Grade	Application	Color
NZ6130B	Gold Coloured, HRC 45° Internal Steel Parts	
NZ6130	Black, HRC 50° Internal Steel Parts, Stainless Steel	
NZ6130A	Light Coloured, Steel Parts, Stainless Steel Within HRC 50°	
NZ6530	Coloured, Die Steel, Hardened Steel, Stainless Steel	
NZ3308	Dark Purple, Stainless Steel, Medium To Low Carbon Steel	
NZ1930	Bronze, Stainless Steel, Carbon Steel	
NZ3080	Northern Lights, Steel Parts, Stainless Steel Semi-Finishing & Finishing	
NZ9025	Black, Steel, Stainless Steel, Cast Iron, High Temperature Alloy Semi-finishing Of Non-ferrous Metal Materials	
NZ1930A	Bronze, HRC 55° Internal Steel Parts	
NZ300H	Golden Yellow, Stainless Steel 201/304, Medium-low Carbon Steel	
NZ3308A	Bronze, Stainless Steel, Mild Steel	

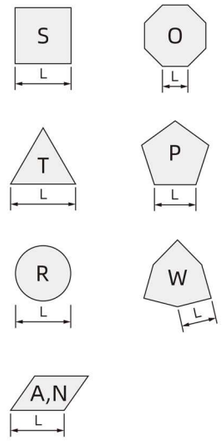
Grade	Application	Color
NZ9015	Black, HRC 35° Internal Steel, Cast Iron	
NZ9125	Golden, HRC 35° Internal Steel, Cast Iron	
NZ1001	Silver Grey, HRC 40° Internal Steel, Mould Steel	
NZ1330	Golden Yellow, HRC 40° Internal Steel, Mould Steel (coated Metal-ceramic)	
NZ2001	Silver White, Copper And Aluminium, Wood, Plastic Materials	
NZ400X	Fuchsia, Stainless Steel 304/316, Titanium	

Symbol	Shape	Symbol	Shape
H	Regular Hexagon	M	Rhombus top angle 86°
O	Regular Octagon	V	Rhombus top angle 35°
P	Regular pentagonal	W	Hexagon
S	Square	L	Rectangle
T	Regular Hexagon	A	Parallelogram top angle 85°
C	Rhombus top angle 80°	B	Parallelogram top angle 82°
D	Rhombus top angle 55°	K	Parallelogram top angle 55°
E	Rhombus top angle 75°	R	Circle
F	Rhombus top angle 50°		

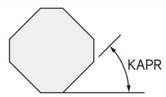
Rhombuses and parallelograms with acute angle angles at the top.

Symbol	Back Angle
A	3°
B	5°
C	7°
D	15°
E	20°
F	25°
G	30°
N	0°
P	11°
O	Other

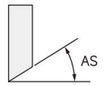
Cutting Edge Length Symbol



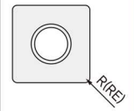
Symbol	Tool Cutting Edge Angle
A	45°
D	60°
E	75°
F	85°
H	87°
P	90°
X	65°



Symbol	Trim Blade Back Angle
A	3°
B	5°
C	7°
D	15°
E	20°
F	25°
G	30°
N	0°
P	11°
R	10°
S	14°
T	22°
U	23°



Blade Edge Radius	
04	0.4
08	0.8
12	1.2
16	1.6
20	2.0



Symbol	Shape
F	Sharp Tips
E	R Honing
T	Chamfer
S	Chamfer+R Honing

S	E	K	N	12		03	A	F	T	N	
						Thicknesses	Tool Cutting Edge Angle	Trim Blade Back Angle	Tip Specification Symbol	Direction	Custom Symbol

Symbol	Dimensional Tolerance		
	Tip Height Tolerance	Thickness Tolerance	Internal Circle Tolerance
A	±0.005	±0.025	±0.025
F			±0.013
C	±0.013		±0.025
H			±0.013
E	±0.025		±0.025
G		±0.013	
J	±0.005	±0.025	±0.05~±0.15
K	±0.013		
L	±0.025		
M	±0.08~±0.18	±0.013	
N		±0.025	
U	±0.13~±0.38	±0.013	±0.08~±0.25

In Principle, The Side Refers To The Sintered Surface Blade.

According to the blade size, tolerance is different, in accordance with the blade's own specifications.

Symbol	Shape	
W		No Chip Break Trough、hole
T		Single side chip-breaker、hole
F		Double-sided chip breaker、holeless
N		No Chip Break Trough、holeless
R		Single side chip-breaker、holeless
M		Single side chip-breaker、hole
A		No Chip Break Trough、hole

Symbol	Thickness
02	2.38
03	31.8
T3	3.97
04	4.76
05	5.56
06	6.35

Symbol	Direction
R	The Right Hand
L	The Left Hand
N	Non-directional

Custom Symbol

Common Calculation Formula		Descr
S Rotate Speed	$S=\frac{Vc \times 1000}{3.14 \times Dc}$ (rev/min)	Dc: Workpiece diameter f: Eed Per Tooth T: Tool Teeth
Vc Turning Speed (linear Speed)	$Vc=\frac{S \times 3.14 \times Dc}{3.14 \times Dc}$ (m/min)	
F Cutting Length F Per Minute	$F= f \times S \times T$ (mm/min)	
f Eed Per Tooth	$f=\frac{F}{S \times T}$ (mm/tooth)	

Milling Insert Information

Shape


NZ6130


NZ6530


NZ5130


NZ1930


NZ6130A


NZ6130B

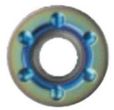

NZ1001

Coating	Mark	Color	Specification
PVD PVD Coating	NZ6130		APMT1135PDER-NZ
			APMT1604PDER-NZ
			APMT1135PDER-XM
			APMT1604PDER-XM
			APMT1135PDER-H2
			APMT1604PDER-H2
			APMT1135PDER-M2
			APMT1604PDER-M2
			APMT1135PDER-XM-1
			APMT1604PDER-XM-1
			APMT1135PDER-M1
			APMT1604PDER-M1
			XOMX120440TR-ME
			XOMX120420TR-ME
			JDMTO70204/08R
PVD PVD Coating	NZ6530		APMT1135PDER-XM
			APMT1604PDER-XM
PVD PVD Coating	NZ1930		JDMTO70204R
			JDMTO70208R
PVD PVD Coating	NZ6130A		APMT1135PDER-XM
			APMT1604PDER-XM
			APMT1135PDER-H2
			APMT1604PDER-H2
			APMT1135PDER-M2
			APMT1604PDER-M2
PVD PVD Coating	NZ6130B		APMT1135PDER-NZ
			APMT1604PDER-NZ
			APMT1135PDER-XM
			APMT1604PDER-XM
			APMT1135PDER-H2
			APMT1604PDER-H2
			APMT1135PDER-M2
			APMT1604PDER-M2
Cermet	NZ1001		APMT1135PDER-XM
			APMT1604PDER-XM
			R39011T308-PM
			R39011T308-PL

Milling Insert Information

Shape


NZ6130


NZ6130A


NZ6130B


NZ6530


NZ3308


NZ400X


NZ1930


NZ1001

Coating	Mark	Color	Specification
PVD PVD Coating	NZ6130		RPMTO8T2MO-JS
			RPMT1003MO-NZ
			RPMT1003MO-TT
			RPMT1003MO-MM
			RPMT10T3MO-JS
			RDMT10T3MO-TT
			RDMT10T3MO-TN
			RPMT1204MO-TT
			RPMT1204MO-JS
			RPMT1204MO-MM
			RDMT1204MO-MM
			RDMT1604MO-TN
			RDMT1605MO-MM
PVD PVD Coating	NZ6130A		RPMTO8T2MO-JS
			RPMT1003MO-TT
			RPMT10T3MO-JS
			RDMT10T3MO-TT
			RPMT1204MO-TT
			RDMT1204MO-MM
			RDMT1204MO-TN
PVD PVD Coating	NZ6130B		RPMTO8T2MO-JS
			RPMT1003MO-NZ
			RPMT1003MO-TT
			RPMT10T3MO-JS
			RDMT10T3MO-TT
			RDMT10T3MO-TN
			RPMT1204MO-TT
			RDMT1204MO-MM
PVD PVD Coating	NZ6530		RPMTO8T2MO-JS
			RPMT1003MO-TT
			RDMT10T3MO-TN
			RPMT1204MO-TT
			RDMT1204MO-TN
Cermet	NZ1001		RPMT1604MO-BB
			RPMT1203MO-BB
			RCKT10T3MO-ST
			RCKT1204MO-ST

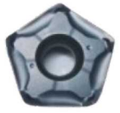
PNMU

Shape

Coating	Mark	Color	Specification
PVD PVD Coating	NZ6130		SEKR1203AFTN
			SEMT13T3PN-EM
			SEMT13T3AGSR-G
			SEKN1504APTN
			SEEN1504APTN
			SEKT1204AFTN
			SEER1203AFTN
PVD PVD Coating	NZ6130B		SEKR1203AFTN
			SEKN1504APTN
			SEEN1504APTN
			SEKT1204AFTN
Cermet	NZ1001		
			SEEN1203AFTN

PNMU

Shape



Coating	Mark	Color	Specification
PVD PVD Coating	NZ6130		PNMU0905XNER-GM

WNMU

Shape

Coating	Mark	Color	Specification
PVD PVD Coating	NZ6130		WNMU080608-GM
			WNMU080608R-ME
PVD PVD Coating	NZ1930A		WNMU080608-GM
			WNMU080608R-ME

HNMU HNMU Universal

Shape

Coating	Mark	Color	Specification
PVD PVD Coating	NZ6130		
			HNMU090612-BR
PVD PVD Coating	NZ1930A		HNMU090612-BR
			HNMX150612-GD

ONMU

Shape

Coating	Mark	Color	Specification
PVD PVD Coating	NZ6130		ONMU050404EN-M08
			ONMU08TX08-PM
PVD PVD Coating	NZ1930A		
			ONMU050404EN-M08

EPMW

Shape

Coating	Mark	Color	Specification
PVD PVD Coating	NZ1930		
			EPNW0603TN-8

ENMU

Shape


Coating	Mark	Color	Specification
PVD PVD Coating	NZ6130		
			ENMU100412PDER-PH
PVD PVD Coating	NZ1930A		
			ENMU100412PDER-PH

BLMP

Shape

Coating	Mark	Color	Specification
PVD PVD Coating	NZ1930A		BLMP0603R-ML
			BLMP0904R-ML

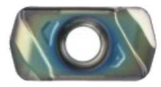
LOGU

Shape


Coating	Mark	Color	Specification
PVD PVD Coating	NZ6130		LOGU030310-GM
	NZ1930		LOGU030310-GM

LNMU

Shape


ZER

ZER


Coating	Mark	Color	Specification
PVD PVD Coating	NZ6130		LNMU0303ZER
	NZ1930		LNMU110408
			LNMU15T608
			LNMU0303ZER
	NZ6130A		LNMU0303ZER
	NZ6130B		LNMU0303ZER

