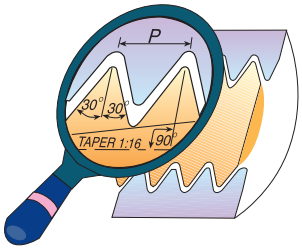
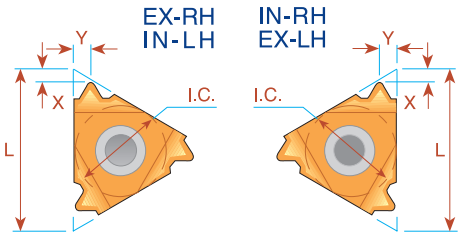
Threading Tools for the Oil & Gas Industries

API Round

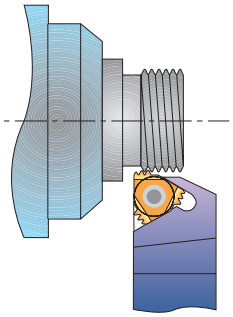


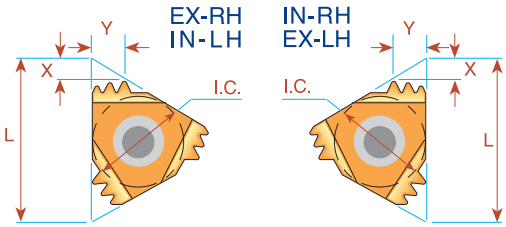


Pitch TPI	L	I.C. in	Taper IPF	EXTERNAL Ordering Code Right Hand	INTERNAL Ordering Code Right Hand	X	Y
10	16	3/8	0.75	**16 ER 10 API RD**	**16 IR 10 API RD**	1.5	1.4
8	16	3/8	0.75	**16 ER 8 API RD**	**16 IR 8 API RD**	1.3	1.6

Order example: 16 ER 10 API RD BMA

Multitooth





Pitch TPI	L	I.C. in	Number of Teeth	EXTERNAL Ordering Code	Anvil	INTERNAL Ordering Code	Anvil	X	Y
10	22	1/2	2	**22 ER 10 API RD 2M**	AE22M	**22 IR 10 API RD 2M**	AI22M	2.4	3.7
10	27	5/8	3	**27 ER 10 API RD 3M**	AE27M	**27 IR 10 API RD 3M**	AI27M	3.8	6.2
8	27	5/8	2	**27 ER 8 API RD 2M**	AE27M	**27 IR 8 API RD 2M**	AI27M	3.0	4.5

Order example: 27 IR 10 API RD 3M MXC

For recommended number of passes see page A04-4

For carbide grade and cutting speed see page A04-2 and 3

Carbide Grade Selection

Choose the CPT grade specifically formulated for your application from the following list:

Coated Grades

HBA (H10-H25) (S10-S25)	Extra-fine sub-micron grade with high toughness, for optimized performance on hardened steels and cast iron up to 62HRc, titanium alloys and super alloys (hastelloy, inconel and nickel based alloys).
BLU (M10-M20) (K05-K20) (N10-N20) (S10-S20)	PVD triple layer coated sub-micron grade for stainless steels, cast iron, titanium, non ferrous metals and most of the high temperature alloys.
BMA (P20-P40) (K20-K30)	PVD TiAlN coated sub-micrograin grade for stainless steels and exotic materials at medium to high cutting speeds.
P25C (P15-P35)	PVD TiN coated grade for treated and hard alloy steels (25 HRc & up) at medium to low cutting speeds.
MXC (K10-K20) (P10-P25)	PVD TiN coated micrograin for free cutting untreated alloy steels (below 30 HRc), for stainless steels and cast iron.
BXC (P30-P50) (K25-K40)	PVD TiN coated grade for low cutting speed. Works well with wide range of stainless steels.

Uncoated Grades

P30* (P20-P30)	Carbide grade for carbon and cast steels, works well at medium to low cutting speeds.
K20* (K10-K30)	Carbide grade for non ferrous metals, aluminum and cast iron.

* Upon request

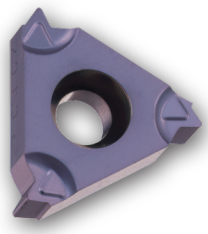
Note: Due to our unique and specialized production techniques, CPT coated inserts provide superior cutting performance and exceptionally long tool life.

