

# D

## THREADING

Korloy threading tools are available for machining various shapes of thread at various pitches while ensuring high quality performances



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# D

## Threading Code System

### Threading holder code system

E R H 10 (N) - 11 (C)

1 2 3 4 5 6 7  
Holder type Hand of insert Name Height of shank Shim Insert size (mm) Clamping system

**1 Holder type**  
**E R H 10(N) - 11(C)**

E: For External I: For Internal

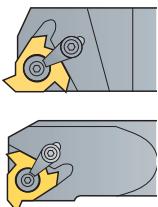
**2 Hand of insert**  
**E R H 10(N) - 11(C)**

R: Right handed L: Left handed

**3 Name**  
**E R H 10(N) - 11(C)**

H: Holder

**4 Height of shank**  
**E R H 10(N) - 11(C)**



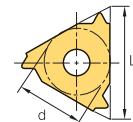
- External  
8, 10, 12, 16, 20,  
25, 32, 40, 50

- Internal  
10, 12, 13, 16, 20,  
25, 32, 49, 50, 60

\* Refer to the specification for shank diameter information

**6 Insert size (mm)**  
**E R H 10(N) - 11(C)**

11: d = 6.35  
16: d = 9.525  
22: d = 12.7  
27: d = 15.875



**5 Shim**  
**E R H 10(N) - 11(C)**

No code: Shim required  
N: No shim required

**7 Clamping system**  
**E R H 10(N) - 11(C)**

No code: Screw on system  
C: Clamp on system

### Threading insert code system

E R M 16 - 1.5 ISO

1 2 3 4 5 6  
Insert type Hand of insert Chip breaker Insert size (mm) Pitch Type

**1 Insert type**  
**E R M 16 - 1.5 ISO**

E: External thread I: Internal thread

**2 Hand of insert**  
**E R M 16 - 1.5 ISO**

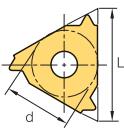
R: Right handed L: Left handed

**3 Chip breaker**  
**E R M 16 - 1.5 ISO**

M: With chip breaker

**4 Insert size (mm)**  
**E R M 16 - 1.5 ISO**

11: d = 6.35  
16: d = 9.525  
22: d = 12.7  
27: d = 15.875



**Insert shape**  
< ER/IR >      < ERM/IRM >

**5 Pitch**  
**E R M 16 - 1.5 ISO**

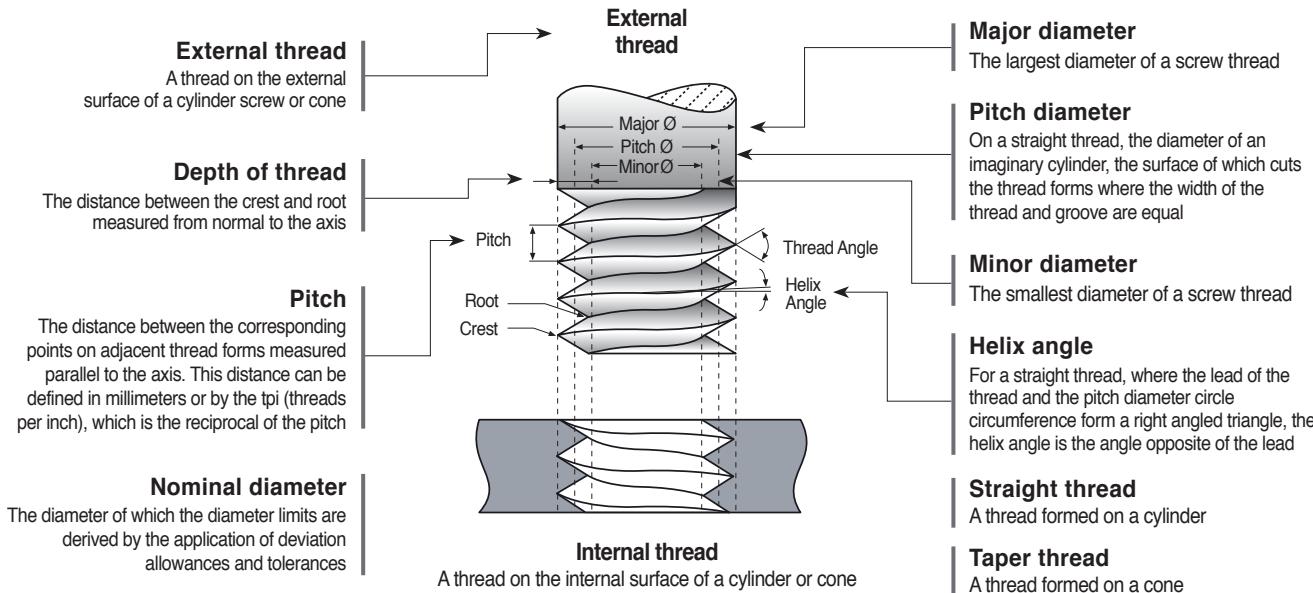
Full profile mm tpi	Partial profile mm tpi
0.35-6.0 72-3	A 0.5-1.5 48-16
	AG 0.5-3.0 48-8
	G 1.75-3.0 14-8
	N 3.5-5.0 7-5
	Q 5.5-6.0 4.5-4

**6 Type**  
**E R M 16 - 1.5 ISO**

Partial profile 60°  
Partial Profile 55°  
ISO Metric (Full Profile)  
American UN (Full Profile) UN, UNC, UNF, UNEF  
Whitworth (Full Profile) BSW, BSF, BSP  
British Standard Pipe thread (Full Profile) BSPT  
National Pipe Thread (Full Profile) NPT  
National Pipe Threads-Dryseal (Full Profile) NPTF  
Round DIN 405  
Trapez DIN 103  
American ACME  
Stub ACME  
UNJ  
American Buttress  
British Buttress  
Metric Buttress-Sagengewinde  
API  
API Buttress Casing  
API Round Casing & Tubing  
EL-Extreme Line Casing



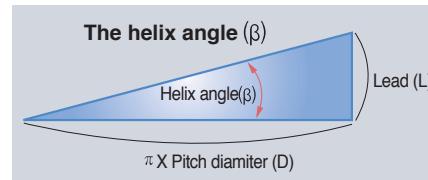
## Special features



A thread which, when viewed axially, winds in a counter clockwise and receding direction. All left handed threads are designated LH



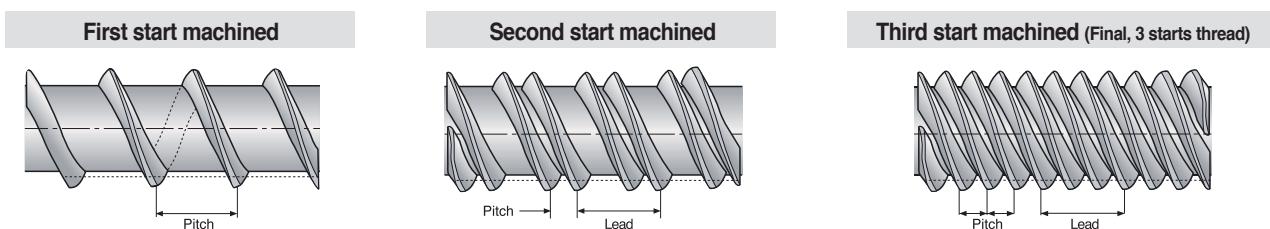
A thread which, when viewed axially, winds in a clockwise and receding direction. Threads are always right handed unless they are specified



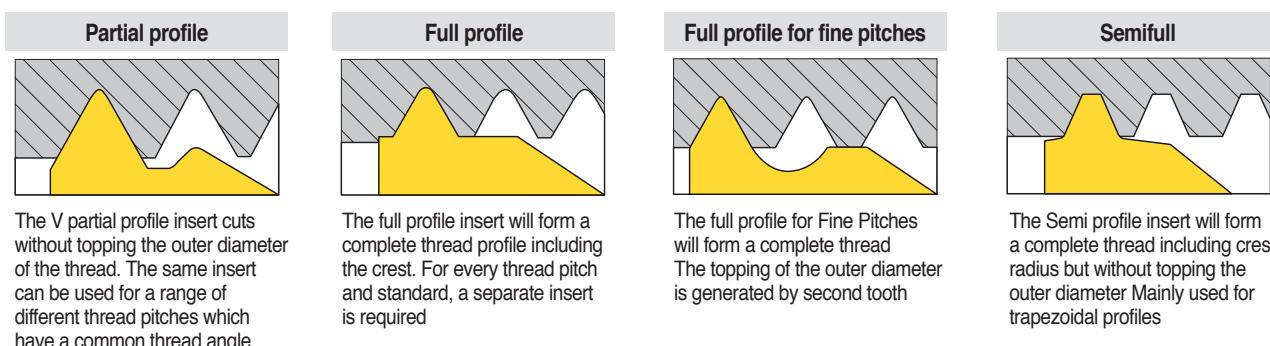
For a straight thread, where the lead of the thread and the pitch diameter circle circumference form a right angled triangle, the helix angle is the angle opposite of the lead

## Machining a multi-start thread

- A thread in which the lead is an integral multiple, greater than one, of the pitch. A multi-start thread permits a more rapid advance without a coarser (larger) thread form



## Insert profile style

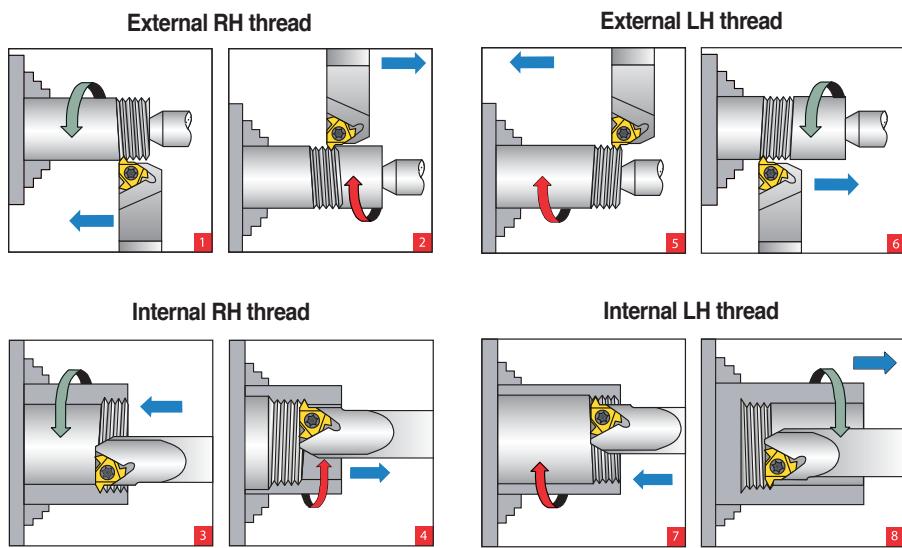


# D

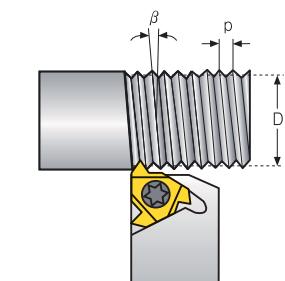
## Technical Information for Threading

### Thread turning method

Thread	Inserts & Tool holder	Rotation	Feed direction	Helix method	Drawing no.
Right Hand External	EX RH	Counter clockwise	Towards chuck	Regular	1
	EX LH	Clockwise	From chuck	Reversed	2
Right Hand Internal	IN LH	Counter clockwise	Towards chuck	Regular	3
	IN LH	Clockwise	From chuck	Reversed	4
Left Hand External	EX LH	Clockwise	Towards chuck	Regular	5
	EX RH	Counter clockwise	From chuck	Reversed	6
Left Hand Internal	IN LH	Clockwise	Towards chuck	Regular	7
	IN RH	Counter clockwise	From chuck	Reversed	8



### Calculating the helix angle ( $\beta$ )



- The helix angle is calculated by the following formula:

$$\beta = \tan^{-1} \frac{P \times N}{\pi \times D}$$

$\beta$ : Helix angle (°)

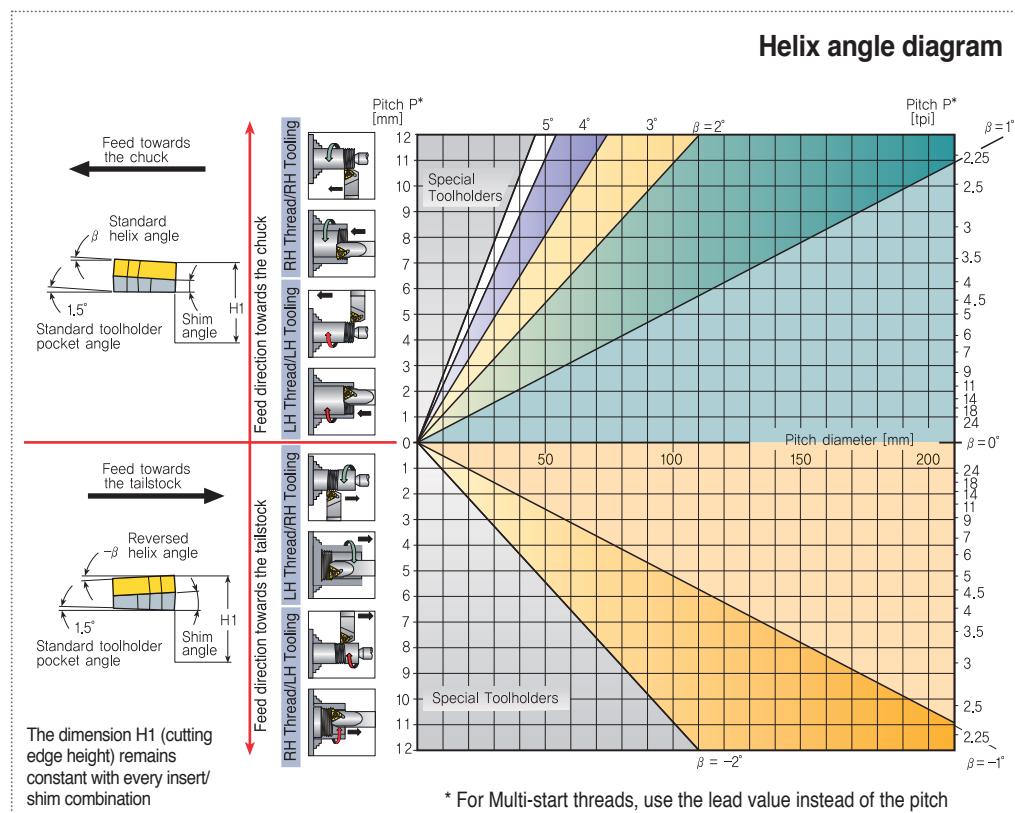
P: Pitch (mm)

N: No. of starts

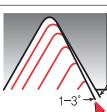
D: Pitch diameter (mm)

Lead =  $P \times N$

- The helix angle can also be found from the diagram below



## Thread infeed method

Infeed	Application
 <b>Radial infeed</b>	<ul style="list-style-type: none"> <li>When the pitch is smaller than 16 tpi</li> <li>For material with short chips</li> <li>For work with hardened material</li> </ul> <p>→ Radial infeed is the simplest and quickest method. The feed is perpendicular to the turning axis, and both flanks of the insert perform the cutting operation. Radial infeed is recommended in 3 cases.</p>
 <b>Flank infeed (modified)</b>	<ul style="list-style-type: none"> <li>When the thread pitch is greater than 16 tpi. Using the radial method, the effective cutting edge length is too large, resulting in chatter. for TRAPEZ and ACME. The radial method results in three cutting edges, making chip flow very difficult.</li> </ul> <p>→ Flank infeed is recommended in the following cases</p>
 <b>Alternate flank infeed</b>	<ul style="list-style-type: none"> <li>This method divides the load equally on both flanks, resulting in equal wear along the cutting edges. Alternate flank infeed requires more complicated programming, and is not available on all lathes.</li> </ul> <p>→ Use of the alternate flank method is recommended especially in large pitches and for materials with long chips</p>

## Shim

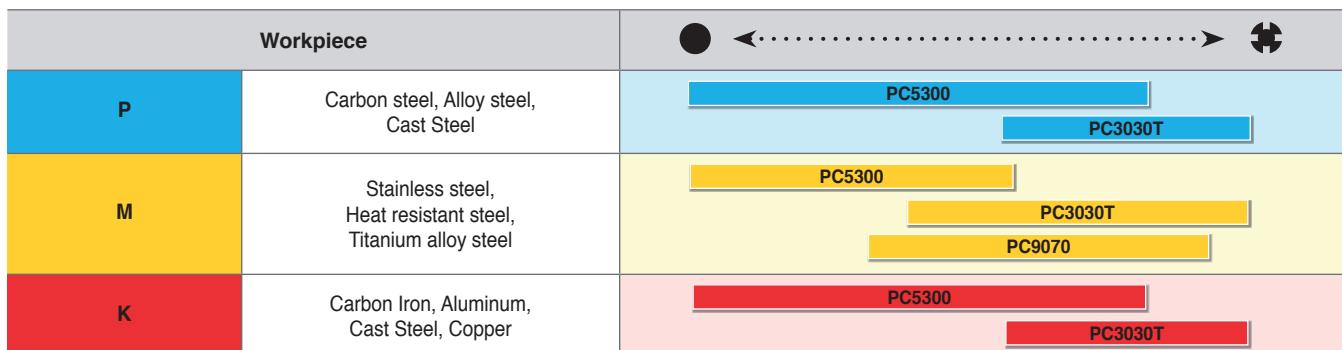
Standard shim	ATE (External)	ATI (Through)	Helix angle 1.5°	Insert size	d	9.525		12.7		15.875	
				L	16	22	27				
	Holder			ER(L)H	IR(L)H	ER(L)H	IR(L)H	ER(L)H	IR(L)H	ER(L)H	IR(L)H
	Ordering code	ATE16	ATI16	ATE22	ATI22	ATE27	ATI27	ATE27	ATI27	ATE27	ATI27

※ Standard shim has lead angle 1.5°

## Application grade

Grade	Features				Available insert type
PC5300	Universal grade	<ul style="list-style-type: none"> <li>For chip breaker type only</li> <li>Stable machining on a wide application due to fine-grained carbide substrate with balanced heat resistance and toughness</li> <li>Excellent wear resistance and oxidation resistance due to TiAlN coating film</li> <li>Outstanding performance on high speed machining</li> </ul>			ERM/IRM (Insert with Chip breaker)
PC3030T	Specialized grade for threading inserts	<ul style="list-style-type: none"> <li>A tough sub-micron substrate with TiAlN coating provides good fracture toughness and excellent wear resistance</li> <li>Outstanding performance on STS and hard to cut materials</li> </ul>			ER/IR (Ground insert)
PC9070	Specialized grade for threading inserts	<ul style="list-style-type: none"> <li>Strong wear resistance in stainless machining thanks to multilayer PVD coatings</li> </ul>			E/IR (Ground insert)

## Recommended cutting speed as per workpiece (vc)



# D

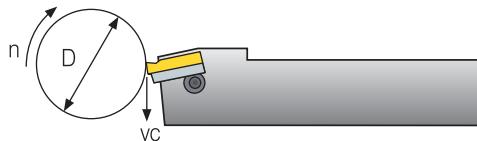
## Technical Information for Threading

### Recommended cutting speed as per workpiece (vc)

Workpiece			Hardness brinell (HB)	vc (m/min)		
	PC3030T	PC9070	PC5300			
<b>P</b>	<b>Carbon steel</b>	Low carbon (C=0.1-0.25 %)	125	115~190		110~190
		Medium carbon (C=0.25-0.55 %)	150	100~175		100~165
		High carbon (C=0.55-0.85 %)	170	90~155		90~155
	<b>Low alloy steel</b> (alloying elements ≤ 5%)	Non-hardened	180	100~180		100~180
		Hardened	275	75~140		75~140
		Hardened	350	70~135		70~135
	<b>High alloy steel</b> (alloying elements > 5%)	Annealed	200	80~120		80~120
		Hardened	325	50~100		50~100
	<b>Cast steel</b>	Low alloy (alloying elements < 5%)	200	70~130		70~130
		High alloy (alloying elements > 5%)	225	60~120		60~120
<b>M</b>	<b>Stainless steel ferritic</b>	Non-hardened	200	70~130	70~150	70~130
		Hardened	330	50~95	60~125	50~95
	<b>Stainless steel austenitic</b>	Austenitic	180	80~120	90~160	80~120
		Super austenitic	200	30~100	40~120	30~100
	<b>Stainless steel cast ferritic</b>	Non-hardened	200	90~120	90~150	90~120
		Hardened	330	65~110	65~120	65~110
	<b>Stainless steel cast austenitic</b>	Austenitic	200	85~110	85~120	85~110
		Hardened	330	60~100	60~110	60~100
	<b>High temperature alloy</b>	Annealed (Iron based)	200	45~60		45~60
		Aged (Iron based)	280	30~50		30~50
		Annealed (Nickel or Cobalt based)	250	20~30		20~30
		Aged (Nickel or Cobalt based)	350	15~25		15~25
<b>K</b>	<b>Titanium alloy</b>	99.5% pure Titanium	400Rm	140~170		140~170
		Titanium alloy	1050Rm	50~70		50~70
	<b>Extra hard steel</b>	Hardened & tempered	55HRC	45~60		45~60
		Ferritic (short chips)	130	70~120		70~120
	<b>Malleable cast iron</b>	Pearlitic (long chips)	230	70~120		70~120
		Low tensile strength	180	70~130		70~130
	<b>Gray cast iron</b>	High tensile strength	260	60~100		60~100
		Ferritic	160	125~160		125~160
	<b>Nodular SG iron</b>	Pearlitic	260	90~120		90~120
		Non-aging	60	100~250		100~250
<b>A</b>	<b>Aluminum alloy wrought</b>	Aged	100	80~180		80~180
		Cast	75	200~400		200~400
	<b>Aluminum alloy</b>	Cast & aged	90	200~280		200~280
		Cast Si 13-22%	130	60~150		60~180
	<b>Copper and copper alloy</b>	Brass	90	80~120		80~210
		Bronze and non-leaded copper	100	80~120		80~210

### Calculation of n [RPM]

$$n = \frac{vc \times 1000}{\pi \times D} \quad vc = \frac{\pi \times D \times n}{1000}$$



n: Revolution Per Minute [min<sup>-1</sup>]  
vc: Cutting Speed [m/min]  
D: Workpiece Diameter [mm]

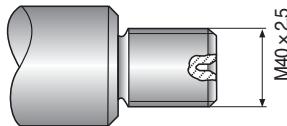
### Number of passes

Pitch	mm	0.50	0.75	1.00	1.25	1.50	1.75	2.00	2.50	3.00	3.50	4.00	4.50	5.00	5.50	6.00	8.00
No. of passes	tpi	48	32	24	20	16	14	12	10	8	7	6	5.5	5	4.5	4	3
4~6	4~7	4~8	5~9	6~10	7~12	7~12	8~14	9~16	10~18	11~18	11~19	12~20	12~20	12~20	12~20	15~24	

\* One cutting depth is calculated by total cutting depth divided into machining times  
ex) ER16-1.5ISO, hmin 0.92: If 10 times machining, one cutting depth is 0.092 (0.92/10)



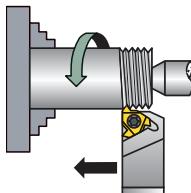
## Step by step thread turning



### Application

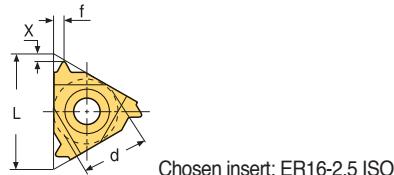
- Thread: External right hand ISO metric M40x2.5
- Material: 4140 (25 HRC)

## 1 Choose the thread turning method



Feed direction towards the chuck was chosen  
Therefore an external right hand insert and an external right hand holder will be used

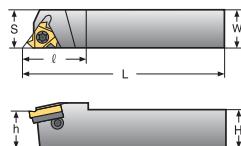
## 2 Choose the insert size



Chosen insert: ER16-2.5 ISO

Insert size	Pitch	Ordering code	Shim	Tool holder
d	mm	RH (Right Hand)	RH (Right Hand)	
9.525	2.5	ER16-2.5ISO	ATE16	ERH□□-16

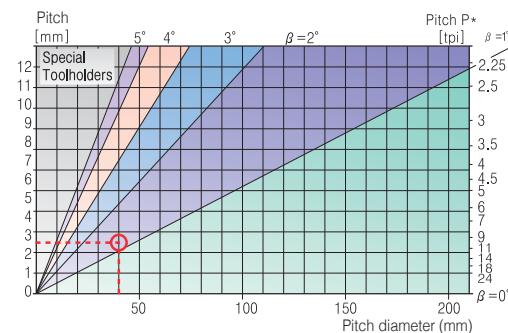
## 3 Choose the tool holder



Chosen tool holder: ERH 25-16

Insert size	Ordering code	Dimensions (mm)				
d	RH (Right Hand)	H=h	W	S	L	l
9.525	ERH25-16	25	25	25	153.6	30

## 4 Determine the helix angle



From the table, using a pitch of 2.5 mm(10 tpi) and a workpiece diameter of 40 mm (1.57"), we find the helix angle to be 1.5°

## 5 Choose the correct shim

Resultant Helix angle		1.5°
Insert size	d	9.525
	L	16
Ordering code		ATE16

## 6 Choose the carbide grade and cutting speed

P	Workpiece	HB	vc (m/min)
		PC3030T	
Low alloy steel (alloying elements ≤ 5%)	Non-hardened	180	85~145
	Hardened	275	75~140
	Hardened	350	70~135

- Carbide grade chosen: PC3030T
- Cutting speed: 140 m/min

## 7 Determine the number of passes

Pitch	mm	1.50	1.75	2.00	2.50	3.00	3.50	4.00
	tpi	16	14	12	10	8	7	6
No.of passes	6~10	7~12	7~12	8~14	9~16	10~18	11~18	

- Carbide grade chosen: PC3030T
- Cutting speed: 140 m/min

## 8 Summary

Thread type	ISO M40 x 2.5 External right hand
1. Feed direction	Towards the chuck
2. Insert and grade	ER16-2.5ISO, PC3030T
3. Tool holder	ERH25-16
4. Helix angle	1.5°
5. Shim	ATE16
6. Cutting speed	140 m/min
7. Number of passes	10



# D

## Technical Information for Threading

### ● Cutting condition depending on

Workpiece	Material type	
	Material dimension	
	Diameter and length chipflow character	
	Material hardness	
Thread application	External or internal	
	Profile shape	
	Surface finish	
Machine	Machine stability	
	Max. RPM	
	Clamping system stability	
Coolant	Coolant type	
Holders	Holder cross section area	
	Holder overhang	
	Through coolant option	
	Shank type: Carbide, alloy,	
Insert	Carbide implant grade	
	Profile shape: Pitch and depth	
	Nose radius	
	Chip breaker style	

### ● Trouble shooting

Problem	Possible cause	Solution
	Increased flank wear Cutting speed too high Depth of cut too low/too many passes Unsuitable carbide grade Insufficient cooling	► Reduce cutting speed/use coated insert ► Increase the depth of cut per pass ► Use a coated carbide grade ► Increase coolant flow rate
	Uneven cutting edge wear Incorrect helix angle Wrong infeed method	► Choose the correct shim ► Use the alternating flank infeed method
	Extreme plastic deformation Depth of cut too large Insufficient cooling Cutting speed too high Unsuitable carbide grade Nose radius too small	► Decrease depth of cut/ increase number of passes ► Increase coolant flow rate ► Reduce cutting speed ► Use a tougher carbide ► Use an insert with a larger radius, if possible
	Cutting edge breakage Depth of cut too large Extreme plastic deformation Insufficient cooling Unsuitable carbide grade Instability	► Decrease depth of cut/ increase number of passes. ► Use a tougher carbide ► Increase flow rate and/or correct flow direction ► Use a tougher carbide ► Check stability of the system
	Built-up edge Incorrect cutting speed Unsuitable carbide grade	► Change the cutting speed ► Use a coated carbide
	Thread profile is too shallow The tool is not at the workpiece axis height Insert is not machining the thread crest Worn insert	► Change tool height ► Measure the workpiece diameter ► Change the cutting edge sooner
	Poor surface quality Too low cutting speed Wrong shim Flank infeed method is not appropriate	► Increase cutting speed ► Choose correct shim ► Use the alternate flank or radial infeed method



## Threading insert with chip breaker

### Features

- Economical insert
- Good toughness and high accuracy as ground type inserts
- Exclusive insert design improves chip control
- New grade for general application of various kinds of workpieces

Type	Ground insert		Insert with a chip breaker			
C/B Code	None		None		U	
Designation	ER16-1.5ISO		ERM16-1.5ISO		ERM16-1.5ISO-U	
Machining	External	Internal	External	Internal	External	Internal
Insert Shape						
Chip Shape						
Class	P, M, K, N, S		P, M, K		P, M, K	
Application	G-Class		M-Class		M-Class	
Features	<ul style="list-style-type: none"> <li>Groove-shaped chip breaker with superior chip evacuation lowers cutting load</li> <li>Enables high precision machining</li> <li>Applicable for machining of various shapes of threads</li> <li>Applicable for machining of various workpieces</li> </ul>		<ul style="list-style-type: none"> <li>Unique 3 dimensional chip breaker improves machinability with good chip control</li> <li>Excellent cutting edge treatment technology ensures high precision sharp cutting edge</li> </ul>		<ul style="list-style-type: none"> <li>Groove-shaped chip breaker with superior chip evacuation lowers cutting load</li> <li>Reduces machining pass by 10~30%</li> <li>Excellent cutting edge treatment achieves high precision sharp cutting edge</li> </ul>	

### Application examples

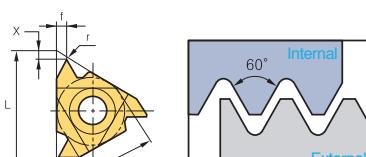
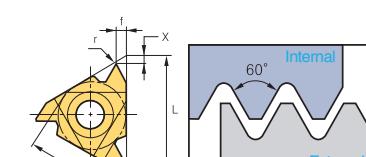
KORLOY		ERM16-1.5ISO [PC3030T]	IRM16-2.0ISO [PC3030T]													
Competitor tools		ER16-1.5ISO [A-Maker]	IR16-2.0ISO [B-Maker]													
Workpiece	Material	SCM440	STS304													
	Figure															
Cutting condition	Cutting speed (m/min)	63	120													
	Pass	8	9													
	Machining	Radial infeed	Radial infeed													
	Pitch	1.5	2.0													
Coolant	Wet															
Result	<p>Tool life/comer</p> <table border="1"> <tr><th>Tool</th><th>Tool life/comer</th></tr> <tr><td>PC3030T</td><td>50</td></tr> <tr><td>Competitor A</td><td>30</td></tr> </table> <p>Increased tool life with good chip breaking</p>		Tool	Tool life/comer	PC3030T	50	Competitor A	30	<p>Tool life/comer</p> <table border="1"> <tr><th>Tool</th><th>Tool life/comer</th></tr> <tr><td>PC3030T</td><td>15</td></tr> <tr><td>Competitor B</td><td>3</td></tr> </table> <p>Prevention outbreak damage of insert due to smooth chip control</p>		Tool	Tool life/comer	PC3030T	15	Competitor B	3
Tool	Tool life/comer															
PC3030T	50															
Competitor A	30															
Tool	Tool life/comer															
PC3030T	15															
Competitor B	3															



# D

## Thread Insert

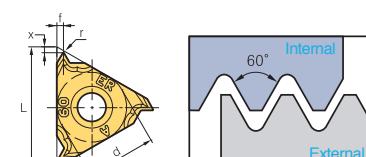
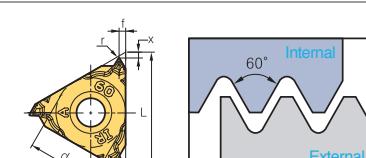
### Partial profile 60°

