L-ZM	5.4	15.875	5.56	4.64	1.6	5						●		★									
	PNEG110512R-ZR	5.4	15.875	5.56	4.64	1.6	5						●		★									
	PNEG110512L-ZR	5.4	15.875	5.56	4.64	1.6	5						●		★									

★ Recommended grade (always stock available) ● Available grade (always stock available) ○ Make-to-order

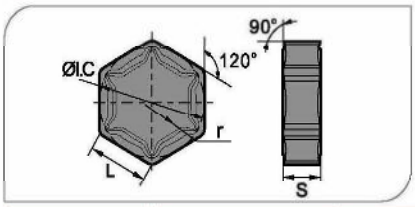
Insert shape	Type	Basic dimensions(mm)						CVD Coating						PVD Coating						Cermet	Cemented carbide			
		L	ØI.C	S	ød	bs	a_{Pmax}	SD4130	SD4040	SD4050	SD4330	SD4340	SD4350	SD1015	SD1025	SD1035	SD1115	SD1125	SD1135		SP302	SK001	SK101	SK201
	PNEG110512R-GF	7.5	15.875	5.56	4.64	1.4	7.5				●				★									
	PNEG110512L-GF	7.5	15.875	5.56	4.64	1.4	7.5				●				★									
	PNEG110512R-GM	7.5	15.875	5.56	4.64	1.4	7.5				●				★									
	PNEG110512L-GM	7.5	15.875	5.56	4.64	1.4	7.5				●				★									
	PNEG110512R-GR	7.5	15.875	5.56	4.64	1.4	7.5				●				★									
	PNEG110512L-GR	7.5	15.875	5.56	4.64	1.4	7.5				●				★									

★ Recommended grade (always stock available) ● Available grade (always stock available) ○ Make-to-order

Recomend cutting parameters

Workpiece material		Hardness HB	Insert grade	Cutting parameters				
				V(m/min)	f_z(mm/z)			a_{pmax}(mm)
					GF	GM	GR	
P	Low-carbon steel soft steel	≤180	SD2035 SD4230	270 (220-350)	0.15 (0.1-0.2)	0.2(0.1-0.3)	0.3(0.2-0.4)	7.5
P	High-carbon stee Alloy steel	180-280	SD2035 SD4230	260 (200-320)	0.15 (0.1-0.2)	0.2(0.1-0.3)	0.3(0.2-0.4)	7.5
P	Alloy tool steel	280-350	SD2035 SD4230	240 (180-300)	0.15 (0.1-0.2)	0.2(0.1-0.3)	0.3(0.2-0.4)	7.5
K	Cast iron	180-250	SD3315	270 (150-300)	ZF	ZM	ZR	5
					0.15(0.1-0.2)	0.2(0.1-0.3)	0.3(0.2-0.4)	

DF01 Selection of inserts



Insert shape	Type	Basic dimensions(mm)				CVD Coating						PVD Coating						Cermet	Cemented carbide			
		L	ØI.C	S	r	SD4030	SD4040	SD4050	SD4330	SD4340	SD4350	SD1015	SD1025	SD1035	SD1115	SD1125	SD1135		SP302	SK001	SK101	SK201
	HNEX090512-SF	9.16	15.875	5.56	1.2				★			★										
	HNEX090512-SM	9.16	15.875	5.56	1.2					★			★									
	HNEX090512-SR	9.16	15.875	5.56	1.2						★			★								

★ Recommended grade (always stock available) ● Available grade (always stock available) ○ Make-to-order

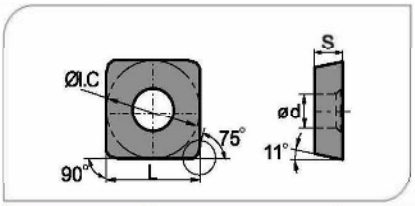
Chip- breaker selection for DF04 milling inserts

Classification \ Function	For finishing	For semi-finishing	For roughing
K	-SF	-SM	-SR

Recommended cutting parameters

Workpiece material		Hardness HB	Insert grade	Cutting parameters			
				V(m/min)	f(mm/z)		
					-SF	-SM	-SR
K	Cast iron	180-250	SD3315	180 (110-250)	0.15(0.1-0.2)	0.2 (0.1-0.3)	0.3(0.2-0.5)
			SD3125	130 (110-200)	0.2(0.1-0.2)	0.25 (0.1-0.3)	0.3(0.2-0.5)

EF04 Selection of inserts



Insert shape	Type	Basic dimensions(mm)				CVD Coating						PVD Coating						Cermet	Cemented carbide			
		L	ØI.C	S	ød	SD4030	SD4040	SD4050	SD4330	SD4340	SD4350	SD1015	SD1025	SD1035	SD1115	SD1125	SD1135		SP302	SK001	SK101	SK201
	SPKW1204EDFR	12.7	12.7	4.76	5.56					★			★									★
	SPKW1204EDSR	12.7	12.7	4.76	5.56					★			★									★
	SPKT1204EDR	12.7	12.7	4.76	5.56					★			★									★

★ Recommended grade (always stock available) ● Available grade (always stock available) ○ Make-to-order

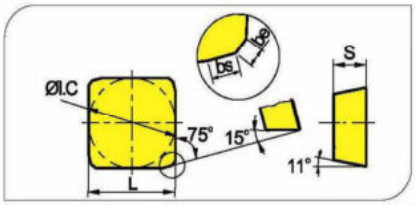
Chip– breaker selection for EF04 milling inserts

Classification \ Function	For finishing	For semi–finishing	For roughing
P	EDFR	EDR	EDSR
M	EDFR	EDR	
K	EDFR	EDR	

Recommended cutting parameters

Workpiece material		Hardness HB	Insert grade	Cutting parameters	
				V(m/min)	f(mm/z)
P	Low–carbon steel soft steel	≤180	SD1125	270(200-360)	0.2 (0.1-0.3)
P	High–carbon stee Alloy steel	180-280	SD1125	240 (180-350)	0.2 (0.1-0.3)
P	Alloy tool steel	280-350	SD1125	220 (170-340)	0.2 (0.1-0.3)
M	Stainless steel	≤270	SD1125	160 (110-270)	0.2 (0.1-0.3)
K	Cast iron	180-250	SD1125	160 (120-200)	0.2 (0.1-0.3)

EF03 Selection of inserts

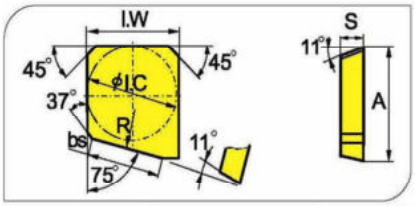


Insert shape	Type	Basic dimensions(mm)					CVD Coating						PVD Coating						Cermet	Cemented carbide			
		L	ØI.C	S	be	bs	SD4030	SD4040	SD4050	SD4330	SD4340	SD4350	SD1015	SD1025	SD1035	SD1115	SD1125	SD1135		SP302	SK001	SK101	SK202
	SPKN1203EDER	12.7	12.7	3.18	1	1.4	●				★			●						○			●
	SPKN1203EDEL	12.7	12.7	3.18	1	1.4	●				★			●						○			●
	SPKN1203EDFR	12.7	12.7	3.18	1	1.4	●				★			●						○			●
	SPKN1203EDFL	12.7	12.7	3.18	1	1.4	●				★			●						○			●
	SPKN1203EDSKR	12.7	12.7	3.18	1	1.4	●				★			●						○			●
	SPKN1203EDSKL	12.7	12.7	3.18	1	1.4	●				★			●						○			●
	SPKN1203EDTKR	12.7	12.7	3.18	1	1.4	●				★			●						○			●
	SPKN1203EDTKL	12.7	12.7	3.18	1	1.4	●				★			●						○			●
	SPKN1203EDS31R	12.7	12.7	3.18	1	1.4	●				★			●						○			●
	SPKN1203EDS31L	12.7	12.7	3.18	1	1.4	●				★			●						○			●
	SPKN1203EDT31R	12.7	12.7	3.18	1	1.4	●				★			●						○			●
	SPKN1203EDT31L	12.7	12.7	3.18	1	1.4	●				★			●						○			●
	SPKR1203EDR-GM	12.7	12.7	3.18	1	1.4		●		★				★						○			●
	SPKR1203EDL-GM	12.7	12.7	3.18	1	1.4		●		★				★						○			●
	SPKN1504EDER	15.875	15.875	4.76	1	1.4		○			★			●						○			●
	SPKN1504EDEL	15.875	15.875	4.76	1	1.4		○			★			●						○			●
	SPKN1504EDFR	15.875	15.875	4.76	1	1.4		○			★			●						○			●
	SPKN1504EDFL	15.875	15.875	4.76	1	1.4		○			★			●						○			●
	SPKN1504EDSKR	15.875	15.875	4.76	1	1.4		○			★			●		○				○			●
	SPKN1504EDSKL	15.875	15.875	4.76	1	1.4		○			★			●		○				○			●
	SPKN1504EDTKR	15.875	15.875	4.76	1	1.4		○			★			●		○				○			●
	SPKN1504EDTKL	15.875	15.875	4.76	1	1.4		○			★			●		○				○			●
	SPKN1504EDS32R	15.875	15.875	4.76	1	1.4		○			★			●		○				○			●
	SPKN1504EDS32L	15.875	15.875	4.76	1	1.4		○			★			●		○				○			●
	SPKN1504EDT32R	15.875	15.875	4.76	1	1.4		○			★			●		○				○			●
	SPKN1504EDT32L	15.875	15.875	4.76	1	1.4		○			★			●		○				○			●
	SPKR1504EDR-GM	15.875	15.875	4.76	1	1.4		○			★			●		★				○			●
	SPKR1504EDL-GM	15.875	15.875	4.76	1	1.4		○			★			●		★				○			●

★ Recommended grade (always stock available) ● Available grade (always stock available) ○ Make-to-order

Order guide: **SPKN1203EDT3 1 R** chamfering angle 20°; chamfering width 0.15mm. For other edge shapes, see inserts code key standard.

EF03 Selection of inserts



Insert shape	Type	Basic dimensions(mm)						CVD Coating						PVD Coating						Cermet	Cemented carbide			
		A	ØI.C	I.W	S	bs	R	SD4030	SD4040	SD4050	SD4330	SD4340	SD4350	SD1015	SD1025	SD1035	SD1115	SD1125	SD1135		SP302	SK001	SK101	SK202
Wiper inserts 	SPEX1203EDL-1	15	12.7	12.7	3.18	10	500					●			●									●
	SPEX1203EDR-1	15	12.7	12.7	3.18	10	500					●			●									●
	SPEX1504EDL-1	18.2	15.875	15.875	4.76	10	500					●			●									●
	SPEX1504EDR-1	18.2	15.875	15.875	4.76	10	500					●			●									●

★ Recommended grade (always stock available) ● Available grade (always stock available) ○ Make-to-order

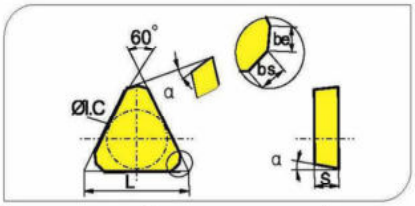
Cutting edge treatment selection for EF03 milling inserts

Treatment of cutting edge	Recommended selection
SP□□EDER/L	Honing edge is suitable for semi-finish and finish machining of steel and stainless steel
SP□□EDFR/L	Sharp cutting edge is suitable for finish machining of cast iron materials.
SP□□EDSKR/L **SP□□EDS□□R/L**	After chamfering and honing, the edge has strong anti-breakage capability, suitable for rough machining of steel parts under poor working conditions.
SP□□EDTKR/L **SP□□EDT□□R/L**	Chamfered edge is suitable for semi-finish and finish machining of steel, stainless steel and cast iron materials.
SP□□EDR/L-GM	3D chipbreaker can reduce cutting force, reinforce the capability of chip control, and improve insert life. It is widely applied in semi-finish machining of steel, stainless steel and cast iron materials.

