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Quality Builds The Brand Integrity Creates The Future

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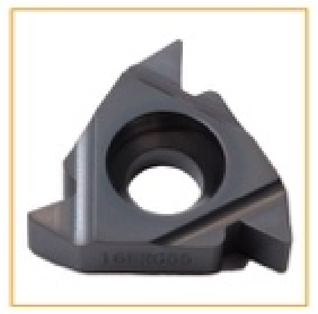

Thread Turning Insert Naming Rules

Indexable Thread Inserts

16	V	E	R	2.00	ISO	2M	TH
1	2	3	4	5	6	7	8

2. Insert Style

:	Horizontal Thread Insert
V:	Vertical Threaded Insert
U:	Horizontal Centering Thread Insert

3. Type of Cutting

E(external):	External thread insert
I(internal):	Internal thread insert

1. Insert Size

Cutting Edge Length (mm)	I. C.	
	mm	IC
06	2.96	5/32
08	4.76	3/16
11	6.35	1/4
16	9.525	3/8
22	12.7	1/2
27	15.875	5/8
33	19.05	3/4

4. Hand of Tools

R(Right-handed):	Right
L(Left-handed):	Left

5. Pitch

Full Profile - Pitch Range

Full Profile	mm	TPI
Pitch Range	0.5～5	48～4

V-tooth

	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	$4\frac{1}{2}$-4
U	6.5-9.0	4-$2\frac{3}{4}$
V	6.0-10.0	4-$2\frac{1}{2}$

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INSERT SELECTION GUIDE

16	V	E	R	2.00	ISO	2M	DJ
1	2	3	4	5	6	7	8

6. Thread Standard

60	范围牙型螺纹局部剖面60°	Partial Profile 60°
55	范围牙型螺纹局部剖面55°	Partial Profile 55°
ISO	ISO公制60°螺纹	ISO Metric Thread 60°
UN	美制统一螺纹60°	Unified National Thread 60°
UNJ	美制统一航空螺纹60°	American Unified Aerospace Thread 60°
MJ	公制航空航天螺纹60°	Metric Aerospace Thread 60°
W	英国惠氏螺纹标准55°	British Whitworth Thread 55°
NPT	美国管螺纹标准60°	National Pipe Taper 60°
NPTF	美国干密封管螺纹标准60°	National Pipe Taper Fuel 60°
NPS	美国一般密封圆柱螺纹标准60°	National Pipe Straight 60°
BSPT	英国管螺纹标准55°	British Standard Pipe Thread 55°
APIRD	美国石油管螺纹标准60°	API Round Casing & Tubing Thread 60°
TR	公制梯形螺纹30°（DIN103)	Metric Trapeze Thread 30° (DIN103)
ACME	美制梯形（爱克母）螺纹29°	American Trapeze ACME Thread 29°
STACME	美制矮牙梯形（爱克母）螺纹29°	American Trapeze Stub ACME Thread 29°
SAGE	公制锯齿形螺纹标准3°/30° (DIN513)	Metric Buttress Thread 3°/30° (Säge) (DIN513)
ABUT	美国锯齿形螺纹标准7°/45°	American Buttress Thread 7°/45°
B. S. BUTTRESS	英国锯齿形螺纹标准7°/45°	British Buttress Thread 7°/45°
RD	圆螺纹30° (DIN405)	Round Thread 30° (DIN405)
RD20400	圆螺纹30° (DIN20400)	Round Thread 30° (DIN20400)
PG	德国钢导管螺纹80° (DIN40430)	Germany Steel Conduit Thread 80° (PG) (DIN40430)
VAM	美制瓦姆螺纹	American VAM Thread
EL	极限连接油管螺纹	API-EL Thread
H90	休斯标准螺纹	Hughes Thread H90

7. Number of Teeth on Cutting Edge

2M - Two Teeth   3M - Three Teeth

8. Insert Grade

Ordering Code	Coating Color	Grade	Ordering Code	Coating Color	Grade
VKD88D	Black	Steel below HRC50°, nickel-based alloy	VKD66F	Purple	Stainless steel, steel
VKD68J	Colorful	Stainless steel	VKD85D	Bronze	Alloys, special materials
VKD66J	Bronze	Steel, stainless steel	VKD82J	Gold	Stainless steel, steel, superalloys

Insert Selection Guide

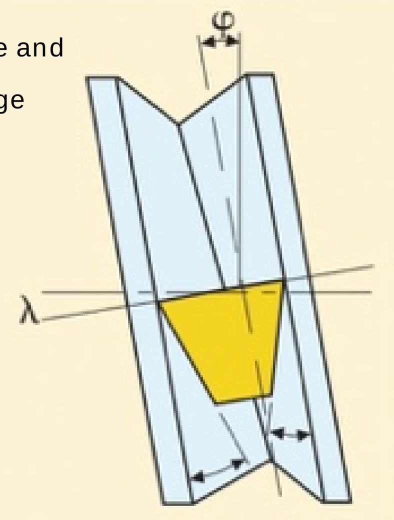
To ensure good processing quality, please consider the following points during purchase and use:

1. Select the appropriate model of thread inserts (samples) according to the internal and external threads, thread direction, workpiece pitch, and tooth count/inch, using the "Lathe External (Internal) Thread Insert" table provided by us. Please discuss with our sales personnel to choose the most suitable insert grade according to the material of the workpiece to be processed.

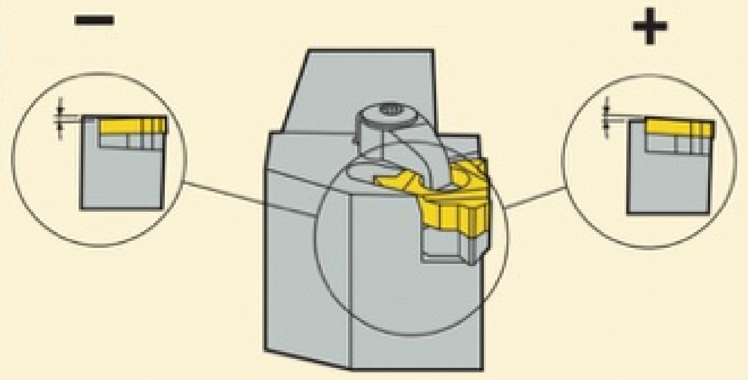
2. Select the appropriate tool holder model according to the model of the machine tool you are using, the processing method, and the selected insert model.

3. Insert selection: The helix angle of the thread must match the tilt angle of the insert. Try to avoid adverse wear on one side of the back face to prevent the tool from having a short lifespan. When manufacturing thread tool holders,we have designed the K value to be 1°.

In order to machine the correct thread profile and maintain uniform insert wear, the cutting edge **inclination angle (λ) should be equal to the thread lead angle φ**



By changing the shim, the cutting edge angle can be varied from +5 to -2.
The same shim can be used for both right-hand and left-hand shanks.
The center height remains constant.



4. Vc selection:

Rotation speed:

$$n = \frac{V_c \cdot 1000}{\pi \cdot D} \quad \text{(rev/min)}$$

Cutting speed:

$$V_c = \frac{\pi \cdot D \cdot n}{1000} \quad \text{(m/min)}$$

Feed:

$$V_f = \frac{n \cdot P_h}{1000} \quad \text{(m/min)}$$

Lead:

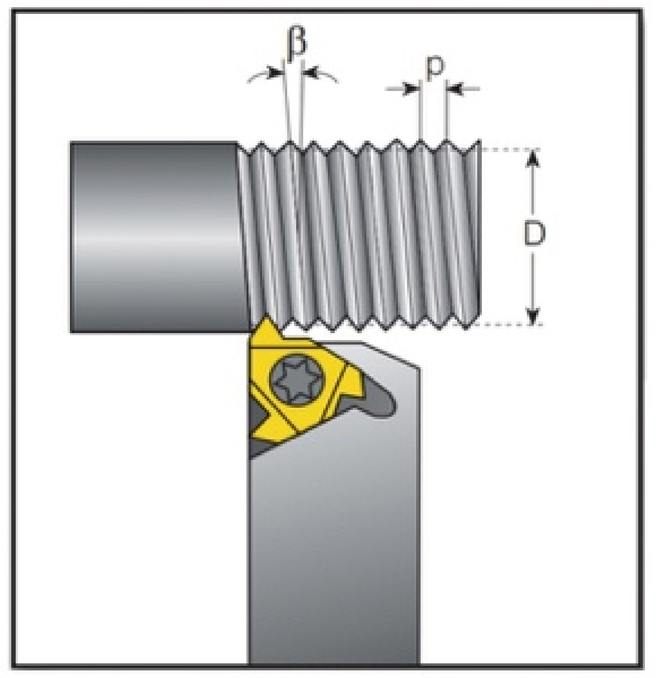
$$P_h = P \cdot \text{头数} \quad \text{(mm)}$$

Edge angle:

$$\lambda = \arctan \frac{P_h}{D_2 \cdot \pi} \quad (°)$$

Pitch and TPI Conversion:

$$TPI = \frac{25{,}4}{P}$$



$$\beta = \arctan \frac{P \times N}{\pi \times D}$$

D =	Workpiece diameter	(mm)
D_2 =	Nominal diameter	(mm)
n =	Rotation speed	(rev/min)
P =	Pitch	(mm)
P_h =	Lead	(mm)
V_f =	Feed	(m/min)
TPI =	Teeth per inch	
V_c =	Cutting speed	(m/min)
λ =	Edge angle	(°)

			Vc: m/min
ISO P	Low Alloy Steel	HB180	125
		HB250	100
		HB275	95
	High Alloy Steel	HB200	110
		HB325	80
	Cast Steel	HB180	200
		HB200	110
ISO M	Easy cutting steel	HB220	120~140
	Ferrite/Martensite	HB330	90
	Austenitic	HB200	90
		HB330	65
ISO K	Ductile Iron	HB130	135
		HB230	65
	Gray Iron	HB180	130
		HB260	110
	Chilled Iron	HB400	15-45

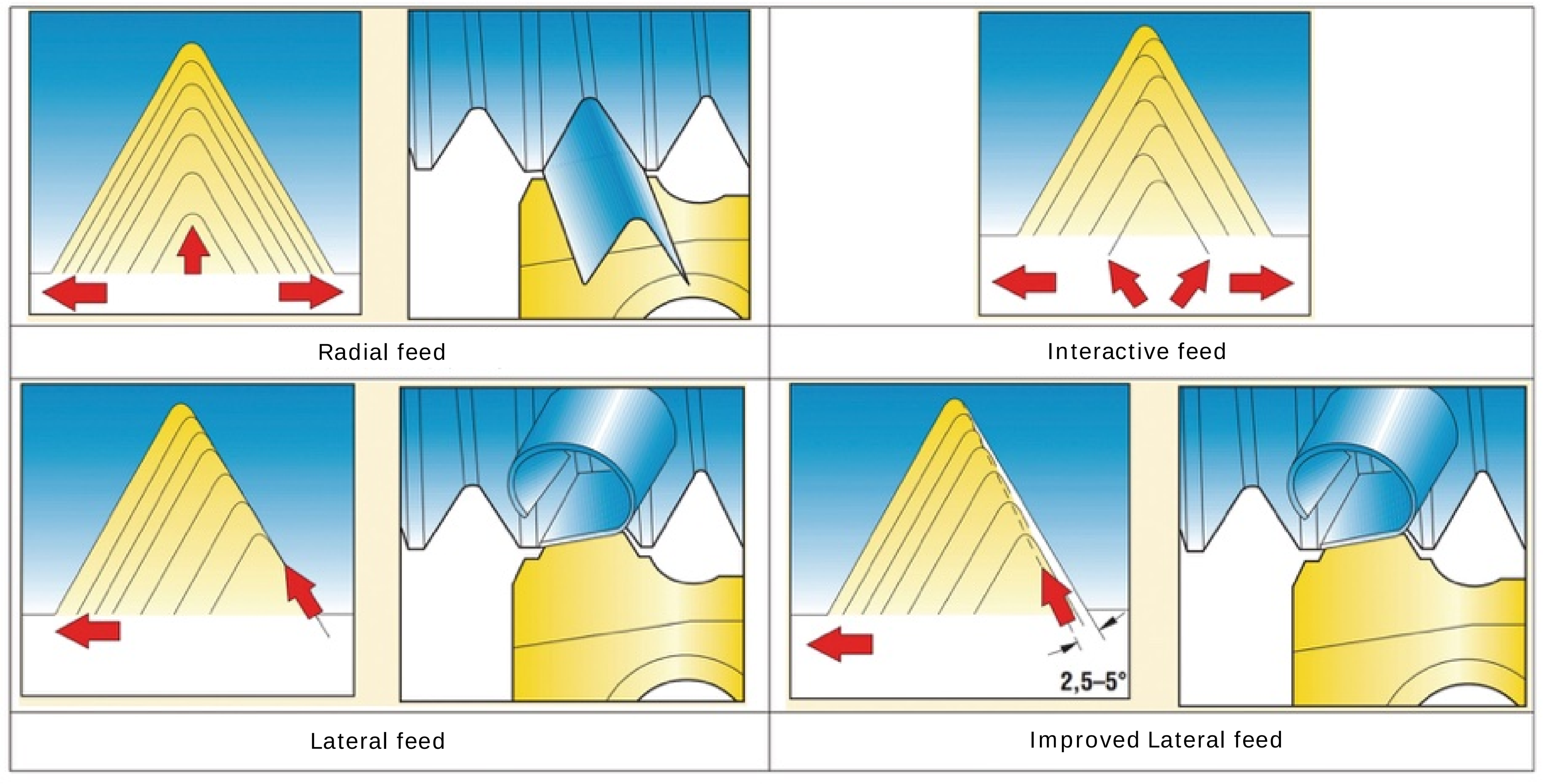
For stainless steel thread cutting, the most important thing is that the cutting speed VC should be high enough to avoid the "chip nodule" phenomenon. In order to increase the life of the blade with a small tip angle, such as NPT thread, you can first use a larger tip angle blade for processing once, or change the cutting parameters accordingly (increase the number of cutting times).

5. Feed method selection:

1) Radial feed: Usually when turning threads, you should first choose the radial feed method. This method is simple to operate and is the first choice for materials with a tendency to work hardening, such as austenitic stainless steel. When processing large pitches, vibration is easy to generate, which can be changed to lateral feed method or interactive feed method.

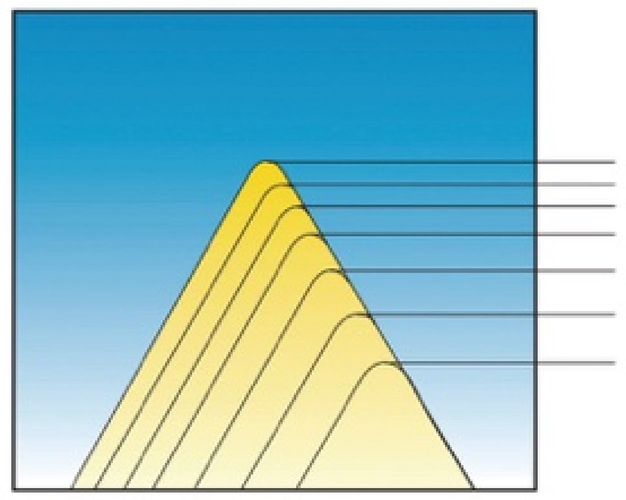
2) Lateral feed method: It is easy to control the chip flow direction, facilitate chip discharge and reduce vibration during thread turning, and the surface roughness of the thread is good. In order to maintain the blade tooth shape and obtain uniform wear during lateral feed, the 600 metric thread is obtained by cutting the radial depth AP while feeding 1/2 AP in the axial direction.

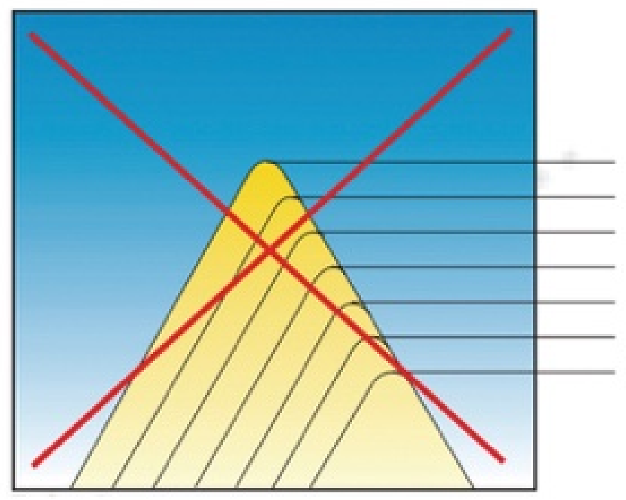
3) Interactive feed: Large pitch coarse thread is the first choice, which can significantly reduce blade wear, improve tool life, and is prone to chip breaking problems. It is suitable for use on CNC machine tools.



6. Number of steps and cutting depth

Due to the relatively brittle cutting edge, the thread cannot be cut in one pass. The total cutting depth is accomplished in several steps, and each step needs to maintain similar cutting force (same cutting area).





- ●If blade chipping occurs, the number of steps should be increased.
- ●The feed depth should not be less than 0.05MM/step.
- ●For stainless steel, the feed depth per step should be greater than 0.08MM/step.
- ●The recommended value can also be used for non-full tooth blades, and the number of steps should be increased.

7. Recommended value of feed amount

On most CNC machine tools, in a cycle of thread processing (such as a fixed loop of thread processing), the total thread depth and the cutting depth AP value of the first or last cut should be given. The maximum feed depth (1.5~2 times the radius of the tool tip arc) should be used for the first feed, and the subsequent feed depth should be gradually reduced. The feed depth of the last cut should not be less than 0.05MM of single-sided feed, otherwise it is easy to cause wear of the tool tip and poor finish of the workpiece tooth surface. In current CNC machine tools, there are several processing methods for thread cutting (fixed loop): radial feed method uses G32 method; (G33, G34, G35);

lateral feed method mostly uses G76 method;

Due to different cutting methods and programming methods, the processing errors caused are different.

(1) Programming instructions for various processing methods.

(A) G32 X( )---Z(W)---F-----;

G32 programming: The cutting depth allocation method is generally a constant value, double-edged cutting, and the cutting depth each time is given by the AP programmer. Because the radial feed method has two side edges working at the same time, the cutting tool is larger and chip removal is difficult. Therefore, when cutting, the two cutting edges are easily damaged. When cutting threads with larger pitches, the cutting edge wears faster due to the larger cutting depth, resulting in errors in the thread diameter. Because of its high tooth shape accuracy, it is mostly used in small pitch thread processing. One thing to note is that the cutting edge is easy to wear, so frequent measurements should be made during processing. (B) G76P(M)@(2)Q(ADMIN)R(D);

G76 X(U) Z(W) R( ) Q( ) F( );

G76 programming: The cutting depth allocation method is decremental, and its cutting is single-edged cutting. Its cutting depth is calculated by the control system.

G76 side feed method, due to single-side cutting, the cutting edge is easily damaged and worn, making the processed thread surface not straight, the tool tip angle changes, and the tooth profile accuracy is reduced. At the same time, it is single-edge cutting, the tool load is small, the chip removal is easy, and the vibration during turning is reduced. This method is generally suitable for large pitch thread processing. When processing higher precision threads, it is recommended to use "double-knife" cutting, that is, first perform rough processing according to the G76 method, and then perform fine processing according to the G32 method. One thing to note is that the starting point of the tool must be accurately positioned and consistent, otherwise it will easily cause random buckling.

Threading insert cutting parameters

Metric ISO Wiper External Thread Feed Parameters						
Pitch (mm)	1	1. 25	1. 5	1. 75	2	2. 5
Ap	0. 72	0. 86	1. 02	1. 17	1. 33	1. 63
nAp	5	6	7	8	9	11
Sequence	Radial feed (X) Tooth side feed (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/–
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
3	0. 16/0. 09	0. 16/0. 09	0. 18/0. 10	0. 18/0. 10	0. 20/0. 12	0. 21/0. 12
4	0. 10/0. 06	0. 14/0. 09	0. 15/0. 09	0. 15/0. 09	0. 15/0. 09	0. 18/0. 10
5	0. 08/–	0. 10/0. 06	0. 12/0. 07	0. 13/0. 08	0. 12/0. 07	0. 15/0. 09
6		0. 08/–	0. 10/0. 06	0. 11/0. 06	0. 12/0. 07	0. 12/0. 07
7			0. 08/–	0. 10/0. 06	0. 10/0. 06	0. 12/0. 07
8				0. 08/–	0. 09/0. 05	0. 10/0. 06
9					0. 08/–	0. 10/0. 06
10						0. 08/0. 05
11						0. 08/–

Metric ISO Wiper Internal Thread Feed Parameters						
Pitch (mm)	1	1. 25	1. 5	1. 75	2	2. 5
Ap	0. 62	0. 77	0. 92	1. 07	1. 21	1. 49
nAp	5	6	7	8	9	11
Sequence	Radial feed (X) Tooth side feed (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/–
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
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
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
5	0. 08/–	0. 10/0. 06	0. 11/0. 06	0. 12/0. 07	0. 12/0. 07	0. 13/0. 08
6		0. 08/–	0. 09/0. 05	0. 11/0. 06	0. 11/0. 06	0. 12/0. 07
7			0. 08/–	0. 10/0. 06	0. 10/0. 06	0. 12/0. 07
8				0. 08/–	0. 09/0. 05	0. 10/0. 06
9					0. 08/–	0. 10/0. 06
10						0. 09/0. 05
11						0. 08/–

Threading insert cutting parameters

Unified Thread UN External Thread Feed Parameters					
Pitch (mm)	12	16	18	20	
AP	1. 299	0. 974	0. 866	0. 779	
nAP	9	7	6	6	
Sequence	Radial feed (X) Tooth side feed (Z)				
	X/Z	X/Z	X/Z	X/Z	X/Z
1	0. 229/-	0. 226/-	0. 233/-	0. 210/-	
2	0. 222/0. 128	0. 188/0. 109	0. 181/0. 104	0. 163/0. 094	
3	0. 170/0. 098	0. 145/0. 083	0. 139/0. 080	0. 125/0. 072	
4	0. 143/0. 083	0. 122/0. 070	0. 117/0. 068	0. 105/0. 072	
5	0. 126/0. 073	0. 107/0. 062	0. 103/0. 059	0. 093/0. 054	
6	0. 114/0. 066	0. 097/0. 056	0. 093/0/054	0. 084/0. 048	
7	0. 105/0. 061	0. 089/0. 052			
8	0. 098/0. 056				
9	0. 092/0. 053				

Unified Thread UN Internal Thread Feed Parameters					
Pitch (mm)	12	16	18	20	
AP	1. 222	0. 916	0. 815	0. 733	
nAP	9	7	6	6	
Sequence	Radial feed (X) Tooth side feed (Z)				
	X/Z	X/Z	X/Z	X/Z	X/Z
1	0. 222/-	0. 230/-	0. 174/-	0. 191/-	
2	0. 207/0. 120	0. 173/0. 10	0. 161/0. 093	0. 155/0. 089	
3	0. 159/0. 092	0. 132/0. 076	0. 124/0. 072	0. 119/0. 069	
4	0. 134/0. 077	0. 112/0. 064	0. 104/0. 060	0. 100/0. 058	
5	0. 118/0. 068	0. 098/0. 057	0. 092/0. 053	0. 088/0. 051	
6	0. 107/0. 062	0. 089/0. 051	0. 083/0. 048	0. 08/0. 046	
7	0. 098/0. 057	0. 082/0. 047	0. 077/0. 044		
8	0. 091/0. 053				
9	0. 086/0. 050				

Threading insert cutting parameters

NPT Internal/External Thread Feed Parameters				
Pitch (mm)	11. 5	14	18	
AP	1. 767	1. 451	1. 129	
nAP	12	10	8	
Sequence	Radial feed (X) Tooth side feed (Z)			
	X/Z	X/Z	X/Z	X/Z
1	0. 24/-	0. 24/-	0. 22/-	
2	0. 208/0. 12	0. 200/0. 115	0. 181/0. 104	
3	0. 182/0. 105	0. 170/0. 098	0. 152/0. 088	
4	0. 168/0. 097	0. 150/0. 086	0. 141/0. 081	
5	0. 155/0. 089	0. 140/0. 081	0. 131/0. 075	
6	0. 145/0. 084	0. 130/0. 075	0. 121/0. 070	
7	0. 138/0. 079	0. 120/0. 069	0. 101/0. 058	
8	0. 124/0. 072	0. 010/0. 063	0. 082/0. 047	
9	0. 117/0. 067	0. 100/0. 058		
10	0. 105/0. 060	0. 090/0. 052		
11	0. 095/0. 055			
12	0. 090/0. 052			

BSPT Internal/External Thread Feed Parameters					
Pitch (mm)	11	14	19		
AP	1. 479	1. 162	0. 856		
nAP	10	8	6		
Sequence	Radial feed (X) Tooth side feed (Z)				
	X/Z	X/Z	X/Z	X/Z	X/Z
1	0. 214/-	0. 222/-	0. 223/-		
2	0. 242/0. 126	0. 213/0. 111	0. 181/0. 094		
3	0. 186/0. 097	0. 163/0. 085	0. 139/0. 072		
4	0. 157/0. 082	0. 138/0. 072	0. 117/0. 061		
5	0. 138/0. 072	0. 121/0. 063	0. 103/0. 054		
6	0. 125/0. 065	0. 110/0. 057	0. 093/0. 049		
7	0. 115/0. 060	0. 101/0. 052			
8	0. 107/0. 056	0. 094/0/049			
9	0. 100/0. 052				
10	0. 095/0. 049				

Matters Needing Attention in Thread Processing

1. The first step is to install the tool bar. According to the machine tool used, choose a threaded tool bar that matches the center height of the machine tool. For external threads, just use one tool bar regardless of the diameter of the workpiece. For internal threads, you need to use tool bars of different diameters according to the inner diameter of the workpiece (see page 7 of the sample for models and applicable ranges). The main consideration is the strength of the tool bar. When installing the tool bar, you should fully understand the actual center height of the machine tool used. Since there are many manufacturers producing machine tools, the center heights of the same model of machine tools from the same manufacturer are different among the customers we have contacted.

(1) When installing an external thread tool bar, select a tool bar with the same center height (machine tool, tool bar) and install it directly. When we manufacture the tool bar, we have controlled the center height to the optimal size.

(2) When installing the internal thread tool bar, please note: (If a round tool bar is used, and the tool table of the machine tool itself uses a tool bar with a round handle, no adjustment is required after pressing. If a square tool table is used, the tool bar must be padded to the center height of the joint, which may cause inaccurate center height and easily cause incorrect thread half angle after processing. During processing, it is best to adjust the center height to the center line of the machine tool (padded) by 0.1-0.2MM. It should not be too high, otherwise it will cause wear on the back face. If the center height is lower than the center line of the machine tool, it is easy to knock off the tool tip. In addition, a square handle internal thread tool bar can be used. The center height has been controlled to the optimal size during manufacturing.

(3) Select the tool pad; (refer to the selection guide) Incorrect tool pads will cause excessive wear on the back face of the blade.

2. Secondly, considering the performance of the machine tool, it is required to have good rigidity, a sufficiently high speed and a good cooling system. In thread processing, the cutting speed is often required to be high, generally between 80-120 rpm, in order to avoid the generation of built-up edge during cutting and obtain a lower surface roughness (higher surface finish). The selection of cutting speed is determined according to the material being processed (refer to the selection guide). Another issue worth noting in thread processing is cooling. Generally, we just flush the coolant onto the workpiece. In fact, it is not the case. The coolant is directly flushed to the place where the tool tip contacts the workpiece, and the coolant must get a sufficiently high flow rate of 15-20 liters/minute (pressure) from the cooling system. This is because the tool tip generates a very high temperature during processing. Generally, the cooling liquid without impact (pressure) has been vaporized before reaching the tool tip, and basically does not play a role in cooling the tool tip, but only cools the processed parts, and the tool tip is easily burned at this time.

3. Selecting reasonable cutting parameters is also a factor in improving the life of the blade.

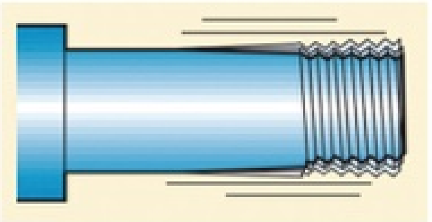
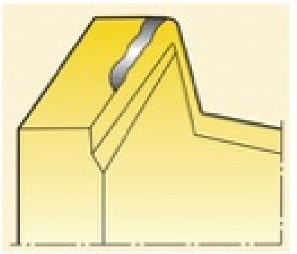
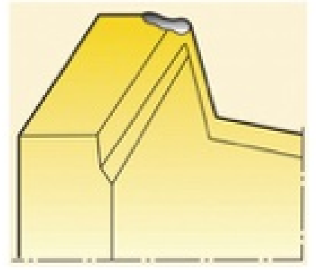
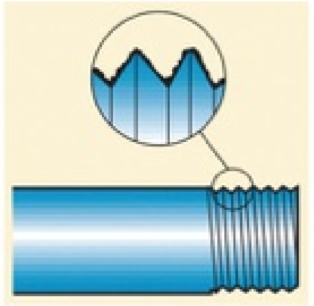
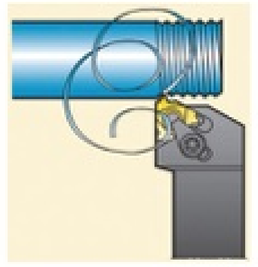
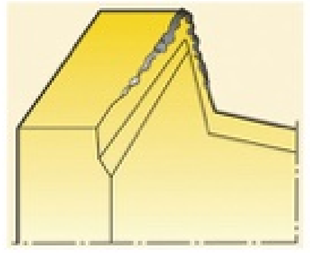
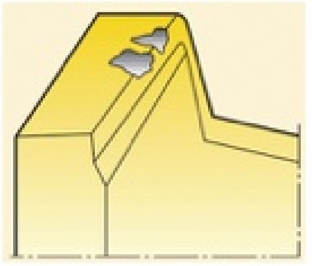
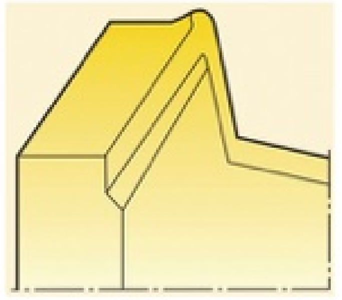
(1) When machining external threads, we generally use the straight-in machining method for programming convenience because the chip removal is smooth. Only when the thread requirements are extremely high, we use the machining method that controls the chip flow direction.

(2) When machining internal threads, for workpieces with large inner diameters, the straight-in machining method is used in most cases because the chip removal is smooth. For internal threads with smaller inner diameters, the chip removal space is very small. If the straight-in machining method is used, the chips will easily break off the tool tip because the chips will wrap around the tool bar. At the same time, the chips will scratch the machined surface, thus affecting the surface quality of the workpiece. At this time, the oblique machining method can be used to control the chips so that they are discharged along the back of the tool body in the cutting direction. This can extend the life of the blade and obtain better surface quality (see the attached table for parameter selection).

4. Machining of the blank of the machined part: (Applicable to thread inserts with wiper blades) (1) When machining external threads, the outer diameter of the blank should be larger than the nominal size of the thread. For example, M30X1.5, the outer diameter of the blank is 30.1MM. (2) When processing internal threads, the outer diameter of the blank should be larger than the nominal size of the thread. For example, for M30X1.5, the outer diameter of the blank is 29.9MM.

5. If the blade breaks during processing, carefully check whether there is any residual alloy slag on the workpiece when replacing the blade (or repositioning) for processing. If there is, it should be completely removed before continuing processing.

Thread Turning Problems and Solutions

Problem	Possible causes	Solution
vibration 	The workpiece is not clamped correctly. The tool is not installed correctly. Incorrect cutting parameters. The tool center height is incorrect. The thread base diameter is incorrect.	Choose a softer chuck. Reduce tool overhang and check that the tool is pressed tightly. Increase the line speed, if that doesn't work then significantly reduce the line speed. Use a continuous constant feed of 0.1-0.16. Use the correct center height. Check if the thread base diameter is correct
Rapid flank wear 	Cutting speed is too fast. The depth of cut is too shallow at each step. Incorrect insert grade. The shim selection is unreasonable.	Reduce cutting speed. Increase Ap. Select the side feed method for machining. Choose a more wear-resistant grade of material. Check to make sure the shim is selected correctly.
Insert chipping edge 	The cutting force is too large and the number of processing steps is unreasonable. The insert material is harder. The center height of the cutting edge is incorrect. The tool bar and insert are loose. Built-up edge occurs.	Increase the number of cuts. Choose a material grade with better toughness. Check tool clamping. Check the center height of the cutting edge. Check for built-up edge.
Poor quality thread surface 	Cutting speed is too low. The blade is above the center line. Poor chip control.	Increase cutting speed. Use the correct center height. Check and make sure the correct shim is selected. Select side feed mode for machining.
Bad chip control 	Cutting speed is too low. The temperature in the cutting zone is too high. The shim selection is unreasonable. Insufficient coolant supply.	Reduce the number of cutting passes. Increase cutting speed. Select the side feed method for machining. Increase coolant supply. Choose the right shim to control chip flow.
Built-up Edge 	Cutting speed influence.	Change the cutting speed. No coolant is used.
Insert micro-break 	Incorrect blade material selection. The clamping of the tool bar is loose. The blade is not securely mounted.	Choose a material grade with better toughness. Check the tool clamping tool. Check cutting speed. Use side infeed.
Plastic deformation 	Incorrect insert grade selection. Cutting speed is too high. The number of processing steps is not reasonable. Insufficient coolant supply.	Choose a material grade that is more resistant to plastic deformation. Reduce cutting speed. Increase the number of steps. Increase coolant supply. Check that the thread base diameter is correct before cutting threads.

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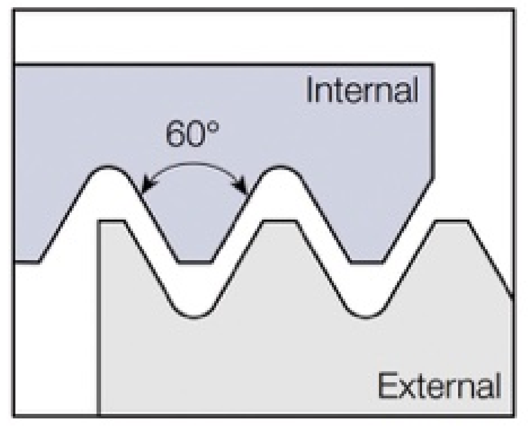
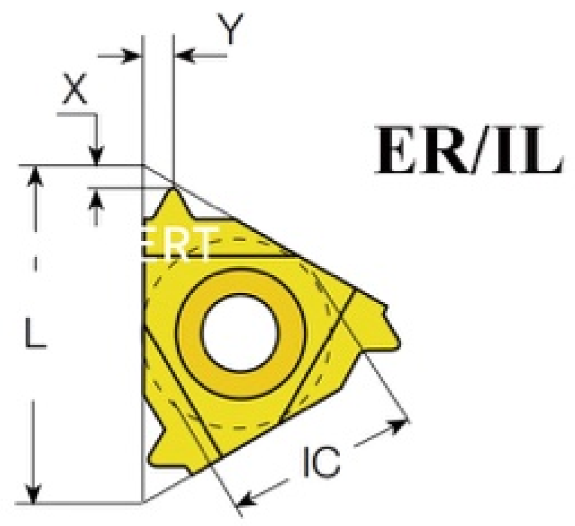
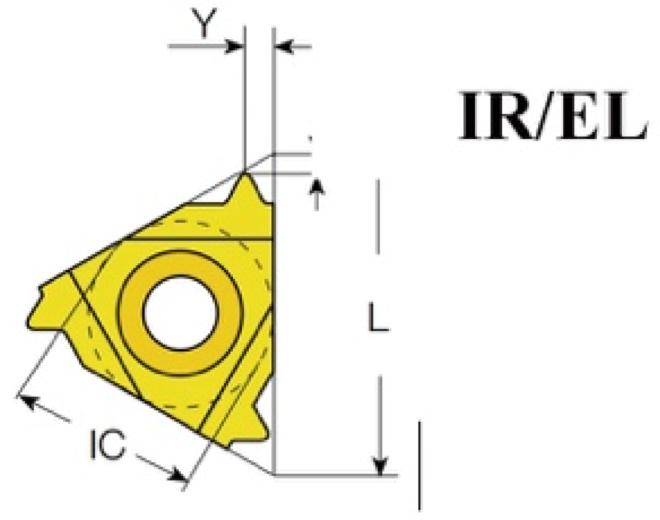
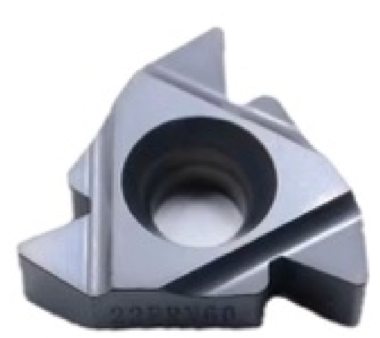
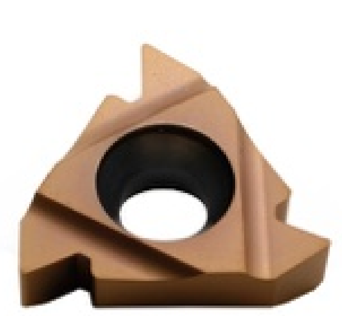
Partial Profile 60° Thread inserts







Insert Shape	I.C.	Pitch		External		L	X	Y
		mm	TPI	Right-hand	Left-hand			
	1/4″	0.5-1.5	48-16	11ERA60	11ELA60	11	0.6	0.8
	3/8″	0.5-1.5	48-16	16ERA60	16ELA60	16	0.6	0.8
		1.75-3.0	14-8	16ERG60	16ELG60	16	1.1	1.5
		0.5-3.0	48-8	16ERAG60	16ELAG60	16	1.1	1.5
	1/2″	3.5-5.0	7-5	22ERN60	22ELN60	22	1.8	2.5
	5/8″	5.5-6.0	4.5-4	27ERQ60	27ELQ60	27	2.1	3.1

Insert Shape	I.C.	Pitch		External		L	X	Y
		mm	TPI	Right-hand	Left-hand			
	5/32″	0.5-1.5	48-16	06IRA60		0.6	0.6	0.6
	3/16″	0.5-1.5	48-16	08IRA60		0.8	0.6	0.7
	1/4″	0.5-1.5	48-16	11IRA60	11ILA60	11	0.6	0.8
	3/8″	0.5-1.5	48-16	16IRA60	16ILA60	16	0.6	0.8
		1.75-3.0	14-8	16IRG60	16ILG60	16	1.1	1.5
		0.5-3.0	48-8	16IRAG60	16ILAG60	16	1.1	1.5
	1/2″	3.5-5.0	7-5	22IRN60	22ILN60	22	1.8	2.5
	5/8″	5.5-6.0	4.5-4	27IRQ60	27ILQ60	27	1.8	2.7

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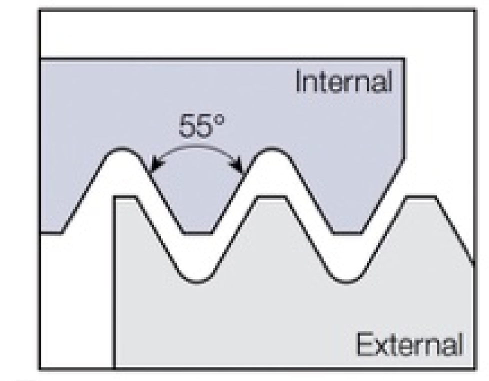
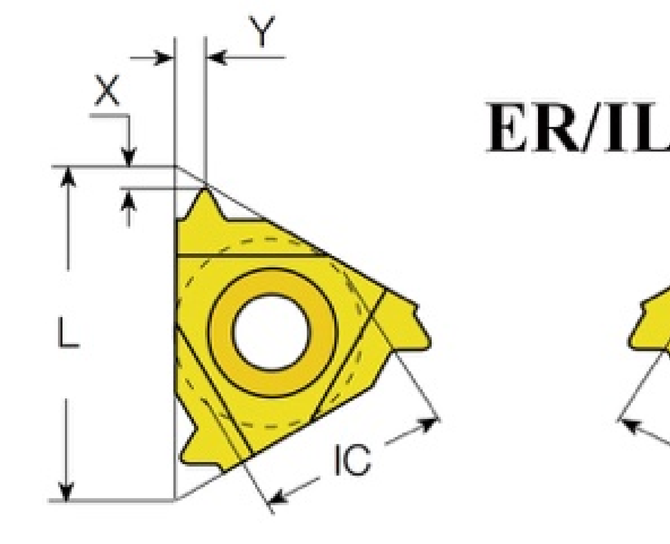
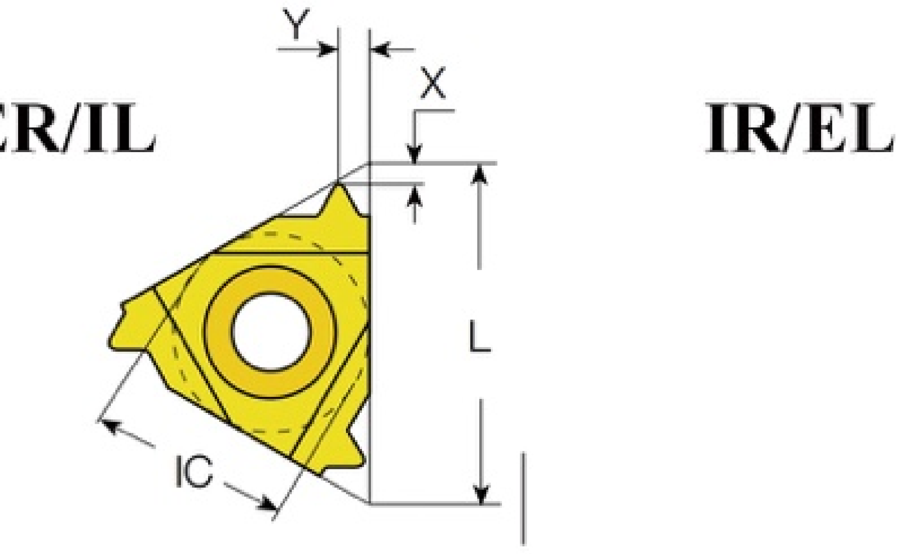
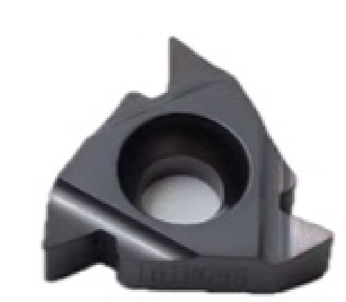
Partial Profile 55° Thread inserts



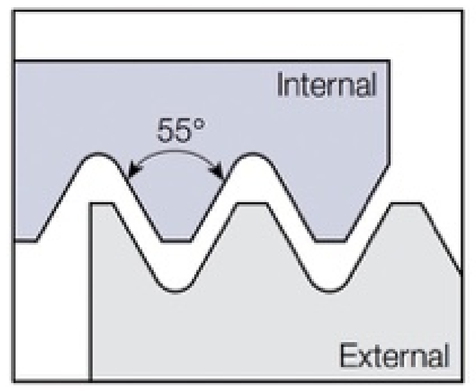


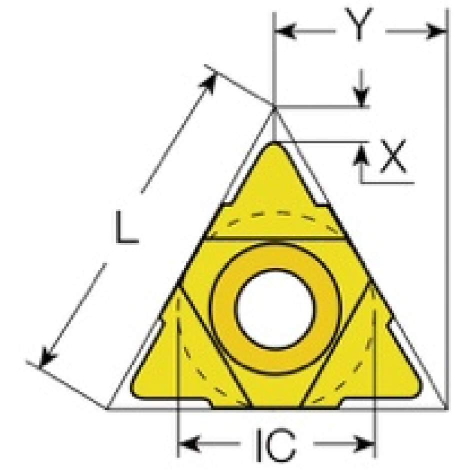


Insert Shape	I.C.	Pitch		External		L	X	Y
		mm	TPI	Right-hand	Left-hand			
	3/8″	0.5-1.5	48-16	16ERA55	16ELA55	16	0.6	0.8
		1.75-3.0	14-8	16ERG55	16ELG55	16	1.1	1.5
		0.5-3.0	48-8	16ERAG55	16ELAG55	16	1.1	1.5
	1/2″	3.5-5.0	7-5	22ERN55	22ELN55	22	1.8	2.5
	5/8″	5.5-6.0	4.5-4	22ERQ55	22ELQ55	27	2.0	2.9

Insert Shape	I.C.	Pitch		External		L	X	Y
		mm	TPI	Right-hand	Left-hand			
	5/32″	0.5-1.5	48-16	06IRA55		6	0.6	0.6
	3/16″	0.5-1.5	48-16	08IRA55		8	0.6	0.7
	1/4″	0.5-1.5	48-16	11IRA55	11ILA55	11	0.6	0.8
	3/8″	0.5-1.5	48-16	16IRA55	16ILA55	16	0.6	0.8
		1.75-3.0	14-8	16IRG55	16ILG55	16	1.1	1.5
		0.5-3.0	48-8	16IRAG55	16ILAG55	16	1.1	1.5
	1/2″	3.5-5.0	7-5	22IRN55	22ILN55	22	1.8	2.5
	5/8″	5.5-6.0	4.5-4	27IRQ55	27ILQ55	27	2.0	2.9

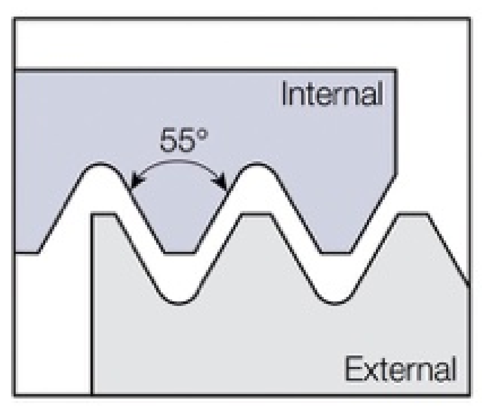
Partial Section U-Shape

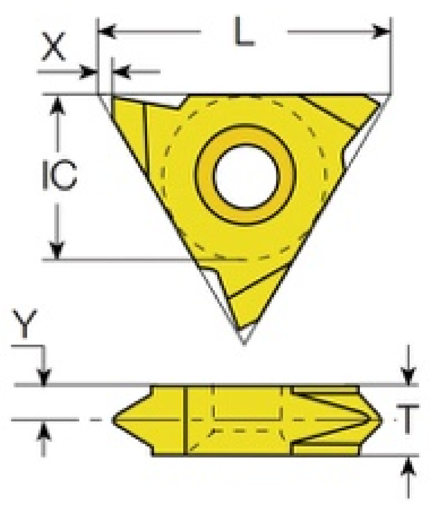




Insert Shape	I.C.	Pitch		External and Internal	L	X	Y
		mm	TPI	Right and Left			
	1/2" U	5.5-8.0	4.5-3.25	22U E/I/R/LU55	22	0.9	11.0
	5/8" U		4-2.75	27U E/I/R/LU55	27	1.2	13.7
	1/2" U	5.5-8.0	4.5-3.25	22U E/I/R/LU60	22	0.6	11.0
	5/8" U	6.5-9.0	4-2.75	27U E/I/R/LU60	27	1.0	13.7

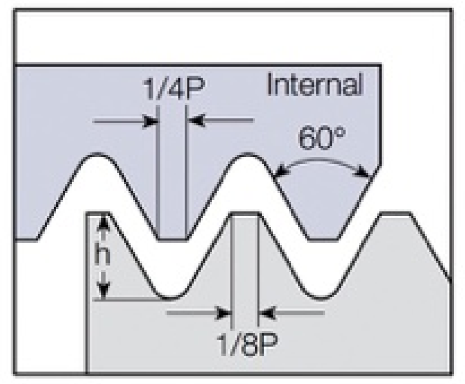
Partial Section V-Shape

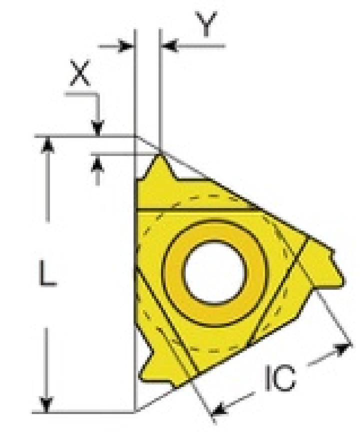




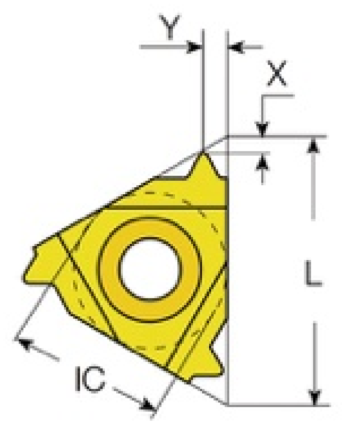
Insert Shape	I.C.	Pitch		External	T	X	Y
		mm	TPI	Right-hand			
	3/8"	0.5-1.5	48-16	16VERA55	3.6	1.0	0.9
		1.75-3.0	14-8	16VERG55	3.6	1.0	1.7
		0.5-3.0	48-8	16VERAG55	3.6	1.0	1.8
	1/2"	3.5-5.0	7-5	22VERN55	4.8	1.2	2.5
	3/8"	0.5-1.5	48-16	16VERA60	3.6	1.0	0.9
		1.75-3.0	14-8	16VERG60	3.6	1.0	1.8
		0.5-3.0	48-8	16VERAG60	3.6	1.0	1.8
	1/2"	1.75-3.0	14-8	22VERG60	4.0	1.2	1.7
		3.5-5.0	7-5	22VERN60	4.8	1.2	2.5

ISO Metric Full Profile Threading Insert

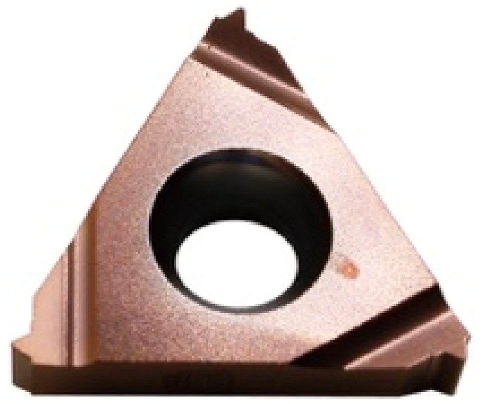




ER/IL



IR/EL

Insert Shape	I.C.	Pitch	External		L	X	Y
		mm	Right-hand	Left-hand			
	3/8"	0.5	16ER0.5ISO	16EL0.5ISO	16	0.8	0.8
		0.75	16ER0.75ISO	16EL0.75ISO		0.8	0.8
		0.8	16ER0.8ISO	16EL0.8ISO		0.6	0.6
		1.0	16ER1.0ISO	16EL1.0ISO		0.8	0.8
		1.25	16ER1.25ISO	16EL1.25ISO		0.8	0.8
		1.5	16ER1.5ISO	16EL1.5ISO		0.8	0.8
		1.75	16ER1.75ISO	16EL1.75ISO		1.2	1.5
		2.0	16ER2.0ISO	16EL2.0ISO		1.2	1.5
		2.5	16ER2.5ISO	16EL2.5ISO		1.2	1.5
		3.0	16ER3.0ISO	16EL3.0ISO		1.2	1.5
		3.5	16ER3.5ISO	16EL3.5ISO		1.2	1.5
	1/2"	3.5	22ER3.5ISO	22EL3.5ISO	22	1.8	2.5
		4.0	22ER4.0ISO	22EL4.0ISO		1.8	2.5
		4.5	22ER4.5ISO	22EL4.5ISO		1.8	2.5
		5.0	22ER5.0ISO	22EL5.0ISO		1.8	2.5
	5/8"	5.5	27ER5.5ISO	22EL5.5ISO	27	2.2	3.2
		6.0	27ER6.0ISO	22EL6.0ISO		2.2	3.2
	3/8"	1.0	16ER1.0ISO3M		16	1.7	2.6
		1.5	16ER1.5ISO2M			1.6	2.4
	1/2"	1.5	22ER1.5ISO3M		22	2.4	3.8
		2.0	22ER2.0ISO2M			2.0	3.0
		2.0	22ER2.0ISO3M			3.1	4.9
	5/8"	3.0	27ER3.0ISO2M		27	2.7	4.3

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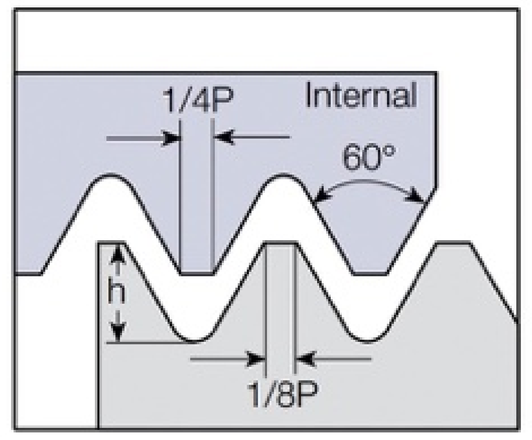
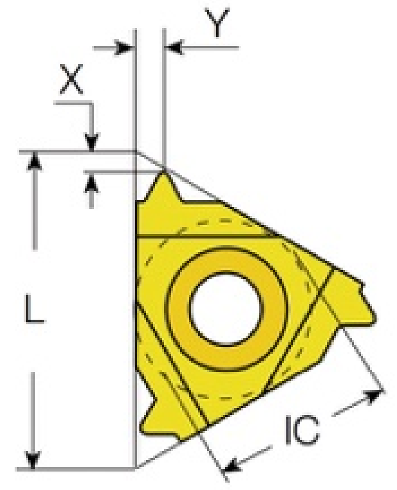
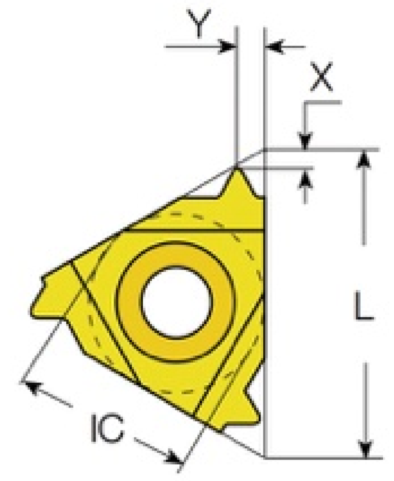
ISO Metric Full Profile Threading Insert

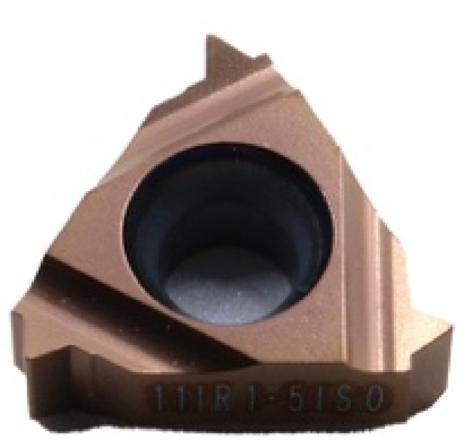




ER/IL



IR/EL

Insert Shape	I.C.	Pitch mm	Internal Right-hand	Internal Left-hand	L	X	Y
	5/32"	0.50	06IR0.50ISO	06IL0.50ISO	6	0.9	0.5
		0.75	06IR0.75ISO	06IL0.75ISO		0.8	0.5
		1.00	06IR1.00ISO	06IL1.00ISO		0.7	0.6
		1.25	06IR1.25ISO	06IL1.25ISO		0.6	0.6
		1.5	06IR1.5ISO	06IL1.5ISO		0.6	0.6
	3/16"	0.50	08IR0.50ISO	08IL0.50ISO	8	0.6	0.5
		0.75	08IR0.75ISO	08IL0.75ISO		0.6	0.5
		1.00	08IR1.00ISO	08IL1.00ISO		0.6	0.6
		1.25	08IR1.25ISO	08IL1.25ISO		0.6	0.7
		1.50	08IR1.50ISO	08IL1.50ISO		0.6	0.7
		1.75	08IR1.75ISO	08IL1.75ISO		0.6	0.8
	1/4"	0.5	11IR0.5ISO	11IL0.5ISO	11	0.8	0.8
		0.75	11IR0.75ISO	11IL0.75ISO		0.8	0.8
		1.0	11IR1.0ISO	11IL1.0ISO		0.8	0.8
		1.25	11IR1.25ISO	11IL1.25ISO		0.8	0.8
		1.5	11IR1.5ISO	11IL1.5ISO		0.8	0.8
		1.75	11IR1.75ISO	11IL1.75ISO		0.8	0.8
		1.75	11IR2.0ISO	11IL2.0ISO		0.8	0.8
		2.5	11IR2.5ISO	11IL2.5ISO		0.8	0.9

