



THE FUTURE OF CUTTING TOOLS

THREADING PRO SERIES



THREADING & GROOVING INSERTS

CATALOGUE 2014

Product Range

Aluminum Turning & Milling Inserts

General Purpose Turning & Milling Inserts

PCD & CBN Inserts

General Purpose Solid Carbide Endmills

High Performance Solid Carbide Endmills

Solid Carbide Drills

Solid Carbide Reamers

PCD Reamers

Threading Inserts

Grooving Inserts

Tool Holders & U Drills

A venture of
SAFE TOOLS MFG. (IMPORT & EXPORT) CO.

SAFE TOOLS MFG. (IMPORT & EXPORT) CO.

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Introduction

Director's Note



A year ago we came across an idea, an idea to develop a product which once again would be a one of a kind product which would enhance the productivity of the current engineering industry. My method of working was different. I did not rush into actual work. I let the idea linger in my mind for a while and then slowly and steadily started building the product up in my imagination. I made a lot of improvements and also saw the application of the product and the benefit it would have to users all in my mind. When I had gone so far as to apply every possible improvement that I could think of, and

when I saw no fault anywhere I put the final product which was in my head and subsequently on paper.

Alumina® Threading Pro Series was born!

At first our team worked on getting samples from competitors from Israel, Japan, China and Sweden and then understanding the composition and other technical aspects required. We then understood that these major players had done a fantastic job to develop this product and it was not going to be easy for us to better this. We worked for over eight months carried out a lot of tests, continuously improved the product and now after a year I can proudly say that yes Alumina® Threading & Grooving inserts are at par with threading inserts manufactured by major reputed companies around the world.

Our brand Alumina® has always been positioned to reach out to clients having one machine to clients have one hundred machines. We started with selling 500 units of Alumina® products a month 3 years ago and today with the help of our sales force and our dealers we have crossed selling 30,000 units of Alumina® products a month. We have achieved these figures because our customers and dealers believe in us when we say that we are giving you a good quality product at a fair price.

Alumina® Threading Pro Series Grade AG 9030 is a must stock grade for dealers all across India and a must buy threading and grooving insert for end users. As a new product we have launched it at very aggressive prices to capture as much market share as possible.

Let us grow together!

Wishing you all the best.

Sincerely,

Quresh Merchant

4 September 2014

Grades & Categorisation

Grades and their Application

Recommended Speed for Thread Turning Inserts

Thread Turning Technical Section

Thread Turning Methods

Thread Turning Terminology

Thread Turning Code System

Thread Turning Troubleshooting



Grades & Categorisation

Grades and their Application



ALUMINA® THREADING PRO SERIES GRADE DESCRIPTION

AG 9030

AG 9030 is a multi purpose grade specially developed to work on all materials. It is a PVD TiAlN Sub-Micron Grade which works well on steels and stainless steels where cutting speeds are medium to high. This grade has been tried and tested on various materials mentioned above across many factories in India and has proved to be at par with market leaders.



ALUMINA® THREADING PRO SERIES GRADE DESCRIPTION

K 20

K 20 is a grade suited for non-ferrous materials, aluminum and cast iron.

Note: Due to our unique and specialised production techniques, Alumina® coated inserts provide superior cutting performance and exceptionally long tool life.

Recommended Speed for Thread Turning Inserts

	Material	VC (m/min)	
		AG 9030	K 20
P Steel	Carbon Steel	90 - 240	
	Low Alloy Steel (alloying elements < 5%)	80 - 130	
	High Alloy Steel (alloying elements > 5%)	60 - 80	
	Cast Steel	120 - 180	
M Stainless Steel	Stainless Steel & Cast Steel	90 - 130	50 - 80
K Cast Iron	Cast Iron Nodular (GGG)	100 - 130	
	Grey Cast Iron (GG)	120 - 130	
	Malleable Cast Iron	100 - 130	
N Non-Ferrous	Aluminum Wrought Alloy		600 - 800
	Aluminum Cast, Alloyed		200 - 550
	Copper Alloys		150 - 250
	Non Metallic (Hard Rubber, plastics)		100 - 200
S Super Alloys	High Temp Alloys, Super Alloys	25 - 60	
	Titanium Alloys	35 - 45	
H Hardened Steel	Hardened Steel	35 - 45	
	Chilled Cast Iron	25 - 35	
	Cast Iron - Hardened	15 - 25	

Thread Turning Technical Section

Number of Threading Passes Selection for Single Point Inserts

	mm	0.5	0.8	1.0	1.25	1.5	1.75	2.0	2.5	3.0	4.0	6.0
Pitch	TPI	48	32	24	20	16	14	12	10	8	6	4
No. of Passes		3 - 6	4 - 7	4 - 9	6 - 10	5 - 11	9 - 12	6 - 13	7 - 15	8 - 17	10 - 20	11 - 22

Notes:

A. For most standard applications, the middle of the range is a good starting point.

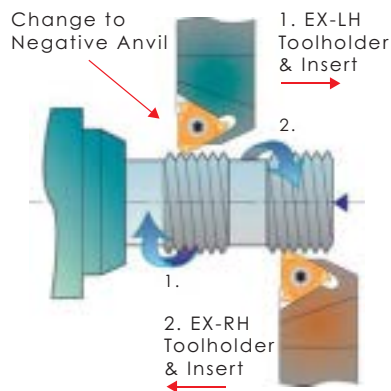
B. For most materials, the tougher the material, the higher the number of cutting passes you select.

C. As a general rule, less passes are better than more speed.

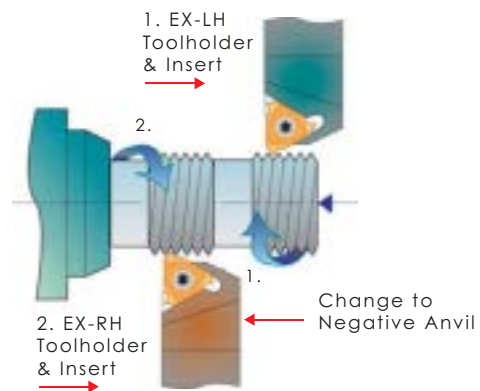
Thread Turning Methods

Thread	Inserts & Tool Holders	Rotation	Feed Direction	Helix Method
Right Hand External	EX RH	Counter Clockwise	Towards Chuck	Regular
	RX LH	Clockwise	From Chuck	Reversed
Right Hand Internal	IN RH	Counter Clockwise	Towards Chuck	Regular
	IN LH	Clockwise	From Chuck	Reversed
Left Hand External	EX LH	Counter Clockwise	Towards Chuck	Regular
	EX RH	Clockwise	From Chuck	Reversed
Left Hand Internal	IN LH	Counter Clockwise	Towards Chuck	Regular
	IN RH	Clockwise	From Chuck	Reversed

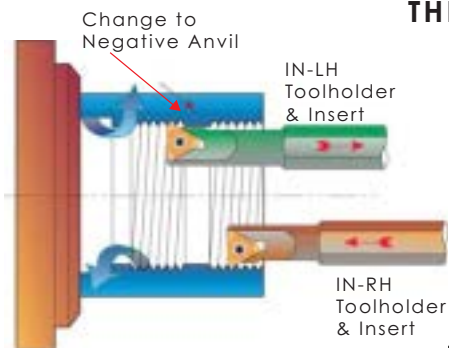
EX-RH THREAD



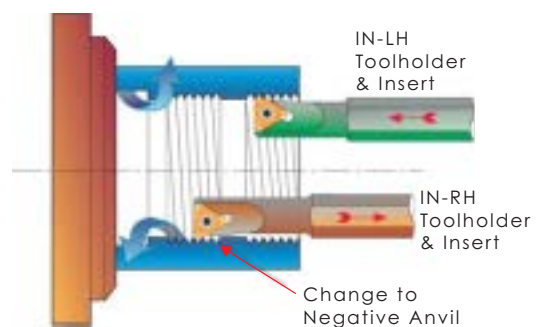
EX-LH THREAD



IN-RH THREAD



IN-LH THREAD



Thread Turning Terminology

EXTERNAL THREAD

A thread on the external surface of a cylinder screw or cone

DEPTH OF THREAD

The distance between the crest and root measured from normal to the axis

PITCH

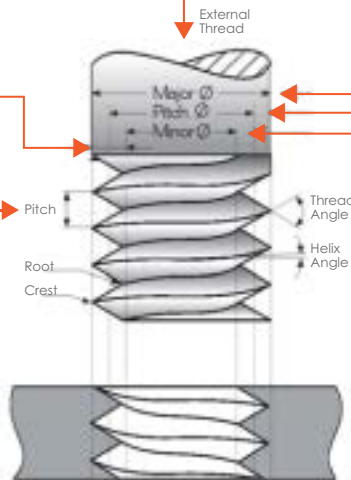
The distance between the corresponding points on adjacent thread forms measured parallel to the axis. The distance can be defined in mm or by TPI (threads per inch), which is the reciprocal of the pitch

NORMAL DIAMETER

The diameter of which the diameter limits are derived by the application of deviation allowances and tolerances

TAPER THREAD

A thread formed on a cone



INTERNAL THREAD

A thread on the internal surface of a cylinder or cone

MAJOR THREAD

The largest diameter of a screw thread

PITCH DIAMETER

On a straight thread, the diameter of an imaginary cylinder, the surface of which cuts the thread forms where the width of the thread and groove are equal

MINOR DIAMETER

The smallest diameter of a screw thread

HELIX ANGLE

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

STRAIGHT THREAD

A thread formed on a cylinder

LEFT HANDED THREAD



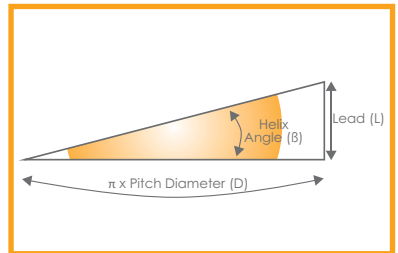
A thread which, when viewed axially, winds in a counter clockwise and receding direction. All left handed threads are designated LH

RIGHT HANDED THREAD



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

THE HELIX ANGLE (β)



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 the opposite of the lead

PARTIAL PROFILE



The V partial profile insert cuts without topping the outer diameter of the thread. The same insert can be used for a range of different thread pitches which have a common thread angle

FULL PROFILE



The full profile insert will form a complete thread profile including the crest. For every thread pitch and standard, a separate insert is required

FULL PROFILE FOR FINE PITCHES



The full profile for Fine Pitches will form a complete thread. The topping of the outer diameter is generated by second tooth

SEMI PROFILE



The Semi profile insert will form a complete thread including crest radius but without topping the outer diameter.

