How to select threading tools

Structure of threading tools selected table

- Categorized as external threading and internal threading according to machining type
- Separately listed out according to series.

Dimensions of product

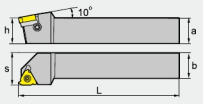
Indicating external threading or internal threading

Threading insert type
Including type, standard, tolerance class

Diagram of thread pitch

External threading tools


R-type shown

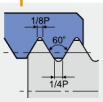


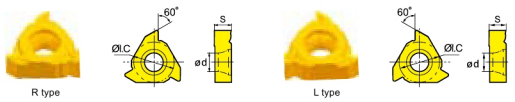
Type		Stock	Basic dimensions(mm) a	h	b	L	s	Applicable inserts	Inserts screw	Shim	Shim screw	Wrench
SWR	1616H16	▲	16	16	16	100	20	RT16.01W-□□□□	I60M3.5×12	MT16-□□M	SM4×8C	WT15IP
	2020K16	▲	20	20	20	125	25					
	2525M16	▲	25	25	25	150	32					
	3225P16	▲	32	32	25	170	32					
	3232P16	▲	32	32	32	170	40					
	2525M22	▲	25	25	25	150	32	RT22.01W-□□□□	I60M5×17	MT22-□□M	SM4×8C	WT15IP WT20IP
	3225P22	▲	32	32	25	170	32					
	3232P22	▲	32	32	32	170	40					
	4040S22	△	40	40	40	250	50					
SWL	1616H16	▲	16	16	16	100	20	LT16.01W-□□□□	I60M3.5×12	MT16-□□M	SM4×8C	WT15IP
	2020K16	▲	20	20	20	125	25					
	2525M16	▲	25	25	25	150	32					
	3225P16	▲	32	32	25	170	32					
	3232P16	▲	32	32	32	170	40					
	2525M22	▲	25	25	25	150	32	LT22.01W-□□□□	I60M5×17	MT22-□□M	SM4×8C	WT15IP WT20IP
	3225P22	▲	32	32	25	170	32					
	3232P22	▲	32	32	32	170	40					
	4040S22	△	40	40	40	250	50					

▲Stock available △Make-to-order

ISO metric thread (with end)

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





	Type		Basic dimensions(mm)				Recommended coating grade YBG201	
	The right hand tools	The left hand tools	Pitch	S	ØI.C	ød	R	L
External thread	RT16.01W-0.50GM	LT16.01W-0.50GM	0.50	3.97	9.525	4.4	○	○
	RT16.01W-0.75GM	LT16.01W-0.75GM	0.75	3.97	9.525	4.4	○	○
	RT16.01W-1.00GM	LT16.01W-1.00GM	1.00	3.97	9.525	4.4	○	○
	RT16.01W-1.25GM	LT16.01W-1.25GM	1.25	3.97	9.525	4.4	★	○
	RT16.01W-1.50GM	LT16.01W-1.50GM	1.50	3.97	9.525	4.4	★	★
	RT16.01W-1.75GM	LT16.01W-1.75GM	1.75	3.97	9.525	4.4	★	○
	RT16.01W-2.00GM	LT16.01W-2.00GM	2.00	3.97	9.525	4.4	★	★
	RT16.01W-2.50GM	LT16.01W-2.50GM	2.50	3.97	9.525	4.4	★	○
	RT16.01W-3.00GM	LT16.01W-3.00GM	3.00	3.97	9.525	4.4	★	○
	RT22.01W-3.50GM	LT22.01W-3.50GM	3.50	5.56	12.7	5.5	★	○
	RT22.01W-4.00GM	LT22.01W-4.00GM	4.00	5.56	12.7	5.5	★	○
	RT22.01W-4.50GM	LT22.01W-4.50GM	4.50	5.56	12.7	5.5	★	○
	RT22.01W-5.00GM	LT22.01W-5.00GM	5.00	5.56	12.7	5.5	★	○
	RT22.01W-5.50GM	LT22.01W-5.50GM	5.50	5.56	12.7	5.5	○	○
	RT22.01W-6.00GM	LT22.01W-6.00GM	6.00	5.56	12.7	5.5	★	○

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

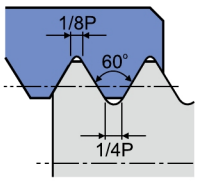
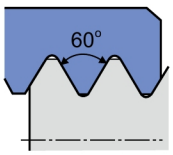
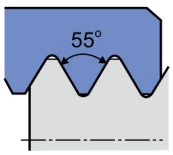
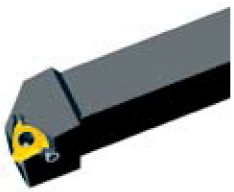
Product specification
Including type (right hand and left hand), basic dimensions, applicable inserts, spare parts

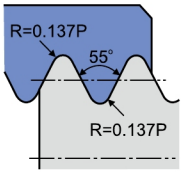
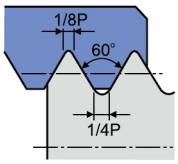
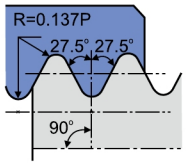
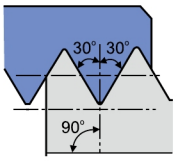
Product specification
Including type (right hand and left hand), basic dimensions, stock

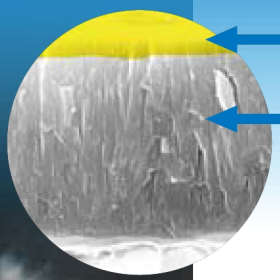
Dimension diagram of insert

TURNING

Threading Tools

Applications		For general use		
Legend				
Thread name		ISO metric thread With end	General pitch thread Without end	General pitch thread Without end
Profil		**GM**	**60**	**55**
Shape of insert (length: 11, 16, 22mm)		R style shown  A268	R style shown  A270	R style shown  A270
Pitch / Tool holder	Dimensions (mm) (H×W×L) (Dia×L×Min. dia)	Pitch/mm	Pitch/mm (pitch/Inch)	Pitch/mm (pitch/Inch)
External thread	 A276	16×16×100 20×20×125 25×25×150 32×25×170 32×32×170 40×40×250	0.5~6.0	0.5~5.0 (5~48)	0.5~5.0 (5~48)
Internal thread	 A277	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	0.5~5.0 (5~48)	0.5~5.0 (5~48)

Applications		For general use	For aerospace industry	Heater, gas and water pipe thread	For gas and water faucet and pipe connection
Legend					
Thread name		Whitworth thread	Unified thread (American standard threads)	British standard taper piper threads	American standard taper pipe threads
Profil		**W**	**UN**	**BSPT**	**NPT**
Shape of insert (length: 11, 16, 22mm)		R style shown  A271	R style shown  A272	R style shown  A273	R style shown  A274
Dimensions (mm) (H×W×L) (Dia×L×Min. dia)		Pitch/mm (pitch/Inch)	Pitch/mm (pitch/Inch)	Pitch/mm (pitch/Inch)	Pitch/mm (pitch/Inch)
External thread	16×16×100 20×20×125 25×25×150 32×25×170 32×32×170 40×40×250	8~16	8~20	11~28	8~27
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	8~16	8~20	11~28	8~27



Golden TiN coating on the surface can diminish friction and help identify abrasion.

The inner layer of nc-TiAlN coating has outstanding wear resistance.

Threading grade YBG201 has been upgraded to nc-TiAlN

YBG201

TiN and PVD coated alloy has good toughness and wear resistance. It is a special grade for machining of carbon steel, stainless steel and cast iron steel, etc.

Functions and applications of wiper for threading inserts

Reduce machining procedures

Before threading, it is unnecessary to finish the threaded part, which could be done by wiper to make the major diameter achieve the desired dimensions and surface quality.

Automatically remove burrs

The wiper on the threading insert realizes finishing on major diameter of machined threading, making it unnecessary to remove burrs after machining and ensuring good surface quality.

Design features of threading inserts' chipbreaker

Outstanding chip breaking performance

Corrugated chipbreaker on the rake face of threading inserts lift the chip flow, direct its movement along the front of chipbreaker and control its shape for a small curvature radius.

Chipbreaker design with good generality

Because of the special chipbreaker structure, the moving, curling and breaking of chips are mainly controlled by the insert itself. Therefore, desirable results can be obtained for different materials and with different cutting parameters.

Threading inserts code key

Cutting direction

R ➤ Righ L ➤ Left

Inserts shape

T Others Z

Insert size

22 ➤ Diameter of insert IC is 12.7
16 ➤ Diameter of insert IC is 9.525
11 ➤ Diameter of insert IC is 6.35

Tooth number per cutting edge

01 ➤ Tooth number of each cutting edge

R T 22. 01 W- 3.50 GM (P)

Cutting style

W ➤ External threading inserts
N ➤ Internal threading inserts

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.)

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

Profile

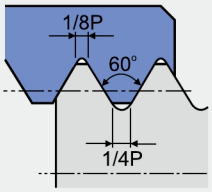
GM ➤ Iso metric 60° thread
60 ➤ 60° general pitch thread
55 ➤ 55° general pitch thread
W ➤ Whitworth thread
UN ➤ Unified thread(American standard threads)
BSPT ➤ British standard taper piper thread
NPT ➤ American standard taper piper thread

Chipbreaker

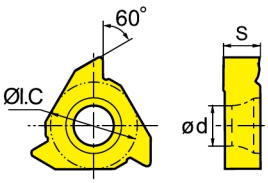
Indicated by P (P is omitted in metric thread)

ISO metric thread (with end)

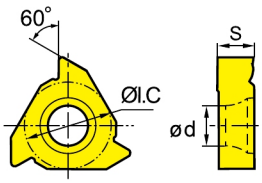
ISO 965-1980 DIN 13
GB/T 197-2003 Tolerance class：6g/6H