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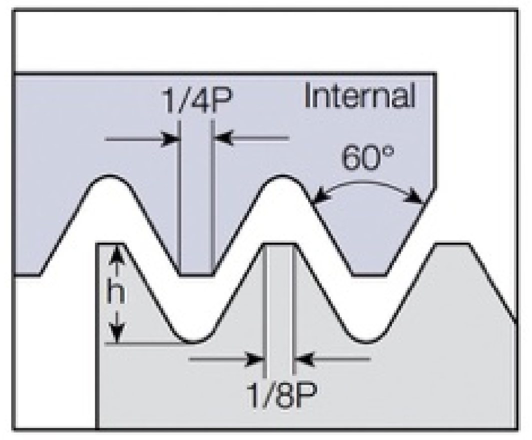
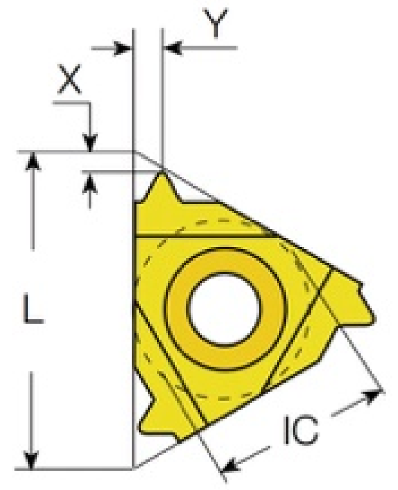
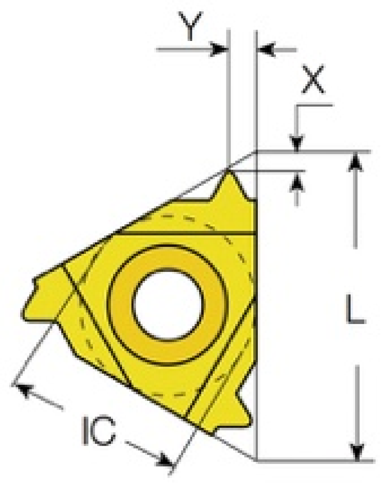
ISO Metric Full Profile Threading Insert

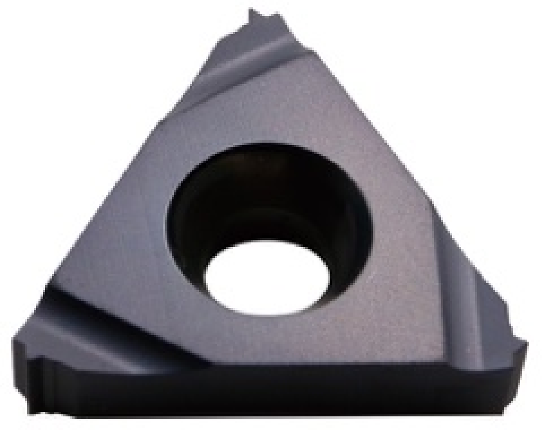




ER/IL



IR/EL

Insert Shape	I.C.	Pitch mm	Internal Right-hand	Internal Left-hand	L	X	Y
	3/8"	0.5	16IR0.5ISO	16IL0.5ISO	16	0.8	0.8
		0.75	16IR0.75ISO	16IL0.75ISO		0.8	0.8
		0.8	16IR0.8ISO	16IL0.8ISO			
		1.0	16IR1.0ISO	16IL1.0ISO		0.8	0.8
		1.25	16IR1.25ISO	16IL1.25ISO		0.8	0.8
		1.5	16IR1.5ISO	16IL1.5ISO		0.8	0.8
		1.75	16IR1.75ISO	16IL1.75ISO		1.2	1.5
		2.0	16IR2.0ISO	16IL2.0ISO		1.2	1.5
		2.5	16IR2.5ISO	16IL2.5ISO		1.2	1.5
		3.0	16IR3.0ISO	16IL3.0ISO		1.2	1.5
		3.5	16IR3.5ISO	16IL3.5ISO		1.2	1.5
	1/2"	3.5	22IR3.5ISO	22IL3.5ISO		1.8	2.5
		4.0	22IR4.0ISO	22IL4.0ISO	22	2.0	2.5
		4.5	22IR4.5ISO	22IL4.5ISO		2.1	2.5
		5.0	22IR5.0ISO	22IL5.0ISO		1.8	2.5
	5/8"	5.5	27IR5.5ISO	27IL5.5ISO	27	2.2	3.2
		6.0	27IR6.0ISO	27IL6.0ISO		2.2	3.2

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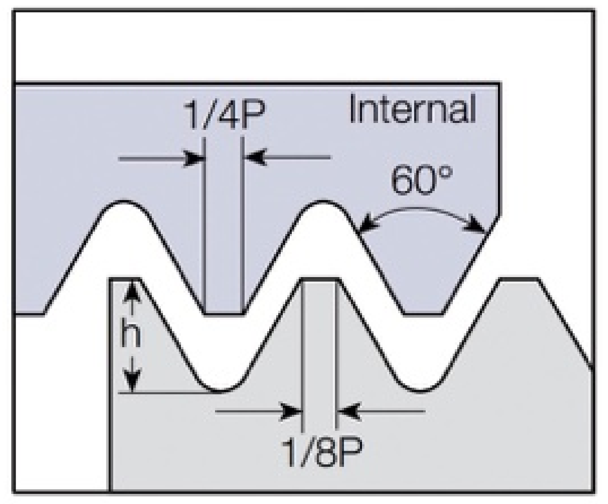
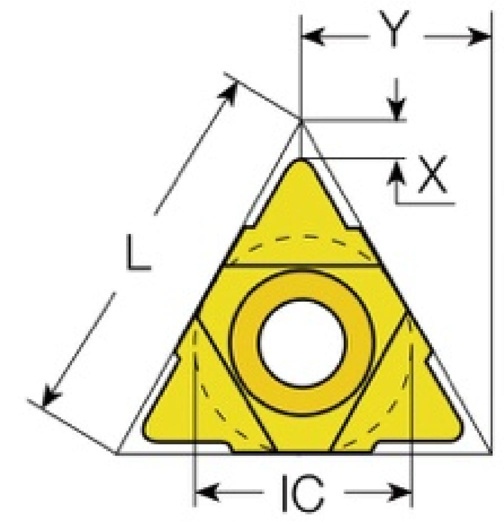
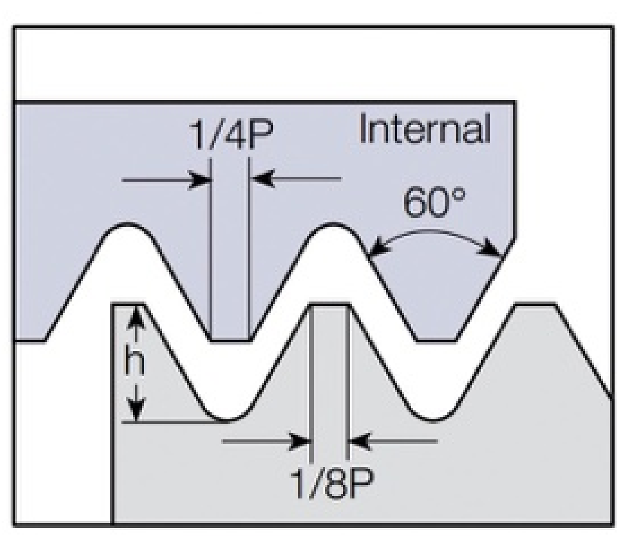
ISO Metric U-Type

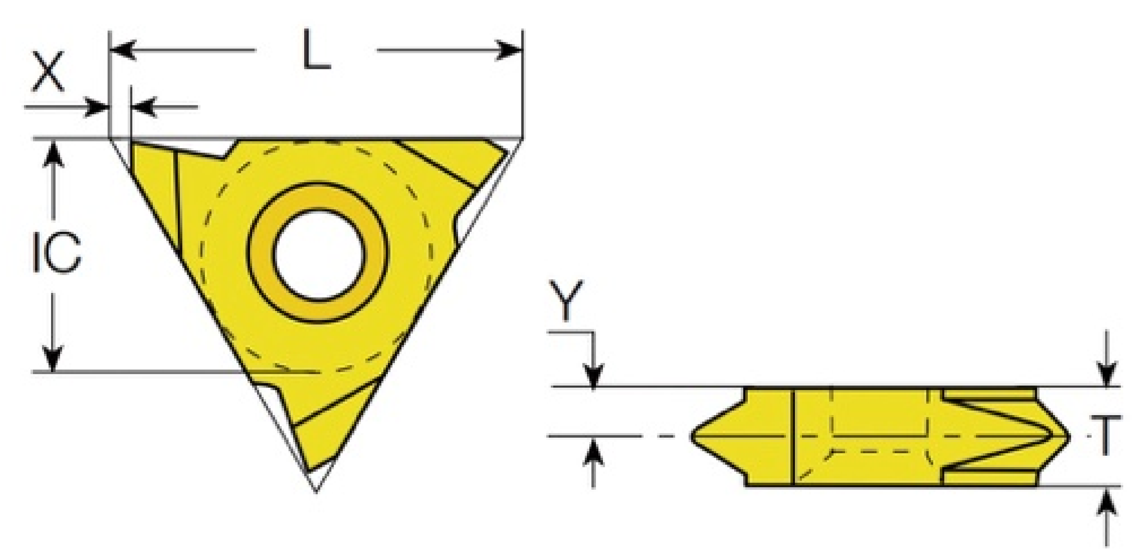




Insert Shape	I.C.	Pitch	External	Internal	L	X	Y
		mm	Right and Left	Right and Left			
	1/2" U	5.5	22U ER/L5.5ISO	22U IR/L5.5ISO	22	E:2.3 N:2.4	11.0
		6.0	22U ER/L6.0ISO	22U IR/L6.0ISO	22	E:2.6 N:2.1	11.0
	5/8" U	8.0	27U ER/L8.0ISO	27U IR/L8.0ISO	27	2.4	13.7
	3/4" U	12.0	33U ER/L12.0ISO	33U IR/L12.0ISO	33	E:2.5 N:3.2	E:16.5 N:16.9

ISO Metric Vertical



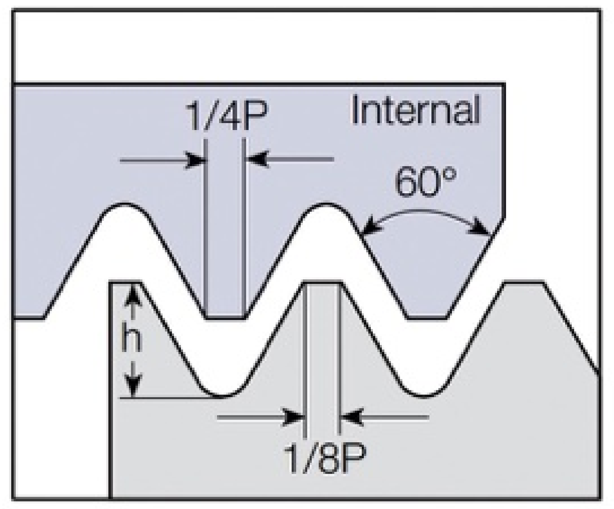


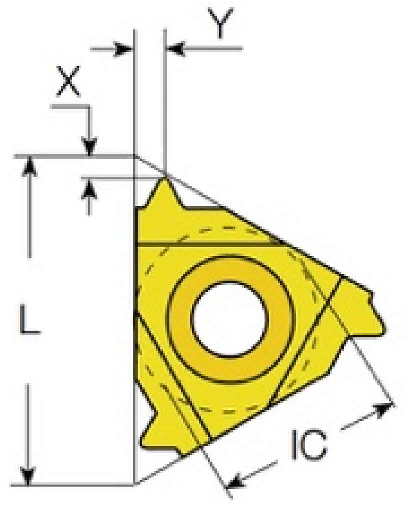
Insert Shape	I.C.	Pitch	External	L	X	Y	T
		mm	Right-hand				
	3/8"	1	16VER1.0ISO	16	1.0	0.7	3.6
		1.25	16VER1.25ISO		1.0	0.9	3.6
		1.5	16VER1.5ISO		1.0	0.9	3.6
		1.75	16VER1.75ISO		1.0	1.2	3.6
		2	16VER2.0ISO		1.0	1.3	3.6
		2.5	16VER2.5ISO		1.0	1.5	3.6

WEIKEDUO

THREAD INSERT

Unified National Full Profile Thread (UN/UNC/UNF/UNEF)



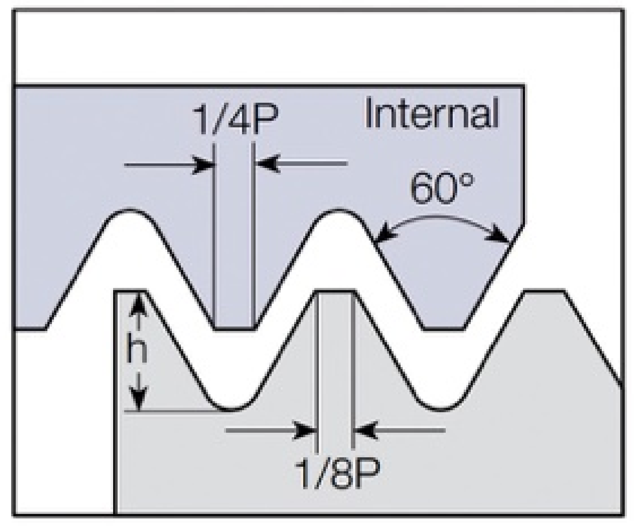


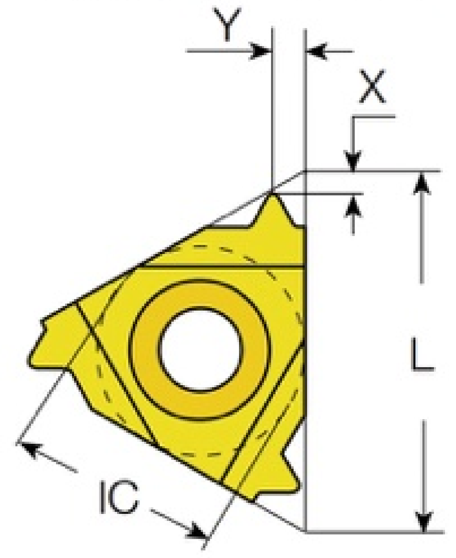
ER/IL

Insert Shape	I.C.	Pitch	External		L	X	Y
		TPI	Right-hand	Left-hand			
	3/8"	32	16ER32UN	16EL32UN	16	0.8	0.8
		28	16ER28UN	16EL28UN		0.8	0.8
		24	16ER24UN	16EL24UN		0.8	0.8
		20	16ER20UN	16EL20UN		0.8	0.8
		18	16ER18UN	16EL18UN		0.8	0.8
		16	16ER16UN	16EL16UN		0.8	0.8
		14	16ER14UN	16EL14UN		1.2	1.5
		13	16ER13UN	16EL13UN		1.0	1.3
		12	16ER12UN	16EL12UN		1.2	1.5
		11	16ER11UN	16EL11UN		1.2	1.5
		10	16ER10UN	16EL10UN		1.2	1.5
		9	16ER9UN	16EL9UN		1.2	1.5
		8	16ER8UN	16EL8UN		1.2	1.5
	1/2"	7	22ER7UN	22EL7UN	22	2.0	2.5
		6	22ER6UN	22EL6UN		2.2	2.5
		5	22ER5UN	22EL5UN		1.8	2.5
	5/8"	4.5	27ER4.5UN	27EL4.5UN	27	2.2	3.2
		4	27ER4UN	27EL4UN		2.2	3.2

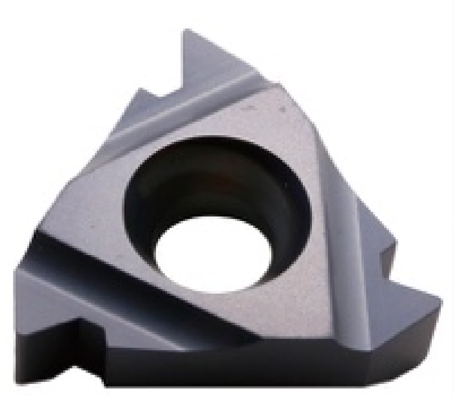
WEIKEDUO

Unified National Full Profile Thread (UN/UNC/UNF/UNEF)





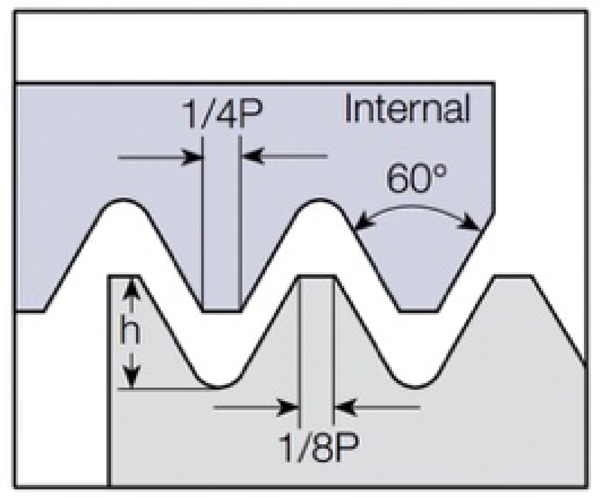
IR/EL

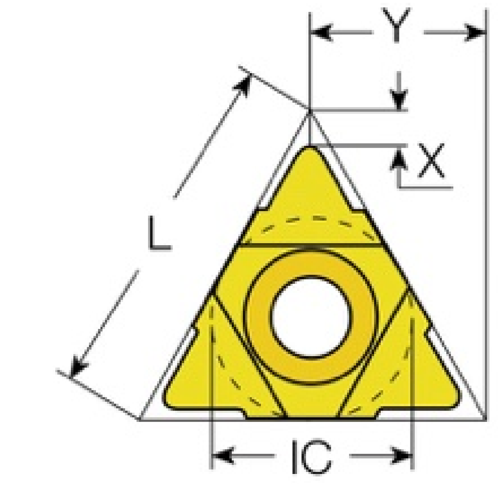
Insert Shape	I.C.	Pitch	Internal		L	X	Y
		TPI	Right-hand	Left-hand			
	1/4″	32	11IR32UN	11IL32UN	11	0.8	0.8
		28	11IR28UN	11IL28UN		0.8	0.8
		24	11IR24UN	11IL24UN		0.8	0.8
		20	11IR20UN	11IL20UN		0.8	0.8
		18	11IR18UN	11IL18UN		0.8	0.8
		16	11IR16UN	11IL16UN		0.8	0.8
		14	11IR14UN	11IL14UN		0.8	0.8
	3/8″	32	16IR32UN	16IL32UN	16	0.8	0.8
		28	16IR28UN	16IL28UN		0.8	0.8
		24	16IR24UN	16IL24UN		0.8	0.8
		20	16IR20UN	16IL20UN		0.8	0.8
		18	16IR18UN	16IL18UN		0.8	0.8
		16	16IR16UN	16IL16UN		0.8	0.8
		14	16IR14UN	16IL14UN		1.2	1.5
		13	16IR13UN	16IL13UN		1.0	1.5
		12	16IR12UN	16IL12UN		1.2	1.3
		11	16IR11UN	16IL11UN		1.2	1.5
		10	16IR10UN	16IL10UN		1.2	1.5
		9	16IR9UN	16IL9UN		1.2	1.5
		8	16IR8UN	16IL8UN		1.2	1.5
	1/2″	7	22IR7UN	22IL7UN	22	2.0	2.5
		6	22IR6UN	22IL6UN		2.2	2.5
		5	22IR5UN	22IL5UN		1.8	2.5
	5/8″	4.5	27IR4.5UN	27IL4.5UN	27	2.2	3.2
		4	27IR4UN	27IL4UN		2.2	3.2

WEIKEDUO

THREAD INSERT

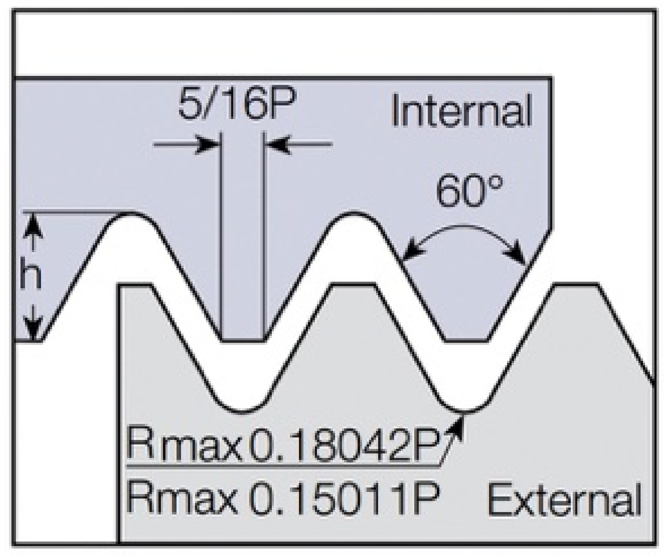
Unified National Thread (UN/UNC/UNF/UNEF) U-Type

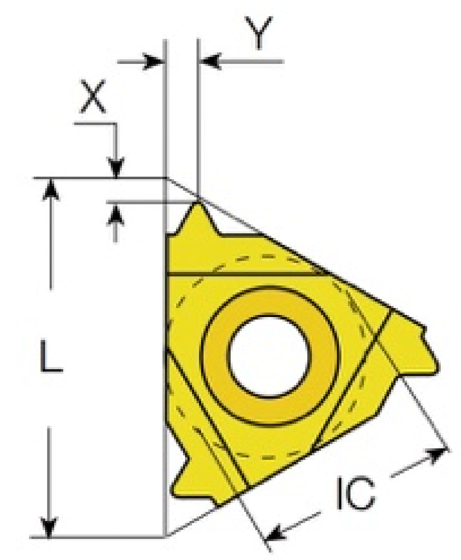




Insert Shape	I.C.	Pitch	External	Internal	L	X	Y
		TPI	Right and Left	Right and Left			
	1/2″ U	4.5	22U ER/L4.5UN	22U IR/L4.5UN	22	E:2.0 N:2.4	11.0
		6.0	22U ER/L4UN	22U IR/L4UN	22	E:2.0 N:2.4	11.0
	5/8″ U	8.0	27U ER/L3UN	27U IR/L3UN	27	E:2.5 N:2.7	13.7
	3/4″ U	12.0	33U ER/L2UN	33U IR/L2UN	33	E:2.8 N:3.6	E:16.5 N16.9

American Unified Aerospace Full Profile Thread (UNJ) 60°

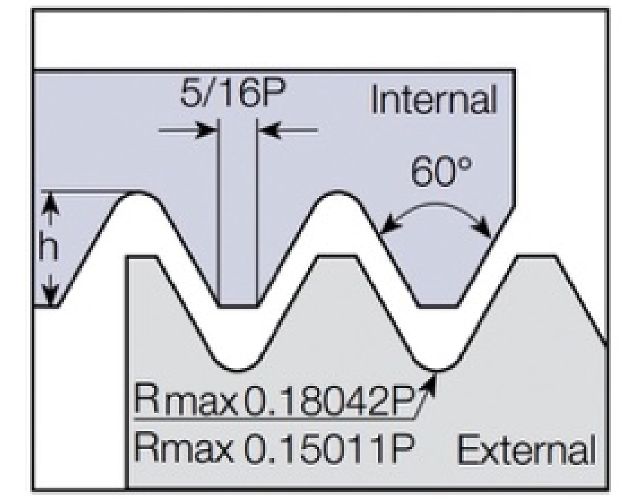


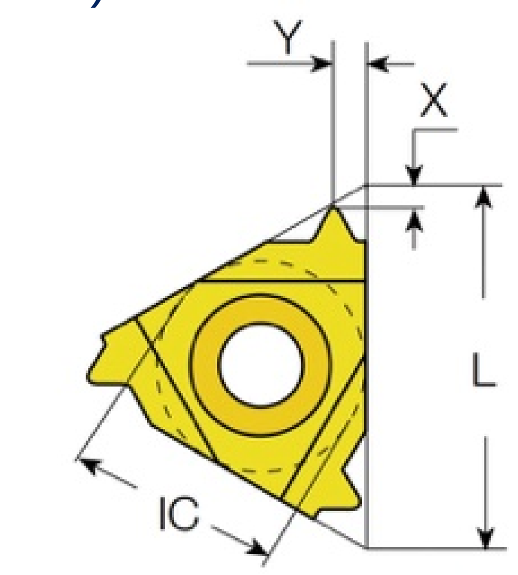


ER/IL

Insert Shape	I.C.	Pitch TPI	External Right-hand	External Left-hand	L	X	Y
	3/8″	32	16ER32UNJ	16EL32UNJ	16	0.8	0.8
		28	16ER28UNJ	16EL28UNJ		0.8	0.8
		24	16ER24UNJ	16EL24UNJ		0.8	0.8
		20	16ER20UNJ	16EL20UNJ		0.8	0.8
		18	16ER18UNJ	16EL18UNJ		0.8	0.8
		16	16ER16UNJ	16EL16UNJ		0.8	0.8
		14	16ER14UNJ	16EL14UNJ		1.2	1.5
		12	16ER12UNJ	16EL12UNJ		1.2	1.5
		11	16ER11UNJ	16EL11UNJ		1.2	1.5
		10	16ER10UNJ	16EL10UNJ		1.2	1.5
		9	16ER9UNJ	16EL9UNJ		1.2	1.5
		8	16ER8UNJ	16EL8UNJ		1.2	1.5
	1/2″	7	22ER7UNJ	22EL7UNJ	22	2.0	2.5
		6	22ER6UNJ	22EL6UNJ		2.2	2.5
		5	22ER5UNJ	22EL5UNJ		1.8	2.5
	5/8″	4.5	27ER4.5UNJ	27EL4.5UNJ	27	2.2	3.2
		4	27ER4UNJ	27EL4UNJ		2.2	3.2

American Unified Aerospace Full Profile Thread (UNJ) 60°

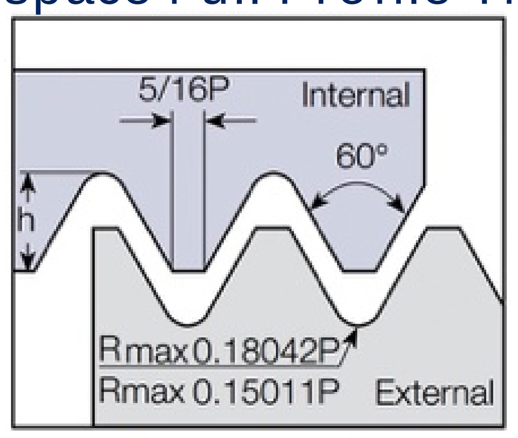


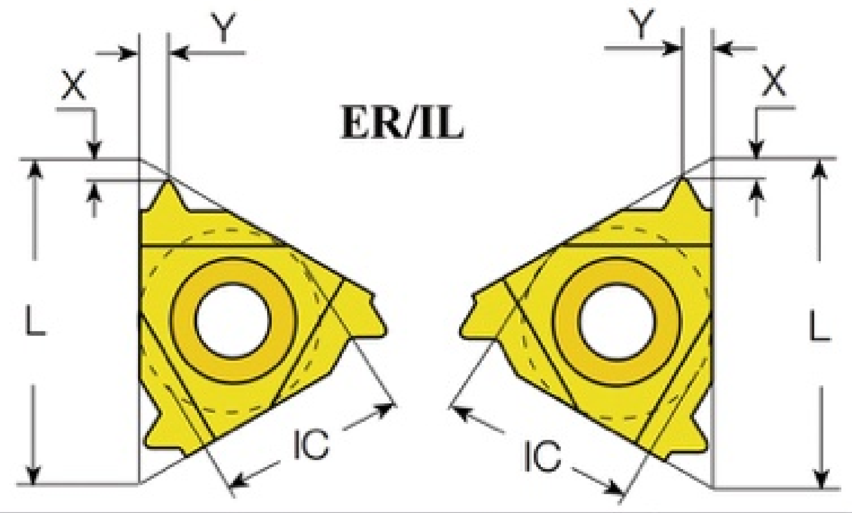


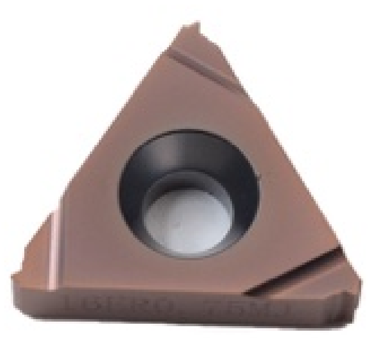
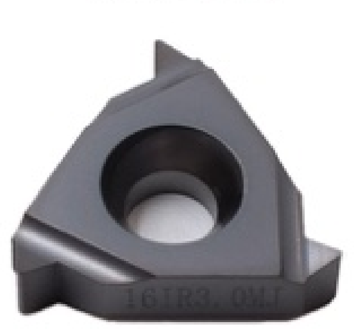
IR/EL

Insert Shape	I.C.	Pitch TPI	Internal Right-hand	Internal Left-hand	L	X	Y
	1/4″	32	11IR32UNJ	11IL32UNJ	11	0.8	0.8
		28	11IR28UNJ	11IL28UNJ		0.8	0.8
		24	11IR24UNJ	11IL24UNJ		0.8	0.8
		20	11IR20UNJ	11IL20UNJ		0.8	0.8
		18	11IR18UNJ	11IL18UNJ		0.8	0.8
		16	11IR16UNJ	11IL16UNJ		0.8	0.8
		14	11IR14UNJ	11IL14UNJ		0.8	0.8
	3/8″	32	16IR32UNJ	16IL32UNJ	16	0.8	0.8
		28	16IR28UNJ	16IL28UNJ		0.8	0.8
		24	16IR24UNJ	16IL24UNJ		0.8	0.8
		20	16IR20UNJ	16IL20UNJ		0.8	0.8
		18	16IR18UNJ	16IL18UNJ		0.8	0.8
		16	16IR16UNJ	16IL16UNJ		0.8	0.8
		14	16IR14UNJ	16IL14UNJ		1.2	1.5
		12	16IR12UNJ	16IL12UNJ		1.2	1.5
		11	16IR11UNJ	16IL11UNJ		1.2	1.5
		10	16IR10UNJ	16IL10UNJ		1.2	1.5
		9	16IR9UNJ	16IL9UNJ		1.2	1.5
		8	16IR8UNJ	16IL8UNJ		1.2	1.5
	1/2″	7	22IR7UNJ	22IL7UNJ	22	2.0	2.5
		6	22IR6UNJ	22IL6UNJ		2.2	2.5
		5	22IR5UNJ	22IL5UNJ		1.8	2.5
	5/8″	4.5	27IR4.5UNJ	27IL4.5UNJ	27	2.2	3.2
		4	27IR4UNJ	27IL4UNJ		2.2	3.2

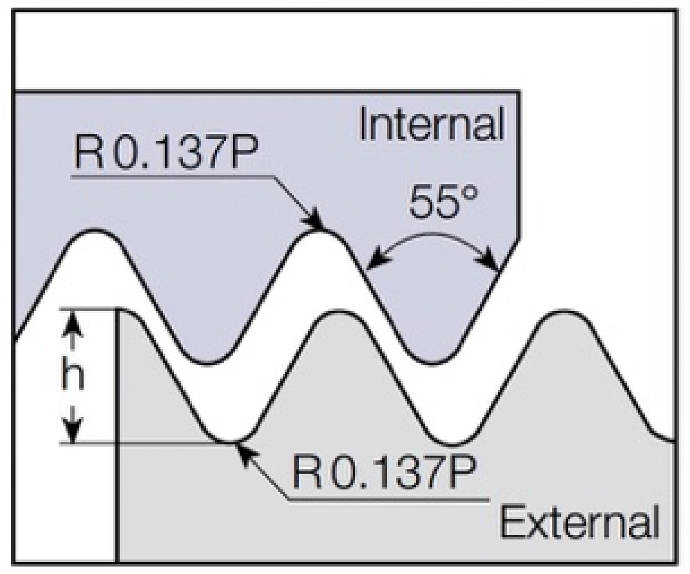
Metric Aerospace Full Profile Thread Insert

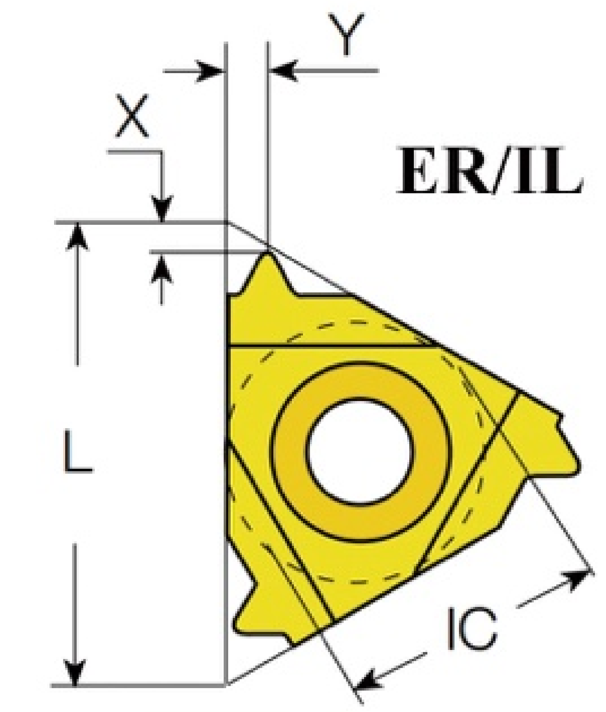




Insert Shape	I.C.	Pitch	Model		L	X	Y
		mm	External	Internal			
	1/4″	1.0	11ER1.0MJ	11IR1.0MJ	11	0.7	0.8
		1.25	11ER1.25MJ	11IR1.25MJ		0.8	0.9
		1.5	11ER1.5MJ	11IR1.5MJ		0.8	1.0
		2.0	11ER2.0MJ	11IR2.0MJ		0.9	1.0
External 	3/8″	0.7	16ER0.7MJ	16IR0.7MJ	16	0.6	0.6
		0.75	16ER0.75MJ	16ER0.75MJ		0.7	0.55
		0.8	16ER0.8MJ	16ER0.8MJ		0.7	0.6
		1.0	16ER1.0MJ	16IR1.0MJ		0.7	0.7
		1.25	16ER1.25MJ	16IR1.25MJ		0.8	0.9
		1.5	16ER1.5MJ	16IR1.5MJ		0.8	1.0
		2.0	16ER2.0MJ	16IR2.0MJ		1.0	1.3
		2.5	16ER2.5MJ	16IR2.5MJ		1.1	1.5
		3.0	16ER3.0MJ	16IR3.0MJ		1.2	1.6
Internal 	1/2″	4.0	22ER4.0MJ	22IR4.0MJ	22	1.55	2.10
	1/4″	0.7	11VER0.7MJ	11VIR0.7MJ	11	0.7	2.5
		0.8	11VER0.8MJ	11VIR0.8MJ		0.7	2.5
		0.9	11VER0.9MJ	11VIR0.9MJ		0.7	2.6
		1.0	11VER1.0MJ	11VIR1.0MJ		0.7	2.5
		1.25	11VER1.25MJ	11VIR1.25MJ		0.7	2.3
		1.5	11VER1.5MJ	11VIR1.5MJ		0.7	2.2

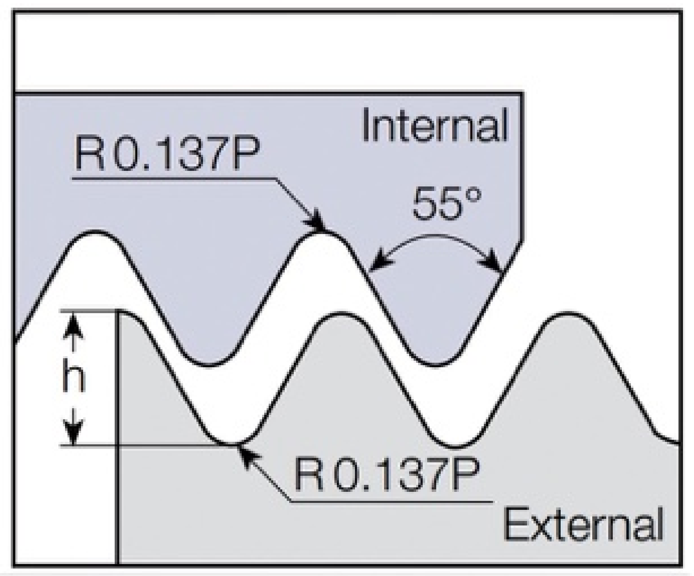
British Whitworth Full Profile Thread (BSW/BSF/BSP) 55°

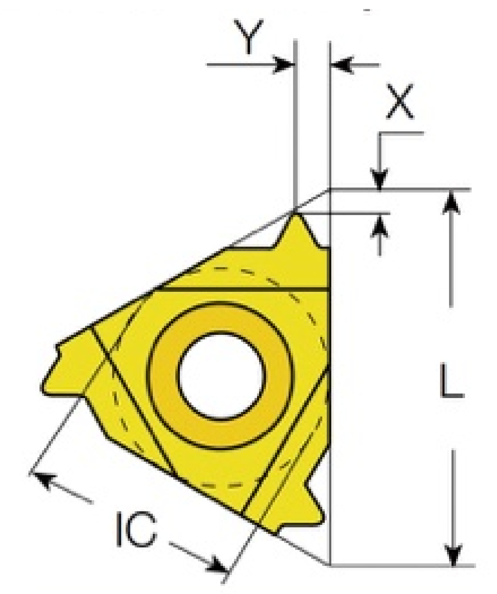




Insert Shape	I.C.	Pitch	External		L	X	L
		TPI	Right-hand	Left-hand			
	3/8″	28	16ER28W	16EL28W	16	0.8	0.8
		26	16ER26W	16EL26W		0.8	0.8
		24	16ER24W	16EL24W		0.8	0.8
		22	16ER22W	16EL22W		0.8	0.8
		20	16ER20W	16EL20W		0.8	0.8
		19	16ER19W	16EL19W		0.8	0.8
		18	16ER18W	16EL18W		0.8	0.8
		16	16ER16W	16EL16W		1.2	1.5
		14	16ER14W	16EL14W		1.2	1.5
		12	16ER12W	16EL12W		1.2	1.5
		11	16ER11W	16EL11W		1.2	1.5
		10	16ER10W	16EL10W		1.2	1.5
		9	16ER9W	16EL9W		1.2	1.5
		8	16ER8W	16EL8W		1.2	1.5
	1/2″	7	22ER7W	22EL7W	22	1.8	2.5
		6	22ER6W	22EL6W		1.8	2.5
		5	22ER5W	22EL5W		1.8	2.5
	5/8″	4.5	27ER4.5W	27EL4.5W	27	2.2	3.2
		4	27ER4W	27EL4W		2.2	3.2

British Whitworth Full Profile Thread (BSW/BSF/BSP) 55°

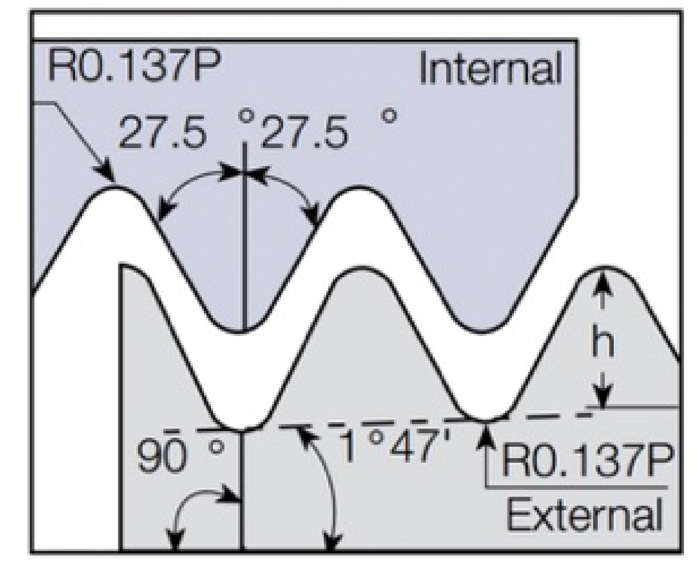


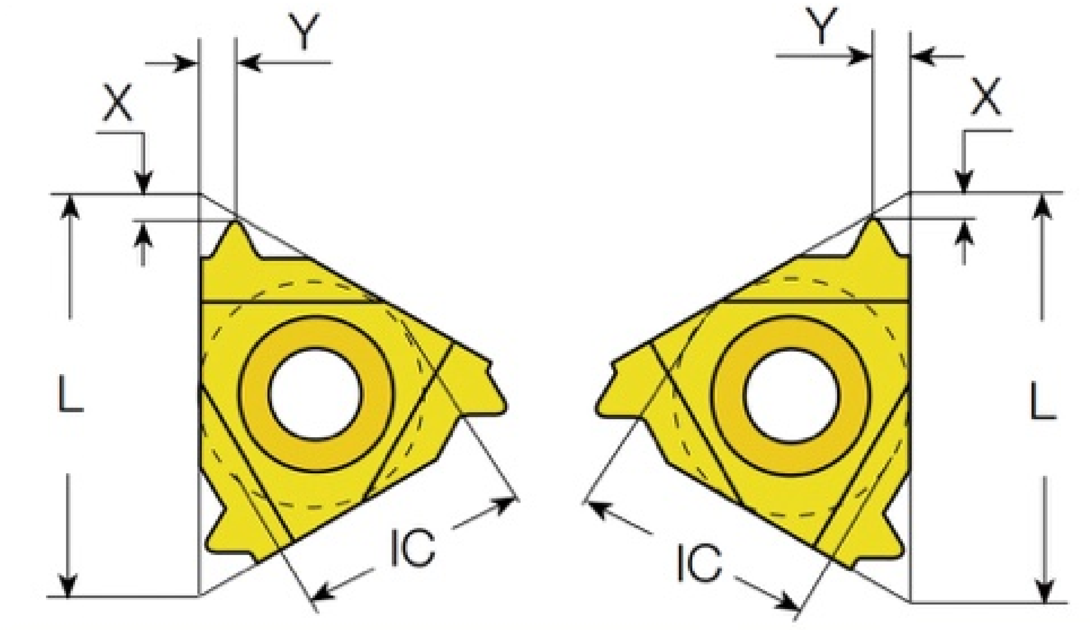


IR/EL

Insert Shape	I.C.	Pitch	Internal		L	X	Y
		TPI	Right-hand	Left-hand			
	1/4″	19	11IR19W	11IL19W	11	0.8	0.8
		14	11IR14W	11IL14W		0.8	0.8
	3/8″	28	16IR28W	16IL18W	16	0.8	0.8
		26	16IR26W	16IL26W		0.8	0.8
		24	16IR24W	16IL24W		0.8	0.8
		22	16IR22W	16IL22W		0.8	0.8
		20	16IR20W	16IL20W		0.8	0.8
		19	16IR19W	16IL19W		0.8	0.8
		18	16IR18W	16IL18W		0.8	0.8
		16	16IR16W	16IL16W		1.2	1.5
		14	16IR14W	16IL14W		1.2	1.5
		12	16IR12W	16IL12W		1.2	1.5
		11	16IR11W	16IL11W		1.2	1.5
		10	16IR10W	16IL10W		1.2	1.5
		9	16IR9W	16IL9W		1.2	1.5
		8	16IR8W	16IL8W		1.2	1.5
	1/2″	7	22IR7W	22IL7W	22	1.8	2.5
		6	22IR6W	22IL6W		1.8	2.5
		5	22IR5W	22IL5W		1.8	2.5
	5/8″	4.5	27IR4.5W	27IL4.5W	27	2.2	3.2
		4	27IR4W	27IL4W		2.2	3.2

British Standard Pipe Taper Full Profile Thread (BSPT)



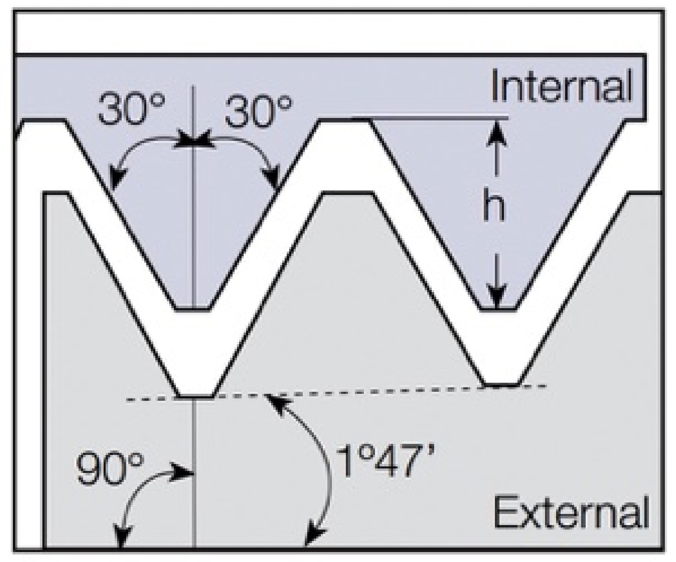


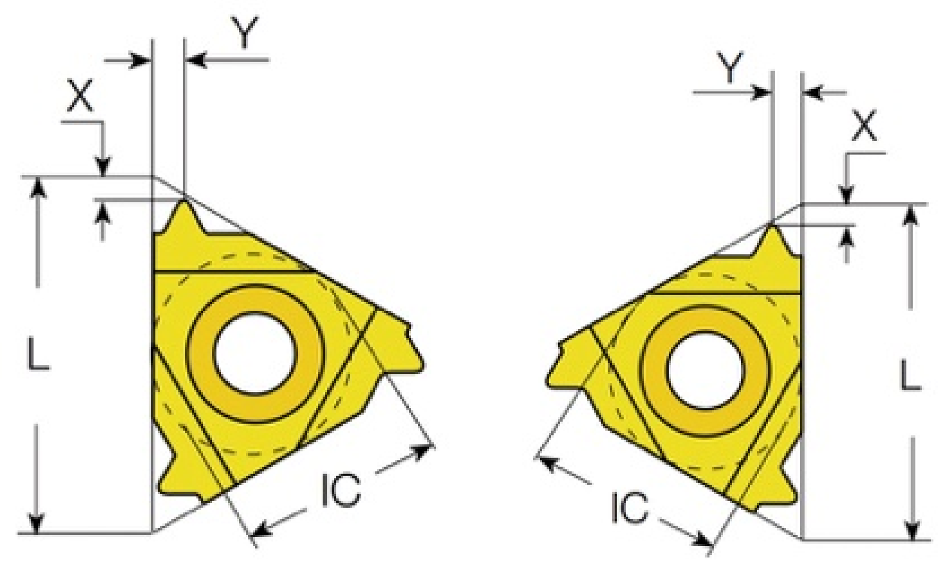
Insert Shape	I.C.	Pitch	External		L	X	Y
		TPI	Right-hand	Left-hand			
	3/8″	28	16ER28BSPT	16EL28BSPT	16	0.6	0.6
		19	16ER19BSPT	16EL19BSPT		0.8	0.9
		14	16ER14BSPT	16EL14BSPT		1.0	1.2
		11	16ER11BSPT	16EL11BSPT		1.1	1.5

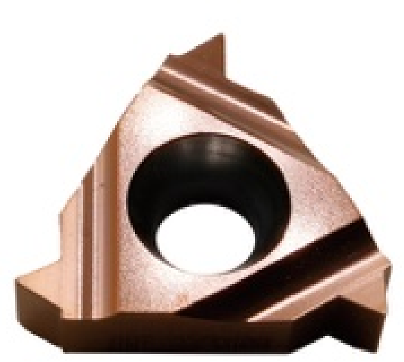
Insert Shape	I.C.	Pitch	Internal		L	X	Y
		TPI	Right-hand	Left-hand			
	3/8″	28	16IR28BSPT	16IL28BSPT	16	0.6	0.6
		19	16IR19BSPT	16IL19BSPT		0.8	0.9
		14	16IR14BSPT	16IL14BSPT		1.0	1.2
		11	16IR11BSPT	16IL11BSPT		1.1	1.5

WEIKEDUO

National Pipe Taper Full Profile Thread (NPT)

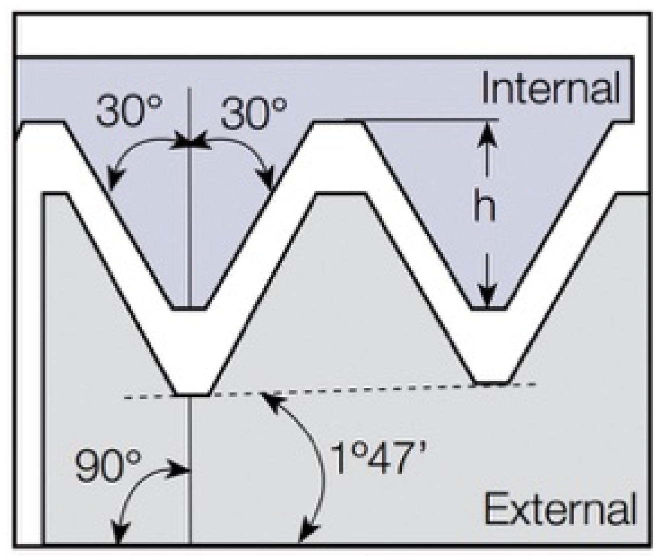


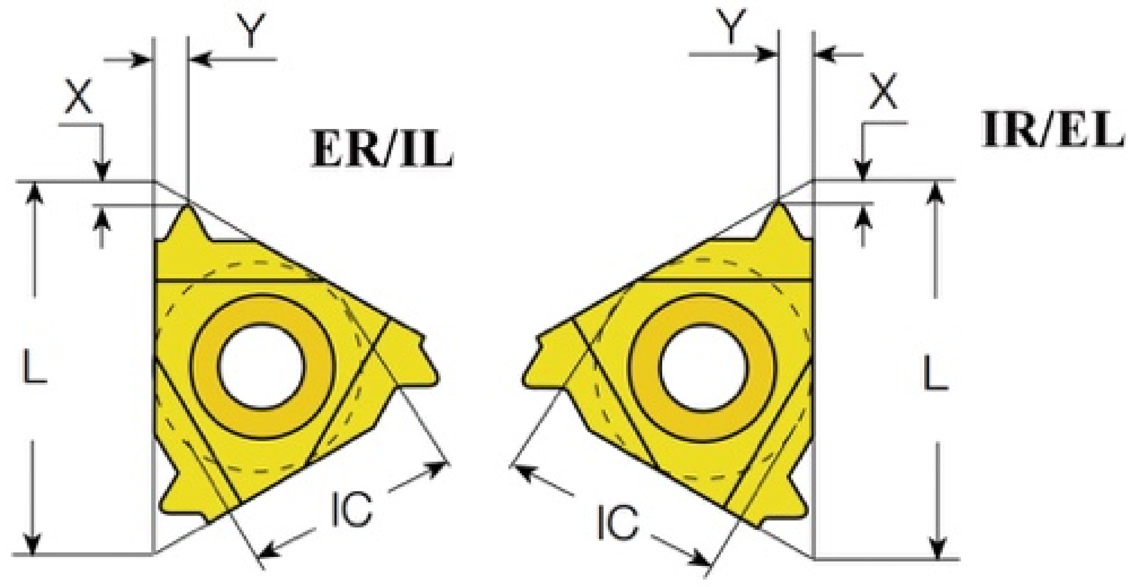


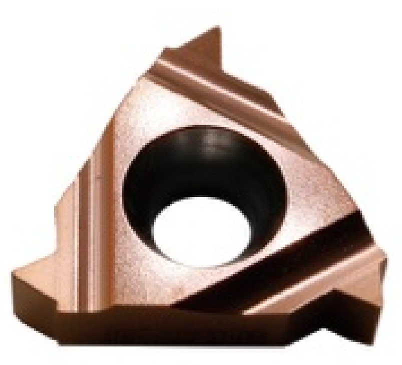
Insert Shape	I.C.	Pitch	External		L	X	Y
		TPI	Right-hand	Left-hand			
	3/8"	27	16ER27NPT	16EL27NPT	16	0.8	0.7
		18	16ER18NPT	16EL18NPT		0.8	0.7
		14	16ER14NPT	16EL14NPT		1.5	1.1
		11.5	16ER11.5NPT	16EL11.5NPT		1.5	1.1
		8	16ER8NPT	16EL8NPT		1.5	1.1

Insert Shape	I.C.	Pitch	Internal		L	X	Y
		TPI	Right-hand	Left-hand			
	3/8"	27	16IR27NPT	16IL27NPT	16	0.8	0.7
		18	16IR18NPT	16IL18NPT		0.8	0.7
		14	16IR14NPT	16IL14NPT		1.5	1.1
		11.5	16IR11.5NPT	16IL11.5NPT		1.5	1.1
		8	16IR8NPT	16IL8NPT		1.5	1.1

National Pipe Taper Fuel Full Profile Thread (NPTF)





Insert Shape	I.C.	Pitch	External		L	X	Y
		TPI	Right-hand	Left-hand			
	1/4"	27	11ER27NPTF	11EL27NPTF	11	0.8	0.7
		18	11ER18NPTF	11EL18NPTF		0.8	0.7
		14	11ER14NPTF	11EL14NPTF		1.2	1.0
	3/8"	27	16ER27NPTF	16EL27NPTF	16	0.8	0.7
		18	16ER18NPTF	16EL18NPTF		0.8	0.7
		14	16ER14NPTF	16EL14NPTF		1.5	1.1
		11.5	16ER11.5NPTF	16EL11.5NPTF		1.5	1.1
		8	16ER8NPTF	16EL8NPTF		1.5	1.1

Insert Shape	I.C.	Pitch	Internal		L	X	Y
		TPI	Right-hand	Left-hand			
	1/4"	27	11IR27NPTF	11IL27NPTF	11	0.8	0.7
		18	11IR18NPTF	11IL18NPTF		0.8	0.7
		14	11IR14NPTF	11IL14NPTF		1.2	1.0
	3/8"	27	16IR27NPTF	16IL27NPTF	16	0.8	0.7
		18	16IR18NPTF	16IL18NPTF		0.8	0.7
		14	16IR14NPTF	16IL14NPTF		1.5	1.1
		11.5	16IR11.5NPTF	16IL11.5NPTF		1.5	1.1
		8	16IR8NPTF	16IL8NPTF		1.5	1.1

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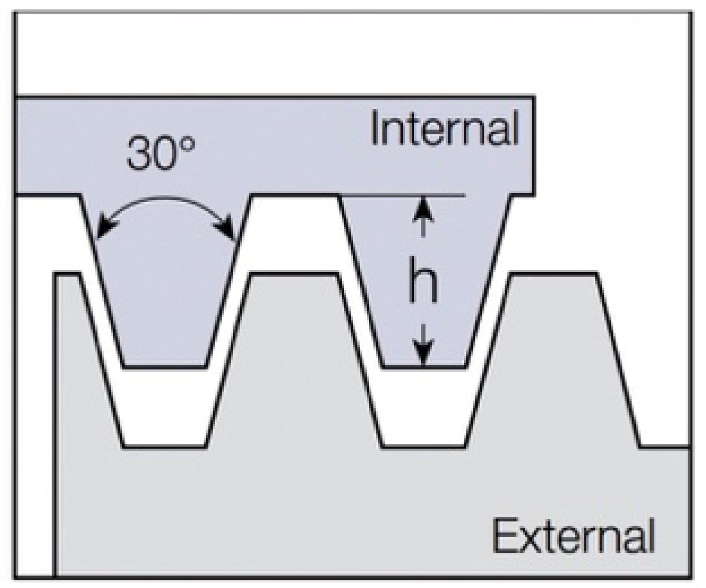
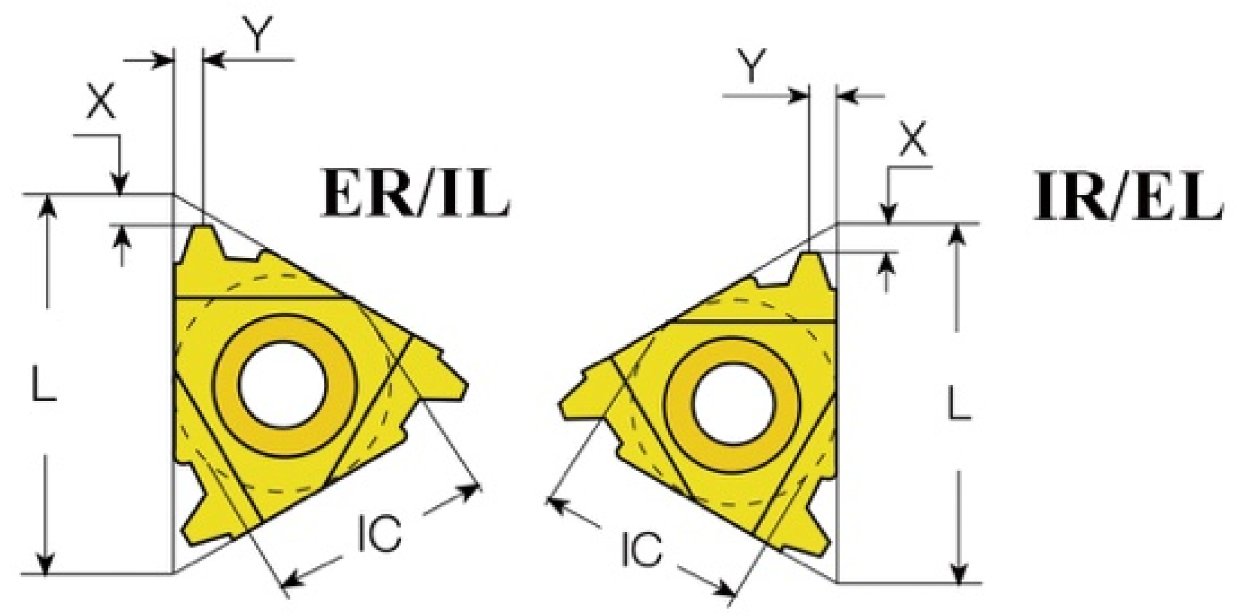
Metric Trapeze Thread (TR) DIN 103 Full Profile & Non-Full Profile