Recomend cutting parameters

Workpiece material		Hardness HB	Insert grade	Cutting parameters	
				V(m/min)	f(mm/z)
P	Low-carbon steel soft steel	≤180	SD1125	270(200-360)	0.2 (0.1-0.4)
			SD1135	230 (170-350)	0.24 (0.1-0.3)
			SD2025 SD4130	270(220-350)	0.2 (0.1-0.4)
			SD4140	220 (180-300)	0.25 (0.15-0.3)
			SP301	140 (100-220)	0.22 (0.1-0.3)
	High-carbon stee Alloy steel	180-280	SD1125	240 (180-350)	0.2 (0.1-0.3)
			SD1135	220 (150-330)	0.24 (0.1-0.3)
			SD2025 SD4130	240 (200-320)	0.2 (0.1-0.4)
			SD4140	200 (160-280)	0.25 (0.15-0.3)
			SP301	120 (80-200)	0.22 (0.1-0.3)
	Alloy tool steel	280-350	SD1125	220 (170-340)	0.2 (0.1-0.3)
			SD1135	190 (130-300)	0.24 (0.1-0.3)
			SD2025 SD4130	220 (180-300)	0.2 (0.1-0.4)
			SD4140	180 (150-250)	0.25 (0.15-0.3)
			SP301	100 (60-180)	0.22 (0.1-0.3)
M	Stainless steel	≤270	SD1125	160 (110-270)	0.2 (0.1-0.3)
			SD1135	140 (100-250)	0.24 (0.1-0.3)
			SD2025	150 (120-240)	0.2 (0.1-0.4)
			SD4140	140 (100-240)	0.25 (0.15-0.3)
K	Cast iron	180-250	SD1105	210 (120-300)	0.12 (0.08-0.3)
			SD1135	160 (120-200)	0.2 (0.1-0.3)
			SK101	100 (80-160)	0.24 (0.15-0.4)

PF01 Selection of inserts



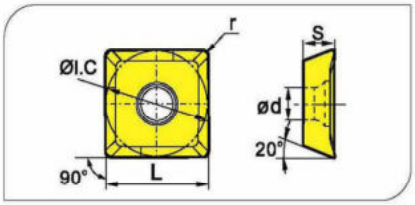
Insert shape	Type	Basic dimensions(mm)						CVD Coating						PVD Coating						Cermet	Cemented carbide			
		L	ØI.C	S	be	bs	α	SD4030	SD4040	SD4050	SD4330	SD4340	SD4350	SD1015	SD1025	SD1035	SD1115	SD1125	SD1135		SP302	SK001	SK101	SK202
	TPKN2204PDFR	22	12.7	4.76	1.4	0.7	11°	○			★				★	○					○			●
	TPKN2204PDFL	22	12.7	4.76	1.4	0.7	11°	○			★				★	○					○			●
	TPKN2204PDR	22	12.7	4.76	1.4	0.7	11°	○			★				★	○					○			●
	TPKN2204PDL	22	12.7	4.76	1.4	0.7	11°	○			★				★	○					○			●
	TPKN2204PDTR	22	12.7	4.76	1.4	0.7	11°	○			★				★	○					○			●
	TPKN2204PDTL	22	12.7	4.76	1.4	0.7	11°	○			★				★	○					○			●

★ Recommended grade (always stock available) ● Available grade (always stock available) ○ Make-to-order

Recomend cutting parameters

Workpiece material		Hardness HB	Insert grade	Cutting parameters	
				V(m/min)	f(mm/z)
P	Low-carbon steel soft steel	≤180	SD4130	270 (220-350)	0.2 (0.1-0.4)
			SD4140	220 (180-300)	0.2 (0.08-0.3)
			SD1125	270 (200-360)	0.2 (0.1-0.3)
			SP301	140 (100-220)	0.22 (0.1-0.3)
	High-carbon stee Alloy steel	180—280	SD4130	240 (200-320)	0.2 (0.1-0.4)
			SD4140	200 (160-280)	0.2 (0.08-0.3)
			SD1125	240 (180-350)	0.2 (0.1-0.3)
			SP301	120 (80-200)	0.22 (0.1-0.3)
	Alloy tool steel	280—350	SD4130	220 (180-300)	0.2 (0.1-0.4)
			SD4140	180 (150-250)	0.2 (0.08-0.3)
			SD1125	220 (170-340)	0.2 (0.1-0.3)
			SP301	100 (60-180)	0.22 (0.1-0.3)
M	Stainless steel	≤270	SD4140	140 (100-240)	0.2 (0.08-0.3)
			SD1125	140 (100-250)	0.2 (0.1-0.3)
K	Cast iron	180—250	YBG102	210 (120-300)	0.2 (0.1-0.3)
			YBG302	160 (120-200)	0.35 (0.10-0.4)
			YD201	100 (80-160)	0.24 (0.15-0.4)

PF02 Selection of inserts



Insert shape	Type	Basic dimensions(mm)					CVD Coating						PVD Coating						Cermet	Cemented carbide			
		L	ØI.C	S	ød	r	SD4130	SD4040	SD4050	SD4330	SD4340	SD4350	SD1015	SD1025	SD1035	SD1115	SD1125	SD1135		SP302	SK001	SK101	SK202
	SEET09T308PER-GF	9.525	9.525	4.01	3.3	0.8	○			★				★			○						○
	SEET09T308PER-GM	9.525	9.525	4.01	3.3	0.8	○			★				★			○						○
	SEET09T308PER-GR	9.525	9.525	4.01	3.3	0.8			○		★				★		○						○
	SEET120308PER-GF	13.308	13.308	4.04	4.1	0.8	○			★				★			○						○
	SEET120308PER-GM	13.308	13.308	4.04	4.1	0.8			○		★				★		○						○
	SEET120308PER-GR	13.308	13.308	4.04	4.1	0.8			○			★			★		○						○

★ Recommended grade (always stock available) ● Available grade (always stock available) ○ Make-to-order

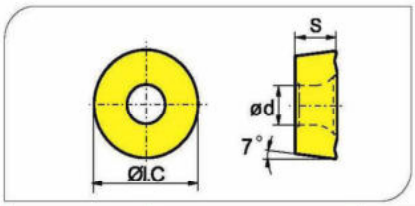
Chipbreaker selection for PF02 milling inserts

Classification \ Function	For finishing	For semi-finishing	For roughing
P	GF  	GM  	GR  
M			
K			

Recomend cutting parameters

Workpiece material		Hardness HB	Insert grade	Cutting parameters			
				V(m/min)	f(mm/z)		
					-PF	-PM	-PR
P	Low-carbon steel soft steel	≤180	SD2025	270(220-350)	0.15(0.1-0.2)	0.2 (0.1-0.3)	0.3 (0.2-0.4)
			SD1125	270(200-360)	0.15(0.1-0.2)	0.2 (0.1-0.3)	0.3 (0.2-0.4)
			SD1135	230 (170-350)	0.15(0.1-0.2)	0.2 (0.1-0.3)	0.3 (0.2-0.4)
	High-carbon stee Alloy steel	180—280	SD2025	240 (200-320)	0.15(0.1-0.2)	0.2 (0.1-0.3)	0.3 (0.2-0.4)
			SD1125	240 (180-350)	0.15(0.1-0.2)	0.2 (0.1-0.3)	0.3 (0.2-0.4)
			SD1135	220 (150-330)	0.15(0.1-0.2)	0.2 (0.1-0.3)	0.3 (0.2-0.4)
	Alloy tool steel	280—350	SD2025	220 (180-300)	0.1(0.1-0.2)	0.2 (0.1-0.3)	0.3 (0.2-0.4)
			SD1125	220 (170-340)	0.1(0.1-0.2)	0.2 (0.1-0.3)	0.3 (0.2-0.4)
			SD1135	190 (130-300)	0.15(0.1-0.2)	0.2 (0.1-0.3)	0.3 (0.2-0.4)
M	Stainless steel	≤270	SD2025	150 (120-240)	0.1(0.1-0.2)	0.2 (0.1-0.3)	0.3 (0.2-0.4)
			SD1125	160 (110-270)	0.1(0.1-0.2)	0.2 (0.1-0.3)	0.3 (0.2-0.4)
			SD1135	140 (100-250)	0.15(0.1-0.2)	0.2 (0.1-0.3)	0.3 (0.2-0.4)
K	Cast iron	180—250	SD1105	210 (120-300)	0.15(0.1-0.2)	0.2 (0.1-0.3)	0.3 (0.2-0.4)
			SD1125	160 (120-200)	0.15(0.1-0.2)	0.2 (0.1-0.3)	0.3 (0.2-0.4)
			SD3125	200 (150-250)	0.15(0.1-0.2)	0.2 (0.1-0.3)	0.3 (0.2-0.4)

RF01 Selection of inserts



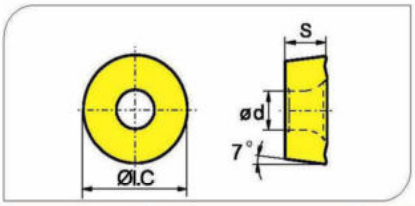
Insert shape	Type	Basic dimensions(mm)			CVD Coating						PVD Coating						Cermet	Cemented carbide			
		ØI.C	S	ød	SD4030	SD4040	SD4050	SD4330	SD4340	SD4350	SD1015	SD1025	SD1035	SD1115	SD1125	SD1135		SP302	SK001	SK101	SK202
	RCKT10T3M0-SM	10.0	3.97	4.4	○				●			★	○		○						
	RCKT1204M0-SM	12.0	4.76	4.0	○				●			★	○		○						
	RCKT1204M0-SR	12.0	4.76	4.0	○				●			★	○		○						
	RCKT1204M0-BR	12.0	4.76	4.0	○				●			★	○		○						

★ Recommended grade (always stock available) ● Available grade (always stock available) ○ Make-to-order