R type



L type

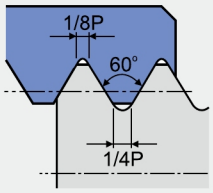


	Type		Basic dimensions(mm)				Recommended coating grade	
	The right hand tools	The left hand tools	Pitch	S	ØI.C	ød	YBG201	
							R	L
External thread	RT16.01W-0.50GM	LT16.01W-0.50GM	0.50	3.97	9.525	4.4	○	○
	RT16.01W-0.75GM	LT16.01W-0.75GM	0.75	3.97	9.525	4.4	○	○
	RT16.01W-1.00GM	LT16.01W-1.00GM	1.00	3.97	9.525	4.4	○	○
	RT16.01W-1.25GM	LT16.01W-1.25GM	1.25	3.97	9.525	4.4	★	○
	RT16.01W-1.50GM	LT16.01W-1.50GM	1.50	3.97	9.525	4.4	★	★
	RT16.01W-1.75GM	LT16.01W-1.75GM	1.75	3.97	9.525	4.4	★	○
	RT16.01W-2.00GM	LT16.01W-2.00GM	2.00	3.97	9.525	4.4	★	★
	RT16.01W-2.50GM	LT16.01W-2.50GM	2.50	3.97	9.525	4.4	★	○
	RT16.01W-3.00GM	LT16.01W-3.00GM	3.00	3.97	9.525	4.4	★	○
	RT22.01W-3.50GM	LT22.01W-3.50GM	3.50	5.56	12.7	5.5	★	○
	RT22.01W-4.00GM	LT22.01W-4.00GM	4.00	5.56	12.7	5.5	★	○
	RT22.01W-4.50GM	LT22.01W-4.50GM	4.50	5.56	12.7	5.5	★	○
	RT22.01W-5.00GM	LT22.01W-5.00GM	5.00	5.56	12.7	5.5	★	○
	RT22.01W-5.50GM	LT22.01W-5.50GM	5.50	5.56	12.7	5.5	○	○
	RT22.01W-6.00GM	LT22.01W-6.00GM	6.00	5.56	12.7	5.5	★	○

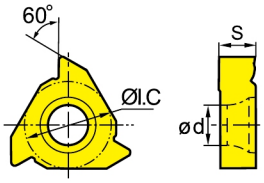
★Recommended grade (always stock available) ●Available grade (always stock available) ○Make-to-order

ISO metric thread (with end)

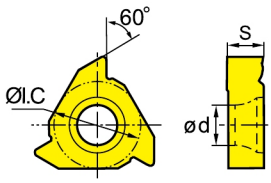
ISO 965-1980 DIN 13
GB/T 197-2003 Tolerance class：6g/6H



R type



L type

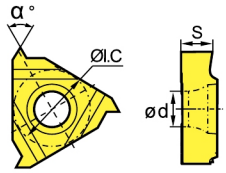


	Type		Basic dimensions(mm)				Recommended coating grade	
	The right hand tools	The left hand tools	Pitch	S	ØI.C	ød	YBG201	
							R	L
Internal thread	RT11.01N-0.50GM	LT11.01N-0.50GM	0.50	3.18	6.35	2.8	○	○
	RT11.01N-0.75GM	LT11.01N-0.75GM	0.75	3.18	6.35	2.8	○	○
	RT11.01N-1.00GM	LT11.01N-1.00GM	1.00	3.18	6.35	2.8	○	○
	RT11.01N-1.25GM	LT11.01N-1.25GM	1.25	3.18	6.35	2.8	○	○
	RT11.01N-1.50GM	LT11.01N-1.50GM	1.50	3.18	6.35	2.8	★	○
	RT11.01N-1.75GM	LT11.01N-1.75GM	1.75	3.18	6.35	2.8	○	○
	RT11.01N-2.00GM	LT11.01N-2.00GM	2.00	3.18	6.35	2.8	★	○
	RT16.01N-0.50GM	LT16.01N-0.50GM	0.50	3.97	9.525	4.4	○	○
	RT16.01N-0.75GM	LT16.01N-0.75GM	0.75	3.97	9.525	4.4	○	○
	RT16.01N-1.00GM	LT16.01N-1.00GM	1.00	3.97	9.525	4.4	★	○
	RT16.01N-1.25GM	LT16.01N-1.25GM	1.25	3.97	9.525	4.4	○	○
	RT16.01N-1.50GM	LT16.01N-1.50GM	1.50	3.97	9.525	4.4	★	★
	RT16.01N-1.75GM	LT16.01N-1.75GM	1.75	3.97	9.525	4.4	○	○
	RT16.01N-2.00GM	LT16.01N-2.00GM	2.00	3.97	9.525	4.4	★	★
	RT16.01N-2.50GM	LT16.01N-2.50GM	2.50	3.97	9.525	4.4	★	★
	RT16.01N-3.00GM	LT16.01N-3.00GM	3.00	3.97	9.525	4.4	★	★
	RT22.01N-3.50GM	LT22.01N-3.50GM	3.50	5.56	12.7	5.5	○	○
	RT22.01N-4.00GM	LT22.01N-4.00GM	4.00	5.56	12.7	5.5	★	○
	RT22.01N-4.50GM	LT22.01N-4.50GM	4.50	5.56	12.7	5.5	○	○
	RT22.01N-5.00GM	LT22.01N-5.00GM	5.00	5.56	12.7	5.5	★	○
	RT22.01N-5.50GM	LT22.01N-5.50GM	5.50	5.56	12.7	5.5	○	○
	RT22.01N-6.00GM	LT22.01N-6.00GM	6.00	5.56	12.7	5.5	★	○

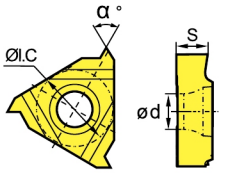
★Recommended grade (always stock available) ●Available grade (always stock available) ○Make-to-order

General pitch thread (without end)


R type




L type

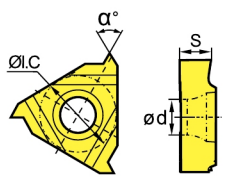


✻ With chipbreaker

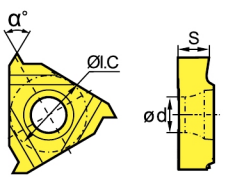
		Type		Basic dimensions(mm)					Recommended coating grade	
		The right hand tools	The left hand tools	Pitch/mm (pitch/Inch)	S	ØI.C	ød	α°	YBG201 R	YBG201 L
External thread	60°	**RT16.01W-A60**	**LT16.01W-A60**	0.5-1.5(48-16)	3.97	9.525	4.4	60°	★	○
		RT16.01W-G60	**LT16.01W-G60**	1.75-3.0(14-8)	3.97	9.525	4.4	60°	○	○
		RT16.01W-G60P*	**LT16.01W-G60P***	1.75-3.0(14-8)	3.97	9.525	4.4	60°	★	○
		RT16.01W-AG60	**LT16.01W-AG60**	0.5-3.0(48-8)	3.97	9.525	4.4	60°	★	○
		RT22.01W-N60P*	**LT22.01W-N60P***	3.5-5.0(7-5)	5.56	12.7	5.5	60°	○	○
	55°	**RT16.01W-A55**	**LT16.01W-A55**	0.5-1.5(48-16)	3.97	9.525	4.4	55°	○	○
		RT16.01W-G55	**LT16.01W-G55**	1.75-3.0(14-8)	3.97	9.525	4.4	55°	○	○
		RT16.01W-G55P*	**LT16.01W-G55P***	1.75-3.0(14-8)	3.97	9.525	4.4	55°	★	★
		RT16.01W-AG55	**LT16.01W-AG55**	0.5-3.0(48-8)	3.97	9.525	4.4	55°	★	○
		RT22.01W-N55P*	**LT22.01W-N55P***	3.5-5.0(7-5)	5.56	12.7	5.5	55°	○	

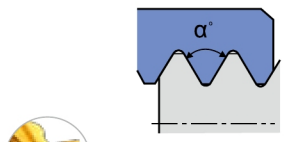
★Recommended grade (always stock available) ●Available grade (always stock available) ○Make-to-order


R type




L type





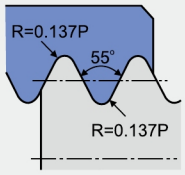
✻ With chipbreaker

		Type		Basic dimensions(mm)					Recommended coating grade	
		The right hand tools	The left hand tools	Pitch/mm (pitch/Inch)	S	ØI.C	ød	α°	YBG201 R	YBG201 L
Internal thread	60°	**RT16.01N-A60**	**LT16.01N-A60**	0.5-1.5 (48-16)	3.97	9.525	4.4	60°	○	○
		RT16.01N-G60	**LT16.01N-G60**	1.75-3.0(14-8)	3.97	9.525	4.4	60°	○	○
		RT16.01N-G60P*	**LT16.01N-G60P***	1.75-3.0(14-8)	3.97	9.525	4.4	60°	★	○
		RT16.01N-AG60	**LT16.01N-AG60**	0.5-3.0 (48-8)	3.97	9.525	4.4	60°	★	○
		RT22.01N-N60P*	**LT22.01N-N60P***	3.5-5.0 (7-5)	5.56	12.7	5.5	60°	○	○
	55°	**RT16.01N-A55**	**LT16.01N-A55**	0.5-1.5(48-16)	3.97	9.525	4.4	55°	○	○
		RT16.01N-G55	**LT16.01N-G55**	1.75-3.0(14-8)	3.97	9.525	4.4	55°	○	○
		RT16.01N-G55P*	**LT16.01N-G55P***	1.75-3.0(14-8)	3.97	9.525	4.4	55°	★	○
		RT16.01N-AG55	**LT16.01N-AG55**	0.5-3.0(48-8)	3.97	9.525	4.4	55°	★	○
		RT22.01N-N55P*	**LT22.01N-N55P***	3.5-5.0(7-5)	5.56	12.7	5.5	55°	○	

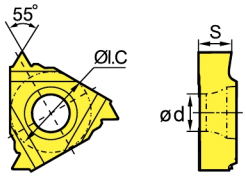
★Recommended grade (always stock available) ●Available grade (always stock available) ○Make-to-order

Whitworth thread (with end)

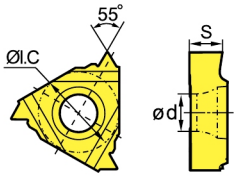
ISO 228/1:1982,
DIN 259, B.S.84:1956
Tolerance class：Medium class A



R type



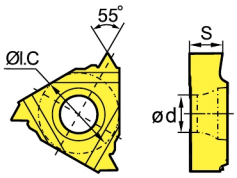
L type



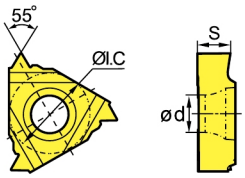
	Type		Basic dimensions(mm)				Recommended coating grade	
	The right hand tools	The left hand tools	Pitch/mm (pitch/Inch)	S	ØI.C	ød	YBG201	
							R	L
External thread	**RT16.01W-8W**	**LT16.01W-8W**	8	3.97	9.525	4.4	○	○
	RT16.01W-9W	**LT16.01W-9W**	9	3.97	9.525	4.4	○	○
	RT16.01W-10W	**LT16.01W-10W**	10	3.97	9.525	4.4	○	○
	RT16.01W-11W	**LT16.01W-11W**	11	3.97	9.525	4.4	○	○
	RT16.01W-12W	**LT16.01W-12W**	12	3.97	9.525	4.4	○	○
	RT16.01W-14W	**LT16.01W-14W**	14	3.97	9.525	4.4	○	○
	RT16.01W-16W	**LT16.01W-16W**	16	3.97	9.525	4.4	○	○