JDMW

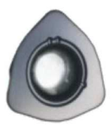
Shape

Coating	Mark	Color	Specification
PVD PVD Coating	NZ6130		JDMW120420ZDSR-ST
			JDMW140520ZDSR-ST
PVD PVD Coating	NZ1930		JDMW120420ZDSR-ST
			JDMW140520ZDSR-ST

WPMT/WDMT

Shape

WPMT

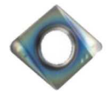


WDMT

Coating	Mark	Color	Specification
PVD PVD Coating	NZ6130		WPMT080615ZSR
			WDMT080520ZTR

OTHER

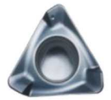
Shape



4NKT

SDMT

XOMX



3PKT

JDMT

MPHT

SPNW

BDMT

LNGU

Coating	Mark	Color	Specification
PVD PVD Coating	NZ6130		SDMTO9T307
			SDMT1205
			SDMT1505
			3PKT060308R-M
			3PKT100408R-M
			BDMT11T308ER-JT
			XOMX060208R-M
			4NKTO60308R
			JDMT070204R
			JDMT070208R
	NZ1930		JDMT070204R
			JDMT070208R
			APGW1003R
			YPGW100308
			LNGU15T608-PR
			LNGU110408-PR
	NZ6130A		4NKTO60308R
	NZ6130B		SPMWO7T27R
			4NKTO60308R

Shape Symbol

A (85°)	B (82°)	C (80°)
D (55°)	E (75°)	H
K (55°)	L	M (86°)
O	P	R
S	T	W (80°)
V (35°)	Other	Z

Chip Breakers And Clamping Forms

Symbol	Holes	Chip Breaker	Profile	Symbol	Holes	Chip Breaker	Profile
B	Have	Not	>65°	N	Not	Not	
H	Have	Single Face	>65°	R	Not	Single Face	
C	Have	Not	>65°	F	Not	Double Face	
J	Have	Double Face	>65°	A	Have	Not	
W	Have	Not	≤65°	M	Have	Single Face	
T	Have	Single Face	≤65°	G	Have	Double Face	
Q	Have	Not	≤65°	X	-	-	
U	Have	Double Face	≤65°				

Linear Cutting Edge

Inscribed Circle Diameter (mm)	Shape C	D	R	S	T	V	W	K
32.00			32					
31.75			31					
25.40			25	25				
25.00	25	25	25					
20.00			20					
19.05	19		19	19	33			
16.00		19	16					
15.875	16		15	16	27			
12.70	12	15	12	12	22	22	08	
12.00			12					
10.00			10					
9.525	09	11	09	09	16	16	06	16
8.00			08					
6.35	06	07			11	11		
6.00			06					
5.56					09			
5.50			05					
3.97					06			

Thickness

Symbol	Thicknesses
12	12.70
10	11.11
T9	9.72
09	9.52
07	7.94
T6	6.75
06	6.35
T5	5.95
05	5.56
T4	4.96
04	4.76
T3	3.97
03	3.18
T2	2.58
02	2.38
T1	1.98
01	1.59
T0	0.99
00	0.79

C N M G

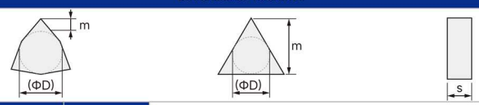
12 04 08 MA ISO

4 3 2

Back Angle Of Main Cutting Edge

Symbol	Back Angle
A	3°
B	5°
C	7°
D	15°
E	20°
F	25°
G	30°
N	0°
P	11°
O	Other

Dimensional Tolerance



Symbol	Tip Height (m)	Incircle (ΦD)	Thicknesses (S)
A	±0.005	±0.025	±0.025
F	±0.005	±0.013	±0.025
C	±0.013	±0.025	±0.025
H	±0.013	±0.013	±0.025
E	±0.025	±0.025	±0.025
G	±0.025	±0.025	±0.13
J	±0.005	±0.05~±0.13	±0.025
K	±0.013	±0.05~±0.13	±0.025
L	±0.025	±0.05~±0.13	±0.025
M	±0.08~±0.18	±0.05~±0.13	±0.13
N	±0.08~±0.18	±0.05~±0.13	±0.025
U	±0.13~±0.38	±0.08~±0.25	±0.13

· M-grade accuracy requirements (differentiated by shape and internal circle size)

· Tip Height (m) Tolerance

Incircle	Regular Triangle	Square	80°diamond	55°diamond	35°diamond	Circle
6.35	±0.08	±0.08	±0.08	±0.11	±0.16	-
9.525	±0.08	±0.08	±0.08	±0.11	±0.16	-
12.7	±0.13	±0.13	±0.13	±0.15	-	-
15.875	±0.15	±0.15	±0.15	±0.18	-	-
19.05	±0.15	±0.15	±0.15	±0.18	-	-
25.4	-	±0.18	-	-	-	-

· Tolerance Of Inscribed Circle

Incircle	Regular Triangle	Square	80°diamond	55°diamond	35°diamond	Circle
6.35	±0.05	±0.05	±0.05	±0.05	±0.05	-
9.525	±0.05	±0.05	±0.05	±0.05	±0.05	±0.05
12.7	±0.08	±0.08	±0.08	±0.08	-	±0.08
15.875	±0.10	±0.10	±0.10	±0.10	-	±0.10
19.05	±0.10	±0.10	±0.10	±0.10	-	±0.10
25.4	-	±0.13	-	-	-	±0.13

Corner Radius Symbol

Symbol	Corner Radius
00	(No Rounding)
02	0.2
04	0.4
08	0.8
12	1.2
16	1.6
20	2.0
24	2.4
32	3.2
X	(other)
Blade Diameter Size Mo (Metric)	Circular Blades

Incircle

Symbol	Inradius
2	6.35
3	9.525
4	12.7
5	15.875
6	19.05
8	25.4

Thickness

Symbol	Thickness
2	3.18
3	4.76
4	6.35
5	7.94
6	9.52

Corner Radius

Symbol	Corner Radius
0	0.2
1	0.4
2	0.8
3	1.2
4	1.6
5	2.0
6	2.4

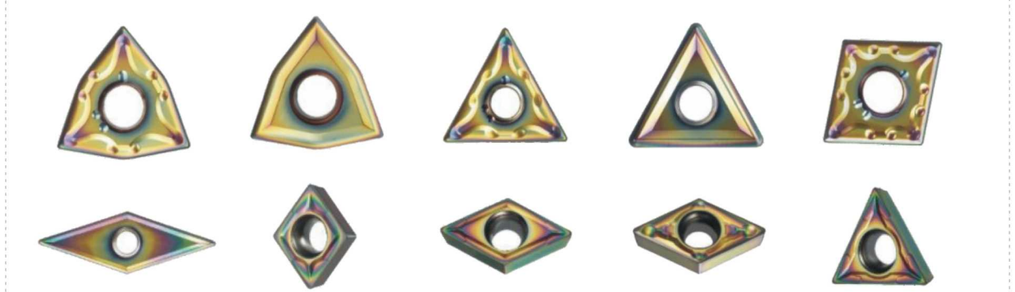
NZ3308

Shape

Coating	Mark	Color	Specification
PVD PVD Coating	NZ3308		WNMG080404/08/12-MA
			WNMG080404/08-MS
			TNMG160404/08/12-MA
			TNMG160404/08-MS
			SNMG120408/12-MA
			SNMG120404/08-MS
			CNMG120404/08/12-MA
			CNMG120404/08-MS
			VNMG160404/08-MS
			VNMG160404/08-MA
			VBMT160404/08-MV
			TCMT16T304/08-MA
			TCMT110202/04/08-MA
			CCMT120404/08-MA
			CCMT09T302/04/08-MA
			CCMT060202/04/08-MA
			DCMT11T304/08-MA
			DCMT11T302/04/08-MV
			DCMT070204-MV
			DNMG150404/08-MA
			DNMG150604/08-MMA

NZ3080

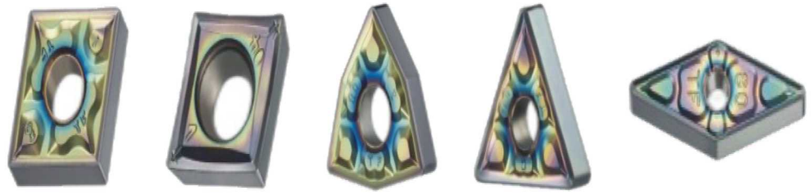
Shape



Coating	Mark	Color	Specification
PVD PVD Coating	NZ3080		WNMG080404/08-MA
			WNMG080404/08-MS
			TNMG160404/08-MA
			TNMG160404/08-MS
			SNMG120408-MA
			CNMG120404/08-MA
			VNMG160404/08-MS
			VNMG160404/08-MA
			VBMT160404/08-MV
			TCMT16T304/08-MA
			TCMT110202/04/08-MA
			CCMT120404/08-MA
			CCMT09T302/04/08-MA
			CCMT060202/04/08-MA
			DCMT11T304/08-MA
			DCMT11T302/04/08-MV
			DCMT070204-MV

NZ6530

Shape



Coating	Mark	Color	Specification
PVD PVD Coating	NZ6530		WNMGO80404-TF
			WNMGO80408-TF
			TNMG160404-TF
			TNMG160408-TF
			CNMG120404-TF
			CNMG120408-TF
			CCMTO9T304-SM
			CCMT060204-SM
			DNMG150608-MA
			VNMG160404/08-TF

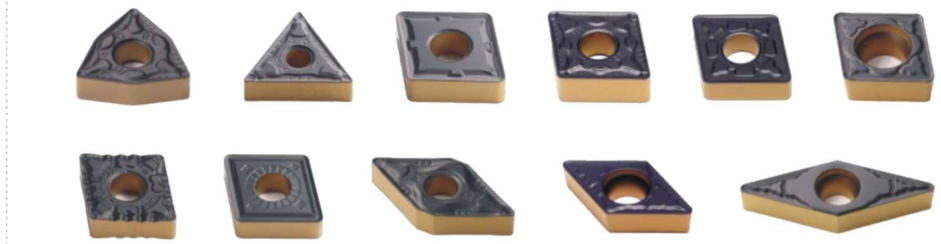
NZ6130

Shape

Coating	Mark	Color	Specification
PVD PVD Coating	NZ6130		WNMG080404-BF
			WNMGO80408-BF
			TNMG160404-BF
			TNMG160408-BF

NZ9015

Shape



Coating	Mark	Color	Specification
CVD CVD Coating	NZ9015		WNMG080404/08-PM
			TNMG160404/08-PM
			TNMG220408-PM
			SNMG190612-M5
			DNMG150604/08/12-PM
			DNMG150404-PM
			CNMG120404/08-PF
			CNMG120404/08-PM
			CNMG160608/12-PM
			CNMG190608-PM
			CNMG190612/16-M5
			VNMG160408-PM
			VBMT160404-PF
			VBMT160404/08-PM
			SNMG120404/08-TM
			WNMG080404/08-TM
			TNMG160404/08-TM