Mainly used for trapezoidal profiles

Thread Turning Code System

16 • E R • 1.50 ISO • • AG 9030									
1	2	3	4	5	6	7	8	9	10
Insert Size	Insert Style	Insert Type	Hand of Insert	Chipbreaker	Pitch	Standard	API Size & Taper	Teeth	Carbide Grade

1 Insert Size (mm)

16 • • E R • • 1.50 ISO • • AG 9030

- 08 : d = 4.76
- 11 : d = 6.35
- 16 : d = 9.525
- 22 : d = 12.7
- 27 : d = 15.875



6 Pitch

16 • • E R • • 1.50 ISO • • AG 9030

Full Profile		Partial Profile	
mm	tpi	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

2 Insert Style

16 • • E R • • 1.50 ISO • • AG 9030



7 Standard

16 • • E R • • 1.50 ISO • • AG 9030

- | | |
|-------------------------------------|---------------------|
| 60° - Partial Profile 60° | NPT - NPT |
| 55° - Partial Profile 55° | NPTF - NPTF |
| STACME - Stub ACME | NPS - NPS |
| UN - American UN | PG - Pg DIN 10130 |
| W - Whitworth BSW, BSP | API - API |
| BSPT - British Standard Pipe Thread | VAM - VAM |
| ABUT - American Buttress | 1190 - 110- |
| BBUT - British Buttress | ISO - ISO Metric |
| SAGE - Metric Buttress DIN 513 | UNJ - UNJ |
| RD - Round DIN 405 | MJ - ISO 5855 |
| RD20400 - Round DIN 20400 | TR - Trapez DIN 103 |
| BUT - API Buttress Casing | ACME - ACME |
| APIRD - API Round Casing & Tubing | |

3 Insert Type

16 • • E R • • 1.50 ISO • • AG 9030

- E : External Thread
- I : Internal Thread

4 Hand of Insert

16 • • E R • • 1.50 ISO • • AG 9030

- R : Right Handed
- L : Left Handed

8 API Size & Taper

16 • • E R • • 1.50 ISO • • AG 9030

- | | |
|-----------------------|----------------------|
| 380.5APIV - 0.38 R | 502 APIV - 0.050 1:6 |
| 382 APIV - 0.038R 1:6 | 503 APIV - 0.050 1:4 |
| 383 APIV - 0.038R 1:4 | 551 APIV - 0.055 1:8 |
| 403 APIV - 0.040R 1:4 | |

5 Chipbreaker

16 • • E R • • 1.50 ISO • • AG 9030

No Code

M : With Chipbreaker



9 No. of Teeth

16 • • E R • • 1.50 ISO • • AG 9030

For Multi Tooth Style : 2, 3, 5, 6, 8

10 Carbide Grade

16 • • E R • • 1.50 ISO • • AG 9030

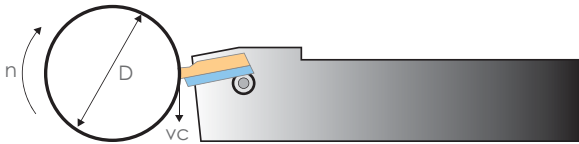
AG 9030

Thread Turning Troubleshooting

Calculation of n [rpm]

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

$$vc = \frac{\pi \times D \times n}{100}$$



n - Revolution per min
vc - Cutting speed (m/min)
D - Workpiece Diameter (mm)

Problem	Possible Cause	Solution
Increased Flank Wear	Cutting speed too high	Reduce cutting speed / use coated insert
	Depth of cut too low/ too many passes	Increase the depth of cut per pass
	Unsuitable carbide grade	Use a coated carbide grade
Uneven cutting edge wear	Incorrect helix angle	Choose the correct shim
	Wrong infeed method	Use alternating flank infeed method
Extreme plastic deformation	Depth of cut too large	Decrease depth of cut / Increase number of passes
	Insufficient cooling	Increase coolant flow rate
	Cutting speed too high	Reduce cutting speed
	Unsuitable carbide grade	Use a tougher carbide
Cutting edge breakage	Depth of cut too large	Decrease depth of cut / Increase number of passes
	Extreme plastic deformation	Use tougher carbide
	Insufficient cooling	Increase coolant flow rate
	Unsuitable carbide grade	Use a coated carbide grade
Built up edge	Incorrect cutting speed	Change the cutting speed
	Unsuitable carbide grade	Use a coated carbide grade
Thread profile too shallow	Tool not at workpiece axis height	Change tool height
	Insert is not machining the crest	Measure the workpiece diameter
Poor surface quality	Too low cutting speed	Increase cutting speed
	Flank infeed method not appropriate	Use alternative flank or radial infeed method

Thread Thread Turning Inserts

Partial Profile 60°

Partial Profile 55°

ISO Metric External

ISO Metric Internal

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

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

American UN

Whitworth External (BSW, BSP, BSB)

Whitworth Internal (BSW, BSP, BSB)

British Standard Pipe Thread (BSPT)

National Pipe Thread (NPT)

American ACME (ACME)

STUB ACME (STACME)

UCJ (UNIFIED CONSTANT THREAD)

Metric Buttress (SAGE)

American Buttress (ABUT)

American Buttress (BBUT)

API

National Pipe Thread (NPTF)

Round Din 405

Trapez Din (TR)

Thread Turning Inserts

Thread Turning Inserts

PARTIAL PROFILE 60°

Type	Picture	Designation (Right)	Designation (Left)	Pitch		Dimensions				
				mm	tpi	d	L	r	x	f
External		ER 11 - A 60	EL 11 - A 60	0.5 ~ 1.5	48 ~ 16	6.35	11	0.05	0.8	0.9
		16 - A 60	16 - A 60	0.5 ~ 1.5	48 ~ 16	9.525	16	0.05	0.8	0.9
		16 - G 60	16 - G 60	1.75 ~ 3.0	14 ~ 8	9.525	16	0.27	1.2	1.7
		16 - AG 60	16 - AG 60	0.5 ~ 3.0	48 ~ 8	9.525	16	0.08	1.2	1.7
		22 - N 60	22 - N 60	3.5 ~ 5.0	7 ~ 5	12.7	22	0.53	1.7	2.5
		27 - Q 60	27 - Q 60	5.5 ~ 6.0	4.5 ~ 4	15.875	27	0.64	2.1	3.1
Internal		IR 08 - A 60	IL 08 - A 60	0.5 ~ 1.5	48 ~ 16	4.76	8	0.05	0.6	0.7
		11 - A 60	11 - A 60	0.5 ~ 1.5	48 ~ 16	6.35	11	0.05	0.8	0.9
		16 - A 60	16 - A 60	0.5 ~ 1.5	48 ~ 16	9.525	16	0.05	0.8	0.9
		16 - G 60	16 - G 60	1.75 ~ 3.0	14 ~ 8	9.525	16	0.16	1.2	1.7
		16 - AG 60	16 - AG 60	0.5 ~ 3.0	48 ~ 8	9.525	16	0.05	1.2	1.7
		22 - N 60	22 - N 60	3.5 ~ 5.0	7 ~ 5	12.7	22	0.30	1.7	2.5
		27 - Q 60	27 - Q 60	5.5 ~ 6.0	4.5 ~ 4	15.875	27	0.30	1.8	2.7

PARTIAL PROFILE 60° (U STYLE)

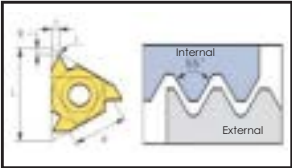
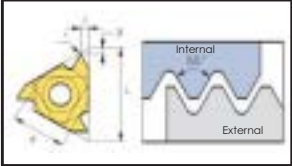
Type	Picture	Designation (Right)	Designation (Left)	Pitch		Dimensions				
				mm	tpi	d	L	r	x	f
External Internal		UEI	08 - U60	1.75 ~ 2.0	14 ~ 11	4.76U	8	0.15	0.8	4
			11 - U60	1.75 ~ 2.0	14 ~ 11	6.35U	11	0.15	0.8	5.5
			22 - U60	5.5 ~ 8.0	4.5 ~ 3.25	12.7U	22	0.3	0.6	11
			27 - U60	6.5 ~ 9.0	4 ~ 2.75	15.875U	27	0.37	1	13.7

PARTIAL PROFILE 60° (V STYLE)

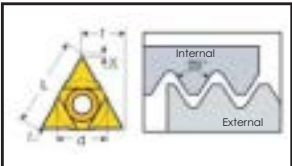
Type	Picture	Designation (Right)	Designation (Left)	Pitch		Dimensions					
				mm	tpi	d	L	r	x	f	t
External		VER 11 - A60	VEL 11 - A60	0.5 - 1.5	48 - 16	6.35	11	0.05	0.69	2.3	3.2
		16 - A60	16 - A60	0.5 - 1.5	48 - 16	9.525	16	0.05	1.1	2.7	3.5
		16 - G60	16 - G60	1.75 - 3.0	14 - 8	9.525	16	0.27	1.1	1.9	3.5
		16 - A G60	16 - AG60	0.5 - 3.0	48 - 8	9.525	16	0.08	1.1	1.9	3.5
		22 - N60	22 - N60	3.5 - 5.0	7 - 5	12.7	22	0.53	1.1	2.3	4.8

Thread Turning Inserts

PARTIAL PROFILE 55°

Type	Picture	Designation (Right)	Designation (Left)	Pitch		Dimensions				
				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	16 - A55	0.5 - 1.5	48 - 16	9.525	16	0.05	0.8	0.9
		16 - G 55	16 - G55	1.75 - 3.0	14 - 8	9.525	16	0.21	1.2	1.7
		16 - AG55	16 - AG55	0.5 - 3.0	48 - 8	9.525	16	0.07	1.2	1.7
		22 - N55	22 - N55	3.5 - 5.0	.7 - 5	12.7	22	0.43	1.7	2.5
		27 - Q55	27 - Q55	5.5 - 6.0	4.5 - 4	15.875	27	0.6	2	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	16 - A55	0.5 - 1.5	48 - 16	9.525	16	0.05	0.8	0.9
		16 - G55	16 - G55	1.75 - 3.0	14 - 8	9.525	16	0.21	1.2	1.7
		16 - AG55	16 - AG55	0.5 - 3.0	14 - 18	9.525	16	0.07	1.2	1.7
		22 - N55	22 - N55	3.5 - 5.0	.7 - 5	12.7	22	0.43	1.7	2.5
		27 - Q55	27 - Q55	5.5 - 6.0	4.5 - 4	15.875	27	0.6	2	2.9

PARTIAL PROFILE 55° (U STYLE)

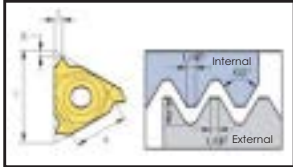
Type	Picture	Designation (Right)	Designation (Left)	Pitch		Dimensions				
				mm	tpi	d	L	r	x	f
External Internal		UEI	08 - U55	1.75 ~ 2.0	14 ~ 11	4.76U	8	0.25	0.8	4
			11 - U55	1.75 ~ 2.0	14 ~ 11	6.35U	11	0.25	0.8	5.5
			22 - U55	5.5 ~ 8.0	4.5 ~ 3.25	12.7U	22	0.6	0.9	11
			27 - U55	6.5 ~ 9.0	4 ~ 2.75	15.875U	27	0.8	1.2	13.7

PARTIAL PROFILE 55° (V STYLE)