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

R type



L type

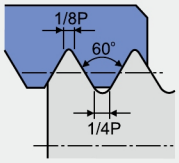


	Type		Basic dimensions(mm)				Recommended coating grade	
	The right hand tools	The left hand tools	Pitch/mm (pitch/Inch)	S	ØI.C	ød	YBG201	
							R	L
Internal thread	**RT16.01N-8W**	**LT16.01N-8W**	8	3.97	9.525	4.4	○	○
	RT16.01N-9W	**LT16.01N-9W**	9	3.97	9.525	4.4	○	○
	RT16.01N-10W	**LT16.01N-10W**	10	3.97	9.525	4.4	○	○
	RT16.01N-11W	**LT16.01N-11W**	11	3.97	9.525	4.4	○	○
	RT16.01N-12W	**LT16.01N-12W**	12	3.97	9.525	4.4	○	○
	RT16.01N-14W	**LT16.01N-14W**	14	3.97	9.525	4.4	○	○
	RT16.01N-16W	**LT16.01N-16W**	16	3.97	9.525	4.4	○	○

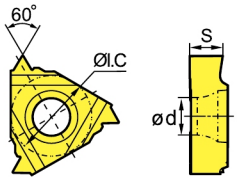
★Recommended grade (always stock available) ●Available grade (always stock available) ○Make-to-order

Unified thread (with end)

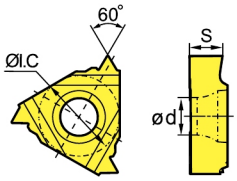
ASME B1.1-1989
Tolerance class：2A/2B




R type



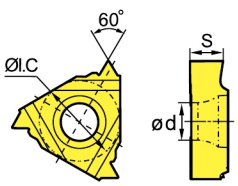

L type



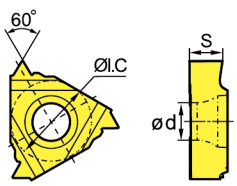
	Type		Basic dimensions(mm)				Recommended coating grade	
	The right hand tools	The left hand tools	Pitch/mm (pitch/Inch)	S	ØI.C	ød	YBG201	
							R	L
External thread	**RT16.01W-8UN**	**LT16.01W-8UN**	8	3.97	9.525	4.4	○	○
	RT16.01W-10UN	**LT16.01W-10UN**	10	3.97	9.525	4.4	○	○
	RT16.01W-12UN	**LT16.01W-12UN**	12	3.97	9.525	4.4	○	○
	RT16.01W-14UN	**LT16.01W-14UN**	14	3.97	9.525	4.4	○	○
	RT16.01W-16UN	**LT16.01W-16UN**	16	3.97	9.525	4.4	○	○
	RT16.01W-18UN	**LT16.01W-18UN**	18	3.97	9.525	4.4	○	○
	RT16.01W-20UN	**LT16.01W-20UN**	20	3.97	9.525	4.4	○	○

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


R type




L type

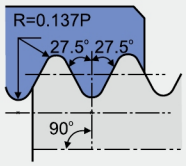


	Type		Basic dimensions(mm)				Recommended coating grade	
	The right hand tools	The left hand tools	Pitch/mm (pitch/Inch)	S	ØI.C	ød	YBG201	
							R	L
Internal thread	**RT16.01N-8UN**	**LT16.01N-8UN**	8	3.97	9.525	4.4	○	○
	RT16.01N-10UN	**LT16.01N-10UN**	10	3.97	9.525	4.4	○	○
	RT16.01N-12UN	**LT16.01N-12UN**	12	3.97	9.525	4.4	○	○
	RT16.01N-14UN	**LT16.01N-14UN**	14	3.97	9.525	4.4	○	○
	RT16.01N-16UN	**LT16.01N-16UN**	16	3.97	9.525	4.4	○	○
	RT16.01N-18UN	**LT16.01N-18UN**	18	3.97	9.525	4.4	○	○
	RT16.01N-20UN	**LT16.01N-20UN**	20	3.97	9.525	4.4	○	○
	RT16.01N-24UN	**LT16.01N-24UN**	24	3.97	9.525	4.4	○	○

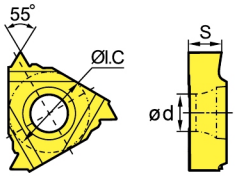
★Recommended grade (always stock available) ●Available grade (always stock available) ○Make-to-order

British standard taper piper thread (with end)

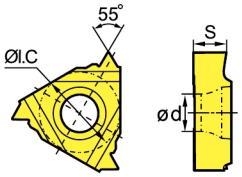
ISO 7/1:1994
B.S.21:1985
Standard BSPT



R type



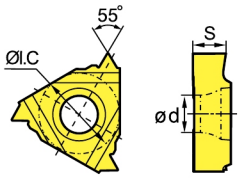
L type



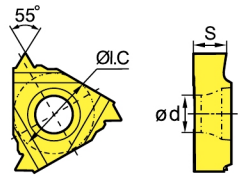
	Type		Basic dimensions(mm)				Recommended coating grade	
	The right hand tools	The left hand tools	Pitch/mm (pitch/Inch)	S	ØI.C	ød	YBG201	
							R	L
External thread	**RT16.01W-11 BSPT**	**LT16.01W-11 BSPT**	11	3.97	9.525	4.4	○	○
	RT16.01W-14 BSPT	**LT16.01W-14 BSPT**	14	3.97	9.525	4.4	○	○
	RT16.01W-19 BSPT	**LT16.01W-19 BSPT**	19	3.97	9.525	4.4	○	○
	RT16.01W-28 BSPT	**LT16.01W-28 BSPT**	28	3.97	9.525	4.4	○	○

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

R type



L type

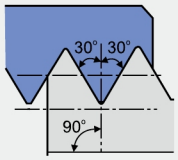


	Type		Basic dimensions(mm)				Recommended coating grade	
	The right hand tools	The left hand tools	Pitch/mm (pitch/Inch)	S	ØI.C	ød	YBG201	
							R	L
Internal thread	**RT16.01N-11 BSPT**	**LT16.01N-11 BSPT**	11	3.97	9.525	4.4	○	○
	RT16.01N-14 BSPT	**LT16.01N-14 BSPT**	14	3.97	9.525	4.4	○	○
	RT16.01N-19 BSPT	**LT16.01N-19 BSPT**	19	3.97	9.525	4.4	○	○
	RT16.01N-28 BSPT	**LT16.01N-28 BSPT**	28	3.97	9.525	4.4	○	○

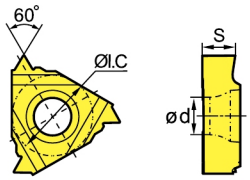
★Recommended grade (always stock available) ●Available grade (always stock available) ○Make-to-order

American standard taper piper thread (with end)

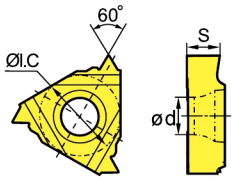
ASME B1.20.1-1983
Standard NPT




R type



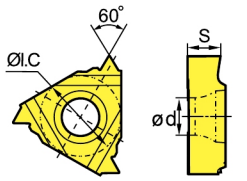

L type



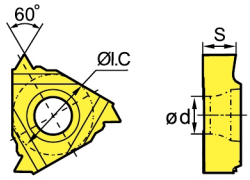
	Type		Basic dimensions(mm)				Recommended coating grade	
	The right hand tools	The left hand tools	Pitch/mm (pitch/Inch)	S	ØI.C	ød	YBG201	
							R	L
External thread	**RT16.01W-8NPT**	**LT16.01W-8NPT**	8	3.97	9.525	4.4	○	○
	RT16.01W-11.5 NPT	**LT16.01W-11.5NPT**	11.5	3.97	9.525	4.4	○	○
	RT16.01W-14NPT	**LT16.01W-14NPT**	14	3.97	9.525	4.4	○	○
	RT16.01W-18NPT	**LT16.01W-18NPT**	18	3.97	9.525	4.4	○	○
	RT16.01W-27NPT	**LT16.01W-27NPT**	27	3.97	9.525	4.4	○	○

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


R type




L type



	Type		Basic dimensions(mm)				Recommended coating grade	
	The right hand tools	The left hand tools	Pitch/mm (pitch/Inch)	S	ØI.C	ød	YBG201	
							R	L
Internal thread	**RT16.01N-8NPT**	**LT16.01N-8NPT**	8	3.97	9.525	4.4	○	○
	RT16.01N-11.5NPT	**LT16.01N-11.5NPT**	10	3.97	9.525	4.4	○	○
	RT16.01N-14NPT	**LT16.01N-14NPT**	12	3.97	9.525	4.4	○	○
	RT16.01N-18NPT	**LT16.01N-18NPT**	18	3.97	9.525	4.4	○	○
	RT16.01N-27NPT	**LT16.01N-27NPT**	20	3.97	9.525	4.4	○	○

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

Threading tools code key

Clamping system

Top clamping — C

Screw clamping — S

Thread type

N ➤ Internal thread

W ➤ External thread

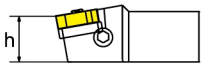
Cutting direction

Right hand — R

Left hand — L

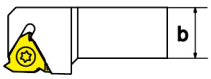
S	W	R	20	20	K	16

Nose height



Note: 00 for round tool holder.
Only to integer, for example:
h=8mm is labeled as 08.

Shank width



Note: Diameter for round tool holder
for example, b=8mm is labeled as 08.