NZ9025

Shape

Coating	Mark	Color	Specification
PVD PVD Coating	NZ9025		WNMGO80408-MP
			TNMG160404/08-MP
			CNMG120404/08-MP
			WNMG080402/04/08-MS
			TNMG160402/04/08-MS
			VNMG160402/04-MS
			CNMG120402/04/08-MS
			CCMT120404/08-LF
			CCMT09T302/04/08-LF
			CCMT060202/04/08-LF
			DCMT070202/04-LF
			DCMT11T302/04/08-LF
			TCMT110202/04-LF
			TCMT16T304/08-LF
			TPMT090202/04-LF
			VBMT110302/04-LF
			VBMT160402/04/08-LF

NZ9125

Shape

Coating	Mark	Color	Specification
CVD CVD Coating	NZ9125		WNMG080404/08-TM
			TNMG160404/08-TM
			DNMG150404/08-TM
			DNMG150604/08-TM
			CNMG120404/08-TM
			VNMG160404/08-TM
			WNMG080404/08R/L-S
			TNMG16040408R/L-S
			SNMG120408R-S
			DCMT070204-PS
			DCMT11T304-PS
			CCMT060204/08-PS
			CCMT09T304/08-PS
			TCMT110204/08-PS
			TCMT16T304/08-PS
			SCMT09T308-PS
			TPMT110304-PS

NZ3308

Shape

Insert Series	Mark	Color	Specification
G G-rated Insert	NZ3308		TNGG160402/04R/L-S
			TNGG160402/04R/L-P

Shape

Insert Series	Mark	Color	Specification
G G-rated Insert	NZ3308		CCGT09T302/04ER/EL-H
			CCGT060202/04ER/EL-H

Shape

Insert Series	Mark	Color	Specification
G G-rated Insert	NZ3308		CCGT09T302/04ER/EL-U
			CCGT060202/04ER/EL-U

Shape

Insert Series	Mark	Color	Specification
G G-rated Insert	NZ3308		CCGT0602/02/04-1L
			CCGT09T3/02/04-1L

NZ3308

Shape

Insert Series	Mark	Color	Specification
G G-rated Insert	NZ3308		
			DCGT11T302/04-MF

Shape

Insert Series	Mark	Color	Specification
G G-rated Insert	NZ3308		
			DCGT070102/04-CK

Shape

Insert Series	Mark	Color	Specification
G G-rated Insert	NZ3308		
			DCGT11T302/04ER/EL-U

Shape

Insert Series	Mark	Color	Specification
G G-rated Insert	NZ3308		DCGT070202/04-1L
			DCGT11T302/04-1L

NZ3308

Shape

Insert Series	Mark	Color	Specification
G G-rated Insert	NZ3308		CCGT030102/04L-F
			CCGT040102/04L-F
			CCGT060201/02/04L-F
			CCGT09T301/02/04L-F

Shape

Insert Series	Mark	Color	Specification
G G-rated Insert	NZ3308		WBGT030102/04R/L-W
			WBGT060102/04R/L-W
			WBGT080202/04R/L-W

Shape

Insert Series	Mark	Color	Specification
G G-rated Insert	NZ3308		TPGH080202/04L-F
			TPGH090202/04L-F
			TPGH110302/04L-F
			TCGH110202/04L-F
			TBGH060102/04L-F

NZ3308

Shape


VBET


VCGT


VBGT

Insert Series	Mark	Color	Specification
G G-rated Insert	NZ3308		VCGT110302/04R/L-Y
			VCGT160402/04R/L-Y
			VBGT110301/02/04R/L-Y
			VBGT160401/02/04R/L-Y

NZ300H

Shape


TNGG


CCGT


DCGT


VBGT

Insert Series	Mark	Color	Specification
G G-rated Insert	NZ300H		TNGG160401/02/04-UL
			CCGT09T301/02/04-YL
			CCGT060201/02/04-YL
			DCGT11T301/02/04-YL
			VBGT110301/02/04-YL
			VCGT110301/02/04-YL

NZ1330

Shape

Insert Series	Mark	Color	Specification
G G-rated Insert	NZ1330		TNGG160402/04R/L-S
			TCGT110302/04L-W
			TBGT060102/04L-W
			TPGT080202/04L-W
			TPGTO90202/04L-W
			TPGT110302/04L-W
			DCMT11T304/08
			WBGT060102/04L-W
			WBGTO80202/04L-W

Shape

Insert Series	Mark	Color	Specification
G G-rated Insert	NZ1330		CCGT030102/04L-F
			CCGT080202/04L-F

Shape

Insert Series	Mark	Color	Specification
G G-rated Insert	NZ1330		CCGT060202/04L-FS
			CCGT09T302/04L-FS

NZ1330

Shape

Insert Series	Mark	Color	Specification
G G-rated Insert	NZ1330		CCGT09T302/04ER-U
			CCGT060202/04ER-U

NZ1001

Shape

Insert Series	Mark	Color	Specification
G G-rated Insert	NZ1001		VBET110302/04R-F
			VCGT110302/04R/L-Y
			VCGT160402/04R/L-Y

Shape

Insert Series	Mark	Color	Specification
G G-rated Insert	NZ1001		TPGT080202/04L-W
			TPGT090202/04L-W
			TPGT110302/04L-W
			TCGT110302/04L-W
			TBGT060102/04L-W

NZ1001

Shape

Insert Series	Mark	Color	Specification
G G-rated Insert	NZ1001		TNGG160402/04R/L-S
			TNGG160402/04R/L-F
			TNGG160402/04R/L-P

Shape

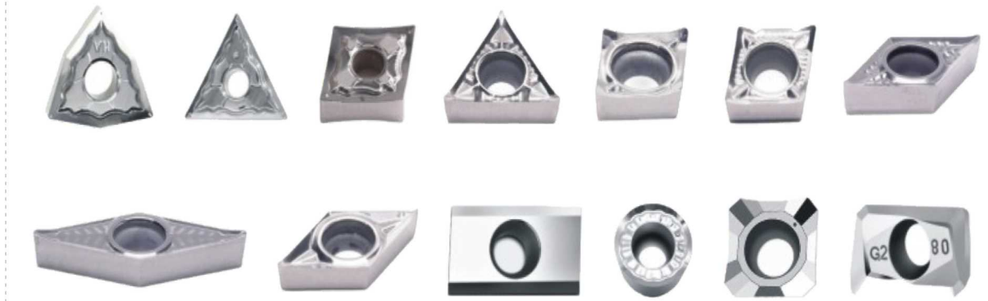
Insert Series	Mark	Color	Specification
G G-rated Insert	NZ1001		VBET110302/04R-F
			VCGT110302/04R/L-Y
			VCGT160402/04R/L-Y

Shape

Insert Series	Mark	Color	Specification
G G-rated Insert	NZ1001		
			WBGT060102/04-W

NZ2001

Shape



Insert Series	Mark	Color	Specification
Aluminium Cutter	NZ2001		WNMG080402/04/08-HA
			TNMG160402/04/08-HA
			CCGT060202/04/08-AK
			CCGT09T302/04/08-AK
			DCGT11T302/04/08-AK
			DCGT070202/04/08-AK
			VCGT160402/04/08-AK
			APKT1604-MA
			APKT1135-MA
			APKT1135-G2
			APKT1604-G2
			RCGT0803-AK
			RP/RCGT1003-AK
			RP/RCGT10T3-AK
			RP/RCGT1204-AK

U-drill Inserts

Shape


WCMT


WCMX


SPMG


SOMT

Work Material	Mark	Color	Specification
Stainless Steel 201, 304	NZ300H		WCMT030208-DG
			WCMT040208-DG
			WCMT050308-DG
			WCMT06T308-DG
			WCMT080412-DG
Steel Parts, Stainless Steel	NZ1930		WCMX030208-ZY
			WCMX040208-ZY
			WCMT050308-ZY
			WCMT06T308-ZY
			WCMT080412-ZY
	NZ6130		SPMG050204-DG
			SPMG060204-DG
			SPMG071308-DG
			SPMG090408-DG
			SPMG110408-DG

Cut-off Inserts

Shape

Work Material	Mark	Color	Specification
Stainless steel, low and medium carbon steel	NZ1930		E-MGMN150-G
			E-MGMN200-G
			E-MGMN250-G

Shape

Work Material	Mark	Color	Specification
Stainless steel, low and medium carbon steel	NZ1930		E-MGMN300-M
			E-MGMN400-M
			E-MGMN500-M

Shape

Work Material	Mark	Color	Specification
Stainless steel, low and medium carbon steel	NZ1930		E-MGGN150-V-R/L
			E-MGGN200-V-R/L
			E-MGGN250-V-R/L
			E-MGGN300-V-R/L
			E-MGGN400-V-R/L

Cutting Inserts

Shape

Work Material	Mark	Color	Specification
Stainless steel, low and medium carbon steel	NZ1930		E-MGMN200-T
			E-MGMN300-T

Shape

Work Material	Mark	Color	Specification
Stainless steel, low and medium carbon steel	NZ1930		E-MRMN200-M
			E-MRMN250-M
			E-MRMN300-M
			E-MRMN400-M

Shape

Work Material	Mark	Color	Specification
Stainless steel, low and medium carbon steel	NZ1930		E-MGGN150-V
			E-MGGN200-V
			E-MGGN250-V
			E-MGGN300-V
			E-MGGN400-V

Cutting Inserts

Shape

Work Material	Mark	Color	Specification
Stainless steel, low and medium carbon steel	NZ6130		TDC200N
			TDC300N

Shape

Work Material	Mark	Color	Specification
Stainless steel, low and medium carbon steel	NZ6130		TDJ200
			TDJ300
			TDJ200-K
			TDJ300-K

Indexable Thread Inserts

16 SHAPE SYMBOL | V BLADE MOUNTING TYPE | E TYPE OF MACHINING | R BLADE HAND | 2.0 PITCH

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

Symbol	Instruction
E	External Threaded Inserts
I	Internal Threaded Inserts

Symbol	Instruction
R	Right-handed
L	Left-handed

Symbol	Instruction
	Horizontal (flush mounted) threaded inserts
V	Vertical (Vertical) Threaded Inserts
U	Horizontal Centring Thread Inserts

Complete (Full Tooth) Pitch Range Indicated By A Number		
Complete	mm	IC
Pitch	0.5-5	48-4

V-tooth Shape Pitch Range In Letters		
Local Section	mm	IC
A	0.5-1.5	48-16
AG	0.5-3.0	48-8
G	1.75-3.0	14-8
N	3.5-5.0	7-5
Q	5.5-6.0	$4\frac{1}{2}$-4
U	6.5-9.0	4-$2\frac{3}{4}$
V	6.0-10.0	4-$2\frac{1}{2}$