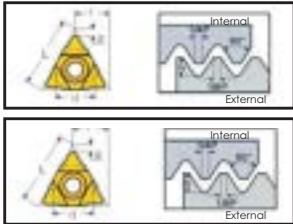
Type	Picture	Designation (Right)	Designation (Left)	Pitch		Dimensions					
				mm	tpi	d	L	r	x	f	t
External		VER 11 - A55	VEL 11 - A55	0.5 - 1.5	48 - 16	6.35	11	0.05	0.8	2.7	3.2
		16 - A55	16 - A55	0.5 - 1.5	48 - 16	9.525	16	0.05	1.1	2.7	3.6
		16 - G55	16 - G55	1.75 - 3.0	14 - 8	9.525	16	0.21	1.1	1.9	3.6
		16 - AG55	16 - AG55	0.5 - 3.0	48 - 8	9.525	16	0.07	1.1	1.9	3.6
		22 - N55	22 - N55	3.5 - 5.0	7 - 5	12.7	22	0.43	1.1	2.3	4.8

Thread Turning Inserts

ISO METRIC EXTERNAL

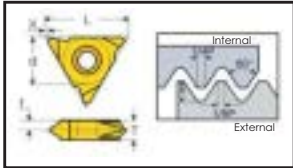
Type	Picture	Designation (Right)	Designation (Left)	Pitch	Dimensions				
				mm	d	L	h _{min}	x	f
External		ER 11 - 0.35 ISO	EL 11 - 0.35 ISO	0.35	6.35	11	0.21	0.8	0.4
		11 - 0.4 ISO	11 - 0.4 ISO	0.4	6.35	11	0.25	0.7	0.4
		11 - 0.45 ISO	11 - 0.45 ISO	0.45	6.35	11	0.28	0.7	0.4
		11 - 0.5 ISO	11 - 0.5 ISO	0.5	6.35	11	0.31	0.6	0.4
		11 - 0.6 ISO	11 - 0.6 ISO	0.6	6.35	11	0.37	0.6	0.6
		11 - 0.7 ISO	11 - 0.7 ISO	0.7	6.35	11	0.43	0.6	0.6
		11 - 0.75 ISO	11 - 0.75 ISO	0.75	6.35	11	0.46	0.6	0.6
		11 - 0.8 ISO	11 - 0.8 ISO	0.8	6.35	11	0.49	0.6	0.6
		11 - 1.0 ISO	11 - 1.0 ISO	1	6.35	11	0.61	0.7	0.7
		11 - 1.25 ISO	11 - 1.25 ISO	1.25	6.35	11	0.77	0.8	0.9
		11 - 1.5 ISO	11 - 1.5 ISO	1.5	6.35	11	0.92	0.8	1
		11 - 1.75 ISO	11 - 1.75 ISO	1.75	6.35	11	1.07	0.8	1.1
		16 - 0.35 ISO	16 - 0.35 ISO	0.35	9.525	16	0.21	0.8	0.4
		16 - 0.4 ISO	16 - 0.4 ISO	0.4	9.525	16	0.25	0.7	0.4
		16 - 0.45 ISO	16 - 0.45 ISO	0.45	9.525	16	0.28	0.7	0.4
		16 - 0.5 ISO	16 - 0.5 ISO	0.5	9.525	16	0.31	0.6	0.4
		16 - 0.6 ISO	16 - 0.6 ISO	0.6	9.525	16	0.37	0.6	0.6
		16 - 0.7 ISO	16 - 0.7 ISO	0.7	9.525	16	0.43	0.6	0.6
		16 - 0.75 ISO	16 - 0.75 ISO	0.75	9.525	16	0.46	0.6	0.6
		16 - 0.8 ISO	16 - 0.8 ISO	0.8	9.525	16	0.49	0.6	0.6
		16 - 1.0 ISO	16 - 1.0 ISO	1	9.525	16	0.61	0.7	0.7
		16 - 1.25 ISO	16 - 1.25 ISO	1.25	9.525	16	0.77	0.8	0.9
		16 - 1.5 ISO	16 - 1.5 ISO	1.5	9.525	16	0.92	0.8	1
		16 - 1.75 ISO	16 - 1.75 ISO	1.75	9.525	16	1.07	0.9	1.2
		16 - 2.0 ISO	16 - 2.0 ISO	2	9.525	16	1.23	1	1.3
		16 - 2.5 ISO	16 - 2.5 ISO	2.5	9.525	16	1.53	1.1	1.5
		16 - 3.0 ISO	16 - 3.0 ISO	3	9.525	16	1.84	1.2	1.6
		22 - 3.5 ISO	22 - 3.5 ISO	3.5	12.7	22	2.15	1.6	2.3
		22 - 4.0 ISO	22 - 4.0 ISO	4	12.7	22	2.45	1.6	2.3
		22 - 4.5 ISO	22 - 4.5 ISO	4.5	12.7	22	2.78	1.7	2.4
22 - 5.0 ISO	22 - 5.0 ISO	5	12.7	22	3.07	1.7	2.5		
27 - 5.5 ISO	27 - 5.5 ISO	5.5	15.875	27	3.37	1.9	2.7		
27 - 6.0 ISO	27 - 6.0 ISO	6	15.875	27	3.68	2	2.9		

ISO METRIC EXTERNAL (U STYLE)

Type	Picture	Designation (Right)	Designation (Left)	Pitch	Dimensions				
				mm	d	L	h _{min}	x	f
Internal External		UE 22 - 5.0ISO		5	12.7U	22	3.07	2.2	11
		22 - 5.5ISO		5.5	12.7U	22	3.37	2.2	11
		22 - 6.0ISO		6	12.7U	22	3.68	2.2	11
		27 - 8.0ISO		8	15.872U	27	4.91	2.4	13.7
		UI 22 - 5.5ISO		5.5	12.7U	22	3.17	2.4	11
		22 - 6.0ISO		6	12.7U	22	3.46	2.1	11
		27 - 8.0ISO		8	15.875U	27	4.26	2.4	13.7

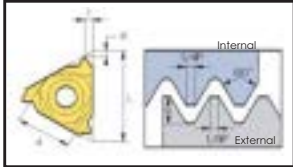
Thread Turning Inserts

ISO METRIC EXTERNAL (V STYLE)

Type	Picture	Designation (Right)	Designation (Left)	Pitch	Dimensions					
				mm	d	L	hmin	x	f	t
External		VER 11 - 0.75 ISO	VER 11 - 0.75 ISO	0.75	6.35	11	0.46	0.7	2.6	3.2
		11 - 1.0 ISO	11 - 1.0 ISO	1	6.35	11	0.61	0.7	2.5	3.2
		11 - 1.5 ISO	11 - 1.5 ISO	1.5	6.35	11	0.92	0.7	2.2	3.2
		11 - 1.75 ISO	11 - 1.75 ISO	1.75	6.35	11	1.07	0.7	2.1	3.2
		11 - 2.0 ISO	11 - 2.0 ISO	2	6.35	11	1.23	0.7	1.9	3.2
		16 - 0.35 ISO	16 - 0.35 ISO	0.35	9.525	16	0.2	1.1	3.25	3.6
		16 - 0.4 ISO	16 - 0.4 ISO	0.4	9.525	16	0.25	1.1	3.2	3.6
		16 - 0.5 ISO	16 - 0.5 ISO	0.5	9.525	16	0.31	1.1	3	3.6
		16 - 0.75 ISO	16 - 0.75 ISO	0.75	9.525	16	0.46	1.1	3	3.6
		16 - 0.8 ISO	16 - 0.8 ISO	0.8	9.525	16	0.49	1.1	3	3.6
		16 - 1.0 ISO	16 - 1.0 ISO	1	9.525	16	0.61	1.1	2.9	3.6
		16 - 1.25 ISO	16 - 1.25 ISO	1.25	9.525	16	0.77	1.1	2.7	3.6
		16 - 1.5 ISO	16 - 1.5 ISO	1.5	9.525	16	0.92	1.1	2.6	3.6
		16 - 1.75 ISO	16 - 1.75 ISO	1.75	9.525	16	1.07	1.1	2.45	3.6
		16 - 2.0 ISO	16 - 2.0 ISO	2	9.525	16	1.23	1.1	2.3	3.6
		16 - 2.5 ISO	16 - 2.5 ISO	2.5	9.525	16	1.53	1.1	2.1	3.6
		16 - 3.0 ISO	16 - 3.0 ISO	3	9.525	16	1.84	1.1	2	3.6

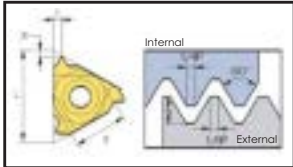
Thread Turning Inserts

ISO METRIC INTERNAL

Type	Picture	Designation (Right)	Designation (Left)	Pitch	Dimensions				
				mm	d	L	hmin	x	f
Internal		IR 11 - 0.35 ISO	IL 11 - 0.35 ISO	0.35	6.35	11	0.2	0.8	0.3
		11 - 0.4 ISO	11 - 0.4 ISO	0.4	6.35	11	0.23	0.8	0.4
		11 - 0.45 ISO	11 - 0.45 ISO	0.45	6.35	11	0.26	0.8	0.4
		11 - 0.5 ISO	11 - 0.5 ISO	0.5	6.35	11	0.29	0.6	0.4
		11 - 0.6 ISO	11 - 0.6 ISO	0.6	6.35	11	0.35	0.6	0.6
		11 - 0.7 ISO	11 - 0.7 ISO	0.7	6.35	11	0.4	0.6	0.6
		11 - 0.75 ISO	11 - 0.75 ISO	0.75	6.35	11	0.43	0.6	0.6
		11 - 1.8 ISO	11 - 1.8 ISO	0.8	6.35	11	0.46	0.6	0.6
		11 - 1.0 ISO	11 - 1.0 ISO	1	6.35	11	0.58	0.6	0.7
		11 - 1.25 ISO	11 - 1.25 ISO	1.25	6.35	11	0.72	0.8	0.9
		11 - 1.5 ISO	11 - 1.5 ISO	1.5	6.35	11	0.87	0.8	1
		11 - 1.75 ISO	11 - 1.75 ISO	1.75	6.35	11	1.01	0.9	1.1
		11 - 2.0 ISO	11 - 2.0 ISO	2	9.525	16	1.15	0.9	1.1
		11 - 2.5 ISO	11 - 2.5 ISO	2.5	9.525	16	1.44	0.8	1.1
		16 - 0.35 ISO	16 - 0.35 ISO	0.35	9.525	16	0.2	0.8	0.3
		16 - 0.4 ISO	16 - 0.4 ISO	0.4	9.525	16	0.23	0.8	0.4
		16 - 0.45 ISO	16 - 0.45 ISO	0.45	9.525	16	0.26	0.8	0.4
		16 - 0.5 ISO	16 - 0.5 ISO	0.5	9.525	16	0.29	0.6	0.4
		16 - 0.6 ISO	16 - 0.6 ISO	0.6	9.525	16	0.35	0.6	0.6
		16 - 0.7 ISO	16 - 0.7 ISO	0.7	9.525	16	0.4	0.6	0.6
		16 - 0.75 ISO	16 - 0.75 ISO	0.75	9.525	16	0.43	0.6	0.6
		16 - 0.8 ISO	16 - 0.8 ISO	0.8	9.525	16	0.46	0.6	0.6
		16 - 1.0 ISO	16 - 1.0 ISO	1	9.525	16	0.58	0.6	0.7
		16 - 1.25 ISO	16 - 1.25 ISO	1.25	9.525	16	0.72	0.8	0.9
		16 - 1.5 ISO	16 - 1.5 ISO	1.5	9.525	16	0.87	0.8	1
		16 - 1.75 ISO	16 - 1.75 ISO	1.75	9.525	16	1.01	0.9	1.2
		16 - 2.0 ISO	16 - 2.0 ISO	2	9.525	16	1.15	1	1.3
		16 - 2.5 ISO	16 - 2.5 ISO	2.5	9.525	22	1.44	1.1	1.5
		16 - 3.0 ISO	16 - 3.0 ISO	3	9.525	22	1.73	1.1	1.5
		22 - 3.5 ISO	22 - 3.5 ISO	3.5	12.7	22	2.02	1.6	2.3
		22 - 4.0 ISO	22 - 4.0 ISO	4	12.7	22	2.31	1.6	2.3
		22 - 4.5 ISO	22 - 4.5 ISO	4.5	12.7	22	2.6	1.6	2.4
22 - 5.0 ISO	22 - 5.0 ISO	5	12.7	22	2.89	1.6	2.3		
27 - 5.5 ISO	27 - 5.5 ISO	5.5	15.875	27	3.17	1.6	2.3		
27 - 6.0 ISO	27 - 6.0 ISO	6	15.875	27	3.46	1.8	2.5		