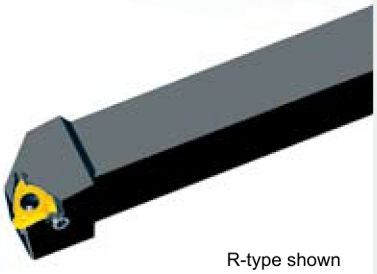
Tool length

Code	H	K	M	P	Q	R	S	T	U
Length	100	125	150	170	180	200	250	300	350

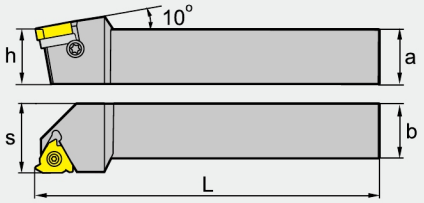
Insert size

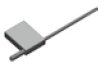
Code	11	16	22
Triangle side length	11	16	22
Inscribed circle	6.35	9.525	12.70

External threading tools



R-type shown

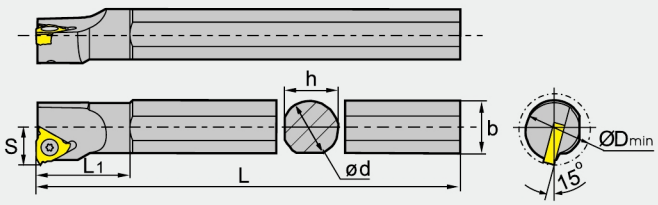


Type		Stock	Basic dimensions(mm)					Applicable inserts	Inserts screw	Shim	Shim screw	Wrench
			a	h	b	L	s					
SWR	1616H16	▲	16	16	16	100	20	RT16.01W-□□□□	I60M3.5×12	MT16-□□M	SM4×8C	WT15IP
	2020K16	▲	20	20	20	125	25					
	2525M16	▲	25	25	25	150	32					
	3225P16	▲	32	32	25	170	32					
	3232P16	▲	32	32	32	170	40					
	2525M22	▲	25	25	25	150	32	RT22.01W-□□□□	I60M5×17	MT22-□□M	SM4×8C	WT15IP WT20IP
	3225P22	▲	32	32	25	170	32					
	3232P22	▲	32	32	32	170	40					
	4040S22	△	40	40	40	250	50					
SWL	1616H16	▲	16	16	16	100	20	LT16.01W-□□□□	I60M3.5×12	MT16-□□M	SM4×8C	WT15IP
	2020K16	▲	20	20	20	125	25					
	2525M16	▲	25	25	25	150	32					
	3225P16	▲	32	32	25	170	32					
	3232P16	▲	32	32	32	170	40					
	2525M22	▲	25	25	25	150	32	LT22.01W-□□□□	I60M5×17	MT22-□□M	SM4×8C	WT15IP WT20IP
	3225P22	▲	32	32	25	170	32					
	3232P22	▲	32	32	32	170	40					
	4040S22	△	40	40	40	250	50					

▲Stock available △Make-to-order

Internal threading tools

R-type shown



Type		Stock	Basic dimensions(mm)							Applicable inserts	Inserts screw	Shim	Shim screw	Wrench
			d	L	b	D_{min}	s	h	L_1					
SNR	0016K11	▲	16	125	16	12	10	15	20.9	RT11.01N-□□□□	I60 M2.5×6.5	---	---	WT07IP
	0016M11	▲	16	150	15.5	16	10.5	15	25.9					
	0016M16	▲	16	150	15.5	20	12	15	27	RT16.01N-□□□□	I60 M3.5×8	---	---	WT15IP
	0020M16	▲	20	150	19	25	14	18	28.7		I60 M3.5×12	MT16-□□M	SM4×8C	WT15IP
	0020Q16	▲	20	180	19	25	14	18	34					
	0025M16	▲	25	150	24	32	17	23	28.8					
	0032R16	▲	32	200	31	40	22	30	30.9					
	0032S16	▲	32	250	31	40	22	30	30.9					
	0040T16	▲	40	300	38.5	50	27	37	31.5					
	0050U16	▲	50	350	49.5	63	35	49	40.2					
	0020Q22	▲	20	180	21.5	25	15	18	35	RT22.01N-□□□□	I60 M5×10			WT20IP
	0025R22	▲	25	200	24	32	19	23	39		I60 M5×17	MT22-□□M	SM4×8C	WT15IP WT20IP
	0032S22	▲	32	250	31	40	22	30	36.4					
	0040T22	▲	40	300	38.5	50	27	37	37.2					
	0050U22	▲	50	350	48.5	63	35	47	42.6					
SNL	0016K11	▲	16	125	16	12	10	15	20.9	LT11.01N-□□□□	I60 M2.5×6.5	---	---	WT07IP
	0016M11	▲	16	150	15.5	16	10.5	15	25.9					
	0016M16	▲	16	150	15.5	20	12	15	27	LT16.01N-□□□□	I60 M3.5×8	---	---	WT15IP
	0020M16	▲	20	150	19	25	14	18	28.7		I60 M3.5×12	MT16-□□M	SM4×8C	WT15IP
	0020Q16	▲	20	180	19	25	14	18	34					
	0025M16	▲	25	150	24	32	17	23	28.8					
	0032R16	▲	32	200	31	40	22	30	30.9					
	0032S16	▲	32	250	31	40	22	30	30.9					
	0040T16	▲	40	300	38.5	50	27	37	31.5					
	0050U16	▲	50	350	49.5	63	35	49	40.2					
	0020Q22	▲	20	180	21.5	25	15	18	35	LT22.01N-□□□□	I60 M5×10	---	---	WT20IP
	0025R22	▲	25	200	24	32	19	23	39		I60 M5×17	MT22-□□M	SM4×8C	WT15IP WT20IP
	0032S22	▲	32	250	31	40	22	30	36.4					
	0040T22	▲	40	300	38.5	50	27	37	37.2					
	0050U22	▲	50	350	48.5	63	35	47	42.6					

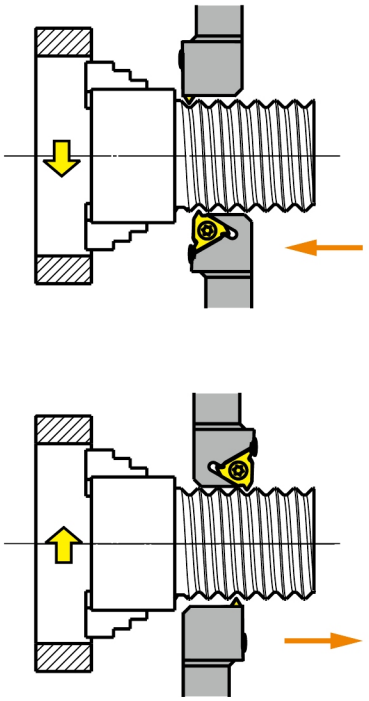
▲Stock available △Make-to-order

Please follow the following steps to get the best threading result:

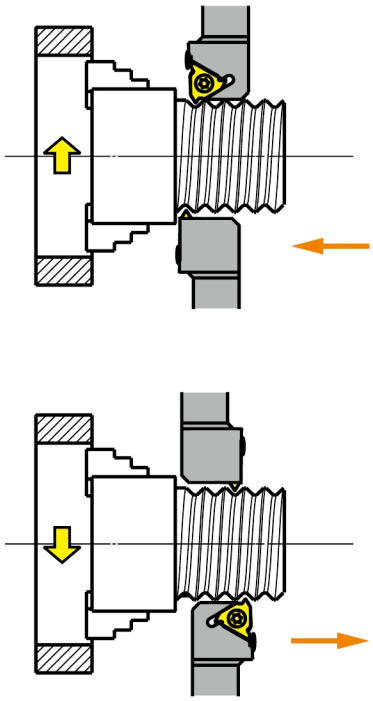
1. Select proper thread machining method.
2. Define helical angle and select shim
3. Select proper insert and tool holder size
4. By checking reference table of standard threading programs, select feasible cutting parameters.
5. Select feed way.

Machining method of threading tools

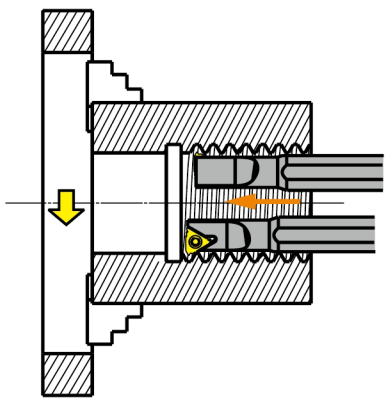
External threading machining (Right thread)



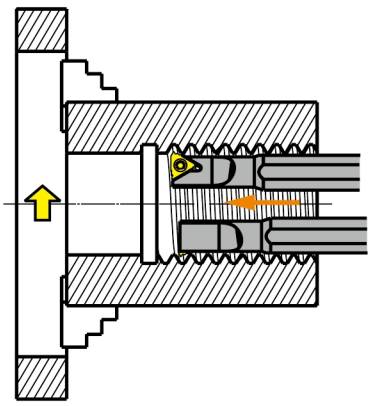
External threading machining (Left thread)



Internal threading machining (Right thread)



Internal threading machining (Left thread)



Decide helical angle and select shim

The clearance angle of threading inserts is actually along the edge (flank). This has significant effect on heat diffusion, spread of abrasion as well as tool life, security and pitch quality. The clearance angle of threading pitch on clearance face is determined by thread helical angle. These two angles are similar to each other to some extent. If inclined angle of insert is different from the helical angle, then the clearance angle won't be the same either.
The helical angle of pitch has to be the same with the inclined angle of insert to prevent over wearing on the clearance face which could affect tool life. the helical angle is calculated as below:

$$\rho = \arctan \frac{P}{d_2 \times \pi}$$

P= Pitch
d_2= pitch diameter
The most common inclined angle is 1°. MT standard shim and its inclined angle is also 1°.
Calculation of clearance angle:
Clearance angle is calculated as below:

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

2θ=Thread profile angle
α=The rake angle of external standard threading tools is 10°; the rake angle of internal standard threading tools is 15°

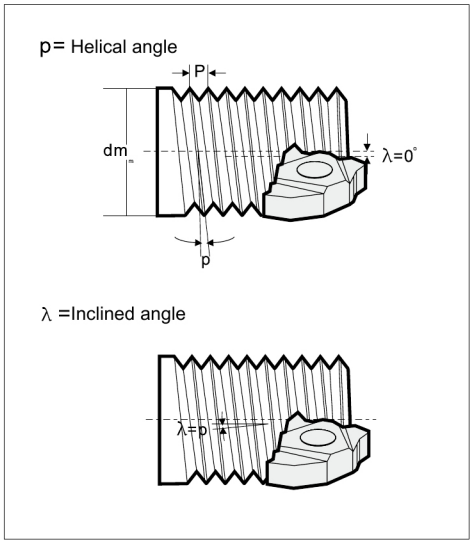
The shim has to be changed when helical angle of thread is ≤ clearance angle of tool, which could cause intervene on insert flank.
Please change the shim to adjust the difference between helical angle of thread and inclined angle of shim to be within 2°~0°.