Recomend cutting parameters

Workpiece material		Hardness HB	Insert grade	Cutting parameters		
				V(m/min)	f(mm/z)	
					-SM	-SR
P	Low-carbon steel soft steel	≤180	SD2025 SD4130	270 (220-350)	0.2(0.1-0.5)	0.3 (0.2-0.8)
			SD4140 SD4230	220 (180-300)	0.25(0.1-0.5)	0.3 (0.2-0.8)
			SD1125	270 (200-360)	0.2(0.1-0.5)	0.3 (0.2-0.8)
	High-carbon stee Alloy steel	180-280	SD2025 SD4130	240 (200-320)	0.2(0.1-0.5)	0.3 (0.2-0.8)
			SD4140 SD4230	200 (160-280)	0.25(0.1-0.5)	0.3 (0.2-0.8)
			SD1125	240 (180-350)	0.2(0.1-0.5)	0.3 (0.2-0.8)
	Alloy tool steel	280-350	SD2025 SD4130	220 (180-300)	0.2(0.1-0.4)	0.3 (0.2-0.6)
			SD4140 SD4230	180 (150-250)	0.2(0.1-0.5)	0.3 (0.2-0.8)
			SD1125	220 (170-340)	0.2(0.1-0.4)	0.3 (0.2-0.6)
M	Stainless steel	≤270	SD2025	150 (120-240)	0.2(0.1-0.4)	0.3 (0.2-0.6)
			SD4140	150 (100-220)	0.2(0.1-0.4)	0.3 (0.2-0.6)
			SD1125	160 (110-270)	0.2(0.1-0.4)	0.3 (0.2-0.6)
K	Cast iron	180-250	SD1135	210 (120-300)	0.2(0.1-0.5)	0.3 (0.2-0.8)

RF01 Selection of inserts



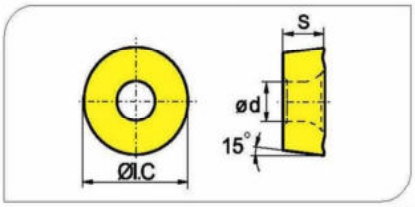
Insert shape	Type	Basic dimensions(mm)			CVD Coating						PVD Coating						Cermet	Cemented carbide			
		ØI.C	S	ød	SD4030	SD4040	SD4050	SD4330	SD4340	SD4350	SD1015	SD1025	SD1035	SD1115	SD1125	SD1135		SP302	SK001	SK101	SK202
	RCKT1204M0-SM	12.0	4.76	4.0	○			●			●			○							
	RCKT1606M0-SM	16.0	6.35	5.56	○			●			●			○							
	RCKT1204M0-SR	12.0	4.76	4.0	○			●			●										
	RCKT1606M0-SR	16.0	6.35	5.56	○			●			●										
	RCKT2006M0-SR	20.0	6.35	6.55	○			●			●			○							
	RCKT1204M0-BR	12.0	4.76	4.0				★			★										
	RCKT1606M0-BR	16.0	6.35	5.56				★			★										
	RCKT2006M0-BR	20.0	6.35	6.55				★			★										

★ Recommended grade (always stock available) ● Available grade (always stock available) ○ Make-to-order

Recomend cutting parameters

Workpiece material		Hardness HB	Insert grade	Cutting parameters			
				V(m/min)	f(mm/z)		
					-SM	-SR	-BR
P	Low-carbon steel soft steel	≤180	SD2025 SD4130	270 (220-350)	0.2(0.1-0.5)	0.3 (0.2-0.8)	
			SD4140 SD1135	220 (180-300)	0.25(0.1-0.5)	0.3 (0.2-0.8)	
			SD1125	270 (200-360)	0.2(0.1-0.5)	0.3 (0.2-0.8)	
	High-carbon stee Alloy steel	180-280	SD2025 SD4130	240 (200-320)	0.2(0.1-0.5)	0.3 (0.2-0.8)	
			SD4140 SD1135	200 (160-280)	0.25(0.1-0.5)	0.3 (0.2-0.8)	
			SD1125	240 (180-350)	0.2(0.1-0.5)	0.3 (0.2-0.8)	
	Alloy tool steel	280-350	SD2025 SD4130	220 (180-300)	0.2(0.1-0.4)	0.3 (0.2-0.6)	
			SD4140 SD1135	180 (150-250)	0.2(0.1-0.5)	0.3 (0.2-0.8)	
			SD1125	220 (170-340)	0.2(0.1-0.4)	0.3 (0.2-0.6)	
M	Stainless steel	≤270	SD2025	150 (120-240)	0.2(0.1-0.4)	0.3 (0.2-0.6)	
			SD2035	150 (100-220)	0.2(0.1-0.4)	0.3 (0.2-0.6)	0.3(0.2-0.6)
			SD4140	150 (100-220)	0.2(0.1-0.4)	0.3 (0.2-0.6)	
			SD1125	160 (110-270)	0.2(0.1-0.4)	0.3 (0.2-0.6)	
K	Cast iron	180-250	SD1135	210 (120-300)	0.2(0.1-0.5)	0.3 (0.2-0.8)	

RF02 Selection of inserts



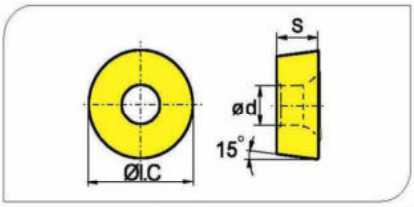
Insert shape	Type	Basic dimensions(mm)			CVD Coating						PVD Coating						Cermet	Cemented carbide			
		ØI.C	S	ød	SD4030	SD4040	SD4050	SD4330	SD4340	SD4350	SD1015	SD1025	SD1035	SD1115	SD1125	SD1135		SP302	SK001	SK101	SK202
	RDKW0803M0	8	3.18	3.4		○			●			★			○						
	RDKW10T3M0	10	3.97	4.4		○			●			★			○						
	RDKW1204M0	12	4.76	4.4		○			●			★			○						

★Recommended grade (always stock available) ●Available grade (always stock available) ○Make-to-order

Recomend cutting parameters

Workpiece material		Hardness HB	Insert grade	Cutting parameters	
				V(m/min)	f(mm/z)
P	Low-carbon steel soft steel	≤180	SD2025 SD4130	270 (220-350)	0.2 (0.08-0.45)
			SD4140 SD1135	220 (180-300)	0.25 (0.15-0.45)
			SD1125	270 (200-360)	0.2 (0.1-0.45)
	High-carbonsteel Alloy steel	180-280	SD2025 SD4130	240 (200-320)	0.2 (0.08-0.45)
			SD4140 SD1135	200 (160-280)	0.25 (0.15-0.45)
			SD1125	240 (180-350)	0.2 (0.1-0.45)
	Alloy tool steel	280-350	SD2025 SD4130	220 (180-300)	0.2 (0.08-0.45)
			SD4140 SD1135	180 (150-250)	0.25 (0.15-0.45)
			SD1125	220 (170-340)	0.2 (0.1-0.45)
M	Stainless steel	≤270	SD1225	150 (120-240)	0.2 (0.08-0.45)
			SD2025	150 (120-240)	0.2 (0.08-0.45)
			SD4140	150 (100-220)	0.25 (0.1-0.45)
			SD1125	160 (110-270)	0.2 (0.1-0.45)
K	Cast iron	180-250	SD1135	210 (120-300)	0.2 (0.1-0.45)

RF02 Selection of inserts



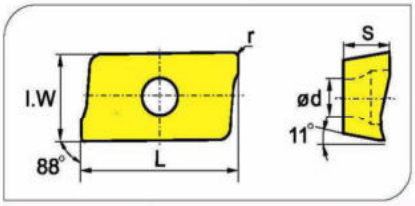
Insert shape	Type	Basic dimensions(mm)			CVD Coating						PVD Coating						Cermet	Cemented carbide			
		ØI.C	S	ød	SD4030	SD4040	SD4050	SD4330	SD4340	SD4350	SD1015	SD1025	SD1035	SD1115	SD1125	SD1135		SP302	SK001	SK101	SK202
	RDKW1204M0	12.0	4.76	4.4	○	○			●			★			○						
	RDKW1605M0	16.0	5.56	5.5	○	○			●			★			○						
	RDKW2006M0	20.0	6.35	6.5	○	○			●			★			○						

★ Recommended grade (always stock available) ● Available grade (always stock available) ○ Make-to-order

Recomend cutting parameters

Workpiece material		Hardness HB	Insert grade	Cutting parameters	
				V(m/min)	f(mm/z)
P	Low-carbon steel soft steel	≤180	SD2025 SD4130	270 (220-350)	0.2 (0.08-0.45)
			SD4140 SD1135	220 (180-300)	0.25 (0.15-0.45)
			SD1125	270 (200-360)	0.2 (0.1-0.45)
	High-carbonsteel Alloy steel	180-280	SD2025 SD4130	240 (200-320)	0.2 (0.08-0.45)
			SD4140 SD1135	200 (160-280)	0.25 (0.15-0.45)
			SD1125	240 (180-350)	0.2 (0.1-0.45)
	Alloy tool steel	280-350	SD2025 SD4130	220 (180-300)	0.2 (0.08-0.45)
			SD4140 SD1135	180 (150-250)	0.25 (0.15-0.45)
			SD1125	220 (170-340)	0.2 (0.1-0.45)
M	Stainless steel	≤270	SD1225	150 (120-240)	0.2 (0.08-0.45)
			SD2025	150 (120-240)	0.2 (0.08-0.45)
			SD4140 SD1135	150 (100-220)	0.25 (0.1-0.45)
			SD1125	160 (110-270)	0.2 (0.1-0.45)
K	Cast iron	180-250	SD1135	210 (120-300)	0.2 (0.1-0.45)

PE01 Selection of inserts



Insert shape	Type	Basic dimensions(mm)					CVD Coating						PVD Coating						Cermet	Cemented carbide			
		L	l.W	S	ød	r	SD4030	SD4040	SD4050	SD4330	SD4340	SD4350	SD1015	SD1025	SD1035	SD1115	SD1125	SD1135		SP302	SK001	SK101	SK201
	APKT11T304-GF	12.24	6.5	3.6	2.8	0.4	●			★	○		○	○		○							
	APKT11T308-GF	12.24	6.5	3.6	2.8	0.8	●			★	○		○	○									
	APKT11T312-GF	12.24	6.5	3.6	2.8	1.2	●			★	○			○									
	APKT11T316-GF	12.24	6.5	3.6	2.8	1.6	●			★	○			○									
	APKT160408-GF	17.877	9.33	5.76	4.4	0.8	●			★	○			○		○							
	APKT11T304-GM	12.24	6.5	3.6	2.8	0.4		●		○	★		★	★		★							
	APKT11T308-GM	12.24	6.5	3.6	2.8	0.8		●		○	★	★	★	★		★							
	APKT11T312-GM	12.24	6.5	3.6	2.8	1.2		●		○	★		○	★		○							
	APKT11T316-GM	12.24	6.5	3.6	2.8	1.6		●		○	★		○	★		○							
	APKT160408-GM	17.877	9.33	5.76	4.4	0.8		●		○	★	○	★	★		★							
	APKT11T304-GR	12.24	6.5	3.6	2.8	0.4			●		○	★	○	○		○							
	APKT11T308-GR	12.24	6.5	3.6	2.8	0.8			●		○	★				○							
	APKT11T312-GR	12.24	6.5	3.6	2.8	1.2			●		○	★				○							
	APKT11T316-GR	12.24	6.5	3.6	2.8	1.6			●		○	★				○							
	APKT160408-GR	17.877	9.33	5.76	4.4	0.8			●		○	★				○							
	APKT11T304-AH	12.24	6.5	3.6	2.8	0.4														●	★		
	APKT11T308-AH	12.24	6.5	3.6	2.8	0.8														●	★		
	APKT160408-AH	17.877	9.33	5.76	4.4	0.8														●	★		