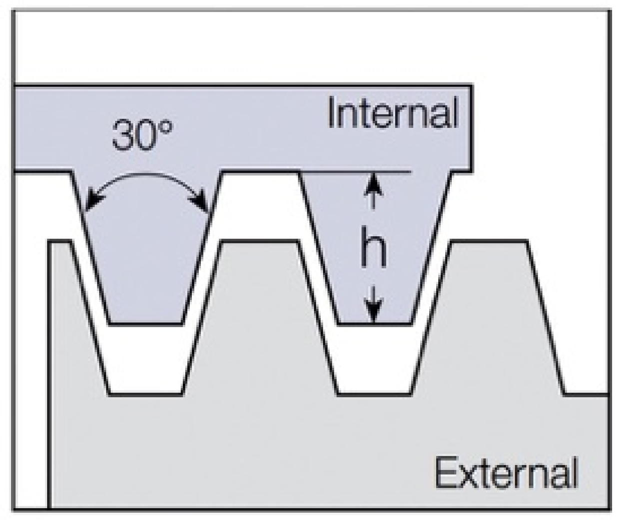


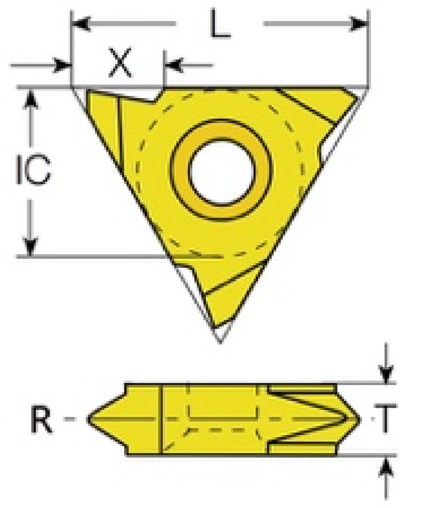
Insert Shape	I.C.	Pitch	External		L	X	Y
		mm	Right-hand	Left-hand			
	3/8″	1.5	16ER1.5TR	16EL1.5TR	16	1.0	1.1
		2	16ER2.0TR	16EL2.0TR		1.1	1.3
		2.5	16ER2.5TR	16EL2.5TR		1.1	1.3
		3	16ER3.0TR	16EL3.0TR		1.3	1.5
	1/2″	4	22ER4.0TR	22EL4.0TR	22	1.8	1.9
		5	22ER5.0TR	22EL5.0TR		2.0	2.4
	5/8″	6	27ER6.0TR	27EL6.0TR	27	2.3	2.7
		7	27ER7.0TR	27EL7.0TR		2.2	2.6

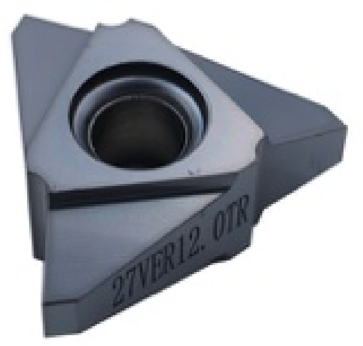
Insert Shape	I.C.	Pitch	内螺纹 Internal		L	X	Y
		mm	Right-hand	Left-hand			
	3/8″	1.5	16IR1.5TR	16IL1.5TR	16	1.0	1.1
		2	16IR2.0TR	16IL2.0TR		1.1	1.3
		2.5	16IR2.5TR	16IL2.5TR		1.1	1.3
		3	16IR3.0TR	16IL3.0TR		1.3	1.5
		4	16IR4.0TR	16IL4.0TR		1.4	1.45
	1/2″	4	22IR4.0TR	22IL4.0TR	22	1.8	1.9
		5	22IR5.0TR	22IL5.0TR		2.0	2.4
	5/8″	6	27IR6.0TR	27IL6.0TR	27	2.3	2.7
		7	27IR7.0TR	27IL7.0TR		2.2	2.6

WEIKEDUO

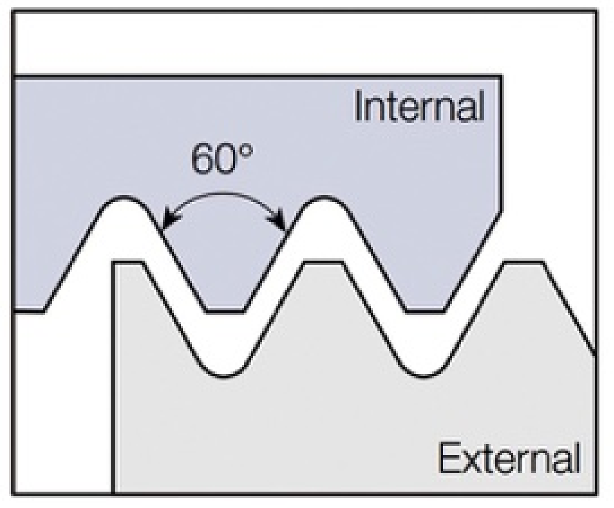
Metric Trapeze Thread Insert (TR)

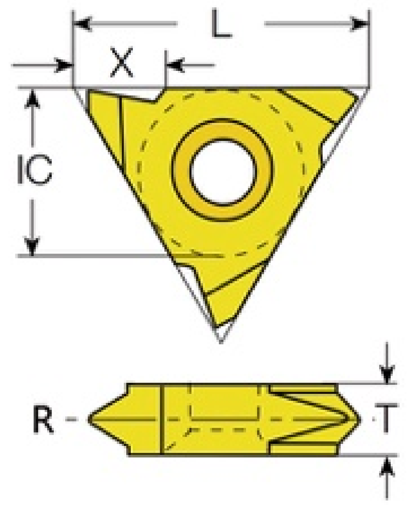




Insert Shape	I.C.	Pitch	Model		L	T
		mm	External	Internal		
	1/2″	4	22VER4.0TR	22VIR4.0TR	22	4.76
		5	22VER5.0TR	22VIR5.0TR		4.76
		6	22VER6.0TR	22VIR6.0TR		4.76
	5/8″	7	27VER7.0TR	27VIR7.0TR	27	6.35
		8	27VER8.0TR	27VIR8.0TR		6.35
		9	27VER9.0TR	27VIR9.0TR		8.7
		10	27VER10.0TR	27VIR10.0TR		8.7
		12	27VER12.0TR	27VIR12.0TR		10

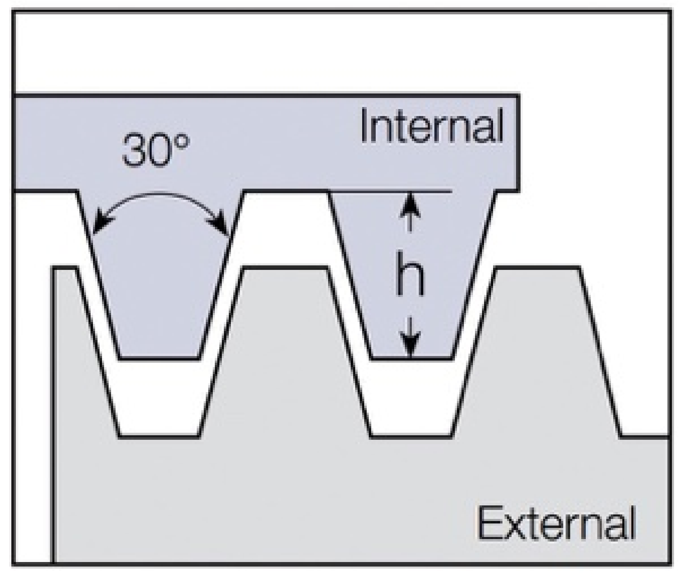
Partial Section 55°/60° Vertical

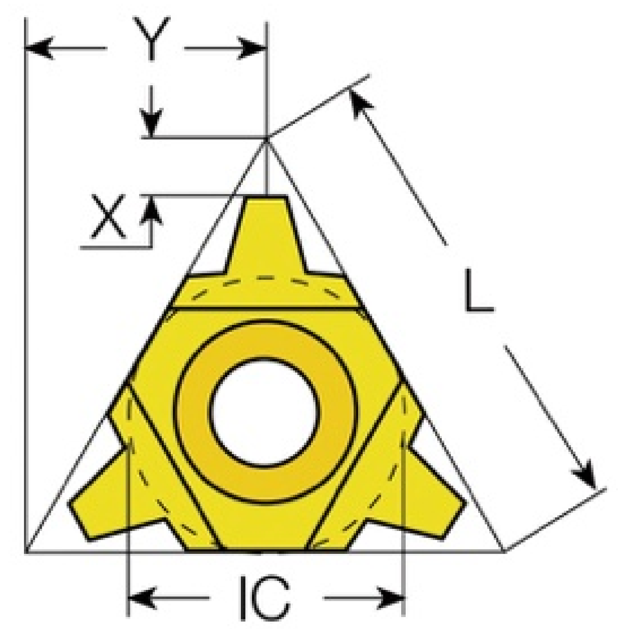




Insert Shape	Model	Pitch (mm/inch)	Re (mm)
	MTTR326001	1.0-1.75	0.1
	MTTR326002	2.0-2.5	0.2
	MTTR326003	3.0-3.5	0.3
	MTTR325502	16-8	0.2
	MTTR436001	1.0-1.75	0.1
	MTTR436002	2.0-2.5	0.2
	MTTR436003	3.0-3.5	0.3
	MTTR436004	4.0-4.5	0.4
	MTTR435502	16-8	0.2

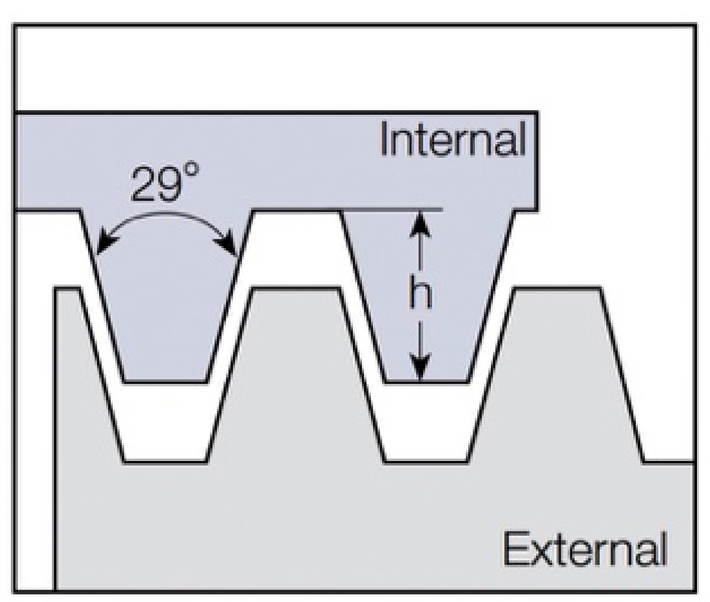
Metric Trapeze Thread (TR) U-Type DIN 103

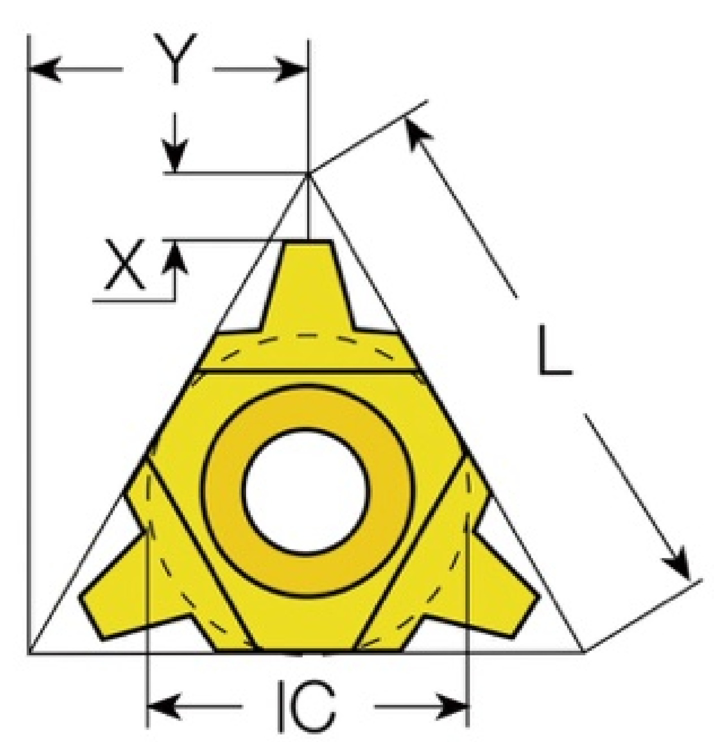




Insert Shape	I.C.	Pitch mm	External Right and Left	Internal Right and Left	L	X	Y
	1/2″ U	6	22U ER/L6TR	22U IR/L6TR	22	2.0	11.0
		7	22U ER/L7TR	22U IR/L7TR	22	2.3	11.0
	5/8″ U	8	27U ER/L8TR	27U IR/L8TR	27	2.5	13.7
		9	27U ER/L9TR	27U IR/L9TR	27	3.0	13.7
		10	27U ER/L10TR	27U IR/L10TR	27	3.2	13.7
	3/4″ U	12	33U ER/L12TR	33U IR/L12TR	33	3.9	16.9

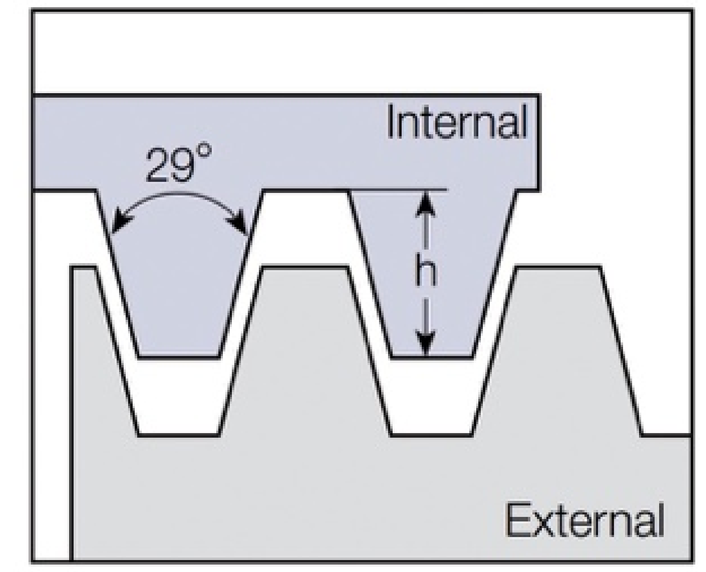
American Trapeze ACME Thread U-Type

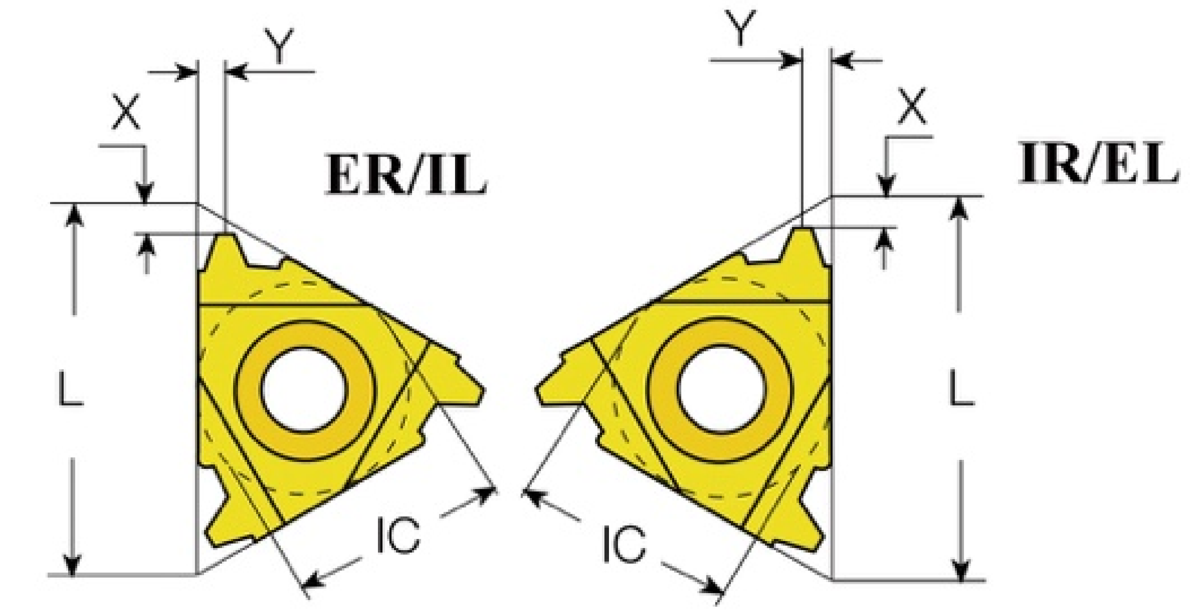


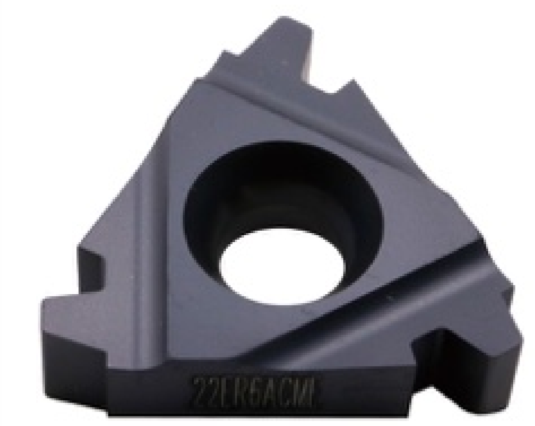


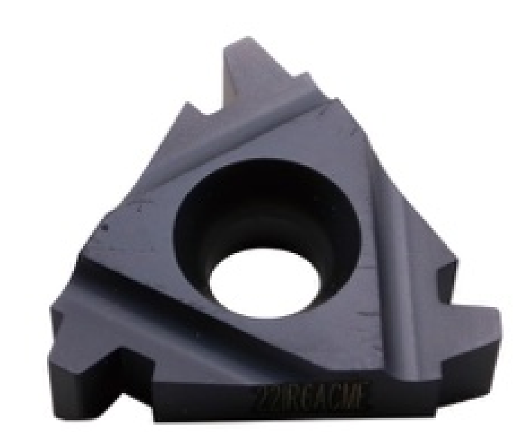
Insert Shape	I.C.	Pitch mm	External Right and Left	Internal Right and Left	L	X	Y
	1/2″ U	4	22U ER/L4ACME	22U IR/L4ACME	22	2.3	11.0
	5/8″ U	3	27U ER/L3ACME	27U IR/L3ACME	27	2.8	13.7
	3/4″ U	2	33U ER/L2ACME	33U IR/L2ACME	33	4.3	16.9

American Trapeze ACME Thread - Full Form & Non-Full Form

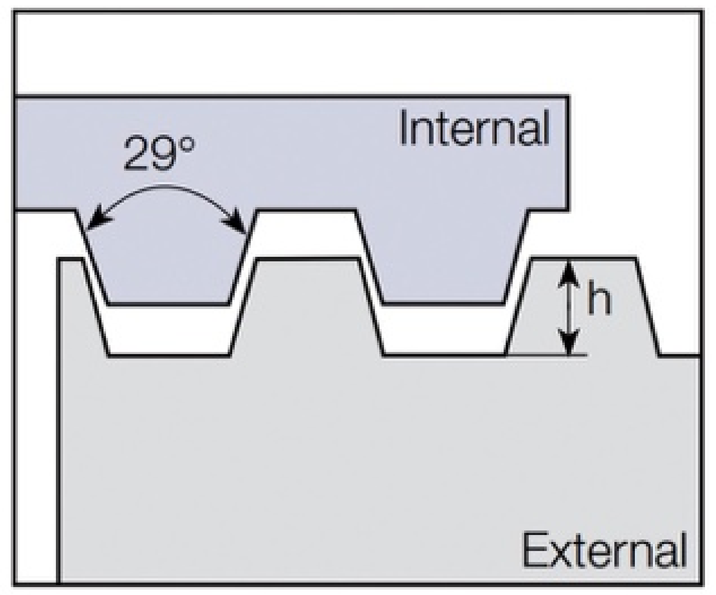


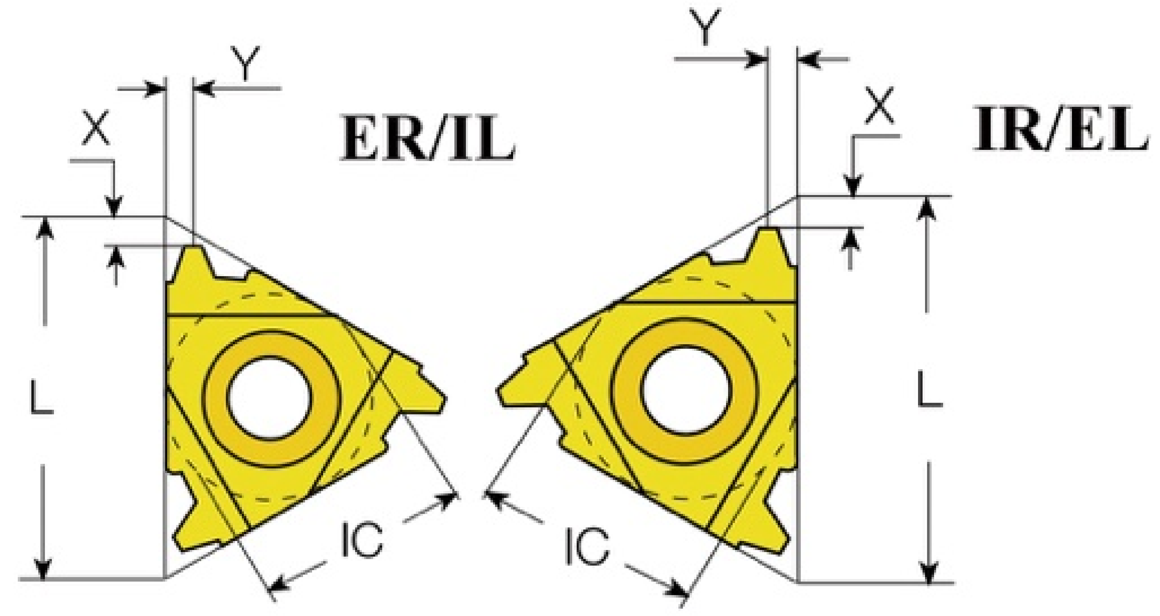


Insert Shape	I.C.	Pitch TPI	External Right-hand	External Left-hand	L	X	Y
	1/4″	16	11ER16ACME	11EL16ACME	11	0.9	1.0
	3/8″	16	16ER16ACME	16EL16ACME	16	0.9	1.0
		14	16ER14ACME	16EL14ACME		1.0	1.2
		12	16ER12ACME	16EL12ACME		1.1	1.2
		10	16ER10ACME	16EL10ACME		1.3	1.3
		8	16ER8ACME	16EL8ACME		1.5	1.5
	1/2″	6	22ER6ACME	22EL6ACME	22	1.8	2.1
		5	22ER5ACME	22EL5ACME		2.0	2.3
	5/8″	4	27ER4ACME	27EL4ACME	27	2.3	2.7

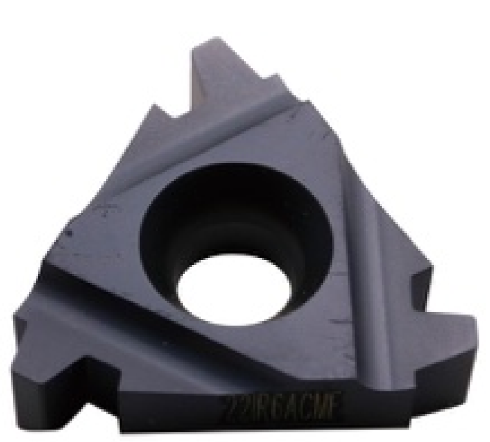
Insert Shape	I.C.	Pitch TPI	Internal Right-hand	Internal Left-hand	L	X	Y
	1/4″	16	11IR16ACME	11IL16ACME	11	0.9	1.0
	3/8″	16	16IR16ACME	16IL16ACME	16	0.9	1.0
		14	16IR14ACME	16IL14ACME		1.0	1.2
		12	16IR12ACME	16IL12ACME		1.1	1.2
		10	16IR10ACME	16IL10ACME		1.3	1.3
		8	16IR8ACME	16IL8ACME		1.5	1.5
	1/2″	6	22IR6ACME	22IL6ACME	22	1.8	2.1
		5	22IR5ACME	22IL5ACME		2.0	2.3
	5/8″	4	27IR4ACME	27IL4ACME	27	2.3	2.7

American Trapeze Stub ACME Thread 29°- Full Form & Non-Full Form

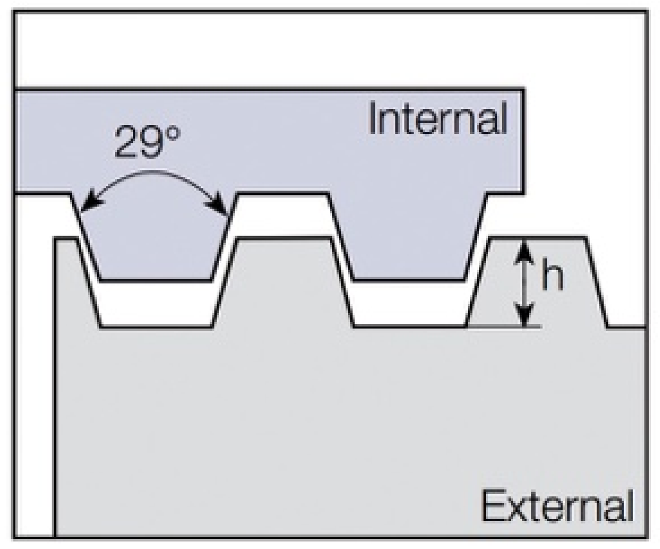


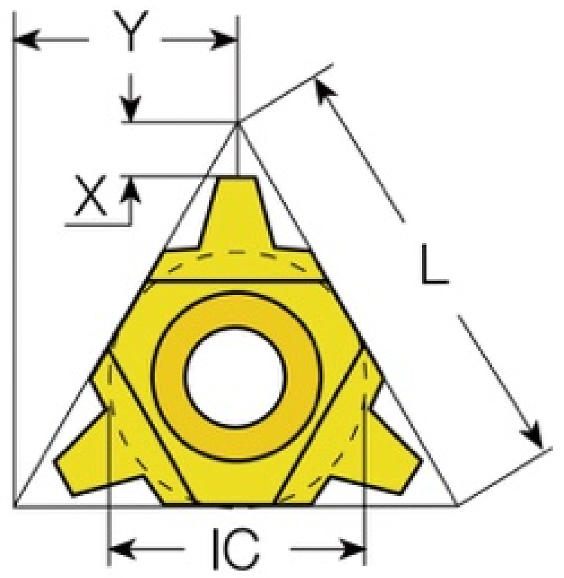


Insert Shape	I.C.	Pitch TPI	External Right-hand	External Left-hand	L	X	Y
	1/4"	16	11ER16STACME	11EL16STACME	11	1.0	1.0
	3/8"	16	16ER16STACME	16EL16STACME	16	1.0	1.0
		14	16ER14STACME	16EL14STACME		1.1	1.1
		12	16ER12STACME	16EL12STACME		1.2	1.2
		10	16ER10STACME	16EL10STACME		1.3	1.3
		8	16ER8STACME	16EL8STACME		1.5	1.5
	1/2"	6	22ER6STACME	22EL6STACME	22	1.8	1.8
		5	22ER5STACME	22EL5STACME		2.0	2.3
	5/8"	4	27ER4STACME	27EL4STACME	27	2.3	2.4
		3	27ER3STACME	27EL3STACME		2.8	2.9

Insert Shape	I.C.	Pitch TPI	Internal Right-hand	Internal Left-hand	L	X	Y
	1/4"	16	11IR16STACME	11IL16STACME	11	1.0	1.0
	3/8"	16	16IR16STACME	16IL16STACME	16	1.0	1.0
		14	16IR14STACME	16IL14STACME		1.1	1.1
		12	16IR12STACME	16IL12STACME		1.2	1.2
		10	16IR10STACME	16IL10STACME		1.3	1.3
		8	16IR8STACME	16IL8STACME		1.5	1.5
	1/2"	6	22IR6STACME	22IL6STACME	22	1.8	1.8
		5	22IR5STACME	22IL5STACME		2.0	2.3
	5/8"	4	27IR4STACME	27IL4STACME	27	2.3	2.4
		3	27IR3STACME	27IL3STACME		2.8	2.9

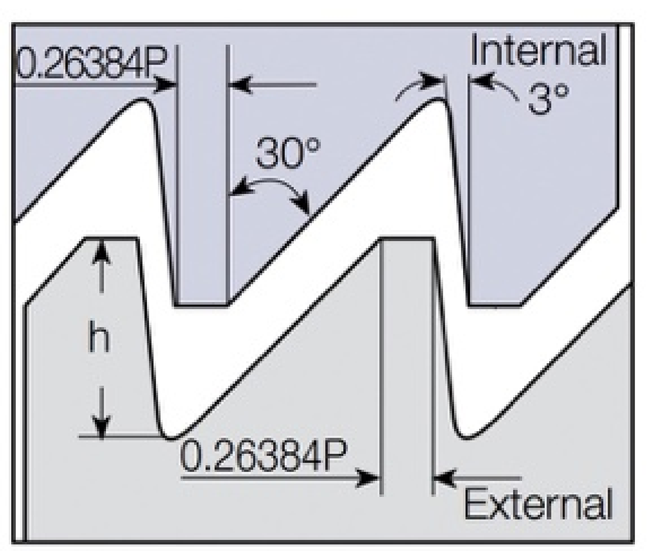
American Trapeze Stub ACME Thread 29° - U-Tyep

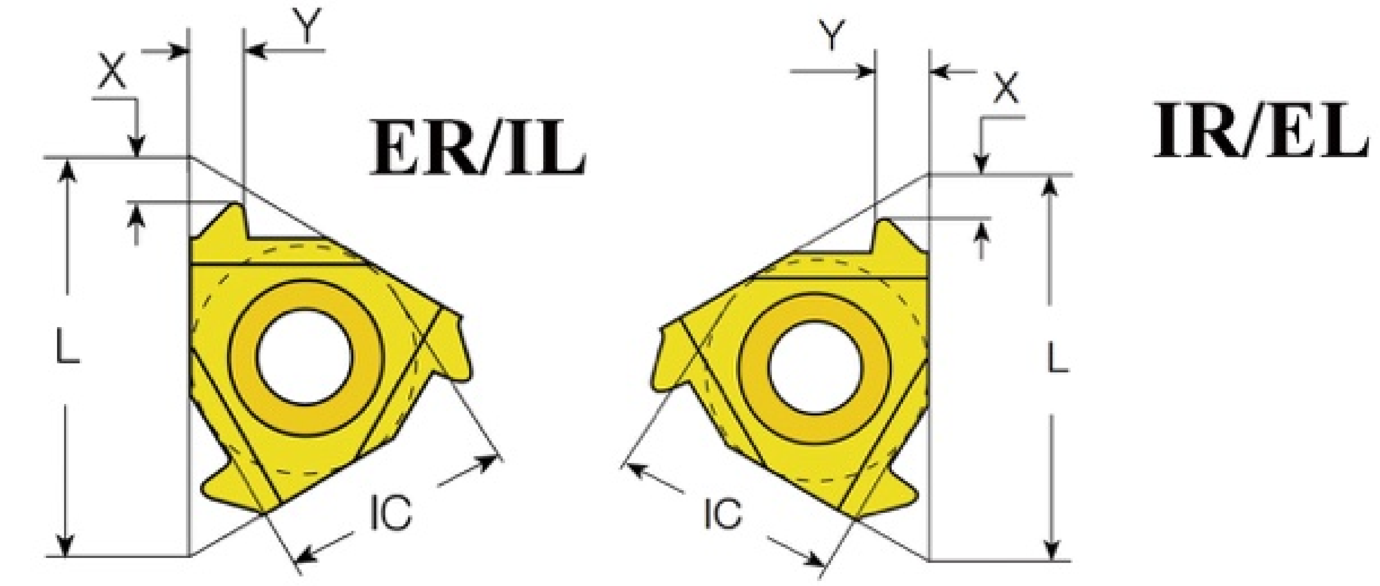




Insert Shape	I.C.	Pitch TPI	External Right and Left	Internal Right and Left	L	X	Y
	1/2"	4	22U ER/L4STACME	22U IR/L4STACME	22	2.5	11.0
		3	22U ER/L3STACME	22U IR/L3STACME	22	3.3	13.7
	3/4"	2	33U ER/L2STACME	33U IR/L2STACME	33	5.0	16.9

Metric Buttress Thread Insert 3°/30°(Säge) - DIN 513

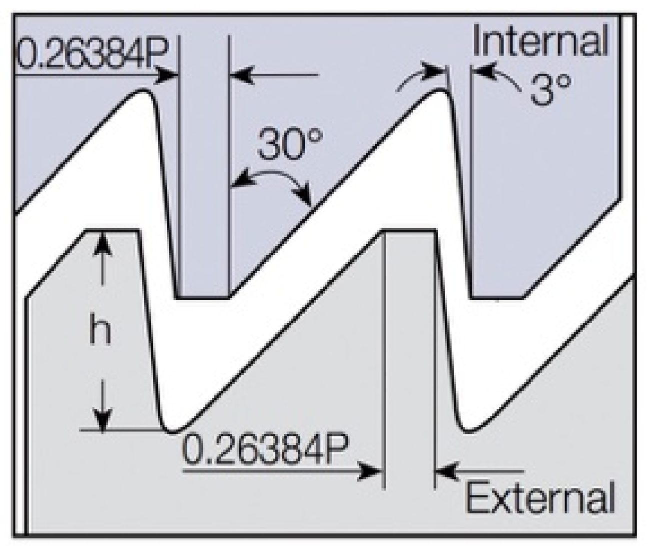


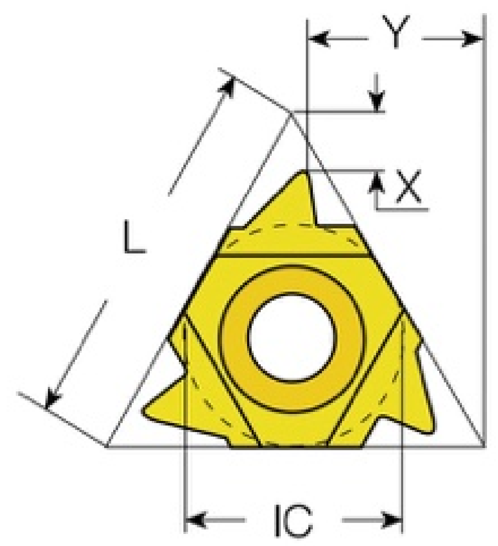


Insert Shape	I.C.	Pitch TPI	External Right and Left	External Right and Left	L	X	Y
	3/8"	2.0	16ER2.0SAGE	16EL2.0SAGE	16	1.1	1.6
	1/2"	3.0	22ER3.0SAGE	22EL3.0SAGE	22	1.5	2.4
		4.0	22ER4.0SAGE	22EL4.0SAGE		1.9	11.7

Insert Shape	I.C.	Pitch TPI	Internal Right and Left	Internal Right and Left	L	X	Y
	3/8"	2.0	16IR2.0SAGE	16IL2.0SAGE	16	1.2	1.7
	1/2"	3.0	22IR3.0SAGE	22IL3.0SAGE	22	1.9	2.9
		4.0	22IR4.0SAGE	22IL4.0SAGE		2.3	3.5

Metric Buttress Thread Insert 3°/30°(Säge) - DIN 513 U-Type





Insert Shape	I.C.	Pitch	External		L	X	Y
		TPI	Right-hand	Left-hand			
External 	1/2"U	5.0	22UER5.0SAGE	22UEL5.0SAGE	22	1.2	11.6
		6.0	22UER6.0SAGE	22UEL6.0SAGE		1.2	11.7

Insert Shape	I.C.	Pitch	Internal		L	X	Y
		TPI	Right-hand	Left-hand			
Internal 	1/2"	5.0	22UIR5.0SAGE	22UIL5.0SAGE	22	1.9	1.7
		6.0	22UIR6.0SAGE	22UIL6.0SAGE		2.1	11.9

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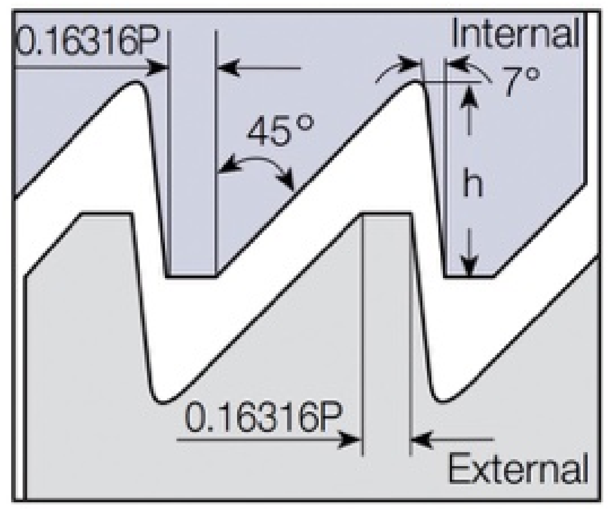
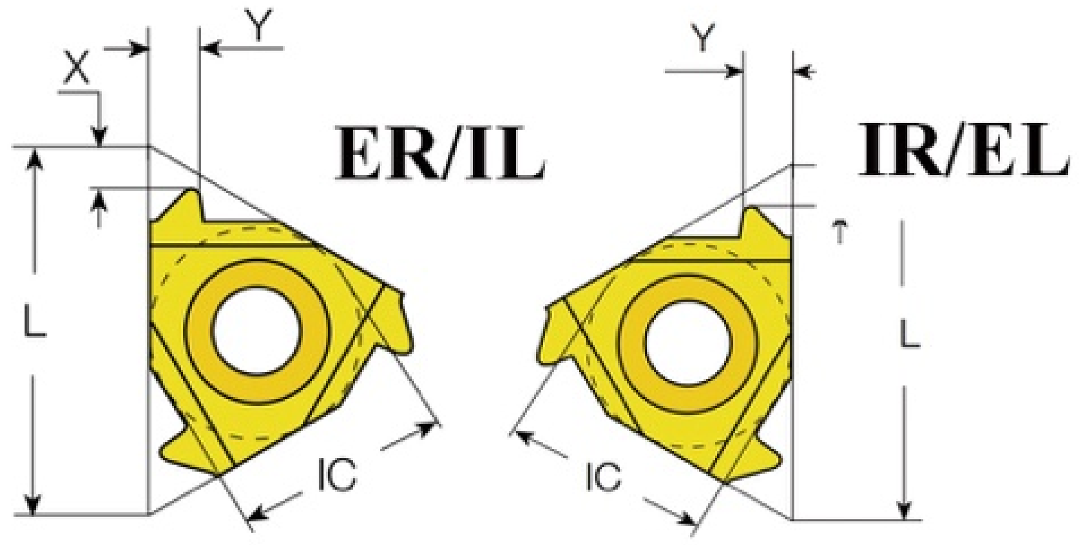
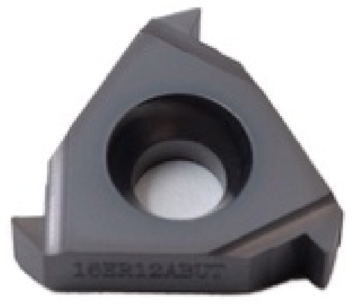
THREAD INSERT

American Buttress Thread Insert (7°/45°) ABUT

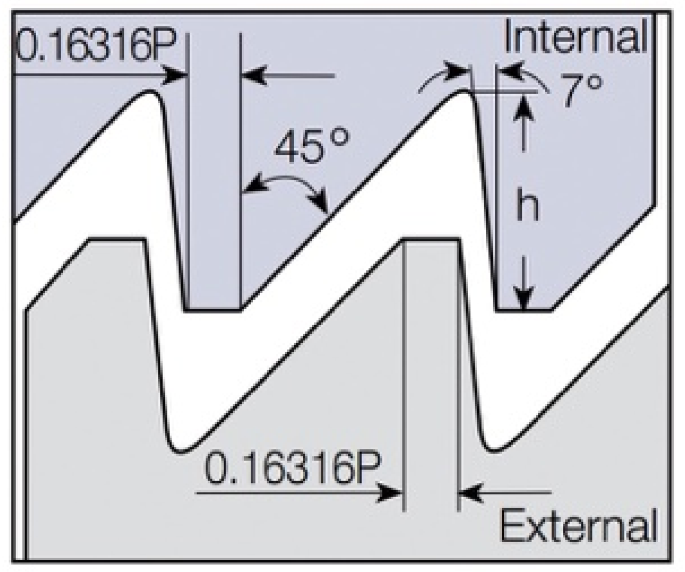


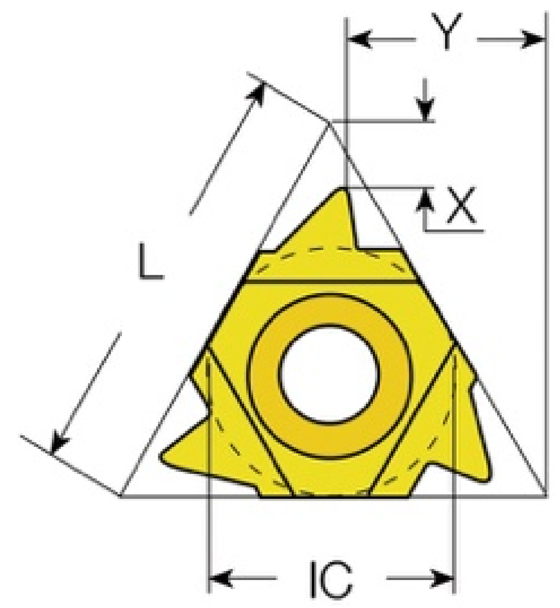


Insert Shape	I. C.	Pitch	External		L	X	Y
		TPI	Right-hand	Left-hand			
External 	1/4"	20	11ER20ABUT	11EL20ABUT	11	1.0	1.3
		16	11ER16ABUT	11EL16ABUT		1.0	1.5
	3/8"	20	16ER20ABUT	16EL20ABUT	16	1.0	1.3
		16	16ER16ABUT	16EL16ABUT		1.0	1.5
		12	16ER12ABUT	16EL12ABUT		1.4	2.0
		10	16ER10ABUT	16EL10ABUT		1.5	2.3
	1/2"	8	22ER8ABUT	22EL8ABUT	22	2.1	3.3
		6	22ER6ABUT	22EL6ABUT		2.1	3.4

Insert Shape	I. C.	Pitch	Internal		L	X	Y
		TPI	Right-hand	Left-hand			
Internal 	1/4"	20	11IR20ABUT	11IL20ABUT	11	1.0	1.3
		16	11IR16ABUT	11IL16ABUT		1.0	1.5
	3/8"	20	16IR20ABUT	16IL20ABUT	16	1.0	1.3
		16	16IR16ABUT	16IL16ABUT		1.0	1.5
		12	16IR12ABUT	16IL12ABUT		1.4	2.0
		10	16IR10ABUT	16IL10ABUT		1.5	2.3
	1/2"	8	22IR8ABUT	22IL8ABUT	22	2.1	3.3
		6	22IR6ABUT	22IL6ABUT		2.1	3.4

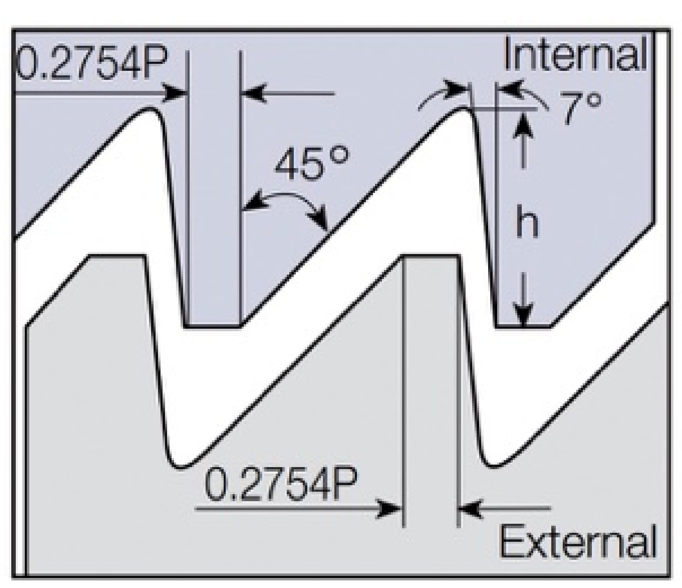
American Buttress Thread Insert (7°/45°)   ABUT U-Type

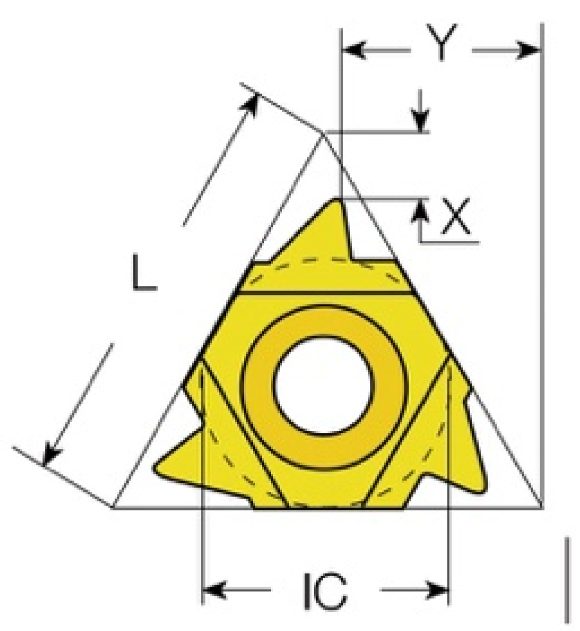




Insert Shape	I.C.	Pitch TPI	External Right and Left	Internal Right and Left	L	X	Y
	1/2"U	4	22U ER4ABUT 22U EL4ABUT	22U IR4ABUT 22U IL4ABUT	22	2.3	9.5
	5/8"U	3	27U ER3ABUT 27U EL3ABUT	27U IR3ABUT 27U IL3ABUT	27	3.1	11.7

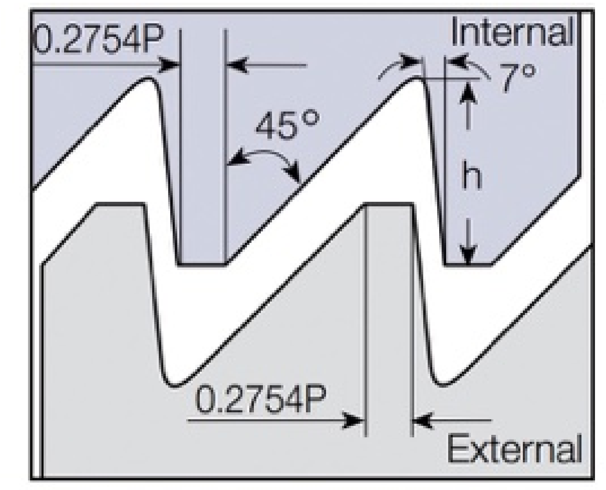
British Buttress Thread Insert (7°/45°)   BBUT   U-Type

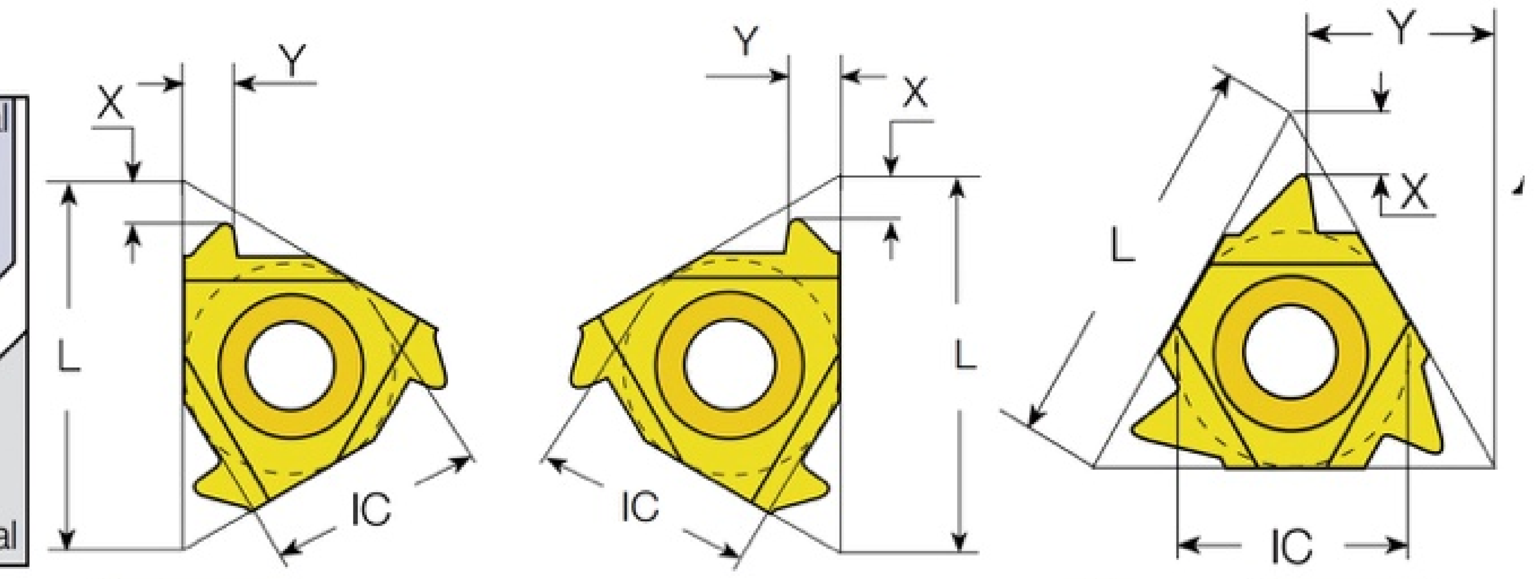




Insert Shape	I.C.	Pitch TPI	External Right and Left	Internal Right and Left	L	X	Y
	1/2"U	4	22U ER4BBUT 22U EL4BBUT	22U IR4BBUT 22U IL4BBUT	22	2.3	9.5
	5/8"U	3	27U ER3BBUT 27U EL3BBUT	27U IR3BBUT 27U IL3BBUT	27	3.1	11.7

British Buttress Thread Insert (7°/45°)   BBUT

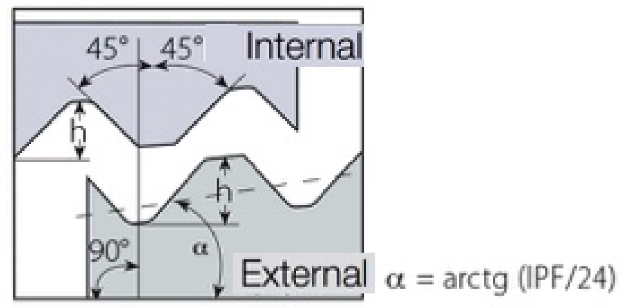


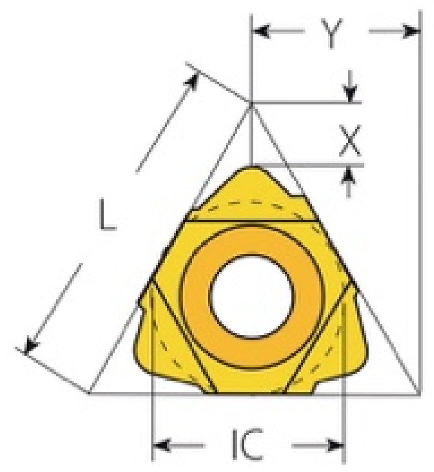


Insert Shape	I.C.	Pitch TPI	External Right-hand	External Left-hand	L	X	Y
External 	1/4"	20	11ER20BBUT	11EL20BBUT	11	1.0	1.3
		16	11ER16BBUT	11EL16BBUT		1.0	1.5
	3/8"	20	16ER20BBUT	16EL20BBUT	16	1.0	1.3
		16	16ER16BBUT	16EL16BBUT		1.0	1.5
		12	16ER12BBUT	16EL12BBUT		1.4	2.0
		10	16ER10BBUT	16EL10BBUT		1.5	2.3
	1/2"	8	22ER8BBUT	22EL8BBUT	22	2.1	3.3
		6	22ER6BBUT	22EL6BBUT		2.1	3.4
	1/2"U	4	22UER4BBUT	22UEL4BBUT	22	2.3	9.5
	5/8"U	3	27UER3BBUT	27UEL3BBUT	27	3.1	11.7

Insert Shape	I.C.	Pitch TPI	Internal Right-hand	Internal Left-hand	L	X	Y
Internal 	1/4"	20	11IR20BBUT	11IL20BBUT	11	1.0	1.3
		16	11IR16BBUT	11IL16BBUT		1.0	1.5
	3/8"	20	16IR20BBUT	16IL20BBUT	16	1.0	1.3
		16	16IR16BBUT	16IL16BBUT		1.0	1.5
		12	16IR12BBUT	16IL12BBUT		1.4	2.0
		10	16IR10BBUT	16IL10BBUT		1.5	2.3
U Type 	1/2"	8	22IR8 BBUT	22IL8 BBUT	22	2.1	3.3
		6	22IR6 BBUT	22IL6 BBUT		2.1	3.4
	1/2"U	4	22UIR4BBUT	22UIL4BBUT		2.3	9.5
	5/8"U	3	27UIR3BBUT	27UIL3BBUT	27	3.1	11.7

Hughes Special Thread H-90

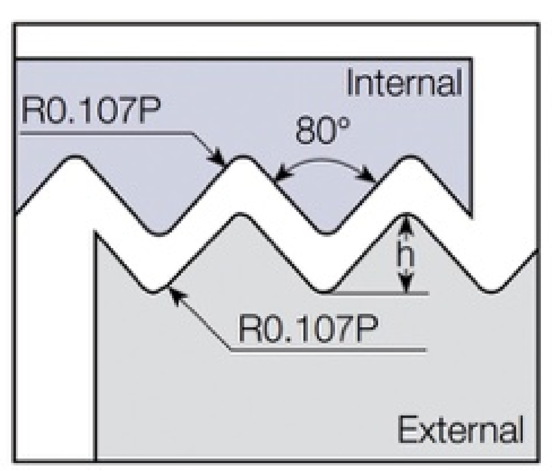


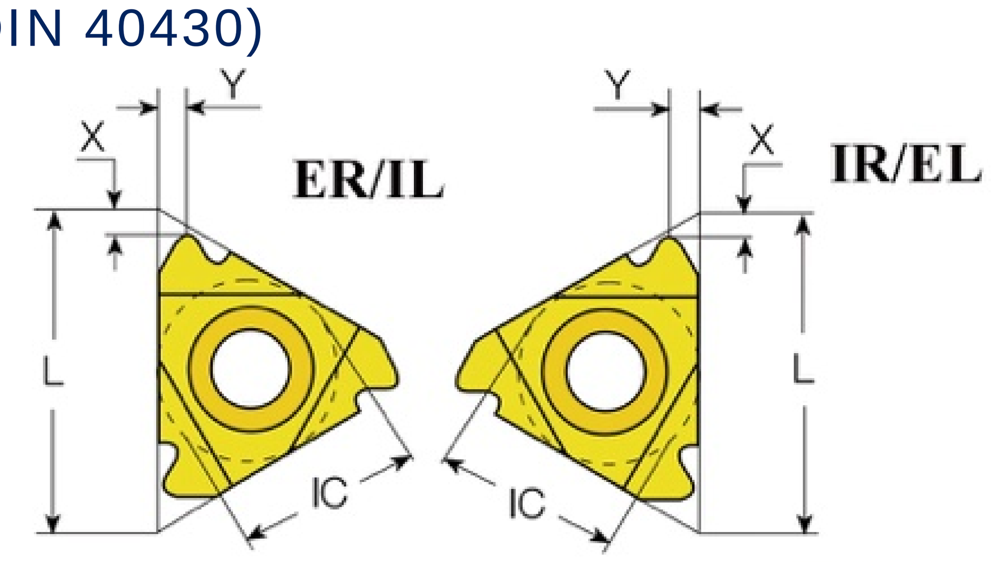


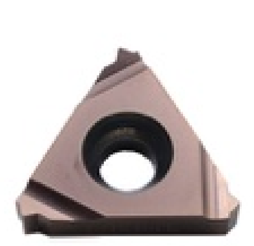
Standard: American API thread STD, 5B:1979.
Tolerance grade standard.