For example: when P=1.5, d2=24mm, helical angle 1.14°-(2°~0°)=inclined angle (-0.86°~1.14°)
it is feasible to use standard shim 1°

Shim specification table is as follows:

Screw pitch range	Insert dimensions	Inclined angle	Shim
0.5-3.0	16	0 1 2 3	MT16-00M MT16-01M MT16-02M MT16-03M
3.5-6.0	22	0 1 2 3	MT22-00M MT22-01M MT22-02M MT22-03M

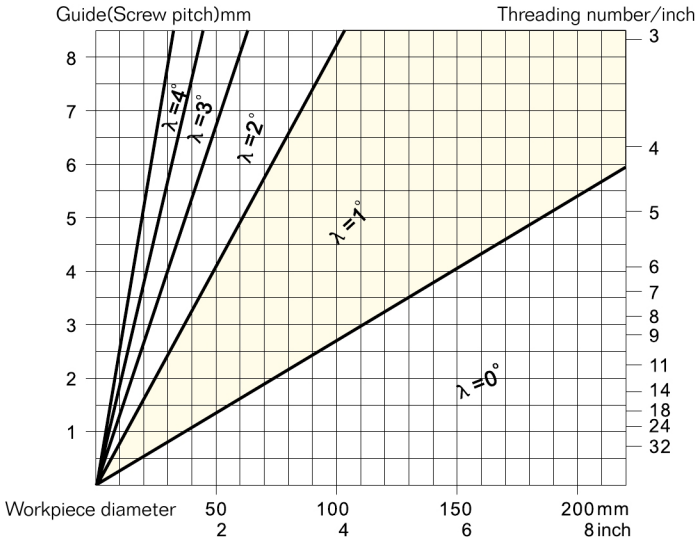
Note: the standard angle of shim for our threading tools is 1°.
((MT16-01M or MT22-01M)



Please refer to the table below for actual value:

Thread profile angle 2θ	β	
	External thread	Internal thread
60°	8.5°	6°
55°	7°	7°
30°	4°	2.5°
29°	4°	2.5°

Select shim:



Select proper inserts and size of tool holder (Please refer to detailed table of threading tools and inserts)

Parameter table for threading program under different standards

Table of recommended in-feed for metric ISO external threading with wiper edge

Screw pitch	1.0	1.25	1.5	1.75	2.0	2.5	3.0	4.0	5.0
Total in-feed	0.72	0.86	1.02	1.17	1.33	1.63	1.94	2.58	3.21
Number of passes	5	6	7	8	9	11	13	15	17
Order to follow in threading operation	Value of radial in-feed (X) and flank in-feed (Z)								
	X/Z	X/Z	X/Z	X/Z	X/Z	X/Z	X/Z	X/Z	X/Z
1	0.20/-	0.20/-	0.21/-	0.22/-	0.24/-	0.25/-	0.26/-	0.35/-	0.40/-
2	0.18/0.10	0.18/0.10	0.18/0.10	0.20/0.12	0.22/0.13	0.24/0.14	0.24/0.14	0.30/0.17	0.35/0.20
3	0.16/0.09	0.14/0.09	0.18/0.10	0.18/0.10	0.20/0.12	0.21/0.12	0.20/0.12	0.25/0.14	0.30/0.17
4	0.10/0.06	0.10/0.08	0.15/0.09	0.15/0.09	0.15/0.09	0.18/0.10	0.20/0.12	0.20/0.12	0.28/0.16
5	0.08/-	0.08/0.06	0.12/0.07	0.13/0.08	0.12/0.07	0.15/0.09	0.18/0.10	0.18/0.10	0.25/0.14
6			0.10/0.06	0.11/0.06	0.12/0.07	0.12/0.07	0.15/0.09	0.18//0.10	0.20/0.12
7			0.08/-	0.10/0.06	0.10/0.06	0.12/0.07	0.13/0.08	0.16/0.09	0.18/0.10
8				0.08/-	0.10/0.06	0.10/0.06	0.12/0.07	0.15/0.09	0.16/0.09
9					0.08/-	0.10/0.06	0.10/0.06	0.15/0.09	0.15/0.09
10						0.08/0.05	0.10/0.06	0.13/0.08	0.15/0.09
11						0.08/-	0.08/0.06	0.12/0.07	0.13/0.08
12							0.08/0.05	0.12/0.07	0.13/0.08
13								0.11/0.06	0.12/0.07
14								0.10/0.06	0.12/0.07
15								0.08/-	0.11/0.06
16									0.10/0.06
17									0.08/-

Table of recommended in-feed for metric ISO internal threading with wiper edge

Screw pitch	1.00	1.25	1.5	1.75	2.0	2.5	3.0	4.0	5.0
Total in-feed	0.62	0.77	0.92	1.06	1.21	0.15	1.79	2.36	2.95
Number of passes	5	6	7	8	9	11	13	15	17
Order to follow in threading operation	Value of radial in-feed (X) and flank in-feed (Z)								
	X/Z	X/Z	X/Z	X/Z	X/Z	X/Z	X/Z	X/Z	X/Z
1	0.18/-	0.20/-	0.22/-	0.23/-	0.24/-	0.25/-	0.26/-	0.30/-	0.32/-
2	0.14/0.08	0.15/0.09	0.16/0.09	0.16/0.09	0.18/0.10	0.20/0.12	0.20/0.12	0.25/0.14	0.28/0.16
3	0.12/0.07	0.12/0.07	0.14/0.08	0.14/0.08	0.15/0.09	0.15/0.09	0.20/0.12	0.22/0.13	0.25/0.14
4	0.10/0.06	0.12/0.07	0.12/0.07	0.13/0.08	0.14/0.08	0.15/0.09	0.18/0.10	0.20/0.12	0.22/0.13
5	0.08/-	0.10/0.06	0.11/0.06	0.12/0.07	0.12/0.07	0.13/0.08	0.15/0.09	0.18/0.10	0.21/0.12
6			0.09/0.05	0.10/0.06	0.11/0.06	0.12/0.07	0.12/0.07	0.15/0.09	0.20/0.12
7			0.08/-	0.10/0.06	0.10/0.06	0.12/0.07	0.12/0.07	0.15/0.09	0.18/0.10
8				0.08/-	0.09/0.05	0.10/0.06	0.10/0.06	0.15/0.09	0.18/0.10
9					0.08/-	0.10/0.06	0.10/0.06	0.12/0.07	0.15/0.09
10						0.09/0.05	0.10/0.06	0.12/0.07	0.15/0.09
11						0.08/-	0.10/0.06	0.12/0.07	0.15/0.09
12							0.08/0.05	0.11/0.06	0.15/0.09
13								0.11/0.06	0.12/0.07
14								0.10/0.06	0.11/0.06
15								0.08/-	0.10/0.06
16									0.10/0.06
17									0.08/-

Table of recommended in-feed for American unified standard external threading with wiper edge

Screw pitch	24	20	18	16	14	12	11	10	9	8	7	6	5
Total in-feed	0.649	0.779	0.866	0.974	1.113	1.299	1.416	1.558	1.731	1.948	2.226	2.597	3.116
Number of passes	5	6	6	7	9	9	10	11	12	13	14	15	16
Order to follow in threading operation	Value of radial in-feed (X) and flank in-feed (Z)												
	X/Z	X/Z	X/Z	X/Z	X/Z	X/Z	X/Z	X/Z	X/Z	X/Z	X/Z	X/Z	X/Z
1	0.206 / —	0.210 / —	0.233 / —	0.226 / —	0.196 / —	0.229 / —	0.220 / —	0.214 / —	0.210 / —	0.211 / —	0.213 / —	0.218 / —	0.229 / —
2	0.148 / 0.086	0.163 / 0.094	0.181 / 0.104	0.188 / 0.109	0.189 / 0.110	0.222 / 0.128	0.228 / 0.132	0.240 / 0.139	0.256 / 0.148	0.276 / 0.160	0.304 / 0.176	0.343 / 0.198	0.399 / 0.230
3	0.114 / 0.066	0.125 / 0.072	0.139 / 0.080	0.145 / 0.083	0.146 / 0.084	0.170 / 0.098	0.176 / 0.102	0.184 / 0.106	0.196 / 0.113	0.212 / 0.122	0.234 / 0.135	0.263 / 0.152	0.306 / 0.177
4	0.096 / 0.055	0.105 / 0.061	0.117 / 0.068	0.122 / 0.070	0.123 / 0.071	0.143 / 0.083	0.148 / 0.086	0.155 / 0.090	0.165 / 0.095	0.179 / 0.103	0.197 / 0.114	0.222 / 0.128	0.258 / 0.149
5	0.085 / 0.049	0.093 / 0.054	0.103 / 0.059	0.107 / 0.062	0.108 / 0.062	0.126 / 0.073	0.131 / 0.075	0.137 / 0.079	0.146 / 0.084	0.158 / 0.091	0.173 / 0.100	0.195 / 0.113	0.227 / 0.131
6		0.084 / 0.048	0.093 / 0.054	0.097 / 0.056	0.098 / 0.056	0.114 / 0.066	0.118 / 0.068	0.124 / 0.072	0.132 / 0.076	0.142 / 0.082	0.157 / 0.091	0.177 / 0.102	0.205 / 0.119
7				0.089 / 0.052	0.090 / 0.052	0.105 / 0.061	0.109 / 0.063	0.114 / 0.066	0.121 / 0.070	0.131 / 0.076	0.144 / 0.083	0.163 / 0.094	0.189 / 0.109
8					0.084 / 0.048	0.098 / 0.056	0.101 / 0.058	0.106 / 0.061	0.113 / 0.065	0.122 / 0.070	0.134 / 0.078	0.151 / 0.087	0.176 / 0.101
9					0.079 / 0.045	0.092 / 0.053	0.095 / 0.055	0.100 / 0.057	0.106 / 0.061	0.114 / 0.066	0.126 / 0.073	0.142 / 0.082	0.165 / 0.095
10							0.090 / 0.052	0.094 / 0.054	0.100 / 0.058	0.108 / 0.063	0.119 / 0.069	0.134 / 0.078	0.156 / 0.090
11								0.090 / 0.052	0.095 / 0.055	0.103 / 0.059	0.113 / 0.065	0.128 / 0.074	0.149 / 0.086
12									0.091 / 0.053	0.098 / 0.057	0.108 / 0.063	0.122 / 0.071	0.142 / 0.082
13										0.094 / 0.054	0.104 / 0.060	0.117 / 0.068	0.136 / 0.079
14											0.100 / 0.058	0.113 / 0.065	0.131 / 0.076
15												0.109 / 0.063	0.126 / 0.073
16													0.122 / 0.071

Table of recommended in-feed for American unified standard internal threading with wiper edge