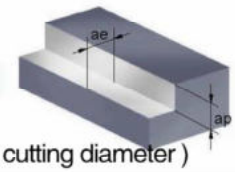
★ Recommended grade (always stock available) ● Available grade (always stock available) ○ Make-to-order

MILLING Indexable Milling Inserts

Chipbreaker selection

Classification \ Function	For finishing	For semi-finishing	For roughing
P	-GF	-GM	-GR
M	-GF	-GM	-GR
K	-GF	-GM	
N	-AH		

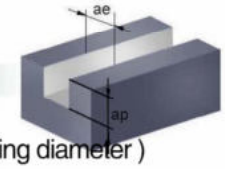
1 Square shoulder milling



PE01 recommended cutting parameters (D: cutting diameter)

Workpiece material		Hardness HB	Insert grade	Cutting parameters				
				V (m/min)	f (mm/z)			ae (mm)
					-GF	-GM	-GR	
P	Low-carbon steel soft steel	≤180	SD2025 SD4130 SD4230	320 (240-400)	0.1 (0.08-0.2)	0.2 (0.1-0.3)	0.25 (0.2-0.35)	≤0.5D
			SD4140	260 (180-380)	0.1 (0.08-0.2)	0.2 (0.1-0.3)	0.25 (0.2-0.35)	≤0.5D
			SD1125	320 (200-400)	0.1 (0.08-0.2)	0.2 (0.1-0.3)	0.25 (0.2-0.35)	≤0.5D
			SD1135	280 (180-400)	0.1 (0.08-0.2)	0.2 (0.1-0.3)	0.25 (0.2-0.35)	≤0.5D
	High-carbon steel Alloy steel	180-280	SD2025 SD4130 SD4230	280 (210-380)	0.1 (0.08-0.2)	0.2 (0.1-0.3)	0.25 (0.2-0.3)	≤0.5D
			SD4140	240 (160-320)	0.1 (0.08-0.2)	0.2 (0.1-0.3)	0.25 (0.2-0.35)	≤0.5D
			SD1125	280 (180-350)	0.1 (0.08-0.2)	0.2 (0.1-0.3)	0.25 (0.2-0.3)	≤0.5D
			SD1135	260 (150-380)	0.1 (0.08-0.2)	0.2 (0.1-0.3)	0.25 (0.2-0.35)	≤0.5D
	Alloy tool steel	280-350	SD2025 SD4130 SD4230	260 (180-350)	0.1 (0.08-0.2)	0.2 (0.1-0.3)	0.25 (0.2-0.3)	≤0.5D
			SD4140	220 (150-280)	0.1 (0.08-0.2)	0.2 (0.1-0.3)	0.25 (0.2-0.35)	≤0.5D
			SD1125	260 (160-330)	0.1 (0.08-0.2)	0.2 (0.1-0.3)	0.25 (0.2-0.3)	≤0.5D
			SD1135	240 (120-350)	0.1 (0.08-0.2)	0.2 (0.1-0.3)	0.25 (0.2-0.35)	≤0.5D
M	Stainless steel	≤270	SD2025	200 (120-270)	0.1 (0.08-0.2)	0.2 (0.1-0.3)	0.25 (0.2-0.3)	≤0.5D
			SD4140	180 (150-300)	0.1 (0.08-0.2)	0.2 (0.1-0.3)	0.25 (0.2-0.3)	≤0.5D
			SD1125	200 (110-300)	0.1 (0.08-0.2)	0.2 (0.1-0.3)	0.25 (0.2-0.3)	≤0.5D
			SD1135	170 (100-280)	0.1 (0.08-0.2)	0.2 (0.1-0.3)	0.25 (0.2-0.3)	≤0.5D
K	Cast iron	180-250	SD1105	220 (120-250)	0.1 (0.08-0.2)	0.2 (0.1-0.3)	-	≤0.5D
			SD3125	200 (120-320)	0.1 (0.08-0.2)	0.2 (0.1-0.3)	-	≤0.5D
N					-AH			≤0.5D
	Aluminium alloy	----	SK101	300-	0.2 (0.08-0.4)			≤0.5D
			SK201	300-	0.2 (0.08-0.4)			≤0.5D

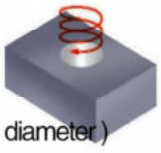
2 Slot Milling

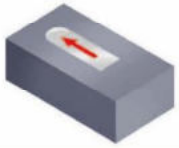


Recommended cutting parameters (D: cutting diameter)

Workpiece material		Hardness HB	Insert grade	Cutting parameters				
				V (m/min)	f (mm/z)			ae(mm)
					-GF	-GM	-GR	
P	Low-carbon steel soft steel	≤180	SD2025 SD4130 SD4230	190 (170-250)	0.1 (0.08-0.15)	0.15 (0.1-0.25)	0.2 (0.2-0.3)	D
			SD4140	150 (130-210)	0.1 (0.08-0.15)	0.15 (0.1-0.25)	0.2 (0.2-0.3)	D
			SD1125	190 (140-250)	0.1 (0.08-0.15)	0.15 (0.1-0.25)	0.2 (0.2-0.3)	D
			SD1135	170 (130-250)	0.1 (0.08-0.15)	0.15 (0.1-0.25)	0.2 (0.2-0.3)	D
	High-carbon steel Alloy steel	180-280	SD2025 SD4130 SD4230	170 (150-220)	0.1 (0.08-0.15)	0.15 (0.1-0.25)	0.2 (0.2-0.3)	D
			SD4140	140 (110-200)	0.1 (0.08-0.15)	0.15 (0.1-0.25)	0.2 (0.2-0.3)	D
			SD1125	170 (130-250)	0.1 (0.08-0.15)	0.15 (0.1-0.25)	0.2 (0.2-0.3)	D
			SD1135	150 (110-230)	0.1 (0.08-0.15)	0.15 (0.1-0.25)	0.2 (0.2-0.3)	D
	Alloy tool steel	280-350	SD2025 SD4130 SD4230	150 (130-210)	0.1 (0.08-0.15)	0.15 (0.1-0.25)	0.2 (0.2-0.3)	D
			SD4140	130 (100-180)	0.1 (0.08-0.15)	0.15 (0.1-0.25)	0.2 (0.2-0.3)	D
			SD1125	150 (110-240)	0.1 (0.08-0.15)	0.15 (0.1-0.25)	0.2 (0.2-0.3)	D
			SD1135	140 (80-210)	0.1 (0.08-0.15)	0.15 (0.1-0.25)	0.2 (0.2-0.3)	D
M	Stainless steel	≤270	SD2025	110 (80-190)	0.1 (0.08-0.15)	0.15 (0.1-0.25)	0.2 (0.2-0.3)	D
			SD4140	100 (80-170)	0.1 (0.08-0.15)	0.15 (0.1-0.25)	0.2 (0.2-0.3)	D
			SD1125	120 (80-190)	0.1 (0.08-0.15)	0.15 (0.1-0.25)	0.2 (0.2-0.3)	D
			SD1135	100 (70-180)	0.1 (0.08-0.15)	0.15 (0.1-0.25)	0.2 (0.2-0.3)	D
K	Cast iron	180-250	SD1105	130 (80-180)	0.1 (0.08-0.15)	0.15 (0.1-0.25)	-	D
			SD3125	120 (80-210)	0.1 (0.08-0.15)	0.15 (0.1-0.25)	-	D
N					-AH			
	Aluminium alloy	---	SK101	300-	0.2 (0.08-0.3)			D
			SK201	300-	0.2 (0.08-0.3)			D

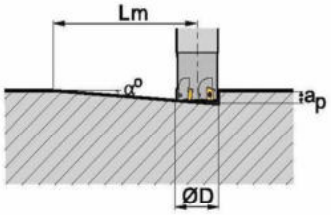
3 Ramp milling , Helical interpolation milling





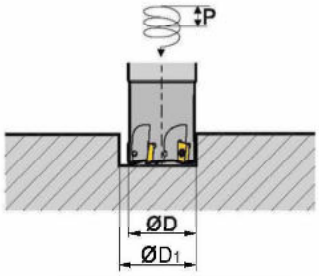
Recommended Cutting Parameters (D: cutting diameter)

● Ramp milling



$$L_m = \frac{a_p}{tg\alpha} \quad (\alpha: \text{Maximum ramp angle})$$

● Helical interpolation

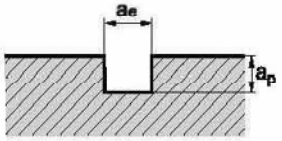
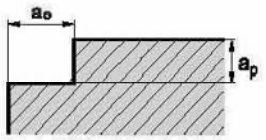
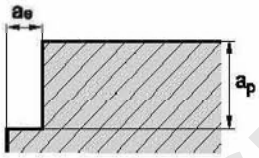


$$tg\alpha = \frac{P}{\pi D_1} \quad (\alpha: \text{Helical angle})$$

Diameter ØD (mm)	APKT Ramp milling, helical interpolation milling (Inserts–11)				
	Ramp milling			Helical interpolation milling	
	Maximum cutting depth a_p (mm)	Maximum ramp angle α°	Minimum length L_m (mm)	Minimum diameter $ØD_1$ (mm)	Maximum pitch (mm)
16	10.0	10.0	56.7	20.0	2.0
20	10.0	5.0	114.4	28.0	2.0
25	10.0	4.5	127.0	40.0	2.0
32	10.0	3.0	190.8	56.0	2.0
40	10.0	2.0	286.4	70.0	2.0

Note: For cutting speed and feed rate per tooth, see square shoulder milling.