Type	Designation (Right)	PC3030T	PC9070T	Designation (Left)	PC3030T	PC9070T	Pitch		Dimensions (mm)					Picture
							(mm)	(tpi)	d	L	r	x	f	
External	ER 11-A60	● ●	EL 11-A60	●	0.5~1.5	48~16	6.35	11	0.05	0.8	0.9			
	16-A60	● ●		●	0.5~1.5	48~16	9.525	16	0.05	0.8	0.9			
	16-G60	●		●	1.75~3.0	14~8	9.525	16	0.27	1.2	1.7			
	16-AG60	● ●		●	0.5~3.0	48~8	9.525	16	0.08	1.2	1.7			
	22-N60	● ●		●	3.5~5.0	7~5	12.7	22	0.53	1.7	2.5			
	27-Q60	● ●		●	5.5~6.0	4.5~4	15.875	27	0.64	2.1	3.1			
Internal	IR 11-A60	● ●	IL 11-A60	●	0.5~1.5	48~16	6.35	11	0.05	0.8	0.9			
	16-A60	●		●	0.5~1.5	48~16	9.525	16	0.05	0.8	0.9			
	16-G60	●		●	1.75~3.0	14~8	9.525	16	0.16	1.2	1.7			
	16-AG60	● ●		●	0.5~3.0	48~8	9.525	16	0.05	1.2	1.7			
	22-N60	● ●		●	3.5~5.0	7~5	12.7	22	0.30	1.7	2.5			
	27-Q60	● ●		●	5.5~6.0	4.5~4	15.875	27	0.30	1.8	2.7			

● Applicable holders D31, D32

● Stock item

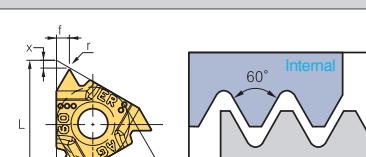
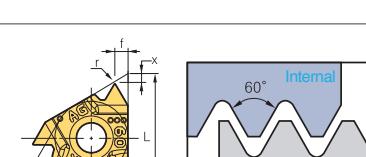
### Partial profile 60° (M chip breaker)

Type	Designation (Right)	PC3030T	PC5300	Designation (Left)	PC3030T	Pitch		Dimensions (mm)					Picture
						(mm)	(tpi)	d	L	r	x	f	
External	ERM 16-A60	●				0.5~1.5	48~16	9.525	16	0.05	0.8	0.9	
	16-G60	●				1.75~3.0	14~8	9.525	16	0.27	1.2	1.7	
	16-AG60	●				0.5~3.0	48~8	9.525	16	0.08	1.2	1.7	
	22-N60	●				3.5~5.0	7~5	12.7	22	0.53	1.7	2.5	
Internal	IRM 11-A60	●				0.5~1.5	48~16	6.35	11	0.08	0.8	0.9	
	16-A60	●				0.5~1.5	48~16	9.525	16	0.08	0.8	0.9	
	16-G60	●				1.75~3.0	14~8	9.525	16	0.12	1.2	1.7	
	16-AG60	●				0.5~3.0	48~8	9.525	16	0.08	1.2	1.7	
	22-N60	●				3.5~5.0	7~5	12.7	22	0.30	1.7	2.5	

● Applicable holders D31, D32

● Stock item

### Partial profile 60° (U chip breaker) new

Type	Designation (Right)	PC3030T	PC5300	Designation (Left)	PC3030T	Pitch		Dimensions (mm)					Picture
						(mm)	(tpi)	d	L	r	x	f	
External	ERM 16-AG60-U					0.5~3.0	48~8	9.525	16	0.08	1.2	1.7	
Internal	IRM 16-AG60-U					0.5~3.0	48~8	9.525	16	0.08	1.2	1.7	

● Applicable holders D31, D32

● Stock item

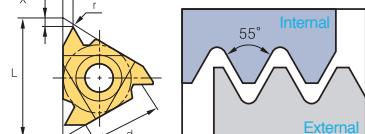
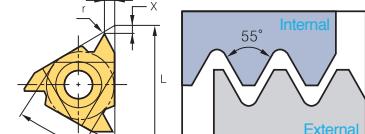


D

Threading

10

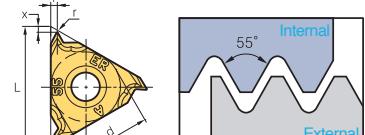
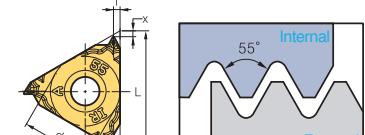
## Partial profile 55°

Type	Designation (Right)	PC3030T		Designation (Left)	PC3030T		Pitch		Dimensions (mm)					Picture
		PC3070T	PC9070T		PC3070T	PC9070T	(mm)	(tpi)	d	L	r	x	f	
External	ER 11-A55	●		EL 11-A55			0.5~1.5	48~16	6.35	11	0.05	0.8	0.9	
	16-A55	●			●		0.5~1.5	48~16	9.525	16	0.05	0.8	0.9	
	16-G55	●					1.75~3.0	14~8	9.525	16	0.21	1.2	1.7	
	16-AG55	●			●		0.5~3.0	48~8	9.525	16	0.07	1.2	1.7	
	22-N55	●					3.5~5.0	7~5	12.7	22	0.43	1.7	2.5	
	27-Q55	●					5.5~6.0	4.5~4	15.875	27	0.60	2.0	2.9	
Internal	IR 11-A55	●		IL 11-A55	●		0.5~1.5	48~16	6.35	11	0.05	0.8	0.9	
	16-A55	●					0.5~1.5	48~16	9.525	16	0.05	0.8	0.9	
	16-G55	●					1.75~3.0	14~8	9.525	16	0.21	1.2	1.7	
	16-AG55	●			●		0.5~3.0	48~8	9.525	16	0.07	1.2	1.7	
	22-N55	●					3.5~5.0	7~5	12.7	22	0.43	1.7	2.5	
	27-Q55	●					5.5~6.0	4.5~4	15.875	27	0.60	2.0	2.9	

② Applicable holders D31, D32

●: Stock item

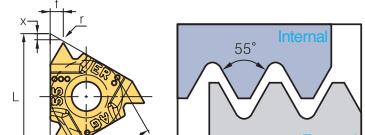
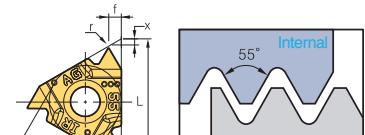
## Partial profile 55° (M chip breaker)

Type	Designation (Right)	PC3030T		Designation (Left)	PC3030T		Pitch		Dimensions (mm)					Picture
		PC5300	PC5300		PC3030T	(mm)	(tpi)	d	L	r	x	f		
External	ERM 16-A55	●					0.5~1.5	48~16	9.525	16	0.08	0.8	0.9	
	16-G55	●					1.75~3.0	14~8	9.525	16	0.21	1.2	1.7	
	16-AG55	●					0.5~3.0	48~8	9.525	16	0.07	1.2	1.7	
	22-N55	●					3.5~5.0	7~5	12.7	22	0.43	1.7	2.5	
Internal	IRM 11-A55	●					0.5~1.5	48~16	6.35	11	0.08	0.8	0.9	
	16-A55	●					0.5~1.5	48~16	9.525	16	0.05	0.8	0.9	
	16-G55						1.75~3.0	14~8	9.525	16	0.08	1.2	1.7	
	16-AG55	●					0.5~3.0	48~8	9.525	16	0.08	1.2	1.7	
	22-N55	●					3.5~5.0	7~5	12.7	22	0.43	1.7	2.5	

② Applicable holders D31, D32

●: Stock item

## Partial profile 55° (U chip breaker) new

Type	Designation (Right)	PC3030T		Designation (Left)	PC3030T		Pitch		Dimensions (mm)					Picture
		PC5300	PC5300		PC3030T	(mm)	(tpi)	d	L	r	x	f		
External	ERM 16-AG55-U						0.5~3.0	48~8	9.525	16	0.07	1.2	1.7	
Internal	IRM 16-AG55-U						0.5~3.0	48~8	9.525	16	0.08	1.2	1.7	

② Applicable holders D31, D32

●: Stock item

# D

## Thread Insert

### ISO Metric

Type	Designation (Right)	PC3030T	PC9070T	Designation (Left)	PC3030T	PC9070T	Pitch	Dimensions (mm)					Picture
								(mm)	d	L	hmin	X	
External	ER 11-0.35ISO	●		EL 11-0.35ISO			0.35	6.35	11	0.21	0.8	0.4	
	11-0.4ISO	●		11-0.4ISO			0.4	6.35	11	0.25	0.7	0.4	
	11-0.45ISO	●		11-0.45ISO			0.45	6.35	11	0.28	0.7	0.4	
	11-0.5ISO			11-0.5ISO			0.5	6.35	11	0.31	0.6	0.4	
	11-0.6ISO			11-0.6ISO			0.6	6.35	11	0.37	0.6	0.6	
	11-0.7ISO	●		11-0.7ISO			0.7	6.35	11	0.43	0.6	0.6	
	11-0.75ISO			11-0.75ISO			0.75	6.35	11	0.46	0.6	0.6	
	11-0.8ISO	●		11-0.8ISO			0.8	6.35	11	0.49	0.6	0.6	
	11-1.0ISO	●		11-1.0ISO			1.0	6.35	11	0.61	0.7	0.7	
	11-1.25ISO	● ●		11-1.25ISO			1.25	6.35	11	0.77	0.8	0.9	
	11-1.5ISO	●		11-1.5ISO	●		1.5	6.35	11	0.92	0.8	1.0	
	11-1.75ISO	●		11-1.75ISO			1.75	6.35	11	1.07	0.8	1.1	
	16-0.35ISO			16-0.35ISO			0.35	9.525	16	0.21	0.8	0.4	
	16-0.4ISO			16-0.4ISO			0.4	9.525	16	0.25	0.7	0.4	
	16-0.45ISO	●		16-0.45ISO			0.45	9.525	16	0.28	0.7	0.4	
	16-0.5ISO	●		16-0.5ISO	●		0.5	9.525	16	0.31	0.6	0.4	
	16-0.6ISO	●		16-0.6ISO			0.6	9.525	16	0.37	0.6	0.6	
	16-0.7ISO	●		16-0.7ISO			0.7	9.525	16	0.43	0.6	0.6	
	16-0.75ISO	●		16-0.75ISO			0.75	9.525	16	0.46	0.6	0.6	
	16-0.8ISO	● ●		16-0.8ISO			0.8	9.525	16	0.49	0.6	0.6	
	16-1.0ISO	● ●		16-1.0ISO	●		1.0	9.525	16	0.61	0.7	0.7	
	16-1.25ISO	● ●		16-1.25ISO	●		1.25	9.525	16	0.77	0.8	0.9	
	16-1.5ISO	● ●		16-1.5ISO	●		1.5	9.525	16	0.92	0.8	1.0	
	16-1.75ISO	● ●		16-1.75ISO			1.75	9.525	16	1.07	0.9	1.2	
	16-2.0ISO	● ●		16-2.0ISO	●		2.0	9.525	16	1.23	1.0	1.3	
	16-2.5ISO	● ●		16-2.5ISO	●		2.5	9.525	16	1.53	1.1	1.5	
	16-3.0ISO	● ●		16-3.0ISO	●		3.0	9.525	16	1.84	1.2	1.6	
	22-3.5ISO	● ●		22-3.5ISO	●		3.5	12.7	22	2.15	1.6	2.3	
	22-4.0ISO	● ●		22-4.0ISO	●		4.0	12.7	22	2.45	1.6	2.3	
	22-4.5ISO	● ●		22-4.5ISO			4.5	12.7	22	2.78	1.7	2.4	
	22-5.0ISO	● ●		22-5.0ISO	●		5.0	12.7	22	3.07	1.7	2.5	
	27-5.5ISO			27-5.5ISO			5.5	15.875	27	3.37	1.9	2.7	
	27-6.0ISO		●	27-6.0ISO			6.0	15.875	27	3.68	2.0	2.9	

② Applicable holders D31

●: Stock item



D

Threading

## ISO Metric (M chip breaker)

Type	Designation (Right)	PC3030T	PC5300	Designation (Left)	PC3030T	Pitch (mm)	Dimensions (mm)					Picture
							d	L	hmin	X	f	
External	ERM 16-1.0ISO	●				1.0	9.525	16	0.61	0.7	0.7	
	16-1.25ISO					1.25	9.525	16	0.77	0.8	0.9	
	16-1.5ISO	●				1.5	9.525	16	0.93	0.8	1.0	
	16-1.75ISO	●				1.75	9.525	16	1.09	0.9	1.2	
	16-2.0ISO	●				2.0	9.525	16	1.25	1.0	1.3	
	16-2.5ISO	●				2.5	9.525	16	1.55	1.1	1.5	
	16-3.0ISO	●				3.0	9.525	16	1.87	1.2	1.6	

② Applicable holders D31

●: Stock item

## ISO Metric (U chip breaker) new

Type	Designation (Right)	PC3030T	PC5300	Designation (Left)	PC3030T	Pitch (mm)	Dimensions (mm)					Picture
							d	L	hmin	X	f	
External	ERM 16-1.5ISO-U					1.5	9.525	16	0.93	0.8	1.0	
	16-2.0ISO-U					2.0	9.525	16	1.25	1.0	1.3	

② Applicable holders D31

●: Stock item

**D**

## Thread Insert

**ISO Metric**

Type	Designation (Right)	PC3030T	PC9070T	Designation (Left)	PC3030T	PC9070T	Pitch	Dimensions (mm)					Picture
							(mm)	d	L	hmin	X	f	
Internal	IR 11-0.35ISO	●		IL 11-0.35ISO			0.35	6.35	11	0.20	0.8	0.3	
	11-0.4ISO	●		11-0.4ISO			0.4	6.35	11	0.23	0.8	0.4	
	11-0.45ISO	●		11-0.45ISO			0.45	6.35	11	0.26	0.8	0.4	
	11-0.5ISO	●		11-0.5ISO	●		0.5	6.35	11	0.29	0.6	0.4	
	11-0.6ISO	●		11-0.6ISO			0.6	6.35	11	0.35	0.6	0.6	
	11-0.7ISO	●		11-0.7ISO			0.7	6.35	11	0.40	0.6	0.6	
	11-0.75ISO	●		11-0.75ISO	●		0.75	6.35	11	0.43	0.6	0.6	
	11-0.8ISO			11-0.8ISO			0.8	6.35	11	0.46	0.6	0.6	
	11-1.0ISO	● ●		11-1.0ISO			1.0	6.35	11	0.58	0.6	0.7	
	11-1.25ISO	● ●		11-1.25ISO	●		1.25	6.35	11	0.72	0.8	0.9	
	11-1.5ISO	● ●		11-1.5ISO	● ●		1.5	6.35	11	0.87	0.8	1.0	
	11-1.75ISO	● ●		11-1.75ISO			1.75	6.35	11	1.01	0.9	1.1	
	11-2.0ISO	● ●		11-2.0ISO	●		2.0	6.35	11	1.15	0.9	1.1	
	11-2.5ISO	●		11-2.5ISO	●		2.5	6.35	11	1.44	0.8	1.1	
	16-0.35ISO	●		16-0.35ISO			0.35	9.525	16	0.20	0.8	0.3	
	16-0.4ISO	●		16-0.4ISO			0.4	9.525	16	0.23	0.8	0.4	
	16-0.45ISO	●		16-0.45ISO			0.45	9.525	16	0.26	0.8	0.4	
	16-0.5ISO	●		16-0.5ISO			0.5	9.525	16	0.29	0.6	0.4	
	16-0.6ISO			16-0.6ISO			0.6	9.525	16	0.35	0.6	0.6	
	16-0.7ISO	●		16-0.7ISO			0.7	9.525	16	0.40	0.6	0.6	
	16-0.75ISO	●		16-0.75ISO			0.75	9.525	16	0.43	0.6	0.6	
	16-0.8ISO	●		16-0.8ISO			0.8	9.525	16	0.46	0.6	0.6	
	16-1.0ISO	● ●		16-1.0ISO			1.0	9.525	16	0.58	0.6	0.7	
	16-1.25ISO	● ●		16-1.25ISO			1.25	9.525	16	0.72	0.8	0.9	
	16-1.5ISO	● ●		16-1.5ISO	●		1.5	9.525	16	0.87	0.8	1.0	
	16-1.75ISO	● ●		16-1.75ISO			1.75	9.525	16	1.01	0.9	1.2	
	16-2.0ISO	● ●		16-2.0ISO	●		2.0	9.525	16	1.15	1.0	1.3	
	16-2.5ISO	● ●		16-2.5ISO	●		2.5	9.525	16	1.44	1.1	1.5	
	16-3.0ISO	● ●		16-3.0ISO	●		3.0	9.525	16	1.73	1.1	1.5	
	22-3.5ISO	● ●		22-3.5ISO			3.5	12.7	22	2.02	1.6	2.3	
	22-4.0ISO	● ●		22-4.0ISO	●		4.0	12.7	22	2.31	1.6	2.3	
	22-4.5ISO	● ●		22-4.5ISO			4.5	12.7	22	2.60	1.6	2.4	
	22-5.0ISO	● ●		22-5.0ISO			5.0	12.7	22	2.89	1.6	2.3	
	27-5.5ISO	●		27-5.5ISO			5.5	15.875	27	3.17	1.6	2.3	
	27-6.0ISO	●		27-6.0ISO			6.0	15.875	27	3.46	1.8	2.5	

Applicable holders D32

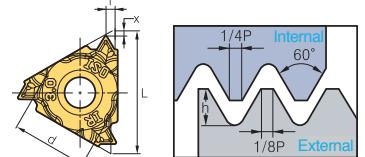
●: Stock item



D

Threading

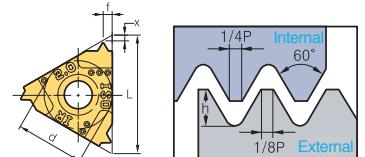
## ISO Metric (M chip breaker)

Type	Designation (Right)	PC3030T	PC5300	Designation (Left)	PC3030T	Pitch	Dimensions (mm)					Picture
						(mm)	d	L	hmin	X	f	
Internal	IRM 11-1.5ISO	●				1.5	6.35	11	0.85	0.8	1.0	
	16-1.0ISO	●				1.0	9.525	16	0.58	0.6	0.7	
	16-1.25ISO					1.25	9.525	16	0.72	0.8	0.9	
	16-1.5ISO	●				1.5	9.525	16	0.85	0.8	1.0	
	16-1.75ISO					1.75	9.525	16	1.01	0.9	1.2	
	16-2.0ISO	●				2.0	9.525	16	1.12	1.0	1.3	
	16-2.5ISO	●				2.5	9.525	16	1.44	1.1	1.5	
	16-3.0ISO	●				3.0	9.525	16	1.69	1.1	1.5	

② Applicable holders D32

●: Stock item

## ISO Metric (U chip breaker) new

Type	Designation (Right)	PC3030T	PC5300	Designation (Left)	PC3030T	Pitch	Dimensions (mm)					
						(mm)	d	L	hmin	X	f	
Internal	IRM 16-1.5ISO-U					1.5	9.525	16	0.85	0.8	1.0	
	16-2.0ISO-U					2.0	9.525	16	1.12	1.0	1.3	

② Applicable holders D32

●: Stock item



# D

## Thread Insert

### American UN (UN, UNC, UNF, UNEF, UNS)

Type	Designation (Right)	PC3030T	PC9070T	Designation (Left)	PC3030T	PC9070T	Pitch	Dimensions (mm)					Picture
							(tpi)	d	L	hmin	X	f	
External	ER 11-72UN	●		EL 11-72UN			72	6.35	11	0.22	0.8	0.4	
	11-64UN	●		11-64UN			64	6.35	11	0.24	0.8	0.4	
	11-56UN	●		11-56UN			56	6.35	11	0.28	0.7	0.4	
	11-48UN	●		11-48UN			48	6.35	11	0.32	0.6	0.6	
	11-44UN	●		11-44UN			44	6.35	11	0.35	0.6	0.6	
	11-40UN	●		11-40UN			40z	6.35	11	0.39	0.6	0.6	
	11-36UN	●		11-36UN			36	6.35	11	0.43	0.6	0.6	
	11-32UN	●		11-32UN			32	6.35	11	0.49	0.6	0.6	
	11-28UN	●		11-28UN			28	6.35	11	0.56	0.6	0.7	
	11-27UN	●		11-27UN			27	6.35	11	0.58	0.7	0.8	
	11-24UN	●		11-24UN			24	6.35	11	0.65	0.7	0.8	
	11-20UN	●		11-20UN			20	6.35	11	0.78	0.8	0.9	
	11-18UN	●		11-18UN			18	6.35	11	0.87	0.8	1.0	
	11-16UN	●		11-16UN			16	6.35	11	0.97	0.9	1.1	
	11-14UN	●		11-14UN			14	6.35	11	1.11	0.9	1.1	
	16-72UN			16-72UN			72	9.525	16	0.22	0.8	0.4	
	16-64UN			16-64UN			64	9.525	16	0.24	0.8	0.4	
	16-56UN			16-56UN			56	9.525	16	0.28	0.7	0.4	
	16-48UN			16-48UN			48	9.525	16	0.32	0.6	0.6	
	16-44UN			16-44UN			44	9.525	16	0.35	0.6	0.6	
	16-40UN			16-40UN			40	9.525	16	0.39	0.6	0.6	
	16-36UN			16-36UN			36	9.525	16	0.43	0.6	0.6	
	16-32UN	●		16-32UN			32	9.525	16	0.49	0.6	0.6	
	16-28UN			16-28UN			28	9.525	16	0.56	0.6	0.7	
	16-27UN	●		16-27UN			27	9.525	16	0.58	0.7	0.8	
	16-24UN	● ●		16-24UN			24	9.525	16	0.65	0.7	0.8	
	16-20UN	● ●		16-20UN			20	9.525	16	0.78	0.8	0.9	
	16-18UN	● ●		16-18UN	●		18	9.525	16	0.87	0.8	1.0	
	16-16UN	● ●		16-16UN	●		16	9.525	16	0.97	0.9	1.1	
	16-14UN	● ●		16-14UN			14	9.525	16	1.11	1.0	1.2	
	16-13UN			16-13UN			13	9.525	16	1.20	1.0	1.3	
	16-12UN	● ●		16-12UN			12	9.525	16	1.30	1.1	1.4	
	16-11.5UN	●		16-11.5UN			11.5	9.525	16	1.35	1.1	1.5	
	16-11UN	● ●		16-11UN			11	9.525	16	1.42	1.1	1.5	
	16-10UN	● ●		16-10UN			10	9.525	16	1.56	1.1	1.5	
	16-9UN	●		16-9UN			9	9.525	16	1.73	1.2	1.7	
	16-8UN	● ●		16-8UN			8	9.525	16	1.95	1.2	1.6	
	22-7UN			22-7UN			7	12.7	22	2.22	1.6	2.3	
	22-6UN	●		22-6UN			6	12.7	22	2.60	1.6	2.3	
	22-5UN	●		22-5UN			5	12.7	22	3.12	1.7	2.5	
	27-4.5UN			27-4.5UN			4.5	15.875	27	3.46	1.9	2.7	
	27-4UN			27-4UN			4	15.875	27	3.89	2.1	3.0	

Applicable holders D31

●: Stock item



## American UN (UN, UNC, UNF, UNEF, UNS)

Type	Designation (Right)	PC3030T	PC9070T	Designation (Left)	PC3030T	PC9070T	Pitch (tpi)	Dimensions (mm)					Picture
								d	L	hmin	X	f	
Internal	IR 11-72UN			IL 11-72UN			72	6.35	11	0.20	0.8	0.3	
	11-64UN			11-64UN			64	6.35	11	0.23	0.8	0.4	
	11-56UN			11-56UN			56	6.35	11	0.26	0.7	0.4	
	11-48UN			11-48UN			48	6.35	11	0.31	0.6	0.6	
	11-44UN			11-44UN			44	6.35	11	0.33	0.6	0.6	
	11-40UN			11-40UN			40	6.35	11	0.37	0.6	0.6	
	11-36UN			11-36UN			36	6.35	11	0.41	0.6	0.6	
	11-32UN			11-32UN			32	6.35	11	0.46	0.6	0.6	
	11-28UN			11-28UN			28	6.35	11	0.52	0.6	0.7	
	11-27UN			11-27UN			27	6.35	11	0.54	0.7	0.8	
	11-24UN			11-24UN			24	6.35	11	0.61	0.7	0.8	
	11-20UN	●		11-20UN			20	6.35	11	0.73	0.8	0.9	
	11-18UN	●		11-18UN			18	6.35	11	0.81	0.8	1.0	
	11-16UN	●		11-16UN			16	6.35	11	0.92	0.9	1.1	
	11-14UN			11-14UN			14	6.35	11	1.05	0.9	1.1	
	11-12UN	●		11-12UN			12	6.35	11	1.22	0.8	1.1	
	11-11UN	●		11-11UN	●		11	6.35	11	1.33	0.8	1.1	
	16-72UN			16-72UN			72	9.525	16	0.20	0.8	0.3	
	16-64UN			16-64UN			64	9.525	16	0.23	0.8	0.4	
	16-56UN			16-56UN			56	9.525	16	0.26	0.7	0.4	
	16-48UN			16-48UN			48	9.525	16	0.31	0.6	0.6	
	16-44UN			16-44UN			44	9.525	16	0.33	0.6	0.6	
	16-40UN			16-40UN			40	9.525	16	0.37	0.6	0.6	
	16-36UN			16-36UN			36	9.525	16	0.41	0.6	0.6	
	16-32UN			16-32UN			32	9.525	16	0.51	0.6	0.6	
	16-28UN	●		16-28UN			28	9.525	16	0.52	0.6	0.7	
	16-27UN			16-27UN			27	9.525	16	0.54	0.7	0.8	
	16-24UN			16-24UN			24	9.525	16	0.61	0.7	0.8	
	16-20UN	●		16-20UN			20	9.525	16	0.73	0.8	0.9	
	16-18UN	●		16-18UN			18	9.525	16	0.81	0.8	1.0	
	16-16UN	●	●	16-16UN			16	9.525	16	0.92	0.9	1.1	
	16-14UN	●		16-14UN			14	9.525	16	1.05	0.9	1.2	
	16-13UN			16-13UN			13	9.525	16	1.13	1.0	1.3	
	16-12UN	●	●	16-12UN			12	9.525	16	1.22	1.1	1.4	
	16-11.5UN	●		16-11.5UN			11.5	9.525	16	1.28	1.1	1.5	
	16-11UN	●	●	16-11UN			11	9.525	16	1.33	1.1	1.5	
	16-10UN	●		16-10UN	●		10	9.525	16	1.47	1.1	1.5	
	16-9UN	●	●	16-9UN			9	9.525	16	1.63	1.2	1.7	
	16-8UN	●	●	16-8UN	●		8	9.525	16	1.83	1.2	1.5	
	22-7UN			22-7UN			7	12.7	22	2.09	1.6	2.3	
	22-6UN			22-6UN			6	12.7	22	2.44	1.6	2.3	
	22-5UN			22-5UN			5	12.7	22	2.93	1.7	2.3	
	27-4.5UN			27-4.5UN			4.5	15.875	27	3.26	1.9	2.4	
	27-4UN			27-4UN			4	15.875	27	3.67	2.1	2.7	

Applicable holders D32

●: Stock item



**D**

## Thread Insert

**Whitworth (BSW, BSF, BSP, BSB)**

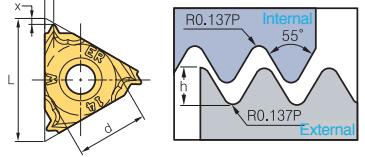
Type	Designation (Right)	PC3030T	PC9070T	Designation (Left)	PC3030T	PC9070T	Pitch (tpi)	Dimensions (mm)					Picture
								d	L	hmin	X	f	
External	<b>ER</b> 11-72W	●		<b>EL</b> 11-72W			72	6.35	11	0.23	0.7	0.4	
	11-60W	●		11-60W			60	6.35	11	0.27	0.7	0.4	
	11-56W	●		11-56W			56	6.35	11	0.29	0.7	0.4	
	11-48W	●		11-48W			48	6.35	11	0.34	0.6	0.6	
	11-40W	●		11-40W			40	6.35	11	0.41	0.6	0.6	
	11-36W	●		11-36W			36	6.35	11	0.45	0.6	0.6	
	11-32W	●		11-32W			32	6.35	11	0.51	0.6	0.6	
	11-28W	●		11-28W			28	6.35	11	0.58	0.6	0.7	
	11-26W	●		11-26W			26	6.35	11	0.63	0.7	0.8	
	11-24W	●		11-24W			24	6.35	11	0.68	0.7	0.8	
	11-22W	●		11-22W			22	6.35	11	0.74	0.8	0.9	
	11-20W	●		11-20W			20	6.35	11	0.81	0.8	0.9	
	11-19W			11-19W			19	6.35	11	0.86	0.8	1.0	
	11-18W	●		11-18W			18	6.35	11	0.90	0.8	1.0	
	11-16W	●		11-16W			16	6.35	11	1.02	0.9	1.1	
	11-14W			11-14W			14	6.35	11	1.16	1.0	1.2	
	16-72W	●		16-72W			72	9.525	16	0.23	0.7	0.4	
	16-60W	●		16-60W			60	9.525	16	0.27	0.7	0.4	
	16-56W	●		16-56W			56	9.525	16	0.29	0.7	0.4	
	16-48W	●		16-48W			48	9.525	16	0.34	0.6	0.6	
	16-40W	●		16-40W			40	9.525	16	0.41	0.6	0.6	
	16-36W	●		16-36W			36	9.525	16	0.45	0.6	0.6	
	16-32W	●		16-32W			32	9.525	16	0.51	0.6	0.6	
	16-30W	●		16-30W			30	9.525	16	0.55	0.6	0.7	
	16-28W	● ●		16-28W			28	9.525	16	0.58	0.6	0.7	
	16-26W	●		16-26W			26	9.525	16	0.63	0.7	0.8	
	16-24W	●		16-24W			24	9.525	16	0.68	0.7	0.8	
	16-22W	●		16-22W			22	9.525	16	0.74	0.8	0.9	
	16-20W	●		16-20W			20	9.525	16	0.81	0.8	0.9	
	16-19W	● ●		16-19W			19	9.525	16	0.86	0.8	1.0	
	16-18W	●		16-18W			18	9.525	16	0.90	0.8	1.0	
	16-16W	●		16-16W			16	9.525	16	1.02	0.9	1.1	
	16-14W	● ●		16-14W			14	9.525	16	1.16	1.0	1.2	
	16-12W	●		16-12W			12	9.525	16	1.36	1.1	1.4	
	16-11W	● ●		16-11W			11	9.525	16	1.48	1.1	1.5	
	16-10W	●		16-10W			10	9.525	16	1.63	1.1	1.5	
	16-9W	●		16-9W			9	9.525	16	1.81	1.2	1.7	
	16-8W	●		16-8W			8	9.525	16	2.03	1.2	1.5	
	22-7W	●		22-7W			7	12.7	22	3.32	1.6	2.3	
	22-6W	●		22-6W	●		6	12.7	22	2.71	1.6	2.3	
	22-5W	●		22-5W			5	12.7	22	3.25	1.7	2.4	
	27-4.5W	●		27-4.5W			4.5	15.875	27	3.61	1.8	2.6	
	27-4W			27-4W			4	15.875	27	4.07	2.0	2.9	

➔ Applicable holders D31

●: Stock item



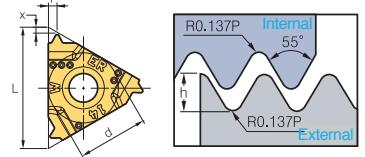
## Whitworth (M chip breaker)

Type	Designation (Right)	PC3030T	PC5300	Designation (Left)	PC3030T	Pitch (tpi)	Dimensions (mm)					Picture
							d	L	hmin	X	f	
External	ERM 16-11W	●				14	9.525	16	1.16	1.0	1.2	
	16-14W	●				11	9.525	16	1.48	1.1	1.5	
	16-19W	●				19	9.525	16	0.86	0.8	1.0	

② Applicable holders D31

●: Stock item

## Whitworth (U chip breaker)

Type	Designation (Right)	PC3030T	PC5300	Designation (Left)	PC3030T	Pitch (tpi)	Dimensions (mm)					Picture
							d	L	hmin	X	f	
External	ERM 16-14W-U					14	9.525	16	1.16	1.0	1.2	
	16-11W-U					11	9.525	16	1.48	1.1	1.5	