ISO THREAD STANDARD | 2M NUMBER OF TEETH | TH BLADE MATERIAL

Symbol	Cutting Edge Length
60	Partial section of range tooth thread 60°
55	Range Thread Partial Section 55°
ISO	ISO metric 60° thread
UN	US Unified 60° thread
UNJ	US Unified Aerospace Thread 60°
MJ	Metric Aerospace Threads
W	British Standard 55°
NPT	American Standard for Pipe Threads 60°
NPTF	American Standard for Dry Sealed Pipe Threads 60°
NPS	American Standard for General Seal Pipe Threads 60°
BSPT	British Standard for Pipe Threads 55°
API	American Petroleum Pipe Thread Standard 60
TR	Metric Trapezoidal Thread Inserts 30° (DIN03)
ACME	American Standard for Acme Threads 29°
STACME	American Standard for Acme Threads 29° (DIN03)
SAGE	Metric serrated inserts 3° / 30
ABUT	U.S. serrated thread inserts 7°/45
B.S.BUTTRESS	British Serrated Threaded Inserts 7°/45
RD	Threaded inserts for fire-fighting food machinery Round (DIN405)
RD	RD Round (DIN20400)
PG	German steel conduit thread 80° (DIN40430)
VAM	American Warm thread
EL	American API-EL Thread
HUGHES	Hughes Standard H-90 Thread

Symbol	Tooth Count
2M	2齿 2 Teeth
3M	3齿 3 Teeth

Blade Material	Blade Colour	Process Material
DJ003-D88	Black	HRC 25-58°、Abrasive steel、nickel-based alloys
DJ003-J68	heptachrome	Stainless Steels
DJ003-J66	Bronze	Steel Parts, Stainless Steel
DJ003-D56	Bronze	Stainless Steels
DJ003-D85	Bronze	Alloy Steel, Special Materials
DJ003-820J	Golden	Stainless steel、steel parts、high temperature alloys

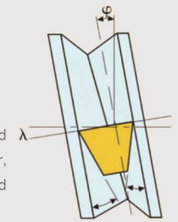
Blade Selection Guide

In order to make you have good machining quality, please consider the following points when purchasing and using.

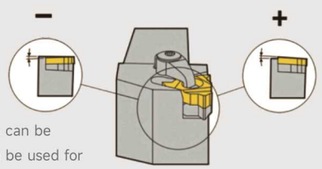
1. according to the processing of internal and external threads, thread direction and workpiece pitch, number of teeth / inch, according to our "turning inserts for external (internal) threads" table to select the appropriate type of threaded inserts (samples), and please consult with our sales staff, according to the material of the parts being processed, to select the most suitable for your use of the insert grade.

2. According to the type of lathe you are exploring, the processing mode and the type of insert you have chosen to select the appropriate type of toolpost.

3. knife pad selection: the spiral angle of the thread must be consistent with the tilt angle of the insert, as far as possible to avoid the unfavourable wear of the rear face side, resulting in a short life of the tool. We have been in the manufacture of threaded shanks Λ value designed for 1 °



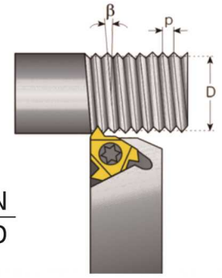
In order to machine the correct thread profile and maintain uniform insert wear, the cutting edge inclination (λ) should be equal to the thread lead angle (φ).



By changing the pads, the camber angle can be varied from +5 to 1.2. The same pad can be used for both right-handed and left-handed toolholders. The centre height remains constant.

4、 The choice of cutting speed:

Rotation Speed	$n = \frac{V_C \cdot 1000}{\pi \cdot D}$ (rev/min)
Cutting Speed	$V_c = \frac{\pi \cdot D \cdot n}{1000}$ (m/min)
Travelling Speed/feeding Speed	$V_f = \frac{n \cdot P_h}{1000}$ (m/min)
Lead Time	$P_h = P \cdot$ Headcount (mm)
Angle Of Dip Of Blade	$\lambda = \arctan \frac{P_h}{D_2 \cdot \pi}$ (°)
Pitch To Tpi Conversion	$TPI = \frac{25,4}{P}$



$$\beta = \arctan \frac{PxN}{\pi xD}$$

D	Workpiece Diameter	(mm)
D_2	Thread Centre Diameter (nominal Diameter)	(mm)
n	Rotation Speed	(rev/min)
P	Pitch Of Spiral	(mm)
P_h	Lead Time	(mm)
V_f	Travelling Speed (feed Speed)	(m/min)
TPI	Teeth Per Inch	
V_c	Cutting Speed	(m/min)
λ	Angle Of Dip Of Blade	(°)

			V_C (m/min)
Stainless Steels	Free Cutting Steel	HB220	120~140
	Ferrite/Martensite	HB330	90
	Austenitic	HB200	60
		HB330	65
Foundry Iron	Ductile Iron	HB130	135
		HB230	65
	Grey Cast Iron	HB180	130
		HB260	110
	Cold Cast Iron	HB400	15~45

			V_C (m/min)
Carbon Fibre	Low Alloy Steel	HB180	125
		HB250	100
		HB275	95
	High-alloy Steel	HB200	110
		HB325	80
	Cast Steel	HB180	200
		HB200	110

For thread cutting of stainless steel, the most important thing is that the cutting speed VC should be high enough to avoid the phenomenon of "chip tumour".

In order to improve the life of small tip angle inserts, such as NPT threads, they can be machined once with a larger tip angle insert first, or the cutting parameters can be changed accordingly (increase the number of cuts).

5、Feeding method selection

1. radial feed: usually heavy cutting threads, should first choose the radial feed way to carry out, this method of operation of the cylinder single, and have a tendency to work hardening materials such as austenitic stainless steel materials preferred. When processing large pitch, easy to produce vibration, can be changed to lateral feed method or interactive feed method.

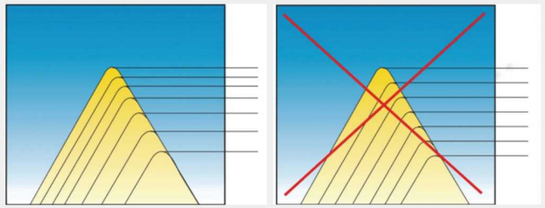
2. lateral feed method: easy to control the chip flow direction, easy to chip discharge and reduce the vibration when turning threads, the surface roughness of the thread is good. In order to keep the insert tooth shape in lateral feed and still get uniform wear, 600 metric threads are obtained by feeding 1/2 AP in the axial direction at the same time of radial depth of cut AP.

3. Interactive feed:Preferred for coarse threads with large pitch,can significantly reduce insert wear and improve tool life,easy to produce chip-breaking problems,suitable for use on CNC numerical control machine tools.

Direct Feed Method | Interactive Feed Method | Lateral Feed Method | Improved Lateral Feed Method

6、Steps and feed depth

Due to the relatively brittle cutting edge, threads cannot be cut in one pass. The total depth of cut is achieved in several steps, each of which requires a similar cutting force (same cutting area).



- If blade chipping occurs, the number of steps should be increased.
- The depth of feed should not be less than 0.05mm/step.
- For stainless steel, the depth of feed per step should be greater than 0.08mm/step.
- Recommended values can also be used for non-full tooth inserts, the number of steps should be increased.

7. Recommended values for tool feed

In most CNC machine tools, threading in a cycle, (such as threading fixed back to the circle) the total thread depth and the first knife or the last knife depth of cut AP value should be given and in the first feed the maximum depth of feed (1.5 ~ 2 times the radius of the tip of the arc of the tool), followed by the depth of the feed should be gradually reduced. The last knife depth of feed should be not less than 0.05mm unilateral feed, otherwise it is easy to cause the tip of the wear and workpiece tooth surface finish is poor.Translated with www.DeepL.com/Translator (free version)

In the current CNC machine tools, thread cutting (fixed back to the circle) have rain kinds of processing methods.

Radial feed method are used G32 way; (G33, G34, G35);

Lateral feed method is more often used G76 way;

Due to different cutting methods, different programming methods, resulting in different machining errors.

(1), rain kind of machining method of programming instructions.

(A) G32X (U) ----Z (W) ---F------.

G32 programming: cutting depth distribution method is generally a constant value, double-edged cutting, each time the depth of cut AP programmer to give.

Radial feed method due to the double side edges work at the same time, the cutting knife is larger, and it is difficult to discharge chips. Therefore, when cutting, the two cutting edges are easy to wear. When cutting threads with larger pitch, the cutting edge wears faster due to larger depth of cut, which results in error in the thread centre diameter. Due to the high precision of the processed tooth shape, it is mostly used in the processing of small-pitch threads. It should be noted that the cutting edge is easy to wear, so it should be measured diligently during processing.Translated with www.DeepL.com/Translator (free version).

(B) G76P (M) ® (2) Q (ΔDMIN) R (D);

G76X (U) Z (W) R () Q () F ();

G76 Programming: The depth of cut is distributed in a decreasing manner, its cutting is single-edged and its depth of cut is given by the automatic calculation of the control system.

G76 lateral feed method, due to the single side edge machining, the machining edge is easy to damage and wear, so that the processed thread surface is not straight, the tip angle changes, resulting in a reduction in the precision of the tooth shape. At the same time, it is single-edged cutting, the tool load is small, chip removal is easy, and reduce the vibration when turning. This method is generally applicable to large pitch thread processing. In the processing of high precision threads, it is recommended to use "double cutter" cutting, i.e. first roughing according to the G76 method, and finishing according to the G32 method. Note that the starting point of the tool should be positioned accurately and consistently, otherwise it is easy to cause chaotic buckling.Translated with www.DeepL.com/Translator (free version).