Screw pitch	24	20	18	16	14	12	11	10	9	8	7	6	5
Total in-feed	0.573	0.687	0.764	0.860	0.982	1.146	1.250	1.375	1.528	1.719	1.964	2.291	2.750
Number of passes	5	6	6	7	8	9	9	10	11	12	13	14	15
Order to follow in threading operation	Value of radial in-feed (X) and flank in-feed (Z)												
	X/Z	X/Z	X/Z	X/Z	X/Z	X/Z	X/Z	X/Z	X/Z	X/Z	X/Z	X/Z	X/Z
1	0.193 / —	0.200 / —	0.222 / —	0.219 / —	0.220 / —	0.228 / —	0.250 / —	0.247 / —	0.246 / —	0.252 / —	0.262 / —	0.278 / —	0.302 / —
2	0.127 / 0.073	0.239 / 0.081	0.155 / 0.089	0.161 / 0.093	0.173 / 0.100	0.190 / 0.110	0.207 / 0.120	0.216 / 0.125	0.229 / 0.132	0.247 / 0.142	0.271 / 0.156	0.304 / 0.176	0.353 / 0.204
3	0.098 / 0.056	0.107 / 0.062	0.119 / 0.069	0.124 / 0.072	0.132 / 0.076	0.146 / 0.084	0.159 / 0.092	0.166 / 0.096	0.176 / 0.101	0.189 / 0.109	0.208 / 0.120	0.234 / 0.135	0.271 / 0.156
4	0.082 / 0.048	0.090 / 0.052	0.100 / 0.058	0.104 / 0.060	0.112 / 0.064	0.123 / 0.071	0.134 / 0.077	0.140 / 0.081	0.148 / 0.086	0.160 / 0.092	0.175 / 0.101	0.197 / 0.114	0.228 / 0.132
5	0.073 / 0.042	0.079 / 0.046	0.088 / 0.051	0.092 / 0.053	0.098 / 0.057	0.108 / 0.062	0.118 / 0.068	0.123 / 0.071	0.130 / 0.075	0.141 / 0.081	0.1543 / 0.089	0.173 / 0.100	0.201 / 0.116
6		0.072 / 0.041	0.080 / 0.046	0.083 / 0.048	0.089 / 0.051	0.098 / 0.056	0.107 / 0.062	0.111 / 0.064	0.118 / 0.068	0.127 / 0.073	0.140 / 0.081	0.157 / 0.091	0.182 / 0.105
7				0.077 / 0.044	0.082 / 0.047	0.090 / 0.052	0.098 / 0.057	0.102 / 0.059	0.108 / 0.063	0.117 / 0.067	0.128 / 0.074	0.144 / 0.083	0.167 / 0.097
8					0.076 / 0.044	0.084 / 0.048	0.091 / 0.053	0.095 / 0.055	0.101 / 0.058	0.109 / 0.063	0.119 / 0.069	0.134 / 0.078	0.156 / 0.090
9						0.079 / 0.045	0.086 / 0.050	0.090 / 0.052	0.095 / 0.055	0.102 / 0.059	0.112 / 0.065	0.126 / 0.073	0.146 / 0.084
10								0.085 / 0.049	0.090 / 0.052	0.097 / 0.056	0.106 / 0.061	0.119 / 0.069	0.138 / 0.080
11									0.085 / 0.049	0.092 / 0.053	0.101 / 0.058	0.113 / 0.065	0.131 / 0.076
12										0.088 / 0.051	0.096 / 0.056	0.108 / 0.063	0.126 / 0.073
13											0.092 / 0.053	0.101 / 0.060	0.121 / 0.070
14												0.100 / 0.058	0.116 / 0.067
15													0.112 / 0.065

Table of recommended in-feed for British standard internal and external threading with wiper edge

Screw pitch	28	20	19	16	14	12	11	10	9	8	7	6	5
Total in-feed	0.581	0.813	0.856	1.017	1.162	1.355	1.479	1.626	1.807	2.033	2.324	2.711	3.253
Number of passes	5	6	6	8	8	9	9	10	11	12	14	15	16
Order to follow in threading operation	Value of radial in-feed (X) and flank in-feed (Z)												
	X/Z	X/Z	X/Z	X/Z	X/Z	X/Z	X/Z	X/Z	X/Z	X/Z	X/Z	X/Z	X/Z
1	0.179 / —	0.211 / —	0.223 / —	0.196 / —	0.223 / —	0.226 / —	0.246 / —	0.236 / —	0.230 / —	0.255 / —	0.195 / —	0.197 / —	0.204 / —
2	0.134 / 0.070	0.172 / 0.089	0.181 / 0.094	0.186 / 0.097	0.213 / 0.111	0.234 / 0.122	0.255 / 0.133	0.226 / 0.139	0.282 / 0.147	0.304 / 0.158	0.322 / 0.167	0.361 / 0.189	0.421 / 0.219
3	0.104 / 0.054	0.132 / 0.069	0.139 / 0.072	0.143 / 0.074	0.163 / 0.085	0.180 / 0.093	0.197 / 0.102	0.206 / 0.106	0.216 / 0.113	0.233 / 0.121	0.247 / 0.128	0.278 / 0.145	0.323 / 0.168
4	0.087 / 0.045	0.111 / 0.058	0.117 / 0.061	0.120 / 0.063	0.138 / 0.072	0.151 / 0.079	0.165 / 0.086	0.172 / 0.090	0.182 / 0.095	0.197 / 0.102	0.208 / 0.108	0.234 / 0.122	0.272 / 0.142
5	0.077 / 0.040	0.098 / 0.051	0.103 / 0.054	0.106 / 0.055	0.121 / 0.063	0.133 / 0.069	0.145 / 0.076	0.152 / 0.079	0.161 / 0.084	0.1738 / 0.090	0.183 / 0.095	0.207 / 0.108	0.240 / 0.125
6		0.089 / 0.046	0.093 / 0.049	0.096 / 0.050	0.110 / 0.057	0.121 / 0.063	0.131 / 0.068	0.137 / 0.071	0.145 / 0.076	0.157 / 0.082	0.166 / 0.086	0.187 / 0.097	0.217 / 0.113
7				0.088 / 0.046	0.101 / 0.052	0.111 / 0.058	0.121 / 0.063	0.126 / 0.066	0.134 / 0.070	0.144 / 0.075	0.152 / 0.079	0.172 / 0.089	0.200 / 0.104
8				0.082 / 0.043	0.093 / 0.049	0.103 / 0.054	0.113 / 0.059	0.117 / 0.061	0.124 / 0.065	0.134 / 0.070	0.142 / 0.074	0.160 / 0.083	0.186 / 0.097
9						0.097 / 0.050	0.106 / 0.055	0.110 / 0.057	0.117 / 0.061	0.126 / 0.066	0.133 / 0.069	0.150 / 0.078	0.174 / 0.091
10								0.104 / 0.054	0.111 / 0.058	0.119 / 0.062	0.126 / 0.066	0.142 / 0.074	0.165 / 0.086
11									0.105 / 0.055	0.113 / 0.059	0.120 / 0.062	0.135 / 0.070	0.157 / 0.082
12										0.108 / 0.056	0.114 / 0.060	0.129 / 0.067	0.150 / 0.078
13											0.110 / 0.055	0.124 / 0.064	0.144 / 0.075
14												0.119 / 0.062	0.138 / 0.072
15												0.115 / 0.060	0.133 / 0.069
16													0.129 / 0.067

Table of recommended in-feed for NPT internal and external threading with wiper edge

Screw pitch	27	18	14	11.5	8
Total in-feed	0.75	1.129	1.451	1.767	2.54
Number of passes	6	8	10	12	14
Order to follow in threading operation	Value of radial in-feed (X) and flank in-feed (Z)				
	X/Z	X/Z	X/Z	X/Z	X/Z
1	0.19/-	0.22/-	0.240/-	0.24/-	0.255/-
2	0.15/0.087	0.181/0.104	0.200/0.115	0.208/0.120	0.250/0.144
3	0.13/0.075	0.152/0.088	0.170/0.098	0.182/0.105	0.245/0.141
4	0.11/0.063	0.141/0.081	0.150/0.086	0.168/0.097	0.230/0.133
5	0.09/0.052	0.131/0.075	0.140/0.081	0.155/0.089	0.210/0.121
6	0.08/0.46	0.121/0.070	0.130/0.075	0.145/0.084	0.195/0.112
7		0.101/0.058	0.120/0.069	0.138/0.079	0.180/0.104
8		0.082/0.047	0.110/0.063	0.124/0.072	0.175/0.101
9			0.100/0.058	0.117/0.067	0.170/0.098
10			0.091/0.052	0.105/0.060	0.155/0.089
11				0.095/0.055	0.140/0.080
12				0.090/0.052	0.125/0.072
13					0.110/0.063
14					0.100/0.058

Table of recommended in-feed for BSPT internal and external threading with wiper edge

Screw pitch	28	19	14	11
Total in-feed	0.581	0.856	1.162	1.479
Number of passes	5	6	8	10
Order to follow in threading operation	Value of radial in-feed (X) and flank in-feed (Z)			
	X/Z	X/Z	X/Z	X/Z
1	0.179/-	0.223/-	0.222/-	0.214/-
2	0.134/0.070	0.181/0.094	0.213/0.111	0.242/0.126
3	0.103/0.054	0.139/0.072	0.163/0.085	0.186/0.097
4	0.087/0.045	0.117/0.061	0.138/0.072	0.157/0.082
5	0.078/0.040	0.103/0.054	0.121/0.063	0.138/0.072
6		0.093/0.049	0.110/0.057	0.125//0.065
7			0.101/0.052	0.115/0.060
8			0.094/0.049	0.107/0.056
9				0.100/0.052
10				0.095//0.049

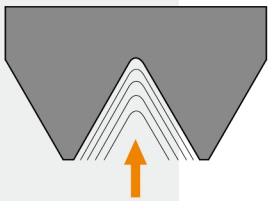
Table of recommended cutting parameters

ISO	Material		Unit cutting force Kc0.4 N/mm²	Hardness HB	Grade YBG201 Cutting speed(m/min)
P	Carbon steel	C=0.15% C=0.35% C=0.60%	1900 2100 2250	125 150 200	150-175 140-155 130-145
	Alloy steel	Anneal Hardened Hardened Hardened	2100 2600 2700 2850	180 275 300 350	110-130 80-100 70-90 60-80
	High alloy steel	Anneal Hardened	2600 3900	200 325	90-115 70-90
	Cast steel	Non-alloy low alloy high alloy Martensite steel 12%Mn	2000 2500 2700 3600	180 200 225 250	180-210 90-115 90-115 40-50
M	Stainless steel	Austenite	2450	180	110-130
		Martensite/Ferrite	2300	200	130-170
K	Malleable cast iron	Ferrite Pearlite	1100 1100	130 230	110-140 85-105
	Gray cast iron	Low tensile-strength High tensile-strength	1100 1500	180 260	110-140 90-115
	Nodular cast iron	Ferrite Pearlite	1100 1800	160 250	110-130 80-100
N	Al alloy	Non-aging treatment Aging treatment	500 800	60 100	1300-1450 450-500
	Cast aluminum alloy	Non-aging treatment Aging treatment	750 900	75 90	430-470 250-290
S	Heat resistant alloy	Iron base: Anneal Iron base: Aging	3000 3050	200 280	35-50 25-35
		Ni- or Co-base: Anneal Ni- or Co-base: Aging Ni- or Co-base: Casting	3500 4150 4150	250 350 320	15-25 10-20 10-15
H	Hardened steel	Hardened steel	4500	HRC55	40-50

Note: •The values in the above table are range values. High values in the range could be considered in actual cutting. When trying new cutting speed, please check the cutting edge condition before operation.
•In stainless steel threading, high cutting speed should be used to prevent built-up edge.
•The cutting parameters should be reduced when cutting small pitch thread and when using tools with small nose radius.
•When cutting thread by tools with small nose radius, such as NPT standard thread, it is advisable to use tools with big nose radius first to rough, so as to improve the life of tools with small nose radius.