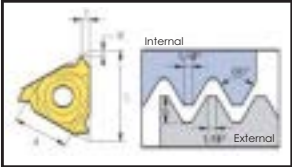
Thread Turning Inserts

AMERICAN UN EXTERNAL (UN, UNC, UNF, UNEF, UNS)

Type	Picture	Designation (Right)	Designation (Left)	Pitch	Dimensions					
				tpi	d	L	hmin	x	f	
External		ER 11 - 72 UN	EL 11-72 UN	72	6.35	11	0.22	0.8	0.4	
		11 - 64 UN	11 - 64 UN	64	6.35	11	0.24	0.8	0.4	
		11 - 56 UN	11 - 56 UN	56	6.35	11	0.28	0.7	0.4	
		11 - 48 UN	11 - 48 UN	48	6.35	11	0.32	0.6	0.6	
		11 - 44 UN	11 - 44 UN	44	6.35	11	0.35	0.6	0.6	
		11 - 40 UN	11 - 40 UN	40Z	6.35	11	0.39	0.6	0.6	
		11 - 36 UN	11 - 36 UN	36	6.35	11	0.43	0.6	0.6	
		11 - 32 UN	11 - 32 UN	32	6.35	11	0.49	0.6	0.6	
		11 - 28 UN	11 - 28 UN	28	6.35	11	0.56	0.6	0.7	
		11 - 27 UN	11 - 27 UN	27	6.35	11	0.58	0.7	0.8	
		11 - 24 UN	11 - 24 UN	24	6.35	11	0.65	0.7	0.8	
		11 - 20 UN	11 - 20 UN	20	6.35	11	0.78	0.8	0.9	
		11 - 18 UN	11 - 18 UN	18	6.35	11	0.87	0.8	1	
		11 - 16 UN	11 - 16 UN	16	6.35	11	0.97	0.9	1.1	
		11 - 14 UN	11 - 14 UN	14	6.35	11	1.11	0.9	1.1	
		16 - 72 UN	16 - 72 UN	72	9.525	16	0.22	0.8	0.4	
		16 - 64 UN	16 - 64 UN	64	9.525	16	0.24	0.8	0.4	
		16 - 56 UN	16 - 56 UN	56	9.525	16	0.28	0.7	0.4	
		16 - 48 UN	16 - 48 UN	48	9.525	16	0.32	0.6	0.6	
		16 - 44 UN	16 - 44 UN	44	9.525	16	0.35	0.6	0.6	
		16 - 40 UN	16 - 40 UN	40	9.525	16	0.39	0.6	0.6	
		16 - 36 UN	16 - 36 UN	36	9.525	16	0.43	0.6	0.6	
		16 - 32 UN	16 - 32 UN	32	9.525	16	0.49	0.6	0.6	
		16 - 28 UN	16 - 28 UN	28	9.525	16	0.56	0.6	0.7	
		16 - 27 UN	16 - 27 UN	27	9.525	16	0.58	0.7	0.8	
		16 - 24 UN	16 - 24 UN	24	9.525	16	0.65	0.7	0.8	
		16 - 20 UN	16 - 20 UN	20	9.525	16	0.78	0.8	0.9	
		16 - 18 UN	16 - 18 UN	18	9.525	16	0.87	0.8	1	
		16 - 16 UN	16 - 16 UN	16	9.525	16	0.97	0.9	1.1	
		16 - 14 UN	16 - 14 UN	14	9.525	16	1.11	1	1.2	
		16 - 13 UN	16 - 13 UN	13	9.525	16	1.2	1	1.3	
		16 - 12 UN	16 - 12 UN	12	9.525	16	1.3	1.1	1.4	
16 - 11.5 UN	16 - 11.5 UN	11.5	9.525	16	1.35	1.1	1.5			
16 - 11 UN	16 - 11 UN	11	9.525	16	1.42	1.1	1.5			
16 - 10 UN	16 - 10 UN	10	9.525	16	1.56	1.1	1.5			
16 - 9 UN	16 - 9 UN	9	9.525	16	1.73	1.2	1.7			
16 - 8 UN	16 - 8 UN	8	9.525	16	1.95	1.2	1.6			
22 - 7 UN	22 - 7 UN	7	12.7	22	2.22	1.6	2.3			
22 - 6 UN	22 - 6 UN	6	12.7	22	2.6	1.6	2.3			
22 - 5 UN	22 - 5 UN	5	12.7	22	3.12	1.7	2.5			
27 - 4.5 UN	27 - 4.5 UN	4.5	15.875	27	3.46	1.9	2.7			
27 - 4 UN	27 - 4 UN	4	15.875	27	3.89	2.1	3			

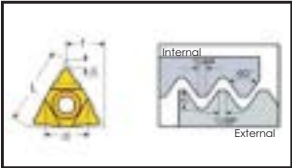
Thread Turning Inserts

AMERICAN UN INTERNAL (UN, UNC, UNF, UNEF, UNS)

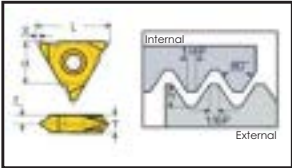
Type	Picture	Designation (Right)	Designation (Left)	Pitch	Dimensions				
				tpi	d	L	hmin	x	f
Internal		IR 11 - 72 UN	IL 11 - 72 UN	72	6.35	11	0.2	0.8	0.3
		11 - 64 UN	11 - 64 UN	64	6.35	11	0.23	0.8	0.4
		11 - 56 UN	11 - 56 UN	56	6.35	11	0.26	0.7	0.4
		11 - 48 UN	11 - 48 UN	48	6.35	11	0.31	0.6	0.6
		11 - 44 UN	11 - 44 UN	44	6.35	11	0.33	0.6	0.6
		11 - 40 UN	11 - 40 UN	40	6.35	11	0.37	0.6	0.6
		11 - 36 UN	11 - 36 UN	36	6.35	11	0.41	0.6	0.6
		11 - 32 UN	11 - 32 UN	32	6.35	11	0.46	0.6	0.6
		11 - 28 UN	11 - 28 UN	28	6.35	11	0.52	0.6	0.7
		11 - 27 UN	11 - 27 UN	27	6.35	11	0.54	0.7	0.8
		11 - 24 UN	11 - 24 UN	24	6.35	11	0.61	0.7	0.8
		11 - 20 UN	11 - 20 UN	20	6.35	11	0.73	0.8	0.9
		11 - 18 UN	11 - 18 UN	18	6.35	11	0.81	0.8	1
		11 - 16 UN	11 - 16 UN	16	6.35	11	0.92	0.9	1.1
		11 - 14 UN	11 - 14 UN	14	6.35	11	1.05	0.9	1.1
		11 - 12 UN	11 - 12 UN	12	6.35	11	1.22	0.8	1.1
		11 - 11 UN	11 - 11 UN	11	6.35	11	1.33	0.8	1.1
		16 - 72 UN	16 - 72 UN	72	9.525	16	0.2	0.8	0.3
		16 - 64 UN	16 - 64 UN	64	9.525	16	0.23	0.8	0.4
		16 - 56 UN	16 - 56 UN	56	9.525	16	0.26	0.7	0.4
		16 - 48 UN	16 - 48 UN	48	9.525	16	0.31	0.6	0.6
		16 - 44 UN	16 - 44 UN	44	9.525	16	0.33	0.6	0.6
		16 - 40 UN	16 - 40 UN	40	9.525	16	0.37	0.6	0.6
		16 - 36 UN	16 - 36 UN	36	9.525	16	0.41	0.6	0.6
		16 - 32 UN	16 - 32 UN	32	9.525	16	0.51	0.6	0.6
		16 - 28 UN	16 - 28 UN	28	9.525	16	0.52	0.6	0.7
		16 - 27 UN	16 - 27 UN	27	9.525	16	0.54	0.7	0.8
		16 - 24 UN	16 - 24 UN	24	9.525	16	0.61	0.7	0.8
		16 - 20 UN	16 - 20 UN	20	9.525	16	0.73	0.8	0.9
		16 - 18 UN	16 - 18 UN	18	9.525	16	0.81	0.8	1
		16 - 16 UN	16 - 16 UN	16	9.525	16	0.92	0.9	1.1
		16 - 14 UN	16 - 14 UN	14	9.525	16	1.05	0.9	1.2
		16 - 13 UN	16 - 13 UN	13	9.525	16	1.13	1	1.3
		16 - 12 UN	16 - 12 UN	12	9.525	16	1.22	1.1	1.4
		16 - 11.5 UN	16 - 11.5 UN	11.5	9.525	16	1.28	1.1	1.5
		16 - 11 UN	16 - 11 UN	11	9.525	16	1.33	1.1	1.5
16 - 10 UN	16 - 10 UN	10	9.525	16	1.47	1.1	1.5		
16 - 9 UN	16 - 9 UN	9	9.525	16	1.63	1.2	1.7		
16 - 8 UN	16 - 8 UN	8	9.525	16	1.83	1.2	1.5		
22 - 7 UN	22 - 7 UN	7	12.7	22	2.09	1.6	2.3		
22 - 6 UN	22 - 6 UN	6	12.7	22	2.44	1.6	2.3		
22 - 5 UN	22 - 5 UN	5	12.7	22	2.93	1.7	2.3		
27 - 4.5 UN	27 - 4.5 UN	4.5	15.875	27	3.26	1.9	2.4		
27 - 4 UN	27 - 4 UN	4	15.875	27	3.67	2.1	2.7		

Thread Turning Inserts

AMERICAN UN (U STYLE)