Grade availability per inserts size

Grade	HBA	BLU	BMA	P25C	MXC	BXC	P30	K20
Insert sizes	11, 16, 22, 27	11, 16, 22	06, 08, 11, 16, 22, 27, 33U,	11, 16, 22, 27, 33U	11, 16, 22, 27, 33U	06, 08	11, 16, 22, 27, 33U	06, 08 11, 16, 22, 27, 33U
		Type-B 11, 16	Type-B 11, 16					

Type B - Threading Inserts

A combination of ground profile, and sintered chip-breaker threading inserts.
Unlike most other manufacturers inserts, this combination ensures a consistent high quality thread, with precise shape and dimensions.
Two different unique styles of chip-breaker were designed to suit the different specific requirements of Internal threads and External threads.
All of CPT Type B inserts are made of BMA Sub-Micrograin grade.



Recommended cutting speed (m/min) for thread turning inserts

ISO Standard	Material		Condition	HBA	BLU	BMA	P25C	MXC	BXC	K20	P30
P	Non-Alloy Steel and Cast Steel, Free Cutting Steel	<0.25%C	Annealed		110–210	120–180	100–180	100–180	70–150		50–130
		≥0.25%C	Annealed								
		<0.55%C	Quenched & Tempered								
		≥0.55%C	Annealed								
			Quenched & Tempered								
	Low Alloy Steel and Cast Steel (less than 5% alloying elements)		Annealed		90–140	80–130	70–120	70–120	60–90		50–80
			Quenched & Tempered								
	High Alloy Steel, Cast Steel, and Tool Steel		Annealed		70–90	60–80	50–60	55–70	50–60		40–50
			Quenched & Tempered								
M	Stainless Steel and Cast Steel		Ferritic / Martensitic		110–160	90–130	60–90	60–90	50–80	50–80	
			Martensitic								
			Austenitic								
K	Cast Iron Nodular (GGG)		Ferritic / Pearlitic		120–150	100–130		80–110	60–90		
			Pearlitic								
	Grey Cast Iron (GG)		Ferritic		140–150	120–130		90–100	65–85		
			Pearlitic								
	Malleable Cast Iron		Ferritic		110–140	100–130		80–100	60–85		
			Pearlitic								
N	Aluminum-Wrought Alloy		Not Cureable		250–500			200–400	150–400	200–400	100–400
			Cured								
	Aluminum-Cast, Alloyed	<=12% Si	Not Cureable		280–500			200–500	150–350	200–500	110–300
			Cured								
		>12% Si	High Temperature								
	Copper Alloys	>1% Pb	Free Cutting		190–350			150–250	110–180	150–250	90–150
			Brass								
			Electrolytic Copper								
	Non Metallic		Duroplastics, Fiber Plastics					200–300	150–210	100–200	110–150
			Hard Rubber								
S	High Temp. Alloys, Super Alloys	Fe based	Annealed	20–80	30–65	25–60					
			Cured								
		Ni or Co based	Annealed								
			Cured								
			Cast								
	Titanium Alloys		Alpha +Beta Alloys Cured	30–60	40–50	35–45				35–45	
H	Hardened Steel		Hardened 45-50 HRc	30–60	40–50	35–45					
			Hardened 51-55 HRc								
			Hardened 56-62 HRc								
	Chilled Cast Iron		Cast	20–50	30–40	25–35					
	Cast Iron		Hardened	20–40	20–30	15–25					