② Applicable holders D31

●: Stock item

# D

## Thread Insert

### Whitworth (BSW, BSF, BSP, BSB)

Type	Designation (Right)	PC3030T	PC9070T	Designation (Left)	PC3030T	PC9070T	Pitch (tpi)	Dimensions (mm)					Picture
								d	L	hmin	X	f	
Internal	IR 11-72W	●		IL 11-72W			72	6.35	11	0.23	0.7	0.4	
	11-60W	●		11-60W			60	6.35	11	0.27	0.7	0.4	
	11-56W	●		11-56W			56	6.35	11	0.29	0.7	0.4	
	11-48W	●		11-48W			48	6.35	11	0.34	0.6	0.6	
	11-40W	●		11-40W			40	6.35	11	0.41	0.6	0.6	
	11-36W	●		11-36W			36	6.35	11	0.45	0.6	0.6	
	11-32W	●		11-32W			32	6.35	11	0.51	0.6	0.6	
	11-28W	●		11-28W			28	6.35	11	0.58	0.6	0.7	
	11-26W	●		11-26W			26	6.35	11	0.63	0.7	0.8	
	11-24W	●		11-24W			24	6.35	11	0.68	0.7	0.8	
	11-22W	●		11-22W			22	6.35	11	0.74	0.8	0.9	
	11-20W			11-20W			20	6.35	11	0.81	0.8	0.9	
	11-19W	● ●		11-19W	●		19	6.35	11	0.86	0.8	1.0	
	11-18W	●		11-18W	●		18	6.35	11	0.90	0.8	1.0	
	11-16W	●		11-16W	●		16	6.35	11	1.02	0.9	1.1	
	11-14W	●		11-14W	●		14	6.35	11	1.16	0.9	1.1	
	11-12W	●		11-12W	●		12	6.35	11	1.32	0.9	1.2	
	16-72W	●		16-72W			72	9.525	16	0.23	0.7	0.4	
	16-60W	●		16-60W			60	9.525	16	0.27	0.7	0.4	
	16-56W	●		16-56W			56	9.525	16	0.29	0.7	0.4	
	16-48W	●		16-48W			48	9.525	16	0.34	0.6	0.6	
	16-40W	●		16-40W			40	9.525	16	0.41	0.6	0.6	
	16-36W	●		16-36W			36	9.525	16	0.45	0.6	0.6	
	16-32W	●		16-32W			32	9.525	16	0.51	0.6	0.6	
	16-30W	●		16-30W			30	9.525	16	0.55	0.6	0.7	
	16-28W	●		16-28W			28	9.525	16	0.58	0.6	0.7	
	16-26W	●		16-26W			26	9.525	16	0.63	0.7	0.8	
	16-24W	●		16-24W			24	9.525	16	0.68	0.7	0.8	
	16-22W	●		16-22W			22	9.525	16	0.74	0.8	0.9	
	16-20W	●		16-20W			20	9.525	16	0.81	0.8	0.9	
	16-19W	●		16-19W			19	9.525	16	0.86	0.8	1.0	
	16-18W	●		16-18W			18	9.525	16	0.90	0.8	1.0	
	16-16W			16-16W			16	9.525	16	1.02	0.9	1.1	
	16-14W	● ●		16-14W	●		14	9.525	16	1.16	1.0	1.2	
	16-12W	●		16-12W			12	9.525	16	1.36	1.1	1.4	
	16-11W	● ●		16-11W			11	9.525	16	1.48	1.1	1.5	
	16-10W	●		16-10W			10	9.525	16	1.63	1.1	1.5	
	16-9W	●		16-9W			9	9.525	16	1.81	1.2	1.7	
	16-8W	●		16-8W			8	9.525	16	2.03	1.2	1.5	
	22-7W			22-7W			7	12.7	22	3.32	1.6	2.3	
	22-6W	●		22-6W			6	12.7	22	2.71	1.6	2.3	
	22-5W	●		22-5W			5	12.7	22	3.25	1.7	2.4	
	27-4.5W	●		27-4.5W			4.5	15.875	27	3.61	1.8	2.6	
	27-4W	●		27-4W			4	15.875	27	4.07	2.0	2.9	

Applicable holders D32

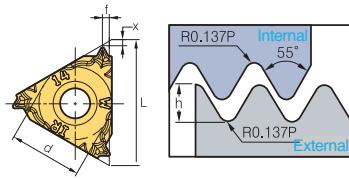
●: Stock item



D

Threading

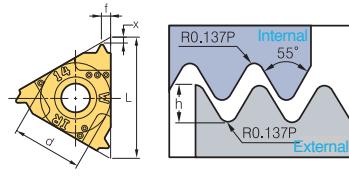
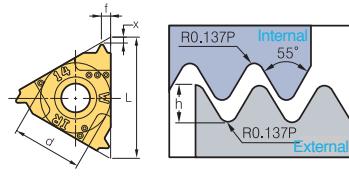
## Whitworth (M chip breaker)

Type	Designation (Right)	PC3030T	PC5300	Designation (Left)	PC3030T	Pitch (tpi)	Dimensions (mm)					Picture
							d	L	hmin	X	f	
Internal	IRM 16-14W					14	9.525	16	1.16	1.0	1.2	
	16-11W	●				11	9.525	16	1.48	1.1	1.5	

② Applicable holders D32

●: Stock item

## Whitworth (U chip breaker)

Type	Designation (Right)	PC3030T	PC5300	Designation (Left)	PC3030T	Pitch (tpi)	Dimensions (mm)					
							d	L	hmin	X	f	
Internal	IRM 16-14W-U					14	9.525	16	1.16	1.0	1.2	
	16-11W-U					11	9.525	16	1.48	1.1	1.5	

② Applicable holders D32

●: Stock item



# D

## Thread Insert

### British Standard Pipe Thread (BSPT)

Type	Designation (Right)	PC3030T	PC9070T	Designation (Left)	PC3030T	PC9070T	Pitch	Dimensions (mm)					Picture
							(tpi)	d	L	hmin	X	f	
External	ER 11-28BSPT			EL 11-28BSPT			28	6.35	11	0.58	0.6	0.6	
	11-19BSPT			11-19BSPT			19	6.35	11	0.86	0.8	0.9	
	11-14BSPT			11-14BSPT			14	6.35	11	1.16	0.9	1.0	
	16-28BSPT			16-28BSPT			28	9.525	16	0.58	0.6	0.6	
	16-19BSPT	● ●		16-19BSPT			19	9.525	16	0.86	0.8	0.9	
	16-14BSPT	● ●		16-14BSPT			14	9.525	16	1.16	1.0	1.2	
	16-11BSPT	● ●		16-11BSPT			11	9.525	16	1.48	1.1	1.5	
Internal	IR 11-28BSPT			IL 11-28BSPT			28	6.35	11	0.58	0.6	0.6	
	11-19BSPT	●		11-19BSPT			19	6.35	11	0.86	0.8	0.9	
	11-14BSPT	● ●		11-14BSPT			14	6.35	11	1.16	0.9	1.0	
	16-28BSPT			16-28BSPT			28	9.525	16	0.58	0.6	0.6	
	16-19BSPT	● ●		16-19BSPT			19	9.525	16	0.86	0.8	0.9	
	16-14BSPT	● ●		16-14BSPT			14	9.525	16	1.16	1.0	1.2	
	16-11BSPT	● ●		16-11BSPT			11	9.525	16	1.48	1.1	1.5	

➔ Applicable holders D31, D32

●: Stock item

### National Pipe Thread (NPT)

Type	Designation (Right)	PC3030T	PC9070T	Designation (Left)	PC3030T	PC9070T	Pitch	Dimensions (mm)					
							(tpi)	d	L	hmin	X	f	
External	ER 11-27NPT	●		EL 11-27NPT			27	6.35	11	0.66	0.7	0.8	
	11-18NPT	●		11-18NPT			18	6.35	11	1.01	0.8	1.0	
	11-14NPT	●		11-14NPT			14	6.35	11	1.33	0.8	1.0	
	16-27NPT	●		16-27NPT			27	9.525	16	0.66	0.7	0.8	
	16-18NPT	● ●		16-18NPT			18	9.525	16	1.01	0.8	1.0	
	16-14NPT	● ●		16-14NPT			14	9.525	16	1.33	0.9	1.2	
	16-11.5NPT	●		16-11.5NPT			11.5	9.525	16	1.64	1.1	1.5	
	16-8NPT	●		16-8NPT			8	9.525	16	2.42	1.3	1.8	
Internal	IR 11-27NPT	●		IL 11-27NPT			27	6.35	11	0.66	0.7	0.8	
	11-18NPT	●		11-18NPT			18	6.35	11	1.01	0.8	1.0	
	11-14NPT	● ●		11-14NPT	●		14	6.35	11	1.33	0.8	1.0	
	16-27NPT	●		16-27NPT			27	9.525	16	0.66	0.7	0.8	
	16-18NPT	●		16-18NPT			18	9.525	16	1.01	0.8	1.0	
	16-14NPT	● ●		16-14NPT			14	9.525	16	1.33	0.9	1.2	
	16-11.5NPT	● ●		16-11.5NPT	●		11.5	9.525	16	1.64	1.1	1.5	
	16-8NPT	●		16-8NPT	●		8	9.525	16	2.42	1.3	1.8	

➔ Applicable holders D31, D32

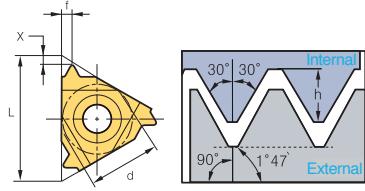
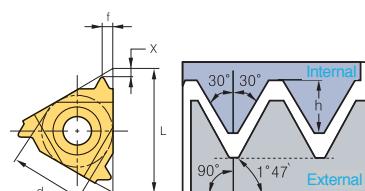
●: Stock item



D

Threading

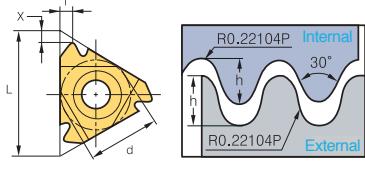
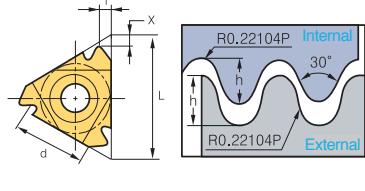
## National Pipe Threads-Dryseal (NPTF)

Type	Designation (Right)	PC3030T	PC9070T	Designation (Left)	PC3030T	PC9070T	Pitch	Dimensions (mm)					Picture
							(tpi)	d	L	hmin	X	f	
External	ER 11-27NPTF			EL 11-27NPTF			27	6.35	11	0.64	0.7	0.8	
	11-18NPTF			11-18NPTF			18	6.35	11	1.00	0.8	1.0	
	11-14NPTF			11-14NPTF			14	6.35	11	1.35	0.8	1.0	
	16-27NPTF			16-27NPTF			27	9.525	16	0.64	0.7	0.8	
	16-18NPTF	●		16-18NPTF			18	9.525	16	1.00	0.8	1.0	
	16-14NPTF			16-14NPTF			14	9.525	16	1.35	0.9	1.2	
	16-11.5NPTF			16-11.5NPTF			11.5	9.525	16	1.63	1.1	1.5	
	16-8NPTF			16-8NPTF	●		8	9.525	16	2.38	1.3	1.8	
Internal	IR 11-27NPTF			IL 11-27NPTF			27	6.35	11	0.64	0.7	0.8	
	11-18NPTF			11-18NPTF			18	6.35	11	1.00	0.8	1.0	
	11-14NPTF			11-14NPTF			14	6.35	11	1.35	0.8	1.0	
	16-27NPTF			16-27NPTF			27	9.525	16	0.64	0.7	0.8	
	16-18NPTF			16-18NPTF			18	9.525	16	1.00	0.8	1.0	
	16-14NPTF			16-14NPTF			14	9.525	16	1.35	0.9	1.2	
	16-11.5NPTF			16-11.5NPTF			11.5	9.525	16	1.63	1.1	1.5	
	16-8NPTF			16-8NPTF			8	9.525	16	2.38	1.3	1.8	

→ Applicable holders D31, D32

●: Stock item

## Round DIN 405

Type	Designation (Right)	PC3030T	PC9070T	Designation (Left)	PC3030T	PC9070T	Pitch	Dimensions (mm)					Picture
							(tpi)	d	L	hmin	X	f	
External	ER 16-10RD			EL 16-10RD			10	9.525	16	1.27	1.1	1.2	
	16-8RD	●		16-8RD			8	9.525	16	1.59	1.4	1.3	
	16-6RD	●		16-6RD			6	9.525	16	2.12	1.5	1.7	
	22-6RD			22-6RD			6	12.7	22	2.12	1.5	1.7	
	22-4RD	●		22-4RD			4	12.7	22	3.18	2.2	2.3	
	27-4RD			27-4RD			4	15.875	27	3.18	2.2	2.3	
Internal	IR 16-10RD			IL 16-10RD			10	9.525	16	1.27	1.1	1.2	
	16-8RD			16-8RD			8	9.525	16	1.59	1.4	1.4	
	16-6RD	●		16-6RD			6	9.525	16	2.12	1.4	1.5	
	22-6RD			22-6RD			6	12.7	22	2.12	1.5	1.7	
	22-4RD	●		22-4RD			4	12.7	22	3.18	2.2	2.3	
	27-4RD			27-4RD			4	15.875	27	3.18	2.2	2.3	

→ Applicable holders D31, D32

●: Stock item



# D

## Thread Insert

### Trapez DIN 103 (TR)

Type	Designation (Right)			Designation (Left)			Pitch	Dimensions (mm)					Picture
		PC3030T	PC9070T		PC3030T	PC9070T		(mm)	d	L	hmin	X	
External	ER 11-1.5TR	●		EL 11-1.5TR	●		1.5	6.35	11	0.90	0.8	0.9	
	16-1.5TR						1.5	9.525	16	0.90	1.0	1.1	
	16-2.0TR	●					2.0	9.525	16	1.25	1.1	1.3	
	16-3.0TR	●	●				3.0	9.525	16	1.75	1.3	1.5	
	22-4.0TR	●	●				4.0	12.7	22	2.25	1.7	1.9	
	22-5.0TR	●	●				5.0	12.7	22	2.75	2.1	2.5	
	27-6.0TR	●	●				6.0	15.875	27	3.50	2.3	2.7	
Internal	IR 11-1.5TR			IL 11-1.5TR	●		1.5	6.35	11	0.90	0.8	0.9	
	16-1.5TR	●					1.5	9.525	16	0.90	1.0	1.1	
	16-2.0TR	●					2.0	9.525	16	1.25	1.1	1.3	
	16-2.5TR	●					2.5	9.525	16	1.53	1.2	1.4	
	16-3.0TR	●					3.0	9.525	16	1.75	1.3	1.5	
	22-4.0TR	●	●				4.0	12.7	22	2.25	1.7	1.9	
	22-5.0TR	●	●				5.0	12.7	22	2.75	2.1	2.5	
	27-6.0TR	●	●				6.0	15.875	27	3.50	2.3	2.7	

● Applicable holders D31, D32

● Stock item

### American ACME (ACME)

Type	Designation (Right)			Designation (Left)			Pitch	Dimensions (mm)					Picture
		PC3030T	PC9070T		PC3030T	PC9070T		(tpi)	d	L	hmin	X	
External	ER 11-16ACME			EL 11-16ACME			16	6.35	11	0.92	1.0	1.1	
	16-16ACME						16	9.525	16	0.92	1.0	1.1	
	16-14ACME						14	9.525	16	1.03	1.0	1.2	
	16-12ACME						12	9.525	16	1.19	1.1	1.2	
	16-10ACME	●					10	9.525	16	1.52	1.3	1.4	
	16-8ACME						8	9.525	16	1.84	1.4	1.5	
	16-6ACME						6	9.525	16	2.37	1.7	1.9	
	22-6ACME	●					6	12.7	22	2.37	1.8	2.1	
	22-5ACME	●					5	12.7	22	2.79	2.0	2.3	
	27-4ACME						4	15.875	27	3.43	2.4	2.7	
Internal	IR 11-16ACME			IL 11-16ACME			16	6.35	11	0.92	0.9	0.9	
	16-16ACME						16	9.525	16	0.92	1.0	1.1	
	16-14ACME						14	9.525	16	1.03	1.1	1.2	
	16-12ACME						12	9.525	16	1.19	1.2	1.3	
	16-10ACME						10	9.525	16	1.52	1.2	1.3	
	16-8ACME	●					8	9.525	16	1.84	1.4	1.5	
	16-6ACME						6	9.525	16	2.37	1.7	1.9	
	22-6ACME	●					6	12.7	22	2.37	1.8	2.1	
	22-5ACME	●					5	12.7	22	2.79	2.0	2.3	
	27-4ACME	●					4	15.875	27	3.43	2.3	2.6	

● Applicable holders D31, D32

● Stock item



D

Threading

## Stub ACME (STACME)

Type	Designation (Right)	PC3030T	PC9070T	Designation (Left)	PC3030T	PC9070T	Pitch (tpi)	Dimensions (mm)					Picture
								d	L	hmin	X	f	
External	ER 11-16STACME			EL 11-16STACME			16	6.35	11	0.60	1.0	1.0	
	16-16STACME			16-16STACME			16	9.525	16	0.60	1.0	1.0	
	16-14STACME			16-14STACME			14	9.525	16	0.67	1.1	1.1	
	16-12STACME			16-12STACME			12	9.525	16	0.76	1.2	1.2	
	16-10STACME			16-10STACME			10	9.525	16	1.02	1.2	1.3	
	16-8STACME			16-8STACME			8	9.525	16	1.21	1.4	1.5	
	16-6STACME			16-6STACME			6	9.525	16	1.52	1.7	1.8	
	22-6STACME			22-6STACME			6	12.7	22	1.52	1.7	1.8	
	22-5STACME			22-5STACME			5	12.7	22	1.78	2.1	2.3	
	27-4STACME			27-4STACME			4	15.875	27	2.16	2.3	2.4	
	27-3STACME			27-3STACME			3	15.875	27	2.79	2.9	2.9	
Internal	IR 11-16STACME			IL 11-16STACME			16	6.35	11	0.60	1.0	1.0	
	16-16STACME			16-16STACME			16	9.525	16	0.60	1.0	1.0	
	16-14STACME			16-14STACME			14	9.525	16	0.67	1.1	1.1	
	16-12STACME			16-12STACME			12	9.525	16	0.76	1.1	1.2	
	16-10STACME			16-10STACME			10	9.525	16	1.02	1.2	1.3	
	16-8STACME			16-8STACME			8	9.525	16	1.21	1.4	1.5	
	16-6STACME			16-6STACME			6	9.525	16	1.52	1.7	1.8	
	22-6STACME			22-6STACME			6	12.7	22	1.52	1.7	1.8	
	22-5STACME			22-5STACME			5	12.7	22	1.78	2.1	2.3	
	27-4STACME			27-4STACME			4	15.875	27	2.16	2.3	2.4	
	27-3STACME			27-3STACME			3	15.875	27	2.79	2.9	2.9	

➔ Applicable holders D31, D32

● Stock item



# D

## Thread Insert

### UNJ (Unified constant thread)

Type	Designation (Right)	PC3030T	PC9070T	Designation (Left)	PC3030T	PC9070T	Pitch	Dimensions (mm)					Picture
							(tpi)	d	L	hmin	X	f	
External	ER 11-48UNJ			EL 11-48UNJ			48	6.35	11	0.31	0.6	0.5	
	11-44UNJ			11-44UNJ			44	6.35	11	0.33	0.6	0.6	
	11-40UNJ			11-40UNJ			40	6.35	11	0.37	0.6	0.6	
	11-36UNJ			11-36UNJ			36	6.35	11	0.41	0.6	0.6	
	11-32UNJ			11-32UNJ			32	6.35	11	0.46	0.6	0.7	
	11-28UNJ			11-28UNJ			28	6.35	11	0.52	0.7	0.7	
	11-24UNJ	●		11-24UNJ			24	6.35	11	0.61	0.7	0.8	
	11-20UNJ			11-20UNJ			20	6.35	11	0.73	0.8	0.9	
	11-18UNJ			11-18UNJ			18	6.35	11	0.81	0.8	1.0	
	11-16UNJ			11-16UNJ			16	6.35	11	0.92	0.9	1.1	
	11-14UNJ			11-14UNJ			14	6.35	11	1.05	1.0	1.2	
	16-48UNJ			16-48UNJ			48	9.525	16	0.31	0.6	0.5	
	16-44UNJ			16-44UNJ			44	9.525	16	0.33	0.6	0.6	
	16-40UNJ			16-40UNJ			40	9.525	16	0.37	0.6	0.6	
	16-36UNJ			16-36UNJ			36	9.525	16	0.41	0.6	0.6	
	16-32UNJ	●		16-32UNJ			32	9.525	16	0.46	0.6	0.7	
	16-28UNJ	●		16-28UNJ			28	9.525	16	0.52	0.7	0.7	
	16-24UNJ	●		16-24UNJ			24	9.525	16	0.61	0.7	0.8	
	16-20UNJ	●		16-20UNJ			20	9.525	16	0.73	0.8	0.9	
	16-18UNJ			16-18UNJ			18	9.525	16	0.81	0.8	1.0	
	16-16UNJ	●		16-16UNJ			16	9.525	16	0.92	0.9	1.1	
	16-14UNJ			16-14UNJ			14	9.525	16	1.05	1.0	1.2	
	16-13UNJ			16-13UNJ			13	9.525	16	1.13	1.0	1.3	
	16-12UNJ	●		16-12UNJ			12	9.525	16	1.22	1.1	1.3	
	16-11UNJ			16-11UNJ			11	9.525	16	1.33	1.2	1.5	
	16-10UNJ	●		16-10UNJ			10	9.525	16	1.47	1.2	1.5	
	16-9UNJ			16-9UNJ			9	9.525	16	1.63	1.3	1.7	
	16-8UNJ			16-8UNJ			8	9.525	16	1.83	1.2	1.6	
	22-7UNJ			22-7UNJ			7	12.7	22	2.09	1.7	2.3	
	22-6UNJ			22-6UNJ			6	12.7	22	2.44	1.7	2.3	
	22-5UNJ			22-5UNJ			5	12.7	22	2.93	1.8	2.5	
	27-4.5UNJ			27-4.5UNJ			4.5	15.875	27	3.26	2.0	2.7	
	27-4UNJ			27-4UNJ			4	15.875	27	3.67	2.2	3.0	

Applicable holders D31

●: Stock item



D

Threading

**UNJ (Unified constant thread)**

Type	Designation (Right)	PC3030T	PC9070T	Designation (Left)	PC3030T	PC9070T	Pitch (tpi)	Dimensions (mm)					Picture
								d	L	hmin	X	f	
Internal	IR 11-48UNJ			IL 11-48UNJ			48	6.35	11	0.28	0.6	0.5	
	11-44UNJ			11-44UNJ			44	6.35	11	0.30	0.6	0.6	
	11-40UNJ			11-40UNJ			40	6.35	11	0.33	0.6	0.6	
	11-36UNJ			11-36UNJ			36	6.35	11	0.37	0.6	0.6	
	11-32UNJ			11-32UNJ			32	6.35	11	0.42	0.6	0.7	
	11-28UNJ			11-28UNJ			28	6.35	11	0.47	0.7	0.7	
	11-24UNJ			11-24UNJ			24	6.35	11	0.55	0.7	0.8	
	11-20UNJ			11-20UNJ			20	6.35	11	0.66	0.8	0.9	
	11-18UNJ			11-18UNJ			18	6.35	11	0.74	0.8	1.0	
	11-16UNJ			11-16UNJ			16	6.35	11	0.83	0.9	1.1	
	11-14UNJ			11-14UNJ			14	9.525	11	0.95	1.0	1.2	
	16-48UNJ			16-48UNJ			48	9.525	16	0.28	0.6	0.5	
	16-44UNJ			16-44UNJ			44	9.525	16	0.30	0.6	0.6	
	16-40UNJ			16-40UNJ			40	9.525	16	0.33	0.6	0.6	
	16-36UNJ			16-36UNJ			36	9.525	16	0.37	0.6	0.6	
	16-32UNJ			16-32UNJ			32	9.525	16	0.42	0.6	0.7	
	16-28UNJ			16-28UNJ			28	9.525	16	0.47	0.7	0.7	
	16-24UNJ			16-24UNJ			24	9.525	16	0.55	0.7	0.8	
	16-20UNJ			16-20UNJ			20	9.525	16	0.66	0.8	0.9	
	16-18UNJ			16-18UNJ			18	9.555	16	0.74	0.8	1.0	
	16-16UNJ			16-16UNJ			16	9.525	16	0.83	0.9	1.1	
	16-14UNJ			16-14UNJ			14	9.525	16	0.95	1.0	1.2	
	16-13UNJ			16-13UNJ			13	9.525	16	1.02	1.0	1.3	
	16-12UNJ	●		16-12UNJ	●		12	9.525	16	1.11	1.1	1.3	
	16-11UNJ			16-11UNJ			11	9.525	16	1.21	1.2	1.5	
	16-10UNJ			16-10UNJ			10	9.525	16	1.33	1.2	1.5	
	16-9UNJ			16-9UNJ			9	9.525	16	1.48	1.3	1.7	
	16-8UNJ			16-8UNJ			8	9.525	16	1.66	1.2	1.6	
	22-7UNJ			22-7UNJ			7	12.7	22	1.90	1.7	2.3	
	22-6UNJ			22-6UNJ			6	12.7	22	2.21	1.7	2.3	
	22-5UNJ			22-5UNJ			5	12.7	22	2.66	1.8	2.5	
	27-4.5UNJ			27-4.5UNJ			4.5	15.875	27	2.95	2.0	2.7	
	27-4UNJ			27-4UNJ			4	15.875	27	3.32	2.2	3.0	

Applicable holders D32

●: Stock item



# D

## Thread Insert

### American Buttress (ABUT)

Type	Designation (Right)	PC3030T	PC9070T	Designation (Left)	PC3030T	PC9070T	Pitch	Dimensions (mm)					Picture
							(tpi)	d	L	hmin	X	f	
External	ER 11-20ABUT			EL 11-20ABUT			20	6.35	11	0.84	1.0	1.4	
	11-16ABUT						16	6.35	11	1.05	1.3	1.9	
	16-20ABUT	●					20	9.525	16	0.84	1.0	1.4	
	16-16ABUT						16	9.525	16	1.05	1.3	1.9	
	16-12ABUT						12	9.525	16	1.40	1.4	2.0	
	16-10ABUT						10	9.525	16	1.68	1.5	2.3	
	22-8ABUT						8	12.7	22	2.10	2.0	3.2	
	22-6ABUT						6	12.7	22	2.80	2.2	3.5	
Internal	IR 11-20ABUT			IL 11-20ABUT			20	6.35	11	0.84	1.0	1.4	
	11-16ABUT						16	6.35	11	1.05	1.3	1.9	
	16-20ABUT	●					20	9.525	16	0.84	1.0	1.4	
	16-16ABUT						16	9.525	16	1.05	1.3	1.9	
	16-12ABUT						12	9.525	16	1.40	1.4	2.0	
	16-10ABUT	●					10	9.525	16	1.68	1.5	2.3	
	22-8ABUT						8	12.7	22	2.10	2.0	3.2	
	22-6ABUT						6	12.7	22	2.80	2.2	3.5	

➔ Applicable holders D31, D32

●: Stock item

### British Buttress (BBUT)

Type	Designation (Right)	PC3030T	PC9070T	Designation (Left)	PC3030T	PC9070T	Pitch	Dimensions (mm)					Picture
							(tpi)	d	L	hmin	X	f	
External	ER 16-16BBUT	●		EL 16-16BBUT			16	9.525	16	0.80	1.1	1.6	
	16-12BBUT						12	9.525	16	1.07	1.4	2.1	
	16-10BBUT						10	9.525	16	1.28	1.4	2.2	
	16-8BBUT	●					8	9.525	16	1.61	1.6	2.5	
	22-8BBUT						8	12.7	22	1.61	1.6	2.5	
Internal	IR 16-16BBUT	●		IL 16-16BBUT			16	9.525	16	0.80	1.1	1.6	
	16-12BBUT						12	9.525	16	1.07	1.4	2.1	
	16-10BBUT						10	9.525	16	1.28	1.4	2.2	
	16-8BBUT						8	9.525	16	1.61	1.6	2.5	
	22-8BBUT						8	12.7	22	1.61	1.6	2.5	

➔ Applicable holders D31, D32

●: Stock item



D

Threading

## Metric Buttress (SAGE)

Type	Designation (Right)	PC3030T	PC9070T	Designation (Left)	PC3030T	PC9070T	Pitch (mm)	Dimensions (mm)					Picture
								d	L	hmin	X	f	
External	ER 16-2.0SAGE			EL 16-2.0SAGE			2.0	9.525	16	1.74	1.47	2.08	
	22-2.0SAGE			22-2.0SAGE			2.0	12.7	22	1.74	1.47	2.08	
	22-3.0SAGE	●		22-3.0SAGE			3.0	12.7	22	2.60	1.79	2.60	
	27-4.0SAGE	●		27-4.0SAGE			4.0	15.875	27	3.55	1.93	3.20	
Internal	IR 16-2.0SAGE	●		IL 16-2.0SAGE			2.0	9.525	16	1.50	1.52	2.2	
	22-3.0SAGE			22-3.0SAGE			3.0	12.7	22	2.25	1.66	2.9	
	27-4.0SAGE	●		27-4.0SAGE			4.0	5/8	27	3.09	2.12	3.2	

② Applicable holders D31, D32

●: Stock item

## API

Type	Designation (Right)	PC3030T	PC9070T	Designation (Left)	PC3030T	PC9070T	Pitch (tpi)	Dimensions (mm)					Picture
								d	L	hmin	X	f	
External	ER 22-4API382	●		EL 22-4API382			4	12.7	22	3.09	2.1	2.8	
	22-4API383			22-4API383			4	12.7	22	3.08	2.1	2.8	
	22-4API502	●		22-4API502			4	12.7	22	3.75	2.0	2.9	
	22-4API503	●		22-4API503			4	12.7	22	3.74	2.0	2.9	
	22-5API403			22-5API403			5	12.7	22	2.99	1.8	2.6	
	22-6API551			22-6API551			6	12.7	22	1.41	2.6	2.0	
	27-4API382			27-4API382			4	15.875	27	3.09	2.1	2.8	
	27-4API383			27-4API383			4	15.875	27	3.08	2.1	2.8	
	27-4API502			27-4API502			4	15.875	27	3.75	2.1	3.1	
	27-4API503	●		27-4API503			4	15.875	27	3.74	2.1	3.1	
	27-5API403			27-5API403			5	15.875	27	2.99	1.9	2.7	
Internal	IR 22-4API382			IL 22-4API382			4	12.7	22	3.09	2.1	2.8	
	22-4API383			22-4API383			4	12.7	22	3.08	2.1	2.8	
	22-4API502	●		22-4API502			4	12.7	22	3.75	2.1	3.1	
	22-4API503			22-4API503			4	12.7	22	3.74	2.0	2.9	
	22-5API403	●		22-5API403			5	12.7	22	2.99	1.8	2.6	
	22-6API551	●		22-6API551			6	12.7	22	1.41	2.6	2.0	
	27-4API382			27-4API382			4	15.875	27	3.09	2.1	2.8	
	27-4API383	●		27-4API383			4	15.875	27	3.08	2.1	2.8	
	27-4API502	●		27-4API502			4	15.875	27	3.75	2.1	3.1	
	27-4API503	●		27-4API503			4	15.875	27	3.74	2.1	3.1	
	27-5API403	●		27-5API403			5	15.875	27	2.99	1.9	2.7	

② Applicable holders D31, D32

●: Stock item

# D

## Thread Insert

### API Buttress Casing (BUT)

Type	Designation (Right)			Designation (Left)			Pitch (tpi)	Dimensions (mm)					Picture	
		PC3030T	PC9070T		PC3030T	PC9070T		IPF	d	L	hmin	X		
External	ER 22-5BUT75			EL 22-5BUT75 22-BUT1			5	0.75	12.7	22	1.55	3.1	1.9	
	22-5BUT1							5	1	12.7	22	1.55	3.1	1.9
Internal	IR 22-5BUT75			IL 22-5BUT75 22-BUT1			5	0.75	12.7	22	1.55	2.8	1.9	
	22-5BUT1	●						5	1	12.7	22	1.55	2.8	1.9