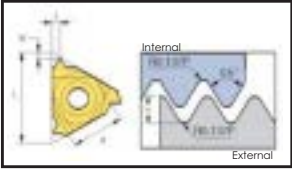
Type	Picture	Designation (Right & Left)	Pitch	Dimensions					
			tpi	d	L	hmin	x	f	
Internal External		UE 22 - 4.5 IUN	4.5	12.7 U	22	3.46	2.2	11	
		22 - 4 UN	4	12.7 U	22	3.89	2.2	11	
		27 - 3 UN	3	15.875 U	27	5.19	2.5	13.7	
		UE 22 - 4.5 IUN	4.5	12.7 U	22	3.26	2.4	11	
		22 - 4 UN	4	12.7 U	22	3.57	2.4	11	
		27 - 3 UN	3	15.875 U	27	4.89	2.7	13.7	

AMERICAN UN (V STYLE)

Type	Picture	Designation (Right)	Designation (Left)	Pitch	Dimensions					
				tpi	d	L	hmin	x	f	t
External		VER 11 - 20 UN	VER 11 - 20 UN	20	6.35	11	0.78	0.69	2.3	3.2
		11 - 18 UN	11 - 18 UN	18	6.35	11	0.87	0.69	2.2	3.2
		11 - 16 UN	11 - 16 UN	16	6.35	11	0.97	0.69	2.2	3.2
		11 - 14 UN	11 - 14 UN	14	6.35	11	1.11	0.69	2	3.2
		11 - 12 UN	11 - 12 UN	12	6.35	11	1.3	0.69	1.8	3.2
		16 - 32 UN	16 - 32 UN	32	9.525	16	0.48	1.1	3	3.6
		16 - 28 UN	16 - 28 UN	28	9.525	16	0.56	1.1	3	3.6
		16 - 24 UN	16 - 24 UN	24	9.525	16	0.65	1.1	2.9	3.6
		16 - 20 UN	16 - 20 UN	20	9.525	16	0.78	1.1	2.7	3.6
		16 - 18 UN	16 - 18 UN	18	9.525	16	0.87	1.1	2.6	3.6
		16 - 16 UN	16 - 16 UN	16	9.525	16	0.97	1.1	2.55	3.6
		16 - 14 UN	16 - 14 UN	14	9.525	16	1.11	1.1	2.5	3.6
		16 - 12 UN	16 - 12 UN	12	9.525	16	1.3	1.1	2.2	3.6
		16 - 10 UN	16 - 10 UN	10	9.525	16	1.56	1.1	2.1	3.6
		16 - 8 UN	16 - 8 UN	8	9.525	16	1.95	1.1	2	3.6

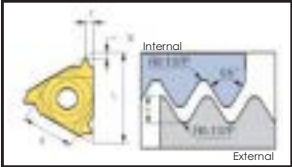
Thread Turning Inserts

WHITWORTH EXTERNAL (BSW, BSP, BSB)

Type	Picture	Designation (Right)	Designation (Left)	Pitch	Dimensions				
				tpi	d	L	hmin	x	f
External		ER 11 - 72 W	EL 11 - 72 W	72	6.35	11	0.23	0.7	0.4
		11 - 60 W	11 - 60 W	60	6.35	11	0.27	0.7	0.4
		11 - 56 W	11 - 56 W	56	6.35	11	0.29	0.7	0.4
		11 - 48 W	11 - 48 W	48	6.35	11	0.34	0.6	0.6
		11 - 40 W	11 - 40 W	40	6.35	11	0.41	0.6	0.6
		11 - 36 W	11 - 36 W	36	6.35	11	0.45	0.6	0.6
		11 - 32 W	11 - 32 W	32	6.35	11	0.51	0.6	0.6
		11 - 28 W	11 - 28 W	28	6.35	11	0.58	0.6	0.7
		11 - 26 W	11 - 26 W	26	6.35	11	0.63	0.7	0.8
		11 - 24 W	11 - 24 W	24	6.35	11	0.68	0.7	0.8
		11 - 22 W	11 - 22 W	22	6.35	11	0.74	0.8	0.9
		11 - 20 W	11 - 20 W	20	6.35	11	0.81	0.8	0.9
		11 - 19 W	11 - 19 W	19	6.35	11	0.86	0.8	1
		11 - 18 W	11 - 18 W	18	6.35	11	0.9	0.8	1
		11 - 16 W	11 - 16 W	16	6.35	11	1.02	0.9	1.1
		11 - 14 W	11 - 14 W	14	6.35	11	1.16	1	1.2
		16 - 72 W	16 - 72 W	72	9.525	16	0.23	0.7	0.4
		16 - 60 W	16 - 60 W	60	9.525	16	0.27	0.7	0.4
		16 - 56 W	16 - 56 W	56	9.525	16	0.29	0.7	0.4
		16 - 48 W	16 - 48 W	48	9.525	16	0.34	0.6	0.6
		16 - 40 W	16 - 40 W	40	9.525	16	0.41	0.6	0.6
		16 - 36 W	16 - 36 W	36	9.525	16	0.45	0.6	0.6
		16 - 32 W	16 - 32 W	32	9.525	16	0.51	0.6	0.6
		16 - 30 W	16 - 30 W	30	9.525	16	0.55	0.6	0.7
		16 - 28 W	16 - 28 W	28	9.525	16	0.58	0.6	0.7
		16 - 26 W	16 - 26 W	26	9.525	16	0.63	0.7	0.8
		16 - 24 W	16 - 24 W	24	9.525	16	0.68	0.7	0.8
		16 - 22 W	16 - 22 W	22	9.525	16	0.74	0.8	0.9
		16 - 20 W	16 - 20 W	20	9.525	16	0.81	0.8	0.9
		16 - 19 W	16 - 19 W	19	9.525	16	0.86	0.8	1
		16 - 18 W	16 - 18 W	18	9.525	16	0.9	0.8	1
		16 - 16 W	16 - 16 W	16	9.525	16	1.02	0.9	1.1
		16 - 14 W	16 - 14 W	14	9.525	16	1.16	1	1.2
		16 - 12 W	16 - 12 W	12	9.525	16	1.36	1.1	1.4
		16 - 11 W	16 - 11 W	11	9.525	16	1.48	1.1	1.5
		16 - 10 W	16 - 10 W	10	9.525	16	1.63	1.1	1.5
16 - 9 W	16 - 9 W	9	9.525	16	1.81	1.2	1.7		
16 - 8 W	16 - 8 W	8	9.525	16	2.03	1.2	1.5		
22 - 7 W	22 - 7 W	7	12.7	22	3.32	1.6	2.3		
22 - 6 W	22 - 6 W	6	12.7	22	2.71	1.6	2.3		
22 - 5 W	22 - 5 W	5	12.7	22	3.25	1.7	2.4		
27 - 4.5 W	27 - 4.5 W	4.5	15.875	27	3.61	1.8	2.6		
27 - 4 W	27 - 4 W	4	15.875	27	4.07	2	2.9		

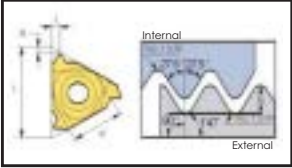
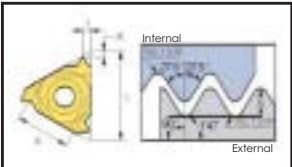
Thread Turning Inserts

WHITWORTH INTERNAL (BSW, BSP, BSB)

Type	Picture	Designation (Right)	Designation (Left)	Pitch	Dimensions				
				tpi	d	L	hmin	x	f
Internal		IR 11 - 72 W	IL 11 - 72 W	72	6.35	11	0.23	0.7	0.4
		11 - 60 W	11 - 60 W	60	6.35	11	0.27	0.7	0.4
		11 - 56 W	11 - 56 W	56	6.35	11	0.29	0.7	0.4
		11 - 48 W	11 - 48 W	48	6.35	11	0.34	0.6	0.6
		11 - 40 W	11 - 40 W	40	6.35	11	0.41	0.6	0.6
		11 - 36 W	11 - 36 W	36	6.35	11	0.45	0.6	0.6
		11 - 32 W	11 - 32 W	32	6.35	11	0.51	0.6	0.6
		11 - 28 W	11 - 28 W	28	6.35	11	0.58	0.6	0.7
		11 - 26 W	11 - 26 W	26	6.35	11	0.63	0.7	0.8
		11 - 24 W	11 - 24 W	24	6.35	11	0.68	0.7	0.8
		11 - 22 W	11 - 22 W	22	6.35	11	0.74	0.8	0.9
		11 - 20 W	11 - 20 W	20	6.35	11	0.81	0.8	0.9
		11 - 19 W	11 - 19 W	19	6.35	11	0.86	0.8	1
		11 - 18 W	11 - 18 W	18	6.35	11	0.9	0.8	1
		11 - 16 W	11 - 16 W	16	6.35	11	1.02	0.9	1.1
		11 - 14 W	11 - 14 W	14	6.35	11	1.16	1	1.2
		16 - 72 W	16 - 72 W	72	9.525	16	0.23	0.7	0.4
		16 - 60 W	16 - 60 W	60	9.525	16	0.27	0.7	0.4
		16 - 56 W	16 - 56 W	56	9.525	16	0.29	0.7	0.4
		16 - 48 W	16 - 48 W	48	9.525	16	0.34	0.6	0.6
		16 - 40 W	16 - 40 W	40	9.525	16	0.41	0.6	0.6
		16 - 36 W	16 - 36 W	36	9.525	16	0.45	0.6	0.6
		16 - 32 W	16 - 32 W	32	9.525	16	0.51	0.6	0.6
		16 - 30 W	16 - 30 W	30	9.525	16	0.55	0.6	0.7
		16 - 28 W	16 - 28 W	28	9.525	16	0.58	0.6	0.7
		16 - 26 W	16 - 26 W	26	9.525	16	0.63	0.7	0.8
		16 - 24 W	16 - 24 W	24	9.525	16	0.68	0.7	0.8
		16 - 22 W	16 - 22 W	22	9.525	16	0.74	0.8	0.9
		16 - 20 W	16 - 20 W	20	9.525	16	0.81	0.8	0.9
		16 - 19 W	16 - 19 W	19	9.525	16	0.86	0.8	1
		16 - 18 W	16 - 18 W	18	9.525	16	0.9	0.8	1
		16 - 16 W	16 - 16 W	16	9.525	16	1.02	0.9	1.1
16 - 14 W	16 - 14 W	14	9.525	16	1.16	1	1.2		
16 - 12 W	16 - 12 W	12	9.525	16	1.36	1.1	1.4		
16 - 11 W	16 - 11 W	11	9.525	16	1.48	1.1	1.5		
16 - 10 W	16 - 10 W	10	9.525	16	1.63	1.1	1.5		
16 - 9 W	16 - 9 W	9	9.525	16	1.81	1.2	1.7		
16 - 8 W	16 - 8 W	8	9.525	16	2.03	1.2	1.5		
22 - 7 W	22 - 7 W	7	12.7	22	3.32	1.6	2.3		
22 - 6 W	22 - 6 W	6	12.7	22	2.71	1.6	2.3		
22 - 5 W	22 - 5 W	5	12.7	22	3.25	1.7	2.4		
27 - 4.5 W	27 - 4.5 W	4.5	15.875	27	3.61	1.8	2.6		
27 - 4 W	27 - 4 W	4	15.875	27	4.07	2	2.9		