Insert Shape	I.C.	Pitch TPI	External Right-hand	External	L	X	Y
External 	1/2"U	3.5	22UER3.5H902	31/2"～65/8"	22	4.2	11
		3.5	22UER3.5H903	7"～85/8"		4.2	11
	5/8"U	3	27UER3H90	23/8"～31/2"	27	5.5	13.5
Internal 	1/2"U	3.5	22UIR3.5H902	31/2"～65/8"	22	4.2	11
		3.5	22UIR3.5H903	7"～85/8"		4.2	11
	5/8"U	3	27UIR3H90SL	23/8"～31/2"	27	5.5	13.5

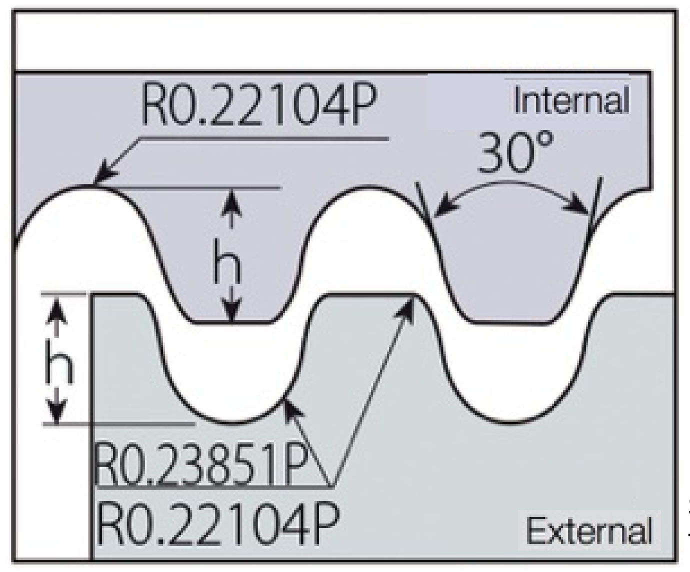
German Steel Conduit Thread 80° PG (DIN 40430)



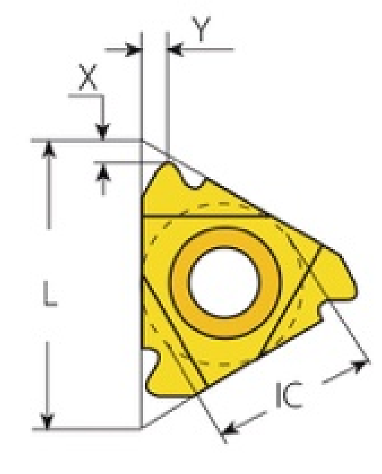


Insert Shape	I.C.	Pitch TPI	Model External	Model Internal		L	X	Y
	3/16"	20		08IR20PG	PG7	08	0.8	0.9
	1/4"	20	11ER20PG	11IR20PG	PG7	11	0.8	0.9
		18	11ER18PG	11IR18PG	PG9/11/13.5/16	11	0.8	1.0
		16	11ER16PG	11IR16PG	PG21/29/36/42/48	11	0.9	1.1
	3/8"	20	16ER20PG	16IR20PG	PG7	16	0.8	0.9
		18		16IR18PG	PG11/13.5/16	16	0.8	1.0
		18	16ER18PG		PG9/11/13.5/16	16	0.8	1.0
		16	16ER16PG	16IR16PG	PG21/29/36/42/48	16	0.9	1.1

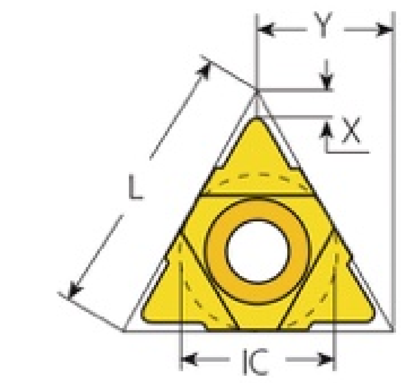
Round Thread 30° (DIN 20400)



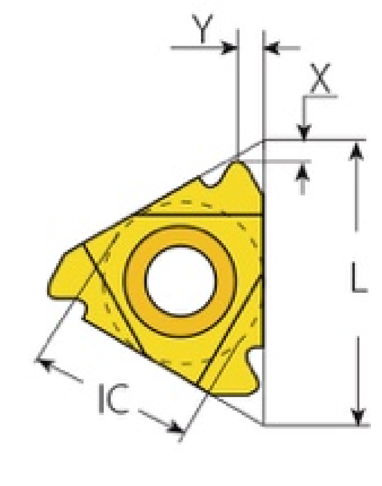
Standard: DIN 20400.
Tolerance class standard.



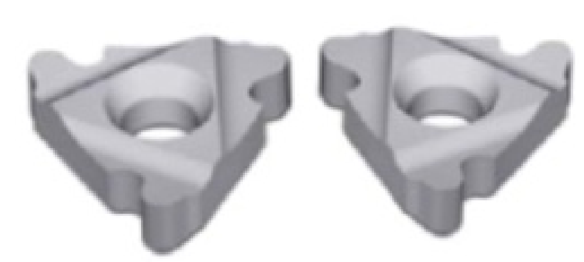
Standard Type



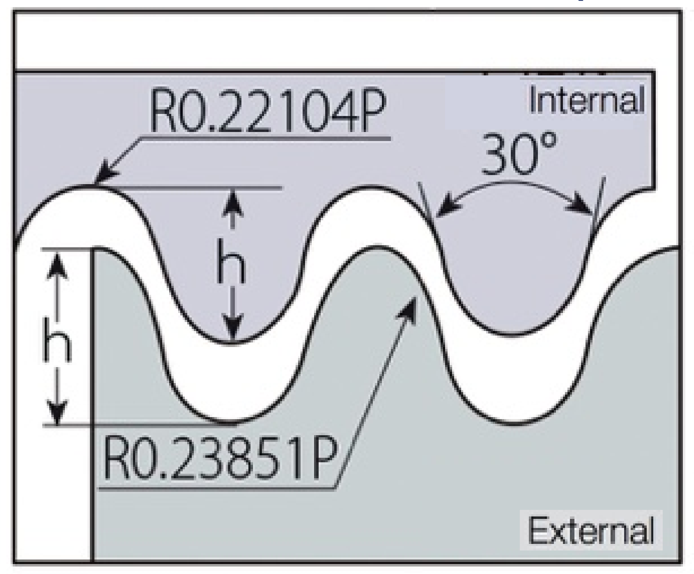
U Type



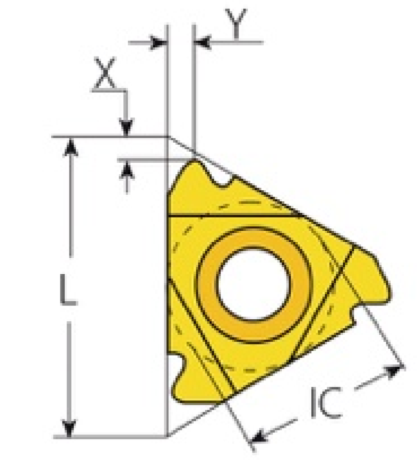
Standard type

Insert Shape	I.C.	Pitch mm	Model External	Model Internal	L	X	Y
	1/2"	4.0	22ER4.0 RD20400	22IR4.0 RD20400	22	1.4	1.4
		5.0	22ER5.0 RD20400	22IR5.0 RD20400	22	1.7	1.8
		6.0	22ER6.0 RD20400	22IR6.0 RD20400	22	1.7	2.0
	5/8"U	8.0	*27U -8.0RD20400	*27U -8.0RD20400	33	3.0	13.7

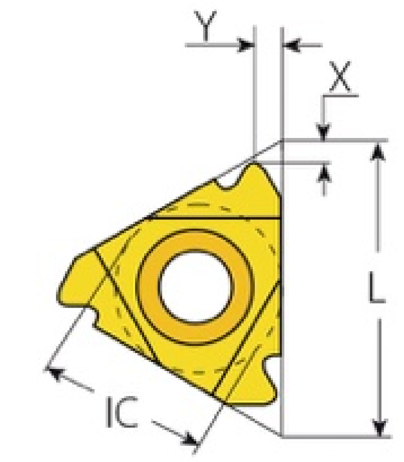
Round Thread 30° (DIN 405)



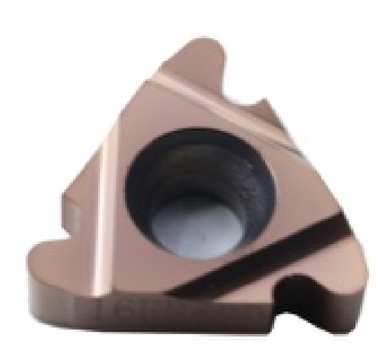
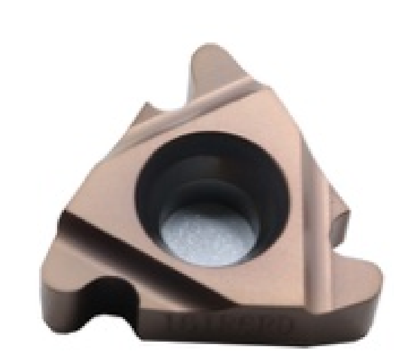
Standard DIN 405.
Tolerance class: 7h/7H.



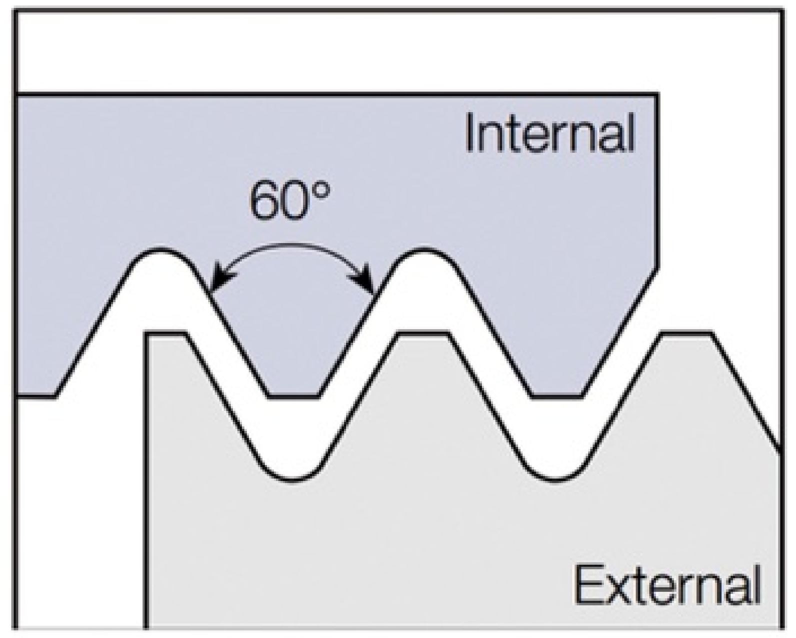
Standard Type

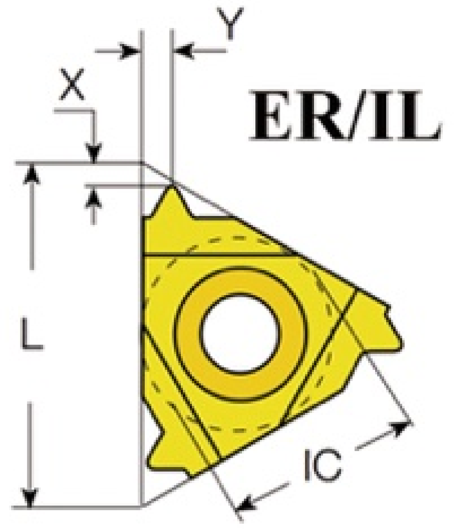


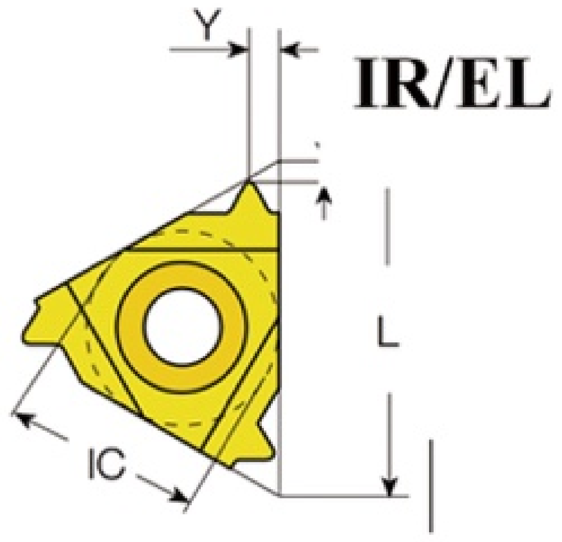
Standard Type

Insert Shape	I.C.	Pitch mm	Model External	Model Internal	L	X	Y
 		6.0	16ER6RD405	16IR6RD405	16	1.4	1.4
		8.0	16ER8RD405	16IR8RD405	16	1.2	1.3
		10.0	16ER10RD405	16IR10RD405	16	1.1	1.2
	1/2"	4.0	22ER4RD405	22IR4RD405	22	2.0	2.1
		5.0	22ER5RD405	22IR5RD405	22	1.6	1.7
		6.0	22ER6RD405	22IR6RD405	22	1.45	1.45
		4.0	27ER4RD405	27IR4RD405	27	2.0	2.1

Pressed M-Class Thread



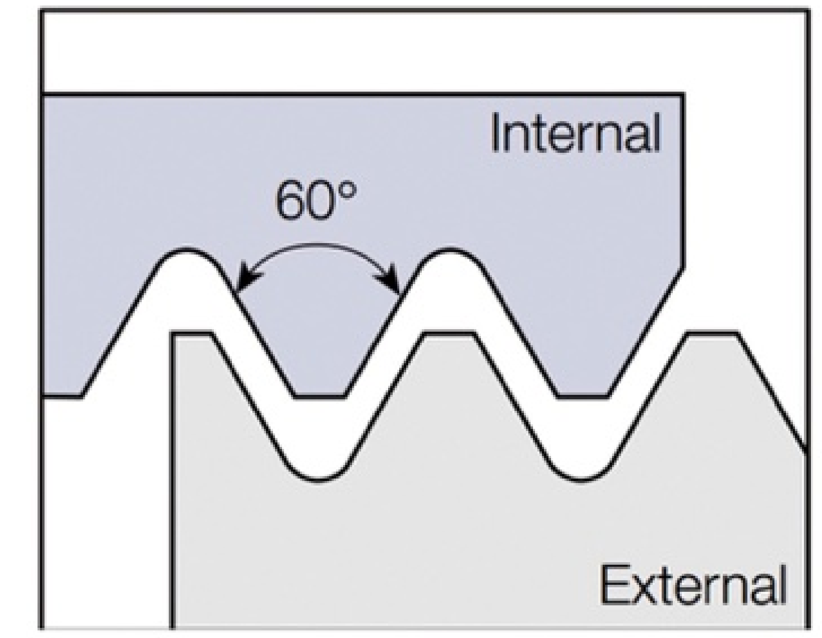


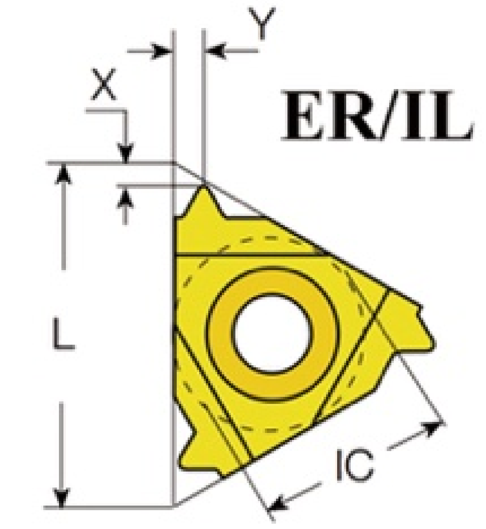


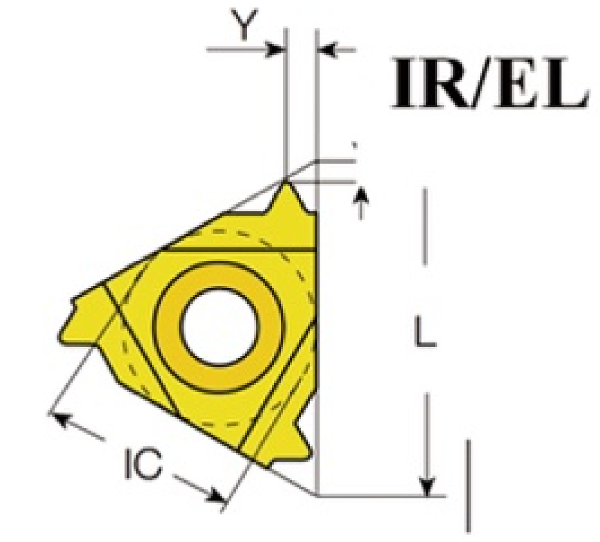
Insert Shape	Model	Size(mm)				Pitch	
		I.C.	L	X	Y	mm	TPI
 	11IRA60	1/4	11	0.6	0.8	0.5-1.5	48-16
	11IR1.0ISO	1/4	11	0.8	0.8	1.00	25
	11IR1.5ISO	1/4	11	0.8	0.8	1.50	16
	11IR2.0ISO	1/4	11	0.8	0.8	2.00	12
	16E/IRAG55	3/8	16	0.6	0.7	0.5-1.5	48-16
	16E/IRAG60	3/8	16	1.2	1.7	0.5-3.0	48-8
	16E/IR1.0ISO	3/8	16	0.6	0.7	1.00	25
	16E/IR1.5ISO	3/8	16	0.8	1.0	1.50	16
	16E/IR2.0ISO	3/8	16	1.0	1.3	2.00	12
	16E/IR2.5ISO	3/8	16	1.1	1.5	2.50	10
	16E/IR3.0ISO	3/8	16	1.1	1.5	3.00	8
	16E/IR11.5NPT	3/8	16	0.8	1.0	2.21	11.5
	16E/IR14NPT	3/8	16	0.8	1.0	1.81	14
	16E/IR11BSPT	3/8	16	1.1	1.5	2.31	11
	16E/IR14BSPT	3/8	16	1.0	1.2	1.81	14
	16E/IR11W	3/8	16	1.1	1.5	2.31	11
	16E/IR14W	3/8	16	1.0	1.2	1.81	14
	22E/IRN60	1/2	22	1.8	2.5	3.5-5.0	7-5
	22ER/IR4.0ISO	1/2	22	2.0	2.5	4.00	
	22ER/IR5.0ISO	1/2	22	1.8	2.5	5.00	
	22ER/IR6.0ISO	1/2	22	2.2	3.2	6.00	

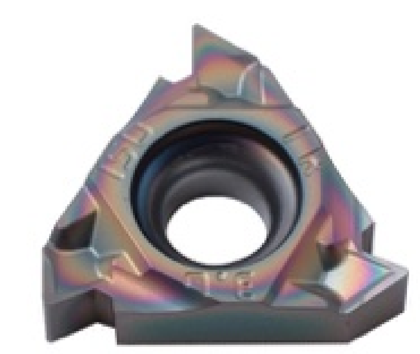
THREAD INSERT
WEIKEDUO

Pressed Precision-Ground Class Thread

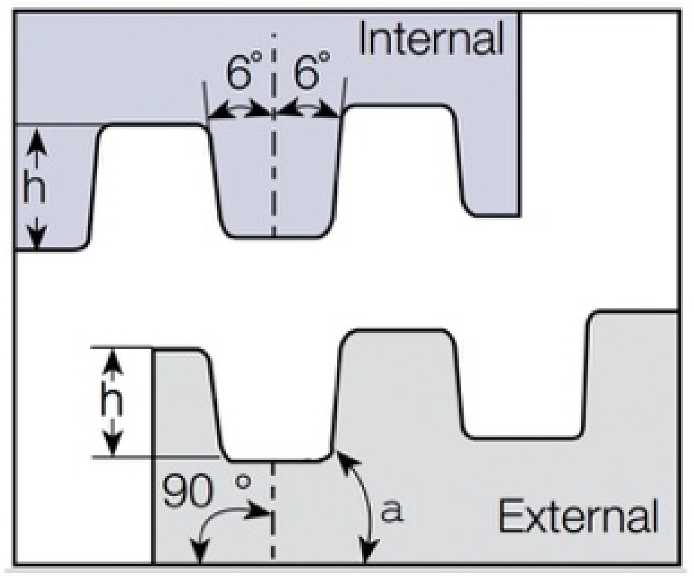


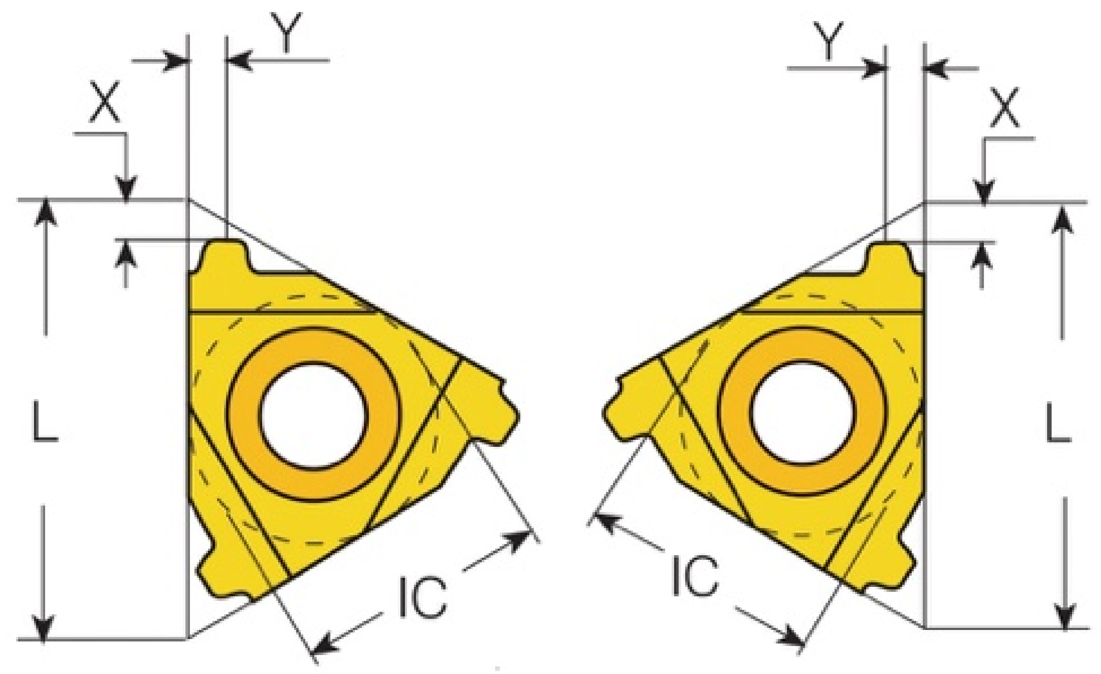




Insert Shape	Model	Size(mm)				Pitch	
		I.C.	L	X	Y	mm	TPI
 	11IRA60-SL	1/4	11	0.6	0.8	0.5-1.5	48-16
	11IRA55-SL	1/4	11	0.6	0.8	0.5-1.5	48-16
	16ER/IRA55-SL	3/8	16	0.8	0.9	0.5-1.5	48-16
	16ER/IRA60-SL	3/8	16	0.8	0.9	0.5-1.5	48-18
	16ER/IRG55-SL	3/8	16	1.5	1.7	1.75-3.0	14-8
	16ER/IRG60-SL	3/8	16	1.5	1.7	1.75-3.0	14-8
	16E/IRAG55-SL	3/8	16	0.6	0.7	0.5-1.5	48-16
	16E/IRAG60-SL	3/8	16	1.2	1.7	0.5-3.0	48-8
	16E/IR1.0ISO-SL	3/8	16	0.6	0.7	1.00	25
	16E/IR1.25ISO-SL	3/8	16	0.8	0.8	1.25	20
	16E/IR1.5ISO-SL	3/8	16	0.8	1.0	1.50	16
	16E/IR1.75ISO-SL	3/8	16	1.2	1.5	1.75	14
	16E/IR2.0ISO-SL	3/8	16	1.0	1.3	2.00	12
	16E/IR2.5ISO-SL	3/8	16	1.1	1.5	2.50	10
	16E/IR3.0ISO-SL	3/8	16	1.1	1.5	3.00	8
	16E/IR11.5NPT-SL	3/8	16	0.8	1.0	2.21	11.5
	16E/IR14NPT-SL	3/8	16	0.8	1.0	1.81	14
	16E/IR11BSPT-SL	3/8	16	1.1	1.5	2.31	11
	16E/IR14BSPT-SL	3/8	16	1.0	1.2	1.81	14
	16E/IR11W-SL	3/8	16	1.1	1.5	2.31	11
	16E/IR14W-SL	3/8	16	1.0	1.2	1.81	14

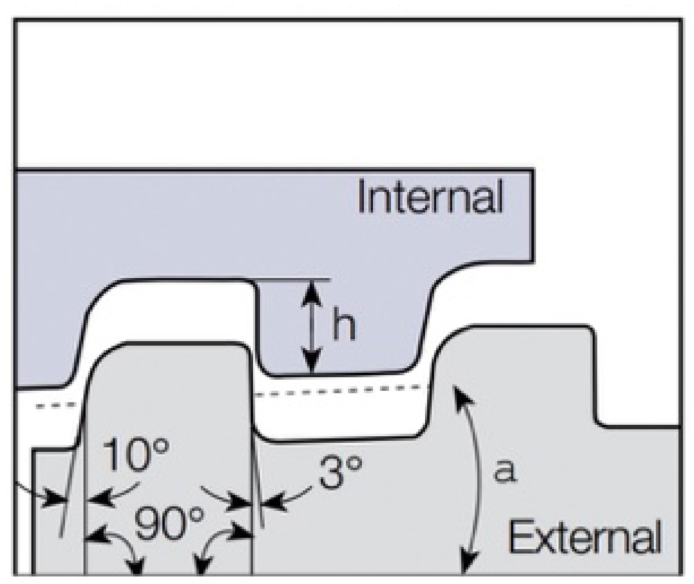
API-EL Thread

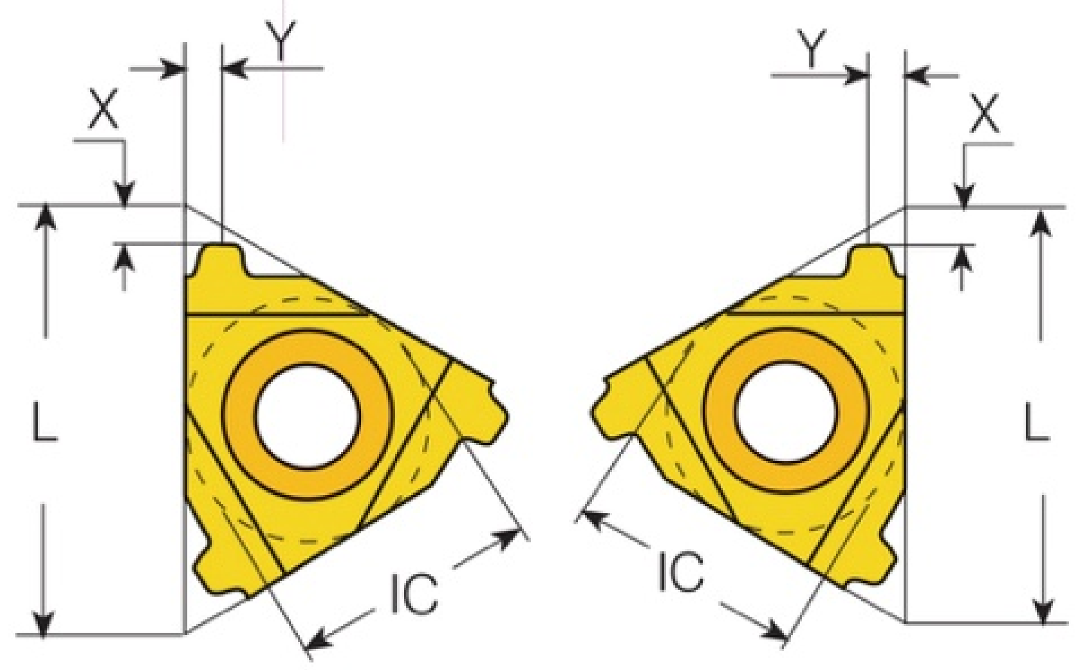




TPI	L	I. C	Taper	External	Internal	X	Y	Connection size
6	22	1/2"	1.5	22ER6EL1.5	22IR6EI1.5	1.9	1.9	4～75/8
5	22	1/2"	1.25	22ER5EL1.25	22IR5EL1.25	2.4	2.3	85/8～103/4

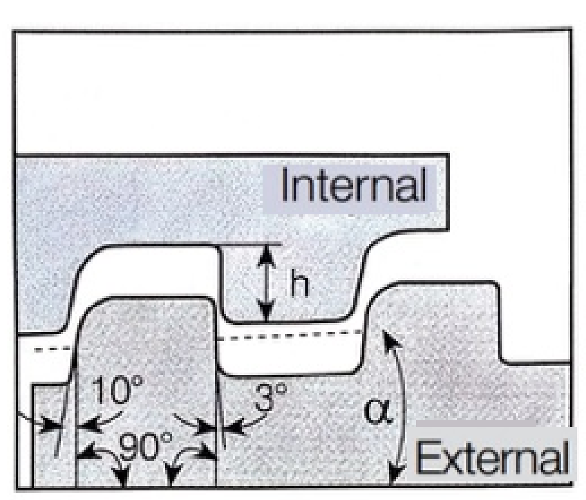
Petroleum Pipe Thread, BUT Type

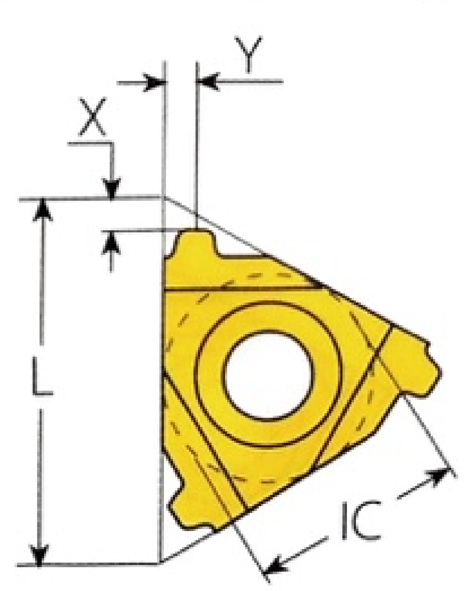




TPI	L	I. C	Taper	External	Internal	X	Y	Connection size
5	22	5/8"	0.75	22ER5BUT0.75	22IR5BUT0.75	2.2	2.4	41/2～133/8
5	22	5/8"	1.0	22ER5BUT1.0	22IR5BUT1.0	2.3	2.4	16～20

VAM Thread

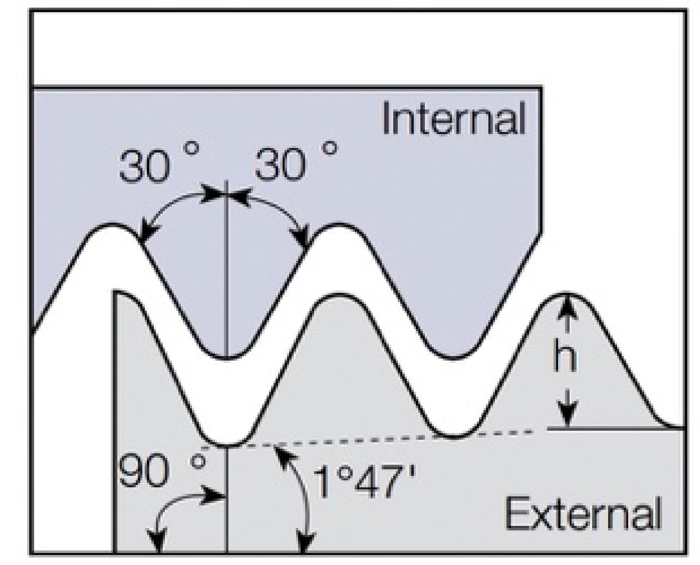


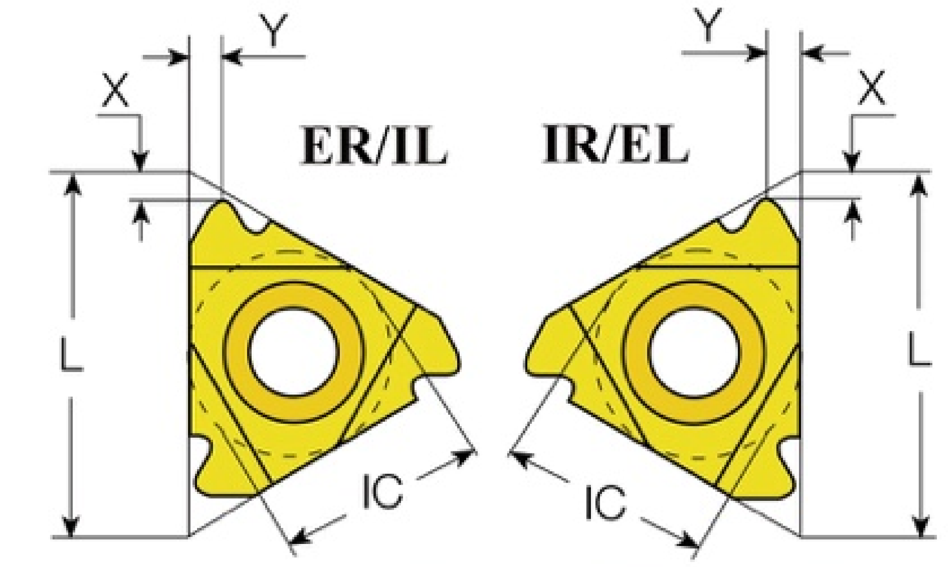


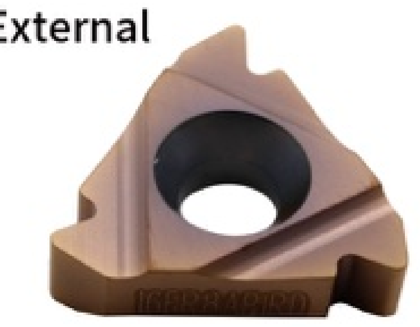
L	I. C	TPI	Taper	External	Internal	X	Y
16	3/8"	8	0.75	16ER8VAM	16IR8VAM	1.8	1.8
22	1/2"	6	0.75	22ER6VAM	22IR6VAM	2.3-2.5	2.3-2.5
22	1/2"	5	0.75	22ER5VAM	22IR5VAM	2.3	2.3-2.5

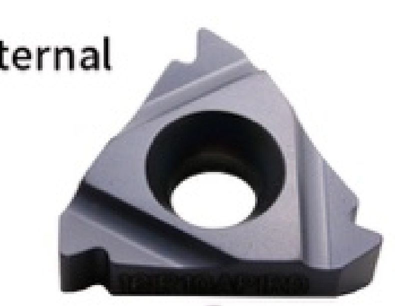
KVD WEIKEDUO
PETROLEUM PIPE THREAD INSERT SERIES

API Round Casing & Tubing Thread 60° Full Form

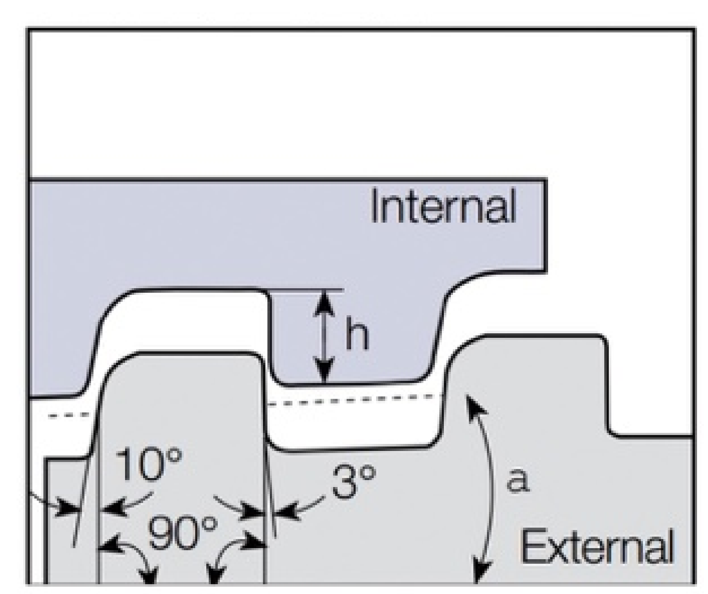


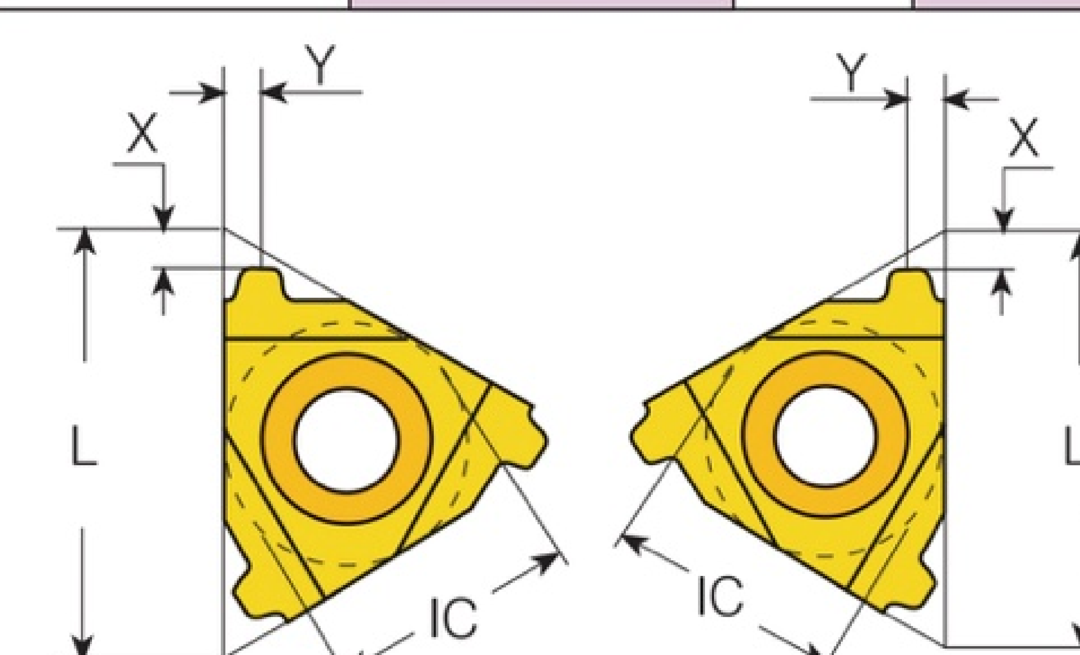


Insert Shape	I.C.	Pitch	External		L	X	Y
		TPI	Right-hand	Left-hand			
External 	3/8"	10	16ER10 API RD	16EL10 API RD	16	1.1	1.2
		8	16ER8 API RD	16EL8 API RD		1.4	1.3
	1/2"	10	22ER10 API RD	22EL10 API RD	22	1.5	1.7
		8	22ER8 API RD	22EL8 API RD		2.2	2.3

Insert Shape	I.C.	Pitch	Internal		L	X	Y
		TPI	Right-hand	Left-hand			
Internal 	3/8"	10	16IR10 API RD	16IL10 API RD	16	1.1	1.2
		8	16IR8 API RD	16IL8 API RD		1.4	1.4
	1/2"	10	22IR10 API RD	22IL10 API RD	22	1.5	1.7
		8	22IR8 API RD	22IL8 API RD		2.2	2.3

Petroleum Pipe Thread, BUT Type



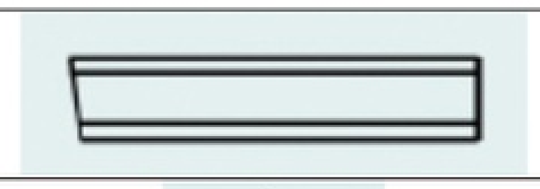
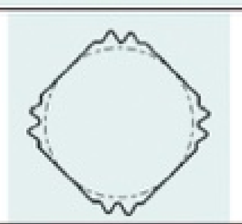
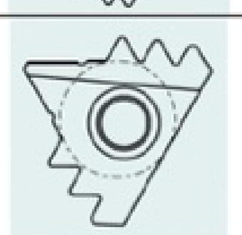


TPI	L	I. C	Taper	External	Internal	X	Y	Connection size
5	16.5	3/8"	0.75	16ER5BUT0.75	16IR5BUT0.75	1.3	1.5	41/2～133/8
5	16.5	3/8"	1.0	16ER5BUT1.0	16IR5BUT1.0	1.3	1.5	16～20

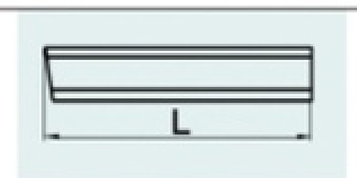
Oil pipe thread insert model preparation instructions

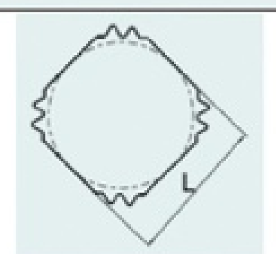
B	17	V	E	R	8	RD	2	--	3	
1	2	3	4	5	6	7	8		9	10

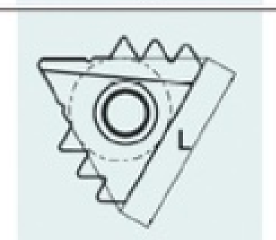
1. Insert style orused for machine tools

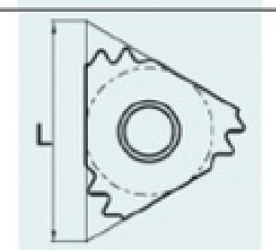
L prism	
S square and rectangle	
B butterfly	
T trangle	
R parallelogram	
P Used for PMC machine tools(USA) C Used for Colinet machine tools(Belgium)	

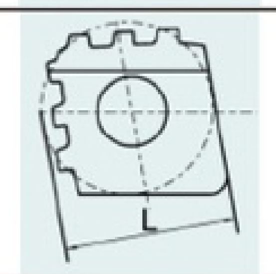
2. Insert size (mm)











3. Insert Style

U: Horizontal Centering Thread Insert

V: Vertical Threaded Insert

: Nothing means others

4. Type of cutting

E(external)

I(internal)

5. Hand of tools

R Right-handed

L Left-handed

6. Pitch

4:	4TPI
5:	5TPI
6 :	6TPI
8 :	8TPI
10 :	10TPI

7. Thread Standard

RD : API For API Round

BU : API For API Buttress

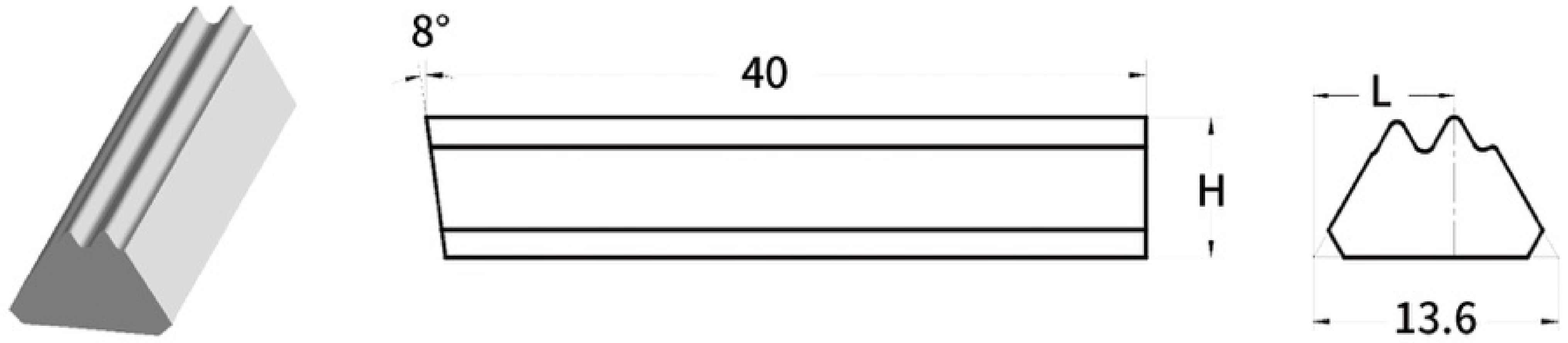
G : API For API LineType

8. Edges of the insert

9. Teeth of the edge

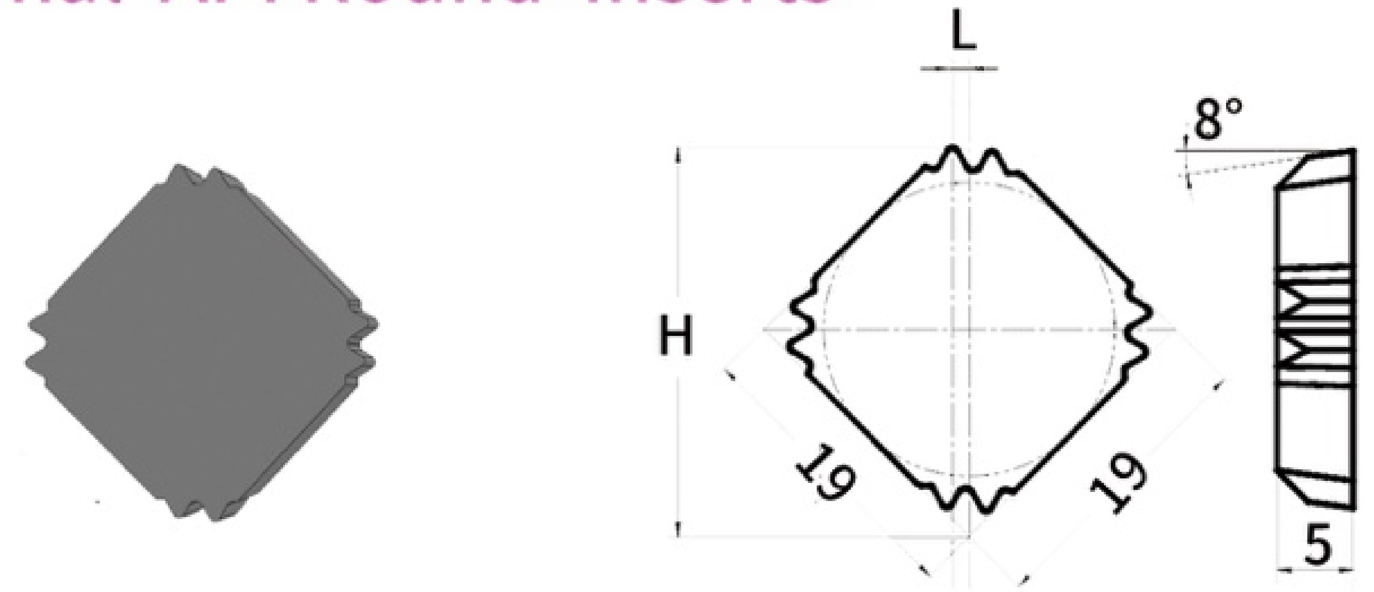
10. Sequence NO. of the Insert

External API Round Inserts



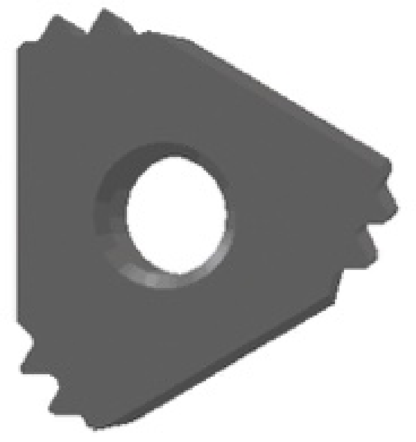
Model	TPI	Taper	H	L
L40VER8RD1-2	8	1:16	7.7	7.85
L40VER10RD1-2	10	1:16	7.7	7.2

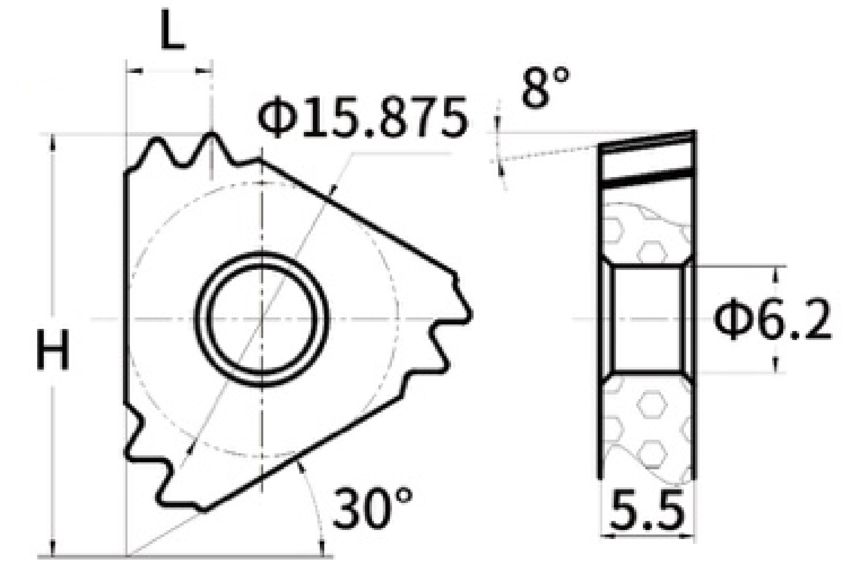
INternal API Round Inserts



Model	TPI	Taper	H	L	Chipbreaker
S19IR8RD4-2	8	1:16	25	1.35	M10(8)N4-DXQ
S19IR10RD4-2	10	1:16	25.2	1.1	M10(8)N4-DXQ

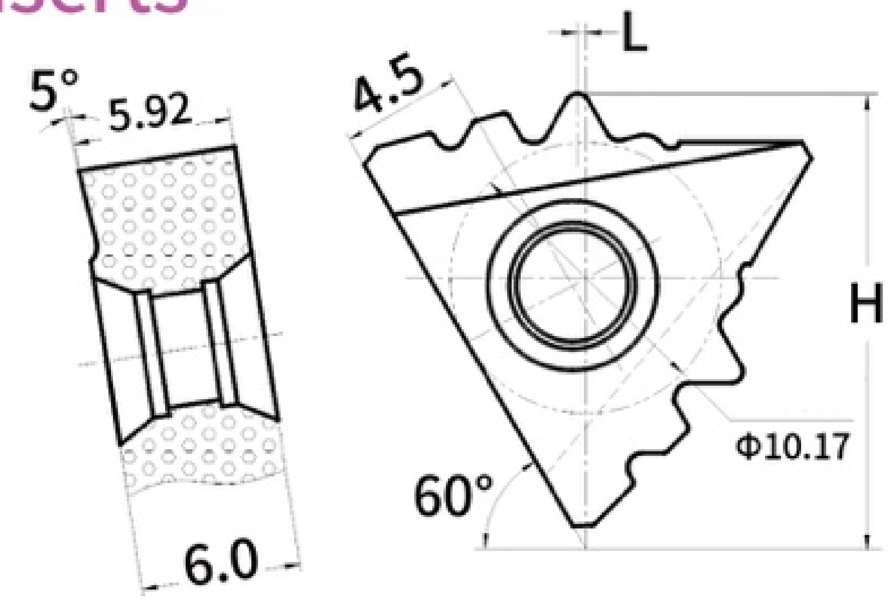
Double-Start External Round Thread Cutter for Oil Tubing and Casing





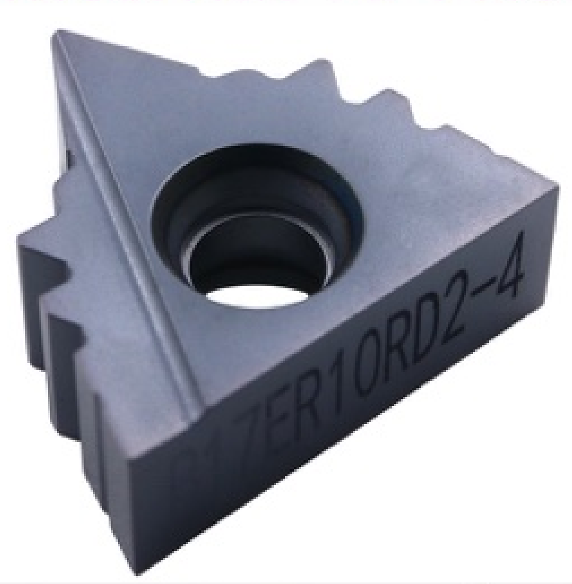
Model	TPI	Taper	H	L	Chipbreaker
T27IR8RD3-2	8	1:16	24.3	5.0	J10(8)N3-DXQ
T27IR10RD3-2	10	1:16	24.5	4.7	J10(8)N3-DXQ

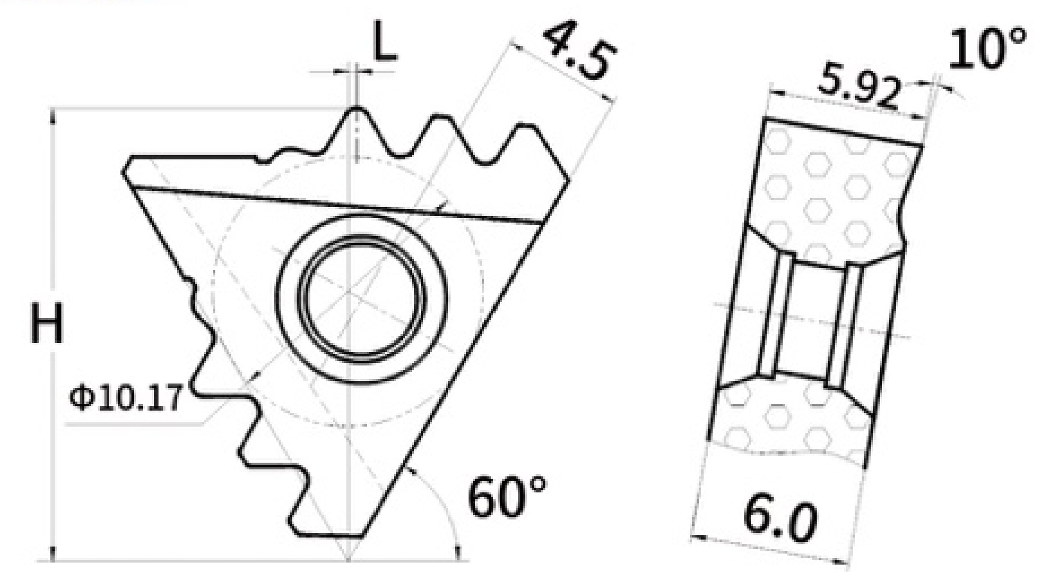
External API Round Inserts



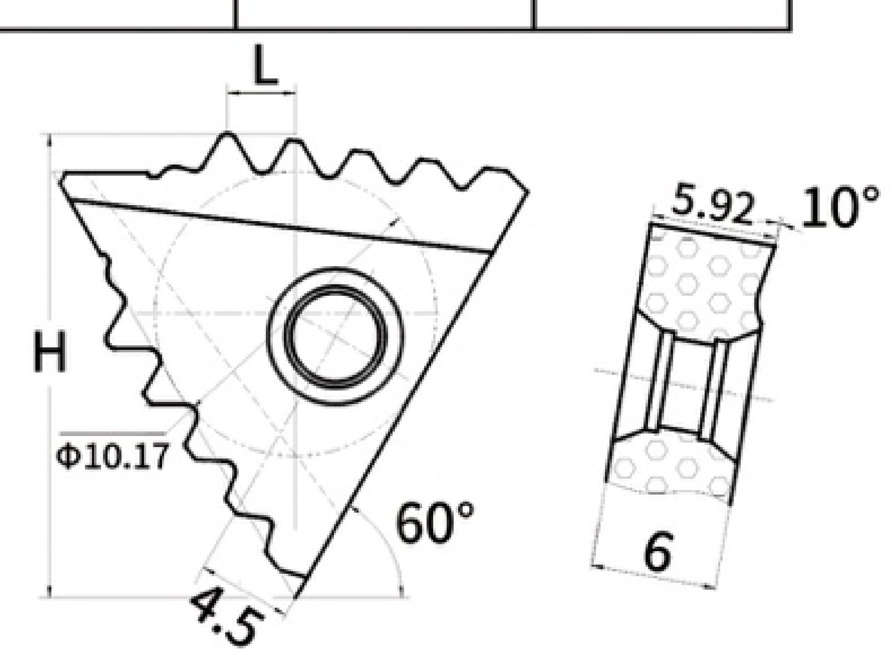
Model	TPI	Taper	H	L
B17ER8RD2-3(15°)	8	1:16	17.09	0.32
B17ER8RD2-3(12°)	8	1:16	17.09	0.32
B17ER10RD2-4	10	1:16	17.09	0.01

Internal API Round Inserts



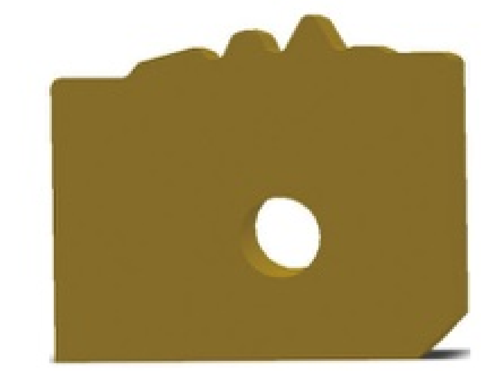


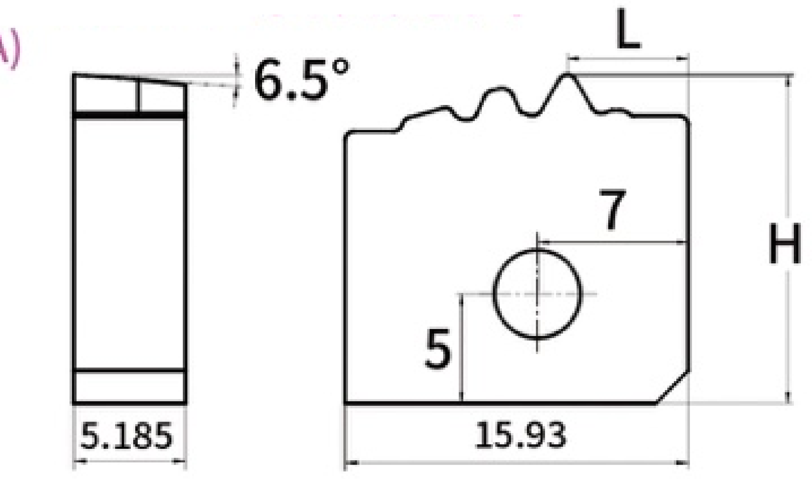
Model	TPI	Taper	H	L
B17IR8RDN2-3	8	1:16	17.09	0.32
B17IR10RDN2-4	10	1:16	17.09	0.01