Cutting Parameters For Each Type Of Threaded Insert

Metric ISO With Trimmed Flute External Thread Feed Parameter						
Pitch (mm)	1	1.25	1.5	1.75	2	2.5
Total Feed (ap)	0.72	0.86	1.02	1.17	1.33	1.63
Number Of Times Of Tool Travelling (nap)	5	6	7	8	9	11
Sequence Of Cuts	Radial Feed (x) Tooth Side Feed (z)					
	X/Z	X/Z	X/Z	X/Z	X/Z	X/Z
1	0.20/-	0.20/-	0.21/-	0.22/-	0.24/-	0.25/-
2	0.18/0.10	0.18/0.10	0.18/0.10	0.20/0.12	0.22/0.13	0.24/0.14
3	0.16/0.09	0.16/0.09	0.16/0.10	0.18/0.10	0.20/0.12	0.21/0.12
4	0.10/0.06	0.14/0.09	0.15/0.09	0.15/0.09	0.15/0.09	0.18/0.10
5	0.08/-	0.10/0.06	0.12/0.07	0.13/0.08	0.12/0.07	0.15/0.09
6		0.08/-	0.10/0.06	0.11/0.06	0.12/0.07	0.12/0.07
7			0.08/-	0.10/0.06	0.10/0.06	0.12/0.07
8				0.08/-	0.09/0.05	0.10/0.06
9					0.08/-	0.10/0.06
10						0.08/0.05
11						0.08/-

Metric ISO With Trimmed Flute Internal Thread Feed Parameter						
Pitch (mm)	1	1.25	1.5	1.75	2	2.5
Total Feed (ap)	0.62	0.77	0.92	1.07	1.21	1.49
Number Of Times Of Tool Travelling (nap)	5	6	7	8	9	11
Sequence Of Cuts	Radial Feed (x) Tooth Side Feed (z)					
	X/Z	X/Z	X/Z	X/Z	X/Z	X/Z
1	0.18/-	0.20/-	0.22/-	0.23/-	0.24/-	0.25/-
2	0.14/0.08	0.15/0.09	0.16/0.09	0.16/0.09	0.18/0.10	0.20/0.12
3	0.12/0.07	0.12/0.07	0.14/0.08	0.14/0.08	0.15/0.09	0.15/0.09
4	0.10/0.06	0.12/0.07	0.12/0.07	0.13/0.08	0.14/0.08	0.15/0.09
5	0.08/-	0.10/0.06	0.11/0.06	0.12/0.07	0.12/0.07	0.13/0.08
6		0.08/-	0.09/0.05	0.11/0.06	0.11/0.06	0.12/0.07
7			0.08/-	0.10/0.06	0.10/0.06	0.12/0.07
8				0.08/-	0.09/0.05	0.10/0.06
9					0.08/-	0.10/0.06
10						0.09/0.05
11						0.08/-

UN American Unified Thread UN External Thread Feed Parameters						
(mm) Pitch	12	16	18	20		
(ap) Total Feed	1.299	0.974	0.866	0.779		
(nap) Number Of Times Of Tool Travelling	9	7	6	6		
Sequence Of Cuts	Radial Feed (x) Tooth Side Feed (z)					
	X/Z	X/Z	X/Z	X/Z	X/Z	X/Z
1	0.229/-	0.226/-	0.233/-	0.210/-		
2	0.222/0.128	0.188/0.109	0.181/0.104	0.163/0.094		
3	0.170/0.098	0.145/0.083	0.139/0.080	0.125/0.072		
4	0.143/0.083	0.122/0.070	0.117/0.068	0.105/0.072		
5	0.126/0.073	0.107/0.062	0.103/0.059	0.093/0.054		
6	0.114/0.066	0.097/0.056	0.093/0.054	0.084/0.048		
7	0.105/0.061	0.089/0.052				
8	0.098/0.056					
9	0.092/0.053					

UN American Unified Thread UN Internal Thread Feed Parameters						
(mm) Pitch	12	16	18	20		
(ap) Total Feed	1.299	0.974	0.866	0.779		
(nap) Number Of Times Of Tool Travelling	9	7	6	6		
Sequence Of Cuts	Radial Feed (x) Tooth Side Feed (z)					
	X/Z	X/Z	X/Z	X/Z	X/Z	X/Z
1	0.222/-	0.230/-	0.174/-	0.191/-		
2	0.207/0.120	0.173/0.10	0.161/0.093	0.155/0.089		
3	0.159/0.092	0.132/0.076	0.124/0.072	0.119/0.069		
4	0.134/0.077	0.112/0.064	0.104/0.060	0.100/0.058		
5	0.118/0.068	0.098/0.057	0.092/0.053	0.088/0.051		
6	0.107/0.062	0.089/0.051	0.083/0.048	0.08/0.046		
7	0.098/0.057	0.082/0.047	0.077/0.044			
8	0.091/0.053					
9	0.086/0.050					

NPT Internal/external Thread Feed Parameters						
(mm) Pitch	11.5	14	18			
(ap) Total Feed	1.767	1.451	1.129			
(nap) Number Of Times Of Tool Travelling	12	10	8			
Sequence Of Cuts	Radial Feed (x) Tooth Side Feed (z)					
	X/Z	X/Z	X/Z			
1	0.24/-	0.24/-	0.22/-			
2	0.208/0.12	0.200/0.115	0.181/0.104			
3	0.182/0.105	0.170/0.098	0.152/0.088			
4	0.168/0.097	0.150/0.086	0.141/0.081			
5	0.155/0.089	0.140/0.081	0.131/0.075			
6	0.145/0.084	0.130/0.075	0.121/0.070			
7	0.138/0.079	0.120/0.069	0.101/0.058			
8	0.124/0.072	0.010/0.063	0.082/0.047			
9	0.117/0.067	0.100/0.058				
10	0.105/0.060	0.090/0.052				
11	0.095/0.055					
12	0.090/0.052					

BSPT Internal/external Thread Feed Parameters						
(mm) Pitch	11	14	19			
(ap) Total Feed	1.479	1.162	0.856			
(nap) Number Of Times Of Tool Travelling	10	8	6			
Sequence Of Cuts	Radial Feed (x) Tooth Side Feed (z)					
	X/Z	X/Z	X/Z			
1	0.214/-	0.222/-	0.223/-			
2	0.242/0.126	0.213/0.111	0.181/0.094			
3	0.186/0.097	0.163/0.085	0.139/0.072			
4	0.157/0.082	0.138/0.072	0.117/0.061			
5	0.138/0.072	0.121/0.063	0.103/0.054			
6	0.125/0.065	0.110/0.057	0.093/0.049			
7	0.115/0.060	0.101/0.052				
8	0.107/0.056	0.094/0.049				
9	0.100/0.052					
10	0.095/0.049					

Matters That Should Be Taken Into Account In Thread Machining

1. The first is the installation of the toolholder, according to the machine tool used, the purchase of threaded toolholder in line with the centre height of the machine tool. For external threads, you can use one toolholder regardless of the diameter of the workpiece. Internal thread according to the size of the inner diameter of the workpiece selection of different diameters of the toolholder, (type and applicable range of samples see page 7) is mainly to consider the strength of the toolholder. In the installation of toolholder, should be fully aware of the actual centre height of the machine tool used, due to the production of machine tools manufacturers, in contact with customers, the same manufacturer of the same type of machine tool centre height are different.

(1)When installing the external threaded toolholder, select the toolholder with the same centre height (machine tool, toolholder) and install it directly, as we have already controlled the centre height at the optimum size when manufacturing the toolholder.

(2)When installing the internal threaded shank, it should be noted that: (If a round shank is used, and the tool table of the machine tool itself is used with a round shank shank, there is no need to adjust it after compression. If it is a four-square tool table, the use of round shank toolpost, it is inevitable that the toolpost will be padded to the appropriate centre height, it may result in inaccurate centre height, and it is easy to cause incorrect half-angle of the threads after machining. Processing is best to adjust the centre height to the centre line of the machine tool (pad height) 0.1-0.2MM, not too high or cause the wear of the rear face, such as the centre height is lower than the centre line of the machine tool, it is easy to knock off the tip of the tool. Alternatively, you can use the square shank of the internal threaded toolholder, the centre of the high has been controlled in the manufacture of the best size.

(3) Selection of tool pads; (refer to the selection guide information) incorrect tool pads will lead to excessive wear of the blade side of the rear face.

2. Secondly, consider the performance of the machine tool, requires good rigidity and high enough speed and good cooling system. In the thread machining is often required in the cutting speed is high, generally between 80-120 rpm, this is in order to avoid the chip tumour in the cutting process and get a lower surface roughness (higher surface finish). The selection of cutting speed is based on the material to be machined (refer to the selection guide for information). Another issue worth noting in thread machining is cooling. Generally we are the coolant rushed to the workpiece on it, it is not, the coolant should be rushed directly to the tip of the tool in contact with the workpiece, and the coolant from the cooling system to get a high enough flow 15-20 litres / min (pressure), this is because the tip of the tool in the processing of the very high temperatures, the general unpowered (pressure) of the coolant has not yet arrived at the tip of the tool has been gasification, basically Did not play a role in cooling the tip of the role, but only cooled the parts being processed, and this time the tip of the knife is easy to be dropped.

3. Selection of reasonable cutting parameters is also a factor to improve the life of the blade.

(1) external thread processing, due to smooth chip removal, generally for programming convenience, we use straight into the processing mode, and only in the case of thread requirements are extremely high, before the use of control chip flow processing mode.

(2)For internal thread processing, for the large inner diameter workpiece, due to the smooth chip removal, in most cases, the straight-in processing mode; for the small inner diameter internal thread, due to the small chip removal space, the straight-in processing mode chip winding in the toolpost is very easy to knock off the tip of the tool, and at the same time, the chips make the surface of the processed surface to produce a scratch road, thus affecting the quality of the workpiece's surface, then you can explore the diagonal processing mode, control the chip to make the chip flow along the body of the tool, and control the chip flow. Chips can be discharged along the back of the cutter body to the cutting direction, so that the life of the blade can be extended and get a better surface quality (see the attached table for the selection of parameters).

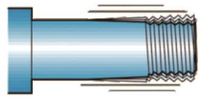
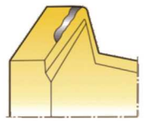
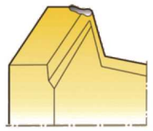
4. Processing of machined parts: (applicable to threaded inserts with dressing edge)

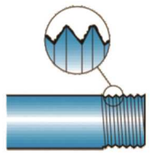
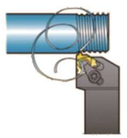
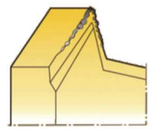
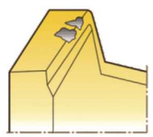
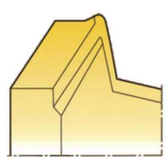
(1)When processing external threads, the outer diameter of the blank should be larger than the nominal size of the thread. Such as M30X1.5, blank outer diameter size Φ30.1mm.

(2) Processing of internal threads, the outer diameter of the blank should be larger than the nominal size of the thread. Such as M30X1.5, the blank outside diameter size Φ29.9mm.

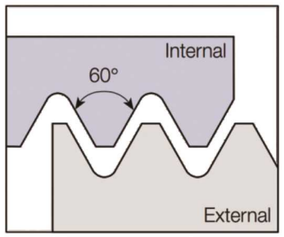
5. Such as in the processing of the blade collapse, re-exchange the blade (or transposition) processing should be carefully checked on the workpiece there is no residual alloy slag. If so, it should be all removed before continuing to process.