PE02 Recommended Cutting Parameters

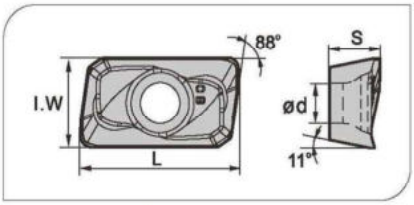
Slot Milling	Square shoulder milling	Deep square shoulder milling
		
ae=D $a_p \leqslant 0.5D$	$a_e \leqslant 0.5D$ $a_p \leqslant 1.2D$	$a_e \leqslant 0.2D$ ap < Cutting length of insert

Workpiece material		Hardness HB	Insert grade	Cutting parameters			
				Square shoulder milling			
				V (m/min)	f (mm/z)		
					-GF	-GM	-GR
P	Low-carbon steel Soft steel	≤180	SD2025 SD4130 SD4230	270 (240-350)	0.1 (0.08-0.2)	0.2 (0.1-0.3)	0.25 (0.2-0.35)
			SD4140	220 (180-300)	0.1 (0.08-0.2)	0.2 (0.1-0.3)	0.25 (0.2-0.35)
			SD1125	270 (200-360)	0.1 (0.08-0.2)	0.2 (0.1-0.3)	0.25 (0.2-0.35)
			SD1135	240 (180-350)	0.1 (0.08-0.2)	0.2 (0.1-0.3)	0.25 (0.2-0.35)
	High-carbon steel Alloy steel	180-280	SD2025 SD4130 SD4230	240 (210-320)	0.1 (0.08-0.2)	0.2 (0.1-0.3)	0.25 (0.2-0.35)
			SD4140	200 (160-280)	0.1 (0.08-0.2)	0.2 (0.1-0.3)	0.25 (0.2-0.35)
			SD1125	240 (180-360)	0.1 (0.08-0.2)	0.2 (0.1-0.3)	0.25 (0.2-0.35)
			SD1135	220 (150-330)	0.1 (0.08-0.2)	0.2 (0.1-0.3)	0.25 (0.2-0.35)
	Alloy tool steel	280-350	SD2025 SD4130 SD4230	220 (180-300)	0.1 (0.08-0.2)	0.2 (0.1-0.3)	0.25 (0.2-0.35)
			SD4140	180 (150-250)	0.1 (0.08-0.2)	0.2 (0.1-0.3)	0.25 (0.2-0.35)
			SD1125	220 (160-340)	0.1 (0.08-0.2)	0.2 (0.1-0.3)	0.25 (0.2-0.35)
			SD1135	200 (120-300)	0.1 (0.08-0.2)	0.2 (0.1-0.3)	0.25 (0.2-0.35)
M	Stainless steel	≤270	SD2025	170 (120-240)	0.1 (0.08-0.2)	0.2 (0.1-0.3)	0.25 (0.2-0.35)
			SD4140	160 (150-270)	0.1 (0.08-0.2)	0.2 (0.1-0.3)	0.25 (0.2-0.35)
			SD1125	150 (110-270)	0.1 (0.08-0.2)	0.2 (0.1-0.3)	0.25 (0.2-0.35)
			SD1135	140 (100-250)	0.1 (0.08-0.2)	0.2 (0.1-0.3)	0.25 (0.2-0.35)
K	Cast iron	180-250	SD1105	200 (120-240)	0.1 (0.08-0.2)	0.2 (0.1-0.3)	
			SD3125	180 (120-300)	0.1 (0.08-0.2)	0.2 (0.1-0.3)	
N					-AH		
	Aluminium alloy	---	SK101	300-	0.2 (0.08-0.4)		
			SK201	300-	0.2 (0.08-0.4)		

Recommended cutting parameters

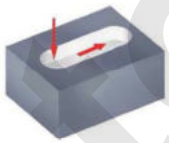
Workpiece material		Hardness HB	Insert grade	Cutting parameters			
				Slot milling/Deep square shoulder milling			
				V (m/min)	f (mm/z)		
					-GF	-GM	-GR
P	Low-carbon steel Soft steel	≤180	SD2025 SD4130 SD4230	270 (240-350)	0.1 (0.08-0.15)	0.15 (0.1-0.25)	0.2 (0.2-0.3)
			SD4140	220 (180-300)	0.1 (0.08-0.15)	0.15 (0.1-0.25)	0.2 (0.2-0.3)
			SD1125	270 (200-360)	0.1 (0.08-0.15)	0.15 (0.1-0.25)	0.2 (0.2-0.3)
			SD1135	240 (180-350)	0.1 (0.08-0.15)	0.15 (0.1-0.25)	0.2 (0.2-0.3)
	High-carbon steel Alloy steel	180-280	SD2025 SD4130 SD4230	240 (210-320)	0.1 (0.08-0.15)	0.15 (0.1-0.25)	0.2 (0.2-0.3)
			SD4140	200 (160-280)	0.1 (0.08-0.15)	0.15 (0.1-0.25)	0.2 (0.2-0.3)
			SD1125	240 (180-360)	0.1 (0.08-0.15)	0.15 (0.1-0.25)	0.2 (0.2-0.3)
			SD1135	220 (150-330)	0.1 (0.08-0.15)	0.15 (0.1-0.25)	0.2 (0.2-0.3)
	Alloy tool steel	280-350	SD2025 SD4130 SD4230	220 (180-300)	0.1 (0.08-0.15)	0.15 (0.1-0.25)	0.2 (0.2-0.3)
			SD4140	180 (150-250)	0.1 (0.08-0.15)	0.15 (0.1-0.25)	0.2 (0.2-0.3)
			SD1125	220 (160-340)	0.1 (0.08-0.15)	0.15 (0.1-0.25)	0.2 (0.2-0.3)
			SD1135	200 (120-300)	0.1 (0.08-0.15)	0.15 (0.1-0.25)	0.2 (0.2-0.3)
M	Stainless steel	≤270	SD2025	170 (120-240)	0.1 (0.08-0.15)	0.15 (0.1-0.25)	0.2 (0.2-0.3)
			SD4140	160 (150-270)	0.1 (0.08-0.15)	0.15 (0.1-0.25)	0.2 (0.2-0.3)
			SD1125	150 (110-270)	0.1 (0.08-0.15)	0.15 (0.1-0.25)	0.2 (0.2-0.3)
			SD1135	140 (100-250)	0.1 (0.08-0.15)	0.15 (0.1-0.25)	0.2 (0.2-0.3)
K	Cast iron	180-250	SD1105	200 (120-240)	0.1 (0.08-0.15)	0.15 (0.1-0.25)	
			SD3125	180 (120-300)	0.1 (0.08-0.15)	0.15 (0.1-0.25)	
N					-AH		
	Aluminium alloy	---	SK101	300-	0.2 (0.08-0.3)		
			SK201	300-	0.2 (0.08-0.3)		

PE03 Selection of inserts



Insert shape	Type	Basic dimensions(mm)					CVD Coating						PVD Coating						Cermet	Cemented carbide			
		L	I.W	S	ød	r	SD4030	SD4040	SD4050	SD4330	SD4340	SD4350	SD1015	SD1025	SD1035	SD1115	SD1125	SD1135		SP302	SK001	SK101	SK201
	APMT1135PDR	11.25	6.2	3.5	2.8	0.8	○			●			★		○								
	APMT160408PDER	17.25	9.25	4.76	4.4	0.8	○			●			★		○								

★ Recommended grade (always stock available) ● Available grade (always stock available) ○ Make-to-order



1 Drilling

Recommended cutting parameters

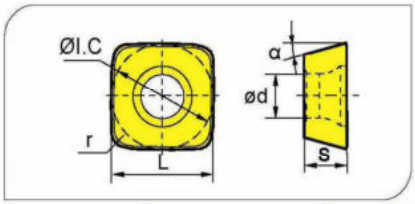
Workpiece material		Hardness HB	Insert grade	Cutting parameters	
				V (m/min)	f (mm/z)
P	Low-carbon steel Soft steel	≤180	SD1125	180 (150-220)	0.2 (0.08-0.25)
P	High-carbon steel Alloy steel	180-280	SD1125	160 (130-200)	0.15 (0.08-0.2)
P	Alloy tool steel	280-350	SD1125	140 (120-180)	0.12 (0.05-0.2)
M	Stainless steel	≤270	SD1125	80 (50-150)	0.08 (0.03-0.15)
K	Cast iron	180-250	SD1125	150 (100-220)	0.15 (0.08-0.2)

2 Milling

Recommended cutting parameters

Workpiece material		Hardness HB	Insert grade	Cutting parameters	
				V (m/min)	f (mm/z)
P	Low-carbon steel Soft steel	≤180	SD1125	190 (140-250)	0.08 (0.04-0.15)
P	High-carbon steel Alloy steel	180-280	SD1125	170 (130-250)	0.08 (0.04-0.15)
P	Alloy tool steel	280-350	SD1125	150 (110-240)	0.08 (0.04-0.15)
M	Stainless steel	≤270	SD1125	120 (80-190)	0.08 (0.04-0.15)
K	Cast iron	180-250	SD1125	120 (80-210)	0.08 (0.04-0.15)

XK01 Selection of inserts



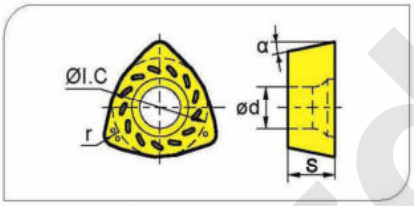
Insert shape	Type	Basic dimensions(mm)						CVD Coating							PVD Coating						Cermet	Cemented carbide			
		ØI.C	L	r	S	ød	α	SD4030	SD4040	SD4050	SD4330	SD4340	SD4350	SP302	SD1015	SD1025	SD1035	SD1115	SD1125	SD1225		SP302	SK051	SK101	SK201
	SDMT09T312-SM	9.525	9.525	1.2	3.97	4.0	15°		★		○	★		○		★									
	SDMT120412-SM	12.7	12.7	2.0	4.76	4.4	15°		★		○	★		○		★									
	SDMT09T312-GM	9.525	9.525	1.2	3.97	4.0	15°		★		○	★		○		★	•								
	SDMT120412-GM	12.7	12.7	2.0	4.76	4.4	15°		★		○	★		○		★	•								

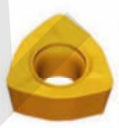
★ Recommended grade (always stock available) ● Available grade (always stock available) ○ Make-to-order

Chipbreaker introduction:

- GM chipbreaker has sharp cutting edge, it is more suitable for machining with power shortage and for relatively adhesive materials, such as stainless steel and Ti alloy, etc.
- SM chipbreaker has blunt cutting edge and is relatively suitable for machining of hard materials such as hardened steel and cast iron, etc.

XK02 Selection of inserts



Insert shape	Type	Basic dimensions(mm)					CVD Coating							PVD Coating						Cermet	Cemented carbide			
		ØI.C	r	S	ød	α	SD4030	SD4040	SD4050	SD4330	SD4340	SD4350	SPP302	SD1015	SD1025	SD1035	SD1115	SD1125	SD1225		SP302	SK051	SK101	SK201
	WPGT050315ZSR	7.94	1.5	3.5	4.0	11°					●				★									
	WPGT060415ZSR	9.525	1.5	4.2	4.4	11°					●				★									
	WPGT080615ZSR	12.85	1.5	6.35	5.5	11°					●				★									
	WPGT090725ZSR	15	2.5	7	5.5	11°					●				★									
	WPGT050315ZSR-GM	7.94	1.5	3.5	4.0	11°					●				★	●								
	WPGT060415ZSR-GM	9.525	1.5	4.2	4.4	11°					●				★	●								
	WPGT080615ZSR-GM	12.85	1.5	6.35	5.5	11°					●				★	●								
	WPGT090725ZSR-GM	15.00	2.5	7.00	5.5	11°					●				★	●								

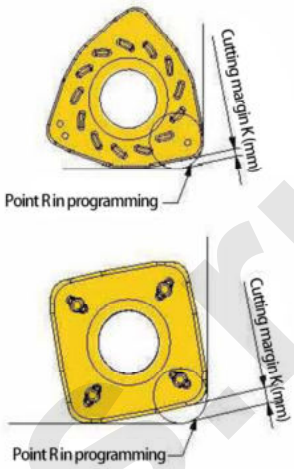
★ Recommended grade (always stock available) ● Available grade (always stock available) ○ Make-to-order

Chipbreaker introduction:

- GM chipbreaker has sharp cutting edge, it is more suitable for machining with power shortage and for relatively adhesive materials, such as stainless steel and Ti alloy, etc.
- Normal chipbreaker has blunt cutting edge and is relatively suitable for machining of hard materials such as hardened steel and cast iron, etc.