➔ Applicable holders D31, D32

●: Stock item

### API Round Casing & Tubing (APIRD)

Type	Designation (Right)			Designation (Left)			Pitch (tpi)	Dimensions (mm)					Picture
		PC3030T	PC9070T		PC3030T	PC9070T		IPF	d	L	hmin	X	
External	ER 16-10APIRD	●		EL 16-10APIRD 16-8APIRD			10	9.525	16	1.41	1.2	1.4	
	16-8APIRD	●						8	9.525	16	1.81	1.3	1.5
Internal	IR 16-10APIRD	●		IL 16-10APIRD 16-8APIRD			10	9.525	16	1.41	1.2	1.4	
	16-8APIRD	●						8	9.525	16	1.81	1.3	1.5

➔ Applicable holders D31, D32

●: Stock item

### Extreme Line Casing (EL)

Type	Designation (Right)			Designation (Left)			Pitch (tpi)	Dimensions (mm)					Picture	
		PC3030T	PC9070T		PC3030T	PC9070T		IPF	d	L	hmin	X		
External	ER 22-6EL15			EL 22-6EL15 22-5EL125			6	1.5	12.7	22	1.21	1.9	1.9	
	22-5EL125							5	1.25	12.7	22	1.71	2.3	2.4
Internal	IR 22-6EL15			IL 22-6EL15 22-5EL125			6	1.5	12.7	22	1.39	1.8	1.9	
	22-5EL125							5	1.25	12.7	22	1.91	2.2	2.4

➔ Applicable holders D31, D32

●: Stock item

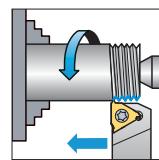
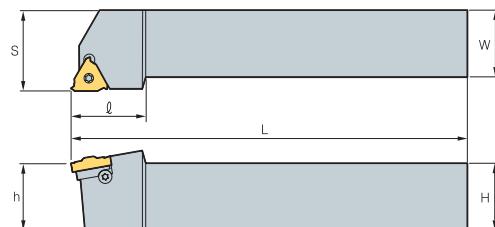


D

Threading

30

## ER(L)H (Screw on system)



Righthand drawing

(mm)

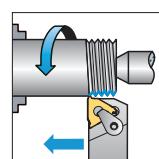
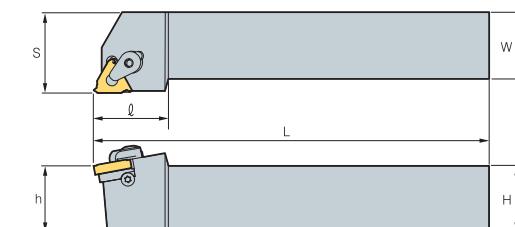
Designation		Inscribed circle	H	W	L	S	H	$\ell$	Insert screw	Shim screw	Screw RH	Screw LH	Wrench
ER(L)H	08N-11	6.35	8	8	136.4	11	8	17.5					
	10N-11	6.35	10	10	70.0	11	10	17.5	ST11N	-	-	-	TW08P
	12N-11	6.35	12	12	80.0	12	12	17.5					
	12N-16	9.525	12	12	83.2	16	12	22	ST16N	-	-	-	TW10P
	09-16	9.525	9.52	9.52	63.6	16	9.52	20.5					
	12-16	9.525	12	12	83.2	16	12	22	ST16	STA16	ATE16	ATI22	TW10P
	16-16	9.525	16	16	100.0	16	16	20.5					
	20-16	9.525	20	20	128.6	20	20	30					
	25-16	9.525	25	25	153.6	25	25	30					
	32-16	9.525	32	32	173.6	32	32	30					
	25-22	12.7	25	25	155.7	25	25	36					
	32-22	12.7	32	32	175.7	32	32	36	ST22	STA22	ATE22	ATI22	TW20P
	40-22	12.7	40	40	205.7	40	40	36					
	25-27	15.875	25	25	151.6	32	25	35					
	32-27	15.875	32	32	176.6	32	32	40	ST27	STA27	ATE27	ATI27	TW25L
	40-27	15.875	40	40	206.6	40	40	40					
	50-27	15.875	50	50	256.6	50	50	40					

② Applicable inserts D10~D13, D16, D18, D19, D22, D23~D26

• Helix angle is 1.5° for all holders

• No shim needed for N type holder

## ER(L)H-C (Clamp on system)



Righthand drawing

(mm)

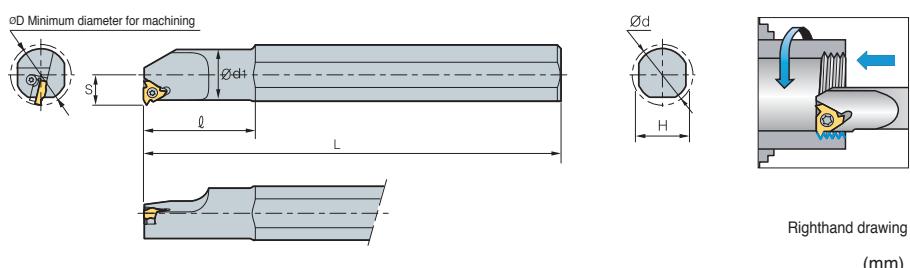
Designation		Inscribed circle	H	W	L	S	H	$\ell$	Shim screw	Clamp	Screw RH	Screw LH	Wrench
ER(L)H	20-16C	9.525	20	20	128.6	20	20	30					
	25-16C	9.525	25	25	153.6	25	25	30	STA16	CTH16	ATE16	ATI16	TW10P TW15P
	32-16C	9.525	32	32	173.6	32	32	30					
	25-22C	12.7	25	25	155.7	25	25	36					
	32-22C	12.7	32	32	175.7	32	32	36	STA22	CTH22	ATE22	ATI22	TW20P
	40-22C	12.7	40	40	205.7	40	40	36					
	25-27C	15.875	25	25	151.6	25	25	35					
	32-27C	15.875	32	32	176.6	32	32	40	STA27	CTH27	ATE27	ATI27	TW25L
	40-27C	15.875	40	40	206.6	40	40	40					
	50-27C	15.875	50	50	256.6	50	50	40					

② Applicable inserts D10~D13, D16, D18, D19, D22, D23~D26

• Helix angle is 1.5° for all holders

# D Internal Holder

## IR(L)H (Screw on system)

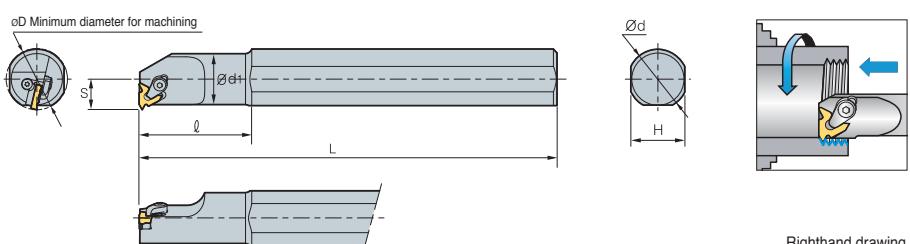


Designation		Inscribed circle	ØD	Ød	Ød1	H	L	S	l	Insert screw	Shim screw	Screw RH	Screw LH	Wrench
IR(L)H	10DN-11	6.35	13	10	10.0	9.5	100	7.3	-	ST11N	-	-	-	TW08P
	10N-11	6.35	13	20	10.0	18.0	180	7.3	25					
	13N-11	6.35	16	20	13.0	18.0	180	8.9	32					
	13N-16	9.525	17	20	12.7	18.0	180	10.3	32	ST16N	-	-	-	TW10P
	16N-16	9.525	20	20	16.0	18.0	180	11.5	40					
	16DN-16	9.525	20	16	16.0	15.2	150	11.3	32					
	20-16	9.525	24	20	20.0	18.0	180	13.4	40	ST16	STA16	ATI16	ATE16	TW10P
	25-16	9.525	29	32	25.0	29.0	250	16.3	60					
	25D-16	9.525	29	25	24.5	22.6	200	16.1	45					
	32-16	9.525	36	32	32.0	29.0	250	19.6	60	ST22N	-	-	-	TW20P
	40-16	9.525	44	40	40.0	36.0	300	23.8	60					
	20N-22	12.7	27	20	20.0	18.0	180	15.6	50	ST22	STA22	ATI22	ATE22	TW20P
	25-22	12.7	32	32	25.0	29.0	250	17.4	60					
	25D-22	12.7	32	25	24.6	22.6	200	17.2	45					
	32-22	12.7	39	32	32.0	29.0	250	21.5	60	ST27	STA27	ATI27	ATE27	TW25L
	40-22	12.7	47	40	40.0	36.0	300	25.8	60					
	32-27	15.875	40	32	32.0	29.0	250	22.4	60					
	40-27	15.875	48	40	40.0	36.0	300	26.4	60					
	50-27	15.875	58	50	50.0	45.0	350	31.4	75					
	60-27	15.875	69	60	60.0	54.0	400	36.4	75					

Applicable inserts D10, D11, D14, D15, D17, D20~D25, D27~D30

\* Helix angle is 1.5° for all holders • No shim needed for N type holder

## IR(L)H-C (Clamp on system)



Designation		Inscribed circle	ØD	Ød	Ød1	H	L	S	l	Shim screw	Clamp	Screw RH	Screw LH	Wrench
IR(L)H	20-16C	9.525	24	20	20.0	18.0	180	13.4	50	STA16	CTH16	ATI16	ATE16	TW10P
	25-16C	9.525	29	32	25.0	28.0	250	16.3	60					TW15P
	25D-16C	9.525	29	25	24.6	22.6	200	16.1	45					
	32-16C	9.525	36	32	32.0	29.0	250	19.6	60	STA22	CTH22	ATI22	ATE22	TW20P
	40-16C	9.525	44	40	40.0	36.0	300	23.8	60					
	25-22C	12.7	32	32	25.0	29.0	250	17.4	60					
	25D-22C	12.7	32	25	24.6	22.6	200	17.2	45					
	32-22C	12.7	39	32	32.0	29.0	250	21.5	60	STA27	CTH27	ATI27	ATE27	TW25L
	40-22C	12.7	47	40	40.0	36.0	300	25.8	60					
	32-27C	15.875	40	32	32.0	29.0	250	22.4	60					
	40-27C	15.875	48	40	40.0	36.0	300	26.4	60					
	50-27C	15.875	58	50	50.0	45.0	350	31.4	75					
	60-27C	15.875	69	60	60.5	54.0	400	36.4	75					

Applicable inserts D10, D11, D14, D15, D17, D20~D25, D27~D30

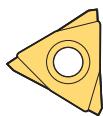
\* Helix angle is 1.5° for all holders



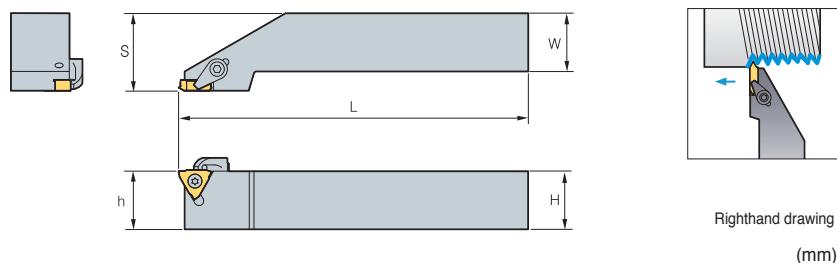
D

Threading

## VTH



VETR



Designation		H = (h)	W	L	S	Insert	Clamp	Clamp screw	Screw	Wrench
VTH	2020R	20	20	125	26.4	VETR	CS6R1	DHA0617	FTKA03510	TW15P, HW30L
	2525R	25	25	150	33.4					
	3225R	32	25	170	33.4					

## ④ Vertical type thread insert

Picture	Designation	Cermet	Uncoated	Dimensions			Configuration
		CN20	ST10	Pitch (mm)	$\theta$	f	
	VETR 080			0.8	60°	1.4	
	100		●	1.0	60°	1.4	
	125			1.25	60°	1.4	
	150		●	1.5	60°	1.2	
	175			1.75	60°	1.2	
	200		●	2.0	60°	1.2	
	250			2.5	60°	1.4	
	300		●	3.0	60°	1.6	
	150F	●	●	0.8~1.5	60°	1.4	
	300F	●	●	1.5~3.0	60°	1.6	

● : Stock item



# D

## Technical Information for Thread Milling

### Thread milling holders code system

TM S R L 25 - 11

1 Insert style

2 Holder style

3 Hand

4 Shank type

5 Shank dia.

11

6 Cutting edge length

1 Insert style

TM S R L 25 - 11

Thread Milling Holder

3 Hand

TM S R L 25 - 11

R: Right Hand L: Left Hand

5 Shank dia.

TM S R L 25 - 11

25: 25.0

2 Holders style

TM S R L 25 - 11

S: Shank Type

4 Shank type

TM S R L 25 - 11

None: Standard

L: Long Type

T: Taper Type

6 Cutting edge length

TM S R L 25 - 11

10: 10.4

11: 11

16: 16

22: 22

27: 27

38: 38.5

### Thread milling inserts code system

TM 2 | 16 - 1.5 ISO

1 Insert style

2 Cutting edge

3 Type of insert

16

1.5

ISO

4 Cutting edge length

5 Pitch

6 Type

1 Insert style

TM 2 | 16 - 1.5 ISO

Thread Milling Holder

4 Cutting edge length

TM 2 | 16 - 1.5 ISO

10: 10.4

11: 11

16: 16

22: 22

27: 27

38: 38.5

6 Type

TM 2 | 16 - 1.5 ISO

ISO Metric

American UN (UNC, UNF, UNEF)

UNJ

Whit Worth (BSW, BSF, BSP, BSB)

National Pipe Thread (NPT)

National Pipe Thread (NPTF)

British Standard Pipe Thread (BSPT)

3 Type of insert

TM 2 | 16 - 1.5 ISO

I: Internal

E: External

EI: External &amp; Internal

5 Pitch

TM 2 | 16 - 1.5 ISO

mm: 0.5~6.0

tpi: 48~6



D

Threading

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## Thread milling

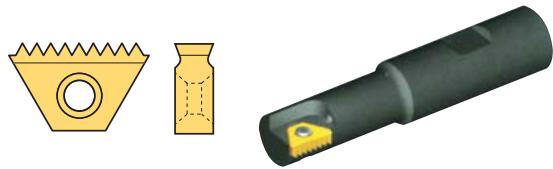
### ► The right tool for the job

Small diameter type



**Tool holder:** TMSR **Insert:** TM L = 10.4 mm  
For small bore diameters down to 9.5 mm

Standard type



**Tool holder:** TMSR **Insert:** TM2  
For standard length threads

Long type



**Tool holder:** TMSR **Insert:** TM2  
For long or remote threads

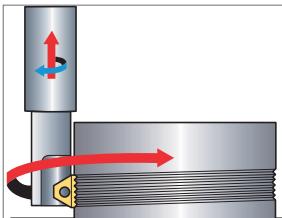
Tapered type



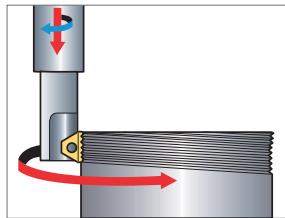
**Tool holder:** TMSR **Insert:** TM2 (BSPT, NPT, NPTF)  
For standard length threads

### ► Thread milling methods

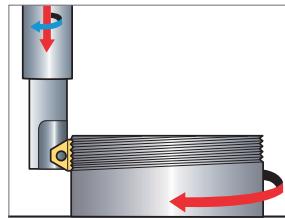
External threading



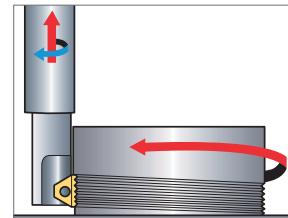
Right handed thread  
conventional milling



Left handed thread  
down milling

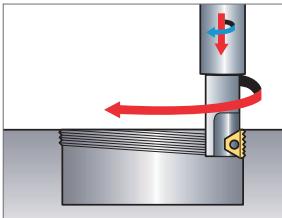


Right handed thread  
down milling

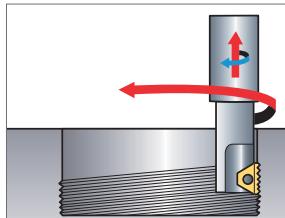


Left handed thread  
conventional milling

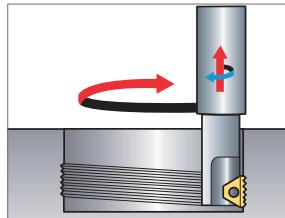
Internal threading



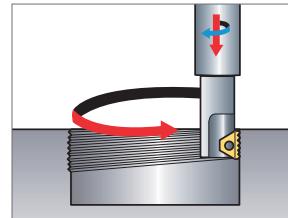
Right handed thread  
down milling



Left handed thread  
conventional milling



Right handed thread  
conventional milling



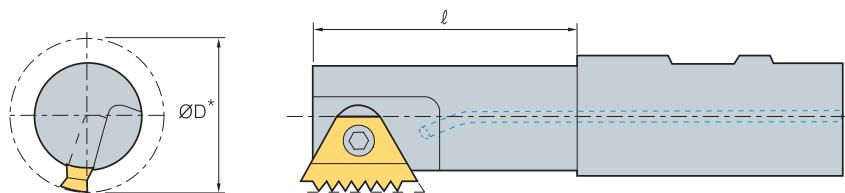
Left handed thread  
down milling



# D

## Technical Information for Thread Milling

### ➡ Tooling recommendation for given internal thread specification



**ISO**

Pitch (mm)	Nominal dia. (mm)	Holder	Insert	ℓ-Tool holder overhang	D-Tool cutting dia.*	Min.Thread depth (Profile depth)
0.75	11	TMSR 12-10	TM2I 10-0.75ISO	12.0	9.0	0.43
	12-14	TMSR 12-10	TM2I 10-1.0ISO	12.0	9.0	
	15-18	TMSR 12-11	TM2I 11-1.0ISO	12.0	11.5	
	20	TMSR 16-16	TM2I 16-1.0ISO	22.0	17.0	0.58
	22	TMSR 20-22	TM2I 22-1.0ISO	29.0	19.0	
	24	TMSR 20-16	TM2I 16-1.0ISO	43.0	20.0	
	25-28	TMSRL 25-16	TM2I 16-1.0ISO	25.0	22.0	
1.0	14	TMSR 12-10	TM2I 10-1.25ISO	12.0	9.0	0.72
	14-15	TMSR 12-10	TM2I 10-1.5ISO	12.0	9.0	
	16-20	TMSR 12-11	TM2I 11-1.5ISO	12.0	11.5	
	22	TMSR 16-16	TM2I 16-1.5ISO	22.0	17.0	
	24	TMSR 20-22	TM2I 22-1.5ISO	29.0	19.0	0.87
	25-26	TMSR 20-16	TM2I 16-1.5ISO	43.0	20.0	
	27-30	TMSRL 25-16	TM2I 16-1.5ISO	25.0	22.0	
	35-42	TMSR 25-27	TM2I 27-1.5ISO	52.0	30.0	
	45	TMSR 32-27	TM2I 27-1.5ISO	58.0	37.0	
1.25	22	TMSRT 16-16	TM2I 16-2.0ISO	22.0	15.5	
	24	TMSR 16-16	TM2I 16-2.0ISO	22.0	17.0	
	25	TMSR 20-22	TM2I 22-2.0ISO	29.0	19.0	
	27	TMSR 20-16	TM2I 16-2.0ISO	43.0	20.0	1.15
	28-32	TMSRL 25-16	TM2I 16-2.0ISO	25.0	22.0	
	39-42	TMSR 25-27	TM2I 27-2.0ISO	52.0	30.0	
	45-48	TMSR 32-27	TM2I 27-2.0ISO	58.0	37.0	
	42-48	TMSR 25-27	TM2I 27-3.0ISO	52.0	30.0	1.73
	50-52	TMSR 32-27	TM2I 27-3.0ISO	58.0	37.0	
2.0	45-52	TMSR 25-27	TM2I 27-4.0ISO	52.0	30.0	
	55	TMSR 32-38	TM2I 38-4.0ISO	55.0	35.0	2.31
	56-58	TMSR 32-27	TM2I 27-4.0ISO	58.0	37.0	
	60-65	TMSR 40-38	TM2I 38-4.0ISO	65.0	46.0	
3.0	48-52	TMSR 32-38	TM2I 38-5.0ISO	55.0	35.0	2.89
4.0	56	TMSR 32-38	TM2I 38-5.5ISO	55.0	35.0	3.17
	60	TMSR 40-38	TM2I 38-5.5ISO	65.0	46.0	
5.0	64-68	TMSR 40-38	TM2I 38-6.0ISO	65.0	46.0	3.46

\* The recommended holder is the largest for the given thread specification

\* Holder with smaller or equal cutting diameters (D2) can also be used

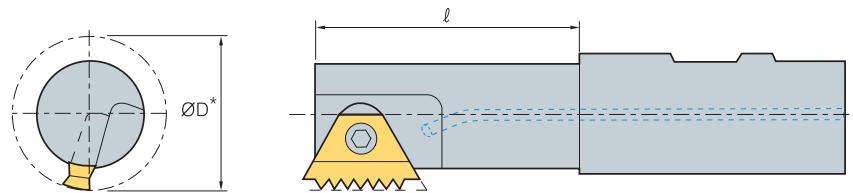


D

Threading

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## Tooling recommendation for given internal thread specification



UN

Pitch (tpi)	Nominal dia. (inch)	Holder	Insert	$\ell$ -Tool holder overhang	D-Tool cutting dia.*	Min.Thread depth (Profile depth)
32	7/16-1/2	TMSR 12-10	TMI 10-32UN	12.0	9.0	0.46
	9/16-11/16	TMSR 12-11	TM2I 11-32UN	12.0	11.5	
	3/4-13/16	TMSR 16-16	TM2I 16-32UN	22.0	17.0	
	7/8-15/16	TMSR 20-16	TM2I 16-32UN	43.0	20.0	
	1	TMSR 25-16	TM2I 16-32UN	25.0	22.0	
28	7/16-1/2	TMSR 12-10	TMI 10-28UN	12.0	9.0	0.52
	9/16-3/4	TMSR 12-11	TM2I 11-28UN	12.0	11.5	
	13/16-7/8	TMSR 16-16	TM2I 16-28UN	22.0	17.0	
	15/16	TMSR 20-16	TM2I 16-28UN	43.0	20.0	
	1-1 1/8	TMSRL 25-16	TM2I 16-28UN	25.0	22.0	
24	9/16-11/16	TMSR 12-11	TM2I 11-24UN	12.0	11.5	0.61
20	1/2-9/16	TMSR 12-10	TMI 10-20UN	12.0	9.0	0.73
	5/8-13/16	TMSR 12-11	TM2I 11-20UN	12.0	11.5	
	7/8	TMSR 16-16	TM2I 16-20UN	22.0	17.0	
	15/16-1	TMSR 20-16	TM2I 16-20UN	43.0	20.0	
	1 1/16-1 1/8	TMSRL 25-16	TM2I 16-20UN	25.0	22.0	
	1 3/8-1 5/8	TMSR 25-27	TM2I 27-20UN	52.0	30.0	
	1 11/16-1 13/16	TMSR 32-27	TM2I 27-20UN	28.0	37.0	
18	5/8	TMSR 12-11	TM2I 11-18UN	12.0	11.5	0.81
	1 1/16-1 3/16	TMSRL 25-16	TM2I 16-18UN	25.0	22.0	
	1 7/16-1 5/8	TMSR 25-27	TM2I 27-18UN	52.0	30.0	
	1 11/16	TMSR 32-27	TM2I 27-18UN	58.0	37.0	
16	11/16-13/16	TMSR 12-11	TM2I 11-16UN	12.0	11.5	0.92
	7/8-15/16	TMSR 16-16	TM2I 16-16UN	22.0	17.0	
	1	TMSR 20-16	TM2I 16-16UN	43.0	20.0	
	1 1/16-1 3/16	TMSRL 25-16	TM2I 16-16UN	25.0	22.0	
	1 7/16-1 5/8	TMSR 25-27	TM2I 27-16UN	52.0	30.0	
	1 11/16-1 7/8	TMSR 32-27	TM2I 27-16UN	58.0	37.0	
14	7/8	TMSR 12-11	TM2I 11-14UN	12.0	11.5	1.05
12	7/8	TMSRT 16-16	TM2I 16-12UN	22.0	15.5	1.22
	15/16	TMSR 16-16	TM2I 16-12UN	22.0	17.0	
	1	TMSR 20-22	TM2I 22-12UN	29.0	19.0	
	1 1/16	TMSR 20-16	TM2I 16-12UN	43.0	20.0	
	1 1/8-1 1/4	TMSRL 25-16	TM2I 16-12UN	25.0	22.0	
	1 1/2-1 11/16	TMSR 25-27	TM2I 27-12UN	52.0	30.0	
	1 3/4-1 15/16	TMSR 32-27	TM2I 27-12UN	58.0	37.0	
8	1 11/16-1 15/16	TMSR 25-27	TM2I 27-8UN	52.0	30.0	1.83
	2-1 1/8	TMSR 32-27	TM2I 27-8UN	58.0	37.0	
6	2-2 1/8	TMSR 25-27	TM2I 27-6UN	52.0	30.0	2.44
	2 1/4	TMSR 32-27	TM2I 27-6UN	58.0	37.0	
	2 3/8-2 1/2	TMSR 40-38	TM2I 38-6UN	65.0	46.0	
4.5	2-2 1/4	TMSR 32-38	TM2I 38-4.5UN	55.0	35.0	3.26
4	2 1/2	TMSR 40-38	TM2I 38-4UN	65.0	46.0	3.67

\* The recommended holder is the largest for the given thread specification

\* Holder with smaller or equal cutting diameters (D2) can also be used

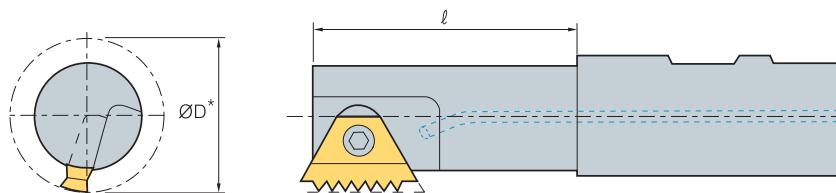


# D

## Technical Information for Thread Milling

### ➡ Tooling recommendation for given internal thread specification

**UNJ**



Pitch (tpi)	Nominal dia. (inch)	Holder	Insert	ℓ-Tool holder overhang	D-Tool cutting dia.*	Min.Thread depth (Profile depth)
24	9/16-11/16	TMSR 12-11	TM2I 11-24UNJ	12.0	11.5	0.55
20	1/2	TMSR 12-10	TM2I 10-20UNJ	12.0	9.0	0.66
	3/4-13/16	TMSR 12-11	TM2I 11-20UNJ	12.0	11.5	
	7/8	TMSR 16-16	TM2I 16-20UNJ	22.0	17.0	
	15/16-1	TMSR 20-16	TM2I 16-20UNJ	43.0	20.0	
18	5/8	TMSR 12-11	TM2I 11-18UNJ	12.0	11.5	0.74
	1 1/16-1 3/16	TMSRL 25-16	TM2I 16-18UNJ	25.0	22.0	
16	11/16-13/16	TMSR 12-11	TM2I 11-16UNJ	12.0	11.5	0.83
	7/8-15/16	TMSR 16-16	TM2I 16-16UNJ	22.0	17.0	
	1	TMSR 20-16	TM2I 16-16UNJ	43.0	20.0	
	1 1/16-1 3/16	TMSRL 25-16	TM2I 16-16UNJ	25.0	22.0	
	1 7/16-1 5/8	TMSR 25-27	TM2I 27-16UNJ	52.0	30.0	
	1 11/16-1 7/8	TMSR 32-27	TM2I 27-16UNJ	58.0	37.0	
14	7/8	TMSR 12-11	TM2I 11-14UNJ	12.0	11.5	0.95
12	7/8	TMSRT 16-16	TM2I 16-12UNJ	22.0	15.5	1.11
	15/16-1	TMSR 16-16	TM2I 16-12UNJ	22.0	17.0	
	1 1/16	TMSR 20-16	TM2I 16-12UNJ	43.0	20.0	
	1 1/8-1 1/4	TMSRL 25-16	TM2I 16-12UNJ	25.0	22.0	
	1 1/2-1 11/16	TMSR 25-27	TM2I 27-12UNJ	52.0	30.0	
	1 3/4-1 15/16	TMSR 32-27	TM2I 27-12UNJ	58.0	37.0	

**W**

Pitch (tpi)	Nominal dia. (inch)	Holder	Insert	ℓ-Tool holder overhang	D-Tool cutting dia.*	Min.Thread depth (Profile depth)
26	1/2-9/16	TMSR 12-10	TMEI 10-26W	12.0	9.0	0.63
	5/8-3/4	TMSR 12-11	TM2EI 11-26 W	12.0	11.5	
	13/16-7/8	TMSR 16-16	TM2EI 16-26W	22.0	17.0	
	15/16-1	TMSR 20-16	TM2EI 16-26W	43.0	20.0	
	1 1/16-1 1/8	TMSRL 25-16	TM2EI 16-26W	25.0	22.0	
20	9/16	TMSR 12-10	TM2EI 10-20W	12.0	9.0	0.81
	5/8-13/16	TMSR 12-11	TM2EI 11-20W	12.0	11.5	
	7/8-15/16	TMSR 16-16	TM2EI 16-20W	22.0	17.0	
	1	TMSR 20-16	TM2EI 16-20W	43.0	20.0	
	1 1/16-1 3/16	TMSRL 25-16	TM2EI 16-20W	25.0	22.0	
16	13/16	TMSR 16-16	TM2EI 16-16W	22.0	15.5	1.02
	7/8-15/16	TMSR 16-16	TM2EI 16-16W	22.0	17.0	
	1-1 1/16	TMSR 20-16	TM2EI 16-16W	43.0	20.0	
	1 1/8-1 1/4	TMSRL 25-16	TM2EI 16-16W	25.0	22.0	
	1.4-1 5/8	TMSR 25-27	TM2EI 27-16W	52.0	30.0	
	1 3/4-1.9	TMSR 32-27	TM2EI 27-16W	28.0	37.0	
12	1 1/2-1 3/4	TMSR 25-27	TM2EI 27-12W	52.0	30.0	1.36
	1 7/8	TMSR 32-27	TM2EI 27-12W	58.0	37.0	
8	1 7/8-1.9	TMSR 25-27	TM2EI 27-8W	52.0	30.0	2.03
	2.1-2 1/8	TMSR 32-27	TM2EI 27-8W	58.0	37.0	
7	2	TMSR 25-27	TM2EI 27-7W	52.0	30.0	2.32
6	2.1-2 1/8	TMSR 25-27	TM2EI 27-6W	52.0	30.0	2.71
	2 1/4	TMSR 32-38	TM2EI 38-6W	55.0	35.0	
	2 3/8-2.6	TMSR 32-27	TM2EI 27-6W	58.0	37.0	
	2 5/8-2 3/4	TMSR 40-38	TM2EI 38-6W	65.0	46.0	
5	3	TMSR 40-38	TM2EI 38-5W	65.0	46.0	3.25
4.5	3 1/2	TMSR 40-38	TM2EI 38-4.5W	65.0	46.0	3.61

\* The recommended holder is the largest for the given thread specification

\* Holder with smaller or equal cutting diameters (D2) can also be used



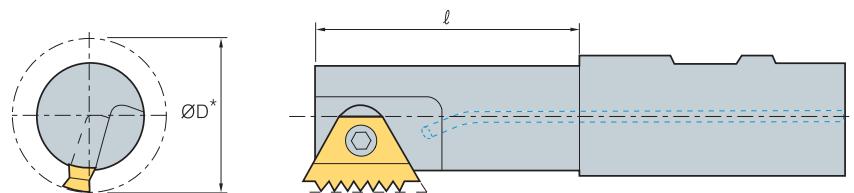
D

Threading

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● Tooling recommendation for given internal thread specification