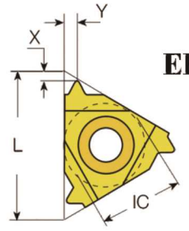
Thread Turning Problems And Solutions

Problem	Possible Cause	Solution
 Vibratory	Incorrect Workpiece Clamping Incorrect Tool Installation Incorrect Cutting Parameters Incorrect Tool Centre Height Incorrect Thread Base Diameter	Choose softer collets Reduce tool overhang, check tool compression Increase line speed, if not, reduce line speed considerably Use continuous constant feed 0.1-0.16 Use correct centre height Check for correct thread base diameter
 Rapid Wear Of The Rear Cutter Face	Cutting speed too high Depth of cut too shallow at each step Incorrect grade of insert material Incorrect selection of insert pads	Decrease cutting speed Increase depth of cut per step Select side feed machining Select a more wear-resistant grade of material. Check and ensure correct tool pad selection
 Blade Chipping	Excessive cutting force, unreasonable number of machining steps Hard insert material Incorrect centre height of cutting edge Loose shanks and inserts Accumulation of chip tumour	Increase the number of feeds Choose a tougher grade of material Check tool clamping Check cutting edge centre height Check chipformers

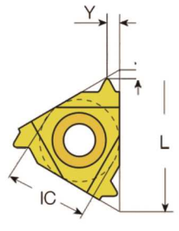
Problem	Possible Cause	Solution
 Poor Thread Surface Quality	Cutting speed too low Inserts above centre line Poor chip control	Increase cutting speed Use the correct centre height Check and ensure correct selection of toolpads Select side feed machining
 Poor Chip Control	Cutting speed too low High temperature of cutting area Unreasonable selection of tool pads Insufficient coolant supply	Reduced number of feeds Increase cutting speed Select side feed machining Increase coolant supply Control chip flow by selecting the correct tool pads
 Pyoderma Gangrenosum	Cutting speed effects	Change of cutting speed Not using coolant
 Blade Chipping	Incorrect selection of blade material Reliable clamping of the toolholder Reliable mounting of inserts	Choose a tougher grade of material Check tool clamping Check cutting speed Use lateral feed
 Plastic Deformation	Incorrect choice of insert material grade Cutting speed too high Inappropriate number of machining steps Insufficient coolant supply	Selection of material grades with better resistance to plastic deformation Reduce cutting speed Increase the number of steps Increase coolant supply Check that the thread base diameter is correct before cutting threads

Local Section 60° Section Setting

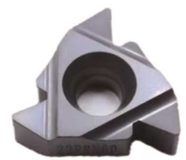


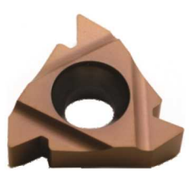


ER/IL

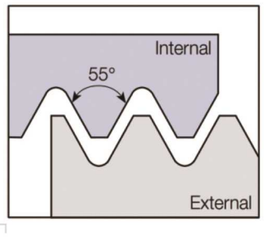


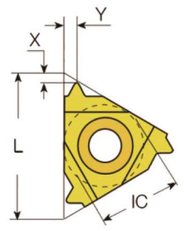
IR/EL

Insert Shape	I.C.	Pitch		External		L	X	Y
		mm	TPI	Right-hand	Left-hand			
	1/4"	0.5-1.5	48-16	11ERA60	11ELA6O	11	0.6	0.8
	3/8"	0.5-1.5	48-16	16ERA60	16ELA60	16	0.6	0.8
		1.75-3.0	14-8	16ERG60	16ELG60	16	1.1	1.5
		0.5-3.0	48-8	16ERAG60	16ELAG60	16	1.1	1.5
	1/2"	3.5-5.0	7-5	22ERN60	22ELN60	22	1.8	2.5
	5/8"	5.5-6.0	4.5-4	27ERQ60	27ELQ60	27	2.1	3.1

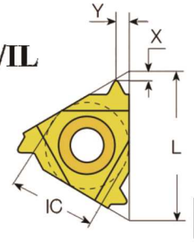
Insert Shape	I.C.	Pitch		External		L	X	Y
		mm	TPI	Right-hand	Left-hand			
	5/32″	0.5-1.5	48-16	06IRA60		0.6	0.6	0.6
	3/16″	0.5-1.5	48-16	08IRA60		0.8	0.6	0.7
	1/4"	0.5-1.5	48-16	11IRA60	11ILA60	11	0.6	0.8
	3/8"	0.5-1.5	48-16	16IRA60	16ILA60	16	0.6	0.8
		1.75-3.0	14-8	16IRG60	16ILG60	16	1.1	1.5
		0.5-3.0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

Local Section 55° Section Setting

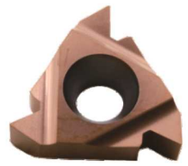




ER/IL

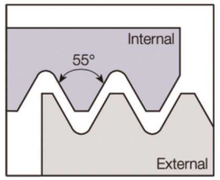


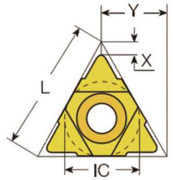
IR/EL

Insert Shape	I.C.	Pitch		External		L	X	Y
		mm	TPI	Right-hand	Left-hand			
	3/8"	0.5-1.5	48-16	16ERA55	16ELA60	16	0.6	0.8
		1.75-3.0	14-8	16ERG55	16ELG60	16	1.1	1.5
		0.5-3.0	48-8	16ERAG55	16ELAG60	16	1.1	1.5
	1/2"	3.5-5.0	7-5	22ERN55	22ELN60	22	1.8	2.5
	5/8"	5.5-6.0	4.5-4	27ERQ55	27ELQ60	27	2.1	3.1

Insert Shape	I.C.	Pitch		External		L	X	Y
		mm	TPI	Right-hand	Left-hand			
	5/32″	0.5-1.5	48-16	06IRA55		0.6	0.6	0.6
	3/16″	0.5-1.5	48-16	08IRA55		0.8	0.6	0.7
	1/4"	0.5-1.5	48-16	11IRA55	11ILA60	11	0.6	0.8
	3/8"	0.5-1.5	48-16	16IRA55	16ILA60	16	0.6	0.8
		1.75-3.0	14-8	16IRG55	16ILG60	16	1.1	1.5
		0.5-3.0	48-8	16IRAG55	16ILAG60	16	1.1	1.5
	1/2"	3.5-5.0	7-5	22IRN55	22ILN60	22	1.8	2.5
	5/8"	5.5-6.0	4.5-4	27IRQ55	27ILQ60	27	1.8	2.7

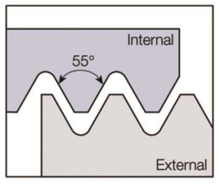
Local Section U-shape

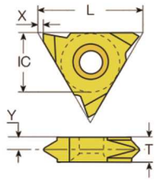


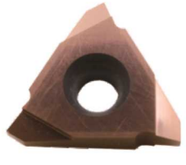


Insert Shape	I.C.	Pitch		External and Internal	L	X	Y
		mm	TPI	Right and left hand			
	1/2" U	5.5-8.0	4.5-3.25	22U E/I/R/LU55	22	0.9	11.0
	5/8" U		4-2.75	27U E/I/R/LU55	27	1.2	13.7
	1/2" U	5.5-8.0	4.5-3.25	22U E/I/R/LU60	22	0.6	11.0
	5/8" U	6.5-9.0	4-2.75	27U E/I/R/LU60	27	1.0	13.7

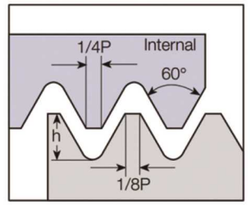
Local Section 60° Section Setting

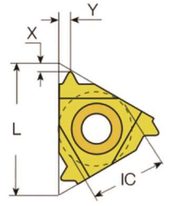




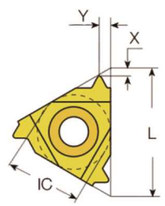
Insert Shape	I.C.	Pitch		External	L	X	Y
		mm	TPI	Right-hand			
	3/8"	0.5-1.5	48-16	16VERA55	3.6	1.0	0.9
		1.75-3.0	14-8	16VERG55	3.6	1.0	1.7
		0.5-3.0	48-8	16VERAG55	3.6	1.0	1.8
	1/2"	3.5-5.0	7-5	22VERN55	4.8	1.2	2.5
	3/8"	0.5-1.5	48-16	16VERA60	3.6	1.0	0.9
		1.75-3.0	14-8	16VERG60	3.6	1.0	1.8
		0.5-3.0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

ISO Metric Complete

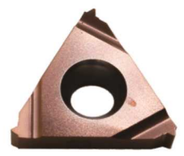
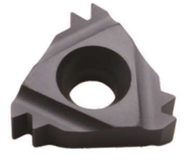




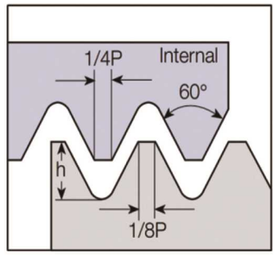
ER/IL

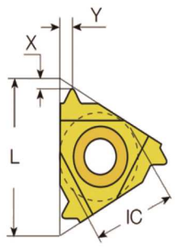


IR/EL

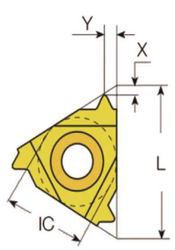
Insert Shape	I.C.	Pitch	External		L	X	Y
		mm	Right-hand	Left-hand			
	3/8"	0.5	16ERO.5ISO	16EL0.5ISO	16	0.8	0.8
		0.75	16ER0.75ISO	16EL0.75ISO		0.8	0.8
		0.8	16ERO.8ISO	16ELO.8ISO		0.6	0.6
		1.0	16ER1.0ISO	16EL1.0ISO		0.8	0.8
		1.25	16ER1.25ISO	16EL1.25ISO		0.8	0.8
		1.5	16ER1.5ISO	16EL1.5ISO		0.8	0.8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