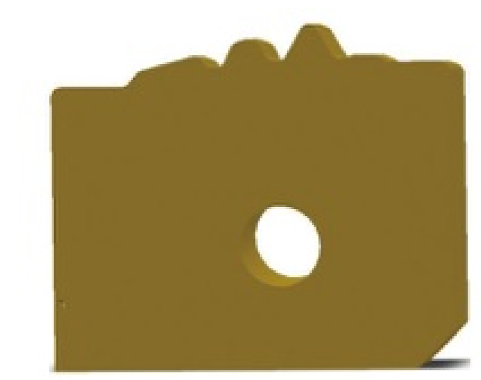
Model	TPI	Taper	H	L
B23IR8RD2-5	8	1:16	21.84	3.24

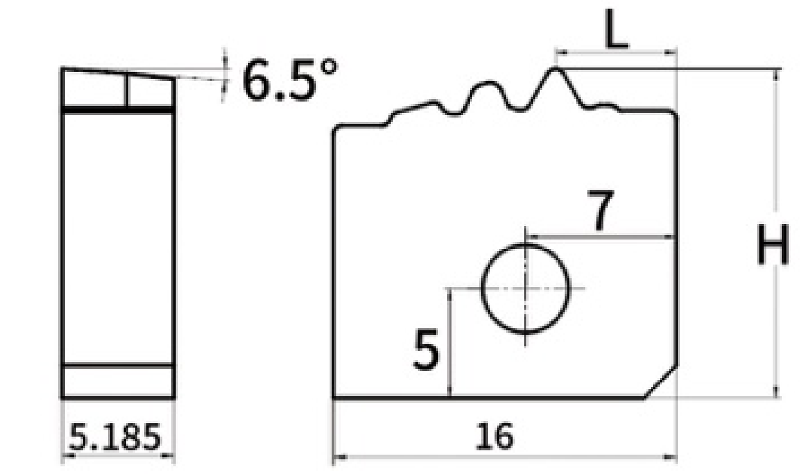
External API Round Inserts for PMC Machine Tools(USA)





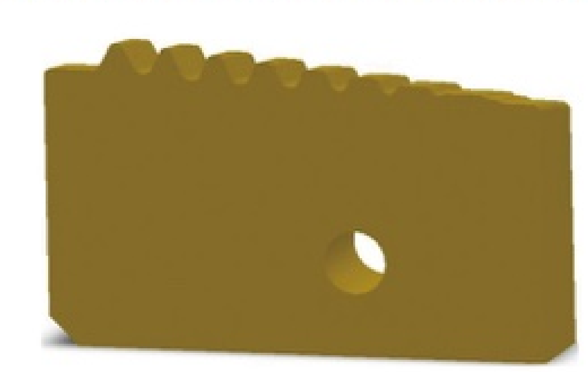
Model	TPI	Taper	H	L	Chipbreaker
P16ER8RD1-31(12°)	8	1:16	14.7	7.72	XP8W1-31、XP8W1B
P16ER8RD1-32(12°)	8	1:16	14.96	6.67	XP8W1-32、XP8W1B
P16ER8RD1-33(12°)	8	1:16	15.04	5.61	XP8W1-33、XP8W1B
P16ER8RD1-31(15°)	8	1:16	14.71	7.72	XP8W1-31、XP8W1B
P16ER8Rd1-32(15°)	8	1:16	14.96	6.67	XP8W1-32、XP8W1B
P16ER8RD1-33(15°)	8	1:16	15.04	5.61	XP8W1-33、XP8W1B

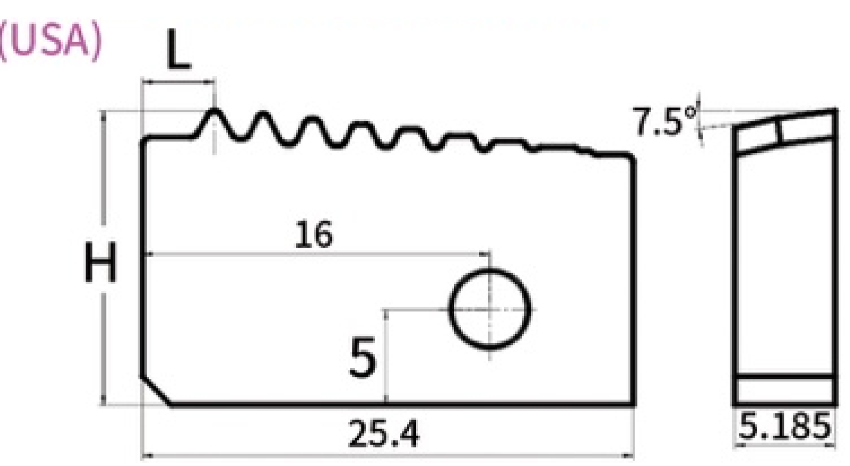




Model	TPI	Taper	H	L	Chipbreaker
P16ER10RD1-31	10	1:16	14.315	7.3	XP10W1-31、XP10W1B
P16ER10RD1-32	10	1:16	14.57	6.46	XP10W1-32、XP10W1B
P16ER10RD1-33	10	1:16	14.65	5.61	XP10W1-33、XP10W1B

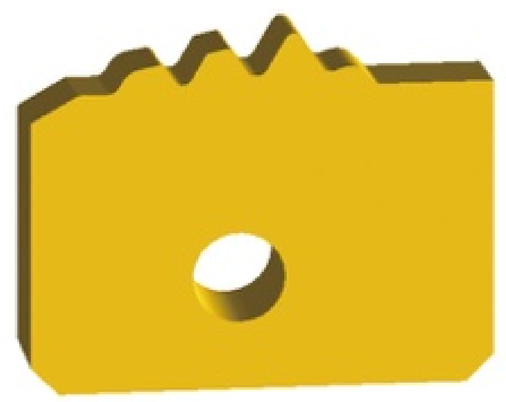
Internal API Round Inserts for PMC Machine Tools(USA)

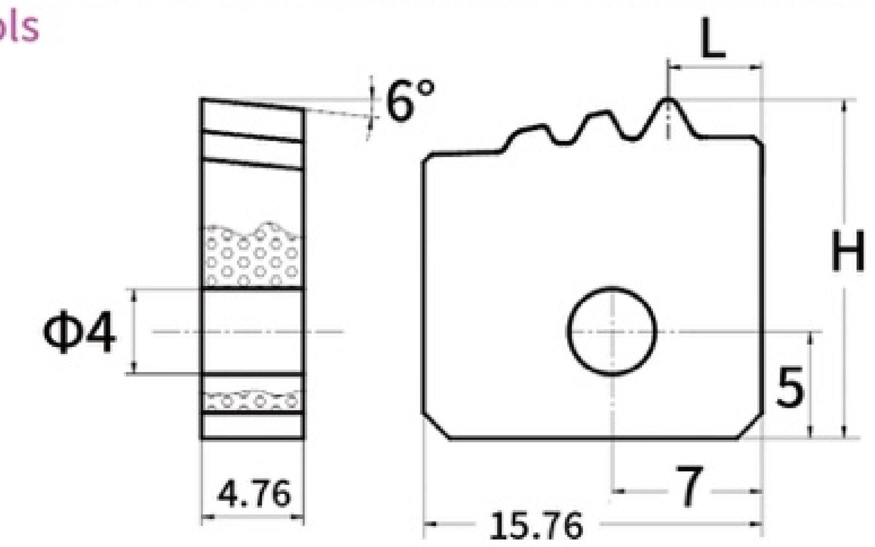




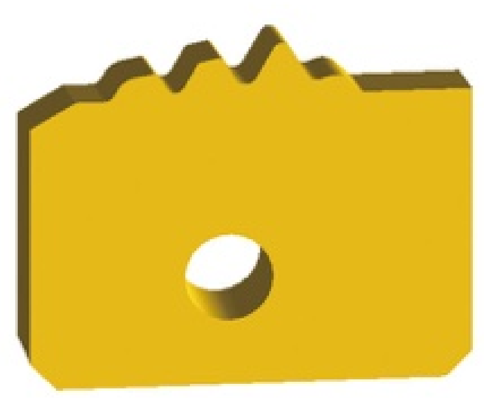
Model	TPI	Taper	H	L	Chipbreaker
P25IR10RD1-8	10	1:16	15.34	3.7	XP10I1-8、BXPQN1C
P25IR8RD1-7	8	1:16	15.715	3.7	XP8I1-7、XP8I1-7A XP8I1-7B、BXPQN1C

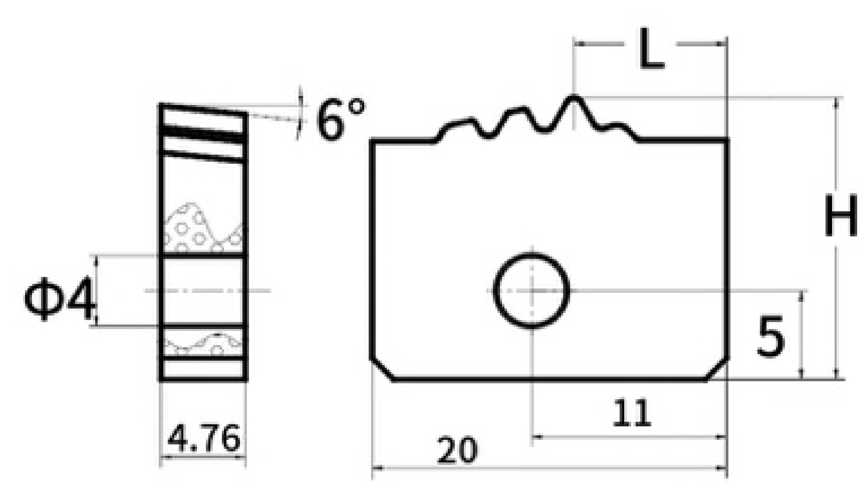
External API Round Inserts for Colinet Machine Tools



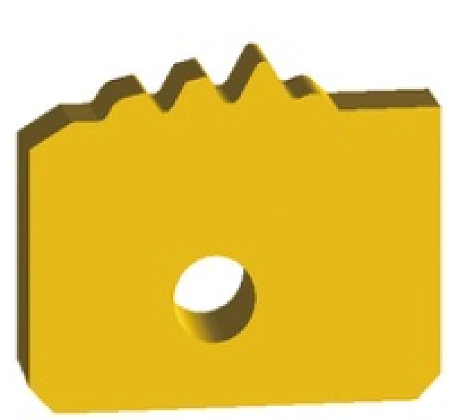


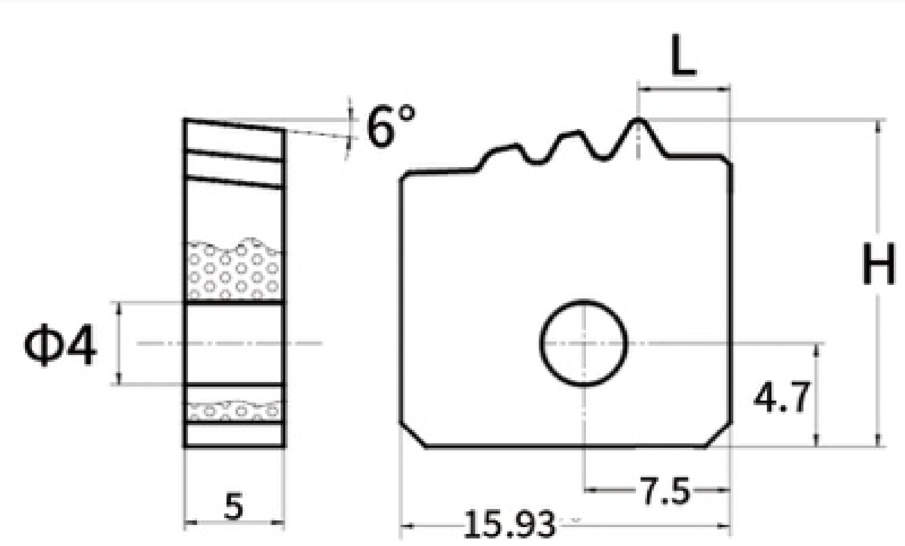
Model	TPI	Taper	H	L	Chipbreaker
C16ER8RD1-31 (15°)	8	1:16	15.54	5.98	BXCQW1BI
C16ER8RD1-32 (15°)	8	1:16	15.86	4.393	BXCQW1BI
C16ER10RD1-31	10	1:16	15.16	5.67	BXCQW1BI
C16ER10RD1-32	10	1:16	15.45	4.4	BXCQW1BI





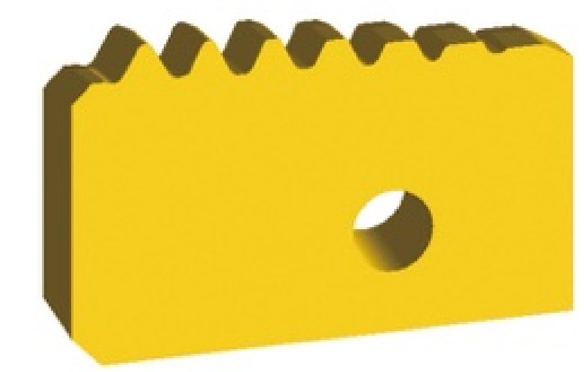
Model	TPI	Taper	H	L	Chipbreaker
C20ER8RD1-31 (12°)	8	1:16	15.6	10.2	BXCQW1BII
C20ER8RD1-32 (12°)	8	1:16	15.9	8.61	BXCQW1BII

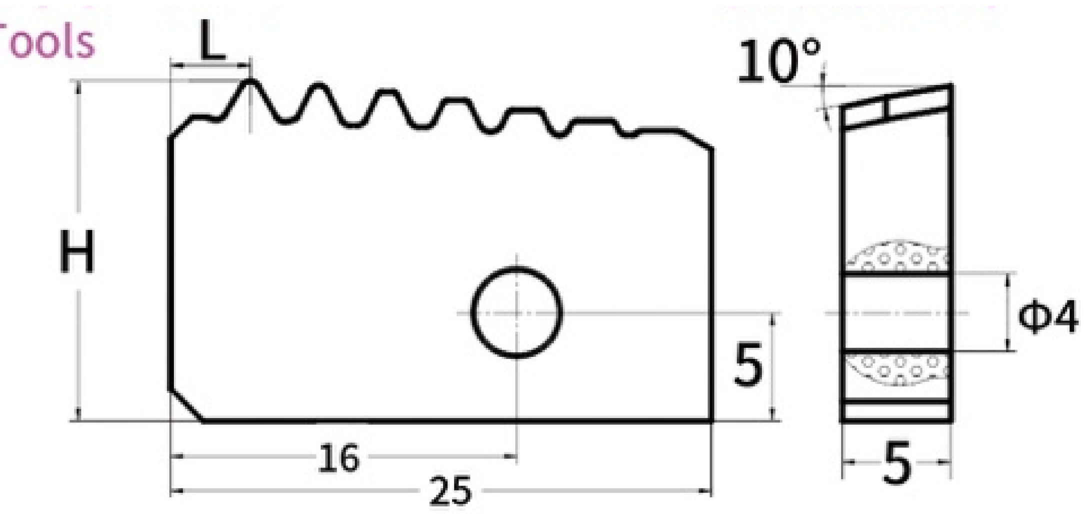




Model	TPI	Taper	H	L	Chipbreaker
C16ER8RD1-3	8	1:16	15.75	4.4	BXCQW1BI
C16ER10RD1-4	10	1:16	15.75	2.5	BXCQW1BI

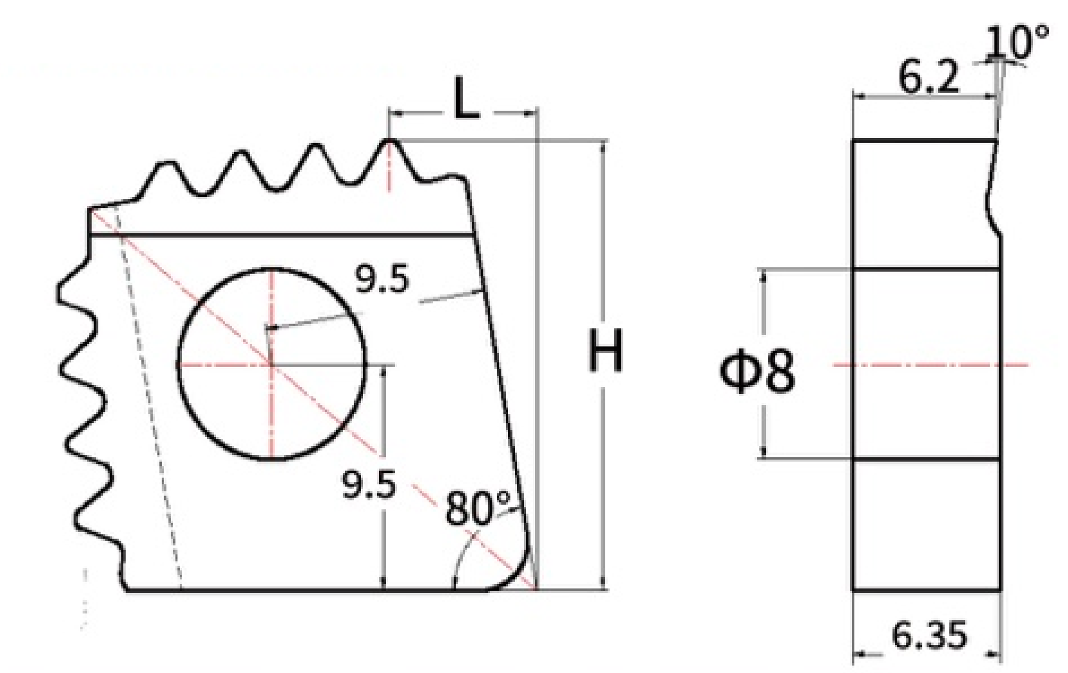
Internal API Round Inserts for Colinet Machine Tools





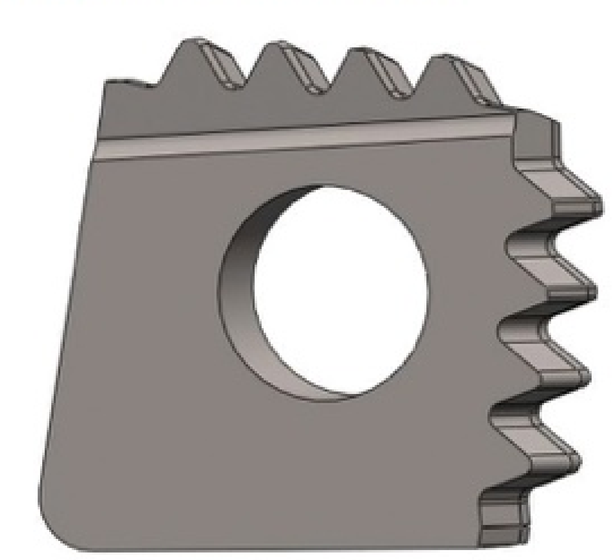
Model	TPI	Taper	Thread Type	H	L	Chipbreaker
C25IR8RD1-7	8	1:16	API Round Thread Casing	15.715	3.7	XCQN1BIII
C25IR10RD1-8	10	1:16	API Round Thread Tubing	15.49	2.5	XCQN1BIII

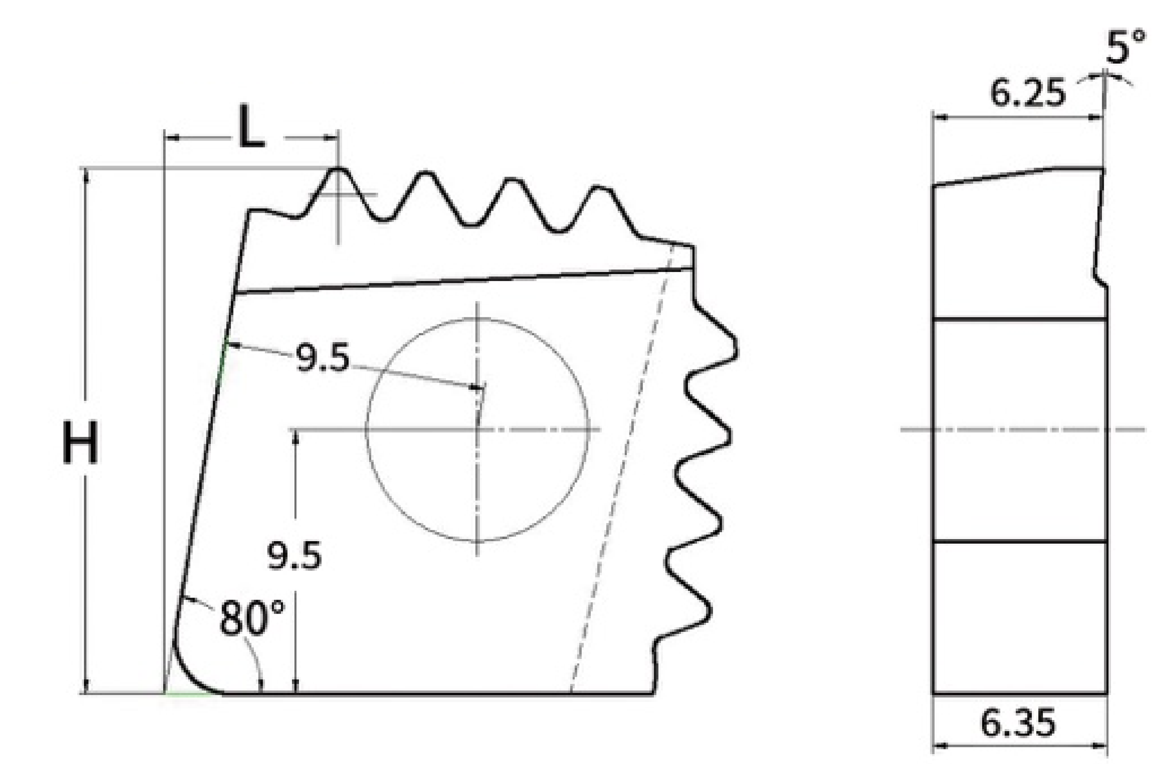
External API Round Inserts



Model	TPI	Taper	H	L
R19ER8RD2-4	8	1:16	18.93	6.29
R19ER10RD2-4	10	1:16	18.93	6.29

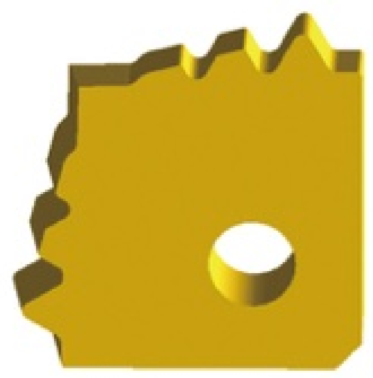
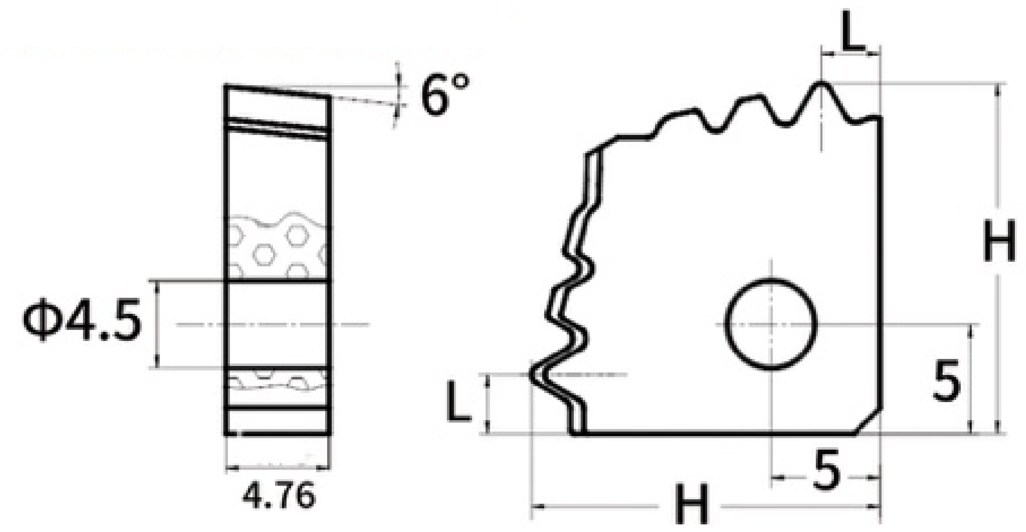
Internal API Round Insert



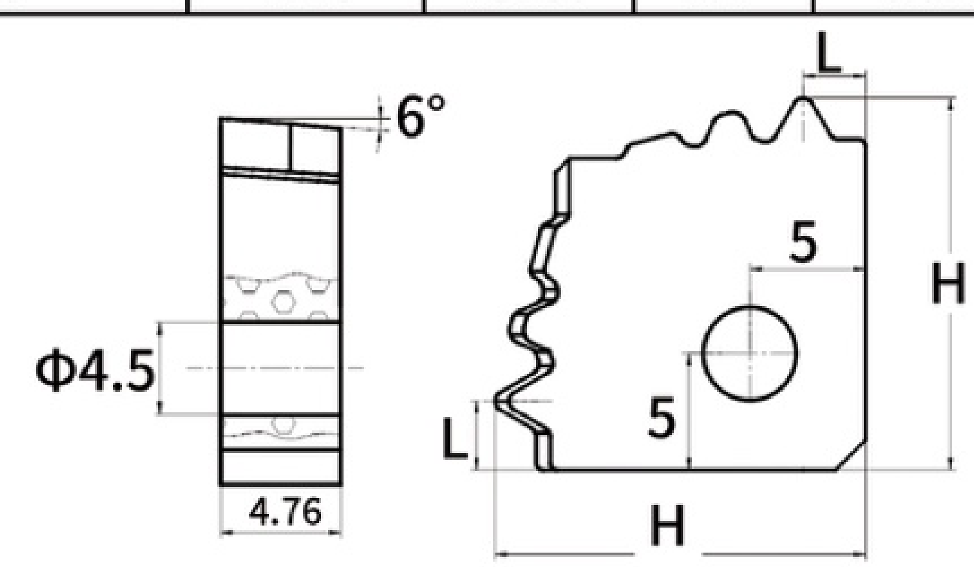


Model	TPI	Taper	H	L
R19IR8RD2-4	8	1:16	18.93	6.29
R19IR10RD2-4	10	1:16	18.93	6.29

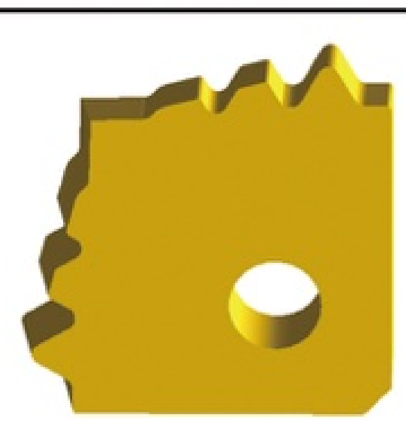
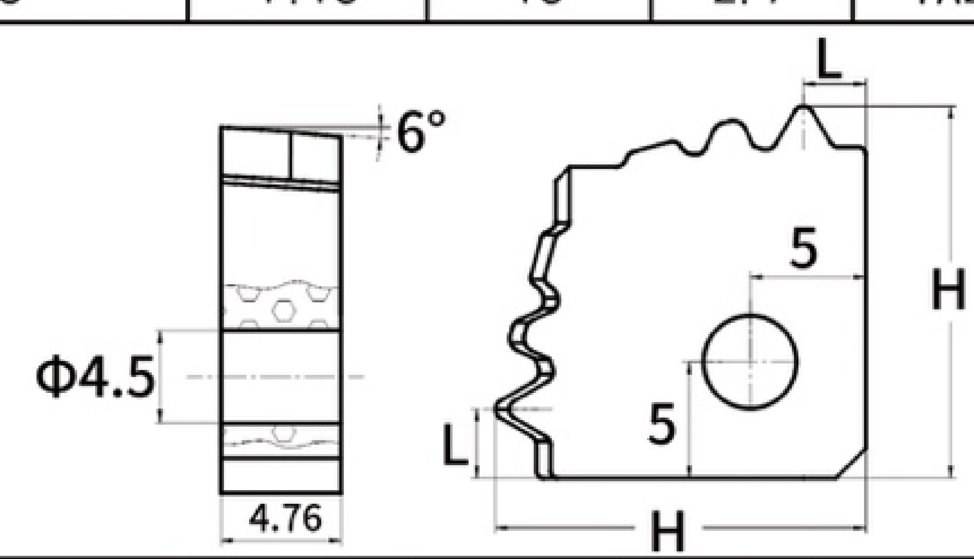
External API Round Insert

Model	TPI	Taper	H	L	Chipbreaker
S16ER10RD2-31	10	1:16	15.3	3.97	TA2118B
S16ER10RD2-32	10	1:16	15.59	2.7	TA2118B
S16ER8RD2-31 (15°)	8	1:16	15.54	4.29	TA2118B
S16ER8RD2-32 (15°)	8	1:16	15.86	2.7	TA2118B
S16ER8RD2-31 (12°)	8	1:16	15.54	4.29	TA2118B
S16ER8RD2-32 (12°)	8	1:16	15.86	2.7	TA2118B

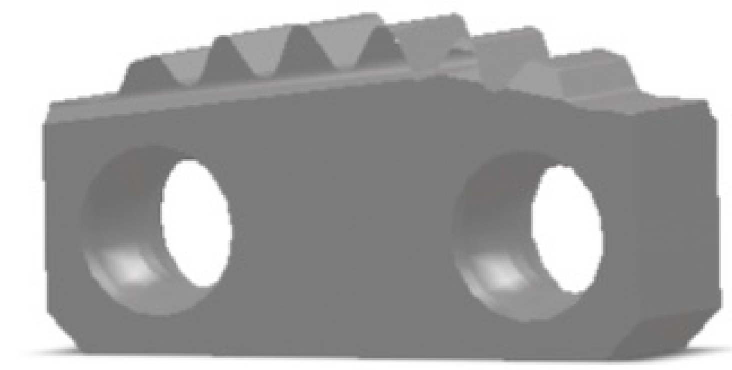
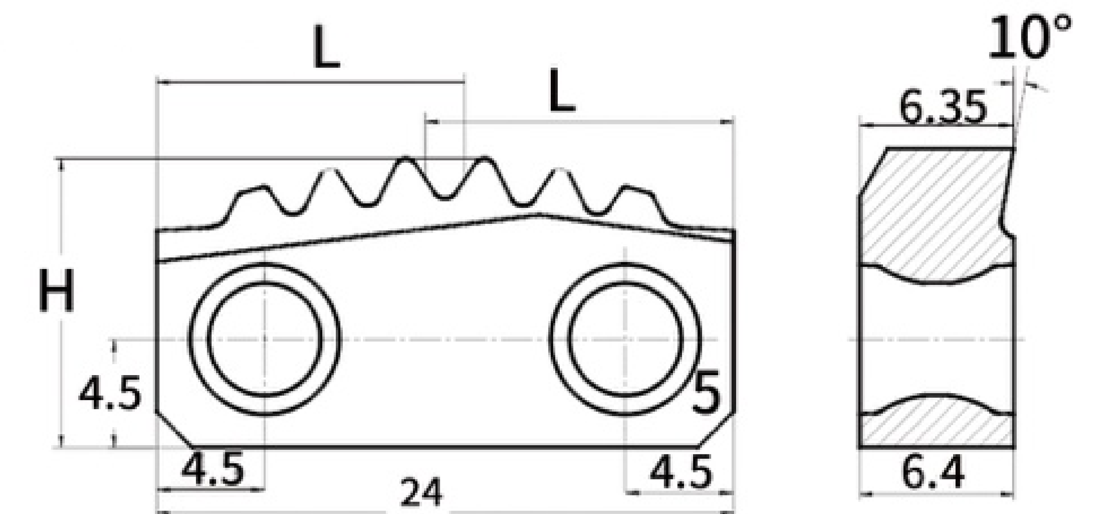
Model	TPI	Taper	H	L	Chipbreaker
S16ER10RD2-31	10	1:16	15.2	4.39	TA2118B
S16ER10RD2-32	10	1:16	15.53	3.547	TA2118B
S16ER10RD2-33	10	1:16	15.6	2.7	TA2118B
S16ER8RD2-31 (15°)	8	1:16	15.67	4.817	TA2118B
S16ER8RD-32 (15°)	8	1:16	15.92	3.76	TA2118B
S16ER8RD2-33 (15°)	8	1:16	16	2.7	TA2118B

Model	TPI	Taper	H	L	Chipbreaker
S16ER10RD2-4	10	1:16	15.6	2.7	TA2118B
S16ER8RD2-3 (15°)	8	1:16	16.0	2.7	TA2118B

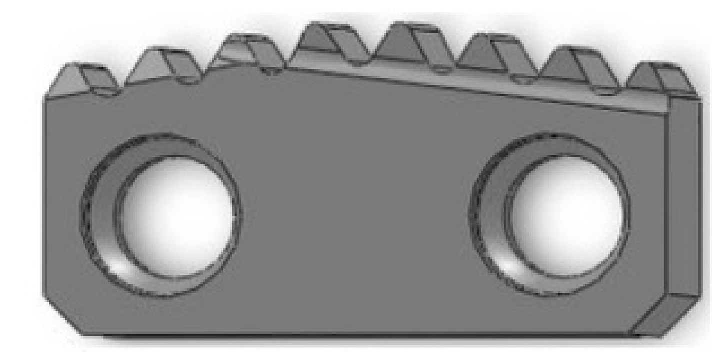
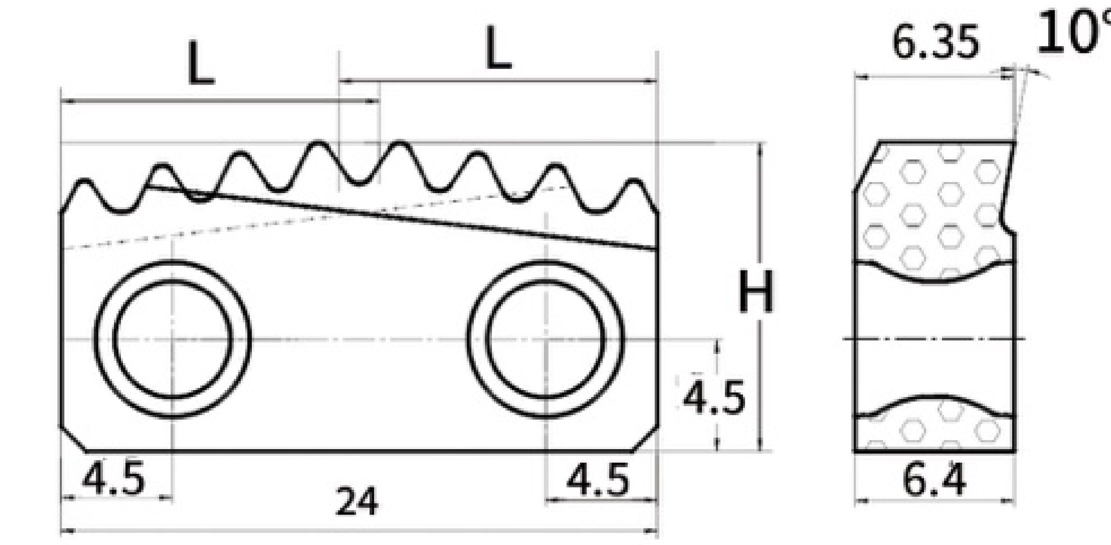
WEIKEDUO
PETROLEUM PIPE THREAD INSERT SERIES

External API Round Inserts

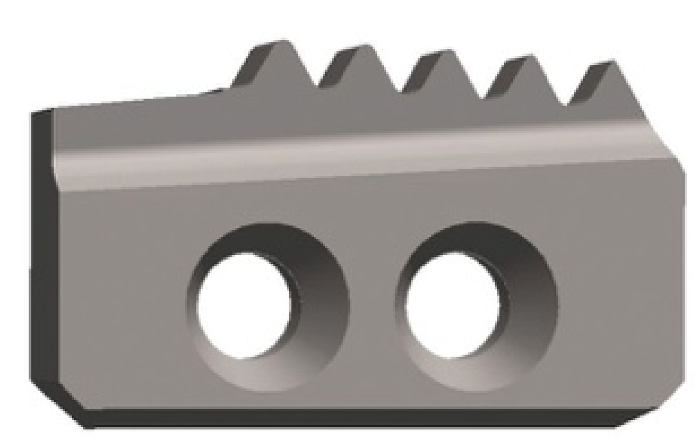
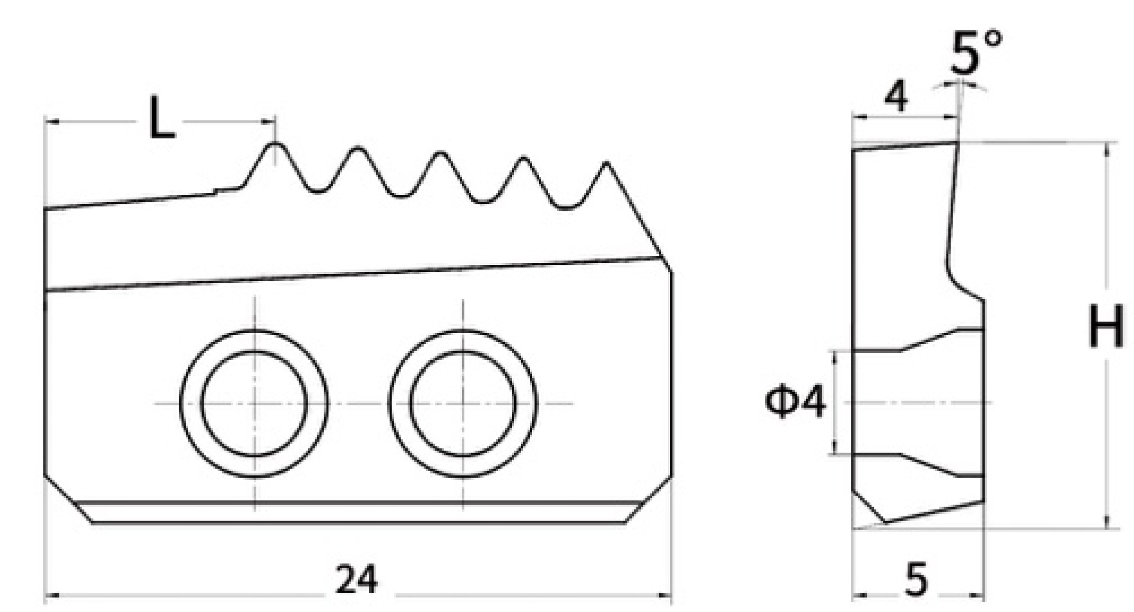
Model	TPI	Taper	H	L
S24ER8RD2-3	8	1:16	12	12.815
S24ER10RD2-3	10	1:16	11.93	16.48

Internal API Round Inserts

Model	TPI	Taper	H	L
S24IR8RD2-4	8	1:16	12.4	12.815
S24IR10RD2-4	10	1:16	12.4	12.815

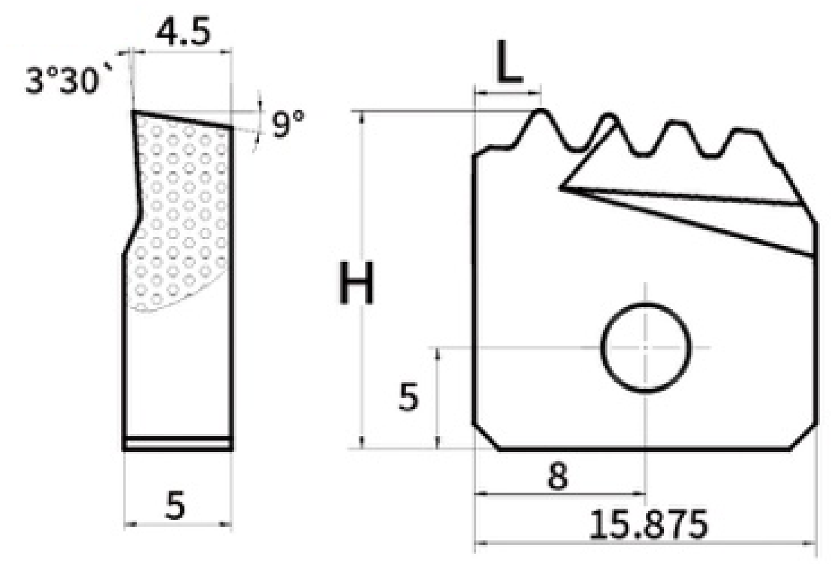
Internal API Round Inserts

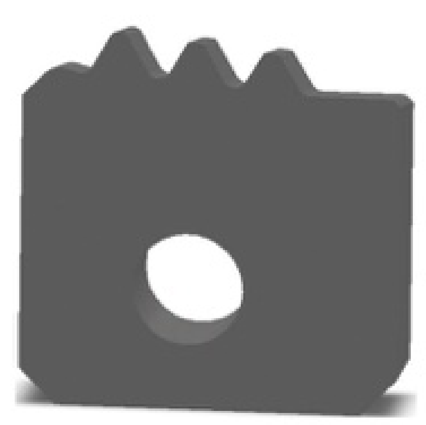
Model	TPI	Taper	H	L
24IR8RD1-5	8	1:16	14.85	8.8
24IR8RD1-5F	8	1:16	14.85	2
S24IR8RD1-7	8	1:16	14.85	3.4
S24IR8RD1-7F	8	1:16	14.85	3.4
S24IR10RD1-7	10	1:16	14.85	7.4

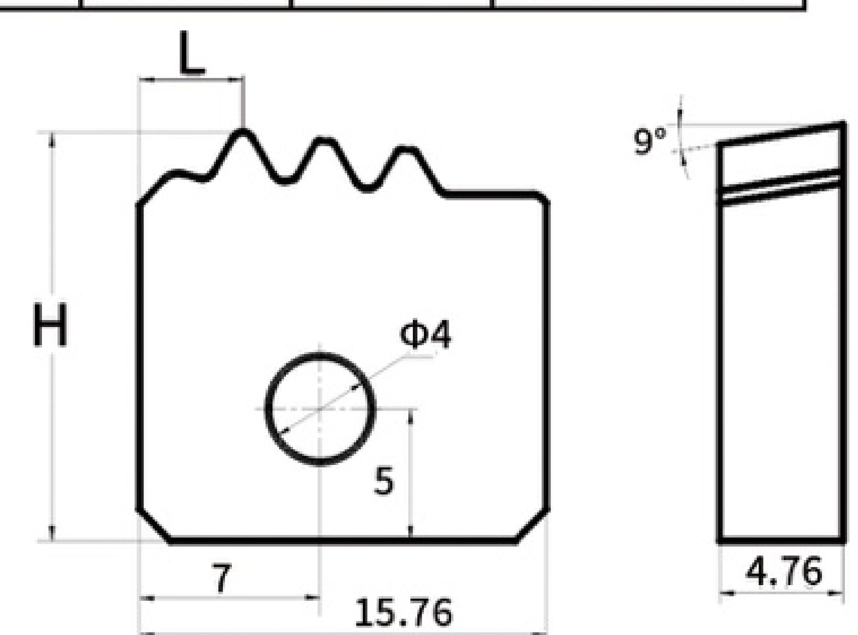
Note: S24IR8RD1-5F and S24IR8RD1-7F are reverse-feed thread inserts

Internal API Round Inserts



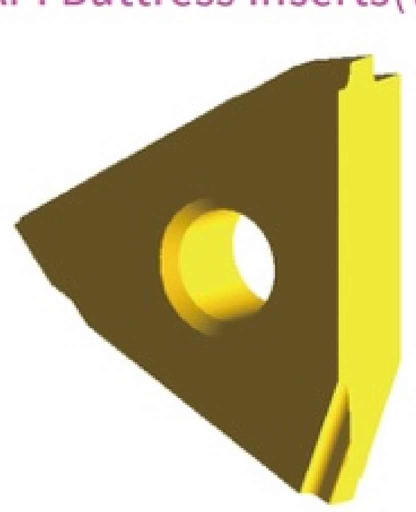
Model	TPI	Taper	H	L	Chipbreaker
S16IR8RD1-4	8	1:16	15.7	3.1	XCQN1BII
S16IR10RD1-5	10	1:16	15.75	2.5	XCQN1BII

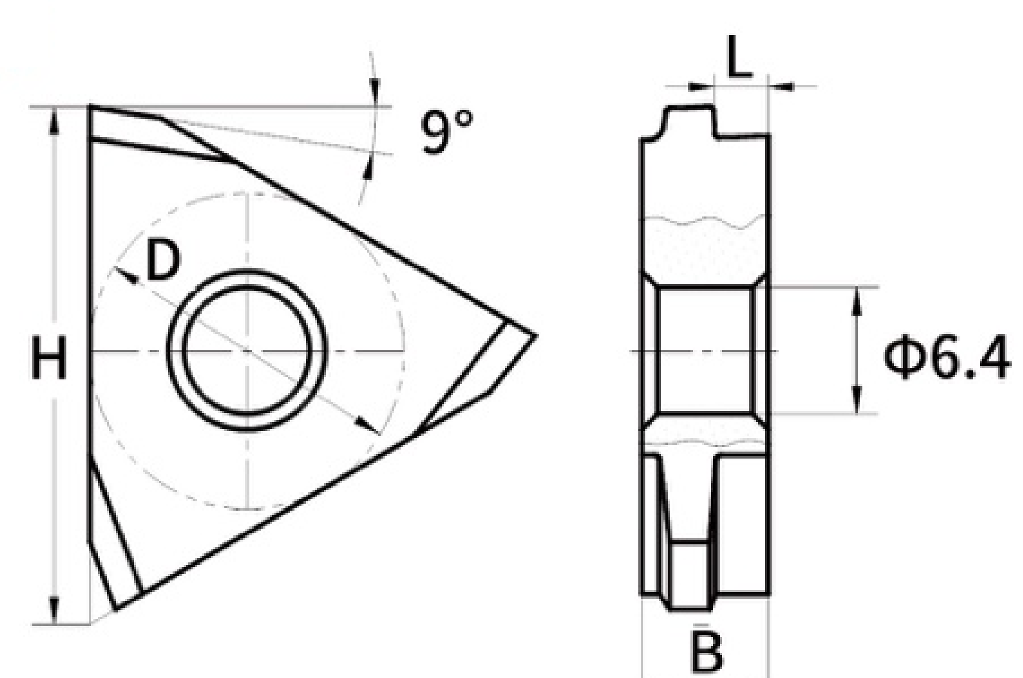




Model	TPI	Taper	H	L	Chipbreaker
S16IR8RD1-3	8	1:16	15.5	4.0	XCQN1BI
S16IR8RD1-3F	8	1:16	15.7	3.15	XCQN1BI

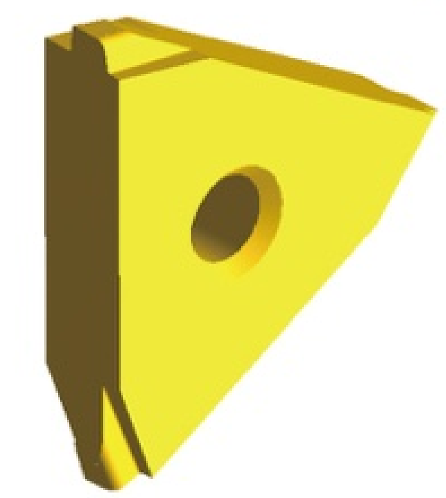
External API Buttress Inserts(V Style)

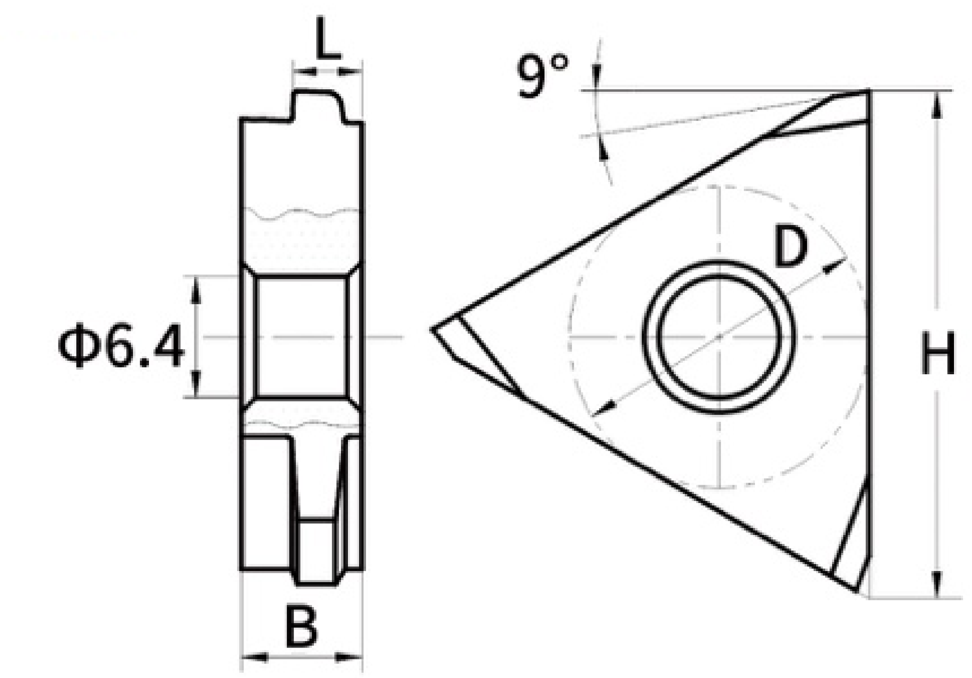




Model	TPI	Thread Type	Taper	H	L	D	B
T28VER5BU3-1	5	API Buttress Thread	1:16	26.2	2.76	16	6.45
T27VER5BU3-1	5	API Buttress Thread	1:16	26.7	2.65	15.875	6.90

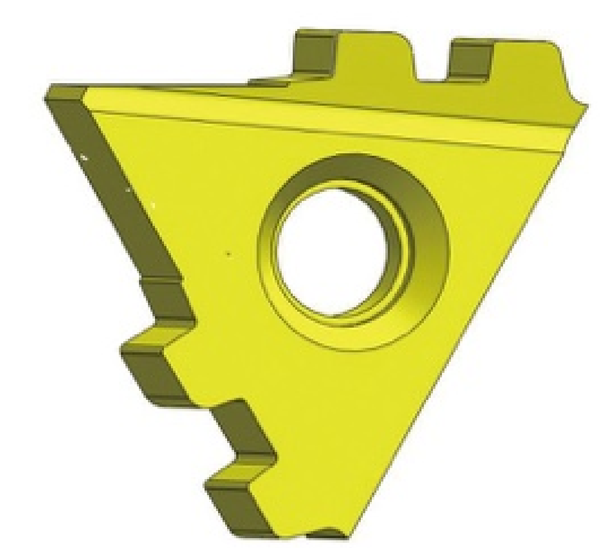
nternal API Buttress Inserts(V Style)

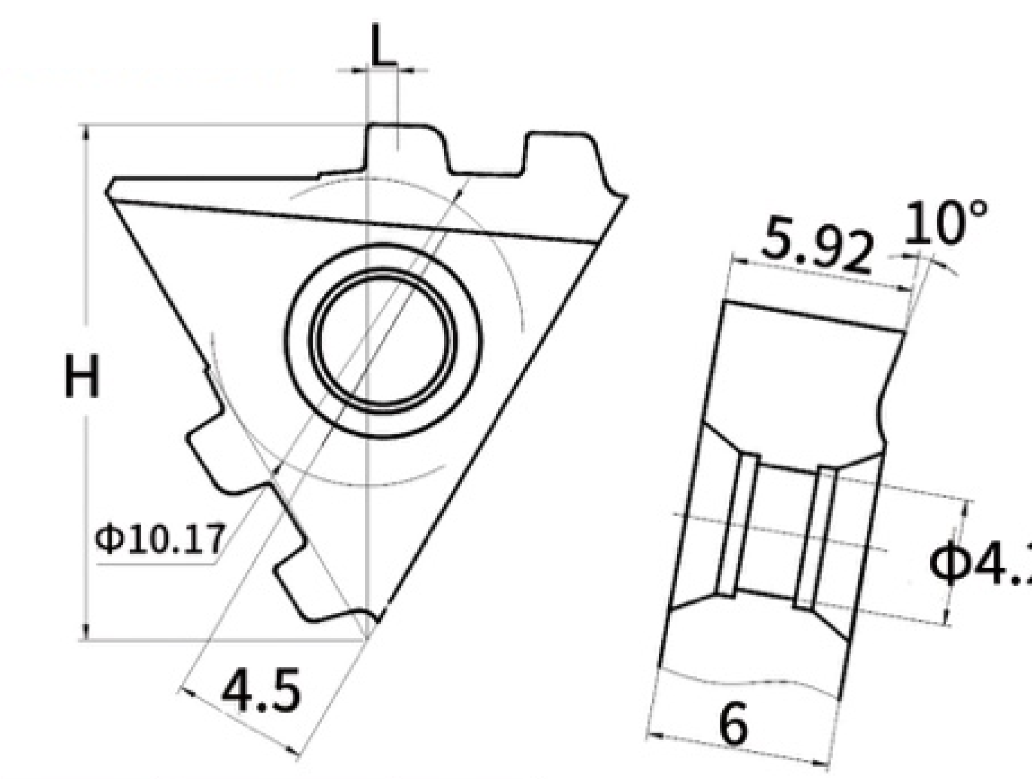




Model	TPI	Thread Type	Taper	H	L	D	B
T28VIR5BU3-1	5	API Buttress Thread	1:16	26.7	3.69	16	6.45
T27VIR5BU3-1	5	API Buttress Thread	1:16	26.75	3.40	15.875	6.90

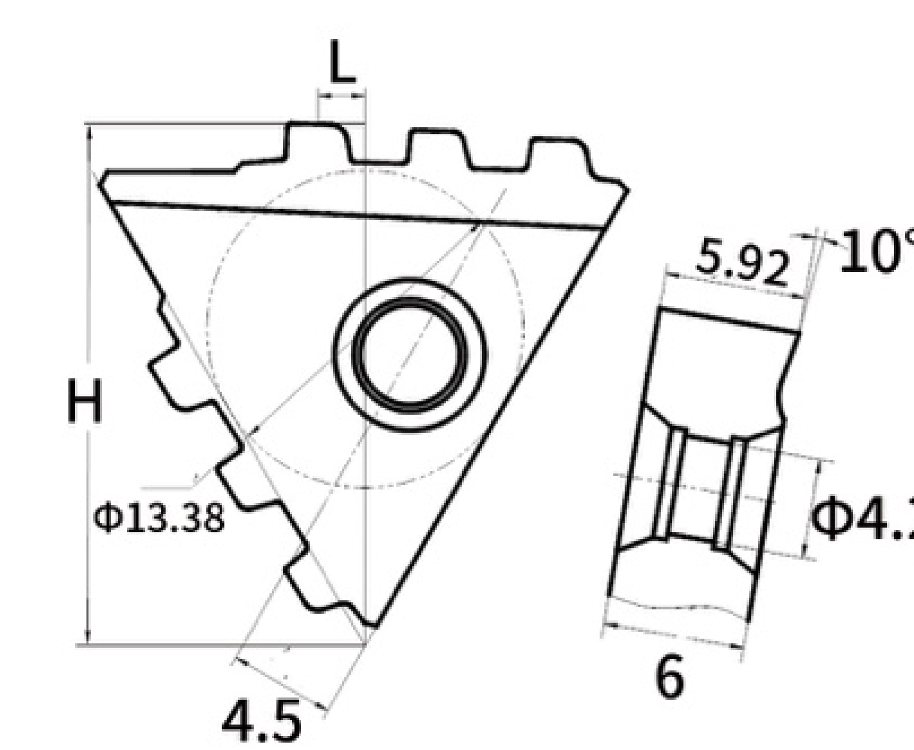
Internal API Round Inserts





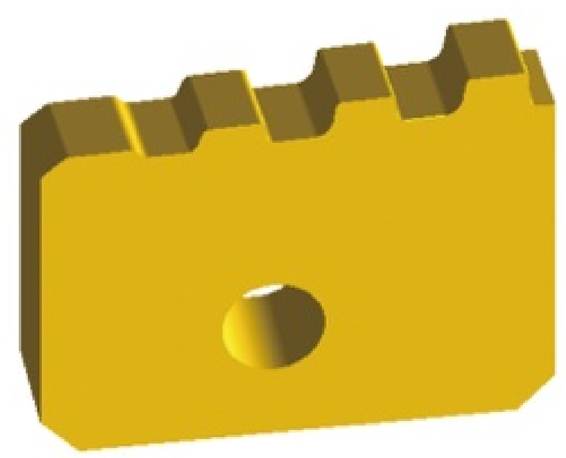
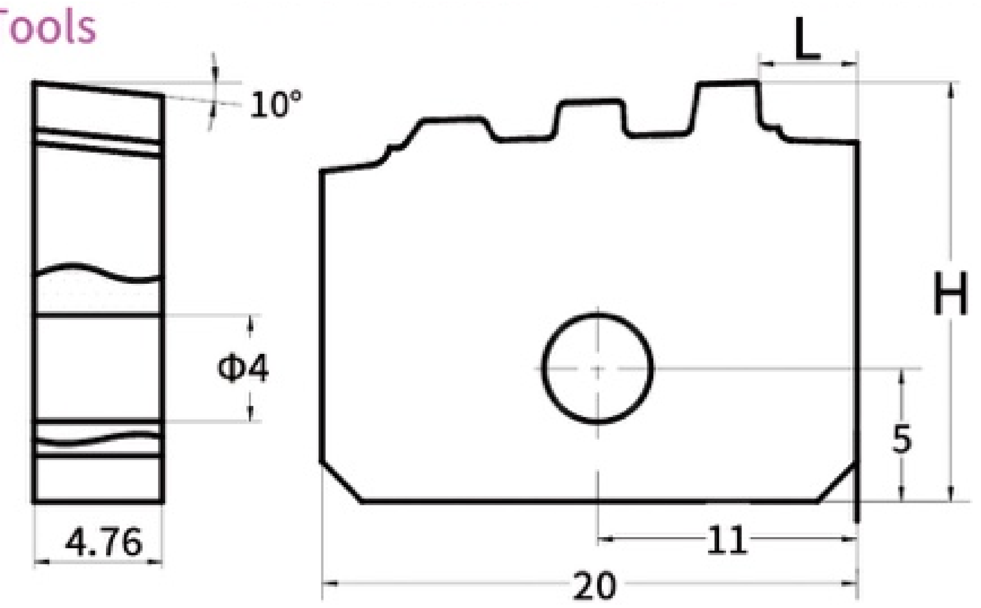
Model	TPI	Taper	H	L
B17IR5BU2-2	5	1:16	17.05	1.0