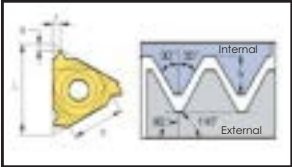
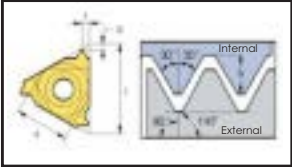
Thread Turning Inserts

BRITISH STANDARD PIPE THREAD (BSPT)

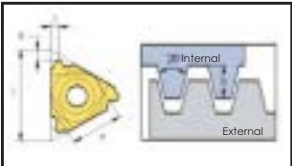
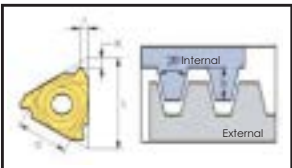
Type	Picture	Designation (Right)	Designation (Left)	Pitch	Dimensions				
				tpi	d	L	hmin	x	f
External		ER 11 - 28 BSPT	EL 11 - 28 BSPT	28	6.35	11	0.58	0.6	0.6
		11 - 19 BSPT	11 - 19 BSPT	19	6.35	11	0.86	0.8	0.9
		11 - 14 BSPT	11 - 14 BSPT	14	6.35	11	1.16	0.9	1
		16 - 28 BSPT	16 - 28 BSPT	28	9.525	16	0.58	0.6	0.6
		16 - 19 BSPT	16 - 19 BSPT	19	9.525	16	0.86	0.8	0.9
		16 - 14 BSPT	16 - 14 BSPT	14	9.525	16	1.16	1	1.2
		16 - 11 BSPT	16 - 11 BSPT	11	9.525	16	1.48	1	1.5
Internal		ER 11 - 28 BSPT	EL 11 - 28 BSPT	28	6.35	11	0.58	0.6	0.6
		11 - 19 BSPT	11 - 19 BSPT	19	6.35	11	0.86	0.8	0.9
		11 - 14 BSPT	11 - 14 BSPT	14	6.35	11	1.16	0.9	1
		16 - 28 BSPT	16 - 28 BSPT	28	9.525	16	0.58	0.6	0.6
		16 - 19 BSPT	16 - 19 BSPT	19	9.525	16	0.86	0.8	0.9
		16 - 14 BSPT	16 - 14 BSPT	14	9.525	16	1.16	1	1.2
		16 - 11 BSPT	16 - 11 BSPT	11	9.525	16	1.48	1	1.5

Thread Turning Inserts

NATIONAL PIPE THREAD (NPT)

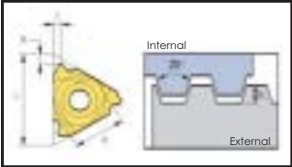
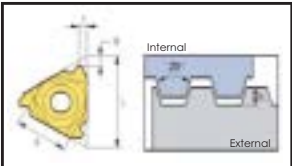
Type	Picture	Designation (Right)	Designation (Left)	Pitch	Dimensions				
				tpi	d	L	hmin	x	f
External		ER 11 - 27 NPT	EL 11 - 27 NPT	27	6.35	11	0.66	0.7	0.8
		11 - 18 NPT	11 - 18 NPT	18	6.35	11	1.01	0.8	1
		11 - 14 NPT	11 - 14 NPT	14	6.35	11	1.33	0.8	1
		16 - 27 NPT	16 - 27 NPT	27	9.525	16	0.66	0.7	0.6
		16 - 18 NPT	16 - 18 NPT	18	9.525	16	1.01	0.8	0.9
		16 - 14 NPT	16 - 14 NPT	14	9.525	16	1.33	0.9	1.2
		16 - 11.5 NPT	16 - 11.5 NPT	11.5	9.525	16	1.64	1.1	1.5
		16 - 8 NPT	16 - 8 NPT	8	9.525	16	2.42	1.3	1.8
Internal		IR 11 - 28 BSPT	IL 11 - 28 BSPT	27	6.35	11	0.66	0.7	0.8
		11 - 19 BSPT	11 - 19 BSPT	18	6.35	11	1.01	0.8	1
		11 - 14 BSPT	11 - 14 BSPT	14	6.35	11	1.33	0.8	1
		16 - 28 BSPT	16 - 28 BSPT	27	9.525	16	0.66	0.7	0.6
		16 - 19 BSPT	16 - 19 BSPT	18	9.525	16	1.01	0.8	0.9
		16 - 14 BSPT	16 - 14 BSPT	14	9.525	16	1.33	0.9	1.2
		16 - 11 BSPT	16 - 11 BSPT	11.5	9.525	16	1.64	1.1	1.5
		16 - 8 NPT	16 - 8 NPT	8	9.525	16	2.42	1.3	1.8

AMERICAN ACME (ACME)

Type	Picture	Designation (Right)	Designation (Left)	Pitch	Dimensions				
				tpi	d	L	hmin	x	f
External		ER 11 - 16 ACME	EL 11 - 16 ACME	16	6.35	11	0.92	1	1.1
		16 - 16 ACME	16 - 16 ACME	16	9.525	16	0.92	1	1.1
		16 - 14 ACME	16 - 14 ACME	14	9.525	16	1.03	1	1.2
		16 - 12 ACME	16 - 12 ACME	12	9.525	16	1.19	1.1	1.2
		16 - 10 ACME	16 - 10 ACME	10	9.525	16	1.52	1.3	1.4
		16 - 8 ACME	16 - 8 ACME	8	9.525	16	1.84	1.4	1.5
		16 - 6 ACME	16 - 6 ACME	6	9.525	16	2.37	1.7	1.9
		22 - 6 ACME	22 - 6 ACME	6	12.7	22	2.37	1.8	2.1
		22 - 5 ACME	22 - 5 ACME	5	12.7	22	2.79	2	2.3
		27 - 4 ACME	27 - 4 ACME	4	15.875	27	3.43	2.4	2.7
Internal		IR 11 - 16 ACME	IL 11 - 16 ACME	16	6.35	11	0.92	0.9	0.9
		16 - 16 ACME	16 - 16 ACME	16	9.525	16	0.92	1	1.1
		16 - 14 ACME	16 - 14 ACME	14	9.525	16	1.03	1.1	1.2
		16 - 12 ACME	16 - 12 ACME	12	9.525	16	1.19	1.2	1.3
		16 - 10 ACME	16 - 10 ACME	10	9.525	16	1.52	1.2	1.3
		16 - 8 ACME	16 - 8 ACME	8	9.525	16	1.84	1.4	1.5
		16 - 6 ACME	16 - 6 ACME	6	9.525	16	2.37	1.7	1.9
		22 - 6 ACME	22 - 6 ACME	6	12.7	22	2.37	1.8	2.1
		22 - 5 ACME	22 - 5 ACME	5	12.7	22	2.79	2	2.3
		27 - 4 ACME	27 - 4 ACME	4	15.875	27	3.43	2.3	2.6

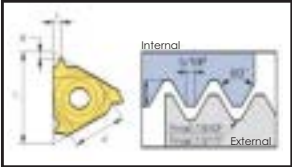
Thread Turning Inserts

STUB ACME (STACME)

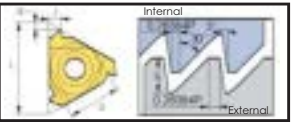
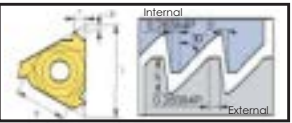
Type	Picture	Designation (Right)	Designation (Left)	Pitch	Dimensions					
				tpi	d	L	hmin	x	f	
External		ER 11 - 16 STACME	EL 11 - 16 STACME	16	6.35	11	0.6	1	1	
		16 - 16 STACME	16 - 16 STACME	16	9.525	16	0.6	1	1	
		16 - 14 STACME	16 - 14 STACME	14	9.525	16	0.67	1.1	1.1	
		16 - 12 STACME	16 - 12 STACME	12	9.525	16	0.76	1.2	1.2	
		16 - 10 STACME	16 - 10 STACME	10	9.525	16	1.02	1.2	1.3	
		16 - 8 STACME	16 - 8 STACME	8	9.525	16	1.21	1.4	1.5	
		16 - 6 STACME	16 - 6 STACME	6	9.525	16	1.52	1.7	1.8	
		22 - 6 STACME	22 - 6 STACME	6	12.7	22	1.52	1.7	1.8	
		22 - 5 STACME	22 - 5 STACME	5	12.7	22	1.78	2.1	2.3	
		27 - 4 STACME	27 - 4 STACME	4	15.875	27	2.16	2.3	2.4	
		27 - 3 STACME	27 - 3 STACME	3	15.875	27	2.79	2.9	2.9	
Internal		ER 11 - 16 STACME	IL 11 - 16 STACME	16	6.35	11	0.6	1	1	
		16 - 16 STACME	16 - 16 STACME	16	9.525	16	0.6	1	1	
		16 - 14 STACME	16 - 14 STACME	14	9.525	16	0.67	1.1	1.1	
		16 - 12 STACME	16 - 12 STACME	12	9.525	16	0.76	1.1	1.2	
		16 - 10 STACME	16 - 10 STACME	10	9.525	16	1.02	1.2	1.3	
		16 - 8 STACME	16 - 8 STACME	8	9.525	16	1.21	1.4	1.5	
		16 - 6 STACME	16 - 6 STACME	6	9.525	16	1.52	1.7	1.8	
		22 - 6 STACME	22 - 6 STACME	6	12.7	22	1.52	1.7	1.8	
		22 - 5 STACME	22 - 5 STACME	5	12.7	22	1.78	2.1	2.3	
		27 - 4 STACME	27 - 4 STACME	4	15.875	27	2.16	2.3	2.4	
		27 - 3 STACME	27 - 3 STACME	3	15.875	27	2.79	2.9	2.9	

Thread Turning Inserts

UCJ (UNIFIED CONSTANT THREAD)