In-feed way of threading tools

Radial in-feed

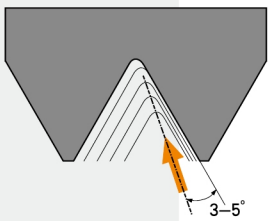


- Easy operating, high general
- V-shape chip caused by long chip steel workpiece will produce big bend stress on cutting edge.
- It requires low cutting depth, sharp cutting edge and good tough material.
- Big quantity of heat when cutting ,V-shape chip is hard to control
- Because the interface of cutting chips on the right and left side is long, so it is easy to cause shaking and make the cutting edge suffer more overloading

Flank in-feed

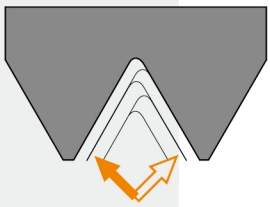
- Cutting edge suffer small bend stress, stable estate, it is easy for chips formation in deep cutting depth.
- There are enough space to leave chips flow when flank in-feed
- Big abrasion on right flank

Modified flank in-feed



- Right Cutting Edge also engage on cutting depth to a certain extent, it can reduce the abrasion on right side of clearance face.
- Cutting edge suffer small bend stress, stable estate, it is easy for chips formation in deep cutting depth.
- Good Cutting Performance

Alternate flank in-feed



- Cutting edge trade off when machining, equality abrasion on left and right side of clearance face on cutting edge, it can improve the life of tools
- Chips are flowing from both of right and left side, good chips flowing
- Recommend using in big screw-pitch thread cutting

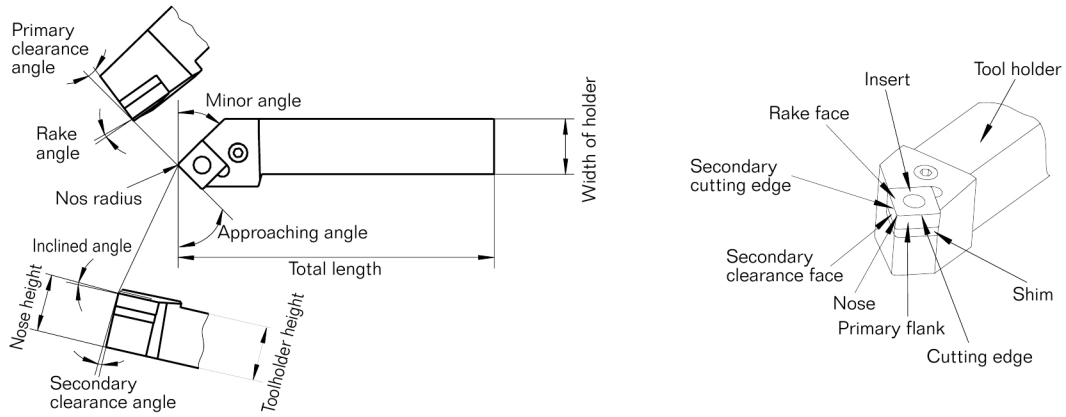
Recommend adopting flank in-feed or alternate flank in-feed under allowable range of machining equipment or programmer, it can eliminate the machining vibration effectively, and it has enough space discharge the chips between pitch. Cutting edge suffer a small stress, machining stable, it likes the general turning process when machining thread, good chip control without extra chips.

Common problems in threading and solutions

Problem	Cause	Solutions
Over wear on clearance face	Cutting speed too high.	Reduce cutting speed.
	Low cutting depth, abrasion.	Reduce frequency of feed and friction of cutting edge.
	Inserts are over the center line.	Adopt correct center height.
Asymmetric wear on right and left cutting edge	The inclined angle of insert is different from the helical angle of thread.	Change to proper shim to get correct inclined angle.
	Flank in-feed is not correct.	Change the way of flank in-feed.
Breakage	Cutting speed too low.	Increase cutting speed.
	Cutting force too high.	Increase frequency of feed and reduce Max in-feed.
	Unstable clamping.	Check if workpiece vibrates. Reduce overhang of tool. Verify clamping of workpiece and tool.
	Chip twisting.	Increase the pressure of cooling liquid to blow away chips.
Plastic deformation	High cutting speed, high temperature on cutting area.	Reduce cutting speed. Increase feed frequency and reduce Max cutting depth.
	Insufficient cooling fluid.	Increase cooling fluid supply.
Low thread surface quality	Cutting speed too low. The insert is over the center line. Chips are not under control.	Increase cutting speed. Adjust centre height. Change the operation way of tools to well control chips.
Incorrect profile	Incorrect center height.	Adjust centre height
	Pitch on machine is not correct.	Adjust machine.
Shallow profile	Cutting speed set wrong.	Alter cutting depth.
Surface damage	Chips involved or contacted.	Change to flank in-feed to control chip flow direction.
Built-up edge	Temperature of cutting edge is too low. Usually occur when machining stainless steel and low carbon steel.	Increase cutting speed as well as pressure and concentration of cooling fluid. Choose inserts with good toughness.
Crack on surface	Cutting force too high	Reduce the cutting depth of each feed.
Vibration	Incorrect clamping of workpiece or tool	Verify clamping of workpiece and tool. Minimize overhang of tool.
	Incorrect cutting parameters	Increase cutting speed or reduce it substantially.
	Incorrect tool clamping	Adjust center height.

The functions of each part of turning tools

1 The names of each part of turning tools



2 Effects of rake angle

Larger rake angle makes cutting edge sharper, reduces resistant forces of chip flow, diminishes friction and prevent deformation, leading to smaller cutting forces and cutting power, lower cutting temperature, less abrasion and higher surface quality. However, too large rake angle would reduce the rigidity and strength of tool. Heat can't be diffused easily. Serious breakage and abrasion on tool would occur, reducing tool life. Please choose rake angle according to machining conditions.

Value selection	Situations
Small rake angle	●When machining brittle and hard materials ●When roughing and intermittent cutting
Big rake angle	●When machining plastic or soft materials ●When finishing

3 Effects of clearance angle

The main function of clearance angle is to reduce the friction between the clearance face of tool and the surface of workpiece. When the rake angle is fixed, larger clearance angle can increase the sharpness of cutting edge, reduce cutting forces and friction, and then achieve higher surface quality. However, if clearance angle is too large, the strength of cutting edge would decrease. Also, heat can't be diffused easily and serious abrasion would occur, reducing tool life.

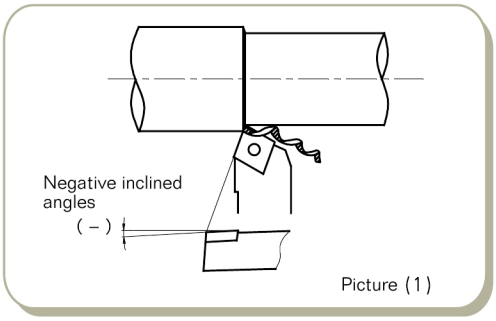
The principle of choosing clearance angle: Choose small clearance angle if friction is not serious.

Value Selection	Situations
Small clearance angle	●In order to increase nose strength when roughing ●When machining brittle and hard materials
Large clearance angle	●In order to reduce friction when finishing ●When machining materials easy to be hardened

4 Effects of inclined angle

Positive or negative inclined angle determines the direction of chip flow, and also affects the strength and impact resistance of insert nose.

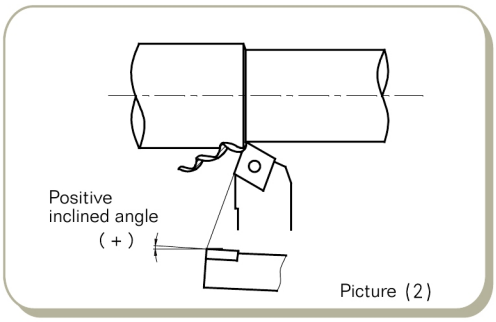
◆As diagram (1) shows, when the inclined angle is negative, namely nose is in the lowest point as apposed to the bottom of tool, chips flow to the machined surface of workpiece.



Picture (1)

◆ As diagram (2) shows, when inclined angle is positive, namely the nose is in the highest point as apposed to the bottom of the tool, chips flow to the areas of workpiece surface that haven't been machined.

◆ The change of inclined angle also affects insert nose strength and impact resistance. When the inclined angle is negative, the nose is in the lowest point of cutting edge. When the cutting edge enters the workpiece, the contacting point is on the cutting edge or rake face, protecting the nose from impact and increase the strength of the nose. Normally, negative inclined angle should be chosen for tools with big rake angle. This can not only increase nose strength, but also prevent the impact of entry.

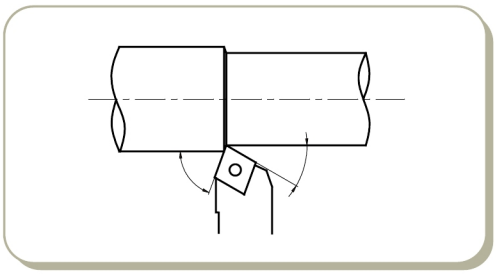


Picture (2)

5 Effects of approaching angle

Reduced approaching angle increases the strength of tools and enable heat to diffuse easily, improving surface quality. This is because when the approaching angle is small, cutting edge width is large, and then the unit width of cutting edge bears less cutting force. Meanwhile, tool life can be improved.