Internal API Round Inserts

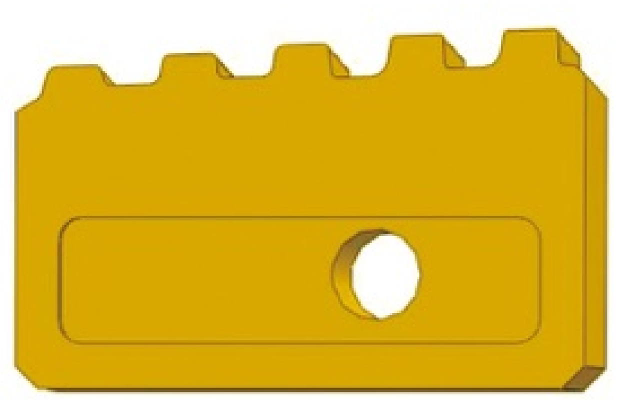
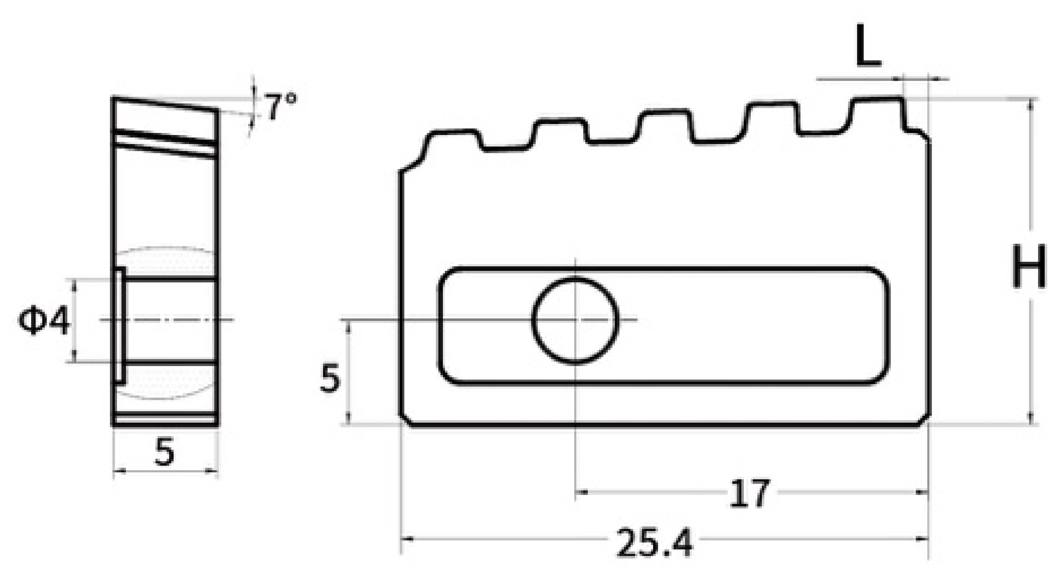


Model	TPI	Thread Type	Taper	H	L
B23IR5BU2-3	5	API Buttress Thread	1:16	22.075	2.0

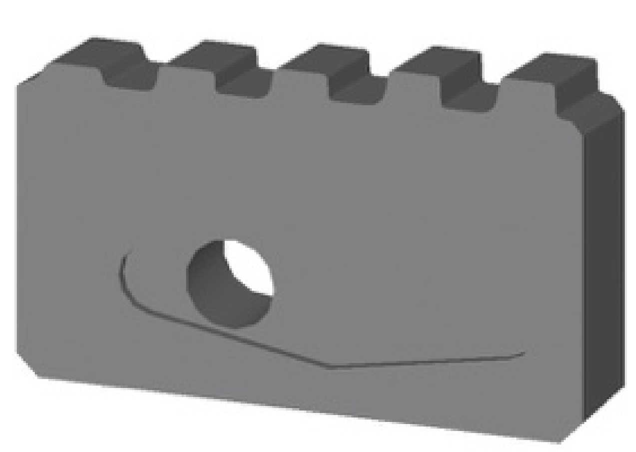
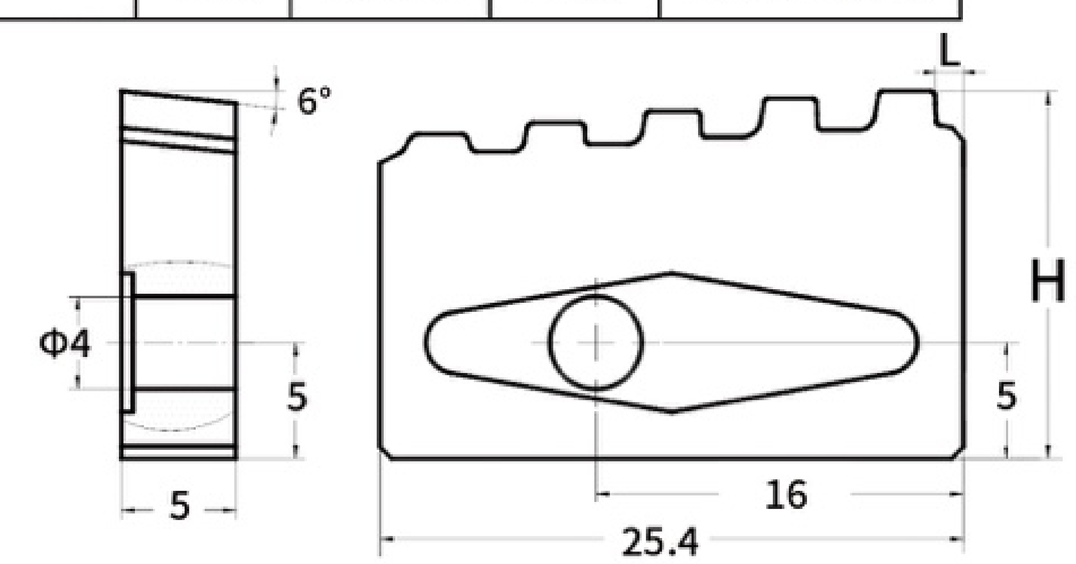
External API Round Inserts for Colinet Machine Tools

Model	TPI	Thread Type	Taper	H	L	Chipbreaker
C20ER5BU1-31	5	API Buttress Thread	1:16	15. 70	3. 65	BXCQW1-BII
C20ER5BU1-32	5	API Buttress Thread	1:16	15. 88	1. 0	BXCQW1-BII
C5BW1-31B	5	API Buttress Thread	1:16	15. 50	3. 13	BXCQW1-BII
C5BW1-32B	5	API Buttress Thread	1:16	15. 88	3. 0	BXCQW1-BII

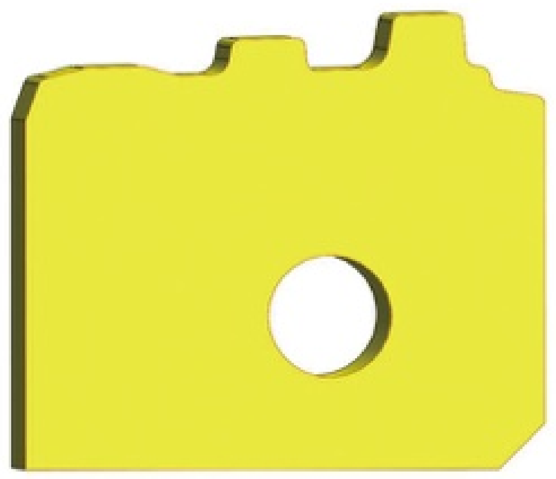
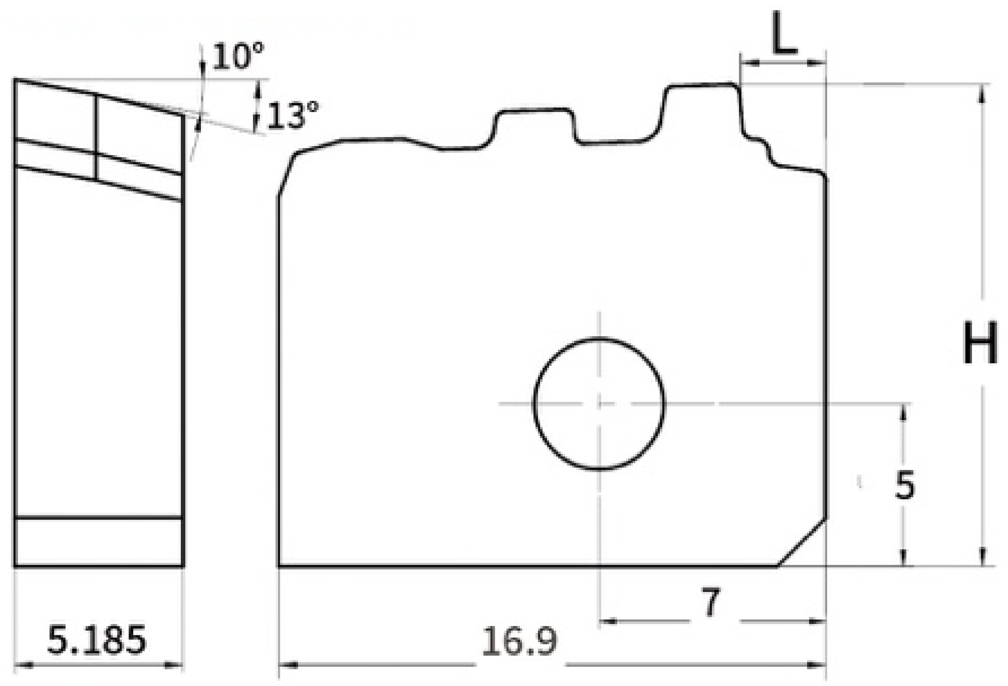



Model	TPI	Thread Type	Taper	H	L	Chipbreaker
C25ER5BU1-5	5	API Buttress Thread	1:16	15. 736	1. 185	BXCQW1-BIII

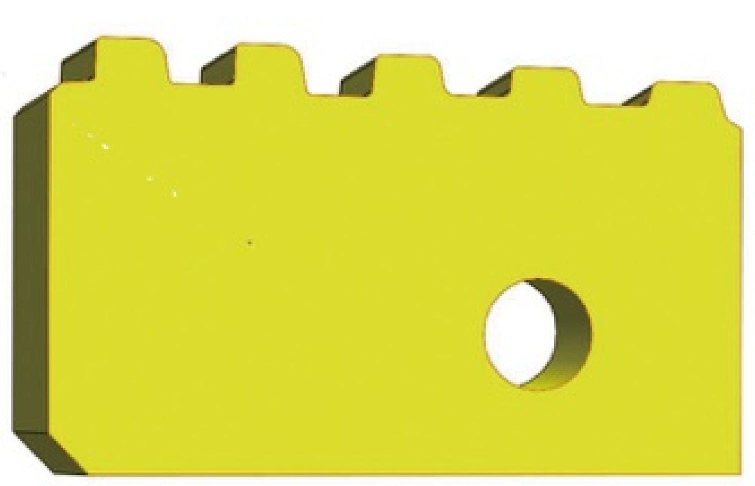
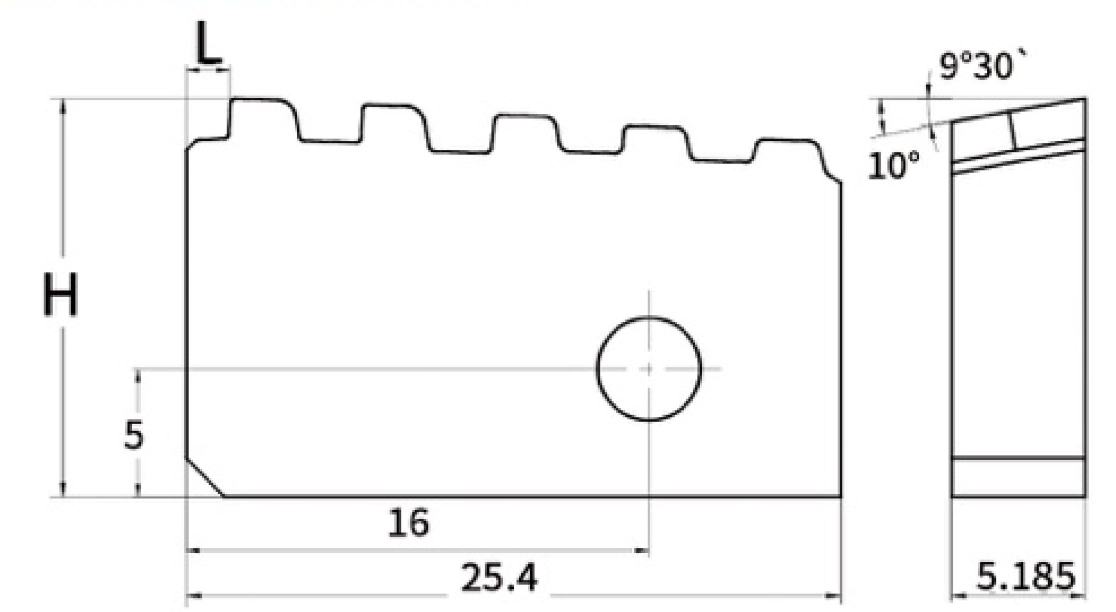
Model	TPI	Thread Type	Taper	H	L	Chipbreaker
C25ER5BU1-5D	5	API Buttress Thread	1:12	15. 875	1. 2	BXCQW1-BIII

External API Buttress Inserts for PMC Machine Tools

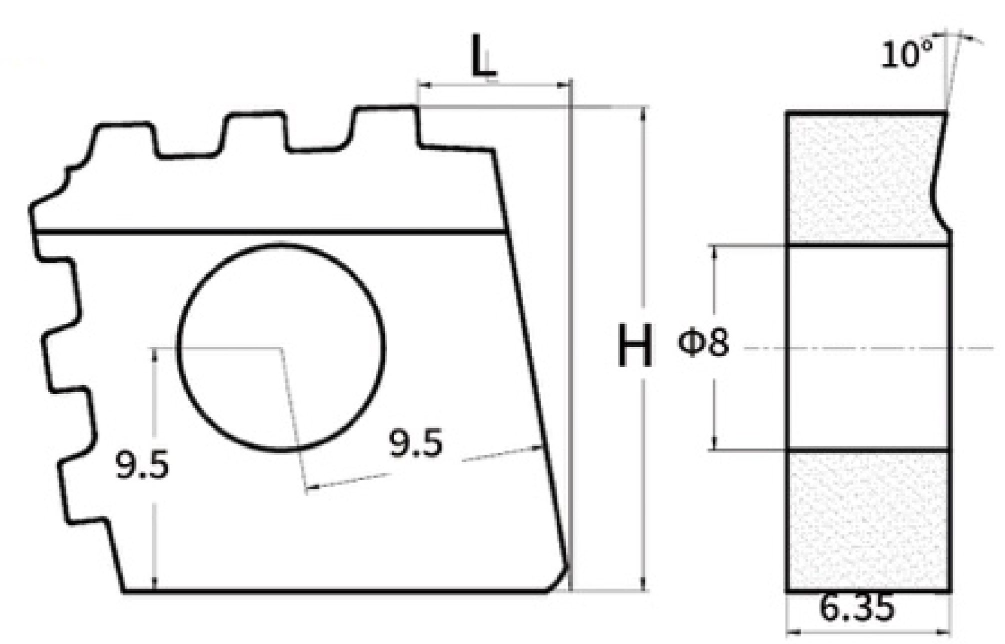
Model	TPI	Taper	H	L	Chipbreaker
P16ER5BU1-31	5	1:16	14. 57	4. 46	XP5BW1-31、XP5BW1-B
P16ER5BU1-32	5	1:16	14. 84	2. 74	XP5BW1-32、XP5BW1-B
P16ER5BU1-33	5	1:16	14. 97	0. 97	XP5BW1-33、XP5BW1-B

Internal API Buttress Inserts for PMC Machine Tools

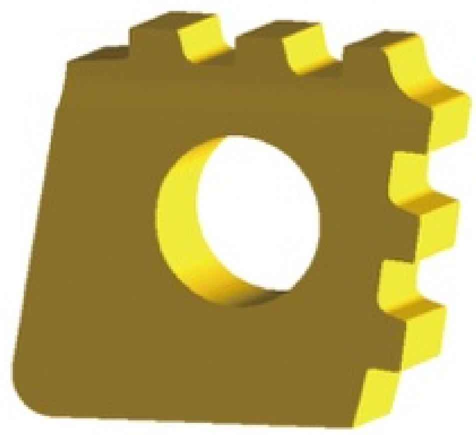
Model	TPI	Taper	H	L	Chipbreaker
P25IR5BU1-5	5	1:16	15. 608	1. 7	XP5BI1-5、BXPQN1C、XP5BI1-5A

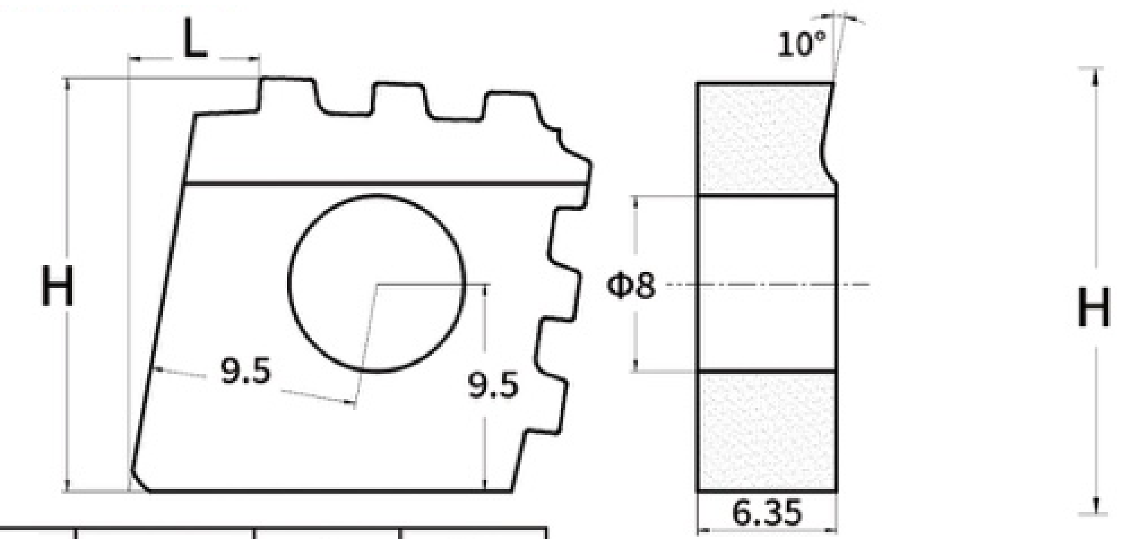
External API Buttress Inserts

Model	TPI	Taper	H	L
R19ER5BU2-3	5	1:16	18. 9	5. 95
R19ER5BU2-3D	5	1:12	18. 9	5. 95

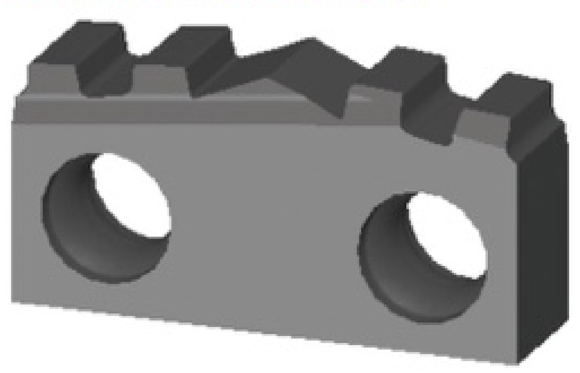
Internal API Buttress InsertS

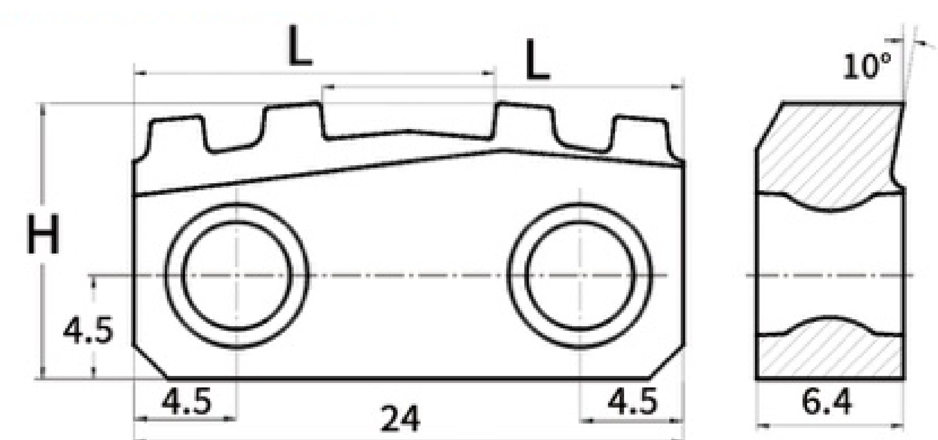




Model	TPI	Taper	H	L
R19IR5BU2-3	5	1:16	18.9	5.95
R19IR5BU2-3D	5	1:12	18.9	5.95

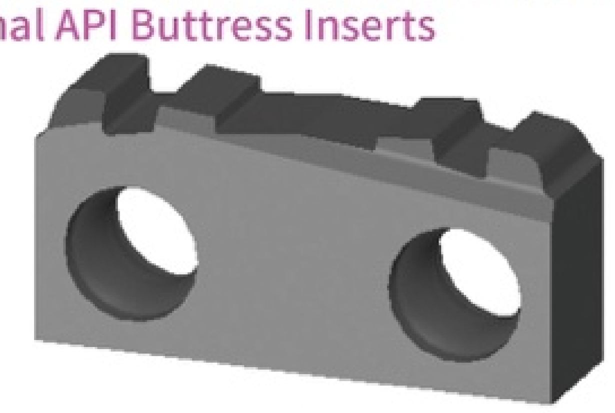
External API Buttress Inserts

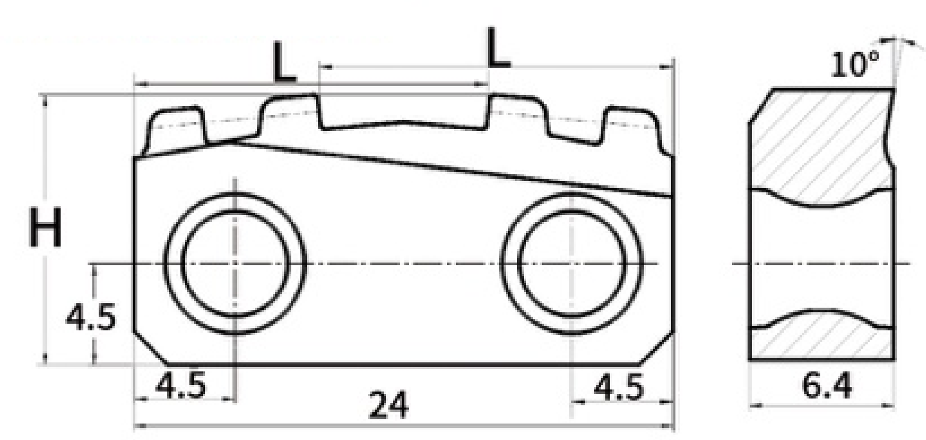




Model	TPI	Taper	H	L
S24ER5BU2-2	5	1:16	12.0	15.76

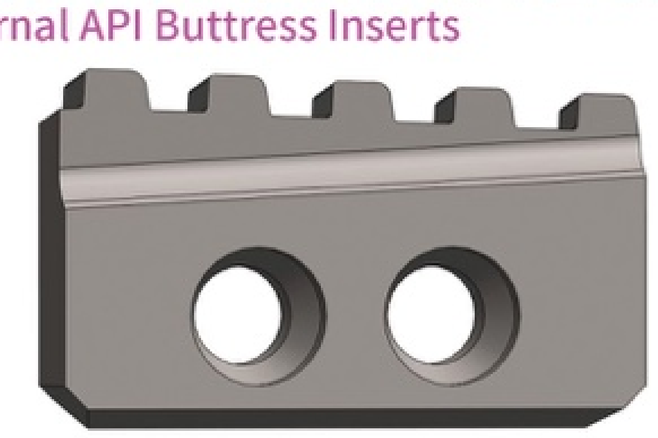
Internal API Buttress Inserts

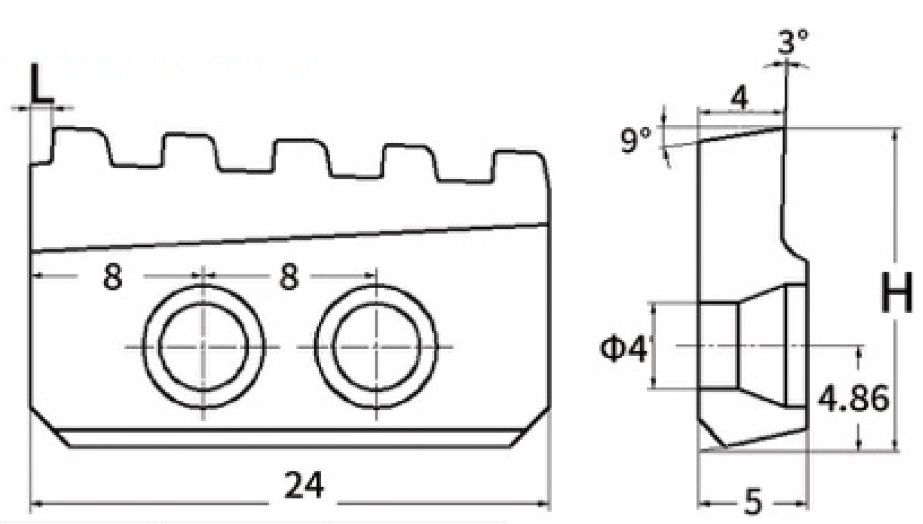




Model	TPI	Taper	H	L
S24IR5BU2-2	5	1:16	12.0	15.76

Internal API Buttress Inserts





Model	TPI	Taper	H	L
S24IR5BU1-5	5	1:16	14.85	1
S24IR5BU1-5F	5	1:16	14.85	3.6

Note: S24IR5BU1-5F is a reverse thread insert

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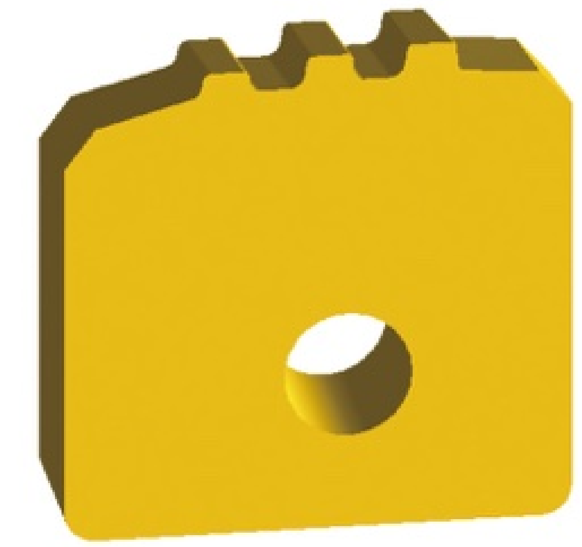
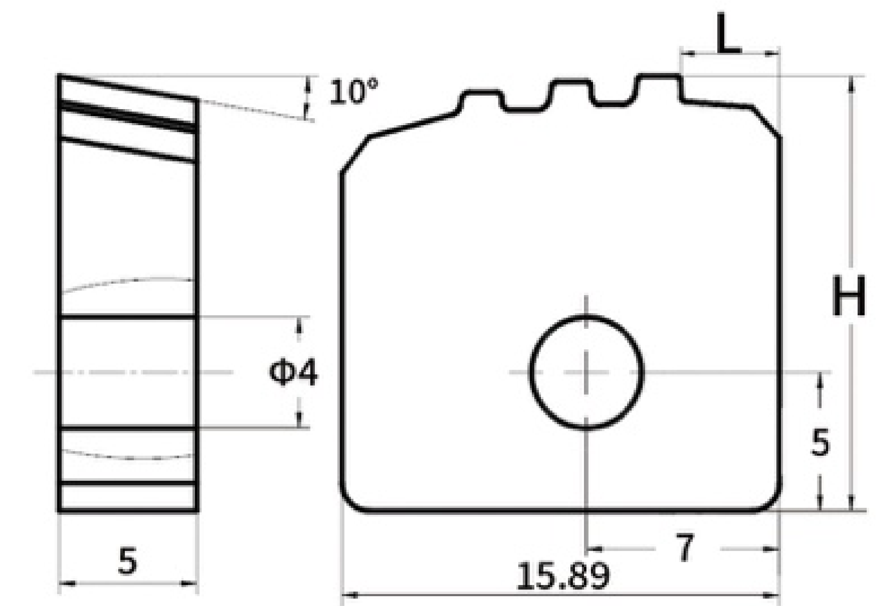
PETROLEUM PIPE THREAD INSERT SERIES

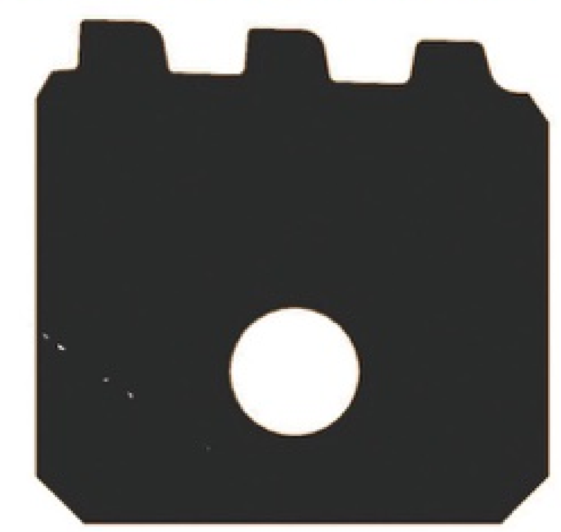
External API Buttress Inserts

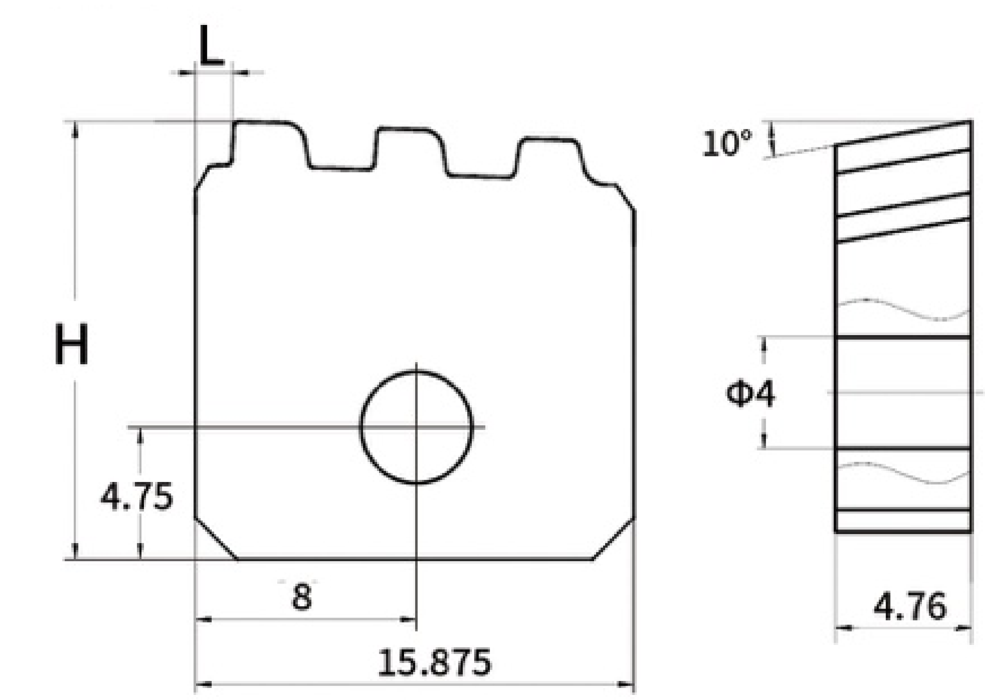




Model	TPI	Thread Type	Taper	H	L	Chipbreaker
S16ER5BU1-3	5	API Buttress Thread	1:16	15.73	1.85	BXCQW1-BI

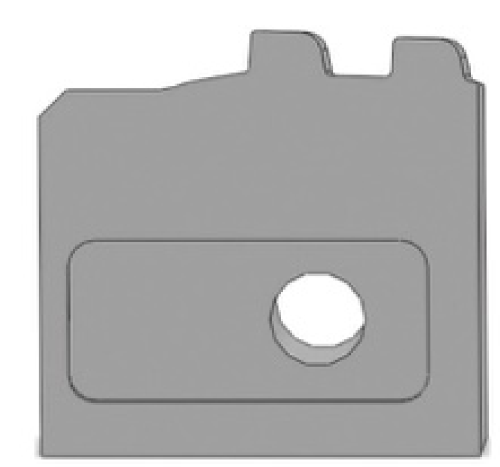
Internal API Buttress Inserts

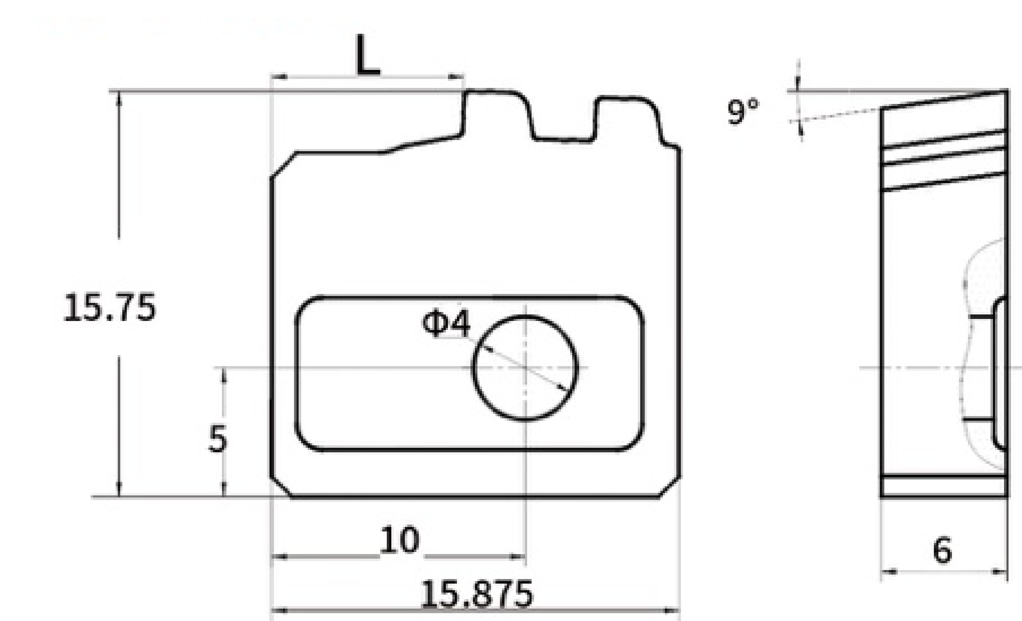




Model	TPI	Taper	H	L	Chipbreaker
S16IR5BU1-3	5	1:16	15.75	1.34	TG2-8T

Internal API Buttress Inserts





Model	TPI	Taper	H	L	Chipbreaker
S16IR5BU1-2	5	1:16	15.75	7.65	BXCQN1B XC5BI1-2

Oil drill pipe (joint) threaded insert model preparation instructions

22	E	R	V38R	--	04	02	A
1	2	3	4		5	6	7

1. Insert size
29—IC=17mm
27—IC=15.875mm
22—IC=12.7mm

2. Type of Inserte
E— External
I— Internal

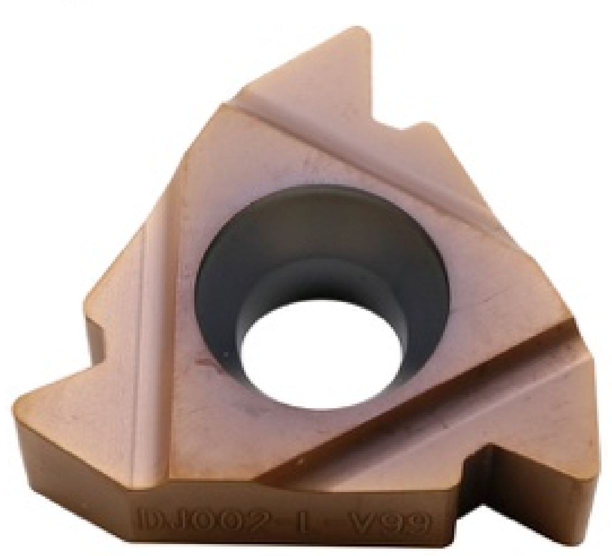
3. RH/LH Standard
R— Right hand
L— Left hand

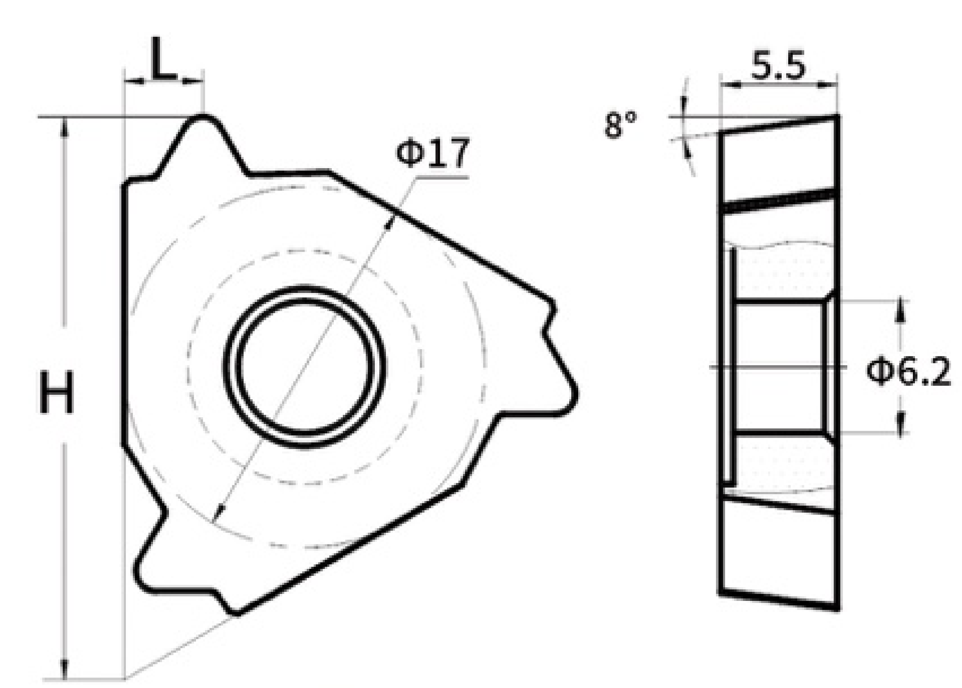
4. Thread Standard
V38R—V0.038R
V 40—V0.040
V 50—V0.050
V 55—V0.055
V 65—V0.065

5. Pitch
4— 4TPI
5— 5TPI
6— 6TPI

6. Thread taper
01—1:8
02—1:6
03—1:4
04—1:12
05—1:16

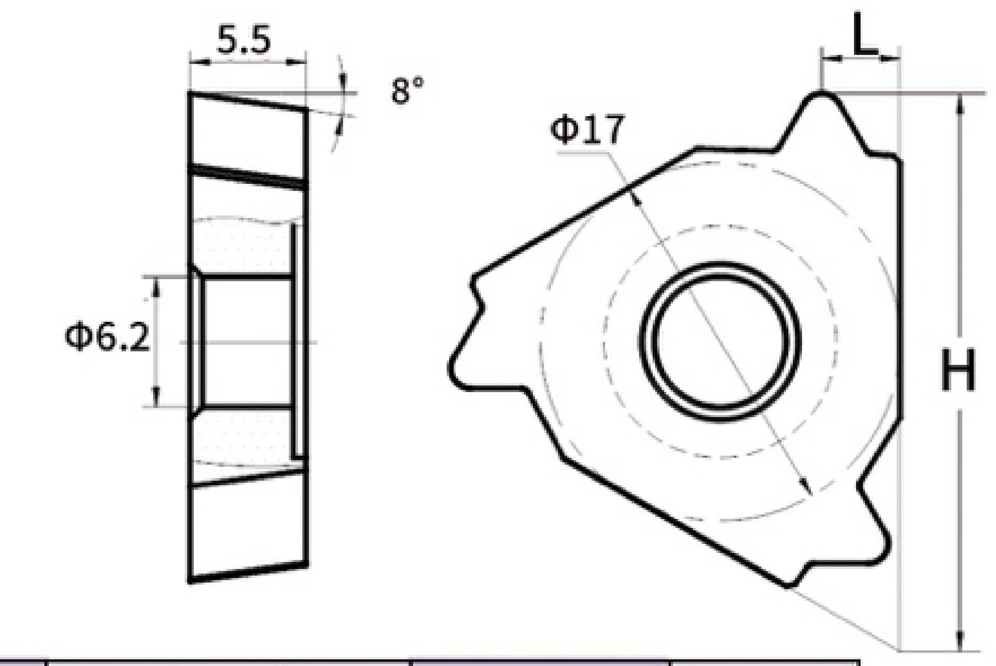
A Style External Inserts





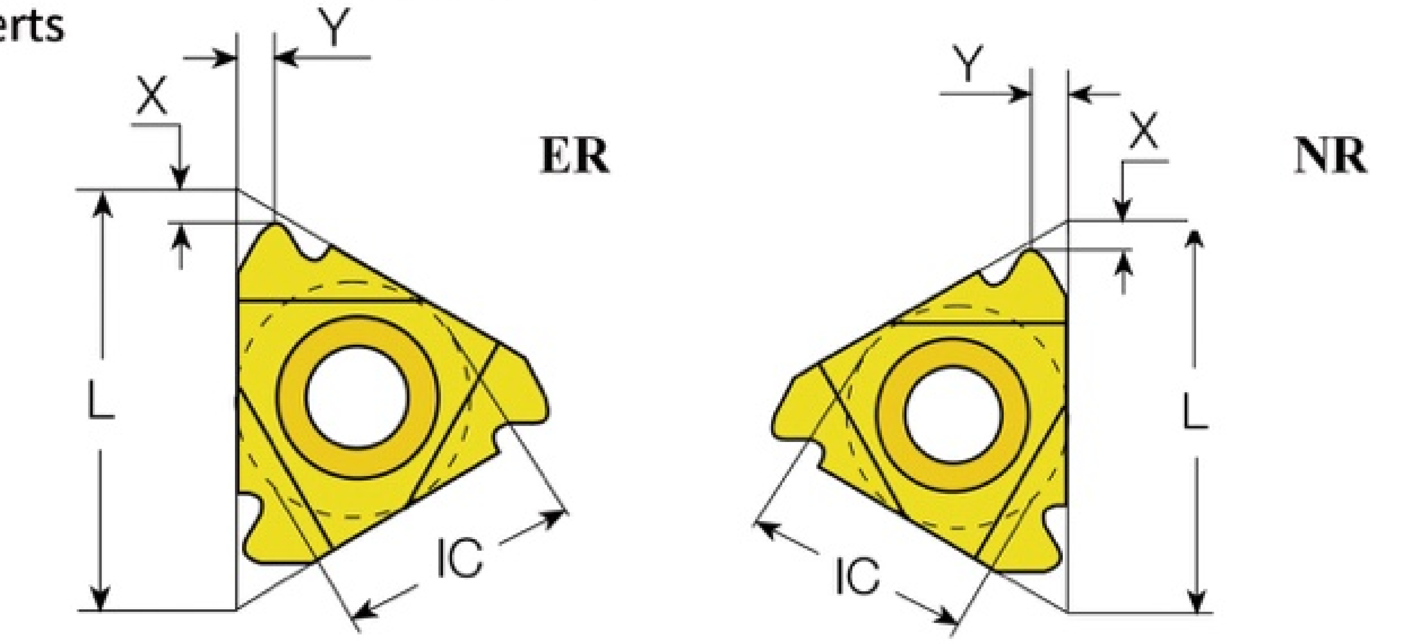
Model	TPI	Taper	Thread Form	H	L
29ERV38R-0405A	4	1:16	V-0.038R	26.51	3.7
29ERV38R-0402A	4	1:6	V-0.038R	26.51	3.7
29ERV38R-0403A	4	1:4	V-0.038R	26.51	3.7
29ERV40-0503A	5	1:4	V-0.040	26.96	3.7
29ERV50-0403A	4	1:4	V-0.050	26.83	3.7
29ERV50-0402A	4	1:6	V-0.050	26.83	3.7
29ERV50-0404A	4	1:12	V-0.050	26.83	3.7
29ERV55-0601A	6	1:8	V-0.055	26.50	3.7
29ERV65-0402A	4	1:6	V-0.065	26.24	3.7

A Style Internal Inserts



Model	TPI	Taper	Thread Form	H	L
29IRV38R-0405A	4	1:16	V-0.038R	26.51	3.7
29IRV38R-0402A	4	1:6	V-0.038R	26.51	3.7
29IRV38R-0403A	4	1:4	V-0.038R	26.9	3.7
29IRV40-0503A	5	1:4	V-0.040	26.51	3.7
29IRV50-0403A	4	1:4	V-0.050	26.96	3.7
29IR4V50-0402A	4	1:6	V-0.050	26.83	3.7
29IRV50-0404A	4	1:12	V-0.050	26.83	3.7
29IRV55-0601A	6	1:8	V-0.055	26.50	3.7
29IRV65-0402A	4	1:6	V-0.065	26.24	3.7

A Style Internal Inserts



V-0.040

TPI	L	I.C	Taper	External	Internal	X	Y	Connection size
5	27	5/8″	1:4	27ERV40-0503B	27IRV40-503B	1.8	2.5	23/8~21/2REG

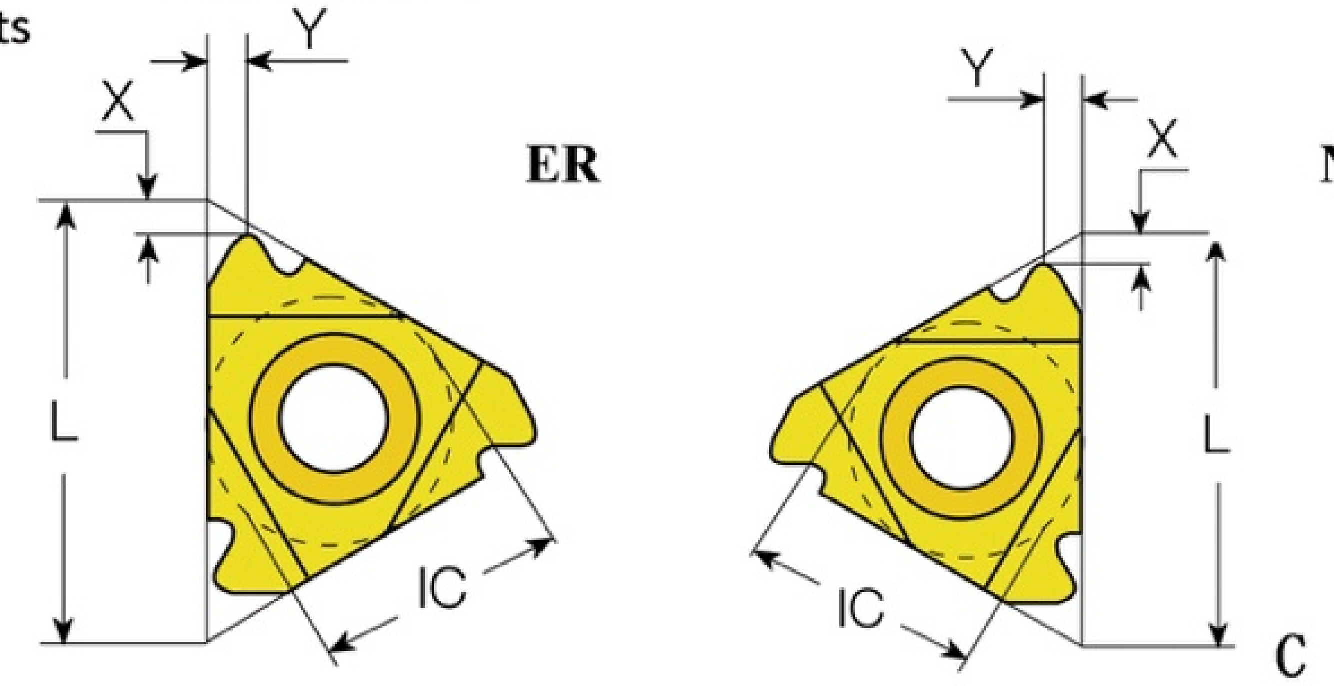
V-0.038R

TPI	L	I.C	Taper	External	Internal	X	Y	Connection size
4	27	5/8″	1:6	27ERV38R-0402B	27IRV38-0402B	2.1	2.8	NC23~NC50
4	27	5/8″	1:4	27ERV38R-0403B	27IRV38R-0403B	2.1	2.8	NC56~NC77

V-0.050

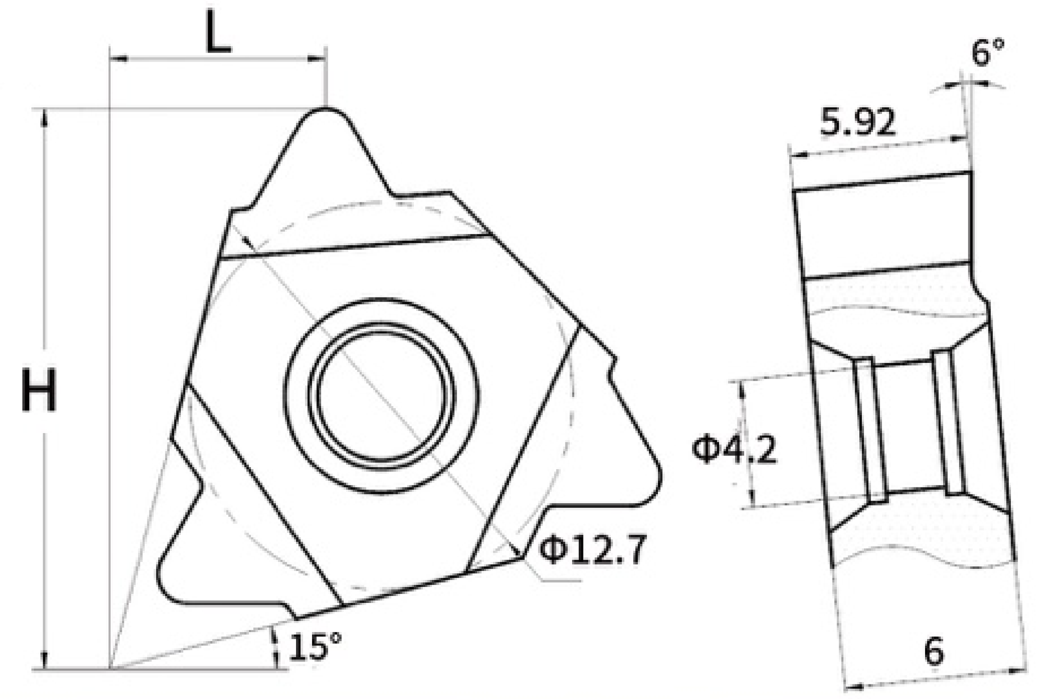
TPI	L	I.C	Taper	External	Internal	X	Y	Connection size
4	27	5/8″	1:6	27ERV50-0402B	27IRV50-0402B	2.0	3.0	25/8REG
4	27	5/8″	1:4	27ERV50-0403B	27IRV50-0403B	2.0	3.0	51/2、75/8、85/8REG

C Style Internal Inserts



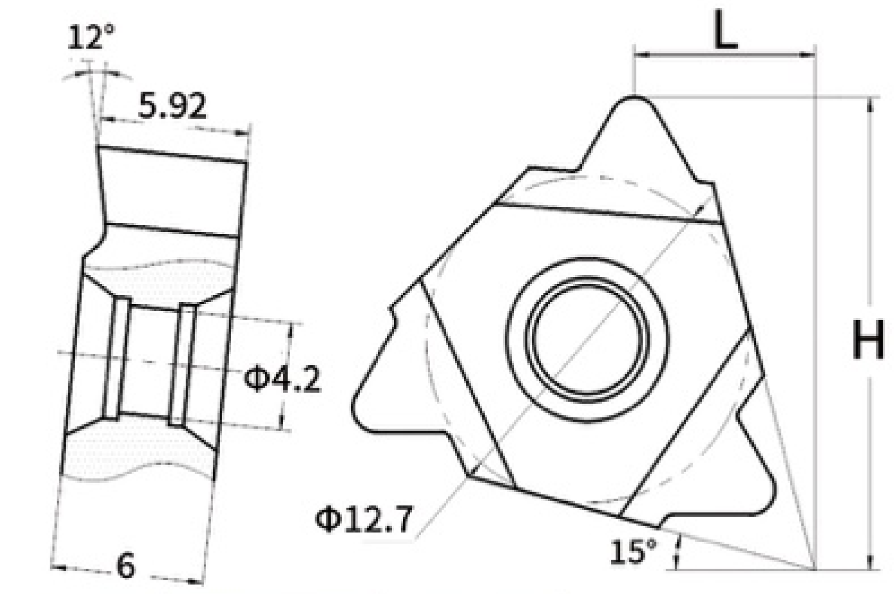
TPI	L	I. C	Taper	Thread Form	Externai	Internai	X	Y
4	22	1/2″	1:6	V-0. 038R	22ERV38R-0402C	22IRV38R-0402C	2. 1	2. 8
4	22	1/2″	1:4	V-0. 038R	22ERV38R-0403C	22IRV38R-0403C	2. 1	2. 8
5	22	1/2″	1:4	V-0. 040	22ERV40-0503C	22IRV40-0503C	1. 8	2. 5
4	22	1/2″	1:6	V-0. 050	22ERV50-0402C	22IRV50-0402C	2. 0	3. 0
4	22	1/2″	1:4	V-0. 050	22ERV50-0403C	22IRV50-0403C	2. 0	3. 0
6	22	1/2″	1:8	V-0. 055	22ERV55-0601C	22IRV55-0601C	1. 7	2. 0
4	22	1/2″	1:6	V-0. 065	22ERV65-0402C	22IRV65-0402C	2. 2	2. 65

D Style External Inserts



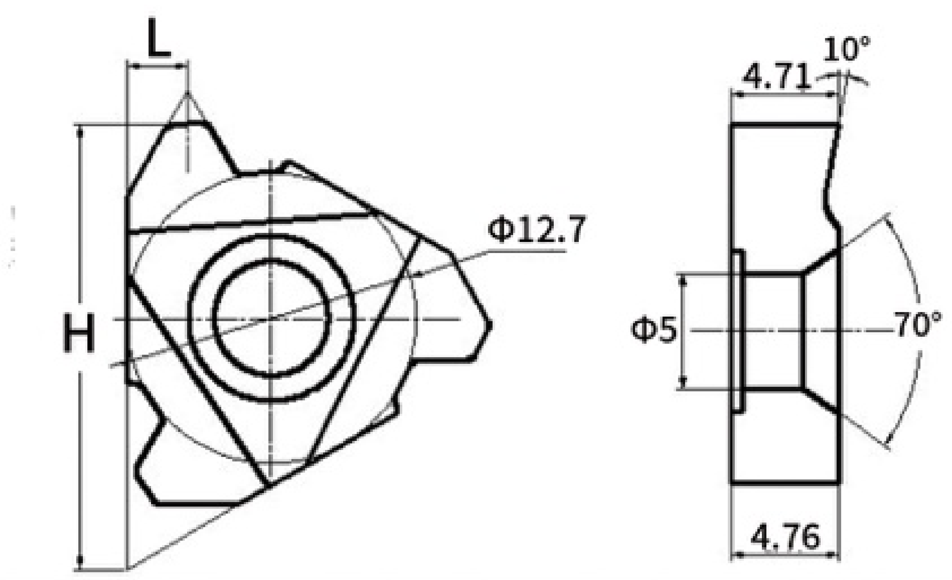
Model	TPI	Taper	Thread Form	H	L
22ERV38R-0402D	4	1:6	V-0. 038R	18. 43	7. 13
22ERV38R-0403D	4	1:4	V-0. 038R	18. 43	7. 13
22ERV40-0503D	5	1:4	V-0. 040	18. 43	7. 13
22ERV50-0403D	4	1:4	V-0. 050	18. 58	7. 13
22ERV50-0402D	4	1:6	V-0. 050	18. 43	7. 13
22ERV55-0601D	6	1:8	V-0. 055	17. 75	6. 85
22ERV65-0402D	4	1:6	V-0. 065	18. 50	7. 3