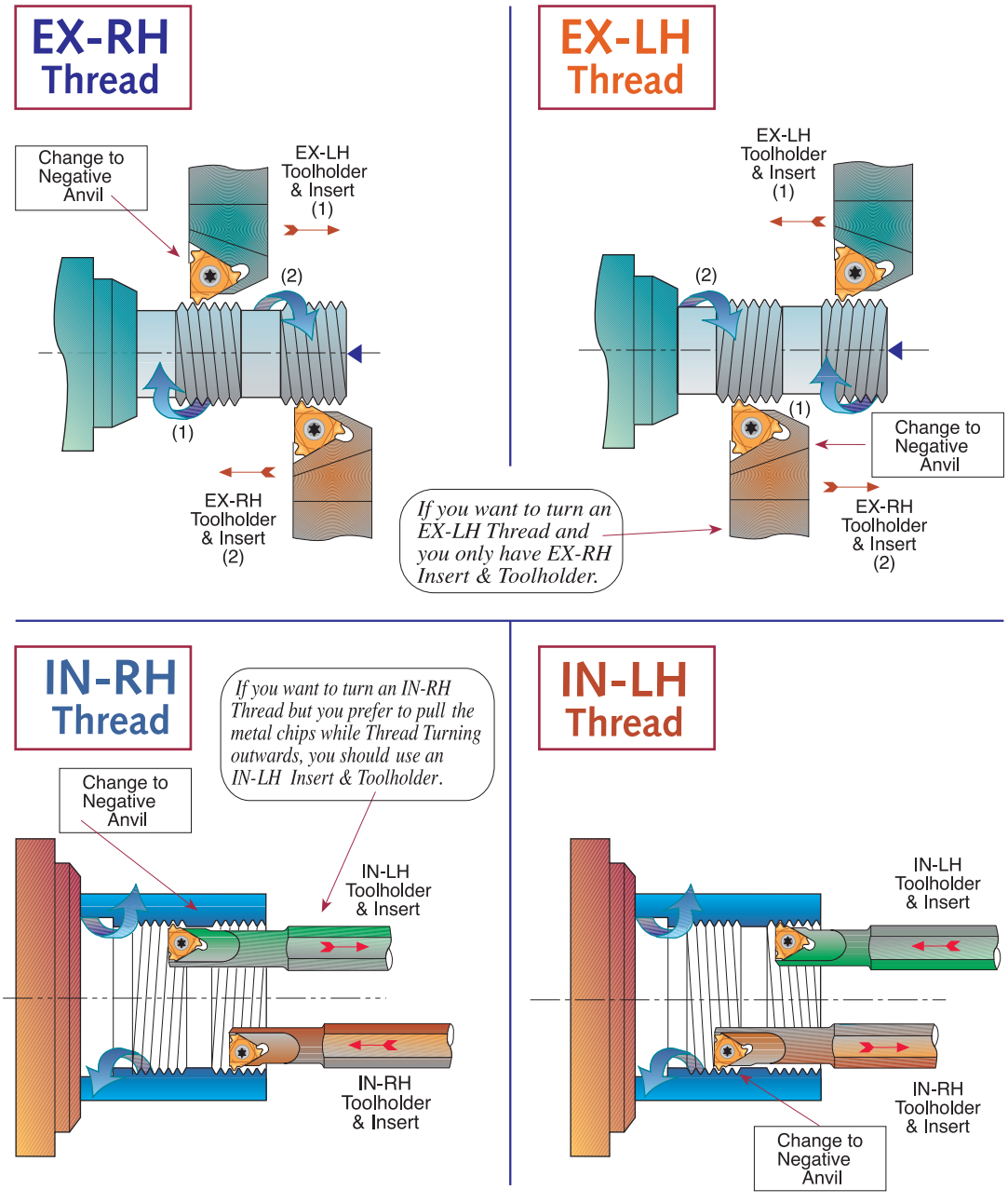
Number of threading passes selection for single point inserts

Pitch:	mm TPI	0.5 48	0.8 32	1.0 24	1.25 20	1.5 16	1.75 14	2.0 12	2.5 10	3.0 8	4.0 6	6.0 4
Number 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:

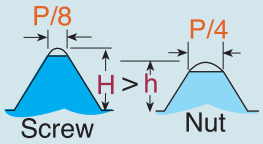
1. For most standard applications the middle of the range is a good starting point.
2. For most materials, the tougher the material, the higher the number of cutting passes you should select.
3. As a general rule of thumb, fewer passes are better than more speed.

Thread Turning Methods

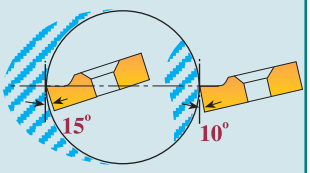


Important Points about CPT Threading Inserts

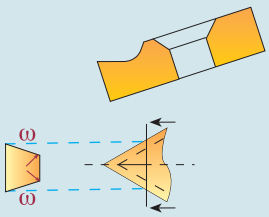
1. In most thread forms internal and external threads have different depth and radii, thus tools are not interchangeable



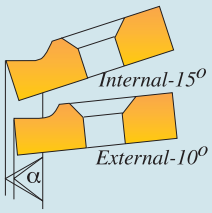
2. The Insert relief angle of a standard CPT external toolholder is 10°; for an internal toolholder it is 15°. This 5° difference is to provide additional necessary radial clearance.