BSPT



Pitch (tpi)	Nominal dia. (inch)	Holder	Insert	Ø-Tool holder overhang	D-Tool cutting dia.*	Min.Thread depth (Profile depth)
19	3/8	TMSR 21-11	TM2EI 11-19 BSPT	20.0	11.5	0.86
14	1/2-3/4	TMSRT 16-11	TM2EI 16-14 BSPT	22.0	15.5	1.16
11	1-1 1/4	TMSRT 20-16	TM2EI 16-11 BSPT	23.0	19.0	1.48
	1 1/2	TMSR 25-27	TM2EI 27-11 BSPT	52.0	30.0	
	2-6	TMSRT 32-27	TM2EI 27-11 BSPT	58.0	37.0	

NPT

Pitch (tpi)	Nominal dia. (inch)	Holder	Insert	Ø-Tool holder overhang	D-Tool cutting dia.*	Min.Thread depth (Profile depth)
14	1/2	TMSRT 16-16	TM2EI 16-14 NPT	22.0	15.5	1.33
	3/4	TMSRT 20-16	TM2EI 16-14 NPT	23.0	19.0	
11.5	1	TMSRT 20-16	TM2EI 16-11.5 NPT	23.0	19.0	1.64
	1 1/4	TMSR 25-27	TM2EI 27-11.5 NPT	52.0	30.0	
	1 1/2-2	TMSRT 32-27	TM2EI 27-11.5 NPT	58.0	37.0	
8	2 1/2	TMSRT 32-27	TM2EI 27-8 NPT	58.0	37.0	2.42
	3-24	TMSR 40-38	TM2EI 38-8 NPT	65.0	46.0	

NPTF

Pitch (tpi)	Nominal dia. (inch)	Holder	Insert	Ø-Tool holder overhang	D-Tool cutting dia.*	Min.Thread depth (Profile depth)
14	1/2	TMSRT 16-16	TM2EI 16-14 NPTF	22.0	15.5	1.35
	3/4	TMSRT 20-16	TM2EI 16-14 NPTF	23.0	19.0	
11.5	1	TMSRT 20-16	TM2EI 16-11.5 NPTF	23.0	19.0	1.63
	1 1/2	TMSR 25-27	TM2EI 27-11.5 NPTF	52.0	30.0	
	2	TMSRT 32-27	TM2EI 27-11.5 NPTF	58.0	37.0	
8	2 1/2	TMSRT 32-27	TM2EI 27-8 NPTF	58.0	37.0	2.38
	3	TMSR 40-38	TM2EI 38-8 NPTF	65.0	46.0	

• The recommended holder is the largest for the given thread specification

\* Holder with smaller or equal cutting diameters (D2) can also be used



# D

## Technical Information for Thread Milling

### Minimum bore diameters for thread milling

Pitch		0.5	0.6	0.7	0.75 0.80	0.9	1.0	1.25	1.5	1.75	2.0	-	2.5	3.0	3.5	4.0	4.5	5.0	5.5	-	6.0	-		
	tpi	48	44	36	32	28	26 24	20 19	18 16	14	13 12	11.5 11	10	9 8	7	6	-	5	-	4.5	-	4		
Holder designation	diameter	Minimum diameter for machining																						
<b>TMSR 12-10</b>	9.0	9.5	9.7	9.9	10.0	10.4	10.7	11.4	12.0															
<b>TMSR 20-10</b>	9.0	9.5	9.7	9.9	10.0	10.4	10.7	11.4	12.0															
<b>TMSR 12-11</b>	11.5	12.0	12.2	12.4	12.5	12.9	13.2	13.9	14.5	15.1														
<b>TMSR 20-11</b>	11.5	12.0	12.2	12.4	12.5	12.9	13.2	13.9	14.5	15.1														
<b>TMSRL 25-11</b>	11.5	12.0	12.2	12.4	12.5	12.9	13.2	13.9	14.5	15.1														
<b>TMSRT 16-16</b>	15.5	16.0	16.2	16.4	16.5	16.9	17.2	17.9	18.5	19.0	19.5	20.0												
<b>TMSR 16-16</b>	17.0	17.6	17.8	18.0	18.2	18.7	19.0	19.6	20.0	20.5	21.0	21.5												
<b>TMSR 16-22</b>	17.0	17.6	17.8	18.0	18.2	18.7	19.0	19.6	20.0	20.5	21.0	21.5												
<b>TMSR 20-22</b>	19.0	19.7	20.0	20.2	20.4	20.8	21.0	21.6	22.0	22.5	23.0	23.5												
<b>TMSRT 20-16</b>	19.0	19.7	20.0	20.2	20.4	20.8	21.0	21.6	22.0	22.5	23.0	23.5												
<b>TMSR 20-16</b>	20.0	20.7	21.0	21.2	21.4	21.8	22.0	22.6	23.0	23.5	24.0	24.5												
<b>TMSRW 25-22</b>	22.0	22.7	23.0	23.2	23.4	23.8	24.0	24.6	25.0	25.5	26.0	26.5												
<b>TMSRL 25-22</b>	22.0	22.7	23.0	23.2	23.4	23.8	24.0	24.6	25.0	25.5	26.0	26.5												
<b>TMSRL 25-16</b>	22.0	22.7	23.0	23.2	23.4	23.8	24.0	24.6	25.0	25.5	26.0	26.5												
<b>TMSR 25-27</b>	30.0	30.7	31.0	31.2	31.4	31.8	32.0	32.8	33.5	34.1	34.6	35.6	36.6	39.0	42.0	45.0	48.0							
<b>TMSRL 25-27</b>	30.0	30.7	31.0	31.2	31.4	31.8	32.0	32.8	33.5	34.1	34.6	35.6	36.6	39.0	42.0	45.0	48.0							
<b>TMSR 32-38</b>	35.0									38.5	39.1	39.6	40.6	42.0	44.0	47.0	50.0	53.4	42.5	50.0	44.6	57.5	56.6	
<b>TMSR 32-27</b>	37.0	38.0	38.2	38.4	38.6	39.1	39.5	40.4	41.0	41.5	42.0	43.0	44.0	46.5	49.0	52.0	55.5							
<b>TMSRL 32-27</b>	37.0	38.0	38.2	38.4	38.6	39.1	39.5	40.4	41.0	41.5	42.0	43.0	44.0	46.5	49.0	52.0	55.5							
<b>TMSRT 32-27</b>	37.0	38.0	38.2	38.4	38.6	39.1	39.5	40.0	41.0	41.5	42.0	43.0	44.0	46.5	49.0	52.0	55.5							
<b>TMSR 40-38</b>	46.0									49.5	50.1	50.6	51.6	53.0	55.0	55.2	55.6	55.0	52.5	54.0	54.5	57.5	56.6	
<b>TMSRL 40-38</b>	46.0									49.5	50.1	50.6	51.6	53.0	55.0	55.2	55.6	55.0	52.5	54.0	54.5	57.5	56.6	

- In order to perform a thread milling operation, a milling machine with three-axis control capability of helical interpolation is required
- Helical interpolation is a CNC function producing tool movement along a helical path. This helical motion combines circular movement in one plane with a simultaneous linear motion in a plane perpendicular to the first. For example, the path from point A to point B (Fig.A) on the envelope of the cylinder combines a circular movement in the x-y plane with a linear displacement in the z direction
- On most CNC systems this function can be executed in two different ways:

- GO2: Helical interpolation in a clockwise direction

- GO3: Helical interpolation in a counter-clockwise direction

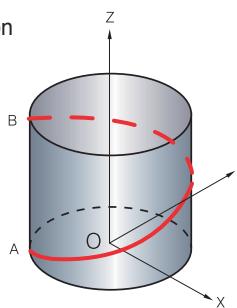


Fig. A

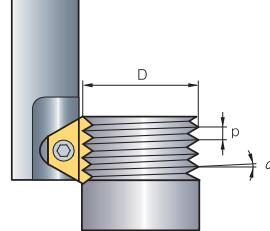


Fig. B

- The thread milling operation (Fig. B) consists of circular rotation of the tool around its own axis together with an orbiting motion along the bore or workpiece circumference. During one such orbit, the tool will shift vertically one pitch length. These movements combined with the insert geometry create the required thread form. There are three acceptable ways of approaching the workpiece with the tool to initiate production of the thread:

1. Tangential Arc Approach
2. Radial Approach
3. Tangential Line Approach

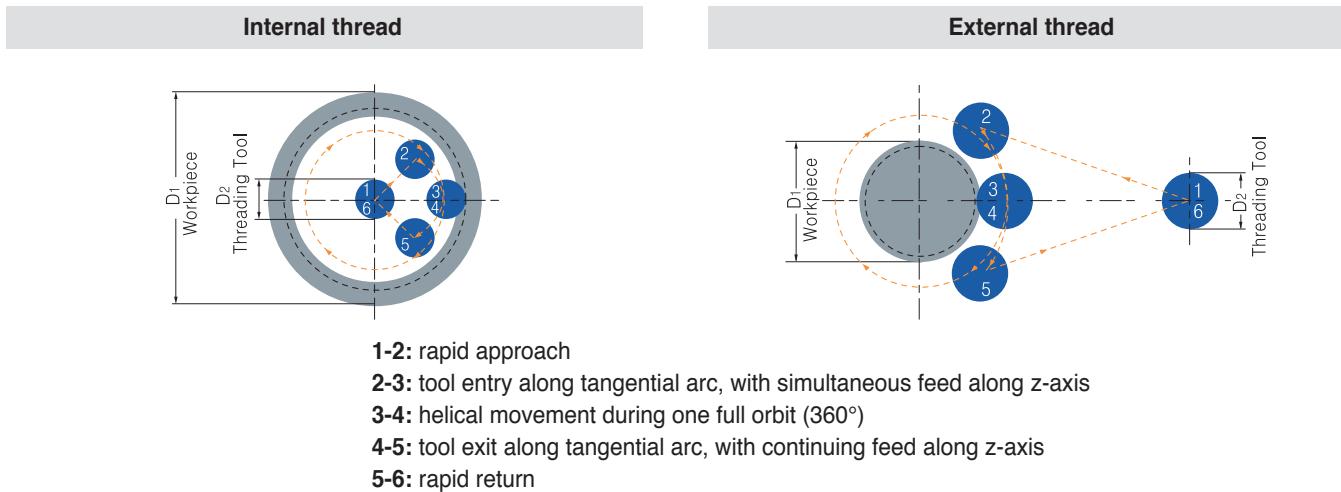


D

Threading

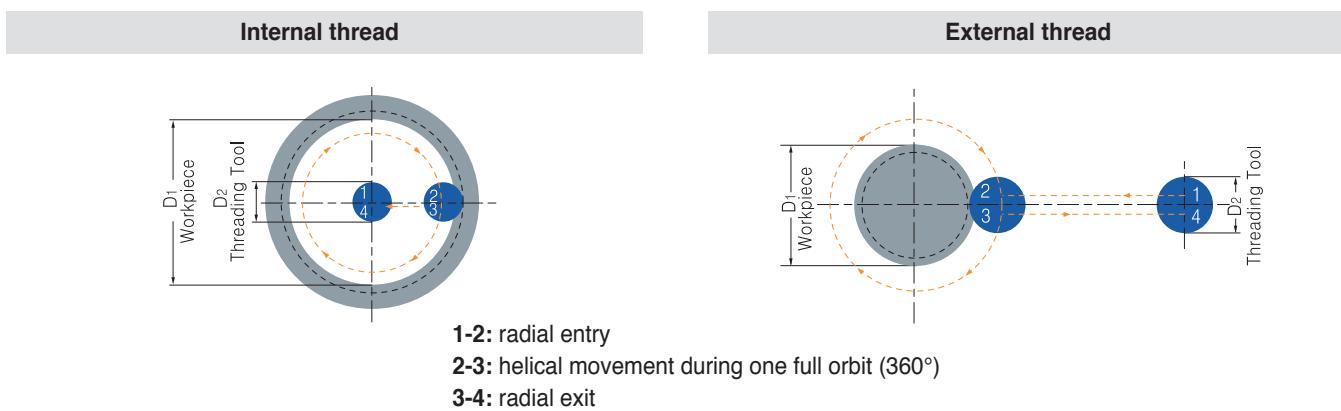
## ⌚ Tangential arc approach

- With this method, the tool enters and exits the workpiece smoothly. No marks are left on the workpiece and there is no vibration, even with harder materials. Although it requires slightly more complex programming than the radial approach (see below), this is the method recommended for machining the highest quality threads



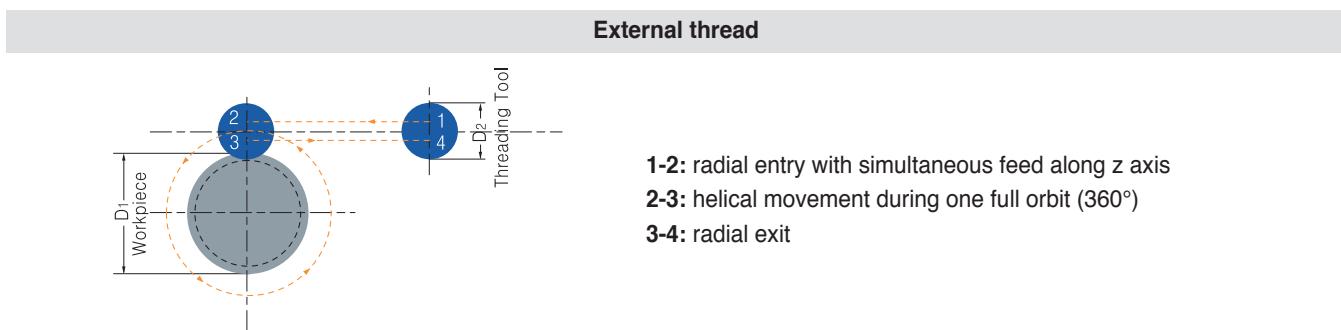
## ⌚ Radial approach

- This is the simplest method. There are two characteristics worth noting about the radial approach:
  - a small vertical mark may be left at the entry (and exit) point. This is of no significance to the thread itself
  - when using this method with very hard materials, there may be a tendency of the tool to vibrate as it approaches the full cutting depth
- Note: Radial feed during entry to the full profile depth should only be 1/3 of the subsequent circular feed



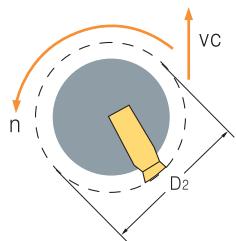
## ⌚ Tangential line approach

- This method is very simple, and has all of the advantages of the tangential arc method  
However, it is applicable only with external threads



## Preparing for the thread milling operation

### Calculation of rotational velocity and feed at the cutting edge



$$n = \frac{vc \times 1000}{\pi \times D_2}$$

$$vc = \frac{n \times \pi \times D_2}{1000}$$

$$F_1 = n \times z \times f_n$$

**n:** Rotational Velocity ( $\text{min}^{-1}$ )

**vc:** Cutting Speed (m/min)

**D2:** Tool holder Cutting Dia. (mm)

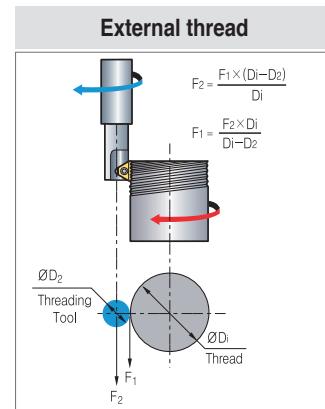
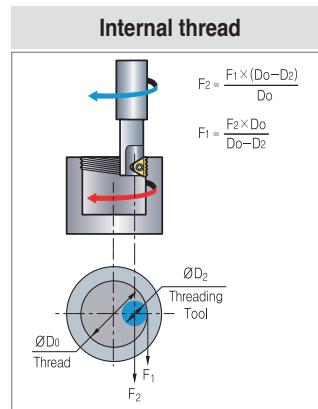
**F1:** Real Feed rate at the Cutting edges (mm/min)

**z:** No. of Cutting Edges

**f<sub>n</sub>:** Feed per Rooth per Rotation (mm/rev)

### Calculation of feed rates at the tool center line

- On most CNC machines, the feed rate required for programming is that of the center-line of the tool. When dealing with linear tool movement, the feed rate at the cutting edge and the center line are identical, but with circular tool movement this is not the case. The equations define the relationship between feed rates at the cutting edge and at the tool center line.



### Grades and applications

- Grade: PC9570T
- Application: First Choice for steel and cast iron A tough sub-micron substrate with TiCN coating. Provides good fracture toughness and excellent wear resistance.

### Trouble shooting

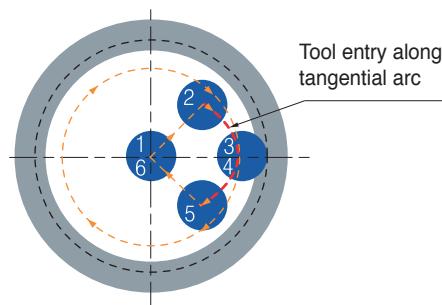
Problem	Possible	Solution
Increased insert flank wear	Cutting speed too high Chip is too thin Insufficient coolant	► Reduce cutting speed/use coated insert ► Increase feed rate ► Increase coolant flow rate
Chipping of cutting edge	Chip is too thick Vibration	► Reduce feed rate/Use the tangential arc method Increase RPM ► Check stability
Material built-up on the cutting edge	Incorrect cutting speed Unsuitable carbide grade	► Change cutting speed ► Use a coated carbide grade
Chatter/vibration	Feed rate is too high Profile is too deep Thread length is too long	► Reduce the feed. ► Execute two passes, each with increased cutting depth/ Execute two passes, each cutting only half the thread length ► Execute two passes, each cutting only half the thread length
Insufficient thread accuracy	Tool deflection	► Reduce feed rate/Execute a "zero" cut

## Recommended cutting condition

Workpiece		Hardness brinell (HB)	vc (m/min)		Feed fz (mm/t)	
			Grade PC9570T	PC9070M	Indexable insert	Solid endmill
<b>P</b>	Unalloyed steel	Low carbon (C+0.1-0.25%)	125	100~210	80~250	0.05~0.3 0.03~0.15
		Medium carbon (C = 0.25-0.55%)	150	100~180	80~230	0.05~0.25 0.03~0.1
		High carbon (C = 0.55-0.85%)	170	100~170	80~200	0.05~0.2 0.03~0.08
	Low alloy steel (alloying elements≤5%)	Non-hardened	180	90~160	60~180	0.05~0.25 0.03~0.1
		Hardened	275	80~150	60~170	0.05~0.2 0.03~0.07
		Hardened	350	70~140	60~160	0.05~0.15 0.01~0.03
	High alloy steel	Annealed	200	60~130	40~100	0.05~0.2 0.03~0.05
		Hardened	325	70~110	30~80	0.05~0.1 0.01~0.03
	Cast steel	Low alloy (alloying elements<5%)	200	100~170	80~250	0.05~0.15 0.03~0.1
		High alloy (alloying elements>5%)	225	70~120	60~170	0.05~0.1 0.01~0.03
<b>M</b>	Stainless steel ferritic	Non-hardened	200	100~170	60~150	0.05~0.15 0.04~0.1
		Hardened	330	100~170	60~120	0.05~0.1 0.01~0.05
	Stainless steel Austenitic	Austenitic	180	70~140	60~140	0.05~0.15 0.04~0.1
		Super austenitic	200	70~140	60~130	0.05~0.1 0.04~0.1
	Stainless steel cast ferritic	Non-hardened	200	70~140	60~160	0.05~0.15 0.04~0.1
		Hardened	330	70~140	60~110	0.05~0.1 0.03~0.05
	Stainless steel cast austenitic	Austenitic	200	70~120	60~150	0.05~0.15 0.04~0.1
		Hardened	330	70~120	60~100	0.05~0.1 0.03~0.05
	High temperature alloys	Annealed (Iron based)	200	20~45	30~60	0.05~0.1 0.04~0.1
		Aged (Iron based)	280	20~30	20~50	0.02~0.05 0.01~0.03
		Annealed (Nickel or Cobalt based)	250	15~20	15~35	0.02~0.05 0.01~0.03
		Aged (Nickel or Cobalt based)	350	10~15	15~30	0.02~0.05 0.01~0.03
<b>K</b>	Titanium alloys	Pure 99.5 Ti	400Rm	70~140	40~80	0.02~0.05 0.03~0.05
		$\alpha+\beta$ alloys	1050Rm	20~50	20~50	0.02~0.05 0.03~0.05
	Extra hard steel	Hardened & tempered	55HRC	20~45	15~45	0.01~0.03 0.005~0.01
	Malleable cast iron	Ferritic (short chips)	130	60~130	70~160	0.02~0.08 0.01~0.03
		Pearlitic (long chips)	230	60~120	60~150	0.02~0.05 0.03~0.05
	Grey cast iron	Low tensile strength	180	60~130	70~160	0.05~0.15 0.05~0.1
		High tensile strength	260	60~100	40~120	0.05~0.1 0.03~0.05
	Nodular SG iron	Ferritic	160	60~125	40~110	0.05~0.15 0.05~0.1
		Pearlitic	260	50~90	40~100	0.05~0.1 0.03~0.05
	Aluminum alloys Wrought	Non-aging	60	100~250	200~300	0.1~0.4 0.1~0.25
		Aged	100	100~180	150~250	0.1~0.3 0.1~0.2
	Aluminum alloys	Cast	75	150~400	100~200	0.1~0.3 0.1~0.2
		Cast & aged	90	150~280	120~220	0.05~0.25 0.1~0.15
		Cast Si 13-22%	130	80~150	200~300	0.1~0.3 0.1~0.2
	Copper and copper alloys	Brass	90	120~210	200~300	0.1~0.3 0.1~0.25
		Bronze and non-leaded copper	100	120~210	150~250	0.05~0.25 0.1~0.2

## Example

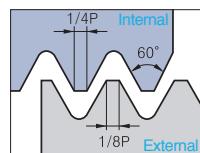
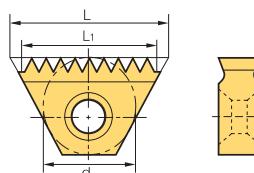
- At tool entry, set the Feed fz (mm/tooth) to 70% lower than the threading Feed
- Threading Feed: 0.3 (mm/t)
- Tool entry Feed: 0.09 (mm/t)



# D

## Thread Milling Inserts

### ISO Metric



Defined by: R262 (DIN 13)

Tolerance class: 6g/6H

(mm)

#### External/Internal

Insert size		Pitch (mm)	Designation				L1	Tooth	Tool holder		
d	L		External	PC9570T	Internal	PC9570T					
6.0	10.4	0.5	-		TMI	10-0.5ISO	●	10.0	20	TMSR-10	
		0.75	-			10-0.75ISO		9.75	13		
		1.0	-			10-1.0ISO	●	9.0	9		
		1.25	-			10-1.25ISO		8.75	7		
		1.5	-			10-1.5ISO		9.0	6		
6.35	11	0.5	-		TM2I	11-0.5ISO		10.0	20	TMSR-11	
		0.75	11-0.75ISO			11-0.75ISO	●	10.5	14		
		1.0	11-1.0ISO			11-1.0ISO	●	10.0	10		
		1.25	11-1.25ISO			-		10.0	8		
		1.25	-			11-1.25ISO		8.75	7		
		1.5	11-1.5ISO			-		9.0	6		
		1.5	-			11-1.5ISO	●	10.5	7		
9.525	16	0.5	-		TM2I	16-0.5ISO		15.0	30	TMSR-16	
		0.75	16-0.75ISO			16-0.75ISO		15.0	20		
		0.8	-			16-0.8ISO		14.4	18		
		1.0	16-1.0ISO			-		14.0	14		
		1.0	-			16-1.0ISO		15.0	15		
		1.25	16-1.25ISO			16-1.25ISO		15.0	12		
		1.5	16-1.5ISO			16-1.5ISO	●	15.0	10		
		1.75	16-1.75ISO			16-1.75ISO		14.0	8		
		2.0	16-2.0ISO			16-2.0ISO	●	14.0	7		
		1.0	TM2E	22-1.0ISO		TM2I	22-1.0ISO		22.0	22	TMSR-22
9.525B	22	1.25	TM2E	22-1.25ISO			22-1.25ISO		21.25	17	
		1.5	TM2E	22-1.5ISO			22-1.5ISO	●	21.0	14	
		1.75	TM2E	22-1.75ISO			22-1.75ISO		21.0	12	
		2.0	TM2E	22-2.0ISO	●		22-2.0ISO	●	22.0	11	
		1.0	TM2E	27-1.0ISO		TM2I	27-1.0ISO		26.0	26	TMSR-27
15.875	27	1.25	TM2E	27-1.25ISO			27-1.25ISO		25.0	20	
		1.5	TM2E	27-1.5ISO			27-1.5ISO	●	25.5	17	
		1.75	TM2E	27-1.75ISO			27-1.75ISO		24.5	14	
		2.0	TM2E	27-2.0ISO			27-2.0ISO	●	24.0	12	
		2.5	TM2E	27-2.5ISO			27-2.5ISO		25.0	10	
		3.0	TM2E	27-3.0ISO			27-3.0ISO	●	24.0	8	
		3.5	TM2E	27-3.5ISO			27-3.5ISO		24.5	7	
		4.0	TM2E	27-4.0ISO			27-4.0ISO	●	24.0	6	
		4.5	TM2E	27-4.5ISO			27-4.5ISO		22.5	5	
		1.5	TM2E	38-1.5ISO		TM2I	38-1.5ISO		36.0	24	TMSR-38
19.05B	38.5	2.0	TM2E	38-2.0ISO			38-2.0ISO		36.0	18	
		3.0	TM2E	38-3.0ISO			38-3.0ISO		36.0	12	
		4.0	TM2E	38-4.0ISO			38-4.0ISO		32.0	8	
		4.5	TM2E	38-4.5ISO			38-4.5ISO		31.5	7	
		5.0	TM2E	38-5.0ISO			38-5.0ISO		30.0	6	
		5.5	TM2E	38-5.5ISO			38-5.5ISO		33.0	6	
		6.0	TM2E	38-6.0ISO			38-6.0ISO		30.0	5	

Applicable holders D49

All inserts except TMI10 code have 2 cutting edges

●: Stock item



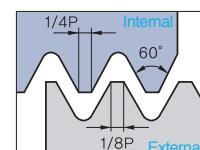
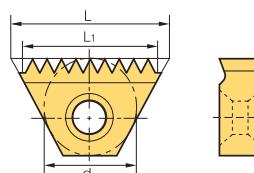
D

Threading

## American UN



## External/Internal



Defined by: ANSI B1.1.74  
Tolerance class: Class 2A/2B

(mm)

Insert size	Pitch (tpi)	Designation				L1	Tooth	Tool holder	
		External	PC9570T	Internal	PC9570T				
6.0	10.4	32	-	TMI	10-32UN	9.53	12	TMSR-10	
		28	-		10-28UN	9.07	10		
		24	-		10-24UN	9.53	9		
		20	-		10-20UN	8.89	7		
		18	-		10-18UN	8.47	6		
		16	-		10-16UN	7.94	5		
6.35	11	48	-	TM2I	11-48UN	10.05	19	TMSR-11	
		40	-		11-40UN	10.16	16		
		32	-		11-32UN	10.32	13		
		28	11-28UN		11-28UN	9.98	11		
		27	11-27UN		11-27UN	10.35	11		
		24	11-24UN		11-24UN	9.53	9		
		20	11-20UN		11-20UN	10.16	8		
		18	11-18UN		11-18UN	9.88	7		
		16	11-16UN		11-16UN	9.53	6		
		14	11-14UN		11-14UN	9.07	5		
9.525	16	40	-	TM2I	16-40UN	14.61	40	TMSR-16	
		32	-		16-32UN	15.08	32		
		28	16-28UN		16-28UN	14.51	28		
		27	16-27UN		16-27UN	14.11	27		
		24	16-24UN		16-24UN	14.82	24		
		20	16-20UN		16-20UN	13.97	20		
		18	16-18UN		16-18UN	14.11	18		
		16	16-16UN	●	16-16UN	14.29	16		
		14	16-14UN		16-14UN	14.51	14		
		13	16-13UN		16-13UN	13.68	13		
		12	16-12UN	●	16-12UN	14.82	12		
		11.5	16-11.5UN		16-11.5UN	13.25	11.5		
9.525B	22	24	TM2E	22-24UN	TM2I	22-24UN	21.16	20	TMSR-22
		20		22-20UN		22-20UN	21.59	17	
		18		22-18UN		22-18UN	21.17	15	
		16		22-16UN		22-16UN	20.64	13	
		14		22-14UN		22-14UN	21.77	12	
		13		22-13UN		22-13UN	21.49	11	
		12		22-12UN		22-12UN	21.17	10	
15.875	27	24	TM2E	27-24UN	TM2I	27-24UN	25.40	24	TMSR-27
		20		27-20UN		27-20UN	25.40	20	
		18		27-18UN		27-18UN	25.40	18	
		16		27-16UN		27-16UN	25.40	16	
		14		27-14UN		27-14UN	25.40	14	
		13		27-13UN		27-13UN	25.40	13	
		12		27-12UN		27-12UN	25.40	12	
		11.5		27-11.5UN		27-11.5UN	24.30	11	
		11		27-11UN		27-11UN	25.40	11	
		10		27-10UN		27-10UN	22.86	9	
		10	-			27-10UN	25.40	10	
		9		27-9UN		27-9UN	22.58	8	
		8		27-8UN		27-8UN	22.23	7	
		7		27-7UN		27-7UN	21.77	6	
		7	-			27-7UN	25.40	7	
		6		27-6UN		27-6UN	21.17	5	
		6	-			27-6UN	25.40	6	
19.05	38.5	6	TM2E	38-6UN	TM2I	38-6UN	38.87	8	TMSR-38
		5		38-5UN		38-5UN	30.48	6	
		4.5		38-4.5UN		38-4.5UN	33.87	6	
		4		38-4UN		38-4UN	31.75	5	

Applicable holders D49

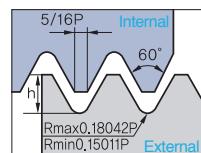
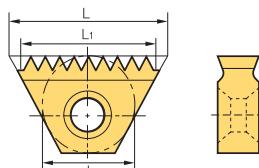
All inserts except TMI10 code have 2 cutting edges

●: Stock item



**D**

## Thread Milling Inserts

**UNJ (Unified constant thread)****External/Internal**Defined by: MIL-S-8879C  
Tolerance class: 3A/3B

(mm)

Insert size		Pitch (tpi)	Designation				L1	Tooth	Tool holder	
d	L		External	PC9570T	Internal	PC9570T				
6.0	10.4	24	-		TMI	10-24UNJ		9.53	9	TMSR-10
		20	-			10-20UNJ		8.89	7	
		18	-			10-18UNJ		8.47	6	
		16	-			10-16UNJ		9.53	8	
6.35	11	24	TM2E	11-24UNJ	TM2I	11-24UNJ		9.53	9	TMSR-11
		20		11-20UNJ		11-20UNJ		10.16	8	
		18	-			11-18UNJ		9.88	7	
		16		11-16UNJ		11-16UNJ		9.53	6	
		14		11-14UNJ		11-14UNJ		9.07	5	
9.525	16	24	TM2E	16-24UNJ	TM2I	16-24UNJ		14.82	14	TMSR-16
		20		16-20UNJ		16-20UNJ		13.97	11	
		18		16-18UNJ		16-18UNJ		14.11	10	
		16		16-16UNJ		16-16UNJ		14.29	9	
		14		16-14UNJ		16-14UNJ		14.51	8	
		13		16-13UNJ		-		13.68	7	
		12		16-12UNJ		16-12UNJ		14.82	7	
15.875	27	16	TM2E	27-16UNJ	TM2I	27-16UNJ		25.40	16	TMSR-27
		12		27-12UNJ		27-12UNJ		25.40	12	
		11		27-11UNJ		27-11UNJ		25.40	11	

● Applicable holders D49

All inserts except TMI10 code have 2 cutting edges

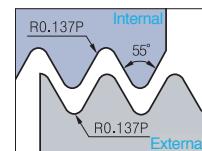
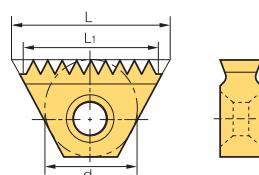
● Stock item



D

Threading

46

**Whitworth (BSW, BSF, BSP, BSB)****External/Internal**

BSW Defined by: B.S.84:1956, DIN 259, ISO228/1: 1982

BSP Define by: B.S.2779: 1956

Tolerance class: BSW-Medium class A, BSP-Medium class

(mm)