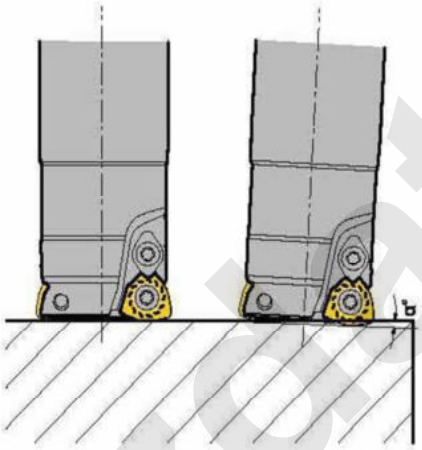
Approximate R in machining program

Applicable insert	Approximate R (mm)	Cutting margin K (mm)
WPGT050315ZSR/-GM	2	0.5
WPGT060415ZSR/-GM	2.5	0.7
WPGT080615ZSR/-GM	2.0	0.7
WPGT090725ZSR/-GM	4.0	1.2
SDMT09T312-DM/-GM	2.5	0.87
SDMT120412-DM/-GM	4.0	0.93

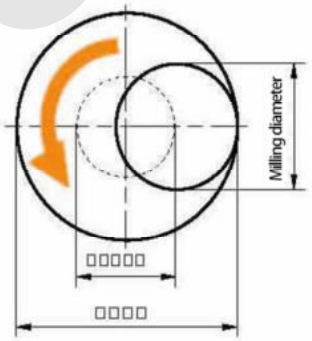


Different machining styles

■ Ramp machining



■ Helical interpolation milling



- Reduce the feed rate in ramp and helical machining operations.
- Set the axial feed rate below 0.2mm/rev in drilling operation.
- Be careful ! Long chippings may y off in drilling operation.
- The cutting depth of each rotation must not exceed the maximum cutting depth (ap).
- The S-type insert can be used for plunge milling in addition to the machining operations mentioned above.

Selection guide for XK01, XK02 series

XK01 series tools (with SD□□ inserts) have perfect edge strength and good economical efficiency, advantageous in face milling.
XK02 series tools (with WP□□ inserts) possess good capability of chip removal,advantageous in cavity milling.

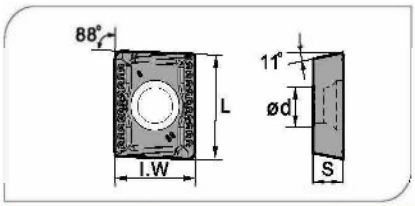
Recomend cutting parameters

	Workpiece material	Hardness HB	Insert grade	Cutting speed (m/min)	Ø25		Ø30/32/35	
					Axial cutting depth	Feed rate per tooth	Axial cutting depth	Feed rate per tooth
P	Soft steel Carbon Steel	≤HB180 HB180-280	SD4230/ SD 4140	170 (120-220) 150 (100-200)	0.6~1.0	0.8~1.2	0.8~1.2	1.0~1.4
P	Alloy steel Alloy tool steel	HB280-350	SD4230/ SD 4140	130 (80-180)	0.4~0.8	0.8~1.2	0.6~1.0	1.0~1.4
P	Pre-hardened steel	≤HRC35	SD4230/ SD 4140	120 (80-160)	0.4~0.8	0.6~1.0	0.6~1.0	0.8~1.2
M	Stainless steel	≤HB270	SD4140	120 (80-160)	0.6~1.0	0.6~1.0	0.8~1.2	0.8~1.2
M	Stainless steel	≤HB270	SD1225	120 (80-190)	0.6~1.0	0.6~1.0	0.8~1.2	0.8~1.2
K	Common cast Iron	抗拉强度 ≤350MPa	SD1135	150 (100-200)	0.6~1.0	1.0~1.4	0.8~1.2	1.2~1.6
K	Nodular cast iron	抗拉强度 ≤800MPa	SD1135	120 (80-160)	0.4~0.8	0.8~1.2	0.6~1.0	1.0~1.4

Recomend cutting parameters

	Workpiece material	Hardness HB	Insert grade	Cutting speed (m/min)	Ø40		Ø50/63		Ø80/100	
					Axial cutting depth	Feed rate per tooth	Axial cutting depth	Feed rate per tooth	Axial cutting depth	Feed rate per tooth
P	Soft steel Carbon Steel	≤HB180 HB180-280	SD4230/SD4140	170 (120-220) 150 (100-200)	0.8~1.2	1.0~1.4	1.1~1.5	1.1~1.5	1.0~1.5	1.0~1.5
P	Alloy steel Alloy tool steel	HB280-350	SD4230/SD4140	130 (80-180)	0.6~1.0	1.0~1.4	0.9~1.3	1.1~1.5	0.8~1.3	1.0~1.5
P	Pre-hardened steel	≤HRC35	SD4230/SD4140	120 (80-160)	0.6~1.0	0.8~1.2	0.9~1.3	0.9~1.3	0.8~1.3	0.8~1.3
M	Stainless steel	≤HB270	SD4140	120 (80-160)	0.8~1.2	0.8~1.2	1.1~1.5	0.9~1.3	1.0~1.5	0.8~1.3
M	Stainless steel	≤HB270	SD1225	120 (80-190)	0.8~1.2	0.8~1.2	1.1~1.5	0.9~1.3	1.0~1.5	0.8~1.3
K	Common cast Iron	张力强度 ≤350MPa	SD1135	150 (100-200)	0.8~1.2	1.2~1.6	1.1~1.5	1.3~1.7	1.0~1.5	1.2~1.7
K	Nodular cast iron	张力强度 ≤800MPa	SD1135	120 (80-160)	0.6~1.0	1.0~1.4	0.9~1.3	1.1~1.5	0.8~1.3	1.0~1.5

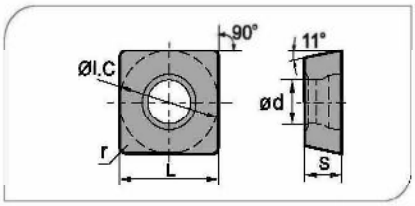
PH01 Selection of inserts



Insert shape	Type	Basic dimensions(mm)					CVD Coating							PVD Coating						Cermet		Cemented carbide			
		L	I.W	S	ød	r	SD4130	SD4230	SD2025	SD2035	SD4140	SD3315	SD3125	SD1105	SD1125	SD1225	SD1135	SD1115	SD3125			SP302	SK051	SK101	SK201
	APKT150412-GM	16.33	12.7	4.76	5.4	1.2				★							●	○							
	APKT150412-ZM	16.33	12.7	4.76	5.4	1.2											●	○							

★ Recommended grade (always stock available) ● Available grade (always stock available) ○ Make-to-order

PH01 Selection of inserts



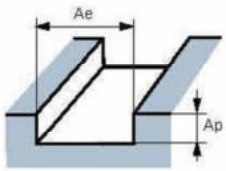
Insert shape	Type	Basic dimensions(mm)					CVD Coating							PVD Coating						Cermet		Cemented carbide			
		L	ØI.C	S	ød	r	SD4130	SD4230	SD2025	SD2035	SD4140	SD3315	SD3125	SD1105	SD1125	SD1225	SD1135	SD1115	SD3125			SP302	SK051	SK101	SK201
	SPMT120408-GM	12.7	12.7	4.76	5.5	0.8				★							●	○							
	SPMT120408-ZM	12.7	12.7	4.76	5.5	0.8											●	○							

★ Recommended grade (always stock available) ● Available grade (always stock available) ○ Make-to-order

Chip- breaker selection for PH01 milling inserts

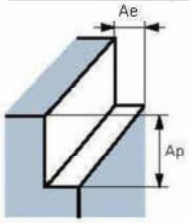
Classification \ Function	For semi-finishing	For roughing
P	-GM	-GM
K	-ZM	-ZM

图A Slot milling



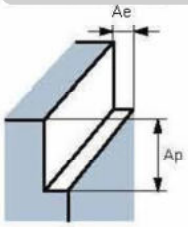
Ae=D
Ap=0.5D (cast iron)
Maximum 12mm (steel)

图B Square shoulder milling



Ae=0.5D
Ap=1.5D (cast iron)
1.0D (steel)

图C Narrow shoulder milling

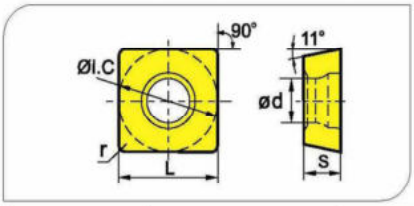


Ae=0.1D
ap< Maximum cutting length

Recommended Cutting Parameters

Workpiece material		Hardness HB	Insert grade	Cutting parameters		Operation (figure)
				Cutting speed (m/min)	Feed speed (mm/z)	
P	Low-carbon steel soft steel	≤180	SD2035 SD1135	80 (60-90)	0.25 (0.1-0.35)	A
				90 (70-120)	0.3 (0.15-0.4)	B
				90 (70-120)	0.3 (0.15-0.4)	C
	High-carbon steel Alloy steel	180-280	SD2035 SD1135	70 (60-100)	0.2 (0.1-0.35)	A
				80 (60-120)	0.25 (0.15-0.35)	B
				90 (70-120)	0.25 (0.15-0.35)	C
	Alloy tool steel	280-350	SD2035 SD1135	50 (40-80)	0.15 (0.08-0.25)	A
				60 (50-100)	0.2 (0.1-0.35)	B
				70 (50-100)	0.2 (0.1-0.35)	C
K	Cast iron	180-250	SD1115 SD1135	70 (50-100)	0.2 (0.1-0.35)	A
				80 (60-120)	0.25 (0.15-0.35)	B
				90 (80-120)	0.25 (0.15-0.35)	C

AC/ZC/DC01 Selection of inserts



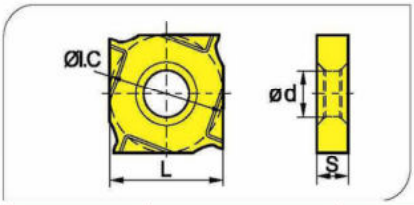
Insert shape	Type	Basic dimensions(mm)					CVD Coating							PVD Coating						Cermet	Cemented carbide			
		ØI.C	L	r	S	ød	SD4030	SD4040	SD4050	SD4330	SD4340	SD4350	SPP302	SD1015	SD1025	SD1035	SD1115	SD1125	SD1225		SP302	SK051	SK101	SK201
	SPMT120408	12.7	12.7	0.8	4.76	5.5		○			●				★						○			

★ Recommended grade (always stock available) ● Available grade (always stock available) ○ Make-to-order