3. Our built-in relief angles ensure automatic insert flank angle clearance.



4. Profiles of CPT internal & external threading inserts are precision ground to ensure accurate thread geometry when used in their corresponding toolholders.
Using internal inserts with an external holder will result in distortion of angle and insert geometry.

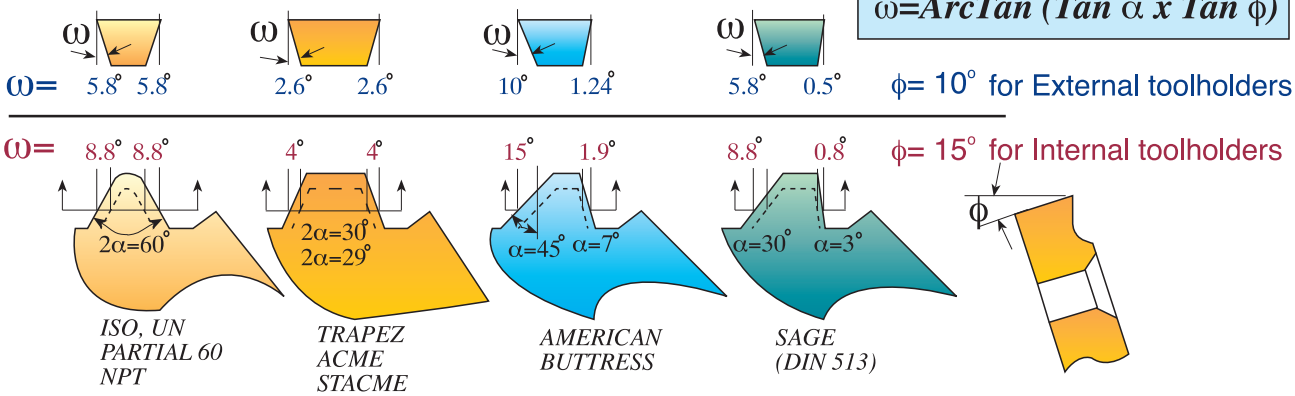


5. Insert and toolholder should always match.
An IN-RH insert must be used with an IN-RH toolholder.
No mismatch is allowed.