Insert size		Pitch (tpi)	Designation	PC9570T	L1	Tooth	Tool holder
d	L		External+Internal				
6.0	10.4	28	TMEI	10-28W	9.07	10	TMSR-10
		26		10-26W	8.79	9	
		24		10-24W	9.53	9	
		20		10-20W	8.89	7	
		19		10-19W	9.36	7	
6.35	11	28	TM2EI	11-28W	9.98	11	TMSR-11
		26		11-26W	9.77	10	
		24		11-24W	9.53	9	
		20		11-20W	10.16	8	
		19		11-19W	9.36	7	
		14		11-14W	9.07	5	
9.525	16	26	TM2EI	16-26W	14.65	15	TMSR-16
		24		16-24W	14.82	14	
		20		16-20W	13.97	11	
		19		16-19W	14.71	11	
		18		16-18W	14.11	10	
		16		16-16W	14.29	9	
		14		16-14W	14.51	8	
		12		16-12W	14.82	7	
		11		16-11W	●	13.85	
		24	TM2EI	22-24W	21.17	20	TMSR-22
		20		22-20W	21.59	17	
		19		22-19W	21.39	16	
		18		22-18W	21.17	15	
		16		22-16W	20.64	13	
		14		22-14W	21.77	12	
		12		22-12W	21.17	10	
		11		22-11W	20.78	9	
15.875	27	16	TM2EI	27-16W	25.4	16	TMSR-27
		14		27-14W	25.4	14	
		12		27-12W	23.28	11	
		11		27-11W	23.09	10	
		10		27-10W	25.40	10	
		9		27-9W	22.58	8	
		8		27-8W	22.23	7	
		7		27-7W	21.77	6	
		6		27-6W	21.17	5	
		11	TM2EI	38-11W	34.64	15	TMSR-38
19.05B	38.5	6		38-6W	33.87	8	
		5		38-5W	30.48	6	
		4.5		38-4.5W	33.87	6	
		-		38-15W	-	-	

Applicable holders D49

All inserts except TMI10 code have 2 cutting edges

●: Stock item



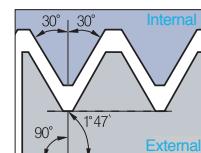
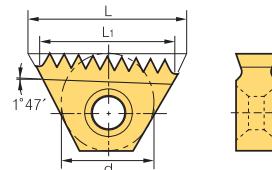
# D

## Thread Milling Inserts

### NPT



#### External/Internal



Defined by: USAS B2.1: 1968

Tolerance class: Standard NPT

(mm)

Insert size	Pitch (tpi)	Designation	PC9570T	L <sub>1</sub>	Tooth	Tool holder	
		External+Internal				RH	LH
9.525	16	18	TM2E 16-18NPT *	14.11	10	TMSRT-16	TMSLT-16
		14	TM2EI 16-14NPT				
		11.5	16-11.5NPT				
9.525B	22	14	TM2EI 22-14NPT	21.77	12	TMSRT-22	TMSLT-22
15.875	27	11.5	TM2EI 27-11.5NPT	●	24.30	11	TMSR-27
		8	27-8NPT	●	22.23	7	
19.05B	38.5	11.5	TM2EI 38-11.5NPT	35.34	16	TMSR-38	TMSL-38
		8	38-8NPT	31.75	10		

➔ Applicable holders D49

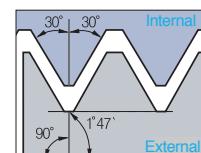
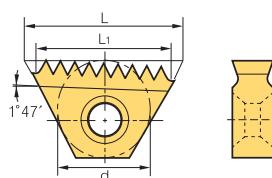
\* TM2E16-18NPT is for external threading

●: Stock item

### NPTF



#### External/Internal



Defined by: ANSI 1.20.3-1976

Tolerance class: Standard NPTF

(mm)

Insert size	Pitch (tpi)	Designation	PC9570T	L <sub>1</sub>	Tooth	Tool holder	
		External+Internal				RH	LH
9.525	16	14	TM2EI 16-14NPTF	●	14.51	8	TMSRT - 16
		11.5	16-11.5NPTF				
9.525B	22	14	TM2EI 22-14NPTF	21.77	12	TMSRT - 22	TMSLT - 22
		11.5	22-11.5NPTF				
15.875	27	11.5	TM2EI 27-11.5NPTF	24.30	11	TMSR - 27	TMSL - 27
		8	27-8NPTF				
19.05B	38.5	11.5	TM2EI 38-11.5NPTF	35.34	16	TMSR - 38	TMSL - 38
		8	38-8NPTF				

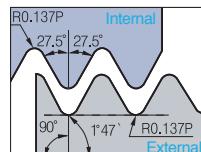
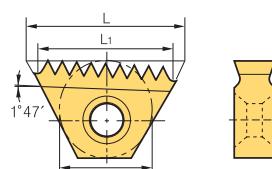
➔ Applicable holders D49

●: Stock item

### BSPT



#### External/Internal



Defined by: B.S 21: 1985

Tolerance class: Standard BSPT

(mm)

Insert size	Pitch (tpi)	Designation	PC9570T	L <sub>1</sub>	Tooth	Tool holder	
		External+Internal				RH	LH
9.525	16	11	TM2EI 11-19BSPT	9.36	7	TMSR - 10	TMSL - 10
		14	TM2EI 16-14BSPT				
		11	16-11BSPT				
15.875	27	11	TM2EI 27-11BSPT	23.09	10	TMSR - 27	TMSL - 27

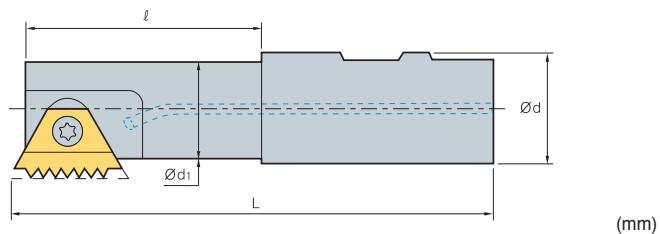
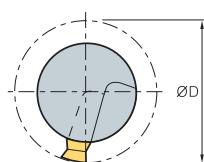
➔ Applicable holders D49

●: Stock item



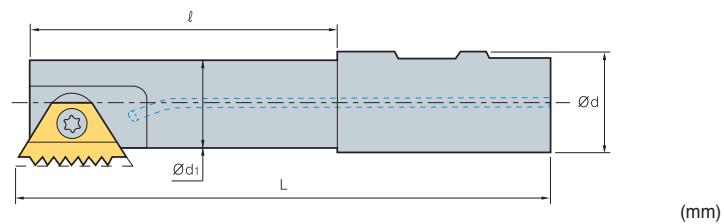
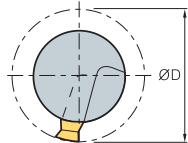
# D

## Threading

**Standard Type**

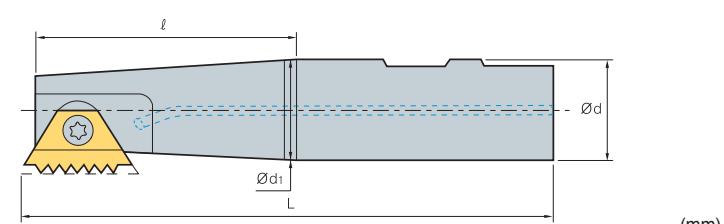
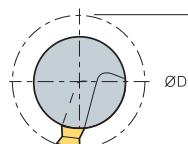
Insert size d	Designation	ØD	Ød	Ød1	l	L	Screw	Wrench
		ØD	Ød	Ød1	l	L	Screw	Wrench
6.0	TMSR 12-10	9.0	12	6.8	12.0	69.0	STM10	TW07P
	20-10	9.0	20	6.8	17.0	84.0		
6.35	TMSR 12-11	11.5	12	8.9	12.0	70.0	STM11	TW08P
	20-11	11.5	20	8.9	20.0	85.0		
9.525	TMSR 16-16	17.0	16	13.6	22.0	90.0	STM1622	TW10P
	20-16	20.0	20	16.6	43.0	95.0		
9.525B	TMSR 16-22	17.0	16	13.5	29.0	79.5	STM1622	TW10P
	20-22	19.0	20	15.5	29.0	81.5		
	25-22	19.0	25	15.5	30.0	92.3		
15.875	TMSRW 25-22	22.0	25	18.5	30.0	90.8	STM27	TW25L
	TMSR 25-27	30.0	25	24.0	52.0	110.0		
	TMSL 25-27	30.0	25	24.0	52.0	110.0		
19.05	TMSR 32-27	37.0	32	31.0	58.0	120.0	STM38	TW30L
	TMSR 32-38	35.0	32	27.0	53.0	115.0		
	40-38	46.0	40	38.0	63.0	135.0		

② Applicable inserts D44~48

**Long Type**

Insert size d	Designation	ØD	Ød	Ød1	l	L	Screw	Wrench
		ØD	Ød	Ød1	l	L	Screw	Wrench
6.35	TMSRL 25-11	11.5	25	8.9	17.0	125.0	STM11	TW08P
	25-16	22.0	25	18.6	25.0	125.0		
9.525B	TMSRL 20-22	19.0	20	15.5	44.0	96.5	STM1622	TW10P
	25-22	22.0	25	18.6	63.5	125.0		
15.875	TMSRL 25-27	30.0	25	24.0	92.0	150.0	STM27	TW25L
	32-27	37.0	32	31.0	98.0	160.0		
19.05B	TMSRL 40-38	46.0	40	38.0	93.0	168.0	STM38	TW30L

② Applicable inserts D44~48

**Tapered Type**

Insert size d	Designation	ØD	Ød	Ød1	l	L	Screw	Wrench
		ØD	Ød	Ød1	l	L	Screw	Wrench
9.525	TMSRT 16-16	15.5	16	12.5	22.0	90.0	STM1622	TW10P
	20-16	19.0	20	15.0	23.0	85.0		
9.525B	TMSRT 16-22	17.0	16	13.5	29.0	79.5	STM1622	TW10P
	20-22	19.0	20	15.5	29.0	81.5		
15.875	TMSRT 32-27	37.0	32	31.0	58.0	120.0	STM27	TW25L

② Applicable inserts D44~48



## Solid threading endmills code system

STM D 3T 03 012 L034 - I 0.35 ISO

1	2	3	4	5	6	7	8	9
Type	Flute style	No. of flutes	Shank dia.	Cutting dia.	Cutting edge length	Type of tool	Pitch	Type
<b>1</b> Type STM D 3T 03 012 L034 - I 0.35 ISO	<b>4</b> Shank dia. STM D 3T 03 012 L034 - I 0.35 ISO	<b>8</b> Pitch STM D 3T 03 012 L034 - I 0.35 ISO	Solid Threading Endmill	03: 3.0	mm: 0.35~3.0 tpi: 72~12			
<b>2</b> Flute style STM D 3T 03 012 L034 - I 0.35 ISO	<b>5</b> Cutting dia. STM D 3T 03 012 L034 - I 0.35 ISO	<b>9</b> Type STM D 3T 03 012 L034 - I 0.35 ISO	HC: Heli Cool HCR: Heli Radial Cooling HCC: Heli Cool Chamfering HCD: Heli Cool C/F & Drilling D: Deep Threading	012: 1.20	ISO Metric American UN Cutting edge Length UNJ Whit Worth (BSW, BSF, BSP, BSB) National Pipe Thread (NPT) National Pipe Thread (NPTF) British Standard Pipe Thread (BSPT)			
<b>3</b> No. of flutes STM D 3T 03 012 L034 - I 0.35 ISO	<b>6</b> Cutting edge length STM D 3T 03 012 L034 - I 0.35 ISO		3T: 3 Flutes 2L: 4 Flutes, Left Flutes	L034: 3.4		I: Internal		
	<b>7</b> Type of tool STM D 3T 03 012 L034 - I 0.35 ISO							

## TM-INFO User guide

CNC Program composition

TM-INFO composes CNC program for thread milling process in a short time

► Multilingual

► Window operation



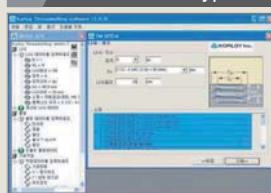
1 Select thread type



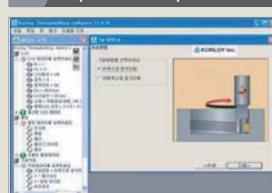
2 Select thread standard



3 Select thread type



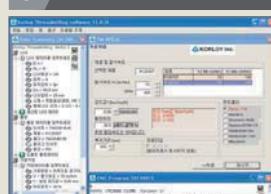
4 Input thread parameter



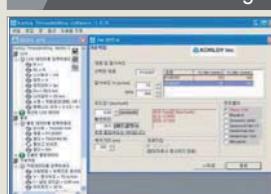
5 Select working way



6 Select tool



7 Confirm the working data & controller



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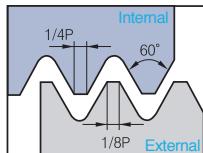
D

Threading

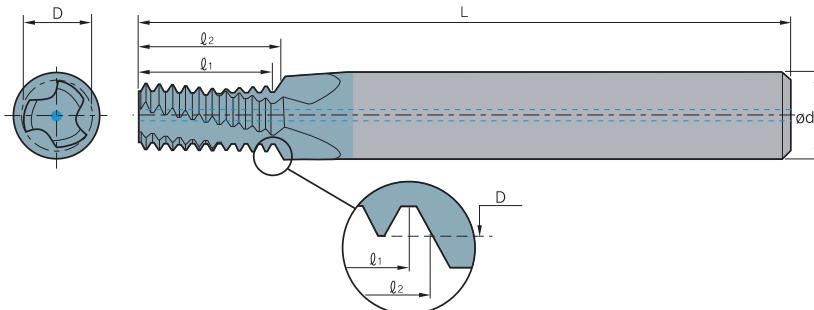
50

**ISO Metric**

Helical flutes with thru-hole coolant

**Internal**


Defined by: R262 (DIN 13)  
Tolerance class: 6H


 $(l_2 \leq 1.5 \times \text{Thread Diameter})$ 

Thread		Pitch (mm)	Designation	PC9070M	Dimensions (mm)					No.of flute	Tooth	*Bore dia. mm
M Coarse	M Fine		Internal		Ød	D	L	l1	l2			
M3x0.5	M3.5~M16x0.5	0.5	STMHC	04024L04-I0.50ISO	4	2.40	45	4.5	4.7	3	9	2.5
M4x0.7		0.7		04031L06-I0.70ISO	4	3.15	45	6.3	6.6	3	9	3.3
M5x0.8		0.8		04039L07-I0.80ISO	4	3.90	45	7.2	7.6	3	9	4.2
M6x1.0	M8~M40x1.0	1.0		06048L09-I1.00ISO	6	4.80	57	9.0	9.5	3	9	5.0
M8x1.25		1.25		08065L13-I1.25ISO	8	6.50	61	12.5	13.1	3	10	6.8
M10x1.5	M12~M48x1.5	1.5		10082L15-I1.50ISO	10	8.20	73	15.0	15.7	3	10	8.5
M12x1.75		1.75		10099L18-I1.75ISO	10	9.90	73	17.5	18.4	4	10	10.2
M14x2.0	M17~M80x2.0	2.0		12116L21-I2.00ISO	12	11.60	73	20.0	21.0	4	10	12.0
M16x2.0	M17~M80x2.0	2.0		14136L25-I2.00ISO	14	13.60	92	24.0	25.0	4	12	14.0

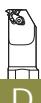
 $(l_2 \leq 2 \times \text{Thread Diameter})$ 

Thread		Pitch (mm)	Designation	PC9070M	Dimensions (mm)					No.of flute	Tooth	*Bore dia. mm
M Coarse	M Fine		Internal		Ød	D	L	l1	l2			
M3x0.5	M3.5~M16x0.5	0.5	STMHC	04024L06-I0.50ISO	4	2.40	45	6.0	6.2	3	12	2.5
	M4x0.5	0.5		04032L08-I0.50ISO	4	3.20	45	8.0	8.2	3	16	3.5
	M5x0.5	0.5		06042L10-I0.50ISO	6	4.20	57	10.0	10.2	3	20	4.5
M4x0.7		0.7		04031L08-I0.70ISO	4	3.15	45	8.4	8.7	3	12	3.3
	M6x0.75	0.75		06050L12-I0.75ISO	6	5.00	57	12.0	12.4	3	16	5.3
M5x0.8		0.8		04039L10-I0.80ISO	4	3.90	45	10.4	10.8	3	13	4.2
M6x1.0	M8~M40x1.0	1.0		06048L12-I1.00ISO	●	4.80	57	12.0	12.5	3	12	5.0
	M8x1.0	1.0		08067L16-I1.00ISO	8	6.70	61	16.0	16.5	3	16	7.0
	M10x1.0	1.0		10087L20-I1.00ISO	10	8.70	73	20.0	20.5	3	20	9.0
	M12x1.0	1.0		12107L24-I1.00ISO	●	10.70	73	24.0	24.5	4	24	11.0
M8x1.25		1.25		08065L16-I1.25ISO	●	6.50	61	16.2	16.9	3	13	6.8
	M10x1.25	1.25		10085L20-I1.25ISO	●	8.50	73	20.0	20.6	3	16	8.8
M10x1.5	M12~M48x1.5	1.5		10082L20-I1.50ISO	●	8.20	73	19.5	20.2	3	13	8.5
	M12x1.5	1.5		10099L24-I1.50ISO	●	9.90	73	24.0	24.7	4	16	10.5
	M14x1.5	1.5		12119L29-I1.50ISO		11.90	80	28.5	29.2	4	19	12.5
	M16x1.5	1.5		14139L32-I1.50ISO		13.90	92	31.5	32.2	4	21	14.5
M12x1.75		1.75		10099L25-I1.75ISO		9.90	73	24.5	25.4	4	14	10.2
M14x2.0	M17~M80x2.0	2.0		12116L29-I2.00ISO		11.60	80	28.0	29.0	4	14	12.0
M16x2.0	M17~M80x2.0	2.0		14136L33-I2.00ISO		13.60	92	32.0	33.0	4	16	14.0
M18x2.5		2.5		16148L36-I2.50ISO		14.80	92	35.0	36.2	4	14	15.5
M 20x2.5		2.5		18171L41-I2.50ISO		17.10	102	40.0	41.2	4	16	17.5
M 24x3.0		3.0		20199L49-I3.00ISO		19.90	102	48.0	49.5	4	16	21.0

\* Bore Diameter applies to smallest thread Dia

 Maximum thread length =  $l_2 - \frac{\text{Pitch}}{4}$ 

●: Stock item

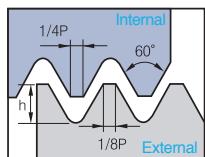


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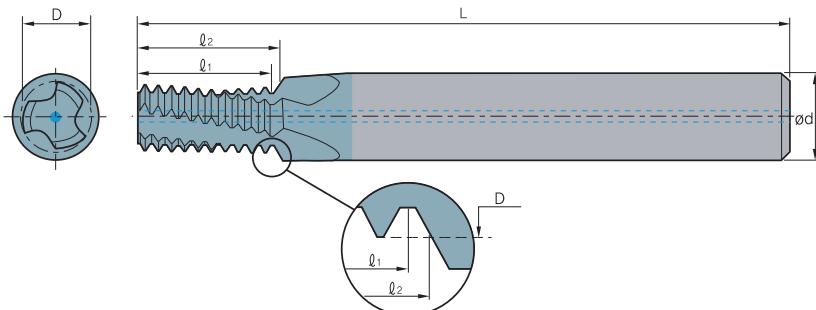
## Solid Threading Endmills

### American UN

#### Internal



Defined by: ANSI B1.1.74  
Tolerance class: 2B



Helical flutes with thru-hole coolant

( $l_2 \leq 1.5 \times$  Thread Diameter)

Thread			Pitch (tpi)	Designation	PC9070M	Dimensions (mm)					No.of flute	Tooth	'Bore dia.
UNC	UNF	UNEF				Ød	D	L	l1	l2	z	zt	mm
No.10~24	5/16", 3/8"×24	9/16"~11/16"×24	24	STMHC Internal	04035L07-I24UNC	4	3.58	45	7.4	7.9	3	7	3.8
No.10~24	5/16", 3/8"×24	9/16"~11/16"×24		STMHC Internal	06041L08-I24UNC	6	4.15	57	8.5	9.0	3	8	4.5
1/4"×20	7/16", 1/2"×20	3/4"~1"×20		STMHC Internal	06048L09-I20UNC	6	4.88	57	8.9	9.5	3	7	5.2
5/16"×18	9/16", 5/8"×18	11/16"~1 1/16"×18		STMHC Internal	08061L11-I18UNC	8	6.15	61	11.3	12.0	3	8	6.5
3/8"×16	3/4"×16			STMHC Internal	08076L15-I16UNC	8	7.65	61	14.3	15.1	3	9	8.0
7/16"×14	7/8"×14			STMHC Internal	10090L17-I14UNC	10	9.00	73	16.3	17.2	3	9	9.3
1/2"×13				STMHC Internal	12104L20-I13UNC	12	10.35	73	19.5	20.5	4	10	10.8
9/16"×12	1"~1 1/2"×12			STMHC Internal	12118L22-I12UNC	12	11.80	73	21.2	22.2	4	10	12.3

( $l_2 \leq 2 \times$  Thread Diameter)

Thread			Pitch (tpi)	Designation	PC9070M	Dimensions (mm)					No.of flute	Tooth	'Bore dia.
UNC	UNF	UNEF				Ød	D	L	l1	l2	z	zt	mm
	No.10~32	No. 12~3/8"×32	32	STMHC Internal	04038L09-I32UNF	4	3.80	45	9.5	9.9	3	12	4.0
		No. 12~3/8"×32		STMHC Internal	06044L11-I32UNEF	6	4.40	57	11.1	11.5	3	14	4.7
	No.12, 1/4"×28	7/16"; 1/2"×28		STMHC Internal	06043L11-I28UNF	6	4.30	57	10.9	11.3	3	12	4.6
	1/4"×28	7/16"; 1/2"×28		STMHC Internal	06052L13-I28UNF	6	5.15	57	12.7	13.1	3	14	5.5
		7/16"; 1/2"×28		STMHC Internal	10099L22-I28UNEF	10	9.90	73	21.8	22.2	3	24	10.2
No.10~24	5/16", 3/8"×24	9/16"~11/16"×24		STMHC Internal	04035L10-I24UNC	4	3.58	45	9.5	10.0	3	9	3.8
No.12~24	5/16", 3/8"×24	9/16"~11/16"×24		STMHC Internal	06041L11-I24UNC	6	4.15	57	10.6	11.1	3	10	4.5
	5/16", 3/8"×24	9/16"~11/16"×24		STMHC Internal	08066L16-I24UNF	8	6.68	61	15.9	16.4	3	15	6.8
	3/8"×24	9/16"~11/16"×24		STMHC Internal	10082L19-I24UNF	10	8.20	73	19.0	19.6	3	18	8.5
		9/16"~11/16"×24		STMHC Internal	14129L29-I24UNEF	14	12.90	92	28.6	29.1	4	27	13.2
1/4"×20	7/16", 1/2"×20	3/4"~1"×20	20	STMHC Internal	06048L13-I20UNC	6	4.88	57	12.7	13.3	3	10	5.2
	7/16", 1/2"×20	3/4"~1"×20		STMHC Internal	10096L22-I20UNF	10	9.60	73	21.6	22.2	3	17	9.8
	1/2"×20	3/4"~1"×20		STMHC Internal	12111L26-I20UNF	12	11.10	80	25.4	26.0	3	20	11.5
		3/4"~1"×20		STMHC Internal	18174L38-I20UNEF	18	17.40	102	38.1	38.7	4	30	17.8
5/16"×18	9/16", 5/8"×18	11/16"~1 1/16"×18		STMHC Internal	08061L16-I18UNC	8	6.15	61	15.5	16.2	3	11	6.5
	9/16", 5/8"×18	11/16"~1 1/16"×18		STMHC Internal	14125L28-I18UNF	14	12.50	92	28.2	28.9	4	20	12.8
	5/8"×18	11/16"~1 1/16"×18		STMHC Internal	16141L31-I18UNF	16	14.10	92	31.0	31.7	4	22	14.5
3/8"×16	3/4"×16			STMHC Internal	08076L19-I16UNC	8	7.65	61	19.0	19.8	3	12	8.0
	3/4"×16			STMHC Internal	18170L38-I16UNF	18	17.00	102	38.1	38.8	4	24	17.5
7/16"×14	7/8"×14			STMHC Internal	10090L22-I14UNC	10	9.00	73	21.8	22.7	3	12	9.3
	7/8"×14			STMHC Internal	20199L44-I14UNF	20	19.90	102	43.5	44.4	4	24	20.5
1/2"×13				STMHC Internal	12104L26-I13UNC	12	10.35	80	25.4	26.4	4	13	10.8
9/16"×12	1"~1 1/2"×12			STMHC Internal	12118L28-I12UNC	12	11.80	80	27.5	28.6	4	13	12.3
	1"~1 1/2"×12			STMHC Internal	20199L51-I12UNF	20	19.90	102	50.8	51.9	4	24	23.5
5/8"×11				STMHC Internal	14131L33-I11UNC	14	13.10	92	32.3	33.5	4	14	13.5
3/4"×10				STMHC Internal	16159L39-I10UNC	16	15.90	92	38.1	39.4	4	15	16.5
7/8"×9				STMHC Internal	20190L46-I9UNC	20	19.00	102	45.2	46.6	4	16	19.5
1"x8				STMHC Internal	20199L52-I8UNC	20	19.90	102	50.8	52.4	4	16	22.0

\* Bore Diameter applies to smallest thread Dia

Maximum thread length =  $l_2 - \frac{\text{Pitch}}{4}$

● Stock item



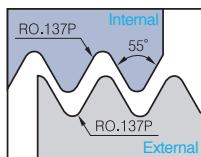
D

Threading

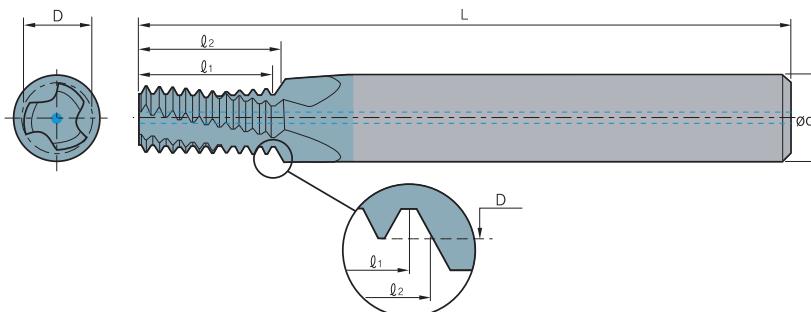
52

**Whitworth**

Helical flutes with thru-hole coolant

**External/Internal**

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



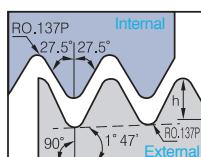
(l2≤2xThread Diameter)

Thread		Pitch (tpi)	Designation	PC9070M	Dimensions (mm)				No.of flute	Tooth	*Bore dia. mm	
BSW	BSF		External/Internal		Ød	D	L	l1				
STMHC	1/4"×26	26	06050L13-EI26BSF		6	5.00	57	12.7	13.2	3	13	5.3
	5/16"×22	22	08063L16-EI22BSF		8	6.35	61	16.2	16.7	3	14	6.7
	1/4"×20	20	06044L13-EI20BSW		6	4.45	57	12.7	13.3	3	10	5.0
	3/8"×20	20	08076L19-EI20BSF		8	7.65	61	19.0	197	3	15	8.2
	5/16"×18	18	06058L16-EI18BSW		6	5.85	57	15.5	16.2	3	11	6.5
	7/16"×18	18	10092L23-EI18BSF		10	9.20	73	22.6	23.3	3	16	9.7
	3/8"×16	16	08072L19-EI16BSW		8	7.20	61	19.0	19.8	3	12	7.9
	1/2", 9/16"×16	16	12105L26-EI16BSF		12	10.50	80	25.4	26.2	4	16	11.1
	9/16"×16	16	14122L29-EI16BSF		14	12.15	92	28.6	29.4	4	18	12.6
	7/16"×14	14	10085L22-EI14BSW		10	8.50	73	21.8	22.7	3	12	9.2
	5/8", 11/16"×14	14	14134L31-EI14BSF		14	13.40	92	30.8	31.7	4	17	14.0
	11/16"×14	14	16150L35-EI14BSF		16	15.00	92	34.5	35.4	4	19	15.6
	1/2"×12	12	10096L26-EI12BSW		10	9.65	73	25.4	26.5	3	12	10.5
	9/16"×12	12	12113L28-EI12BSW		12	11.25	80	27.5	28.6	4	13	12.1
	3/4"×12	12	18162L39-EI12BSF		18	16.20	102	38.1	39.2	4	18	16.8
	5/8"×11	11	14126L33-EI11BSW		14	12.60	92	32.3	33.5	4	14	13.4
	11/16"×11	11	16142L35-EI11BSW		16	14.20	92	34.6	35.8	4	15	15.0

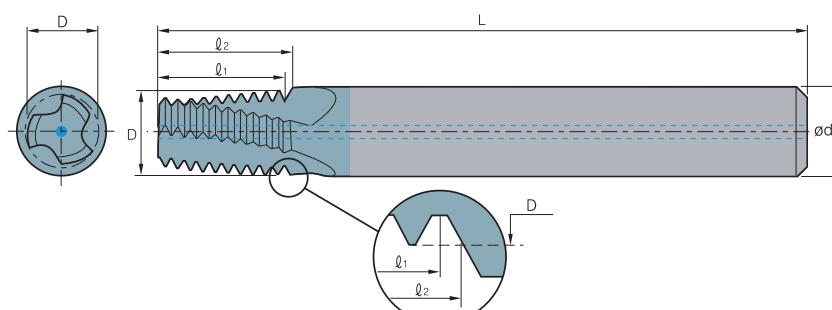
● Stock item

**BSPT**

Helical flutes with thru-hole coolant

**External/Internal**

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



Thread		Pitch (tpi)	Designation	PC9070M	Dimensions (mm)				No.of flute	Tooth	*Bore dia. mm	
Standard	Internal				Ød	D	L	l1				
STMHC	06059L10-EI28BSPT	28			6	5.90	57	10.0	10.2	3	11	6.7
	08076L10-EI28BSPT	28			8	7.65	61	10.0	10.2	3	11	8.7
	10099L15-EI19BSPT	19			10	9.90	73	14.7	15.4	3	11	11.8
	12111L15-EI19BSPT	19			12	11.15	73	14.7	15.4	4	11	15.2
	16142L22-EI14BSPT	14			16	14.25	92	21.8	22.7	4	12	19.0
	20196L28-EI11BSPT	11			20	19.60	102	27.7	28.9	4	12	30.7

\* Bore Diameter applies to smallest thread Dia

Maximum thread length =  $l_2 - \frac{\text{Pitch}}{4}$ 

● Stock item

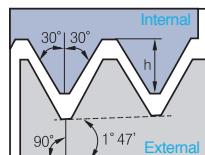


# D

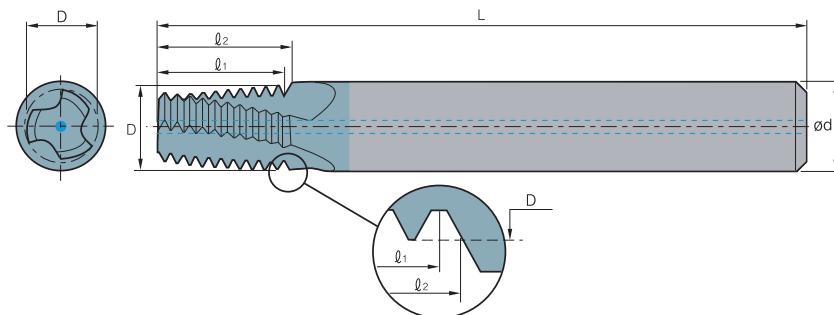
## Solid Threading Endmills

### NPT

#### External/Internal



Defined by: USAS B.2.1: 1968  
Tolerance class: Standard NPT



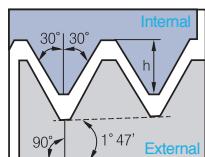
Helical flutes with thru-hole coolant

Thread	Pitch (tpi)	Designation	PC9070M	Dimensions (mm)				No.of flute	Tooth	*Bore dia.		
Standard		Internal		Ød	D	L	ℓ1	ℓ2	z	zt	mm	
1/16"×27	27	STMHC	06059L09-EI27NPT		6	5.90	57	9.4	9.9	3	10	6.3
1/8"×27	27		08076L09-EI27NPT		8	7.65	61	9.4	9.9	3	10	8.5
1/4"×18	18		10099L14-EI18NPT	●	10	9.90	73	14.1	14.8	3	10	11.1
3/8"×18	18		12111L14-EI18NPT		12	11.15	73	14.1	14.8	4	10	14.5
1/2", 3/4"×14	14		16142L19-EI14NPT		16	14.25	92	18.1	19.0	4	10	17.7, 23.0
1", 1 1/14, 1 1/2", 2"×11.5	11.5		20196L23-EI11.5NPT		20	19.60	102	22.1	23.2	4	10	29.0, 37.7, 44.0, 55.6
2 1/2"×8 ; 3"×8	8		20196L33-EI8NPT		20	19.60	102	31.7	33.3	4	10	66.5, 82.1