ISO Metric Complete



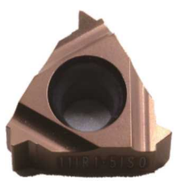


ER/IL

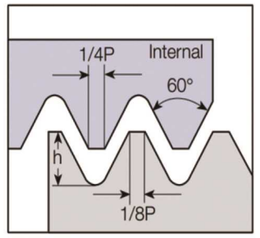


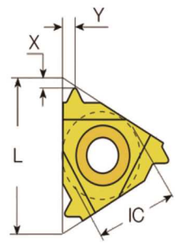
IR/EL

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

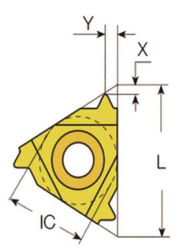


ISO Metric Complete



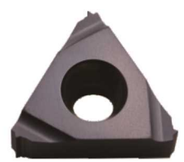


ER/IL

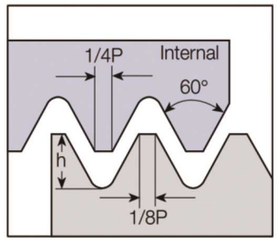


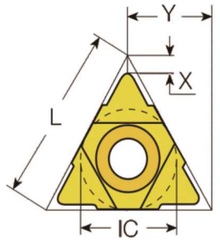
IR/EL

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



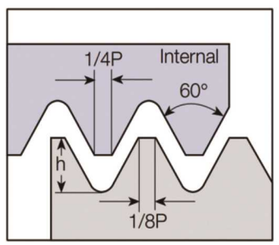
ISO Metric U-Type

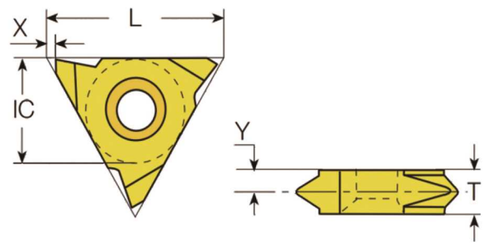




Insert Shape	I.C.	Pitch	External	Internal	L	X	Y
		MM	Right and Left	Right and Left			
	1/2" U	5.5	22U ER/L5.5ISO	22U IR/L5.5ISO	22	E:2.3 N:2.4	11.0
		6.0	22U ER/L6.0ISO	22U IR/L6.0ISO	22	E:2.6 N:2.1	11.0
	5/8" U	8.0	27U ER/L8.0ISO	27U IR/L8.0ISO	27	2.4	13.7
	3/4" U	12.0	33U ER/L12.0ISO	33U IR/L12.0ISO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

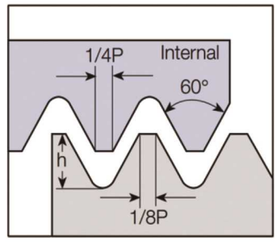
ISO Metric Vertical

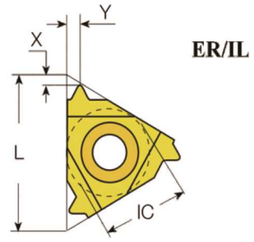




Insert Shape	I.C.	Pitch	External	L	X	Y
		MM	Right and Left			
	3/8"	1	16VER1.0ISO	16	1.0	0.7
		1.25	16VER1.25ISO		1.0	0.9
		1.5	16VER1.5ISO		1.0	0.9
		1.75	16VER1.75ISO		1.0	1.2
		2	16VER2.0ISO		1.0	1.3
		2.5	16VER2.5ISO		1.0	1.5

UN unified protocol thread 60° complete type

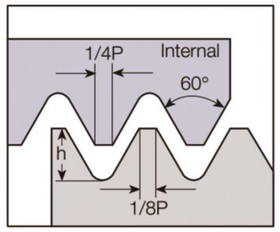


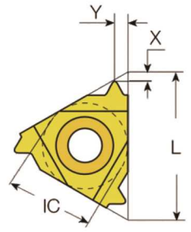


ER/IL

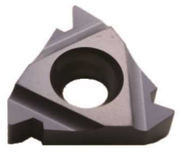
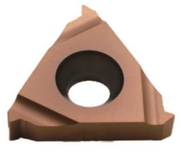
Insert Shape	I.C.	Pitch	External		L	X	Y
		TPI	Right-hand	Left-hand			
	3/8"	32	16ER32UN	16EL32UN	16	0.8	0.8
		28	16ER28UN	16EL28UN		0.8	0.8
		24	16ER24UN	16EL24UN		0.8	0.8
		20	16ER20UN	16EL20UN		0.8	0.8
		18	16ER18UN	16EL18UN		0.8	0.8
		16	16ER16UN	16EL16UN		0.8	0.8
		14	16ER14UN	16EL14UN		1.2	1.5
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

UN Unified Protocol Thread 60° Complete Type

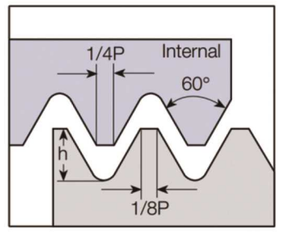


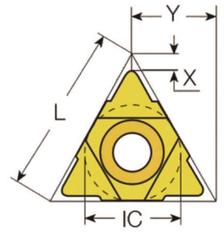


IR/EL

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

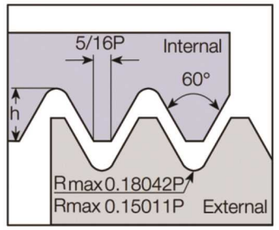
UN Unified Protocol Thread 60° U-Type

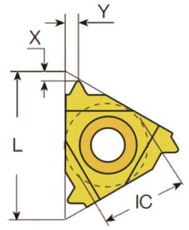




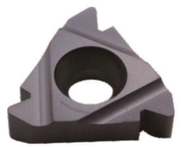
Insert Shape	I.C.	Pitch	Internal		L	X	Y
		TPI	Right and Left	Right and Left			
	1/2" U	4.5	22U ER/L4.5UN	22U IR/L4.5UN	22	E:2.0 N:2.4	11.0
		6.0	22U ER/L4UN	22U IR/L4UN	22	E:2.0 N:2.4	11.0
	5/8" U	8.0	27U ER/L3UN	27U IR/L3UN	27	E:2.5 N:2.7	13.7
	3/4" U	12.0	33U ER/L2UN	33U IR/L2UN	33	E:2.8 N:3.6	E:16.5 N:16.9

UNJ Unified Aviation Thread 60° Complete Type

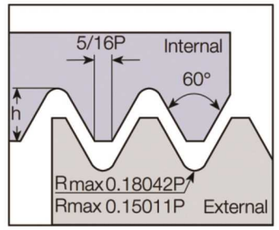


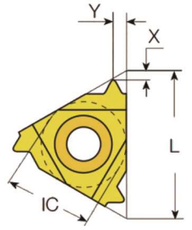


ER/IL

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

UNJ Unified Aviation Thread 60° Complete Type

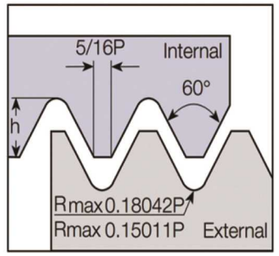


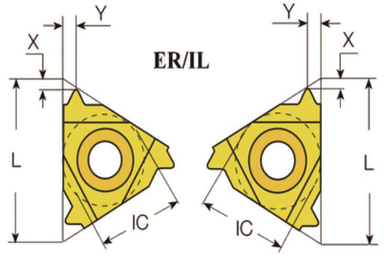


IR/EL

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

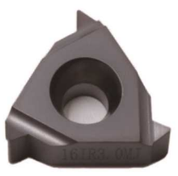
Metric Aerospace Thread Inserts Complete Type





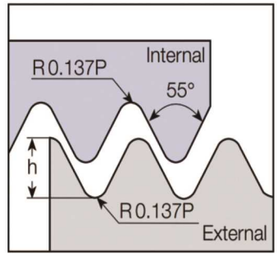
Insert Shape	I.C.	Pitch	Model		L	X	Y
		mm	Right-hand	Left-hand			
	1/4"	1.0	11ER1.0MJ	11IR1.0MJ	11	0.7	0.8
		1.25	11ER1.25MJ	11IR1.25MJ		0.8	0.9
		1.5	11ER1.5MJ	11IR1.5MJ		0.8	1.0
		2.0	11ER2.0MJ	11IR2.0MJ		0.9	1.0
	3/8"	0.7	16ER0.7MJ	16IR0.7MJ	16	0.6	0.6
		0.75	16ER0.75MJ	16ER0.75MJ		0.7	0.55
		0.8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

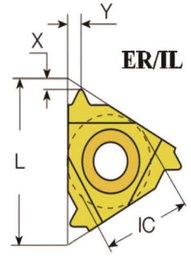
External



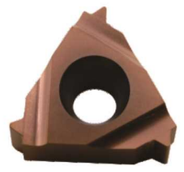
Internal

British Wheatstone Thread 55° Complete (BSW, BSF, BSP)

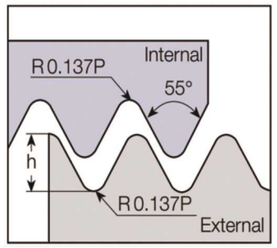


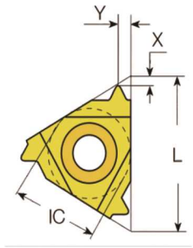


Insert Shape	I.C.	Pitch	External		L	X	Y
		TPI	Right-hand	Left-hand			
	3/8"	28	16ER28W	16EL28W	16	0.8	0.8
		26	16ER26W	16EL26W		0.8	0.8
		24	16ER24W	16EL24W		0.8	0.8
		22	16ER22W	16EL22W		0.8	0.8
		20	16ER20W	16EL20W		0.8	0.8
		19	16ER19W	16EL19W		0.8	0.8
		18	16ER18W	16EL18W		0.8	0.8
		16	16ER16W	16EL16W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



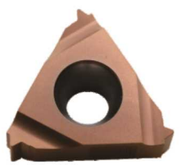
British Wyeth Thread 55 ° Complete Type



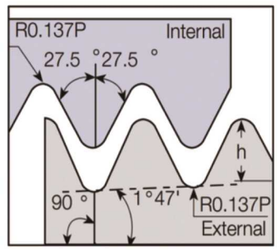


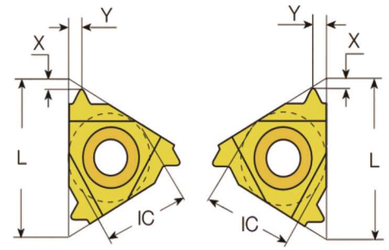
IR/EL

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



British Standard Pipe Thread BSPT Complete Type

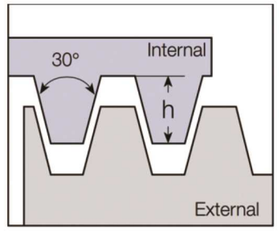


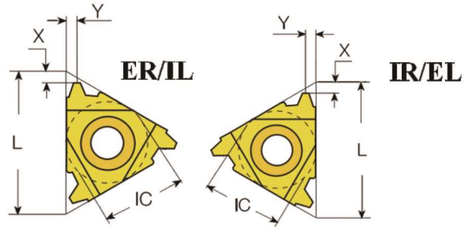


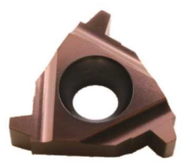
Insert Shape	I.C.	Pitch	External		L	X	Y
		TPI	Right-hand	Left-hand			
	3/8"	28	16ER28BSPT	16EL28BSPT	16	0.6	0.6
		19	16ER19BSPT	16EL19BSPT		0.8	0.9
		14	16ER14BSPT	16EL14BSPT		1.0	1.2
		11	16ER11BSPT	16EL11BSPT		1.1	1.5