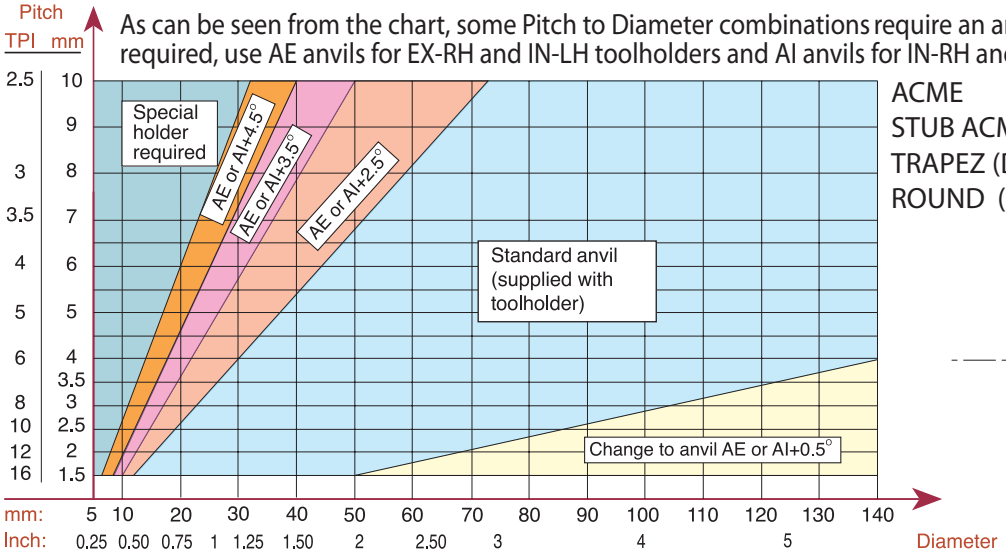
Flank Clearance Angle ω

$$\omega = ArcTan\ (Tan\ \alpha \times Tan\ \phi)$$

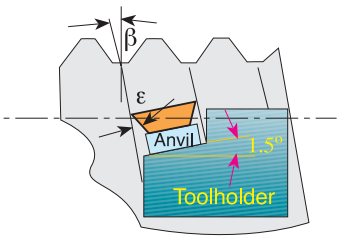


Anvil Change Recommendation

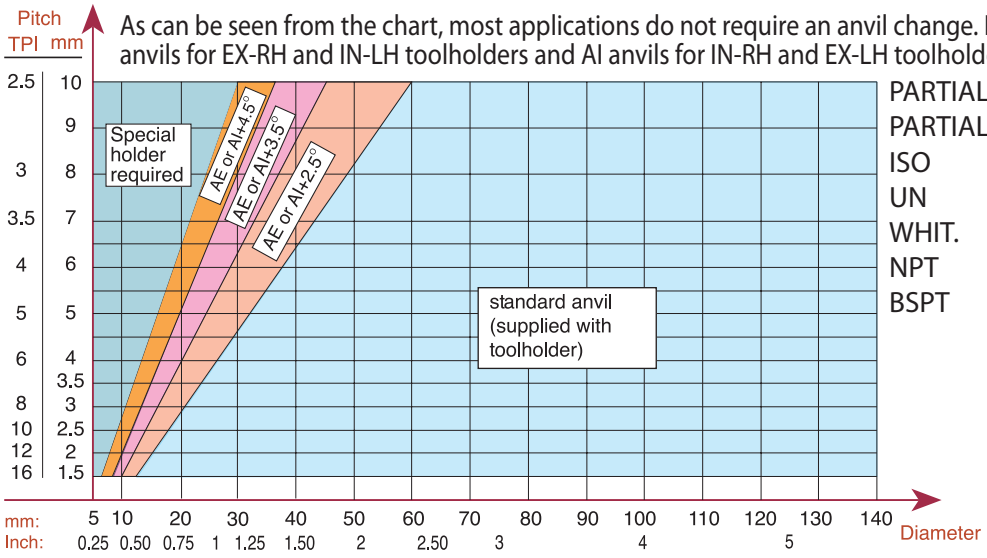
As can be seen from the chart, some Pitch to Diameter combinations require an anvil change. If change is required, use AE anvils for EX-RH and IN-LH toolholders and AI anvils for IN-RH and EX-LH toolholders.



ACME
STUB ACME
TRAPEZ (DIN 103)
ROUND (DIN 405)

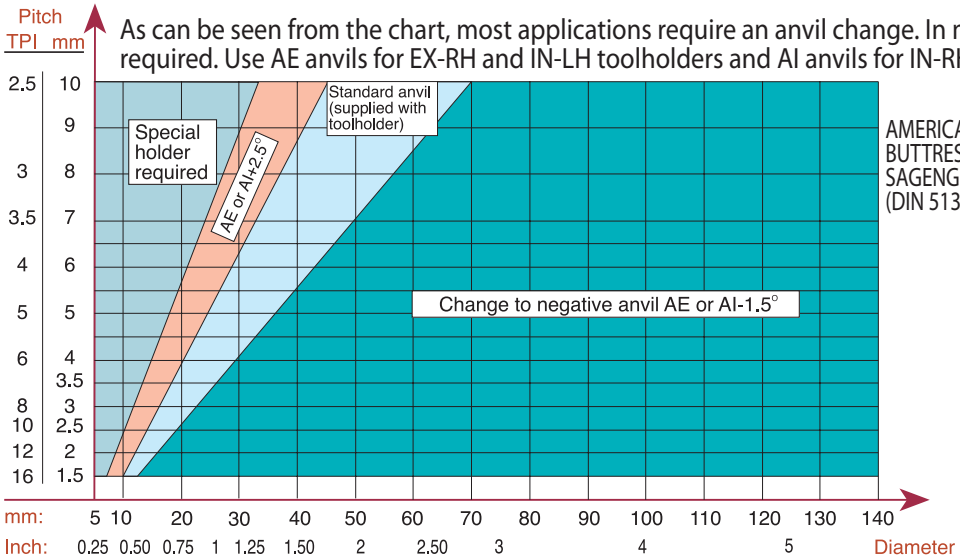


As can be seen from the chart, most applications do not require an anvil change. If change is required, use AE anvils for EX-RH and IN-LH toolholders and AI anvils for IN-RH and EX-LH toolholders.