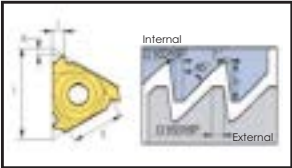
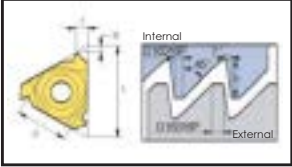
Type	Picture	Designation (Right)	Designation (Left)	Pitch	Dimensions				
				tpi	d	L	hmin	x	f
External		IR 11 - 48 UNJ	IL 11 - 48 UNJ	48	6.35	11	0.28	0.6	0.5
		11 - 44 UNJ	11 - 44 UNJ	44	6.35	11	0.3	0.6	0.6
		11 - 40 UNJ	11 - 40 UNJ	40	6.35	11	0.33	0.6	0.6
		11 - 36 UNJ	11 - 36 UNJ	36	6.35	11	0.37	0.6	0.6
		11 - 32 UNJ	11 - 32 UNJ	32	6.35	11	0.42	0.6	0.7
		11 - 28 UNJ	11 - 28 UNJ	28	6.35	11	0.47	0.7	0.7
		11 - 24 UNJ	11 - 24 UNJ	24	6.35	11	0.55	0.7	0.8
		11 - 20 UNJ	11 - 20 UNJ	20	6.35	11	0.66	0.8	0.9
		11 - 18 UNJ	11 - 18 UNJ	18	6.35	11	0.74	0.8	1
		11 - 16 UNJ	11 - 16 UNJ	16	6.35	11	0.83	0.9	1.1
		11 - 14 UNJ	11 - 14 UNJ	14	9.525	11	0.95	1	1.2
		16 - 48 UNJ	16 - 48 UNJ	48	9.252	16	0.28	0.6	0.5
		16 - 44 UNJ	16 - 44 UNJ	44	9.252	16	0.3	0.6	0.6
		16 - 40 UNJ	16 - 40 UNJ	40	9.252	16	0.33	0.6	0.6
		16 - 36 UNJ	16 - 36 UNJ	36	9.252	16	0.37	0.6	0.6
		16 - 32 UNJ	16 - 32 UNJ	32	9.525	16	0.42	0.6	0.7
		16 - 28 UNJ	16 - 28 UNJ	28	9.525	16	0.47	0.7	0.7
		16 - 24 UNJ	16 - 24 UNJ	24	9.525	16	0.55	0.7	0.8
		16 - 20 UNJ	16 - 20 UNJ	20	9.525	16	0.66	0.8	0.9
		16 - 18 UNJ	16 - 18 UNJ	18	9.525	16	0.74	0.8	1
		16 - 16 UNJ	16 - 16 UNJ	16	9.525	16	0.83	0.9	1.1
		16 - 14 UNJ	16 - 14 UNJ	14	9.525	16	0.95	1	1.2
		16 - 13 UNJ	16 - 13 UNJ	13	9.525	16	1.02	1	1.3
		16 - 12 UNJ	16 - 12 UNJ	12	9.525	16	1.11	1.1	1.3
		16 - 11 UNJ	16 - 11 UNJ	11	9.525	16	1.21	1.2	1.5
		16 - 10 UNJ	16 - 10 UNJ	10	9.525	16	1.33	1.2	1.5
		16 - 9 UNJ	16 - 9 UNJ	9	9.525	16	1.48	1.3	1.7
		16 - 8 UNJ	16 - 8 UNJ	8	9.525	16	1.66	1.2	1.6
		22 - 7 UNJ	22 - 7 UNJ	7	12.7	22	1.9	1.7	2.3
		22 - 6 UNJ	22 - 6 UNJ	6	12.7	22	2.21	1.7	2.3
		22 - 5 UNJ	22 - 5 UNJ	5	12.7	22	2.66	1.8	2.5
		27 - 4.5 UNJ	27 - 4.5 UNJ	4.5	15.875	27	2.95	2	2.7
27 - 4 UNJ	27 - 4 UNJ	4	15.875	27	3.32	2.2	3		

METRIC BUTTRESS (SAGE)

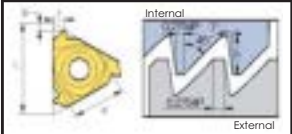
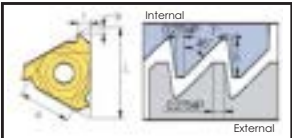
Type	Picture	Designation (Right)	Designation (Left)	Pitch	Dimensions				
				tpi	d	L	hmin	x	f
External		ER 16 - 2.0 SAGE	EL 16 - 2.0 SAGE	2	9.525	16	1.74	1.47	2.08
		22 - 2.0 SAGE	22 - 2.0 SAGE	2	12.7	22	1.74	1.47	2.08
		22 - 3.0 SAGE	22 - 3.0 SAGE	3	12.7	22	2.6	1.79	2.6
		27 - 4.0 SAGE	27 - 4.0 SAGE	4	15.875	27	3.55	1.93	3.2
Internal		IR 16 - 2.0 SAGE	IL 16 - 2.0 SAGE	2	9.525	16	1.5	1.52	2.2
		22 - 3.0 SAGE	22 - 3.0 SAGE	3	12.7	22	2.25	1.66	2.9
		27 - 4.0 SAGE	27 - 4.0 SAGE	4	5/8	27	3.09	2.12	3.2

Thread Turning Inserts

AMERICAN BUTTRESS (ABUT)

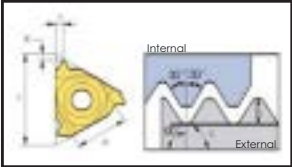
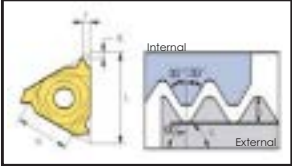
Type	Picture	Designation (Right)	Designation (Left)	Pitch	Dimensions				
				tpi	d	L	hmin	x	f
External		ER 11 - 20 ABUT	EL 11 - 20 ABUT	20	6.35	11	0.84	1	1.4
		11 - 16 ABUT	11 - 16 ABUT	16	6.35	11	1.05	1.3	1.9
		16 - 20 ABUT	16 - 20 ABUT	20	9.525	16	0.84	1	1.4
		16 - 16 ABUT	16 - 16 ABUT	16	9.525	16	1.05	1.3	1.9
		16 - 12 ABUT	16 - 12 ABUT	12	9.525	16	1.4	1.4	2
		16 - 10 ABUT	16 - 10 ABUT	10	9.525	16	1.68	1.5	2.3
		22 - 8 ABUT	22 - 8 ABUT	8	12.7	22	2.1	2	3.2
Internal		IR 11 - 20 ABUT	IL 11 - 20 ABUT	20	6.35	11	0.84	1	1.4
		11 - 16 ABUT	11 - 16 ABUT	16	6.35	11	1.05	1.3	1.9
		16 - 20 ABUT	16 - 20 ABUT	20	9.525	16	0.84	1	1.4
		16 - 16 ABUT	16 - 16 ABUT	16	9.525	16	1.05	1.3	1.9
		16 - 12 ABUT	16 - 12 ABUT	12	9.525	16	1.4	1.4	2
		16 - 10 ABUT	16 - 10 ABUT	10	9.525	16	1.68	1.5	2.3
		22 - 8 ABUT	22 - 8 ABUT	8	12.7	22	2.1	2	3.2
		22 - 6 ABUT	22 - 6 ABUT	6	12.7	22	2.8	2.2	3.5

BRITISH BUTTRESS (BBUT)

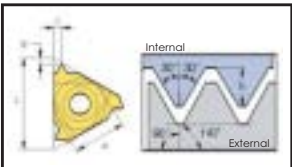
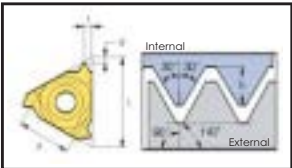
Type	Picture	Designation (Right)	Designation (Left)	Pitch	Dimensions				
				tpi	d	L	hmin	x	f
External		ER 16 - 16 BBUT	EL 16 - 16 BBUT	16	9.525	16	0.8	1.1	1.6
		16 - 12 BBUT	16 - 12 BBUT	12	9.525	16	1.07	1.4	2.1
		16 - 10 BBUT	16 - 10 BBUT	10	9.525	16	1.28	1.4	2.2
		16 - 8 BBUT	16 - 8 BBUT	8	9.525	16	1.61	1.6	2.5
		22 - 8 BBUT	22 - 8 BBUT	8	12.7	22	1.61	1.6	2.5
Internal		IR 16 - 16 BBUT	IL 16 - 16 BBUT	16	9.525	16	0.8	1.1	1.6
		16 - 12 BBUT	16 - 12 BBUT	12	9.525	16	1.07	1.4	2.1
		16 - 10 BBUT	16 - 10 BBUT	10	9.525	16	1.28	1.4	2.2
		16 - 8 BBUT	16 - 8 BBUT	8	9.525	16	1.61	1.6	2.5
		22 - 8 BBUT	22 - 8 BBUT	8	12.7	22	1.61	1.6	2.5

Thread Turning Inserts

API

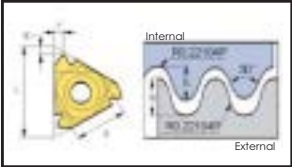
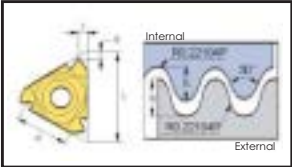
Type	Picture	Designation (Right)	Designation (Left)	Size	Pitch	Dimensions						
					tpi	d	L	hmin	x	f		
External		ER 22 - 4 AP 1382	EL 22 - 4 AP 1382	NC 23 A 50	4	12.7	22	3.09	2.1	2.8		
		22 - 4 AP 1383	22 - 4 AP 1383	NC 56 - NC 77	4	12.7	22	3.08	2.1	2.8		
		22 - 4 AP 1502	22 - 4 AP 1502	65/8" REG	4	12.7	22	3.75	2	2.9		
		22 - 4 AP 1503	22 - 4 AP 1503	51/2" 75/8" 85/8" REG	4	12.7	22	3.74	2	2.9		
		22 - 5 AP 1403	22 - 5 AP 1403	23/8" - 4 1/2" REG	5	12.7	22	2.99	1.8	2.6		
		22 - 6 AP 1551	22 - 6 AP 1551	NC 10 - NC 16	6	12.7	22	1.41	2.6	2		
		27 - 4 AP 1382	27 - 4 AP 1382	NC 23 NC 50	4	15.875	27	3.09	2.1	2.8		
		27 - 4 AP 1383	27 - 4 AP 1383	NC 56 - NC 77	4	15.875	27	3.08	2.1	2.8		
		27 - 4 AP 1502	27 - 4 AP 1502	65/8" REG	4	15.875	27	3.75	2.1	3.1		
		27 - 4 AP 1503	27 - 4 AP 1503	51/2" 75/8" 85/8" REG	4	15.875	27	3.74	2.1	3.1		
		27 - 5 AP 1403	27 - 5 AP 1403	23/8" - 4 1/2" REG	5	15.875	27	2.99	1.9	2.7		
		Internal		IR 22 - 4 AP 1382	IL 22 - 4 AP 1382	NC 23 A50	4	12.7	22	3.09	2.1	2.8
				22 - 4 AP 1383	22 - 4 AP 1383	NC 56 - NC 77	4	12.7	22	3.08	2.1	2.8
22 - 4 AP 1502	22 - 4 AP 1502			65/8" REG	4	12.7	22	3.75	2.1	3.1		
22 - 4 AP 1503	22 - 4 AP 1503			51/2" 75/8" 85/8" REG	4	12.7	22	3.74	2	2.9		
22 - 5 AP 1403	22 - 5 AP 1403			23/8" - 4 1/2" REG	5	12.7	22	2.99	1.8	2.6		
22 - 6 AP 1551	22 - 6 AP 1551			NC 10 - NC 16	6	12.7	22	1.41	2.6	2		
27 - 4 AP 1382	27 - 4 AP 1382			NC 23 NC 50	4	15.875	27	3.09	2.1	2.8		
27 - 4 AP 1383	27 - 4 AP 1383			NC 56 - NC 77	4	15.875	27	3.08	2.1	2.8		
27 - 4 AP 1502	27 - 4 AP 1502			65/8" REG	4	15.875	27	3.75	2.1	3.1		
27 - 4 AP 1503	27 - 4 AP 1503			51/2" 75/8" 85/8" REG	4	15.875	27	3.74	2.1	3.1		
27 - 5 AP 1403	27 - 5 AP 1403			23/8" - 4 1/2" REG	5	15.875	27	2.99	1.9	2.7		