Recomend cutting parameters

Workpiece material		Hardness HB	Insert grade	Cutting parameters	
				Cutting speed (m/min)	Feed speed (mm/z)
P	Low-carbon steel soft steel	≤180	SD2025 SD4130	180 (100—250)	0.25 (0.1-0.4)
			SD4140 SD1135	150 (100—200)	0.3 (0.1-0.5)
			SP301	120 (80—150)	0.4 (0.1-0.5)
	High-carbonsteel Alloy steel	180—280	SD2025 SD4130	160 (100—220)	0.3 (0.1-0.4)
			SD4140 SD1135	130 (100—180)	0.3 (0.1-0.5)
			SP301	100 (60—150)	0.4 (0.1-0.5)
	Alloy tool steel	280—350	SD2025 SD4130	120 (80—180)	0.3 (0.1-0.4)
			SD4140 SD1135	100 (80—150)	0.3 (0.1-0.5)
			SP301	80 (60—120)	0.4 (0.1-0.5)
M	Stainless steel	≤270	SD2025 SD4130	120 (80—180)	0.3 (0.1-0.4)
			SD4140 SD1135	100 (80—150)	0.3 (0.1-0.5)
			SP301	80 (60—120)	0.4 (0.1-0.5)
K	Cast iron	180-250	SD1135	130 (100—180)	0.4 (0.1-0.5)

PT02 Selection of inserts



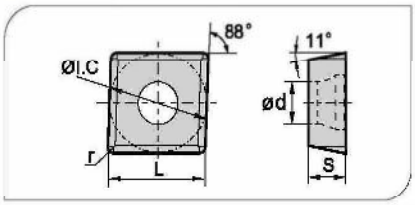
Insert shape	Type	Basic dimensions(mm)				CVD Coating							PVD Coating						Cermet	Cemented carbide			
		ØI.C	L	S	ød	SD4030	SD4040	SD4050	SD4330	SD4340	SD4350	SP302	SD1015	SD1025	SD1035	SD1115	SD1125	SD1225		SP302	SK051	SK101	SK201
	XSEQ1202	12.7	12.7	2.3	5.0					★				★									
	XSEQ1203	12.7	12.7	3.0	5.0					★				★									
	XSEQ12T3	12.7	12.7	3.5	5.0					★				★									
	XSEQ1204	12.7	12.7	4.0	5.0					★				★									
	XSEQ12T4	12.7	12.7	4.5	5.0					★				★									

★ Recommended grade (always stock available) ● Available grade (always stock available) ○ Make-to-order

Recomend cutting parameters

Workpiece material		Hardness HB	Insert grade	Cutting parameters	
				V(m/min)	f(mm/z)
P	Low-carbon steel soft steel	≤180	SD1125	180 (100-250)	0.1(0.08-0.25)
			SD1135	150 (100-200)	0.15(0.1-0.3)
	High-carbonsteel Alloy steel	180-280	SD1125	150 (80-250)	0.1(0.08-0.25)
			SD1135	120 (80-200)	0.15(0.1-0.3)
	Alloy tool steel	280-350	SD1125	120 (80-250)	0.1(0.08-0.25)
			SD1135	100 (80-200)	0.15(0.1-0.3)
M	Stainless steel	≤270	SD1125	120 (80-250)	0.1(0.05-0.15)
			SD1135	100 (80-200)	0.08(0.05-0.15)
K	Cast iron	180-250	SD1115	120 (80-250)	0.1(0.05-0.15)
			SD1135	150 (100-250)	0.08(0.05-0.15)

PT01 Selection of inserts



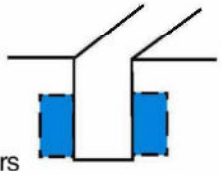
Insert shape	Type	Basic dimensions(mm)					CVD Coating							PVD Coating					Cermet	Cemented carbide		
		ØI.C	L	S	ød	r	SD4030	SD4050	SD4330	SD4340	SD4350	SP302	SD1015	SD1025	SD1035	SD1115	SD1125	SD1225	SP302	SK051	SK101	SK201
	MPHT060304-SM	6.35	6.35	3.18	2.8	0.4													★			
	MPHT080305-SM	8.3	8.3	3.18	3.4	0.5													★			
	MPHT120408-SM	12.7	12.7	4.76	5.56	0.8													★			

★Recommended grade (always stock available) ●Available grade (always stock available) ○Make-to-order

Recomend cutting parameters

Workpiece material		Hardness HB	Insert grade	Cutting parameters	
				V(m/min)	f(mm/z)
P	Low-carbon steel soft steel	≤180	SD1125	180 (100-250)	0.1(0.08-0.25)
			SD1135	150 (100-200)	0.15(0.1-0.3)
	High-carbonsteel Alloy steel	180-280	SD1125	150 (80-250)	0.1(0.08-0.25)
			SD1135	120 (80-200)	0.15(0.1-0.3)
	Alloy tool steel	280-350	SD1125	120 (80-250)	0.1(0.08-0.25)
			SD1135	100 (80-200)	0.15(0.1-0.3)
M	Stainless steel	≤270	SD1125	120 (80-250)	0.1(0.05-0.15)
			SD1135	100 (80-200)	0.08(0.05-0.15)
K	Cast iron	180-250	SD1115	120 (80-250)	0.1(0.05-0.15)
			SD1135	150 (100-250)	0.08(0.05-0.15)

◆ Workpiece shape before process



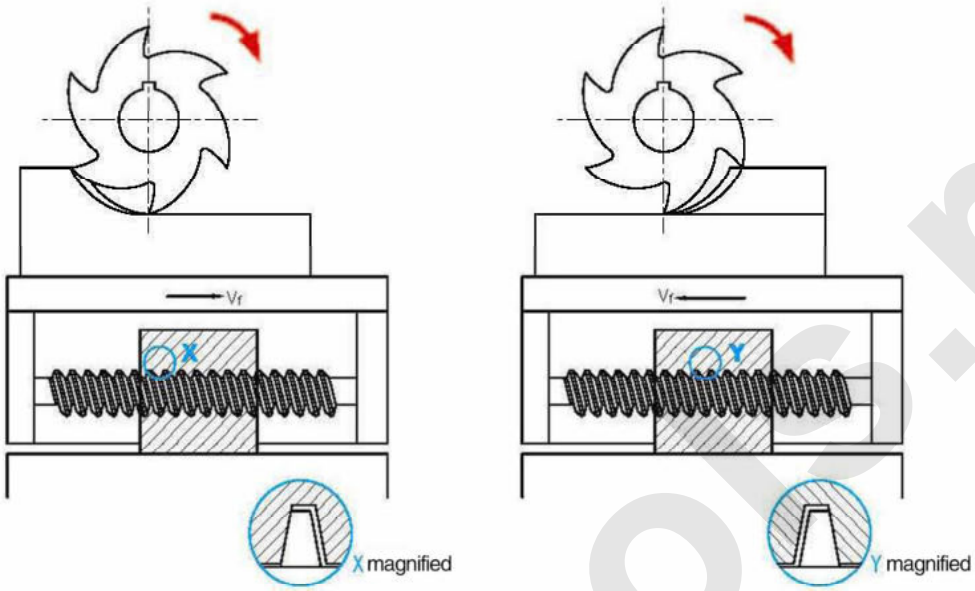
Recomend cutting parameters

Workpiece material	Insert grade	Cutting parameters		
		V(m/min)	f(mm/z)	Coolant condition
Gray cast iron	SD1135	80~160	0.05~0.2	Wet/Dry

Common problems in milling and solutions

Failure		Main points of solution and inspection	Selection of tool material: Material with higher hardness	Selection of tool material: Material with perfect toughness	Cutting condition: Cutting speed	Cutting condition: Feed rate	Cutting condition: Cutting depth	Cutting condition: Change the diameter and width of milling tools	Cutting condition: Cutting liquid	Tool shape: Rake angle	Tool shape: Approach angle	Tool shape: Strength of cutting edge	Tool shape: Number of teeth	Tool shape: Increase the width of chip pocket	Tool shape: Examine the geometry shape of Minor cutting edge	Tool shape: check the end face run-out	Tool shape: Improve the rigidity of tool	Machine clamping system: Clamping system of work piece	Machine clamping system: Overhang of too	Machine clamping system: Power, gap
Fracture of tool nose	severe abrasion on clearance face	Improper cutting condition			↓				✓											
		Unsuitable geometry shape of cutting edge	✓							↑		↓								
	severe abrasion on rake face	improper cutting condition			↓	↓	↓		✓											
		Unsuitable geometry shape of cutting edge	✓							↑	↓	↓								
	Fracture of cutting edge	Improper cutting condition				↓	↓													
		Unsuitable geometry shape of cutting edge		✓							↓	↑			✓	✓	✓	✓	✓	✓
	Thermal cracking	Improper cutting condition			↓	↓	↓		✓											
		Unsuitable geometry shape of cutting edge								↑		↓								
	Build–up edge	Improper cutting condition			↑	↑			✓											
		Unsuitable geometry shape of cutting edge								↑		↓								
Machining precision	Bad surface roughness	Abrasion of tool Great vibration of milling tool	✓		↑	↓	↓		✓			↓			Wiper	✓				
	Burrs occurring	Unsuitable geometry shape of cutting edge			↓	↓	↓	✓												
		Improper geometry shape of cutting edge								↑	↑	↓			✓					
	Side collapse	Improper cutting condition				↓	↓													
		Unsuitable geometry shape of cutting edge								↑	↓	↓	↑		✓		✓			
	Planeness and parallelism deterioration	Improper geometry Improper technique				↓	↓			↑	↑		↓		✓	✓	✓	✓	✓	✓
Other	Vibration	Cutting condition Improper technology			↓	↓	↓	✓		↑	↑	↓					✓	✓	✓	✓
	Chips twisting and jamming	Improper cutting condition			↑	↑↓		✓	✓				↓							
		Unsuitable geometry shape of cutting edge								↑			↓	✓						

Difference and selection between down milling and up milling



Up milling

Down milling

Climb milling (also called down milling): the feed direction of workpiece is the same as that of the milling rotation at the connecting position.

Conventional milling(also called up milling): the feed direction of workpiece is opposite to that of the milling rotation at the connecting position.

In down milling, the major force of cutting edge is compressive stress, while in up milling the tensile stress. The compressive strength of cemented carbide material is much larger than its tensile strength. In down milling, as chips become thin from thick gradually, cutting edge and workpiece press against each other. The friction between edge and workpiece is small, thus reducing the abrasion of edge, the hardening of workpiece surface and the surface roughness (Ra). In uo milling, chips become thin from thick gradually. When the insert is cutting into the workpice, it produces strong friction and more heat than in down milling, and make workpiece surface hardened.

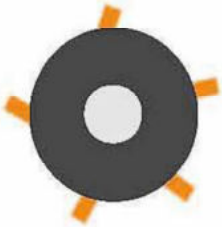
In up milling, because horizontal direction of cutting force milling cutter conducting on workpiece is opposite to the feed direction of workpiece, the lead screw of worktable joints closely with one side of the screw nut. In down milling, the direction of cutting force is the same as the feed direction. When edge' s radial force on workpiece is large enough, the worktable will bounce left and right, thus make the gap fall behind. The gap will return to the front side with the continuing rotation of lead screw. At this moment the worktable stops motion, however, it will bounce left and right again when the radial cutting force is large enough again. The periodical bounce of worktable will cause poor surface quality of workpiece and tool breakage.

When using end mills for down milling, the edges always starts cutting at the workpiece surface, therefore end mills are not suitable for machining workpiece with hardened surface.