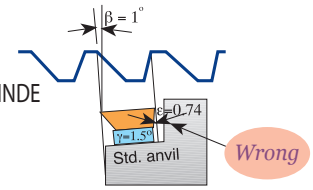


PARTIAL PROFILE 60°
PARTIAL PROFILE 55°
ISO
UN
WHIT.
NPT
BSPT

As can be seen from the chart, most applications require an anvil change. In most cases a negative anvil is required. Use AE anvils for EX-RH and IN-LH toolholders and AI anvils for IN-RH and EX-LH toolholders.

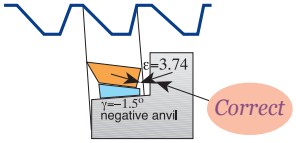


AMERICAN BUTTRESS
SAGENGEWINDE (DIN 513)



Before Anvil change

Replacing the standard anvil with an anvil with negative angle, will eliminate side rubbing



After Anvil Change

Threading Inserts Standards

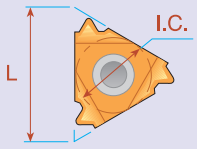
Thread Profile	Standard	Thread Class
ISO	DIN 13	6g / 6H
UN	ANSI B1.1-1989	2A / 2B
WHITWORTH	B.S. 84: 1956	Medium Class
NPT	ANSI B1.20.1-1983	-
NPTF	ANSI B1.20.3-1976	-
NPS	ANSI B1.20.1-1983	-
NPSM	ANSI B1.20.1-1983	-
BSPT	B.S. 21: 1957	-
DIN 477	DIN 477	-
ACME	ANSI B1.5-1988	3G (EXT), 3G / 2G (INT)
STUB ACME	ANSI B1.5-1988	2G
TRAPEZ	DIN 103	7e / 7H
ROUND	DIN 405	Class 7
UNJ	MIL-S-8879C	3A / 3B
MJ	ISO 5855	4h/6h, 4H/5H
AMERICAN BUTTRESS	ANSI B1.9-1973	Class 2
SAGENGEWINDE	DIN 513	-
PG	DIN 40430	-
V-0.040	API Spec7	-
V-0.038R	API Spec7	-
V-0.050	API Spec7	-
V-0.055	API Spec7	-
API ROUND	API Spec Standard 5B	-
EXTREME – LINE CASING	API Spec Standard 5B	-
BUTTRESS CASING	API Spec Standard 5B	-
VAM	VAM	-
HUGHES	HUGHES	-
PAC	PAC	-

DIN: **Deutsches Institut für Normung**
ANSI: **American National Standards Institute**
API: **American Petroleum Institute**
B.S.: **British Standards**
ISO: **International Organisation for Standardization**
MIL-S: **Military Specification**
NPT: **American National Standard Taper Pipe Thread**
NPTF: **National Standard Taper Fuel:Dryseal USA**
PAC: **Pacific Asia Connection**
NPS: **Straight thread,same as NPT without taper**
NPSM: **Free-Fitting Mechanical Joints**

Product Identification

Thread Turning Inserts Ordering Codes

16	E	R		12	UN		BMA



L	I.C.
06	5/32″
08	3/16″
08U	3/16″U
11	1/4″
16	3/8″
16V	3/8″
22	1/2″
22U	1/2″U
22V	1/2″
27	5/8″
27U	5/8″U
27V	5/8″
33U	3/4″U

E = External
I = Internal

R = Right Hand
L = Left Hand

B = Type B

Pitch
in mm:
0.35-12

or TPI
(Threads
per Inch)
72-2

Full Profiles:
ISO
UN
WHIT
NPT
NPTF
BSPT
DIN 477
ACME
ST.ACME
TRAPEZ
ROUND
UNJ
MJ
PG
AM. BUTT.
SAGE
API
VAM

Partial Profiles:
A
G
AG
N
Q
U

Multitooth style & number of teeth

API size & taper

Carbide Grade:
P30
K20
BMA
MXC
P25C
BXC
BLU
HBA