NATIONAL PIPE THREAD (NPTF)

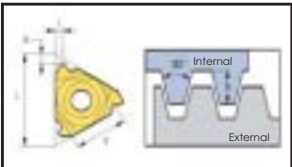
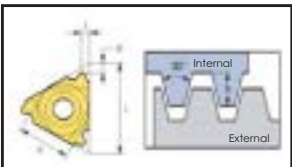
Type	Picture	Designation (Right)	Designation (Left)	Pitch	Dimensions				
				tpi	d	L	hmin	x	f
External		ER 11 - 27 NPTF	EL 11 - 27 NPTF	27	6.35	11	0.64	0.7	0.8
		11 - 18 NPTF	11 - 18 NPTF	18	6.35	11	1	0.8	1
		11 - 14 NPTF	11 - 14 NPTF	14	6.35	11	1.35	0.8	1
		16 - 27 NPTF	16 - 27 NPTF	27	9.525	16	0.64	0.7	0.8
		16 - 18 NPTF	16 - 18 NPTF	18	9.525	16	1	0.8	1
		16 - 14 NPTF	16 - 14 NPTF	14	9.525	16	1.35	0.9	1.2
		16 - 11.5 NPTF	16 - 11.5 NPTF	11.5	9.525	16	1.63	1.1	1.5
		16 - 8 NPTF	16 - 8 NPTF	8	9.525	16	2.38	1.3	1.8
Internal		IR 11 - 27 NPTF	IL 11 - 27 NPTF	27	6.35	11	0.64	0.7	0.8
		11 - 18 NPTF	11 - 18 NPTF	18	6.35	11	1	0.8	1
		11 - 14 NPTF	11 - 14 NPTF	14	6.35	11	1.35	0.8	1
		16 - 27 NPTF	16 - 27 NPTF	27	9.525	16	0.64	0.7	0.8
		16 - 18 NPTF	16 - 18 NPTF	18	9.525	16	1	0.8	1
		16 - 14 NPTF	16 - 14 NPTF	14	9.525	16	1.35	0.9	1.2
		16 - 11.5 NPTF	16 - 11.5 NPTF	11.5	9.525	16	1.63	1.1	1.5
		16 - 8 NPTF	16 - 8 NPTF	8	9.525	16	2.38	1.3	1.8

Thread Turning Inserts

ROUND DIN 405

Type	Picture	Designation (Right)	Designation (Left)	Pitch	Dimensions				
				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	1.3
		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

TRAPEZ DIN (TR)

Type	Picture	Designation (Right)	Designation (Left)	Pitch	Dimensions				
				tpi	d	L	hmin	x	f
External		ER 11 - 1.5 TR	EL 11 - 1.5 TR	1.5	6.35	11	0.9	0.8	0.9
		16 - 1.5 TR	16 - 1.5 TR	1.5	9.525	16	0.9	1	1.1
		16 - 2.0 TR	16 - 2.0 TR	2	9.525	16	1.25	1.1	1.3
		16 - 3.0 TR	16 - 3.0TR	3	9.525	16	1.75	1.7	1.5
		22 - 4.0 TR	22 - 4.0 TR	4	12.7	22	2.25	2.1	1.9
		22 - 5.0 TR	22 - 5.0 TR	5	12.7	22	2.75	2.1	2.5
		27 - 6.0 TR	27 - 6.0 TR	6	15.875	27	3.5	2.3	2.7
Internal		IR 11 - 1.5 TR	IL11 - 1.5 TR	1.5	6.35	11	0.9	0.8	0.9
		16 - 1.5 TR	16 - 1.5 TR	1.5	9.525	16	0.9	1	1.1
		16 - 2.0 TR	16 - 2.0 TR	2	9.525	16	1.25	1.1	1.3
		16 - 2.5 TR	16 - 2.5 TR	2.5	9.525	16	1.53	1.2	1.4
		16 - 3.0 TR	16 - 3.0 TR	3	9.525	16	1.75	1.3	1.5
		22 - 4.0 TR	22 - 4.0 TR	4	12.7	22	2.25	1.7	1.9
		22 - 5.0 TR	22 - 5.0 TR	5	12.7	22	2.75	2.1	2.5
27 - 6.0 TR	27 - 6.0 TR	6	15.8	27	3.5	2.3	2.7		



Circlip Grooving Inserts

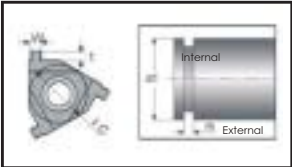
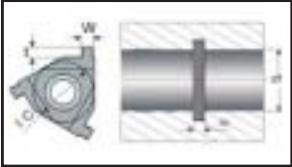
Din 471 / 472 Standard (Partial Profile)

Din 471 / 472 Standard (Full Profile)

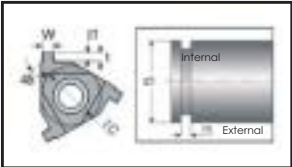
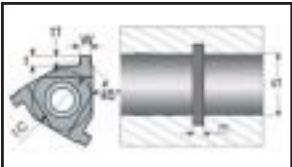
Circlip Grooving Inserts

Grooving Inserts

DIN 471 / 472 STANDARD (PARTIAL PROFILE)

Type	Picture	Designation (Right)	Designation (Left)	Groove Width	Dimensions		
				m(H13)	IC	W	T
External		ER 16 - 1.00 - D 471 - 1.30	EL 16 - 1.00 - D 471 - 1.30	1	9.525	1.09	1.3
		16 - 1.10 - D 471 - 1.30	16 - 1.10 - D 471 - 1.30	1.1	9.525	1.19	1.3
		16 - 1.20 - D 471 - 1.50	16 - 1.20 - D 471 - 1.50	1.2	9.525	1.29	1.5
		16 - 1.30 - D 471 - 1.50	16 - 1.30 - D 471 - 1.50	1.3	9.525	1.39	1.5
		16 - 1.40 - D 471 - 1.85	16 - 1.40 - D 471 - 1.85	1.4	9.525	1.49	1.85
		16 - 1.60 - D 471 - 1.85	16 - 1.60 - D 471 - 1.85	1.6	9.525	1.69	1.85
		16 - 1.70 - D 471 - 2.00	16 - 1.70 - D 471 - 2.00	1.7	9.525	1.79	2
		16 - 1.85 - D 471 - 2.00	16 - 1.85 - D 471 - 2.00	1.85	9.525	1.94	2
		16 - 2.25 - D 471 - 2.25	16 - 2.25 - D 471 - 2.25	2.25	9.525	2.34	2.25
Internal		IR 16 - 1.00 - D 472 - 1.30	IL 16 - 1.00 - D 472 - 1.30	1	9.525	1.09	1.3
		16 - 1.10 - D 472 - 1.30	16 - 1.10 - D 472 - 1.30	1.1	9.525	1.19	1.3
		16 - 1.20 - D 472 - 1.50	16 - 1.20 - D 472 - 1.50	1.2	9.525	1.29	1.5
		16 - 1.30 - D 472 - 1.50	16 - 1.30 - D 472 - 1.50	1.3	9.525	1.39	1.5
		16 - 1.40 - D 472 - 1.85	16 - 1.40 - D 472 - 1.85	1.4	9.525	1.49	1.85
		16 - 1.60 - D 472 - 1.85	16 - 1.60 - D 472 - 1.85	1.6	9.525	1.69	1.85
		16 - 1.70 - D 472 - 2.00	16 - 1.70 - D 472 - 2.00	1.7	9.525	1.79	2
		16 - 1.85 - D 472 - 2.00	16 - 1.85 - D 472 - 2.00	0.85	9.525	1.94	2
		16 - 2.25 - D 472 - 2.25	16 - 2.25 - D 472 - 2.25	2.25	9.525	2.34	2.25

DIN 471 / 472 STANDARD (FULL PROFILE)

Type	Picture	Designation (Right)	Designation (Left)	Groove Width	Dimensions				
				m(H13)	D1	IC	W	T1	T
External		ER 16 - 1.10 C - D 471 - 0.35	IR 16 - 1.10 C - D 471 - 0.35	1.1	15	9.525	1.09	0.33	0.35
		16 - 1.10 C - D 471 - 0.40	16 - 1.10 C - D 471 - 0.40	1.1	16-17	9.525	1.19	0.36	0.45
		16 - 1.30 C - D 471 - 0.50	16 - 1.30 C - D 471 - 0.50	1.3	18-22	9.525	1.39	0.44	0.5
		16 - 1.30 C - D 471 - 0.55	16 - 1.30 C - D 471 - 0.55	1.3	24-26	9.525	1.39	0.45	0.55
		16 - 1.60 C - D 471 - 0.75	16 - 1.60 C - D 471 - 0.75	1.6	28-30	9.525	1.69	0.6	0.7
		16 - 1.60 C - D 471 - 0.85	16 - 1.60 C - D 471 - 0.85	1.6	32-34	9.525	1.69	0.75	0.85
		16 - 1.60 C - D 471 - 1.00	16 - 1.60 C - D 471 - 1.00	1.6	35	9.525	1.69	0.85	1
		16 - 1.85 C - D 471 - 1.00	16 - 1.85 C - D 471 - 1.00	1.85	36-38	9.525	1.94	0.85	1
		16 - 1.85 C - D 471 - 1.25	16 - 1.85 C - D 471 - 1.25	1.85	40-48	9.525	1.94	1.1	1.25
		16 - 2.15 C - D 471 - 1.50	16 - 2.15 C - D 471 - 1.50	2.15	50-63	9.525	2.24	1.35	1.5
Internal		IR 16 - 1.10 C - D 472 - 0.50	IL 16 - 1.10 C - D 472 - 0.50	1.1	18-22	9.525	1.09	0.36	0.5
		16 - 1.30 C - D 472 - 0.60	16 - 1.30 C - D 472 - 0.60	1.3	24-26	9.525	1.39	0.44	0.6
		16 - 1.30 C - D 472 - 0.70	16 - 1.30 C - D 472 - 0.70	1.3	28-30	9.525	1.39	0.6	0.7
		16 - 1.30 C - D 472 - 0.85	16 - 1.30 C - D 472 - 0.85	1.3	31-34	9.525	1.39	0.75	0.85
		16 - 1.60 C - D 472 - 0.85	16 - 1.60 C - D 472 - 0.85	1.6	34	9.525	1.69	0.75	0.85
		16 - 1.60 C - D 472 - 1.00	16 - 1.60 C - D 472 - 1.00	1.6	35-38	9.525	1.69	0.85	1
		16 - 1.85 C - D 472 - 1.25	16 - 1.85 C - D 472 - 1.25	0.85	40-48	9.525	1.94	1.1	1.25
		16 - 2.15 C - D 472 - 1.50	16 - 2.15 C - D 472 - 1.50	2.15	50-63	9.525	2.34	1.35	1.5

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