Up milling is recommended for milling thin–wall components or square milling with high requirement for precision.

Pitch selection

Pitch is the distance between one point on one cutting edge and the same point on the next edge.
Milling cutters are mainly classified into coarse, close and extra close pitches.

Optimized Stability		
L (Low)	**M** (Medium)	**H** (High)
Coarse pitch	Close pitch	Extra close pitch
		
Unequal pitch design . When the milling width is equal to diameter of cutter, the machining system is stable and main power of machine is sufficient, the use of coarse pitch can achieve high productive efficiency.	Used in general milling and multiple mixed productions.	When the milling width is less than diameter of cutter, cutting by maximum edges can achieve high productive efficiency.

Selection of approach angle

The approach angle is formed by insert and tool body. It affects chip thickness, cutting forces and tool–life. Decreasing the approach angle reduces chip thickness and expands the cutting area between cutting edge and workpiece at a given feed rate.

A smaller approach angle also ensures stable entry into or exiting workpiece, protecting the cutting edge and extending tool life. However, this will increase axial cutting forces on the workpiece, thus is not suitable for machining thin workpiece such as thin plate.

Approach angle	Feed rate per tooth	Real maximum cutting depth
90°	f_z	$h_{ex}=f_z\times sin\kappa_r$
75°	f_z	$h_{ex}=0.96\times f_z$
60°	f_z	$h_{ex}=0.86\times f_z$
45°	f_z	$h_{ex}=0.707\times f_z$
Round insert	f_z	$h_{ex}=\frac{\sqrt{iC^2\times(iC-2a_p)^2}}{iC}\times f_z$

General formula

V_c : cutting speed(m/min) V_f : feed rate of worktable (feed speed)(mm/min)

D_c : nominal diameter of milling tool(mm)

f_z : feed rate per tooth(mm/z) n : Spindle speed(rev/min) π : circumference ratio ≈3.14

z_n : number of teeth T_c : machining time(min)

Q : metal removal rate(cm 3 /min)

f_z : feed rate per revolution (mm/rev) L : Actual working distance(mm)

- Cutting speed

$$V_c = \frac{\pi \times D_c \times n}{1000} \text{ (m/min)}$$

- Spindle speed

$$n = \frac{1000 \times V_c}{\pi \times D_c} \text{ (rev/min)}$$

- Feed rate of worktable (feed speed)

$$V_f = f_z \times n \times z_n \text{ (mm/min)}$$

- Feed rate per tooth

$$f_z = \frac{V_f}{n \times Z_n} \text{ (mm/z)}$$

- Feed rate per revolution

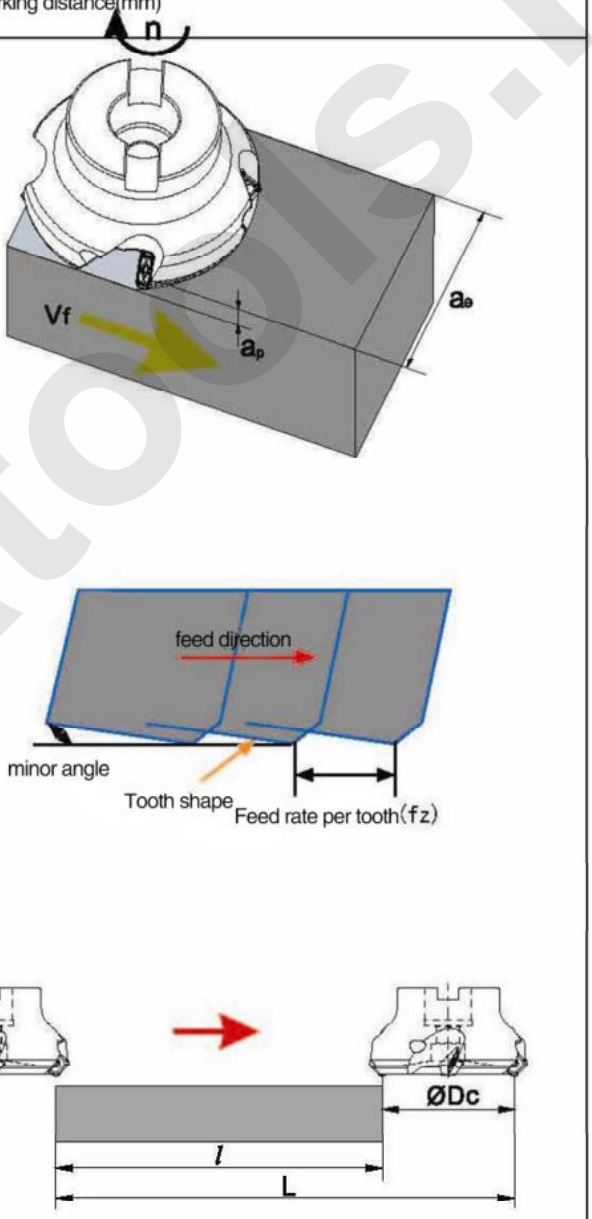
$$f_n = \frac{V_f}{n} \text{ (mm/rev)}$$

- Machining time

$$T_c = \frac{L}{V_f} \text{ (min)}$$

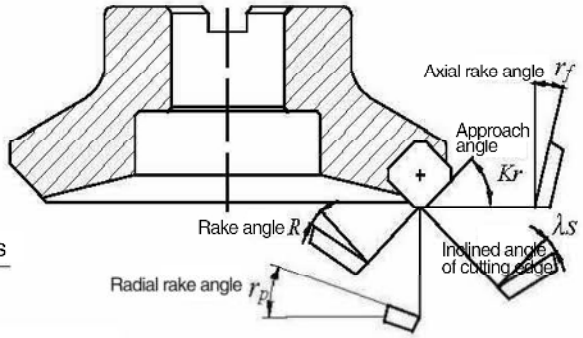
- Metal removal rate

$$Q = \frac{a_p \times a_e \times V_f}{1000} \text{ (cm}^3\text{/min)}$$



Function of each part in face milling

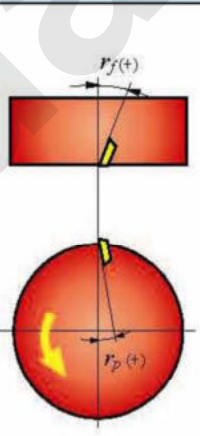
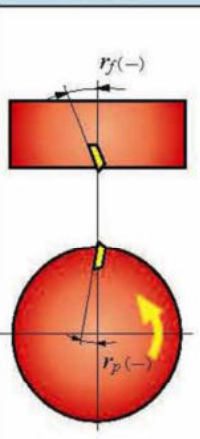
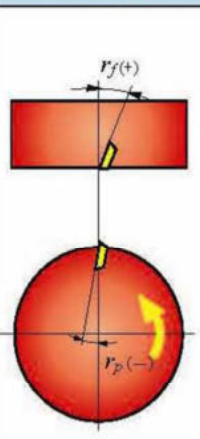
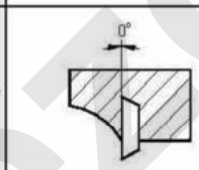
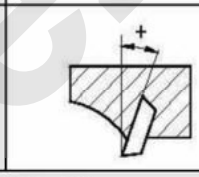
Main angles of face mills



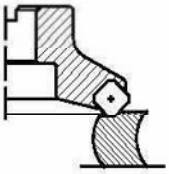
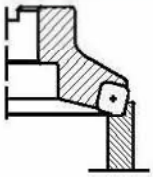
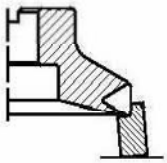
Main angles of face mills

Designation	Function	Effect		
Axial rake angle rf	Determining the chip direction	Negative angle, excellent capability of chip removal		
Radial rake angle r_p	Determining whether the cutting is easy and fast or not	Positive angle: good cutting performanc		
Approach angle Kr	Determining the chip thickness	Kr↑,chip thickness↑; Kr↓chip thickness↓;		
Rake angle R	Determining whether the cutting is easy and fast or not	Poor cutting performance, High-strength cutting edge	(−) ←0→ (+)	Good cutting performance, Low-strength cutting edge
Inclined angle of cutting edge λs	Determining the chip direction	Poor cutting performance, High-strength cutting edge	(−) ←0→ (+)	Good cutting performance, Low-strength cutting edge

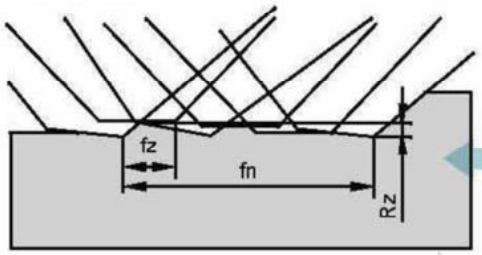
Characteristics of different rake angles combined

		Double positive rake angle	Double negative rake angle	Positive and negative rake angle
Negative rake angle				
0° rake angle				
Positive rake angle				
Axial rake angle rf		+	−	+
Radial rake angle r_p		+	−	−
Applicable material machined	P	√		√
	M	√		√
	K		√	√
	N	√		
	S	√		√

Cutting performances of different approach angles

Approach angle	45°	75°	90°
Schematic diagram			
Instruction	Axial force is the largest. It will bend when machining thinwall workpiece, reducing the precision of workpiece. It can help avoid fringe breakage of workpiece when machining cast iron.	The main force is radial cutting force. It is often used in general face milling.	The axial force is zero in theory, suitable for milling thin plate workpiece

Wiper insert

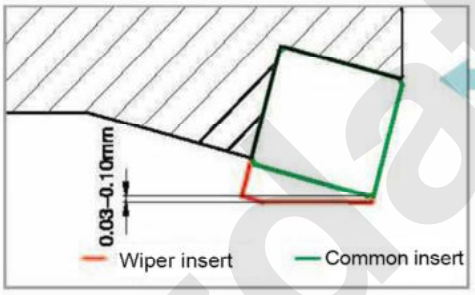


It has axial and radial run-out because tools and inserts have manufacturing tolerance. The axial run-out leads to poor surface roughness.

Solution

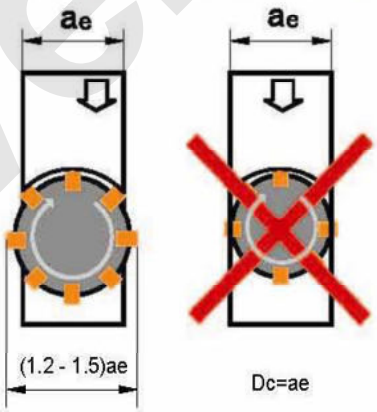
Mounting wiper inserts

usage



The wiper insert must protrude below the other inserts by 0.03-0.10 mm at axial direction, so that the wiping function can take effect. Generally speaking, a cutter just needs only one wiper insert. If the diameter of cutter is much larger or cutter's feed rate per revolution is higher than the length of wiper edge, 2 to 3 wiper inserts can be mounted.

Selection of cutting width and tool cutting diameter in face milling



Dc: Tool cutting diameter
ae: Cutting width

Generally speaking, the relation between cutting width and tool cutting diameter is Dc=(1.2—1.5) ae. In practical machining, same center line of tool center and work piece center should be avoided.