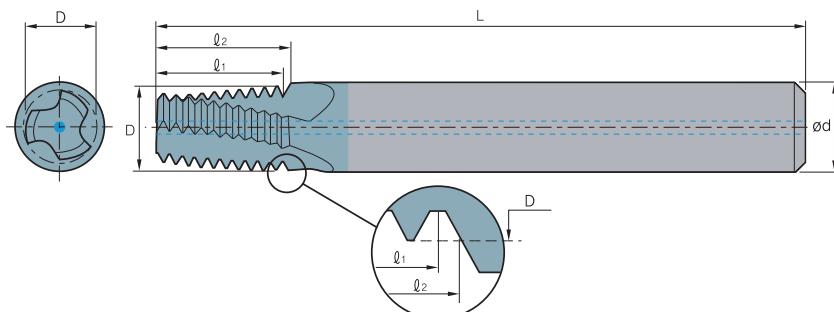
### NPTF

Helical flutes with thru-hole coolant

#### External/Internal



Defined by: ANSI 1.20.3-1976  
Tolerance class: Standard NPTF



Thread	Pitch (tpi)	Designation	PC9070M	Dimensions (mm)				No.of flute	Tooth	*Bore dia.		
Standard		Internal		Ød	D	L	ℓ1	ℓ2	z	zt	mm	
1/16"×27	27	STMHC	06059L09-EI27NPTF	●	6	5.90	57	9.4	9.9	3	10	6.3
1/8"×27	27		08076L09-EI27NPTF		8	7.65	61	9.4	9.9	3	10	8.5
1/4"×18	18		10099L14-EI18NPTF		10	9.90	73	14.1	14.8	3	10	11.1
3/8"×18	18		12111L14-EI18NPTF		12	11.15	73	14.1	14.8	4	10	14.5
1/2", 3/4"×14	14		16142L19-EI14NPTF		16	14.25	92	18.1	19.0	4	10	17.7, 23.4
1", 1 1/14, 1 1/2", 2"×11.5	11.5		20196L23-EI11.5NPTF		20	19.60	102	22.1	23.2	4	10	29.0, 37.7, 43.7, 55.6
2 1/2"×8 ; 3"×8	8		20196L33-EI8NPTF		20	19.60	102	31.7	33.3	4	10	66.3, 82.1

\* Bore Diameter applies to smallest thread Dia

Maximum thread length =  $\ell_2 - \frac{\text{Pitch}}{4}$

●: Stock item



D

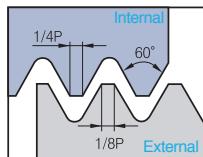
Threading

54

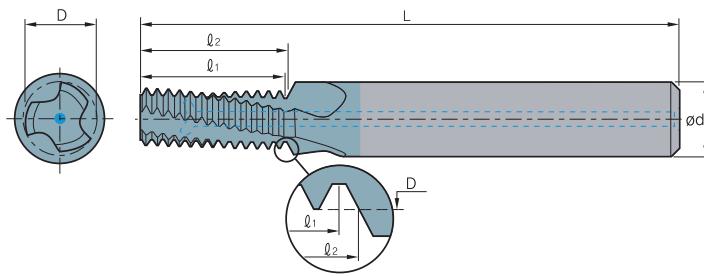
## ISO Metric

Helical flutes with radial cooling

### Internal



Defined by: R262 (DIN 13)  
Tolerance class: 6H



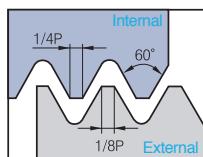
( $l_2 \leq 2 \times$  Thread Diameter)

Thread		Pitch (mm)	Designation	PC9070M	Dimensions (mm)					No.of flute	Tooth	*Bore dia. mm
M Coarse	M Fine		Internal		Ød	D	L	l1	l2			
M6x1.0	M8~M40x1.0	1.0	STMHCR	06048L12-I1.00ISO	6	4.8	57	12.0	12.5	3	12	5.0
	M10x1.0	1.0		10087L20-I1.00ISO	10	8.7	73	20.0	20.5	3	20	9.0
	M12x1.0	1.0		12107L24-I1.00ISO	12	10.7	73	24.0	24.5	4	24	11.0
M8x1.25		1.25		08065L16-I1.25ISO	8	6.5	64	16.3	16.9	3	13	6.8
M10x1.5	M12~M48x1.5	1.5		10082L20-I1.50ISO	10	8.2	73	19.5	20.3	3	13	8.5
	M12x1.5	1.5		10099L24-I1.50ISO	10	9.9	73	24.0	24.8	4	16	10.5
	M14x1.5	1.5		12119L29-I1.50ISO	12	11.9	84	28.5	29.3	4	19	12.5
	M16x1.5	1.5		14139L32-I1.50ISO	14	13.9	84	31.5	32.3	4	21	14.5
M12x1.75		1.75		10099L25-I1.75ISO	10	9.9	73	24.5	25.4	4	14	10.2

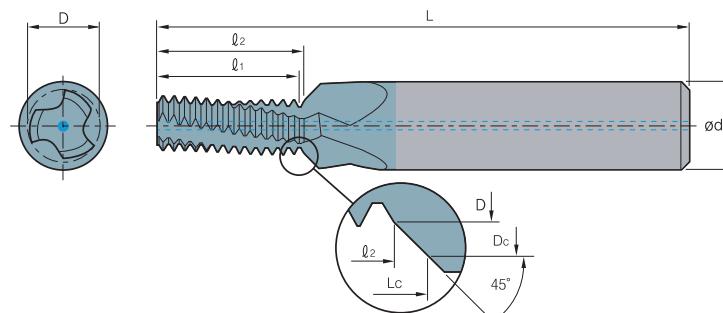
## ISO Metric

Helical flutes with thru-hole coolant-thru & Chamfer

### Internal



Defined by: R262 (DIN 13)  
Tolerance class: 6H



( $l_2 \leq 2 \times$  Thread Diameter)

Thread		Pitch (mm)	Designation	PC9070M	Dimensions (mm)					No.of flute	Tooth	*Bore dia. mm		
M Coarse	M Fine		Internal		Ød	D	Dc	L	l1	l2	Lc	z	zt	
M6x1.0	M8~M40x1.0	1.0	STMHCC	08048L12-I1.00ISO	8	4.8	6.3	61	12.0	12.5	13.3	3	12	5.0
	M10x1.0	1.0		12087L20-I1.00ISO	12	8.7	10.3	73	20.0	20.5	21.3	3	20	9.0
	M12x1.0	1.0		14107L24-I1.00ISO	14	10.7	12.3	80	24.0	24.5	25.3	4	24	11.0
M8x1.25		1.25		10065L16-I1.25ISO	10	6.5	8.3	73	16.3	16.9	17.8	3	13	6.8
M10x1.5	M12~M48x1.5	1.5		12082L20-I1.50ISO	12	8.2	10.3	80	19.5	20.3	21.3	3	13	8.5
	M12x1.5	1.5		14099L24-I1.50ISO	14	9.9	12.3	80	24.0	24.8	26.0	4	16	10.5
	M14x1.5	1.5		16119L29-I1.50ISO	16	11.9	14.3	92	28.5	29.3	30.5	4	19	12.5
	M16x1.5	1.5		18139L32-I1.50ISO	18	13.9	16.3	92	31.5	32.3	33.5	4	21	14.5
M12x1.75		1.75		14099L25-I1.75ISO	14	9.9	12.3	80	24.5	25.4	26.6	4	14	10.2

\* Bore Diameter applies to smallest thread Dia

Maximum thread length =  $l_2 - \frac{\text{Pitch}}{4}$

●: Stock item



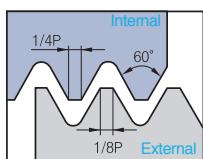
# D

## Solid Threading Endmills

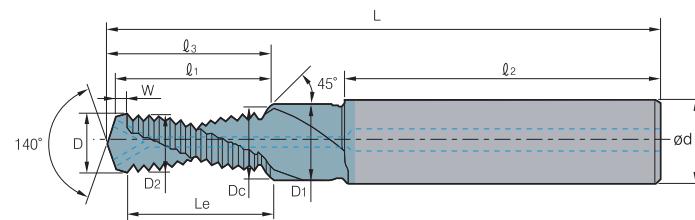
### ISO Metric

Drill, Chamfer & Thread with thru-hole coolant

#### Internal



Defined by: R262 (DIN 13)  
Tolerance class: 6H



Thread	Pitch (mm)	Designation	PC9070M	Dimensions (mm)										No.of flute	Tooth	
				L	l3	l1	l2	W	Le	D	Ød	D1	Dc	D2		
ISO 2D M Coarse	1.0	STMHCD	IM6x1.0ISO-2D	62.0	14.5	13.7	36	1.0	12.7	5.0	8	6.6	6.3	4.85	2	11
			IM8x1.25ISO-2D	74.0	18.2	17.1	40	1.3	15.8	6.8	10	9.0	8.3	6.45	2	11
			IM10x1.5ISO-2D	79.0	23.4	22.1	45	1.5	20.6	8.5	12	11.0	10.3	8.08	2	12
			IM12x1.75ISO-2D	89.0	27.1	25.5	45	1.5	24.0	10.3	14	13.5	12.3	9.74	2	12

Thread	Pitch (mm)	Designation	PC9070M	Dimensions (mm)										No.of flute	Tooth	
				L	l3	l1	l2	W	Le	D	Ød	D1	Dc	D2		
ISO 2.5D M Coarse	1.0	STMHCD	IM6x1.0ISO-2.5D	62.0	16.5	15.7	36	1.0	14.7	5.0	8	6.6	6.3	4.85	2	13
			IM8x1.25ISO-2.5D	74.0	23.2	22.1	40	1.3	20.8	6.8	10	9.0	8.3	6.45	2	15
			IM10x1.5ISO-2.5D	79.0	27.9	26.6	45	1.5	25.1	8.5	12	11.0	10.3	8.08	2	15

Maximum thread length =  $l_2 - \frac{\text{Pitch}}{4}$

●: Stock item

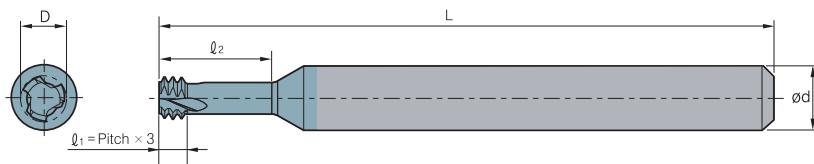
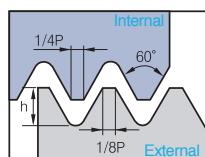


D

Threading

**ISO Metric**

Deep threading

**Internal**


Defined by: R262 (DIN 13)  
Tolerance class: 6H

(ℓ₂ ≤ 2 × Thread Diameter)

Thread		Pitch (mm)	Designation	PC9070M	Dimensions (mm)				No.of flute	Tooth	*Bore dia. mm
M Coarse	M Fine		Internal		Ød	D	L	ℓ₂			
M1.6×0.35		0.35	STMD3T	03012L034-I0.35ISO	3	1.20	30	3.4	3	3	1.25
M2×0.4		0.4		06015L042-I0.4ISO	6	1.55	57	4.2	3	3	1.6
M2.2×0.45		0.45		06016L046-I0.45ISO	6	1.65	57	4.6	3	3	1.75
M2.5×0.45		0.45		06019L052-I0.45ISO	6	1.95	57	5.2	3	3	2.05
M3×0.5	M3.5~M16×0.5	0.5		06024L062-I0.5ISO	6	2.40	57	6.2	3	3	2.5
M3.5×0.6		0.6		06027L073-I0.6ISO	6	2.75	57	7.3	3	3	2.9
M4×0.7		0.7		06031L083-I0.7ISO	6	3.15	57	8.3	3	3	3.3
M5×0.8		0.8		06040L104-I0.8ISO	6	4.05	57	10.4	3	3	4.2
M6×1.0	M8~M40×1.0	1.0		06048L125-I1.0ISO	6	4.80	57	12.5	3	3	5.0
M8×1.25		1.25		08065L166-I1.25ISO	8	6.50	63	16.6	3	3	6.8
M10×1.5	M12~M48×1.50	1.5		10082L208-I1.50ISO	10	8.20	73	20.8	3	3	8.5
M12×1.75		1.75		10099L250-I1.75ISO	10	9.90	73	25.0	3	3	10.3

3d (ℓ₂ ≤ 3 × Thread Diameter)

Thread		Pitch (mm)	Designation	PC9070M	Dimensions (mm)				No.of flute	Tooth	*Bore dia. mm
M Coarse	M Fine		Internal		Ød	D	L	ℓ₂			
M1.6×0.35		0.35	STMD3T	03012L050-I0.35ISO	3	1.20	30	5.0	3	3	1.25
M2×0.4		0.4		06015L062-I0.4ISO	6	1.55	57	6.2	3	3	1.6
M2.5×0.45		0.45		06019L077-I0.45ISO	6	1.95	57	7.0	3	3	2.05
M3×0.5	M3.5~M16×0.5	0.5		06024L092-I0.5ISO	6	2.40	57	9.2	3	3	2.5
M4×0.7		0.7		06031L123-I0.7ISO	6	3.15	57	12.3	3	3	3.3
M5×0.8		0.8		06040L154-I0.8ISO	6	4.05	57	15.4	3	3	4.2
M6×1.0	M8~M40×1.0	1.0		06048L185-I1.0ISO	6	4.80	57	18.5	3	3	5.0
M8×1.25		1.25		08065L246-I1.25ISO	8	6.50	63	24.6	3	3	6.8

\* Bore Diameter applies to smallest thread Dia

 Maximum thread length = ℓ₂ -  $\frac{\text{Pitch}}{4}$ 

●: Stock item

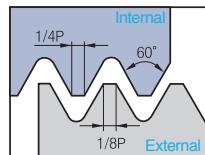


# D Solid Threading Endmills

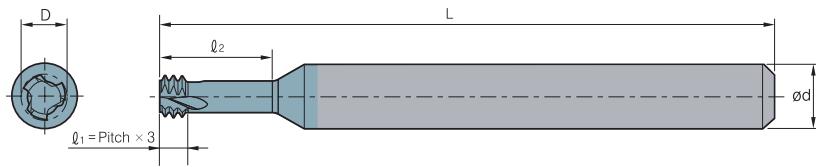
## American UN

Deep threading

### Internal



Defined by: ANSI B1.1.74  
Tolerance class: 2B



( $\ell_2 \leq 2 \times$  Thread Diameter)

Thread		Pitch (tpi)	Designation	PC9070M	Dimensions (mm)			No.of flute	Tooth	*Bore dia. mm
UNC	UNF				Ød	D	L			
	No.1~72	72	STMD3T	06014L039-I72UN	6	1.45	57	3.9	3	3
No.1~64	No.2~64	64		06014L042-I64UN	6	1.40	57	4.2	3	3
No.2~56	No.3~56	56		06016L050-I56UN	6	1.65	57	5.0	3	3
No.3~48	No.4~48	48		06019L060-I48UN	6	1.90	57	6.0	3	3
No.4, No.5~40	No.6~40	40		06021L060-I40UN	6	2.10	57	6.0	3	3
No.5~40	No.6~40	40		06024L072-I40UN	6	2.45	57	7.2	3	3
	No.8~36	36		06033L087-I36UN	6	3.30	57	8.7	3	3
No.6, No.8~32	No.10~32	32		06025L074-I32UN	6	2.55	57	7.4	3	3
No.8~32	No.10~32	32		06032L100-I32UN	6	3.20	57	10.0	3	3
	1/4"×28	28		06052L132-I28UN	6	5.25	57	13.2	3	3
No.10~24	5/16"×24	24		06035L102-I24UN	6	3.58	57	10.2	3	3
	5/16"×24	24		08066L165-I24UN	8	6.68	63	16.5	3	3
1/4"×20	7/16"×20	20		06048L134-I20UN	6	4.88	57	13.4	3	3
	7/16"×20	20		10095L230-I20UN	10	9.55	73	23.0	3	3
3/8"×16		16		08067L191-I16UN	8	6.70	63	19.1	3	3
7/16"×14		14		10090L233-I14UN	10	9.00	73	23.3	3	3

( $\ell_2 \leq 3 \times$  Thread Diameter)

Thread		Pitch (tpi)	Designation	PC9070M	Dimensions (mm)			No.of flute	Tooth	*Bore dia. mm
UNC	UNF				Ød	D	L			
	No.1~72	72	STMD3T	06014L057-I72UN	6	1.45	57	5.75	3	3
No.4, No.5~40	No.6~40	40		06021L090-I40UN	6	2.10	57	9.0	3	3
No.5~40	No.6~40	40		06024L100-I40UN	6	2.45	57	10.0	3	3
No.6, No.8~32	No.10~32	32		06025L110-I32UN	6	2.55	57	11.0	3	3
No.8~32	No.10~32	32		06032L130-I32UN	6	3.20	57	13.0	3	3
	1/4" 28	28		06052L196-I28UN	6	5.25	57	19.6	3	3
	5/16"×24	24		08066L245-I24UN	8	6.68	63	24.5	3	3
1/4"×20	7/16"×20	20		06048L198-I20UN	6	4.88	57	19.8	3	3

\* Bore Diameter applies to smallest thread Dia

Maximum thread length =  $\ell_2 - \frac{\text{Pitch}}{4}$

●: Stock item



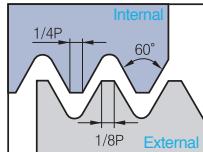
D

Threading

## ISO Metric

Deep threading for hard materials (~HRC62)

### Internal



Defined by: R262 (DIN 13)  
Tolerance class: 6H

( $\ell_2 \leq 2 \times$  Thread Diameter)

Thread		Pitch (mm)	Designation	PC9070M	Dimensions (mm)				No.of flute	Tooth	*Bore dia. mm
M Coarse	M Fine				Ød	D	L	$\ell_2$			
M2x0.4		0.4	STMD2L	06015L042-I0.4ISO	6	1.55	76	4.60	4	2	1.6
M2.2x0.45		0.45		06016L046-I0.45ISO	6	1.65	76	5.05	4	2	1.8
M2.5x0.45		0.45		06019L052-I0.45ISO	6	1.95	76	5.65	4	2	2.05
M3x0.5	M3.5~M16x0.5	0.5		06024L062-I0.5ISO	6	2.40	76	6.75	4	2	2.55
M3.5x0.6		0.6		06027L073-I0.6ISO	6	2.75	76	7.90	4	2	2.95
M4x0.7		0.7		06031L083-I0.7ISO	6	3.15	76	9.05	4	2	3.35
M5x0.8		0.8		06040L104-I0.8ISO	6	4.05	76	11.20	4	2	4.3
M6x1.0	M8~M40x1.0	1.0		06048L125-I1.0ISO	6	4.80	76	13.50	4	2	5.1
M8x1.25		1.25		08065L166-I1.25ISO	8	6.50	80	17.85	4	2	6.8
M10x1.5	M12~M48x1.50	1.5		08079L208-I1.50ISO	8	7.90	80	22.30	4	2	8.6
M12x1.75		1.75		10099L250-I1.75ISO	10	9.90	101	26.75	4	2	10.4

( $\ell_2 \leq 3 \times$  Thread Diameter)

Thread		Pitch (mm)	Designation	PC9070M	Dimensions (mm)				No.of flute	Tooth	*Bore dia. mm
M Coarse	M Fine				Internal	Ød	D	L			
M2x0.4		0.4	STMD2L	06015L062-I0.4ISO	6	1.55	76	6.60	4	2	1.6
M2.2x0.45		0.45		06019L077-I0.45ISO	6	1.95	76	8.15	4	2	2.05
M3x0.5	M3.5~M16x0.5	0.5		06024L092-I0.5ISO	6	2.40	76	9.75	4	2	2.55
M4x0.7		0.7		06031L123-I0.7ISO	6	3.15	76	13.05	4	2	3.35
M5x0.8		0.8		06040L154-I0.8ISO	6	4.05	76	16.20	4	2	4.3
M6x1.0	M8~M40x1.0	1.0		06048L185-I1.0ISO	6	4.80	76	19.50	4	2	5.1
M8x1.25		1.25		08065L246-I1.25ISO	8	6.50	80	25.85	4	2	6.8
* Bore Diameter applies to smallest thread Dia		Maximum thread length = $\ell_2 - \frac{\text{Pitch}}{4}$				●: Stock item					

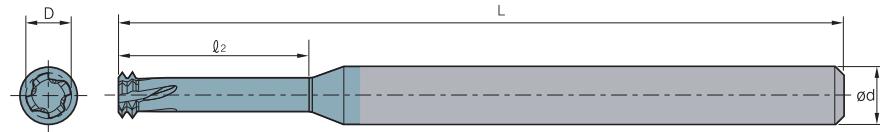
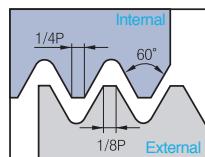


# D Solid Threading Endmills

## American UN

Deep threading for hard materials (~HRC62)

### Internal



Defined by: ANSI B1.1.74  
Tolerance class: 2B

( $\ell_2 \leq 2 \times$  Thread Diameter)

Thread		Pitch (tpi)	Designation	PC9070M	Dimensions (mm)				No.of flute	Tooth	*Bore dia. mm
UNC	UNF				Internal						
No.2~56	No.3~56	56	<b>STMD2L</b>	06016L050-I56UN	6	1.65	76	5.45	4	2	1.80
No.3~48	No.4~48			06019L060-I48UN	6	1.90	76	6.53	4	2	2.10
No.4~40 ; No.5~40	No.6~40			06021L060-I40UN	6	2.10	76	6.64	4	2	2.35
No.5~40	No.6~40			06024L072-I40UN	6	2.45	76	7.84	4	2	2.65
	No.8~36			06033L087-I36UN	6	3.30	76	9.41	4	2	3.55
No.6~32 ; No.8~32	No.10~32			06025L074-I32UN	6	2.55	76	8.20	4	2	2.85
No.8~32	No.10~32			06032L100-I32UN	6	3.20	76	10.79	4	2	3.50
	1/4"×28			06052L132-I28UN	6	5.25	76	14.11	4	2	5.55
No.10~24	5/16"×24			06035L102-I24UN	6	3.58	76	11.26	4	2	3.90
	5/16"×24			08066L165-I24UN	8	6.68	76	17.56	4	2	7.00
1/4"×20	7/16"×20	20		06048L134-I20UN	6	4.88	76	14.67	4	2	5.20
	7/16"×20	20		10095L230-I20UN	10	9.55	101	24.27	4	2	9.90
3/8"×16		16		08076L197-I16UN	8	7.65	80	21.29	4	2	8.00
7/16"×14		14		10090L233-I14UN	10	9.00	101	25.11	4	2	9.50
1/2"×13		13		10099L256-I13UN	10	9.90	101	27.55	4	2	10.90

( $\ell_2 \leq 3 \times$  Thread Diameter)

Thread		Pitch (tpi)	Designation	PC9070M	Dimensions (mm)				No.of flute	Tooth	*Bore dia. mm
UNC	UNF				Internal						
No.4~40, No.5~40	No.6~40	40	<b>STMD2L</b>	06021L090-I40UN	6	2.10	76	9.64	4	2	2.35
No.5~40	No.6~40			06024L100-I40UN	6	2.45	76	10.64	4	2	2.65
No.6~32, No.8~32	No.10~32			06025L110-I32UN	6	2.55	76	11.79	4	2	2.85
No.8~32	No.10~32			06032L130-I32UN	6	3.20	76	13.79	4	2	3.50
	1/4"×28			06052L196-I28UN	6	5.25	76	20.51	4	2	5.55
	5/16"×24			08066L245-I24UN	8	6.68	80	25.56	4	2	7.00
1/4"×20	7/16"×20			06048L198-I20UN	6	4.88	76	21.07	4	2	5.20
7/16"×14				10090L335-I14UN	10	9.00	101	35.31	4	2	9.50

\* Bore Diameter applies to smallest thread Dia

Maximum thread length =  $\ell_2 - \frac{\text{Pitch}}{4}$

●: Stock item



D

Threading

60

## High performance carbide tap and HSS tap

# TAP

- Highly durable carbide tap and HSS tap
- A variety of taps including point taps, spiral taps, straight taps, roll taps, and more to meet a wide range of requirements, available for JIS and DIN standards in metric threads
- Custom orders can be made for powder HSS and taps under M3

### Features

- Carbide type and HSS type
  - Carbide Taps: High toughness substrate
  - HSS: High vanadium substrate
- Applicable to various workpiece forms
  - A wide selection composed of point taps, spiral taps, straight taps, roll taps and more
- Metric threads standardized
  - JIS, DIN standard and special tools
- Broad line-ups per type and size
  - A wide choice with various types and sizes



### Code system

M3 x 0.5	-	ST	25	(S)	-	(120)
Metric coarse screw threads and thread size	Appearance	Incomplete thread length	Roll Tap	Overall length		
	ST: Straight Tap PT: Point Tap SP: Spiral Tap RT: Roll Tap SR: Spiral roll Tap STD: Straight Tap(DIN) PTD: Point Tap(DIN) SPD: Spiral Tap(DIN) RTD: Roll Tap(DIN)		S: Single M: Multi			

### Grade system

Carbide Tap		HSS Tap	
FN30T	Carbide, Uncoated	HN30T	HSS, Uncoated
PC20T	Carbide, TiN coating	HC20T	HSS, TiN coating
PC10T	Carbide, TiCN coating	HC10T	HSS, TiCN coating
-	-	HH30T	HSS, Steam Oxide



# D

## Technical Information for Tap

### Carbide tap

Tap type		Picture	Features	Grade	Size
ST	<b>Straight tap</b>		<ul style="list-style-type: none"> <li>For through holes and mass production</li> <li>For cast iron, medium carbon steel and non-ferrous metal</li> </ul>	FN30T	M3~M12
				PC10T	M3~M12
				PC20T	M3~M12
SP	<b>Spiral tap</b>		<ul style="list-style-type: none"> <li>For blind holes</li> <li>Better chip evacuation through flutes</li> </ul>	FN30T	M3~M12
				PC10T	M3~M12
RT	<b>Roll tap</b>		<ul style="list-style-type: none"> <li>For non-ferrous metal</li> <li>For through holes and blind holes</li> </ul>	FN30T	M3~M12
				PC10T	M3~M12
SR	<b>Spiral roll tap</b>		<ul style="list-style-type: none"> <li>For non-ferrous metal, Al and magnesium</li> </ul>	FN30T	M3~M6
				PC10T	M3~M6

### HSS tap

Tap type		Picture	Features	Grade	Size
ST	<b>Straight tap</b>		<ul style="list-style-type: none"> <li>For through holes and mass production</li> <li>For cast iron, medium carbon steel and non-ferrous metal</li> </ul>	HN30T	M3~M20
				HC20T	M3~M20
				HC10T	M3~M20
				HH30T	M3~M20
PT	<b>Point tap</b>		<ul style="list-style-type: none"> <li>For through holes and mass production</li> <li>Similar shape to the straight type but specialized with easier chip evacuation</li> </ul>	HN30T	M3~M20
				HC20T	M3~M20
				HC10T	M3~M20
				HH30T	M3~M20
SP	<b>Spiral tap</b>		<ul style="list-style-type: none"> <li>For blind holes</li> <li>Chip evacuation through flutes</li> </ul>	HN30T	M3~M20
				HC20T	M3~M20
				HC10T	M3~M20
				HH30T	M3~M24
RT	<b>Roll tap</b>		<ul style="list-style-type: none"> <li>For non-ferrous metal</li> <li>For through holes and blind holes</li> </ul>	HN30T	M3~M12
				HC20T	M3~M12
				HC10T	M3~M12
SR	<b>Spiral roll tap</b>		<ul style="list-style-type: none"> <li>For non-ferrous metal, Al and magnesium</li> </ul>	HN30T	M3~M6
				HC20T	M3~M6
				HC10T	M3~M6



D

Threading

## Recommended cutting speeds and cutting fluid

- For machining cold/hot forging steel and sintered ferrous alloy in high feed, high depth of cut and highly interrupted conditions
- Excellent resistance to chipping, fracture and thermal cracks
- Improved surface finish due to optimized cutting edges

ISO	Workpiece	Cutting speed, vc (m/min)					Cutting fluid		
		Straight tap	Spiral tap	Point tap	Carbide tap	Roll tap	Insoluble	Water soluble emulsion	Semi dry
P	Low carbon steel	≤ 0.25 %C	8~13	8~13	15~25	-	8~13	◎	○
	Medium carbon steel	0.25~0.45 %C	7~12	7~12	10~15	-	7~10	◎	○
	High carbon steel	≥ 0.45 %C	6~9	6~9	8~13	-	5~8	◎	○
	Alloy steel	SCM	7~12	7~12	10~15	-	5~8	◎	△
	Quenched and tempered steel	25~45HRC	3~5	3~5	4~6	-	-	◎	△
	Tool steel	SKD	6~9	6~9	7~10	-	-	◎	-
M	Cast steel	SCM	6~11	6~11	10~15	-	-	◎	○
	Stainless steel	SUS	4~7	5~8	8~13	-	5~10	◎	○
K	Precipitation hardened stainless steel	SUS630 SUS631	3~5	3~5	4~6	-	-	◎	-
	Cast iron	GC	10~15	-	-	10~20	-	◎	○
N	Ductile cast iron	GCD	7~12	7~12	10~20	10~20	-	◎	○
	Copper	Cu	6~9	6~11	7~12	10~20	7~12	○	○
	Brass, brass-cast	Bs Bsc	10~15	10~20	15~25	15~25	7~12	○	○
	Bronze, bronze-cast	PB PBC	6~11	6~11	10~20	10~20	7~12	○	○
	Rolled aluminum	AI	10~20	10~20	15~25	-	10~20	◎	○
	Aluminum-cast, alloyed	AC ACD	10~15	10~15	15~20	10~20	10~25	◎	△
	Magnesium-cast, alloyed	MC	7~12	7~12	10~15	10~20	-	◎	○
	Zinc-cast, alloyed	ZDC	1~12	7~12	10~15	10~20	7~12	◎	△
	Thermosetting plastics	Bakelite phenol epoxy	10~20	-	-	15~25	-	○	○
	Thermoplastics	Nylon vinyl chloride	10~20	10~15	10~20	10~20	-	○	○

◎ Recommended ○ Applicable △ Usable - unusable



# D

## Technical Information for Tap

### ◎ Recommended drill diameter [On 2nd class thread basis]

#### [ Straight tap & Spiral tap ]

Thread size	Drill diameter		
	Min	Recommended	Max
M3X0.5	2.459	2.5	2.599
M4X0.7	3.242	3.3	3.422
M5X0.8	4.134	4.2	4.334
M6X1.0	4.917	5.0	5.153
M8X1.25	6.647	6.8	6.912
M10X1.25	8.647	8.8	8.912
M10X1.5	8.376	8.5	8.676
M12X1.0	10.917	11.0	11.153
M12X1.25	10.647	10.8	10.912
M12X1.5	10.376	10.5	10.676

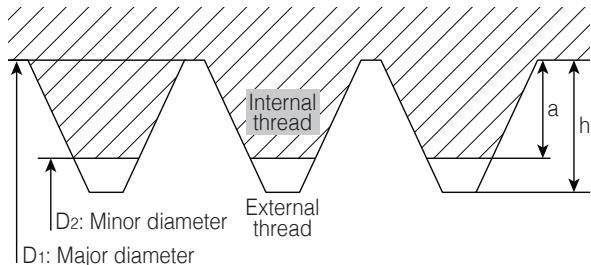
Thread size	Drill diameter		
	Min	Recommended	Max
M12X1.75	10.106	10.3	10.441
M14X1.5	12.376	12.5	12.676
M14X2.0	11.835	12.0	12.21
M16X1.5	14.376	14.5	14.676
M16X2.0	13.835	14.0	14.21
M18X1.5	16.376	16.5	16.676
M18X2.5	15.294	15.5	15.744
M20X1.5	18.376	18.5	18.676
M20X2.5	17.294	17.5	17.744
-	-	-	-

#### [ Roll tap ]

Thread size	Drill diameter		
	Min	Recommended	Max
M3X0.5	2.76	2.8	2.81
M4X0.7	3.65	3.7	3.7
M5X0.8	4.59	4.6	4.66
M6X1.0	5.48	5.5	5.57
M8X1.25	7.34	7.4	7.41
M10X1.25	9.34	9.4	9.41

Thread size	Drill diameter		
	Min	Recommended	Max
M10X1.5	9.18	9.2	9.28
M12X1.0	11.48	11.5	11.57
M12X1.25	11.34	11.4	11.41
M12X1.5	11.18	11.2	11.28
M12X1.75	11.05	11.1	11.15
-	-	-	-

[Fig] In case that a external thread has a standard shape



- Pre-hole diameter = D1: Major diameter
- D2: Minor diameter
- $a = \frac{1}{2} \times (D1 - D2)$
- $h = \text{Height of fundamental triangle}$
- Rate of threading engagement =  $a/h \times 100 (\%)$

$$\text{* Rate of threading engagement} = \frac{\text{Major diameter} - \text{Pre-hole diameter}}{2 \times (\text{Height of fundamental triangle})}$$

$$\text{* Pre-hole diameter} = d - 2 \times H \times \frac{\text{rate of threading engagement}}{100}$$

- d: Major diameter
- H (Rate of threading engagement's Height): 0.541266P
- P: Pitch (mm)

\* Recommended bottom hole diameters follow the JIS2 standard for a nut. (Nuts outside the JIS standard are excluded)

$$\text{* Drill diameter} = D - 0.0068 \times P \times 65$$

- D: Nominal diameter
- P: Pitch (mm)
- 65 = 65% of the thread height

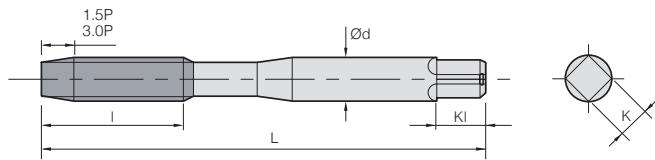
\* Nut's bottom hole diameters outside the JIS standard are only for reference.