Normally, select 90°approaching angle for turning of slender and step shaft; select 45° approaching angle for external turning, end surface machining and chamfering. When approaching angle is larger, radial force is reduced, cutting is stable, cutting thickness is increased, and chip breaking is excellent.



Value selection	Situations
Small approaching angle	For those materials with high intensity, high hardness and hardened layer on the surface
Big approaching angle	When rigidity of the machine is not enough

6 Effects of minor angle

Minor angle is the main angle that can affect surface quality, and it can also affect tool strength. If the approaching angle is too small, the friction between the secondary flank and machined surface of workpiece will increase, causing vibration.

The principle of selecting minor angle: Select small minor angle when roughing or when the friction is unaffected and there is no vibration. Select large minor angle when finishing.

7 Nose radius

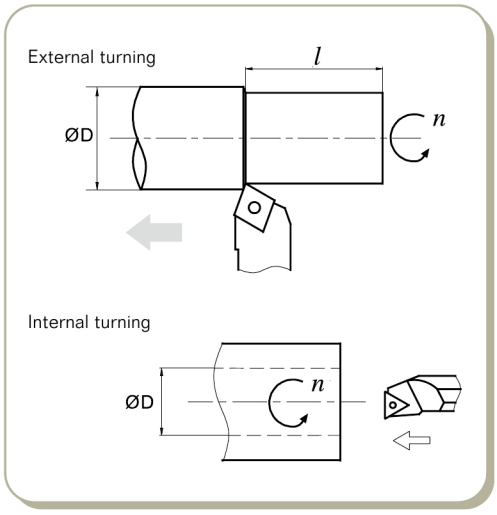
Nose radius significantly affects nose strength and surface quality.

Large nose radius means higher cutting edge strength, and the abrasion on the rake face and clearance face can be reduced to some extent. However, if the nose radius is too large, radial force will increase, and vibration is easy to occur, affecting machining precision and surface quality.

Value selection	Situations
Small nose radius	●Finishing at small cutting depth ●Machining parts such as slender shaft ●When the rigidity of the machine is not enough
Large nose radius	●When roughing ●When machining hard materials (intermittent cutting) ●When the rigidity of the machine is not enough

Calculation method of turning parameters

1 Calculation of cutting speed



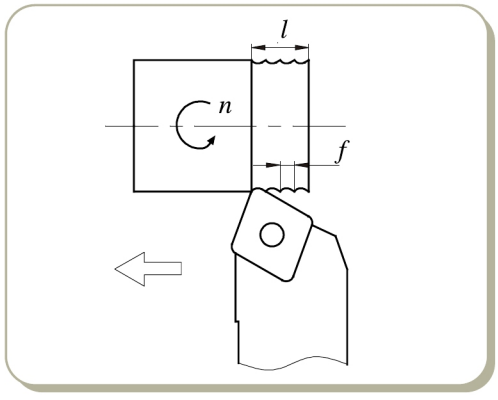
$$Vc=\frac{\pi \times D \times n}{1000}\ (m/min)$$

In the formula: Vc: Cutting speed (m/min)
n: Rotating speed of main axle (rev/min)
D: Diameter of workpiece (mm)

For example: When the rotating speed is 280rev/min and the diameter of workpiece is 150mm, the cutting speed should be:

$$Vc=\frac{\pi \times D \times n}{1000}\ (m/min)\ =132(m/min)$$

2 Calculation of feed rate



$$f=\frac{l}{n}\ (mm/rev)$$

In the formula: f: Feed rate per rotation (mm/rev)
l: Cutting length per minute (mm/min)
n: Rotating speed of main axle (rev/min)

For example: When the rotating speed of main axle is 500rev/min, and the cutting length per minute is 100mm/min, the feed rate per rotation should be:

$$f=\frac{l}{n}=\frac{100}{500}=0.2(mm/rev)$$

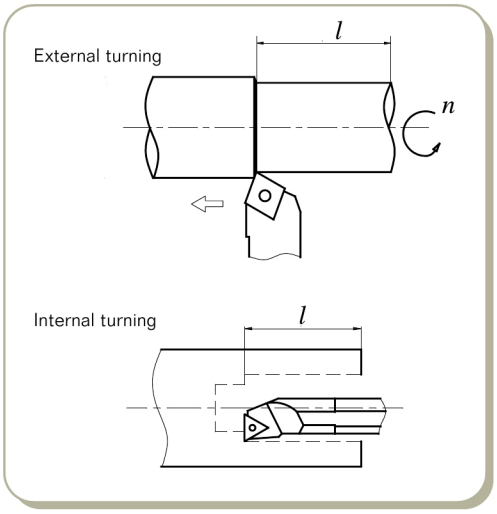
3 Cutting time calculation of external and internal turning

$$T=\frac{l}{f\times n}\ (min)$$

In the formula: T: Cutting time (min)
l: Length of machined areas (mm)
f: Feed rate (mm/rev)
n: Rotating speed of main axle (rev/min)

For example: When the rotating speed of main axle is 250rev/min, and the feed rate is 0.2mm/rev, the time needed for a cutting length of 150mm should be:

$$T=\frac{l}{f\times n}=\frac{150}{0.2\times 250}=3(min)$$

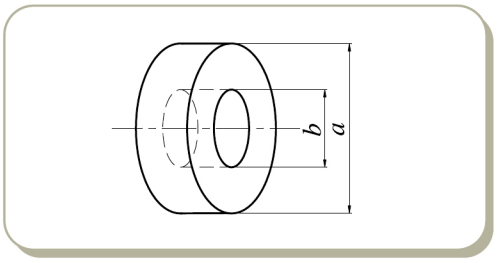


4 Time calculation for end surface turning (constant linear speed)

$$T=\frac{\pi\times(a^2-b^2)}{4000\times Vc\times f}\ (min)$$

In the formula: T: Cutting time (min)
Vc: Cutting speed (m/min)
f: Feed rate (mm/rev)

For end surface without hole, b=0, the formula is still valid.



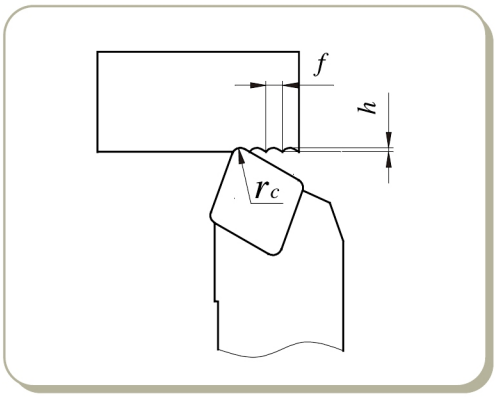
5 Theoretical value calculation of machined surface roughness

$$R=\frac{f^2}{8r_c}\times 1000\ (\mu m)$$

In the formula: R: Theoretical roughness value of machined surface
f: Feed rate (mm/rev)
rc: Nose radius (mm)

For example: When the feed rate is 0.2mm/rev, and the nose radius is 0.4mm, the theoretical roughness value of machined surface should be:

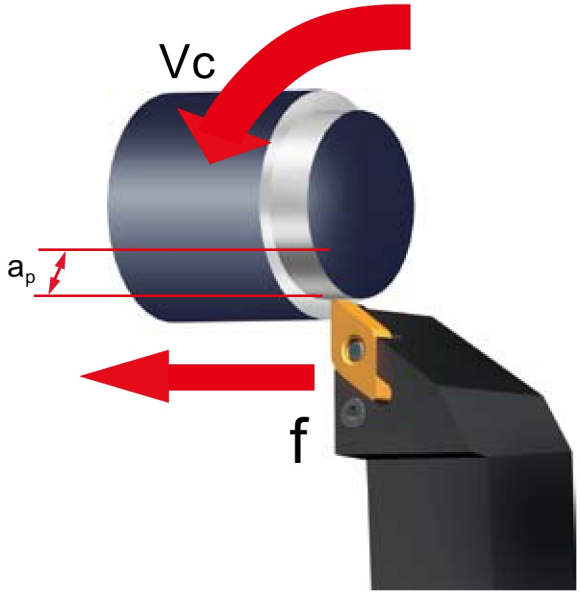
$$R=\frac{f^2}{8r_c}\times 1000=\frac{0.2^2}{8\times 0.4}\times 1000=12.5(\mu m)$$



Effect of three main turning parameters on machining

Effects of three main parameters

Normally, short machining time, long tool life and high machining precision are expected in machining, so the material quality, hardness, and shape of the workpiece, and properties of machine should be fully considered, and then we can select suitable tools and adopt high-efficiency cutting parameters, namely three parameters.



Cutting speed (Vc)

When the workpiece is rotating on the machine, the number of its rotation per minute is defined as Rotating speed of main axle (n). Because of its rotation, the cutting speed measured on the contacting point of diameter is defined as linear speed, m/min. Normally, linear speed is considered to measure the effect of cutting speed on machining.

Effect of cutting speed

Cutting speed has significant effect on tool life. When the cutting speed is increased, cutting temperature will increase and tool life will be shortened. Cutting speed varies according to the different types and hardness of workpiece. The below conclusions are reached after many cutting experiments:

(1) Normally tool life would be reduced to half when the cutting speed is increased by 20%. Tool life would be 20% of the original life if the cutting speed is raised by 50%.

(2) Low speed (20-40m/min) cutting could easily cause vibration and shorten tool life.

Feed rate (fn)

Feed rate is defined as the moving distance of tool after workpiece rotates for one circle, measured by mm/rotation.

Effect of feed rate

Feed rate is a key factor that determines surface quality. Meanwhile it also affect the range of chip forming and the thickness of chips during machining.

In term of the effect on tool life, small feed rate leads to serious abrasion on clearance face, greatly reducing tool life.

Cutting depth (ap)

Cutting depth is defined as the difference between machined surface and unmachined surface, measured by mm. It is half the difference value between the original diameter and machined diameter.

Effect of cutting depth

Cutting depth should be determined by the machining allowance and shape of workpiece, power and rigidity of machine, and tool rigidity.

The change of cutting depth has little effect on tool life. If the cutting depth is too low, the cutting nose only scrapes the hardened layer on the workpiece surface, reducing tool life. When there is hardened oxide layer on workpiece surface, higher cutting depth should be adopted within the possible range of machine's power to avoid cutting nose just cutting the hardened layer of workpiece.