D Style Internal Inserts



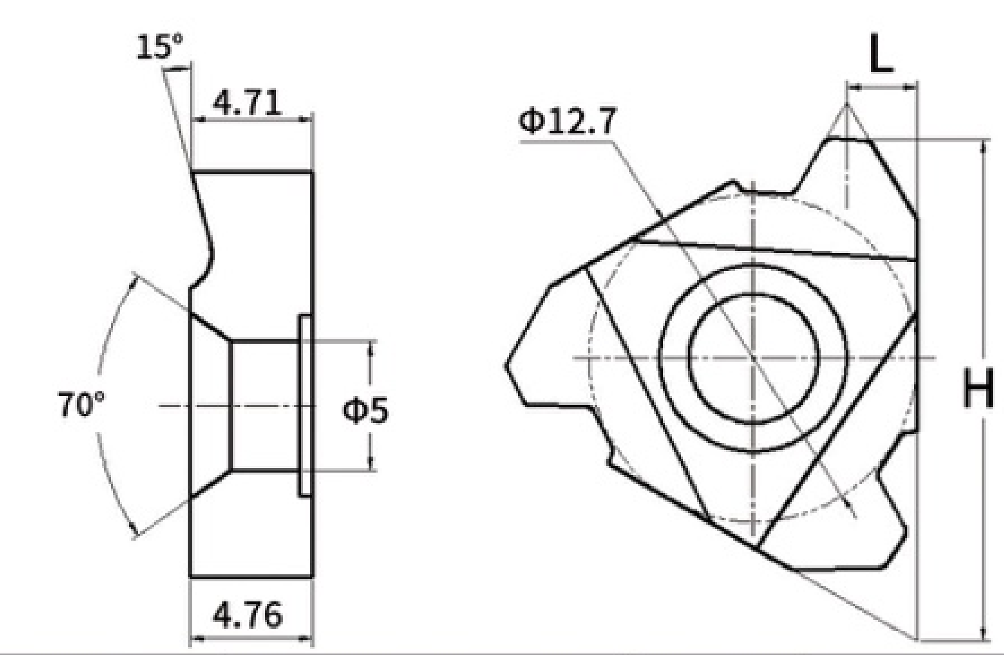
Model	TPI	Taper	Thread Form	H	L
22IR4API382D	4	1:6	V-0. 038R	18. 43	7. 13
22IR4API383D	4	1:4	V-0. 038R	18. 43	7. 13
22IR5API403D	4	1:4	V-0. 038R	18. 43	7. 13
22IR4API503D	5	1:4	V-0. 040	18. 58	7. 13
22IR4API502D	4	1:6	V-0. 050	18. 43	7. 13
22IR4API575D	4	1:8	V-0. 050	18. 43	7. 13
22IR4API652D	4	1:6	V-0. 050	18. 50	7. 3

PAC Style External Inserts



Model	TPI	Taper	Thread Form	H	L
22ER4PAC	4	1:8	V-0. 076	19. 5	2. 7

PAC Style Internal Inserts



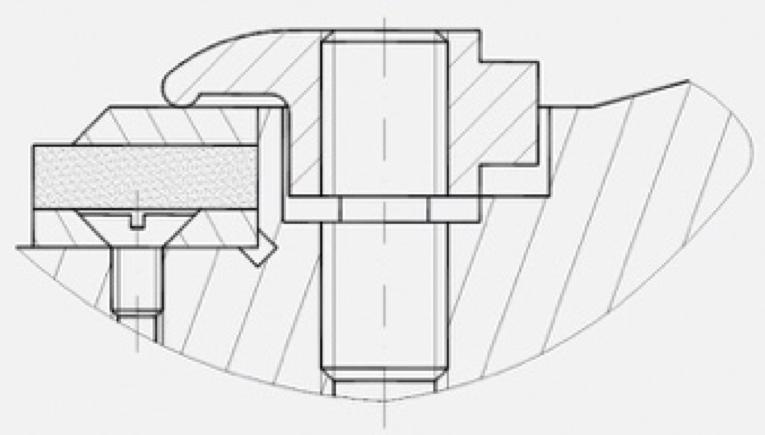
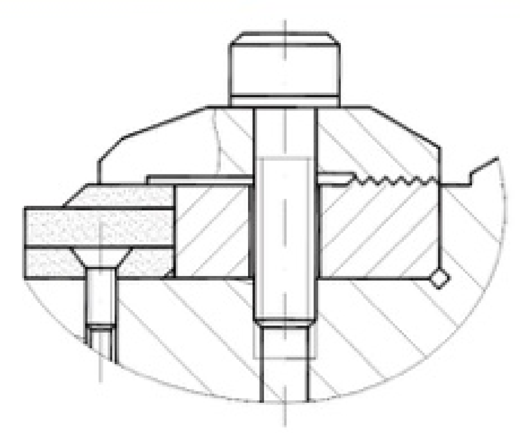
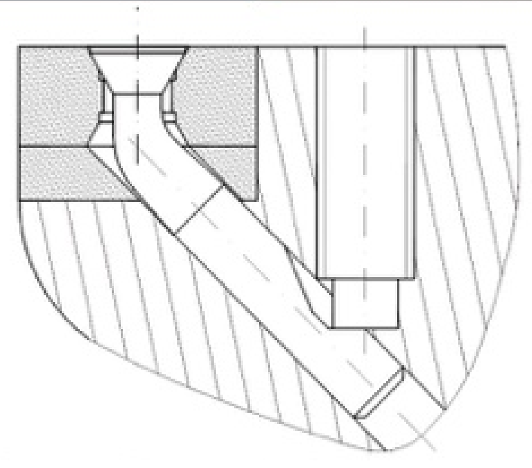
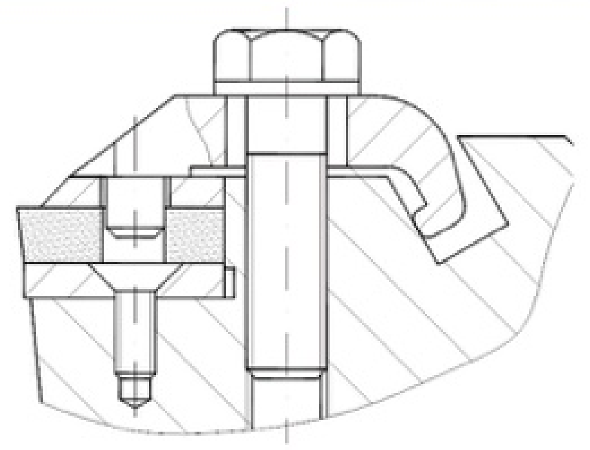
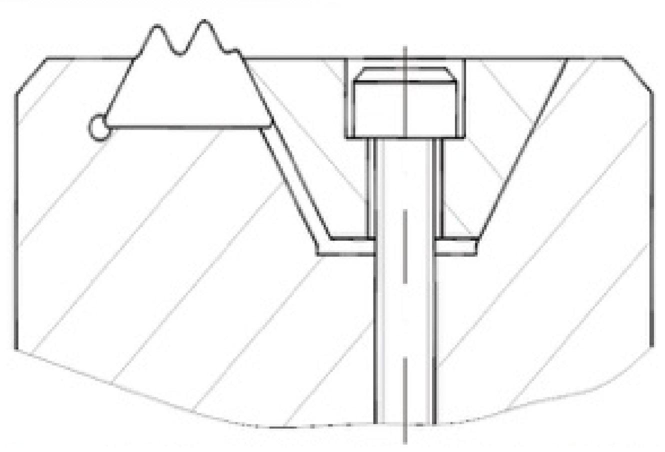
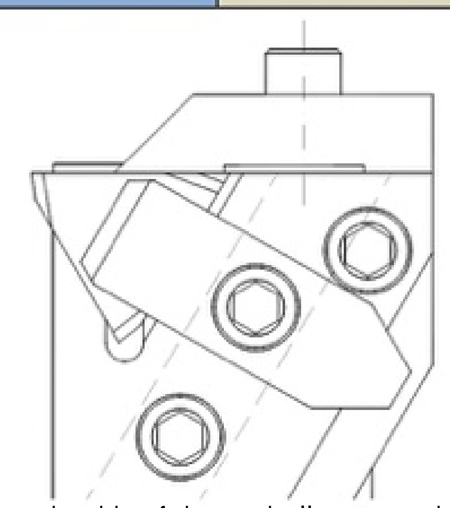
Model	TPI	Taper	Thread Form	H	L
22IR4PAC	4	1:8	V-0. 076	19. 5	2. 7

Instructions for compilation of oil pipe threading tool holder models

P	E	R	00	80 —	175 —	B17	A	
①	②	③	④	⑤	⑥	⑦	⑧	⑨

illustrate:

① Use letters such as M, C, P, J, F, G to represent different types of insert clamping methods respectively. The specific meanings are as follows:

Clamping style	Hook nut hold down	Clamping style	Upper pressure plate clamping
Clamping code	M	Clamping code	C
 M: Indicates hook nut top pressure type		 C: Indicates the sawtooth pressure plate type	
Clamping style	Inclined rod taper pressing	Clamping style	Inclined bidirectional clamping
Clamping code	P	Clamping code	J
 P: Indicates the inner-pull cone compression of the diagonal rod		 J: Indicates that the inclined surface of the pressure plate with core rod is pressed in both directions.	
Clamping style	Wedge bevel pressing	Clamping style	Side pressure plate clamping
Clamping code	F	Clamping code	G
 F: Indicates that the wedge block slope is pressed laterally		 G: Indicates that the side of the vertically mounted blade is pressed	

② Letter E is used to indicate external cylindrical tool holder, letter | is used to indicate internal cylindrical tool holder.

③ Letter R is used to indicate right-hand feed, letter L is used to indicate left-hand feed.

④ 00 is used to indicate internal thread round shank tool holder, square shank tool holder is tool center height (mm).

⑤ Square shank tool holder is square shank thickness (mm), round shank tool holder is round shank diameter (mm).

⑥ Total length of tool holder (mm).

⑦ Blade type, multiple blades of composite tool holder are separated by "/".

⑧ Letters A, B, C, D are used to indicate the diameter range of processed oil pipes, casings, and drill rods, respectively, as shown in the following table:

Petroleum pipe name	Pipe diameter			
	A 類	B 類	C 類	D 類
Oil pipes and casing (Processing V-shaped round thread)	$2\frac{3}{8}$"~$3\frac{1}{2}$"	4"~$5\frac{1}{2}$"	$6\frac{5}{8}$"~$8\frac{5}{8}$"	$9\frac{5}{8}$"~$13\frac{3}{8}$"
Oil Drill Rod	$2\frac{3}{8}$"~$3\frac{1}{2}$"	4"~$5\frac{1}{2}$"	$6\frac{5}{8}$"~$8\frac{5}{8}$"	
Oil casing (Processing of trapezoidal threads)		$4\frac{1}{2}$"~$6\frac{5}{8}$"	7"~$11\frac{3}{4}$"	$13\frac{3}{8}$"~20"

⑨- Special note items, no need to note can be omitted.

Use of Cemented Carbide Oil Pipe Threading Tools

(1) Three factors affecting the quality of oil pipe thread processing and tool cutting performance

A. External factors of the tool itself. Including:

I. Rationality of tool structure design.

II. Accuracy, finish and surface condition of blade edge and tooth shape.

III. Quality of blade edge reinforcement.

IV. Manufacturing accuracy of tool bar and quality of accessories such as chip breaker.

B. Internal factors of the insert itself. Mainly including:

I. Quality and performance of insert base material.

II. Quality and performance of insert surface coating.

III. Material and heat treatment performance of tool bar.

C. Use factors of insert. Mainly including:

I. Correct selection and use of tools.

II. Condition of thread processing equipment.

III. Cutting cooling method and effect.

IV. Machinability and material uniformity of processed materials.

V. Correct selection of thread processing cutting specifications.

Factors A and B depend on the tool manufacturer, and factor C depends on the tool user. The importance of reasonable use of tools can be seen.

(2) Two methods of oil pipe thread processing

A: Thread turning method: (applicable to oil, casing and drill pipe thread processing).

Its cutting motion characteristics:

Workpiece (pipe body or coupling, joint) - performs rotational motion. Generates the main cutting motion.

Tools (thread cutters and extraction knives) - perform cutting motion along the direction of the tapered thread bus line and intermittent cutting.

Thread turning method is the most widely used oil pipe thread processing method. There are two types of cutting: single blade cutting and group blade (generally two blades) combined with combined tool cutting, depending on the production parts and threading machine. Drill pipe joint thread processing all uses single-knife thread turning method.

B: Thread cutting processing method: (only oil and casing thread processing).

Its cutting motion characteristics:

Workpiece (pipe body or coupling) - is firmly clamped and stationary during cutting.

Tools (thread cutters and extraction cutters) - perform the main cutting motion of rotating around the axis of the workpiece, and at the same time perform the cutting motion along the direction of the tapered thread busbar and intermittent cutting.

There are two types of thread cutting processing methods: external cutting and internal cutting. They are used for mass production of tubing, casing and their couplings, with high production efficiency. External cutting heads generally contain a set of three-blade thread blades and a set of stripping blades, while internal cutting heads contain one thread blade and multiple stripping blades.

(3) Recommendations for the selection of cemented carbide oil pipe threading inserts

(1) Oil pipe and casing threading blade

A. Mass production conditions

I. Blades for thread cutting machines:

For machining external threads (set of inserts):

P16ER8RD1-31/P16ER8RD1-32/P16ER8RD1-33; P16ER10RD1-31/P16ER10RD1-32/P16ER10RD1-33; P16ER5BU1-31/P16ER5BU1-32/P16ER5BU1-33, etc.

Processing internal threads:

P25IR8RD1-7;P25IR10RD1-8;P25IR5BU1-5.

II. The blades used for thread turning machines:

The inserts for machining external threads are:

C16ER8RD1-31/C16ER8RD1-32; C16ER10RD1-31/C16ER10RD1-32; C20ER5BU1-31/C20ER5BU1-32.

Single blades are:

B17ER8RD2-3; B17ER10RD2-4; B17ER5BU2-2;

S24ER8RD2-3; S24ER5BU2-2;

SC16ER8RD2-3; SC16ER10RD2-4;

R19ER8RD2-4; R19ER5BU2-3;R19ER5BU2-3D;

S24IR8RD1-7; S24IR8RD1-7F; S24IR10RD1-7;

S24ER5BRD1-3;C25ER5BU1-5;

C16ER8RD1-3;C16ER10RD1-4.

Processing internal threads:

C25IR8RD1-7;C25IR10RD1-8;C25IR5BU1-5;C16IR5BU1-2;

C16IR5BU1-3; B17IR8RD2-3; B23IR8RD2-5; B17IR10RD2-4; B23IR5BU2-3;B17IR5BU2-2;S16IR8RD2-4; S16IR5BU2-2;R19IR8RD2-4;R19IR5BU2-3;S19IR5BU2-3D;

S24IR5BU1-5;S25IR5BU1-5F;S24IR8RD1-3;S24IR8RD1-5.

B Small batch production conditions (all processed by thread turning) blade selection:

Machining external thread:

L40ER10RD1-2;L40ER8RD1-2:T27ER8RD3-2:T27ER10RD3-2;

16ER8APIRD;16ER10APIRD;T28ER5BU3-1.

Machining internal thread:

S19IR10RD4-2; S19IR8RD4-2;

T27IR10RD3-2;T27IR8RD3-2;

16IR8APIRD; 16IR10APIRD; T28IR5BU3-1.

(2) Drill pipe thread inserts (all processed by thread turning):

Type A blade: general purpose.

B-type blade: preferred, blade and shank are highly interchangeable.

C-type inserts: Mainly suitable for small-scale drill pipe joint internal and external thread processing below 3".

(4) Oil pipe thread insert cutting graphics

1）The problem of how to reasonably design the cutting pattern of each tooth structure and the distribution of cutting load of each tooth in the oil pipe threading insert is very important for improving and enhancing the thread processing quality, efficiency and tool life. Single-tooth blades (such as drill pipe joint blades) have the problem of designing different feed and cutting methods to determine the cutting pattern of each cutting stroke, rather than being determined by the tooth shape structure of the blade.

(1) The situation where the entire thread is cut in one stroke:

When the machine tool power and rigidity are large enough, the best solution is to complete the full thread cutting in one stroke, which can significantly improve efficiency, design the cutting pattern most reasonably, and increase the life of the thread insert. It must be noted that whether the thread insert completes full thread cutting in one stroke or multiple strokes, the last fine-cutting tooth is the tooth shape to ensure thread accuracy. It must cover the full thread tooth shape and contain reasonable cutting allowances in all parts. (The two tooth sides are 0.07-0.12MM, the tooth bottom and tooth top are 0.10-0.20MM)

Example 1: Internal thread cutting pattern of the round thread of the casing coupling of P25IR8RD1-7 (Figure 1).

Example 2: External thread cutting pattern of the round thread of the three-piece casing body of P16ER8RD1-31/P16ER8RD1-32/P16ER8RD1-33 (Figure 2).

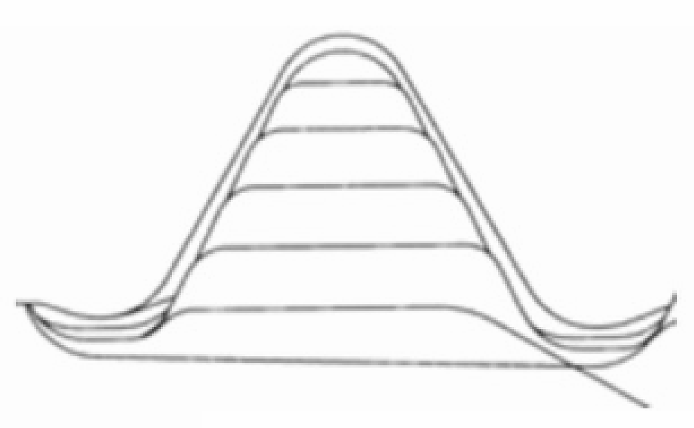


Figure 1

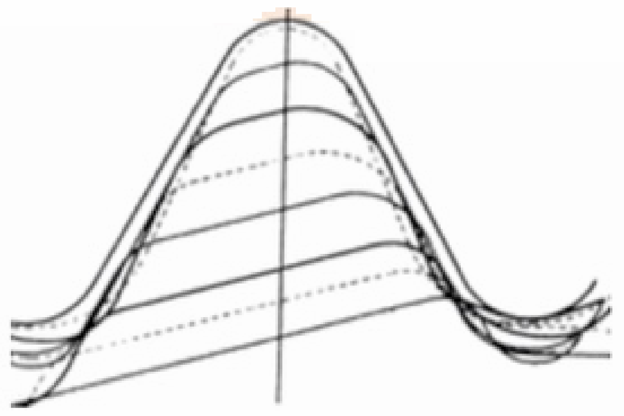


Figure 2

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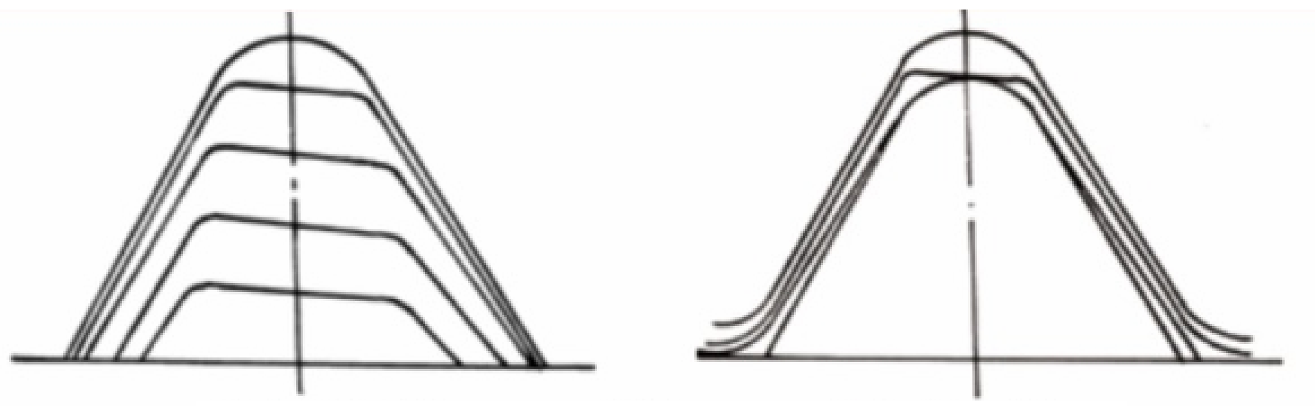
TIPS FOR USE

2) Multiple tool passes to complete full thread cutting:

When the power and rigidity of the threading machine cannot complete the full thread cutting in one tool pass, it can only be completed by using multiple tool passes. At this time, the first stroke removes the main amount (especially for inserts with more than 3 teeth), so the thread insert cutting pattern design is based on the allocation of the first stroke. The subsequent strokes have a smaller amount of cutting for each roughing tooth. (Figure 3)

Example 1: Internal thread cutting pattern of B23IR8RD2-5 casing coupling round thread.



First trip Figure 3 Second trip

Example 2: P25IR5BU1-5 casing coupling trapezoidal thread internal thread cutting pattern (Figure 4)

First trip Figure 4 Second trip

(5) The "double arc" structure of the tooth bottom of the oil pipe casing round thread insert for precision turning

As shown in Figure 5, the round thread blades used for processing petroleum pipes, casings and their couplings use a "double arc" knot at the bottom of the teeth on both sides of the fine turning teeth, that is, two arc segments R1 and R2, and R2≈R1+(0.2-0.3), (R1 is 0.508MM or 0.432MM). Practice has shown that defects such as "small flat top buckle" and "butt" scratches on the top of the workpiece thread teeth can be avoided.

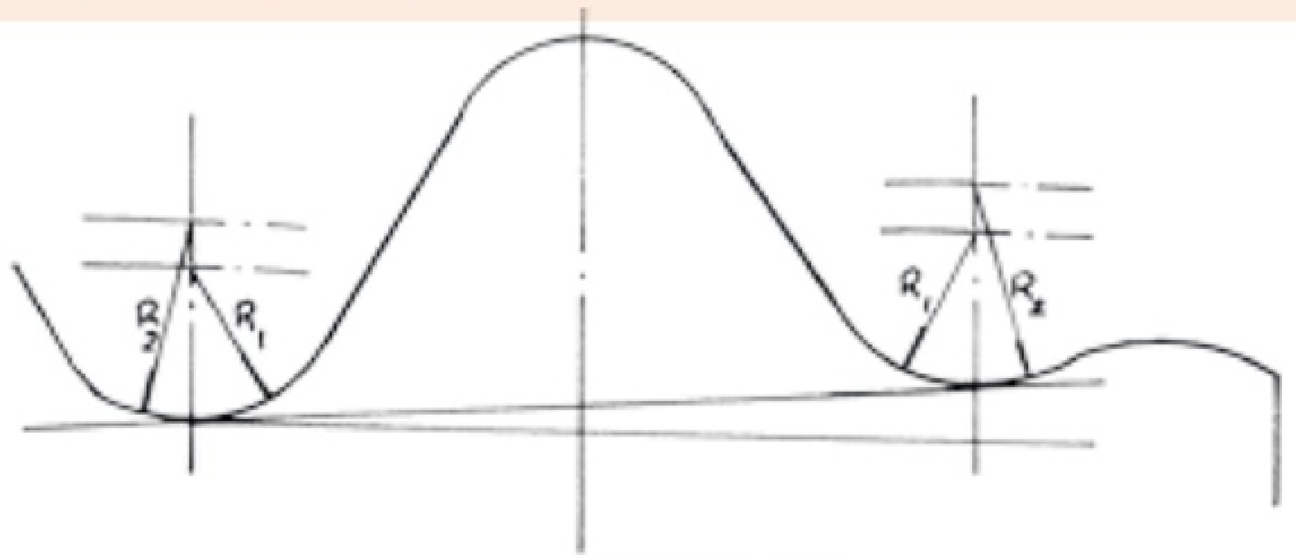


Figure 5 Insert thread finishing

(6) Several types of oil pipe thread blade grooves and chip breakers

Four types of thread insert grooves or chip breaker structures are used as shown in FIG6 .

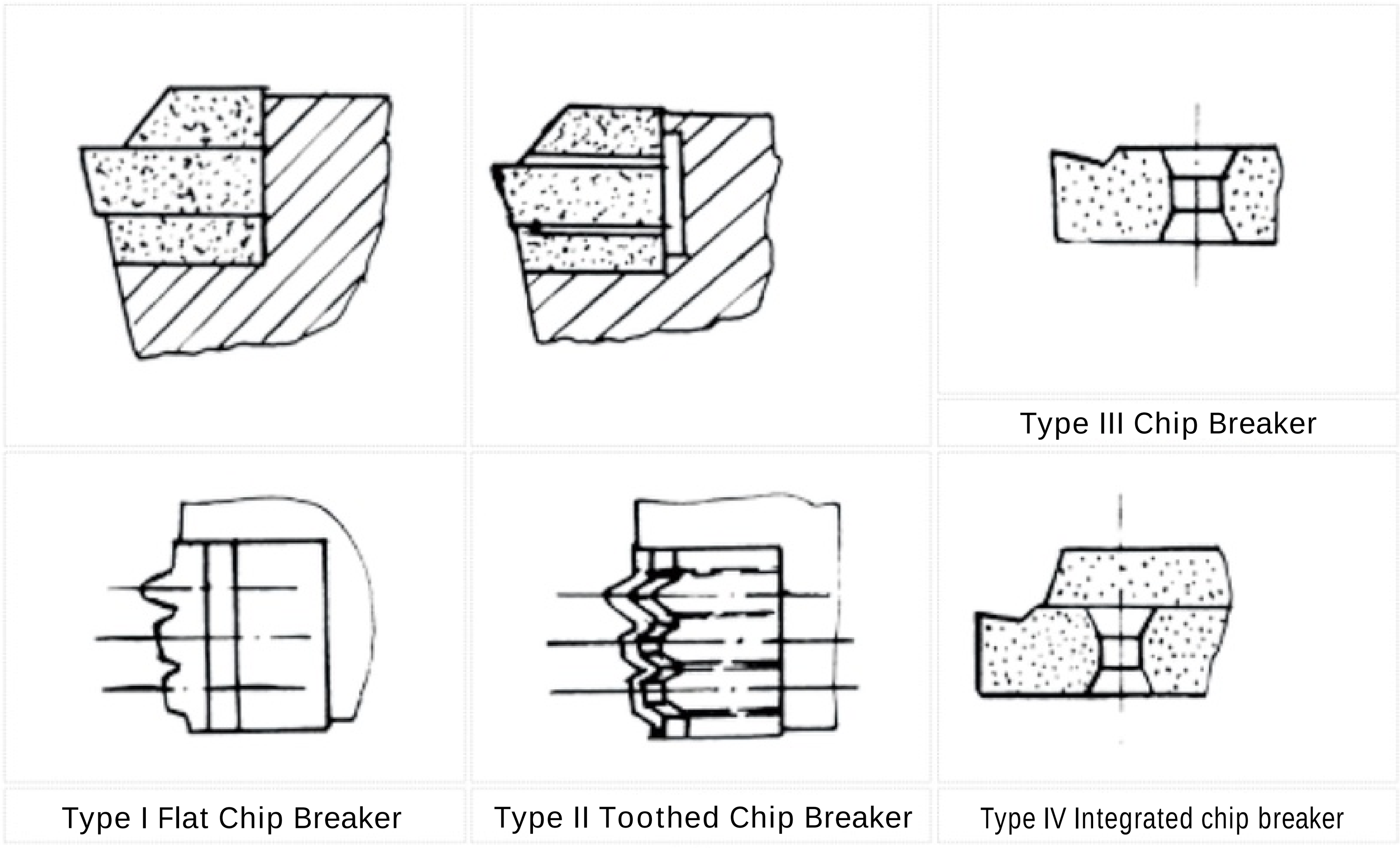


Figure 6

It must be pointed out that the chip breaking problem in oil pipe thread processing is one of the current technical difficulties, and it is even more severe on multi-tooth blades, especially the chip breaking of fine turning teeth is the most difficult. The above-mentioned blade groove shape and chip breaker structure can significantly improve the chip removal and chip curling conditions, and can also partially break chips.

(7) Several forms of oil pipe thread blade clamping structure and tool rod structure

The tool bar is the connecting part between the insert and the tool holder (or tool holder). It should have sufficient strength, hardness and precision.

The head of the tool bar is the part that clamps the insert, and the shank is the part that is installed in the tool holder (or tool holder).

The structure of the shank head, i.e. the part that clamps the blade, is mainly determined by the shape of the blade. In addition to requiring sufficient strength and rigidity, the rigidity, positioning reliability, accuracy, ease of use, chip removal and chip breaking of the clamped blade must also be guaranteed. Blades with different structural shapes have corresponding clamping structures. Please refer to the model notes of carbide oil pipe thread arbor.

The upper pressure type (M and C structures) is an installation of a square blade (or fan-shaped blade) without a hole. Mostly used for machining internal threads of oil casing couplings. Both ends of the screw of the hook nut are provided with left and right threads respectively and act as a pressure plate to clamp the blade and the chip guide plate. The inclined pull rod inner pull type (P structure) is an inner pull type fastening joint with a double tapered hole blade. It has a two-way tightening effect. The double-tapered hole of the insert should ensure the required accuracy. Its characteristics include compact structure, reliable positioning and high utilization rate of blade materials. It is used for oil, casing and drill pipe blades (double tapered hole blades).

The bidirectional clamping structure (J structure) with the inclined surface of the core rod pressure plate is mainly used for clamping the threaded blades of the drill pipe joint and the triangular straight hole blades of the oil pipe threads of the sucker rod parts.

The wedge block bevel side clamping (F structure) is used for the installation of prismatic long strip non-coated resharpenable blades. It is used for outer thread processing of oil and casing pipes. It is firmly clamped and the blade can be reground along the front edge after wear so that it can be used multiple times. The center height of the blade can be adjusted as needed during use.

The vertically mounted insert side clamping (G structure) structure is mainly used for clamping vertically mounted triangular indexable trapezoidal casing thread single-tooth inserts. The blade has good strength and rigidity and is firmly clamped. This knot is clamped in both the upward and side pressure directions.

The handle of the tool rod is installed in the tool holder (or tool seat), and the cross-section of the general tool rod handle is square or rectangular. On some CNC threading machines for processing internal threads, the cross-section of the shank is circular. The shank size should ensure that the tool shank has sufficient strength and rigidity and the protruding length of the tool shank head should be as small as possible to prevent cutting vibration and thread surface ripples.

In most cases, the shank and head of the tool bar are an integral structure, but there are also modular assemblies of the head and shank, which are mainly used on internally threaded tool bars, as shown in the figure. When the head is broken, you only need to replace the head, not the entire shank.

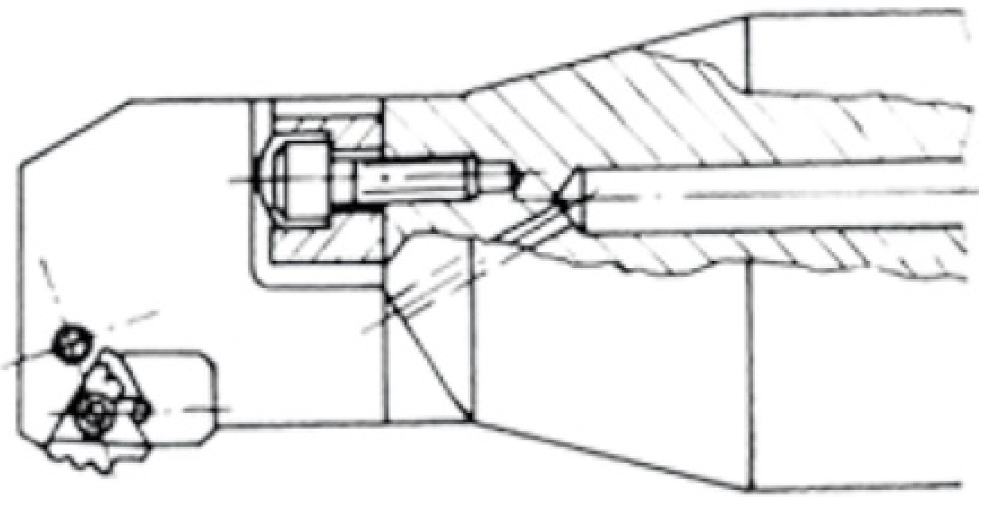


Figure 7

In order to keep the blades on both sides with approximately the same side edge normal back angle when machining threads, the insert needs to be installed on the tool arbor at an angle that is equal to or close to the helix angle of the thread. Therefore, it is related to the pitch and thread straightness. This inclination angle has been machined on the tool bar, ranging from approximately 0° to 120', and is divided into four levels. Therefore, when selecting a tool arbor, the user should select the corresponding tool arbor specifications after determining the pipe thread specifications (diameter and pitch). The A, B, C, and D in the tool bar note ⑥ of this sample indicate the tool bar specifications applicable to pipes of different diameters.

The tool bar and tool bar components must be made of high-quality steel and heat treated to maintain and achieve the required hardness and strength. The chip breaker should be made of cemented carbide with good performance. The base surface and positioning surface of the tool bar should be ground to achieve the required accuracy.

(8) Recommendations for selecting the cutting amount of oil pipe thread inserts

Cutting speed recommendation table

Insert Type	Workpiece grade					
	Ordinary grade steel	Second highest steel grade	High steel grade	Anti-S	Anti-crush	High Cr, High Ni
	J55 (H40;K55, M65.etc.)	N80 (C75,L80 etc.)	P110 (C90,T95, Q125 etc.)	N80+S P110+S, etc.	N80+T P110+T, etc.	13Cr etc.
	Vc (mm/min)					
Uncoated Inserts	90～120	80～100	---	---	---	---
Coating Insert	170～220	150～200	120～180	120～180	100～160	50～100

Note: The data in the table are for full cooling with coolant; if it is dry cutting, the speed is 20% lower.

Insert Type			Tool feed stroke sequence											
			1	2	3	4	5	6	7	8	9	10	11	12
			Ap (mm)											
8 teeth per inch round thread	Internal	2-tooth insert	0. 60	0. 40	0. 35	0. 30	0. 20	0. 20						
		3-tooth insert	0. 80	0. 60	0. 40	0. 20								
		5-tooth insert	1. 75	0. 25										
		7-tooth insert 2 times	1. 80	0. 20										
		7-tooth insert 1 times	2. 00											
	External	2-tooth insert	0. 70	0. 45	0. 40	0. 30	0. 20							
		3-tooth insert	0. 85	0. 60	0. 35	0. 20								
		3-tooth insert 2 pieces per group	2. 00											
		3-tooth insert 3 pieces per group	2. 00											
10 teeth per inch round thread	Internal	2-tooth insert	0. 55	0. 40	0. 35	0. 20	0. 15							
		3-tooth insert	0. 80	0. 55	0. 20									
		4-tooth insert	1. 00	0. 50	0. 15									
		8-tooth insert	1. 60											
	External	2-tooth insert	0. 55	0. 50	0. 35	0. 20								
		3-tooth insert	0. 90	0. 55	0. 15									
		4-tooth insert	1. 05	0. 50	0. 15									
		3-tooth insert 2 or 3 pieces per group	1. 60											

Insert Type			Tool feed stroke sequence											
			1	2	3	4	5	6	7	8	9	10	11	12
			Ap (mm)											
5 threads per inch trapezoidal round thread	Internal	Single tooth vertical insert	0. 35	0. 30	0. 25	0. 25	0. 20	0. 20	0. 20					
		3-tooth insert	0. 50	0. 40	0. 35	0. 30	0. 20							
		5-tooth insert	1. 30	0. 45										
	External	Single tooth vertical insert	0. 45	0. 35	0. 30	0. 25	0. 25	0. 20						
		2-tooth insert	0. 45	0. 40	0. 35	0. 35	0. 20							
		3-tooth insert	0. 55	0. 50	0. 40	0. 30								
		3-tooth insert 3 pieces per group	1. 75											
Drill bit adapter thread	Internal	29IRV038R-0402A、29IRV038R-0403A、29IRV40-0503A Single tooth insert	0. 50	0. 45	0. 40	0. 40	0. 35	0. 30	0. 25	0. 20	0. 15	0. 15	0. 10	
		29IRV50-0402A、29IRV50-0403A Single tooth insert	0. 50	0. 45	0. 45	0. 40	0. 35	0. 35	0. 35	0. 30	0. 30	0. 25	0. 15	0. 10
		29IRV55-0601A Single tooth insert	0. 45	0. 45	0. 40	0. 40	0. 30	0. 30	0. 25	0. 20	0. 20	0. 10		
	External	29ERV038R-0402A、29ERV038R-0403A、29ERV40-0503A Single tooth insert	0. 50	0. 45	0. 45	0. 40	0. 35	0. 30	0. 30	0. 25	0. 20	0. 10		
		29ERV50-0402A、29ERV50-0403A Single tooth insert	0. 55	0. 50	0. 45	0. 40	0. 40	0. 35	0. 35	0. 35	0. 30	0. 20	0. 10	
		29ERV55-0601A Single tooth insert	0. 50	0. 45	0. 40	0. 40	0. 35	0. 35	0. 25	0. 20	0. 10			

Note: When machining the drill pipe joint thread, if ordinary inserts are used for rough turning and then formed inserts are used for fine turning, the number of times the formed inserts are used in this table should be reduced accordingly.

(9) Several issues that should be paid attention to when using oil pipe threading tools

(1) Before use, the user should understand the tool structure, processing requirements and usage requirements.
(2) The tool bar must be correctly and firmly clamped on the tool holder (or tool holder). Before installation, wipe the base surface of the tool holder and tool bar dry. The base surface of the shank of the ordinary threading machine should be aligned with a dial indicator to make it parallel or perpendicular to the axis of the thread. The alignment error should be within 0.015MM/100MM. Otherwise, it will cause thread profile errors or even out-of-tolerance.
(3) The threaded insert should be properly installed into the insert groove of the tool arbor. Firmly hold the insert side locating surfaces together by hand and tighten the screws. The insert should be positioned correctly and reliably and clamped securely. If the clamping screws or other clamping parts and chip breakers are damaged, they should be replaced in time to avoid damaging the thread blade during cutting. Each time the insert is changed, the insert groove on the tool bar and the base surfaces of the insert should be wiped clean to prevent debris from getting caught, otherwise it will affect the positioning accuracy or crush the blade.
(4) The machine tool taper plate must be adjusted accurately to minimize the taper error of the processed thread.
(5) Depending on the thread diameter and pitch size, the bottom surface of the insert groove on the threaded tool arbor has different blade inclination angles to adapt to the changing needs of the helix angle and improve the side clearance angle of the insert. Users should pay attention to this when selecting the tool arbor. (See page 12 of this catalog)
(6) During the processing, attention should be paid to the surface condition of the thread, the shape of the insert edge and the operation condition of the threading machine at any time so as to adjust the operation in time and keep the processing going normally. The most common surface defects of threads are corrugations and scratches, which are affected by many factors, including thread inserts, machine tools, etc. Scratches may be caused by: the brightness of the blade, tiny chipping and notches on the blade, built-up edge on the blade, or scratches caused by chips entangled in the blade. The arc at the bottom of the fine-turned teeth is a full arc on the - side and is most likely to have "butt" scratches (referring to oil and casing round threads). When processing threads, if the cutting depth is not enough and the excess of thread cutting cannot be completed, obvious scratches will appear on the top of the thread teeth. When the bed system has poor rigidity, it is easy for top scratches to appear at the pipe ends (when the insert is cut). The ripples on the thread surface are caused by the vibration of the system, which may be due to: poor system accuracy, insufficient machine tool power, too sharp blade (such as unreinforced blade of non-coated blade), excessive blade wear, or the system's natural frequency is close to the forced vibration frequency during cutting. If the above-mentioned scratches and corrugation defects occur, they should be handled according to the specific situation and causes.
(7) When processing petroleum pipe threads, the thread accuracy must be checked by single-item instrument inspection and thread gauge inspection. If the tooth height and tooth profile angle in the thread parameter inspection are out of tolerance, it is usually related to the tooth profile accuracy of the blade. The insert tooth profile accuracy must be checked or the insert replaced with a new one. If the tool tip collapses during fine turning, it can easily cause the tooth height to increase beyond the tolerance. Wear on the tool tip can easily cause the tooth height to decrease and exceed the tolerance. The change of tooth profile angle will also be affected accordingly. Errors in other thread parameters such as pitch, degree, and close spacing are often related to improper adjustment of the machine tool, and the machine tool needs to be readjusted.
(8) Proper insert edge strengthening is critical to the threading process. The finished product of the coated thread insert has undergone a reasonable edge strengthening process at the manufacturer. The cutting edge fillet radius should be R=0.04-0.06MM. The fillet radius of the insert tooth top and tooth bottom should be uniform and the difference should not be too large. Uncoated resharpenable blades are often not edge hardened by the manufacturer. If abnormal conditions (such as ripples, etc.) occur during processing, the operator can use a small triangular oil stone (silicon carbide or diamond oil stone) to carefully grind the blade along the direction of the cutting edge to achieve the cutting edge strengthening requirements. The insert edge should be treated similarly after regrinding.
(9) Under the current circumstances, sufficient cooling must be carried out during the thread processing of petroleum pipes, and the main method is still to supply coolant. This is an important factor in improving thread processing quality and tool durability. The coolant is directed directly onto the cutting part of the teeth. If conditions permit, high-pressure coolant spray can be used. The coolant is sprayed directly at high pressure to the cutting area of the blade through the small grooves on the front edge or bottom surface of the insert and the chip breaker or gasket, and the effect is very obvious. And it is helpful to increase the chip removal effect.
(10) Regrinding of blades: Coated inserts are generally not suitable for regrinding. Uncoated inserts should generally be reground. When resharpening, only sharpen the front edge of the insert and resharpen in the direction of the original front edge of the insert. It is not advisable to regrind the insert or tool bar by hand on the grinding machine, but it is recommended to use a special fixture to regrind it on the tool grinder.
Recommended grinding wheel specifications: JR1, 120#-180# grit, 75% degree: So BW100x20x35.

Causes of common problems during use and recommended solutions:

Frequently asked questions	Causes and recommended measures
(1) Vibration and ripples during cutting	(1) Check whether the system rigidity is sufficient, whether the workpiece and tool bar extension is too long, whether the spindle bearing is properly adjusted, whether the blade is clamped firmly, etc. (2) Lower or increase the spindle speed by 1 to 2 gears for trial processing, and select the speed that avoids the generation of ripples. (3) For non-coated blades, if the blade edge has not been hardened, the blade edge can be gently ground with a fine oilstone on site (along the direction of the blade edge). Or after processing a few workpieces with the new cutting edge, the ripples can be reduced or eliminated.
(2) The insert wears out quickly and has low durability	(1) Check whether the cutting parameters are too high, especially whether the cutting speed and cutting depth are too large. and make adjustments. (2) Is there insufficient coolant supply? (3) Cutting squeezes the blade, causing slight chipping and increasing tool wear (4) The insert is not clamped firmly or becomes loose during the cutting process. (5) Quality issues with the insert itself.
(3) Large pieces of the insert are chipped or broken	(1) Are there any chips or hard particles caught in the insert groove? Cracks or stress have occurred during clamping. (2) Chips entangle and interfere with objects during the cutting process. (3) The insert is accidentally hit during the cutting process. (4) The previous cutting tool such as the stripping knife causes the subsequent cracking of the threaded insert. (5) When a machine tool is operated by hand to retract the tool multiple times, the blade load suddenly increases and the tool is hit because the tool retracts slowly in the subsequent times. (6) The workpiece material is uneven or the machinability is very poor. (7) Quality issues with the insert itself.
4) Pipe thread profile error exceeds tolerance	(1) The insert fine-tip cutting blade is worn and needs to be replaced with a new insert. (2) When fine turning the insert teeth, the "collapsed tip" phenomenon occurs, and the cutting speed and cutting depth should be appropriately reduced. (3) The insert or arbor is not installed correctly. For example, the base surface is not aligned when the tool rod is installed, the base surface of the insert is not firmly attached, etc. (4) If there is a slight chipping on the blade, please replace the insert in time. (5) If there is a built-up edge on the blade, you may need to increase the cutting speed appropriately, or use a fine oilstone to lightly grind to remove the built-up edge, or replace the insert.

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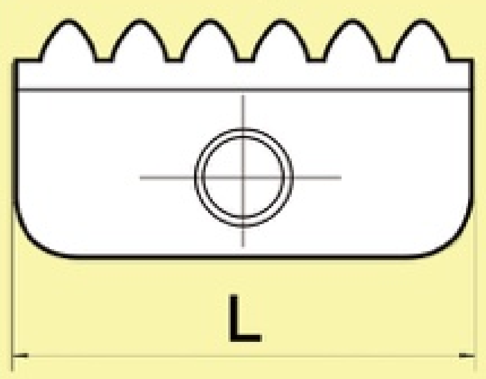
Product Number

Thread milling insert representation method

30 E 12 UN TH



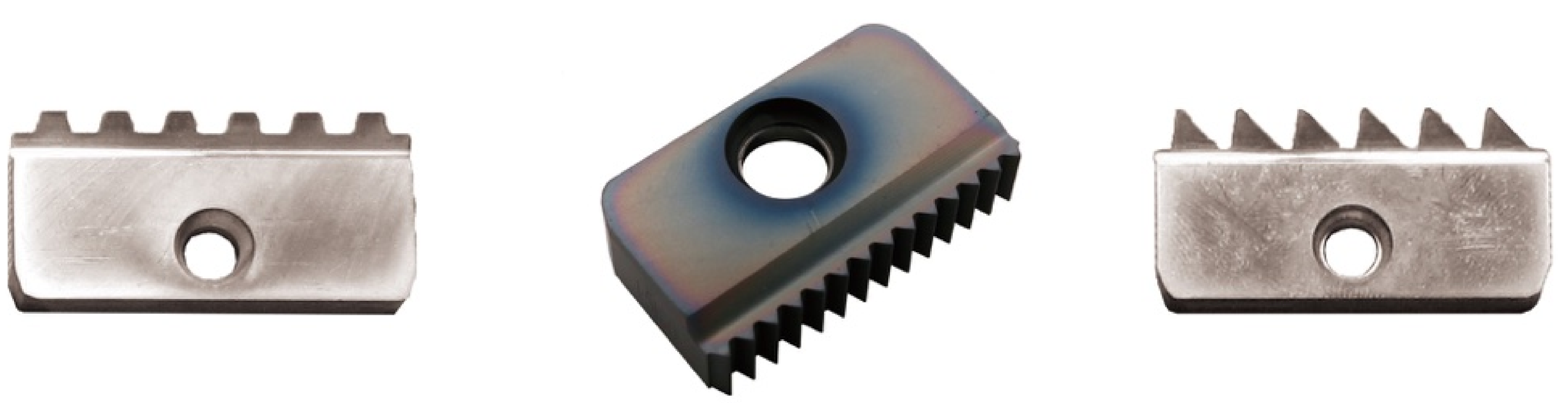
30: 12, 14, 21, 30

E:
- E External
- I Internal
- — External+Internal

12: TPI

UN: Thread Standard
- ISO
- UN
- W
- NPT
- NPTF
- BSPT
- ……

TH: Insert material
- ……



Recommended cutting data table

ISO	Workpiece material	Vc (mm/min)	
		GY01	GY03
P	Low&medium carbon steel	100–250	115–280
P	High Carbon Steel	110–180	130–200
P	Alloy Steel	90–160	105–180
M	Stainless steel	110–170	130–190
M	Cast steel	130–170	150–190
K	Cast iron	70–150	80–150
N	Non-ferrous metals	160–300	180–340
N	Synthetic materials, thermoplastics	100–400	115–460
S	Nickel-based alloy, titanium alloy	20–80	25–90

Ap :0.05- 0.15 mm

Notes on thread milling:

In most cases, choose mid-range values when you first start using it, and use low cutting speeds for harder materials.

When the overhang of the tool bar is large during deep hole processing, please reduce the cutting speed and feed speed to 20%-40% of the original (depending on the workpiece material, pitch and overhang).

For those with large pitch (asymmetric tooth shape), rough machining and fine machining must be carried out separately. Materials with hard or high elasticity and large depth ratio need to be processed with 2-3 cuts. Otherwise, there will be problems such as large vibration, poor surface quality and inability to insert the plug gauge. During processing, it is also necessary to pay attention to the extension of the threaded tool rod as short as possible to increase rigidity, reduce vibration and increase feed.

Tool selection steps:

Select the insert according to the thread pitch to be machined.

Select a rotation diameter dc smaller than the size being machined.

Refer to the table above and select the tool that meets the above two conditions according to the maximum tool diameter.

Thread milling programming:

Among the cutting methods of thread milling, there are arc cutting method, radial cutting method and tangential cutting method. I recommend using the 1/8 or 1/4 arc cutting method. After the thread cutter has traveled 1/8 or 1/4 pitch, the tangent cuts into the workpiece, then travels 360° full circle cutting interpolation for one circle, moves axially for one lead, and finally travels 1/8 or 1/4 pitch to cut out the workpiece.

Using the arc cutting method, the tool cuts in and out in a balanced manner, leaving no trace and generating no vibration, even when machining hard materials.

1. Thread milling parameters and calculation formula:

(1) Calculation of tool speed The tool speed is equal to the machine tool spindle speed, that is,

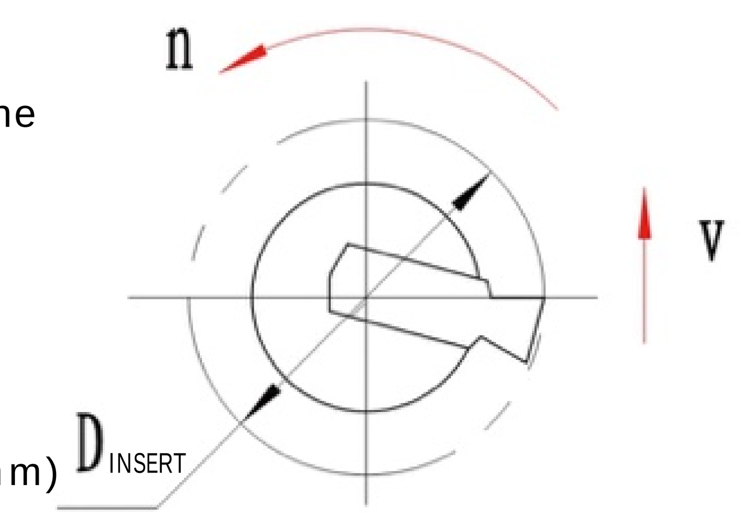
$$n=1000v/nD_{insert}$$

Where:

n- tool speed (r/min);

v- tool linear speed (m/min);

D_{insert}-milling cutter rotation diameter (including insert) (mm)



(2) Calculation of tool radial feed speed

The radial feed rate of the tool is the speed of the milling cutter's rotation diameter (including insert), which is also the feed rate per minute, that is:

$$F1=fzn$$

Where: F1-cutting tool radial feed speed (mm/min);

f-feed per blade per revolution (mm/r);

z-number of cutting edges of the tool;

(3) Calculation of tool center feed speed

Most CNC machine tools require the use of tool center feed speed programming during programming. The feed rate of the tool is determined by the feed rate of the tool center. The feed rate of the tool center is not given directly, but it can be obtained from the relationship equation between the tool feed rate and the tool center. The program is written according to the tool center trajectory. This programming method does not take into account tool radius compensation and wear offset. The program is simple and easy to modify.

The tool center feed speed when machining external threads is

F2=F1x(D+ Dinsert)/D

Where: F2- tool center feed speed (mm/min);

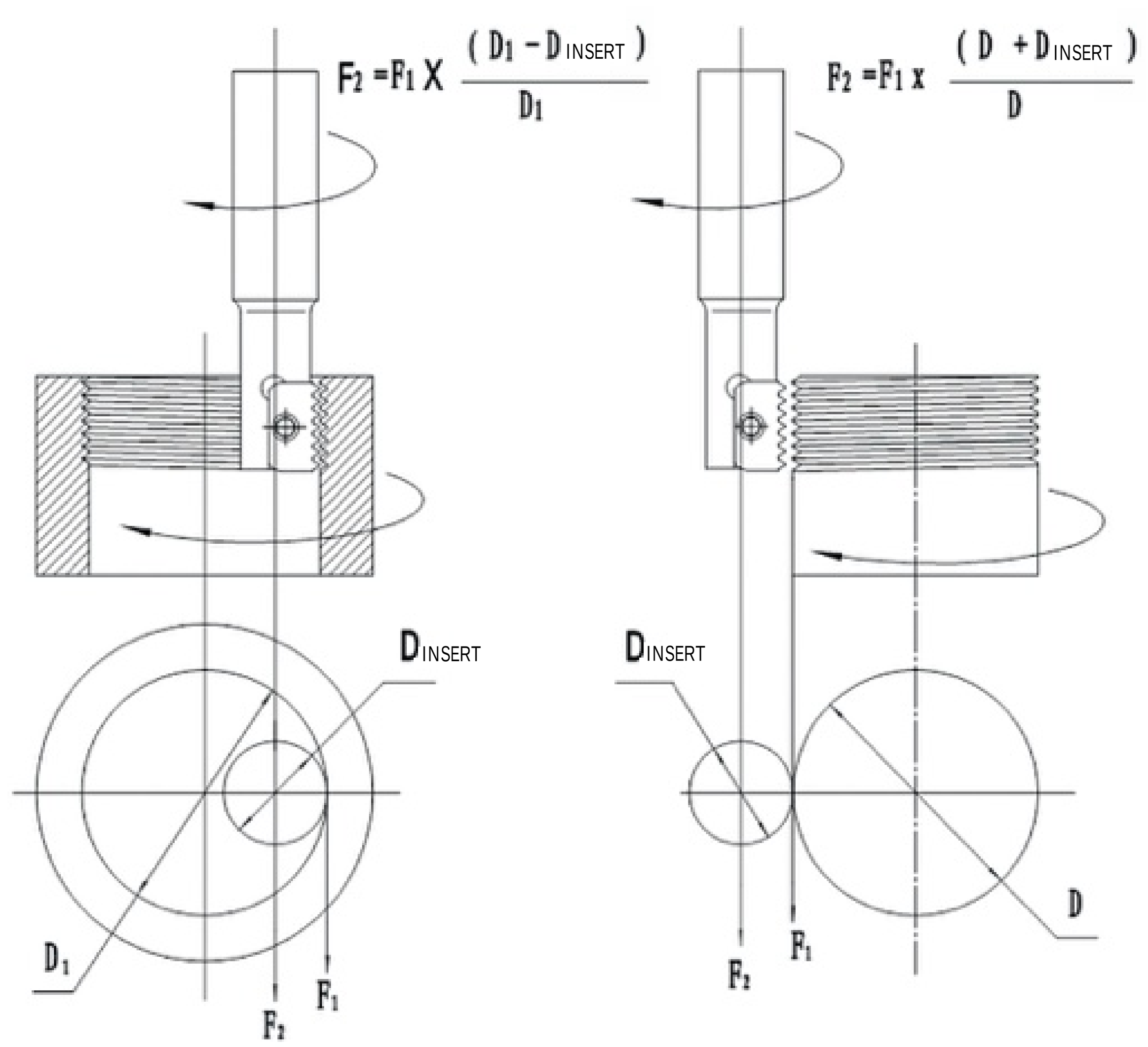
D- thread nominal diameter (thread major diameter) (mm);

The tool center feed speed when machining internal threads is

F2=F1x(D1-Dinsert)/D1

Where: D1-thread diameter (mm);

At the production site, when the minor diameter is unknown, the nominal thread diameter (major thread diameter) can be used for simple calculation.



Thread Milling General Program

```
G90 G00 G54 G43 H1 X0 Y0 Z10 S-
G00 Z-(Thread depth)
G01 G91 G41 D1 X (A/2) Y- (A/2) Z0 F-
G03 X (A/2) Y (A/2) R (A/2) Z (1/8 Pitch)
G03 X0 Y0 I- (A) J0 Z (Pitch)
G03 X- (A/2) Y (A/2) R (A/2) Z (1/8 Pitch)
G01 G40 X- (A/2) Y- (A/2) Z0
G90 X0 Y0 Z0
```

The above data are given based on theoretical calculations. In the actual thread milling process, there will be some changes due to differences in thread processing depth, pitch size, processing materials, cooling conditions, etc. During processing, it is also necessary to pay attention to the extension of the threaded tool rod as short as possible to increase rigidity, reduce vibration and increase feed. For blind hole threads, in order to prevent the processing area from being covered by chips when processing to the bottom of the hole, and the chip accumulation from interfering with the tool, the tool path direction is used from the bottom of the hole to the outside.