D

Threading

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**ST Straight Tap**

(mm)

Flutes	Designation		Thread size	L	I	d	K	Kl	Limits
	1.5P	3P							
3	M3X0.5-ST15	M3X0.5-ST30	M3X0.5	46	11	4.0	3.2	6	KH3
	M4X0.7-ST15	M4X0.7-ST30	M4X0.7	52	13	5.0	4.0	7	KH3
	M5X0.8-ST15	M5X0.8-ST30	M5X0.8	60	16	5.5	4.5	7	KH3
	M6X1.0-ST15	M6X1.0-ST30	M6X1.0	62	19	6.0	4.5	7	KH3
4	M8X1.0-ST15	M8X1.0-ST30	M8X1.0	70	22	6.2	5.0	8	KH3
	M8X1.25-ST15	M8X1.25-ST30	M8X1.25	70	22	6.2	5.0	8	KH4
	M10X1.0-ST15	M10X1.0-ST30	M10X1.0	75	24	7.0	5.5	8	KH3
	M10X1.25-ST15	M10X1.25-ST30	M10X1.25	75	24	7.0	5.5	8	KH4
	M10X1.5-ST15	M10X1.5-ST30	M10X1.5	75	24	7.0	5.5	8	KH4
	M12X1.0-ST15	M12X1.0-ST30	M12X1.0	82	29	8.5	6.5	9	KH3
	M12X1.25-ST15	M12X1.25-ST30	M12X1.25	82	29	8.5	6.5	9	KH4
	M12X1.5-ST15	M12X1.5-ST30	M12X1.5	82	29	8.5	6.5	9	KH4
	M12X1.75-ST15	M12X1.75-ST30	M12X1.75	82	29	8.5	6.5	9	KH5

\* Ideal for mass tapping operations of general cast iron, ductile cast iron, brass-cast, thermosetting plastics, etc

\* Wear resistance highly improved by the use of TiCN, TiN coating for high efficiency tapping operations

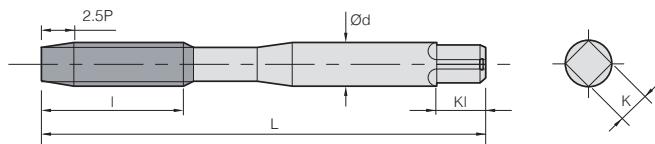
**Applicable workpiece range**

Division	Carbon steel			Alloy steel	Quenched and tempered steel			Stainless steel	Tool steel	Cast steel	Cast iron	Ductile cast iron	Copper	Brass	Brass-cast	Bronze	Rolled aluminum	Aluminum-cast, alloyed	Magnesium-cast, alloyed	Zinc-cast, alloyed	Titanium alloy		Thermo-setting plastics	Thermoplastics		
	C ~0.25%	C0.25% ~0.45%	C 0.45%~		SCM	25~45 HRC	45~55 HRC	50~60 HRC																		
FN30T										◎	○		○	○	○		○	○	○				○			
PC10T										◎	○		○	○	○	○		○	○	○				○		
PC20T										◎	○		○	○	○	○		○	○	○				○		



# D Carbide Tap

## SP Spiral Tap



(mm)

Flutes	Designation 2.5P	Thread size		L	I	d	K	Kl	Limits
		M3X0.5-SP25	M4X0.7-SP25						
3	M5X0.8-SP25	M5X0.8	60	16	5.5	4.5	7	KH3	
	M6X1.0-SP25	M6X1.0	62	19	6.0	4.5	7	KH3	
	M8X1.0-SP25	M8X1.0	70	22	6.2	5.0	8	KH3	
	M8X1.25-SP25	M8X1.25	70	22	6.2	5.0	8	KH4	
	M10X1.0-SP25	M10X1.0	75	24	7.0	5.5	8	KH3	
	M10X1.25-SP25	M10X1.25	75	24	7.0	5.5	8	KH4	
	M10X1.5-SP25	M10X1.5	75	24	7.0	5.5	8	KH4	
	M12X1.0-SP25	M12X1.0	82	29	8.5	6.5	9	KH3	
	M12X1.25-SP25	M12X1.25	82	29	8.5	6.5	9	KH4	
	M12X1.5-SP25	M12X1.5	82	29	8.5	6.5	9	KH4	
	M12X1.75-SP25	M12X1.75	82	29	8.5	6.5	9	KH5	

\* Ideal for making blind holes in quantity on general cast iron, ductile cast iron, brass-cast, thermosetting plastics, etc

\* Wear resistance highly improved by the use of TiCN coating for high efficiency tapping operations

## Applicable workpiece range

Division	Carbon steel			Alloy steel	Quenched and tempered steel			Stainless steel	Tool steel	Cast steel	Cast iron	Ductile cast iron	Copper	Brass	Brass-cast	Bronze	Rolled aluminum	Aluminum-cast, alloyed	Magnesium-cast, alloyed	Zinc-cast, alloyed	Titanium alloy		Thermo-setting plastics	Thermoplastics
	C ~0.25%	C0.25% ~0.45%	C 0.45%~	SCM	25~45 Hrc	45~55 Hrc	50~60 Hrc	SUS	SKD	SC	GC	GCD	Cu	Bs	BsC	PB	AI	AC ADC	MC	ZDC	Ti	Ni	-	-
FN30T												○	○	○	○	○	○	○	○	○				○
PC10T												○	○	○	○	○	○	○	○	○			○	○

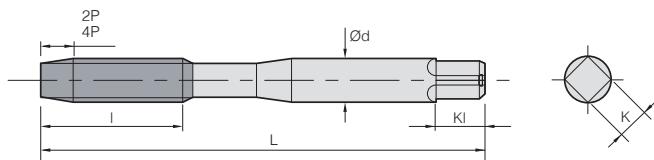


D

Threading

66

# RT Roll Tap



Carbide      Uncoated FN30T      TiCN PC10T

(mm)

Flutes	Designation		Thread size	L	I	d	K	Kl	Limits
	2P	4P							
1	M3X0.5-RT20(S)	-	M3X0.5	46	11	4.0	3.2	6	GH5
4	M3X0.5-RT20(M)	M3X0.5-RT40(M)	M3X0.5	46	11	4.0	3.2	6	GH5
1	M4X0.7-RT20(S)	-	M4X0.7	52	13	5.0	4.0	7	GH6
4	M4X0.7-RT20(M)	M4X0.7-RT40(M)	M4X0.7	52	13	5.0	4.0	7	GH6
1	M5X0.8-RT20(S)	-	M5X0.8	60	16	5.5	4.5	7	GH6
4	M5X0.8-RT20(M)	M5X0.8-RT40(M)	M5X0.8	60	16	5.5	4.5	7	GH6
1	M6X1.0-RT20(S)	-	M6X1.0	62	19	6.0	4.5	7	GH7
4	M6X1.0-RT20(M)	M6X1.0-RT40(M)	M6X1.0	62	19	6.0	4.5	7	GH7
1	M8X1.25-RT20(S)	-	M8X1.25	70	22	6.2	5.0	8	GH7
4	M8X1.25-RT20(M)	M8X1.25-RT40(M)	M8X1.25	70	22	6.2	5.0	8	GH7
1	M10X1.25-RT20(S)	-	M10X1.25	75	24	7.0	5.5	8	GH7
4	M10X1.25-RT20(M)	M10X1.25-RT40(M)	M10X1.25	75	24	7.0	5.5	8	GH7
1	M12X1.0-RT20(S)	-	M12X1.0	82	29	8.5	6.5	9	GH7
4	M12X1.0-RT20(M)	M12X1.0-RT40(M)	M12X1.0	82	29	8.5	6.5	9	GH7
1	M12X1.25-RT20(S)	-	M12X1.25	82	29	8.5	6.5	9	GH7
4	M12X1.25-RT20(M)	M12X1.25-RT40(M)	M12X1.25	82	29	8.5	6.5	9	GH7
1	M12X1.5-RT20(S)	-	M12X1.5	82	29	8.5	6.5	9	GH7
4	M12X1.5-RT20(M)	M12X1.5-RT40(M)	M12X1.5	82	29	8.5	6.5	9	GH7
1	M12X1.75-RT20(S)	-	M12X1.75	82	29	8.5	6.5	9	GH8
4	M12X1.75-RT20(M)	M12X1.75-RT40(M)	M12X1.75	82	29	8.5	6.5	9	GH8

\* For general use on both steels and non-ferrous metal

\* Wear resistance highly improved by the use of TiCN coating for high efficiency tapping operations

\* Ideal for making both through holes and blind holes on non-ferrous metals

## Applicable workpiece range

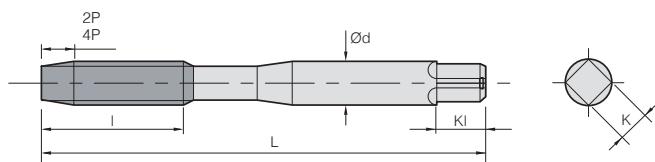
Division	Carbon steel			Alloy steel	Quenched and tempered steel			Stainless steel	Tool steel	Cast steel	Cast iron	Ductile cast iron	Copper	Brass	Brass-cast	Bronze	Rolled aluminum	Aluminum-cast, alloyed	Magnesium-cast, alloyed	Zinc-cast, alloyed	Titanium alloy		Thermo-setting plastics	Thermoplastics
	C ~0.25%	C ~0.25%	C ~0.45%	SCM 0.45%~	25~45 HRC	45~55 HRC	50~60 HRC	SUS	SKD	SC	GC	GCD	Cu	Bs	BsC	PB	Al	AC ADC	MC	ZDC	Ti	Ni	-	-
FN30T													○	○	○			○	○		○			
PC10T	○	○	○	○				○					○	○	○		○	○		○				



# D

## Carbide Tap

### SR Spiral Roll Tap



Carbide

Uncoated  
FN30TTiCN  
PC10T

(mm)

Designation		Thread size	L	I	d	K	KI	Limits
2P	4P							
M3X0.5-SR20	M3X0.5-SR40	M3X0.5	46	18	4.0	3.2	6	GH6
M3.5X0.6-SR20	M3.5X0.6-SR40	M3.5X0.6	46	18	4.0	3.2	6	GH6
M4X0.7-SR20	M4X0.7-SR40	M4X0.7	52	20	5.0	4.0	7	GH7
M5X0.8-SR20	M5X0.8-SR40	M5X0.8	60	22	5.5	4.5	7	GH7
M6X1.0-SR20	M6X1.0-SR40	M6X1.0	62	24	6.0	4.5	7	GH7

\* For general use for tapping aluminum, magnesium and zinc as well as non-ferrous metal

\* Ideal for tapping steel, non-ferrous materials and stainless steel

\* Wear resistance highly improved by the use of TiCN coating for high efficiency tapping operations

### Applicable workpiece range

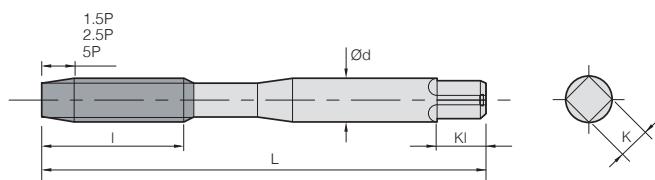
Division	Carbon steel			Alloy steel	Quenched and tempered steel			Stainless steel	Tool steel	Cast steel	Cast iron	Ductile cast iron	Copper	Brass	Brass-cast	Bronze	Rolled aluminum	Aluminum-cast, alloyed	Magnesium-cast, alloyed	Zinc-cast, alloyed	Titanium alloy		Thermo-setting plastics	Thermoplastics	
	C ~0.25%	C0.25% ~0.45%	C 0.45%~		SCM	25~45 HRC	45~55 HRC														Ti	Ni			
FN30T													◎	◎	◎			◎	◎		◎				
PC10T	◎	◎	○	○				◎					◎	◎	◎			◎	◎		◎				



D

Threading

## ST Straight Tap



(mm)

Flutes	Designation			Thread size	L	I	d	K	KI	Limits
	1.5P	2.5P	5P							
3	M3X0.5-ST15	M3X0.5-ST25	M3X0.5-ST50	M3X0.5	46	11	4.0	3.2	6	KH2
	M4X0.7-ST15	M4X0.7-ST25	M4X0.7-ST50	M4X0.7	52	13	5.0	4.0	7	KH2
	M5X0.8-ST15	M5X0.8-ST25	M5X0.8-ST50	M5X0.8	60	16	5.5	4.5	7	KH2
	M6X1.0-ST15	M6X1.0-ST25	M6X1.0-ST50	M6X1.0	62	19	6.0	4.5	7	KH2
4	M8X1.25-ST15	M8X1.25-ST25	M8X1.25-ST50	M8X1.25	70	22	6.2	5.0	8	KH2
	M10X1.25-ST15	M10X1.25-ST25	M10X1.25-ST50	M10X1.25	75	24	7.0	5.5	8	KH2
	M10X1.5-ST15	M10X1.5-ST25	M10X1.5-ST50	M10X1.5	75	24	7.0	5.5	8	KH3
	M12X1.0-ST15	M12X1.0-ST25	M12X1.0-ST50	M12X1.0	82	29	8.5	6.5	9	KH2
	M12X1.25-ST15	M12X1.25-ST25	M12X1.25-ST50	M12X1.25	82	29	8.5	6.5	9	KH2
	M12X1.5-ST15	M12X1.5-ST25	M12X1.5-ST50	M12X1.5	82	29	8.5	6.5	9	KH3
	M12X1.75-ST15	M12X1.75-ST25	M12X1.75-ST50	M12X1.75	82	29	8.5	6.5	9	KH3
	M14X1.5-ST15	M14X1.5-ST25	M14X1.5-ST50	M14X1.5	88	30	10.5	8.0	11	KH3
	M14X2.0-ST15	M14X2.0-ST25	M14X2.0-ST50	M14X2.0	88	30	10.5	8.0	11	KH3
	M16X1.5-ST15	M16X1.5-ST25	M16X1.5-ST50	M16X1.5	95	32	12.5	10.0	13	KH3
	M16X2.0-ST15	M16X2.0-ST25	M16X2.0-ST50	M16X2.0	95	32	12.5	10.0	13	KH3
	M18X1.5-ST15	M18X1.5-ST25	M18X1.5-ST50	M18X1.5	100	37	14.0	11.0	14	KH3
	M18X2.5-ST15	M18X2.5-ST25	M18X2.5-ST50	M18X2.5	100	37	14.0	11.0	14	KH3
	M20X1.5-ST15	M20X1.5-ST25	M20X1.5-ST50	M20X1.5	105	37	15.0	12.0	15	KH3
	M20X2.5-ST15	M20X2.5-ST25	M20X2.5-ST50	M20X2.5	105	37	15.0	12.0	15	KH3

\* Ideal for making both through holes and blind holes on carbon steel, alloy steel and non-ferrous metal

\* Wear resistance highly improved by the use of TiN, TiCN, Steam oxide coating for high efficiency tapping operations

\* Built-up edges are prevented thanks to a reduced coefficient of friction gained by using porous cutting fluid of Fe<sup>3</sup>O<sup>4</sup>

\* Ideal for tapping stainless steel, cast steel, carbon steel for machine structures, etc

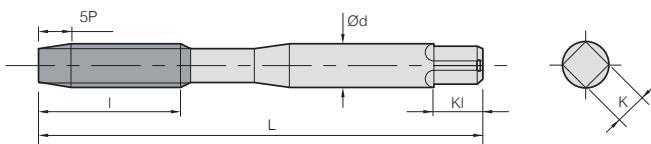
### Applicable workpiece range

Division	Carbon steel			Alloy steel	Quenched and tempered steel			Stainless steel	Tool steel	Cast steel	Cast iron	Ductile cast iron	Copper	Brass	Brass-cast	Bronze	Rolled aluminum	Aluminum-cast, alloyed	Magnesium-cast, alloyed	Zinc-cast, alloyed	Titanium alloy		Thermo-setting plastics	Thermoplastics	
	C ~0.25%	C 0.25%~0.45%	C 0.45%~		SCM	25-45 HRC	45-55 HRC	50-60 HRC													Ti	Ni			
HN30T	○												○		○	○	○	○	○	○	○				
HC20T	○	○	○	○	○										○	○	○	○	○	○	○	○	○		
HC10T	○	○	○	○	○										○	○	○	○	○	○	○	○	○		
HH30T	○	○	○	○	○	○	○	○	○	○	○	○	○												



# D HSS Tap

## PT Point Tap



(mm)

Flutes	Designation 5P	Thread size		L	I	d	K	KI	Limits
		M3X0.5-PT50	M4X0.7-PT50						
3	M5X0.8-PT50	M5X0.8	60	16	5.5	4.5	7	KH2	
	M6X1.0-PT50	M6X1.0	62	19	6.0	4.5	7	KH2	
	M8X1.25-PT50	M8X1.25	70	22	6.2	5.0	8	KH3	
	M10X1.25-PT50	M10X1.25	75	24	7.0	5.5	8	KH3	
	M10X1.5-PT50	M10X1.5	75	24	7.0	5.5	8	KH3	
	M12X1.0-PT50	M12X1.0	82	29	8.5	6.5	9	KH3	
	M12X1.25-PT50	M12X1.25	82	29	8.5	6.5	9	KH3	
	M12X1.5-PT50	M12X1.5	82	29	8.5	6.5	9	KH3	
	M12X1.75-PT50	M12X1.75	82	29	8.5	6.5	9	KH4	
	M14X1.5-PT50	M14X1.5	88	30	10.5	8.0	11	KH3	
	M14X2.0-PT50	M14X2.0	88	30	10.5	8.0	11	KH4	
	M16X1.5-PT50	M16X1.5	95	32	12.5	10.0	13	KH3	
	M16X2.0-PT50	M16X2.0	95	32	12.5	10.0	13	KH4	
	M18X1.5-PT50	M18X1.5	100	37	14.0	11.0	14	KH4	
	M18X2.5-PT50	M18X2.5	100	37	14.0	11.0	14	KH4	
	M20X1.5-PT50	M20X1.5	105	37	15.0	12.0	15	KH4	
	M20X2.5-PT50	M20X2.5	105	37	15.0	12.0	15	KH4	

\* Ideal for making through holes on carbon steel, alloy steel and non-ferrous metal

\* Wear resistance highly improved by the use of TiN, TiCN, Steam oxide coating for high efficiency tapping operations

\* Built-up edges are prevented thanks to a reduced coefficient of friction gained by using porous cutting fluid of  $\text{Fe}^3\text{O}^4$ 

\* Ideal for tapping stainless steel, cast steel, carbon steel for machine structures, etc

## Applicable workpiece range

Division	Carbon steel			Alloy steel	Quenched and tempered steel			Stainless steel	Tool steel	Cast steel	Cast iron	Ductile cast iron	Copper	Brass	Brass-cast	Bronze	Rolled aluminum	Aluminum-cast, alloyed	Magnesium-cast, alloyed	Zinc-cast, alloyed	Titanium alloy		Thermo-setting plastics	Thermoplastics	
	C ~0.25%	C 0.25%~0.45%	C 0.45%~		SCM	25~45 HRC	45~55 HRC	50~60 HRC													Ti	Ni			
HN30T	○	○	○	○					○	○	○	○	○	○	○	○	○	○	○	○	○			○	
HC20T	○	○	○	○					○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
HC10T	○	○	○	○					○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
HH30T	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	

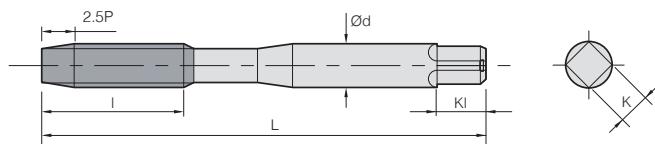


D

Threading

70

## SP Spiral Tap



(mm)

Flutes	Designation 2.5P	Thread size	L	I	d	K	Kl	Limits
3	M3X0.5-SP25	M3X0.5	46	11	4.0	3.2	6	KH2
	M4X0.7-SP25	M4X0.7	52	13	5.0	4.0	7	KH2
	M5X0.8-SP25	M5X0.8	60	16	5.5	4.5	7	KH2
	M6X1.0-SP25	M6X1.0	62	19	6.0	4.5	7	KH2
	M8X1.25-SP25	M8X1.25	70	22	6.2	5.0	8	KH2
	M10X1.25-SP25	M10X1.25	75	24	7.0	5.5	8	KH2
	M10X1.5-SP25	M10X1.5	75	24	7.0	5.5	8	KH2
	M12X1.0-SP25	M12X1.0	82	29	8.5	6.5	9	KH2
	M12X1.25-SP25	M12X1.25	82	29	8.5	6.5	9	KH2
	M12X1.5-SP25	M12X1.5	82	29	8.5	6.5	9	KH2
	M12X1.75-SP25	M12X1.75	82	29	8.5	6.5	9	KH2
	M14X1.5-SP25	M14X1.5	88	30	10.5	8.0	11	KH2
	M14X2.0-SP25	M14X2.0	88	30	10.5	8.0	11	KH2
	M16X1.5-SP25	M16X1.5	95	32	12.5	10.0	13	KH2
	M16X2.0-SP25	M16X2.0	95	32	12.5	10.0	13	KH2
4	M18X1.5-SP25	M18X1.5	100	37	14.0	11.0	14	KH2
	M18X2.5-SP25	M18X2.5	100	37	14.0	11.0	14	KH3
	M20X1.5-SP25	M20X1.5	105	37	15.0	12.0	15	KH3
	M20X2.5-SP25	M20X2.5	105	37	15.0	12.0	15	KH3

\* Ideal for making blind holes. Its flutes provide excellent chip evacuation in tapping carbon steel, alloy steel and non-ferrous materials

\* Wear resistance highly improved by the use of TiN, TiCN, Steam oxide coating for high efficiency tapping operations

\* Built-up edges are prevented thanks to a reduced coefficient of friction gained by using porous cutting fluid of  $\text{Fe}^3\text{O}^4$

\* Ideal for tapping stainless steel, cast steel, carbon steel for machine structures, etc

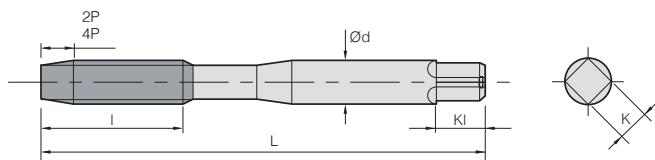
### Applicable workpiece range

Division	Carbon steel			Alloy steel	Quenched and tempered steel			Stainless steel	Tool steel	Cast steel	Cast iron	Ductile cast iron	Copper	Brass	Brass-cast	Bronze	Rolled aluminum	Aluminum-cast, alloyed	Magnesium-cast, alloyed	Zinc-cast, alloyed	Titanium alloy		Thermo-setting plastics	Thermo-plastics		
	C ~0.25%	C 0.25%~0.45%	C 0.45%~		SCM	25-45 Hrc	45-55 Hrc	50-60 Hrc															Ti	Ni		
HN30T	○	○	○	○									○	○	○	○	○	○	○	○	○	○	○	○	○	○
HC20T	○	○	○	○					○	○	○		○	○	○	○	○	○	○	○	○	○	○	○	○	○
HC10T	○	○	○	○					○	○	○		○	○	○	○	○	○	○	○	○	○	○	○	○	○
HH30T	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	



# D HSS Tap

## RT Roll Tap



HSSE      Uncoated  
 HN30T      HC20T  
 TiN      TiCN  
 HC10T

(mm)

Flutes	Designation		Thread size	L	I	d	K	Kl	Limits
	2P	4P							
1	M3X0.5-RT20(S)	-	M3X0.5	46	11	4.0	3.2	6	GH5
4	M3X0.5-RT20(M)	M3X0.5-RT40(M)	M3X0.5	46	11	4.0	3.2	6	GH5
1	M4X0.7-RT20(S)	-	M4X0.7	52	13	5.0	4.0	7	GH6
4	M4X0.7-RT20(M)	M4X0.7-RT40(M)	M4X0.7	52	13	5.0	4.0	7	GH6
1	M5X0.8-RT20(S)	-	M5X0.8	60	16	5.5	4.5	7	GH6
4	M5X0.8-RT20(M)	M5X0.8-RT40(M)	M5X0.8	60	16	5.5	4.5	7	GH6
1	M6X1.0-RT20(S)	-	M6X1.0	62	19	6.0	4.5	7	GH7
4	M6X1.0-RT20(M)	M6X1.0-RT40(M)	M6X1.0	62	19	6.0	4.5	7	GH7
1	M8X1.25-RT20(S)	-	M8X1.25	70	22	6.2	5.0	8	GH7
4	M8X1.25-RT20(M)	M8X1.25-RT40(M)	M8X1.25	70	22	6.2	5.0	8	GH7
1	M10X1.25-RT20(S)	-	M10X1.25	75	24	7.0	5.5	8	GH7
4	M10X1.25-RT20(M)	M10X1.25-RT40(M)	M10X1.25	75	24	7.0	5.5	8	GH7
1	M10X1.5-RT20(S)	-	M10X1.5	75	24	7.0	5.5	8	GH7
4	M10X1.5-RT20(M)	M10X1.5-RT40(M)	M10X1.5	75	24	7.0	5.5	8	GH7
1	M12X1.0-RT20(S)	-	M12X1.0	82	29	8.5	6.5	9	GH7
4	M12X1.0-RT20(M)	M12X1.0-RT40(M)	M12X1.0	82	29	8.5	6.5	9	GH7
1	M12X1.25-RT20(S)	-	M12X1.25	82	29	8.5	6.5	9	GH7
4	M12X1.25-RT20(M)	M12X1.25-RT40(M)	M12X1.25	82	29	8.5	6.5	9	GH7
1	M12X1.5-RT20(S)	-	M12X1.5	82	29	8.5	6.5	9	GH7
4	M12X1.5-RT20(M)	M12X1.5-RT40(M)	M12X1.5	82	29	8.5	6.5	9	GH7
1	M12X1.75-RT20(S)	-	M12X1.75	82	29	8.5	6.5	9	GH8
4	M12X1.75-RT20(M)	M12X1.75-RT40(M)	M12X1.75	82	29	8.5	6.5	9	GH8

\* For general use for both steels and non-ferrous metal

\* Wear resistance highly improved by the use of TiN, TiCN coating for high efficiency tapping operations

\* Ideal for tapping non-ferrous alloys such as aluminum, zinc, copper, etc

### ◎ Applicable workpiece range

Division	Carbon steel			Alloy steel	Quenched and tempered steel			Stainless steel	Tool steel	Cast steel	Cast iron	Ductile cast iron	Copper	Brass	Brass-cast	Bronze	Rolled aluminum	Aluminum-cast, alloyed	Magnesium-cast, alloyed	Zinc-cast, alloyed	Titanium alloy		Thermo-setting plastics	Thermoplastics	
	C ~0.25%	C0.25% ~0.45%	C 0.45%~		SCM	25~45 HRC	45~55 HRC	50~60 HRC													Ti	Ni	-	-	
HN30T													○	○	○	○	○	○		○					
HC20T	○	○	○	○					○	○	○		○	○	○	○									
HC10T	○	○	○	○					○				○	○	○	○	○	○	○	○					

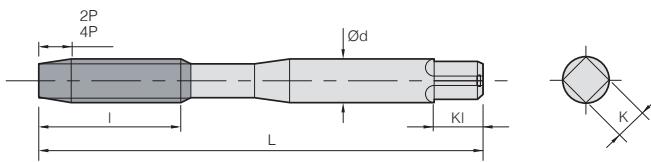


D

Threading

72

## SR Spiral Roll Tap



HSSE      Uncoated HN30T      TiN HC20T      TiCN HC10T

(mm)

Designation		Thread size	L	I	d	K	KI	Limits
2P	4P							
M3X0.5-SR20	M3X0.5-SR40	M3X0.5	46	18	4.0	3.2	6	GH6
M3.5X0.6-SR20	M3.5X0.6-SR40	M3.5X0.6	48	18	4.0	3.2	6	GH6
M4X0.7-SR20	M4X0.7-SR40	M4X0.7	52	20	5.0	4.0	7	GH7
M5X0.8-SR20	M5X0.8-SR40	M5X0.8	60	22	5.5	4.5	7	GH7
M6X1.0-SR20	M6X1.0-SR40	M6X1.0	62	24	6.0	4.5	7	GH7

\* For general use for tapping aluminum, magnesium and zinc as well as non-ferrous metal

\* Wear resistance highly improved by the use of TiN, TiCN coating for high efficiency tapping operations

\* Ideal for tapping steel, non-ferrous materials and stainless steel

### Applicable workpiece range

Division	Carbon steel			Alloy steel	Quenched and tempered steel			Stainless steel	Tool steel	Cast steel	Cast iron	Ductile cast iron	Copper	Brass	Brass-cast	Bronze	Rolled aluminum	Aluminum-cast, alloyed	Magnesium-cast, alloyed	Zinc-cast, alloyed	Titanium alloy		Thermo-setting plastics	Thermoplastics
	C ~0.25%	C ~0.45%	C 0.45%~	SCM	25-45 HRC	45-55 HRC	50-60 HRC	SUS	SKD	SC	GC	GCD	Cu	Bs	BsC	PB	AI	AC ADC	MC	ZDC	Ti	Ni	-	-
HN30T													○	○	○	○	○	○		○				
HC20T	○	○	○	○				○	○	○		○	○	○	○									
HC10T	○	○	○	○				○					○	○	○		○	○		○				