2. Thread milling programming example

Program the M25x1.5 internal thread, thread depth 18mm, workpiece material 45#;

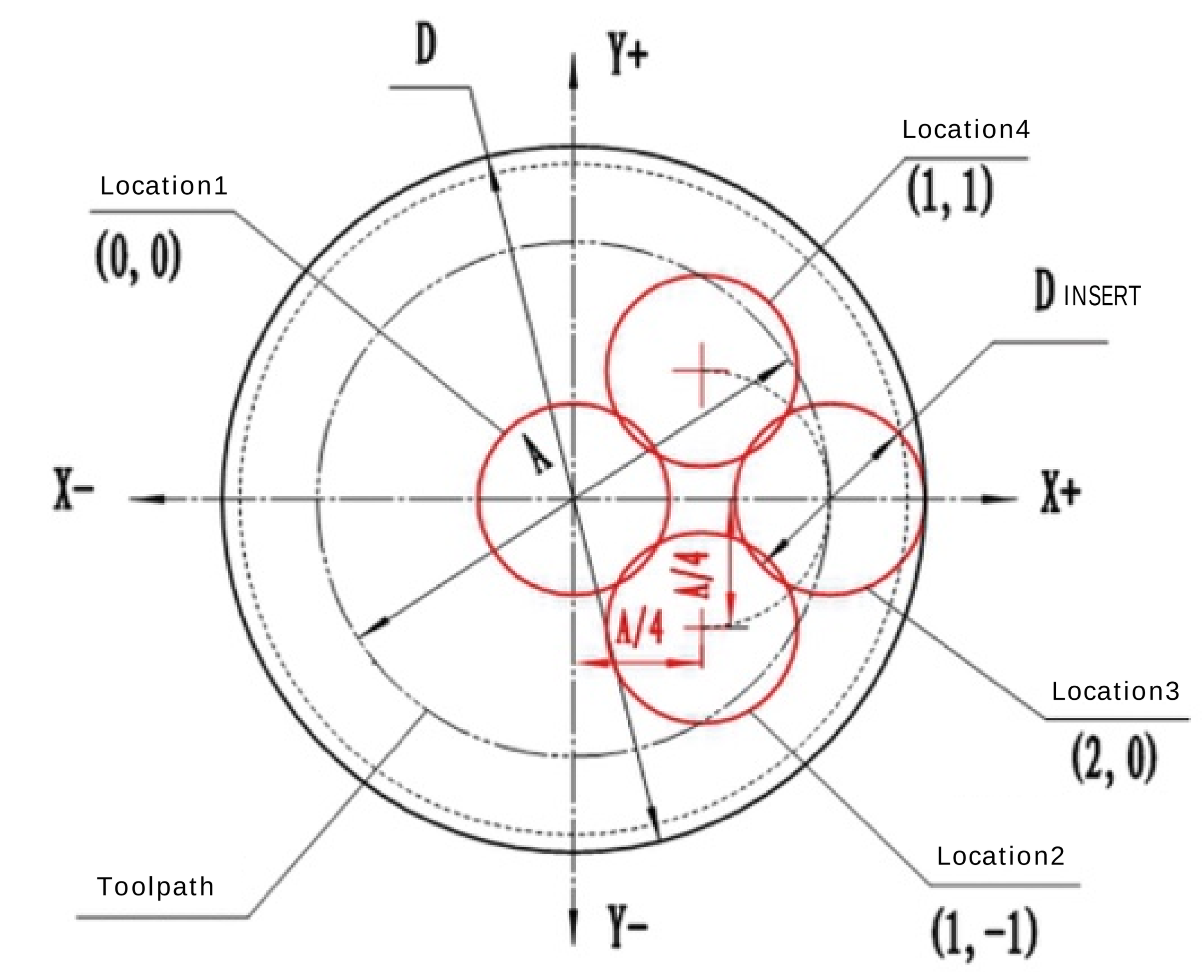
According to the thread size, select the tool model: ST90-21R1T21-B20, tool rotation diameter Φ21mm;

Blade model: 21I1.5ISO, material grade: VKD88D.

Tool linear speed 153m/min; one milling cutter processing, feed rate per revolution 0.07mm/r;

The data system is FANUCOi.

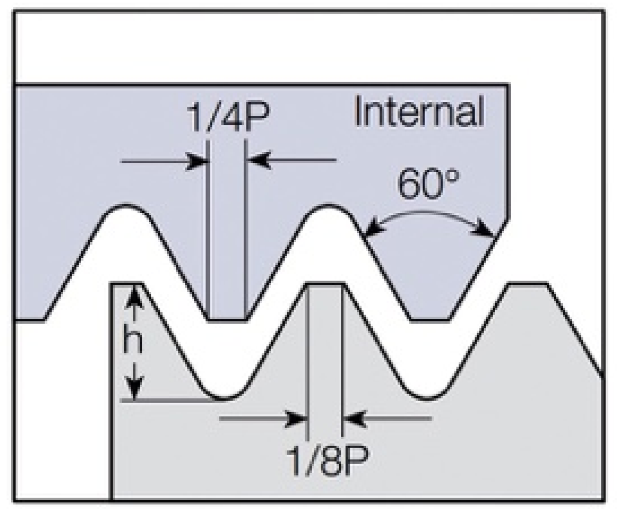
```
N10   G40 G80;
N20   G91 G28 Z0;
N30   M6 T1;
N40   G17 G54 G90 G0 X0 Y0 M3 S2320;
N50   G43 H1 Z60;
N60   G01 Z-18.188 F5000 M08;
N70   G91 ;
N80   G41 D10 X1. Y1. Z0 F26;
N90   G03 X1. Y1. Z0.188 I0 J1.;
N100  G03 X0 Y0 Z1.5 I-2. J0;
N110  G03 X-1. Y1. Z0.188 I-1. J0;
N120  G01 G40 X-1. Y-1. Z0. F5000;
N130  G01 Z25.;
N140  G90 G0 X0 Y0 Z50;
N150  G91 G28 Z0;
N160  M30;
```

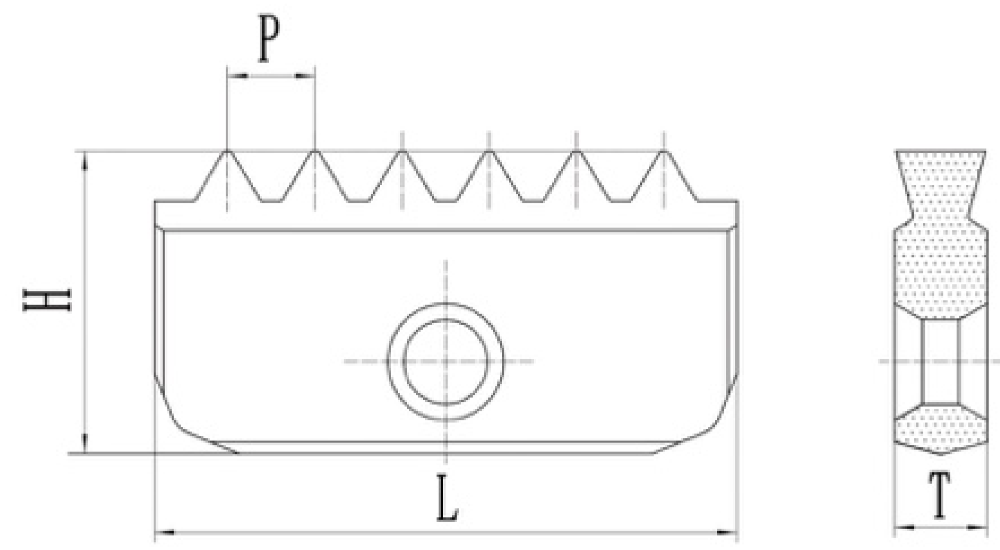


Tool interpolation path diameter

$$A=D-D_{INSERT}$$

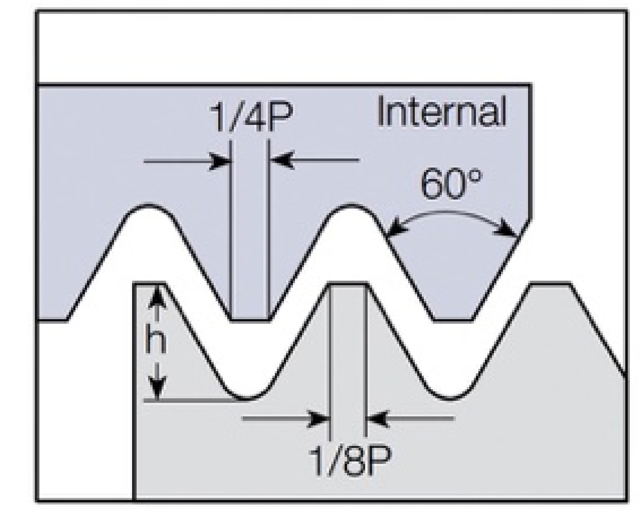
ISO Metric Full Profile

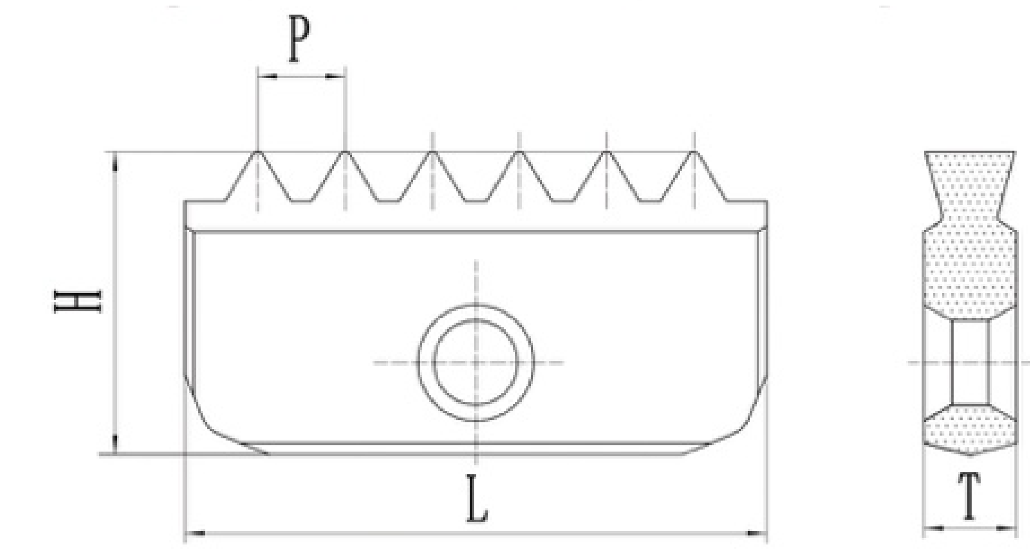




TPI mm		L 12mm	14mm	21mm	30mm	40mm
0.5	Ext.					
	Int.	12 I 0.5 ISO	14 I 0.5 ISO			
0.75	Ext.		14 E 0.75ISO			
	Int.	12 I 0.75ISO	14 I 0.75ISO			
1	Ext.		14 E 1.0 ISO	21 E 1.0 ISO		
	Int.	12 I 1.0 ISO	14 I 1.0 ISO	21 I 1.0 ISO		
1.25	Ext.		14 E 1.25ISO			
	Int.	12 I 1.25ISO	14 I 1.25ISO			
1.5	Ext.		14 E 1.5 ISO	21 E 1.5 ISO	30 E 1.5 ISO	40 E 1.5 ISO
	Int.	12 I 1.5 ISO	14 I 1.5 ISO	21 I 1.5 ISO	30 I 1.5 ISO	40 I 1.5 ISO
1.75	Ext.		14 E 1.75ISO			
	Int.		14 I 1.75ISO	21 I 1.75ISO		
2	Ext.		14 E 2.0 ISO	21 E 2.0 ISO	30 E 2.0 ISO	40 E 2.0 ISO
	Int.		14 I 2.0 ISO	21 I 2.0 ISO	30 I 2.0 ISO	40 I 2.0 ISO
2.5	Ext.		14 E 2.5 ISO	21 E 2.5 ISO		
	Int.		14 I 2.5 ISO	21 I 2.5 ISO		
3	Ext.			21 E 3.0 ISO	30 E 3.0 ISO	40 E 3.0 ISO
	Int.			21 I 3.0 ISO	30 I 3.0 ISO	40 I 3.0 ISO
3.5	Ext.				30 E 3.5 ISO	
	Int.			21 I 3.5 ISO	30 I 3.5 ISO	40 I 3.5 ISO
4	Ext.				30 E 4.0 ISO	40 E 4.0 ISO
	Int.				30 I 4.0 ISO	40 I 4.0 ISO
4.5	Ext.					
	Int.				30 I 4.5 ISO	40 I 4.5 ISO
5	Ext.					40 E 5.0 ISO
	Int.					40 I 5.0 ISO
5.5	Ext.					
	Int.					40 I 5.5 ISO
6	Ext.					40 E 6.0 ISO
	Int.					40 I 6.0 ISO
H		6.3	7.5	12	16	20
T		2.9	3.1	4.7	5.5	6.3

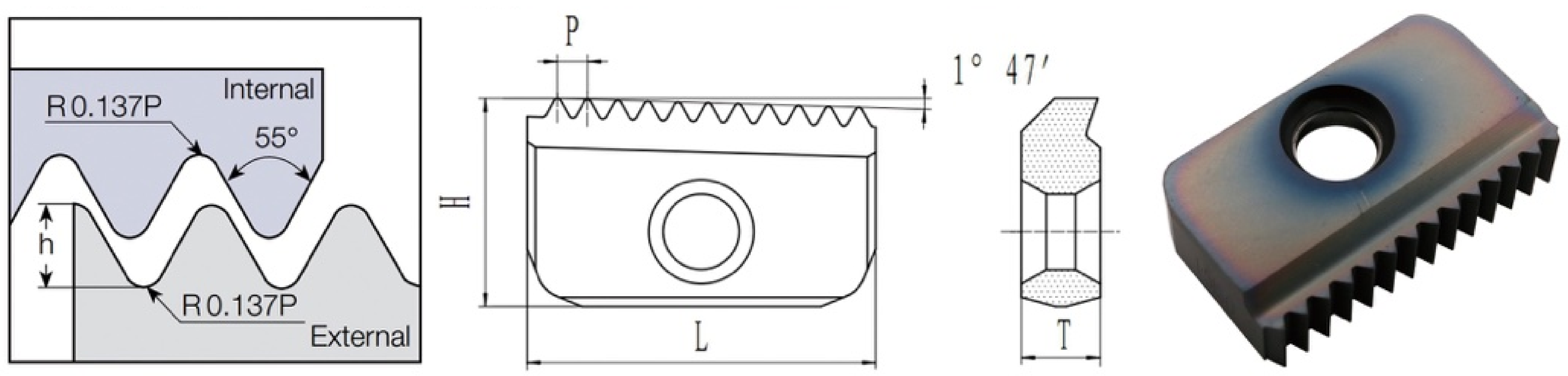
UN American Unified Thread 60° Full Profile (UN, UNC, UNF)





TPI mm		L 12mm	14mm	21mm	30mm	40mm
32	Ext.		14 E 32 UN			
	Int.	12 I 32 UN	14 I 32 UN			
28	Ext.		14 E 28 UN			
	Int.	12 I 28 UN	14 I 28 UN			
27	Ext.					
	Int.		14 I 27 UN			
24	Ext.		14 E 24 UN	21 E 24 UN		
	Int.	12 I 24 UN	14 I 24 UN	21 I 24 UN		
20	Ext.		14 E 20 UN	21 E 20 UN	30 E 20 UN	
	Int.	12 I 20 UN	14 I 20 UN	21 I 20 UN	30 I 20 UN	
18	Ext.		14 E 18 UN	21 E 18 UN	30 E 18 UN	
	Int.	12 I 18 UN	14 I 18 UN	21 I 18 UN	30 I 18 UN	
16	Ext.		14 E 16 UN	21 E 16 UN	30 E 16 UN	40 E 16 UN
	Int.	12 I 16 UN	14 I 16 UN	21 I 16 UN	30 I 16 UN	40 I 16 UN
14	Ext.		14 E 14 UN	21 E 14 UN	30 E 14 UN	40 E 14 UN
	Int.		14 I 14 UN	21 I 14 UN	30 I 14 UN	40 I 14 UN
12	Ext.		14 E 12 UN	21 E 12 UN	30 E 12 UN	40 E 12 UN
	Int.		14 I 12 UN	21 I 12 UN	30 I 12 UN	40 I 12 UN
10	Ext.			21 E 10 UN	30 E 10 UN	40 E 10 UN
	Int.		14 I 10 UN	21 I 10 UN	30 I 10 UN	40 I 10 UN
8	Ext.				30 E 8 UN	40 E 8 UN
	Int.			21 I 8 UN	30 I 8 UN	40 I 8 UN
7	Ext.					
	Int.			21 I 7 UN		
6	Ext.				30 E 6 UN	40 E 6 UN
	Int.				30 I 6 UN	40 I 6 UN
4.5	Ext.					
	Int.					40 I 4.5 UN
4	Ext.					
	Int.					40 I 4 UN
H		6.3	7.5	12	16	20
T		2.9	3.1	4.7	5.5	6.3

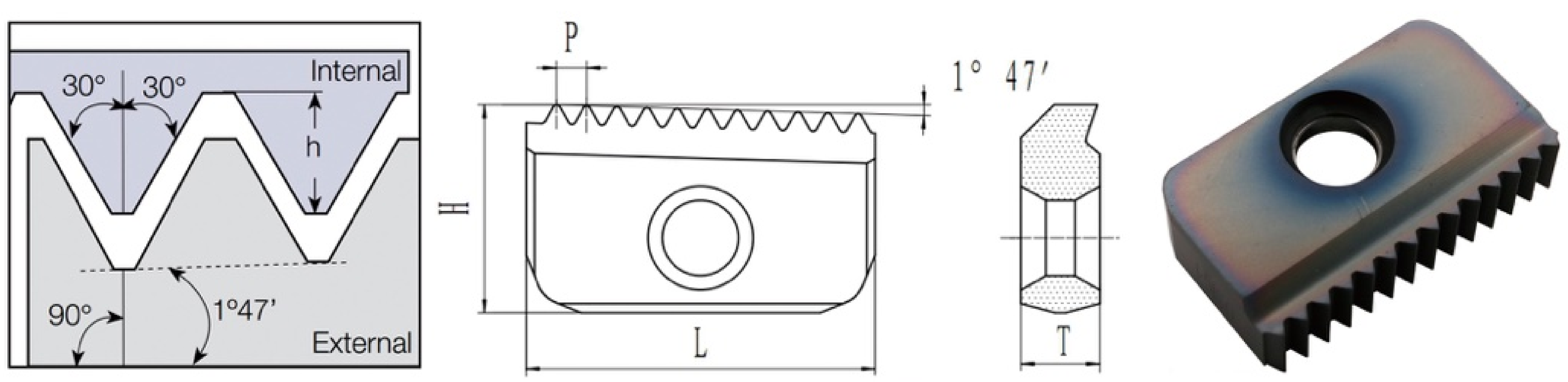
British Whitworth 55° Full Profile BSW, BSF, BSP



TPI mm	L				
	12mm	14mm	21mm	30mm	40mm
24		14-24 W			
20		14-20 W	21-20 W		
19	12-19 W	14-19 W	21-19 W		
16		14-16 W	21-16 W	30-16 W	
14		14-14 W	21-14 W	30-14 W	
11			21-11 W	30-11 W	40-11 W
8					40-8 W
H	6.3	7.5	12	16	20
T	2.9	3.1	4.7	5.5	6.3

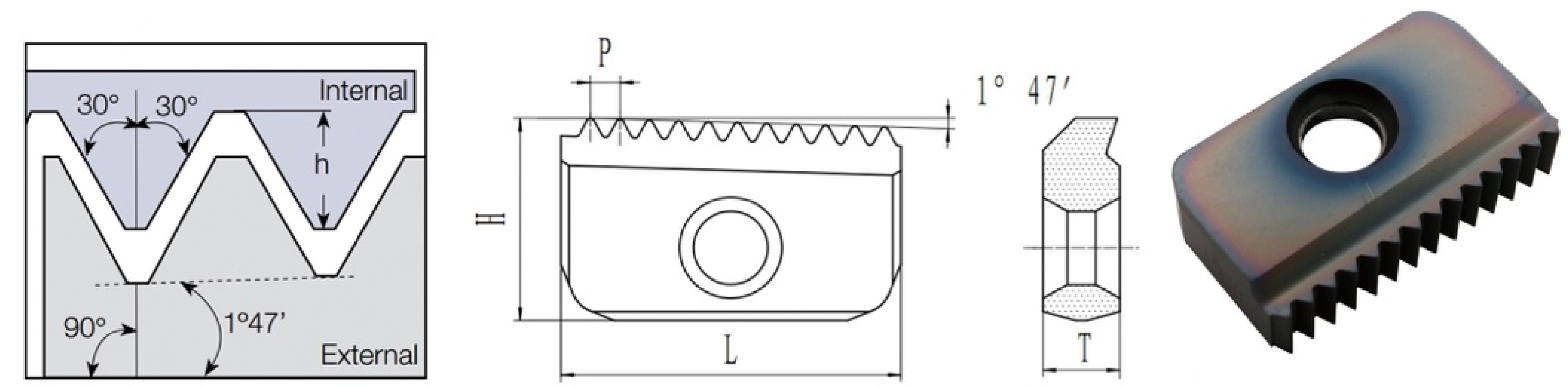
Note: The same insert is used for machining internal and external threads.

National Pipe Taper 60° NPT



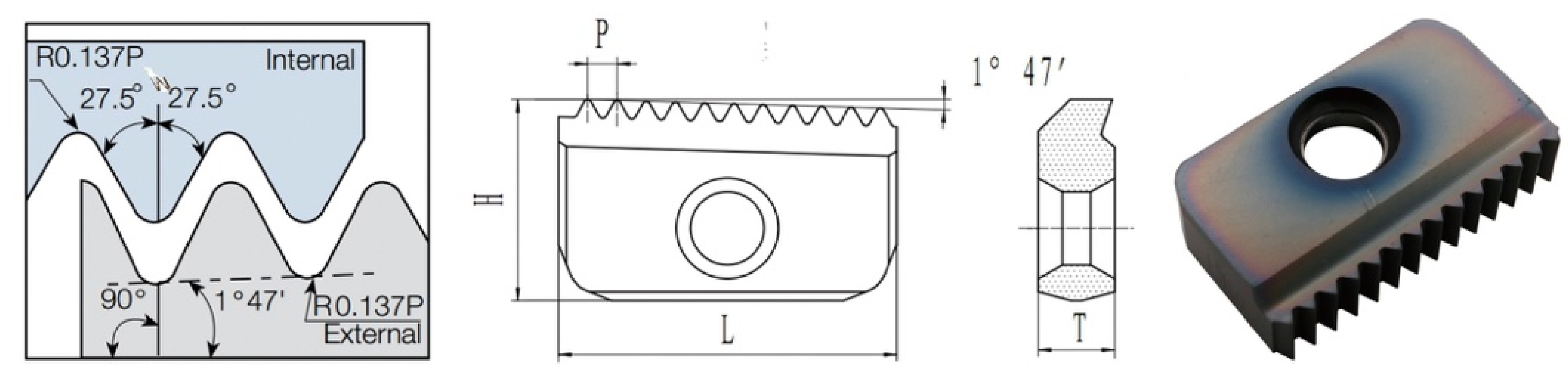
TPI mm	L				
	12mm	14mm	21mm	30mm	40mm
18	12-18 NPT	14-18 NPT			
14		14-14 NPT	21-14 NPT		
11.5			21-11.5 NPT	30-11.5 NPT	40-11.5 NPT
8				30-8 NPT	40-8 NPT
H	6.3	7.5	12	16	20
T	2.9	3.1	4.7	5.5	6.3

National Pipe Taper Fuel 60° NPTF



TPI mm	L				
	12mm	14mm	21mm	30mm	40mm
18	12-18 NPTF	14-18 NPTF			
14		14-14 NPTF	21-14 NPTF		
11.5			21-11.5 NPTF	30-11.5 NPTF	40-11.5 NPTF
8				30-8 NPTF	40-8 NPTF
H	6.3	7.5	12	16	20
T	2.9	3.1	4.7	5.5	6.3

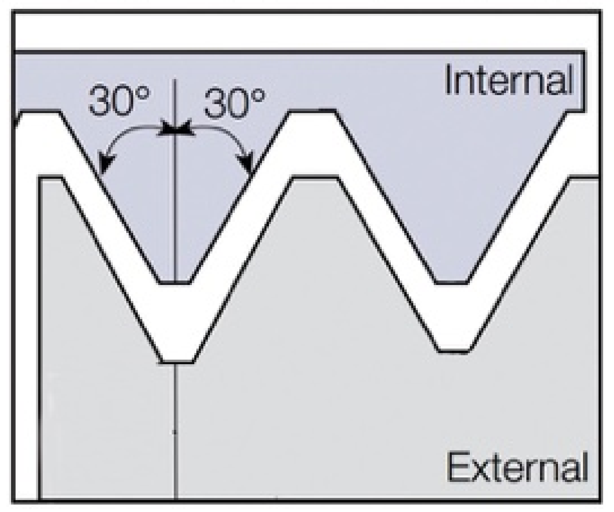
British Standard Pipe Thread BSPT

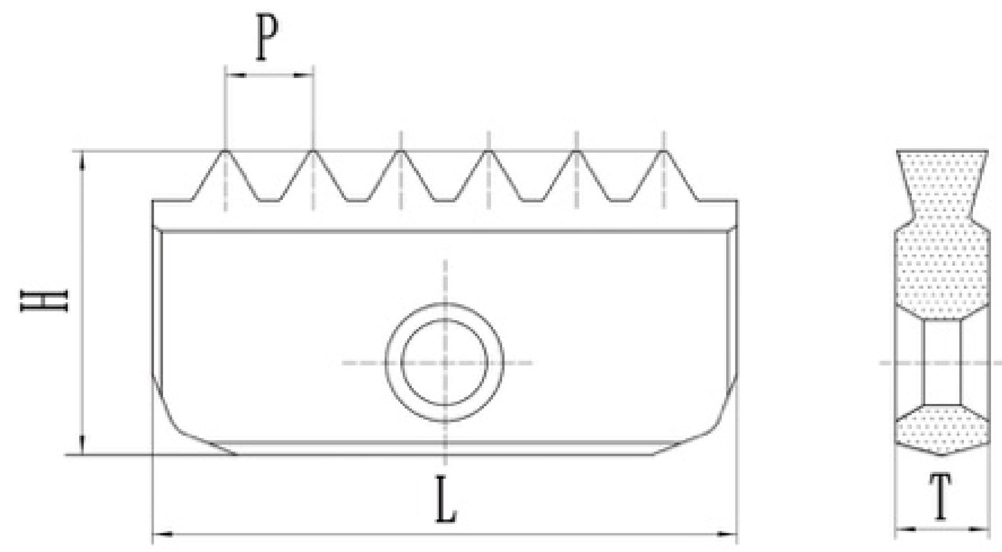


TPI mm	L				
	12mm	14mm	21mm	30mm	40mm
19	12-19 BSPT	14-19 BSPT			
14		14-14 BSPT	21-14 BSPT		
11			21-11 BSPT	30-11 BSPT	40-11 BSPT
H	6.3	7.5	12	16	20
T	2.9	3.1	4.7	5.5	6.3

Note: The same insert is used for machining internal and external threads.

National Pipe Straight 60° NPS

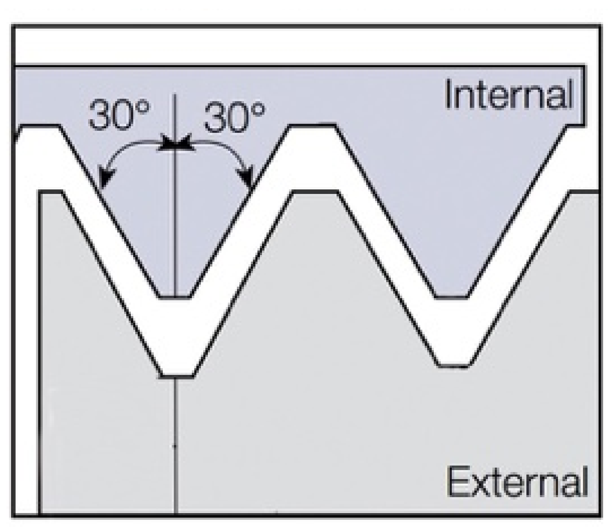


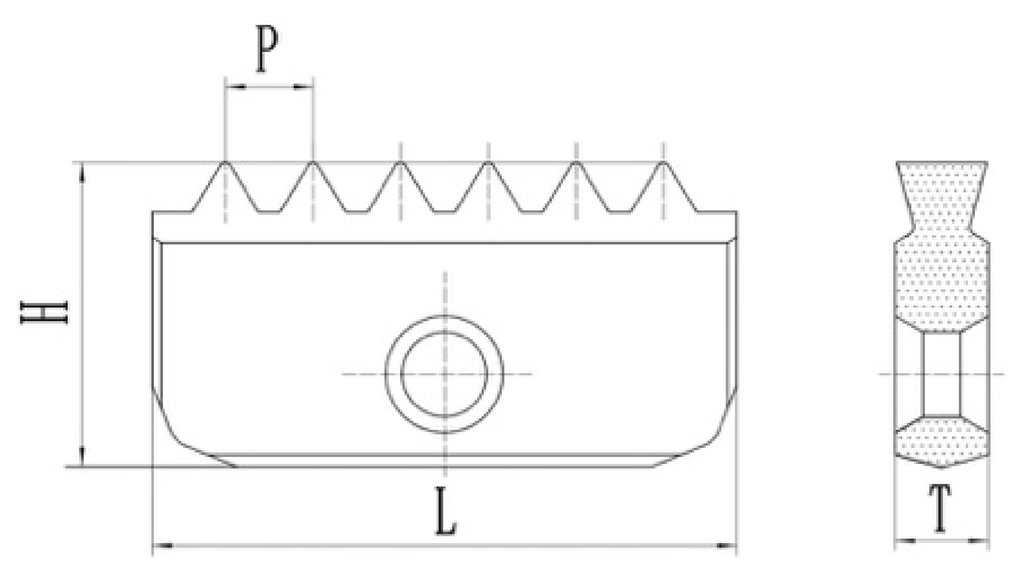


TPI mm	L				
	12mm	14mm	21mm	30mm	40mm
18	12-18 NPS	14-18 NPS			
14		14-14 NPS	21-14 NPS		
11.5			21-11.5 NPS	30-11.5 NPS	40-11.5 NPS
8				30-8 NPS	40-8 NPS
H	6.3	7.5	12	16	20
T	2.9	3.1	4.7	5.5	6.3

Note: The same insert is used for machining internal and external threads.

National Pipe Straight Fuel 60° NPSF

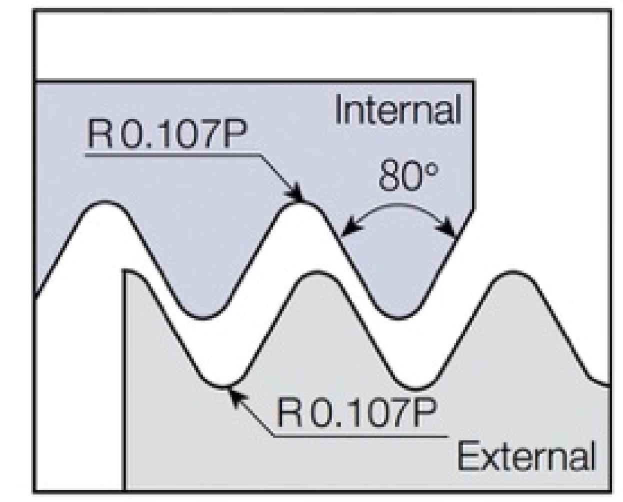


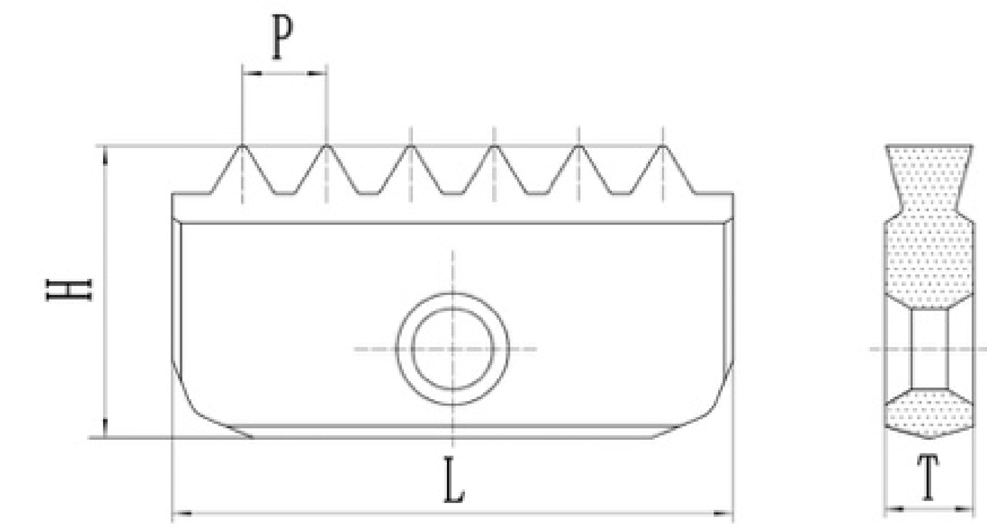


TPI mm	L				
	12mm	14mm	21mm	30mm	40mm
18	12-18 NPSF	14-18 NPSF			
14		14-14 NPSF	21-14 NPSF		
11.5			21-11.5 NPSF	30-11.5 NPSF	40-11.5 NPSF
8				30-8 NPSF	40-8 NPSF
H	6.3	7.5	12	16	20
T	2.9	3.1	4.7	5.5	6.3

Note: The same insert is used for machining internal and external threads.

Germany Steel Conduit Thread 80° PG DIN40430

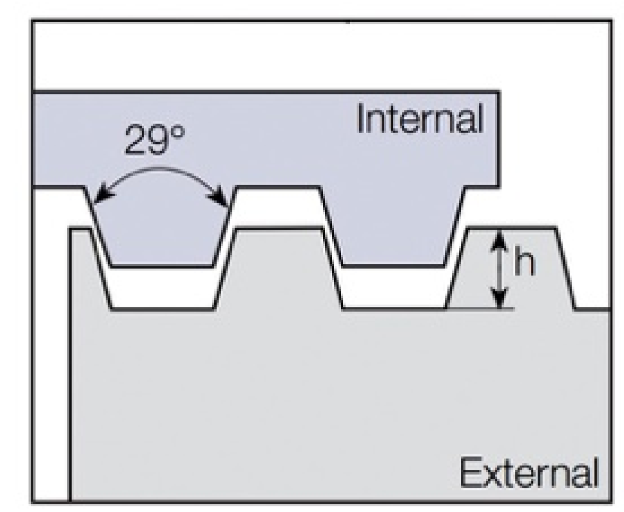


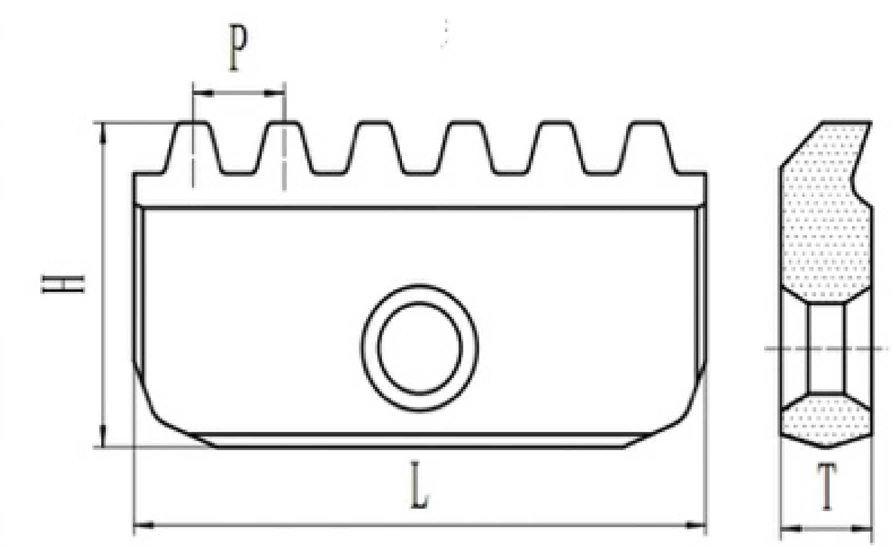


TPI mm	L				
	12mm	14mm	21mm	30mm	40mm
20	12-20 PG				
18		14-18 PG	21-18 PG		
16			21-16 PG	30-16 PG	
H	6.3	7.5	12	16	
T	2.9	3.1	4.7	5.5	

Note: The same insert is used for machining internal and external threads.

ACME American Trapeze Thread 29°



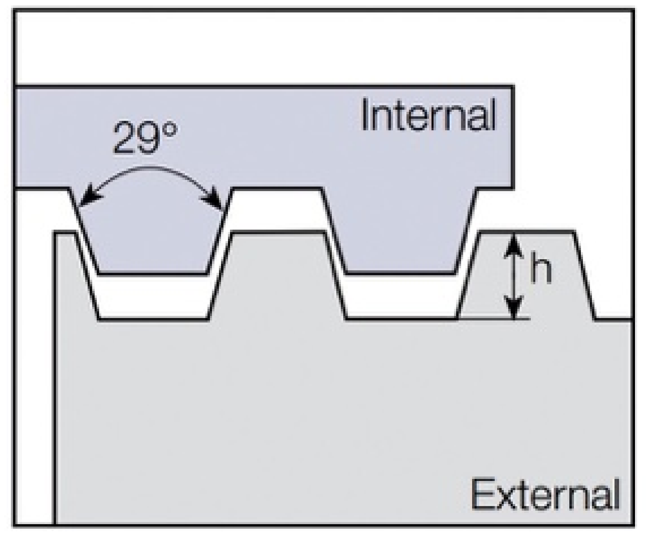


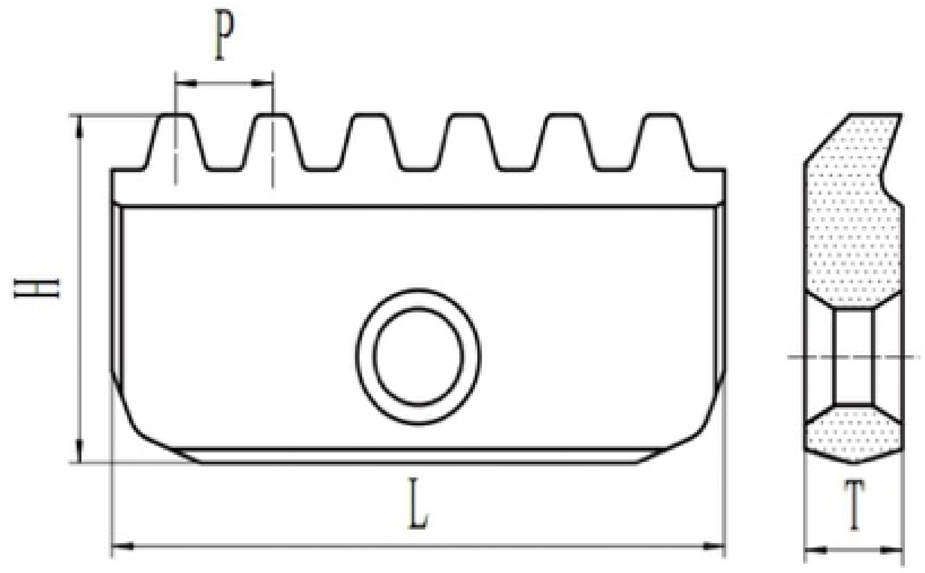
TPI mm	L				
	14 mm	20mm	30mm	30mm (S)	40mm
16	1416ACME	21116ACME	30116ACME	30116ACME (S)	40116ACME
14	14114ACME	21114ACME	30114ACME	30114ACME (S)	40114ACME
12		21112ACME	30112ACME	30112ACME (S)	40112ACME
10			30110ACME	30110ACME (S)	40110ACME
8			3018ACME	3018ACME (S)	4018ACME
6			3016ACME	3016ACME (S)	4016ACME
5				3015ACME (S)	4015ACME
4				3014ACME (S)	4014ACME
3				3013ACME (S)	4013ACME
H	7.5	12	16	20	20
T	3.1	4.7	5.5	6.3	6.3

Note: S-thickened blank

WEIKEDUO

TR Metric Trapezoidal Thread 30°





TPI mm		L				
		14mm	21mm	30mm	30mm (S)	40mm
1.5	Ext.	14 E 1.5 TR	21 E 1.5 TR	30 E 1.5 TR		
	Int.	14 I 1.5 TR	21 I 1.5 TR	30 I 1.5 TR		
2.0	Ext.	14 E 2.0 TR	21 E 2.0 TR	30 E 2.0 TR		40 E 2.0 TR
	Int.	14 I 2.0 TR	21 I 2.0 TR	30 I 2.0 TR		40 I 2.0 TR
2.5	Ext.		21 E 2.5 TR	30 E 2.5 TR		40 E 2.5 TR
	Int.		21 I 2.5 TR	30 I 2.5 TR		40 I 2.5 TR
3.0	Ext.		21 E 3.0 TR	30 E 3.0 TR		40 E 3.0 TR
	Int.		21 I 3.0 TR	30 I 3.0 TR		40 I 3.0 TR
4.0	Ext.			30 E 4.0 TR		40 E 4.0 TR
	Int.			30 I 4.0 TR		40 I 4.0 TR
5.0	Ext.				40E5.0TR(S)	40 E 5.0 TR
	Int.				40I5.0TR(S)	40 I 5.0 TR
6.0	Ext.				40E6.0TR(S)	40 E 6.0 TR
	Int.				40I6.0TR(S)	40 I 6.0 TR
7.0	Ext.				40E7.0TR(S)	40 E 7.0 TR
	Int.				40I7.0TR(S)	40 I 7.0 TR
H		7.5	12	16	20	20
T		3.1	4.7	5.5	6.3	6.3

Note: S-thickened blank

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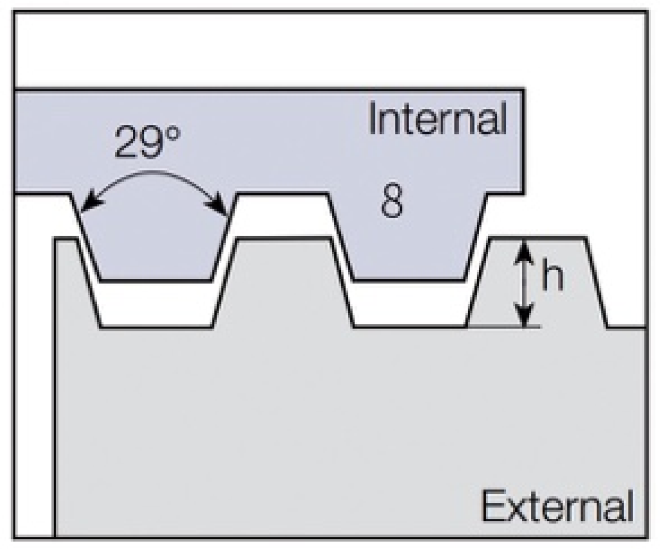
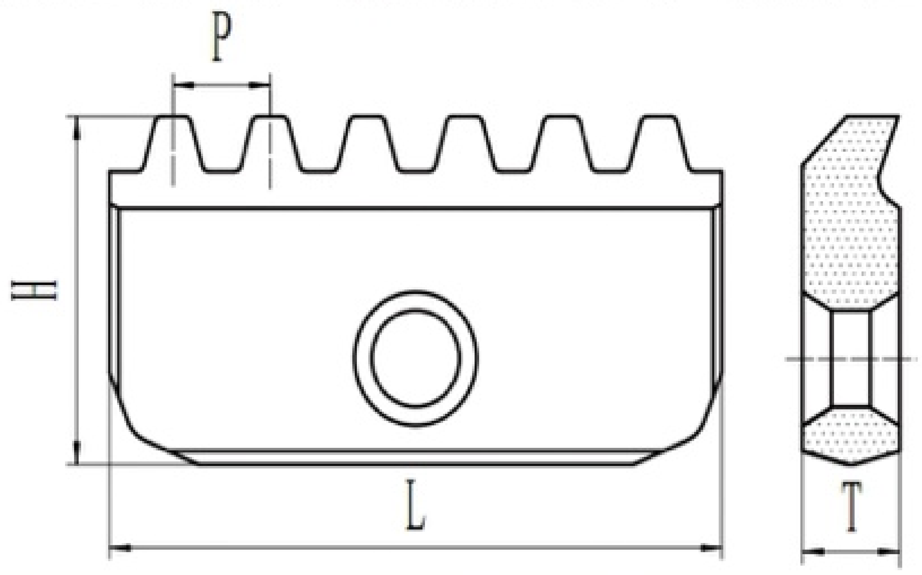
COMB THREAD MILLING INSERT SERIES

STACME American Trapeze Stub ACME Thread 29°

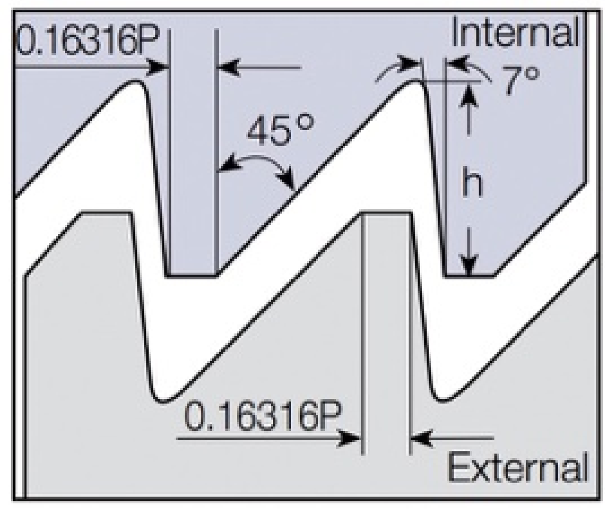


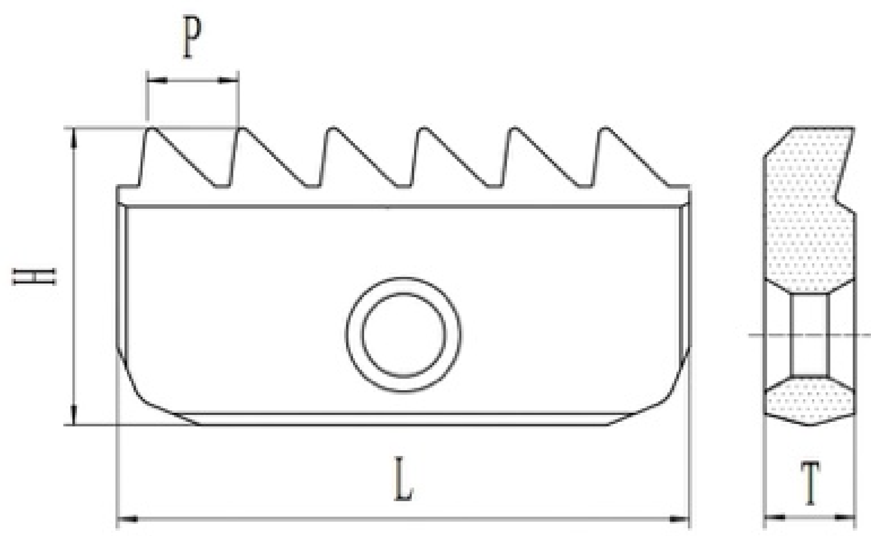


TPI mm	L				
	14 mm	20mm	30mm	30mm (S)	40mm
16	14N16STACME	21N16STACME	30I16STACME	30I16STACME (S)	40I16STACME
14	14N14STACME	21N14STACME	30I14STACME	30I14STACME (S)	40I14STACME
12		21N12STACME	30I12STACME	30I12STACME (S)	4012STACME
10			30I10STACME	30I10STACME (S)	40I10STACME
8			30I8STACME	30I8STACME (S)	40I8STACME
6			30I6STACME	30I6STACME (S)	40I6STACME
5				30I5STACME (S)	40I5STACME
4				30I4STACME (S)	40I4STACME
3				30I3STACME (S)	40I3STACME
H	7.5	12	16	20	20
T	3.1	4.7	5.5	6.3	6.3

Note: S-thickened blank

ABUT American Buttress Thread 7°/45°

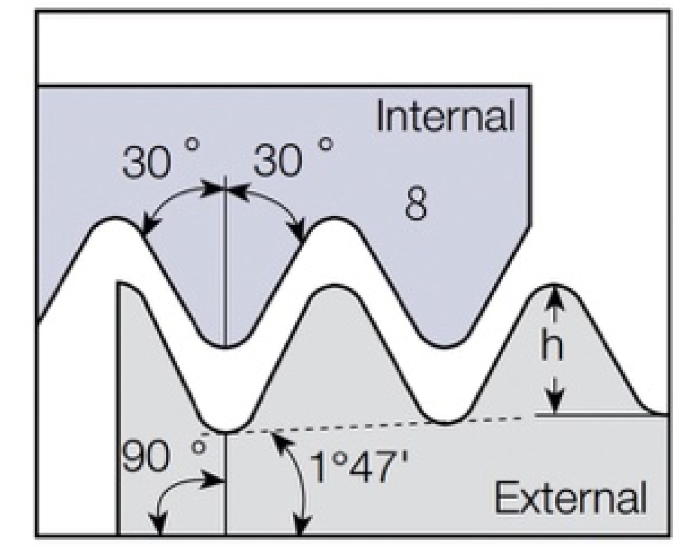


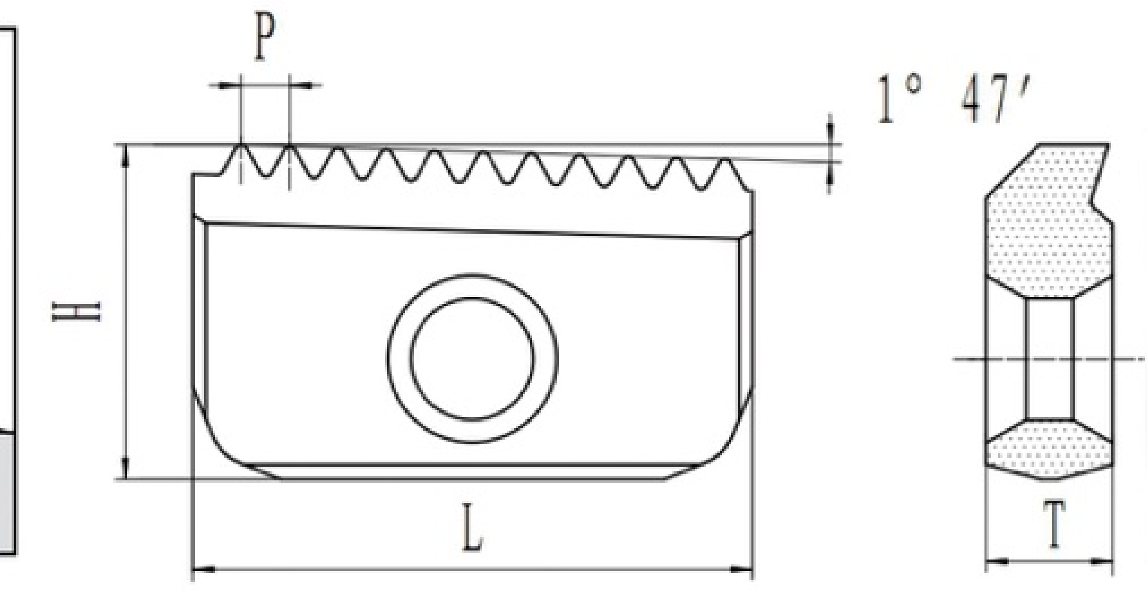


TPI mm		L				
		14mm	21mm	30mm (S)	30mm (S)	40mm
1. 5	Ext.	14 E 1. 5 TR	21 E 1. 5 TR	30 E 1. 5 TR		
	Int.	14 I 1. 5 TR	21 I 1. 5 TR	30 I 1. 5 TR		
2. 0	Ext.	14 E 2. 0 TR	21 E 2. 0 TR	30 E 2. 0 TR		40 E 2. 0 TR
	Int.	14 I 2. 0 TR	21 I 2. 0 TR	30 I 2. 0 TR		40 I 2. 0 TR
2. 5	Ext.		21 E 2. 5 TR	30 E 2. 5 TR		40 E 2. 5 TR
	Int.		21 I 2. 5 TR	30 I 2. 5 TR		40 I 2. 5 TR
3. 0	Ext.		21 E 3. 0 TR	30 E 3. 0 TR		40 E 3. 0 TR
	Int.		21 I 3. 0 TR	30 I 3. 0 TR		40 I 3. 0 TR
4. 0	Ext.			30 E 4. 0 TR		40 E 4. 0 TR
	Int.			30 I 4. 0 TR		40 I 4. 0 TR
5. 0	Ext.				40E5. 0TR (S)	40 E 5. 0 TR
	Int.				40I5. 0TR (S)	40 I 5. 0 TR
6. 0	Ext.				40E6. 0TR (S)	40 E 6. 0 TR
	Int.				40I6. 0TR (S)	40 I 6. 0 TR
7. 0	Ext.				40E7. 0TR (S)	40 E 7. 0 TR
	Int.				40I7. 0TR (S)	40 I 7. 0 TR
H		7. 5	12	16	20	20
T		3. 1	4. 7	5. 5	6. 3	6. 3

Note: S-thickened blank

APIRD API Round Casing & Tubing Thread 60°



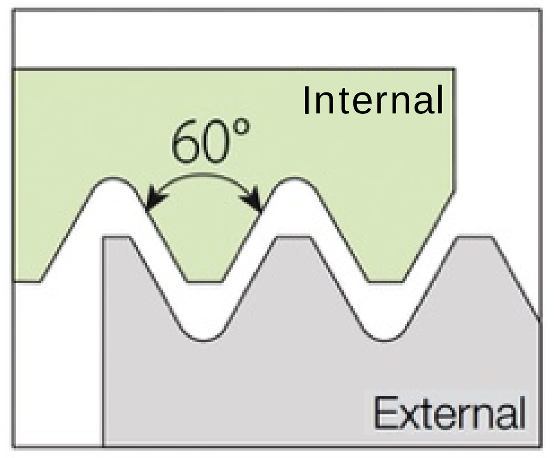


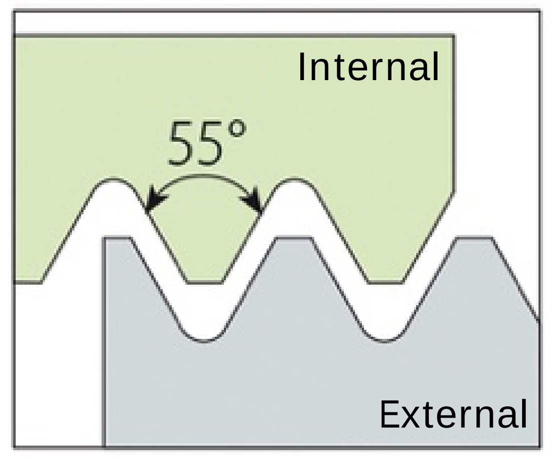
TPI mm	L				
	12mm	14mm	21mm	30mm	40mm
10			21-10APIRD	30-10APIRD	40-10APIRD
8			21-8APIRD	30-8APIRD	40-8APIRD
H	6. 3	7. 5	12	16	20
T	2. 9	3. 1	4. 7	5. 5	6. 3

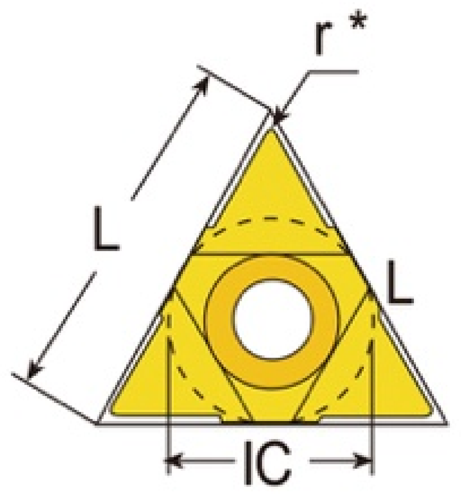
Note: The same insert is used for machining internal and external threads.

WEIKEDUO

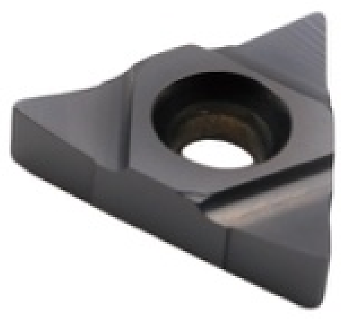
Deep Hole Thread Milling Inserts







U型

Insert Shape	I.C.	Pitch (mm)		Internal	L	r
		mm	TPI	Right-hand		
	1/4″	0.5-1.5	48-16	11UIDA60	11	0.05
		1.5-2.0	16-12	11UIDB60		0.06
		2.0-2.5	9-12	11UIDD60		0.11
		2.5	10	11UIDM60		0.11
		2.5-4.0	10-6	11UIDC60		0.14
	3/8″	1.5-2.0	16-12	16UIDB60	16	0.06
		2.5-3.5	10-7	16UIDE60		0.14
		4.0-6..0	6-4	16UIDH60		0.25
	1/2″	6.0-8.0	4-3	22UIDK60	22	0.30
	1/4″	-	48-16	11UIDA55	11	0.11
		-	16-12	11UIDB55		0.08
		-	11-7	11UIDL55		0.24
	3/8″	-	16-12	16UIDB55	16	0.08
		-	11-7	16UIDL55		0.24
		-	6-4	16UIDH55		0.27
	1/2″	-	4-3	22UIDK55	22	0.50