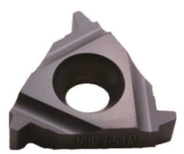
Insert Shape	I.C.	Pitch	Internal		L	X	Y
		TPI	Right-hand	Left-hand			
	3/8"	28	16IR28BSPT	16IL28BSPT	16	0.6	0.6
		19	16IR19BSPT	16IL19BSPT		0.8	0.9
		14	16IR14BSPT	16IL14BSPT		1.0	1.2
		11	16IR11BSPT	16IL11BSPT		1.1	1.5

Metric Trapezoidal Thread Blade TR Complete、incomplete

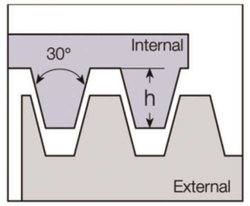


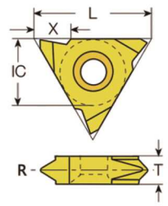


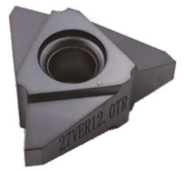
Insert Shape	I.C.	Pitch	External		L	X	Y
		TPI	Right-hand	Left-hand			
	3/8"	1.5	16ER1.5TR	16EL1.5TR	16	1.0	1.1
		2	16ER2.0TR	16EL2.0TR		1.1	1.3
		2.5	16ER2.5TR	16EL2.5TR		1.1	1.3
		3	16ER3.0TR	16EL3.0TR		1.3	1.5
	1/2"	4	22ER4.0TR	22EL4.0TR	22	1.8	1.9
		5	22ER5.0TR	22EL5.0TR		2.0	2.4
	5/8"	6	27ER6.0TR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

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

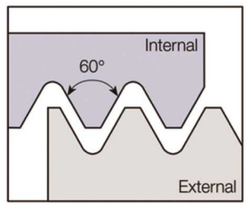
Metric Trapezoidal Thread Blade TR

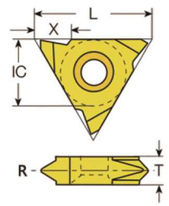


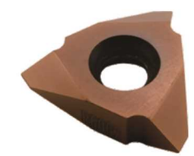


Insert Shape	I.C.	Pitch	Model		L	T
		mm	External	Internal		
	1/2"	4	22VER4.0TR	22VIR4.0TR	22	4.76
		5	22VER5.0TR	22VIR5.0TR		4.76
		6	22VER6.0TR	22VIR6.0TR		4.76
	5/8"	7	27VER7.0TR	27VIR7.0TR	27	6.35
		8	27VER8.0TR	27VIR8.0TR		6.35
		9	27VER9.0TR	27VIR9.0TR		8.7
		10	27VER10.0TR	27VIR10.0TR		8.7
		12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

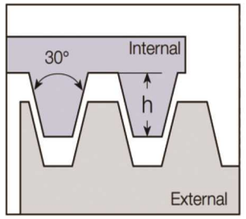
Local Section 55°/60° Vertical

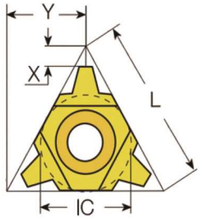


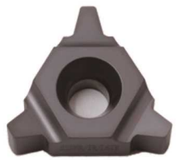


Insert Shape	Model	Pitch（mm/inch）	Re（mm）
	MTTR326001	1.0-1.75	0.1
	MTTR326002	2.0-2.5	0.2
	MTTR326003	3.0-3.5	0.3
	MTTR325502	16-8	0.2
	MTTR436001	1.0-1.75	0.1
	MTTR436002	2.0-2.5	0.2
	MTTR436003	3.0-3.5	0.3
	MTTR436004	4.0-4.5	0.4
	MTTR435502	16-8	0.2

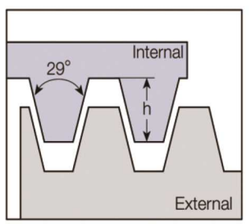
Metric Trapezoidal Thread Blade TR (DIN103) U-Type

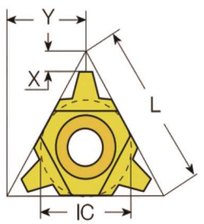




Insert Shape	I.C.	Pitch	External	Internal	L	X	Y
		mm	Right and Left	Right and Left			
	1/2" U	6	22U ER/L6TR	22U IR/L6TR	22	2.0	11.0
		7	22U ER/L7TR	22U IR/L7TR	22	2.3	11.0
	5/8" U	8	27U ER/L8TR	27UIR/L8TR	27	2.5	13.7
		9	27U ER/L9TR	27UIR/L9TR	27	3.0	13.7
		10	27U ER/L1OTR	27UIR/L10TR	27	3.2	13.7
	3/4" U	12	33U ER/L12TR	33U IR/L12TR	33	3.9	16.9

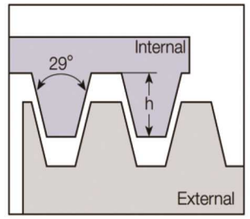
American Ike Female Thread Standard ACME U-Type

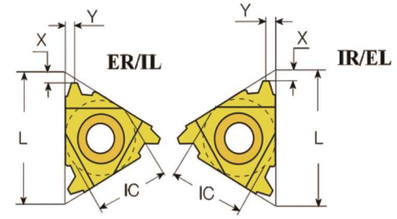


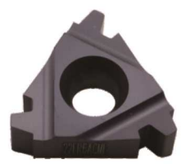


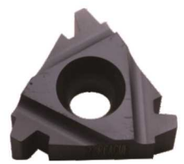
Insert Shape	I.C.	Pitch	External	Internal	L	X	Y
		mm	Right and Left	Right and Left			
	1/2" U	4	22U ER/L4ACME	22U IR/L4ACME	22	2.3	11.0
	5/8" U	3	27U ER/L3ACME	27U IR/L3ACME	27	2.8	13.7
	3/4" U	2	33U ER/L2ACME	33U IR/L2ACME	33	4.3	16.9

American Ike Female Thread Standard ACME Complete、incomplete



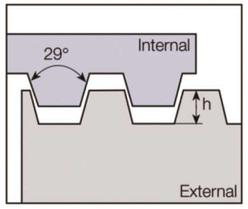


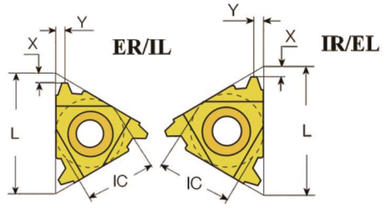
Insert Shape	I.C.	Pitch	External		L	X	Y
		TPI	Right-hand	Left-hand			
	1/4"	16	11ER16ACME	11EL16ACME	11	0.9	1.0
	3/8"	16	16ER16ACME	16EL16ACME	16	0.9	1.0
		14	16ER14ACME	16EL14ACME		1.0	1.2
		12	16ER12ACME	16EL12ACME		1.1	1.2
		10	16ER10ACME	16EL10ACME		1.3	1.3
		8	16ER8ACME	16EL8ACME		1.5	1.5
	1/2"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

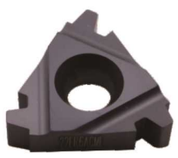
Insert Shape	I.C.	Pitch	Internal		L	X	Y
		TPI	Right-hand	Left-hand			
	1/4"	16	11IR16ACME	11IL16ACME	11	0.9	1.0
	3/8"	16	16IR16ACME	16IL16ACME	16	0.9	1.0
		14	16IR14ACME	16IL14ACME		1.0	1.2
		12	16IR12ACME	16IL12ACME		1.1	1.2
		10	16IR10ACME	16IL10ACME		1.3	1.3
		8	16IR8ACME	16IL8ACME		1.5	1.5
	1/2"	6	22IR6ACME	22IL6ACME	22	1.8	2.1
		5	22IR5ACME	22IL5ACME		2.0	2.3
	5/8"	4	27IR4ACME	27IL4ACM	27	2.3	2.7

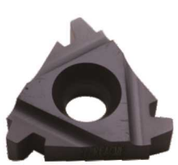
American Standard For Short Elk Female Thread STACME

Complete、Incomplete

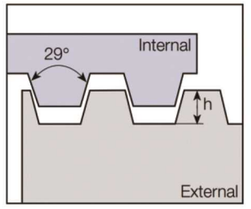


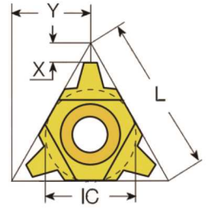


Insert Shape	I.C.	Pitch	External		L	X	Y
		TPI	Right-hand	Left-hand			
	1/4"	16	11ER16STACME	11EL16STACME	11	1.0	1.0
	3/8"	16	16ER16STACME	16EL16STACME	16	1.0	1.0
		14	16ER14STACME	16EL14STACME		1.1	1.1
		12	16ER12STACME	16EL12STACME		1.2	1.2
		10	16ER10STACME	16EL10STACME		1.3	1.3
		8	16ER8STACME	16EL8STACME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

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

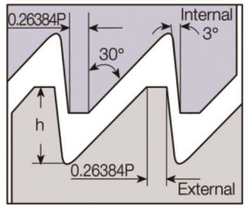
American Standard For Short Elk Female Thread STACME U-Type

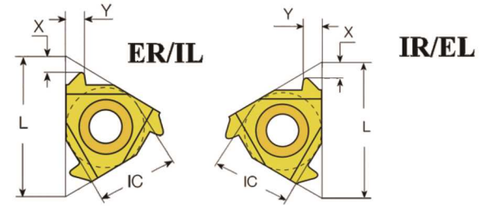


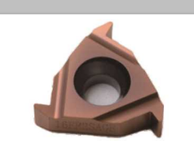


Insert Shape	I.C.	Pitch	External	Internal	L	X	Y
		TPI	Right and Left	Right and Left			
	1/2"	4	22U ER/L4STACME	22U IR/L3STACME	22	2.5	11.0
		3	22U IR/L4STACME	33U ER/L2STACME	22	3.3	13.7
	3/4"	2	22U ER/L3STACME	33U IR/L2STACME	33	5.0	16.9

Metric Serrated Thread Blade (3°/30°) (DIN513)

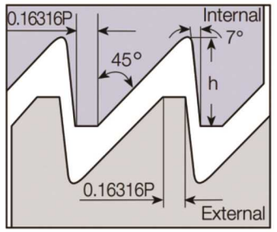


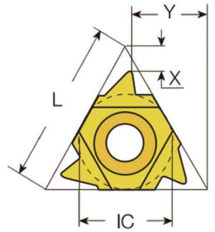


Insert Shape	I.C.	Pitch	External		L	X	Y
		TPI	Right and Left	Right and Left			
	3/8"	2.0	16ER2.0SAGE	16EL2.0SAGE	16	1.1	1.6
	1/2"	3.0	22ER3.0SAGE	22EL3.0SAGE	22	1.5	2.4
		4.0	22ER4.0SAGE	22EL4.0SAGE		1.9	11.7

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

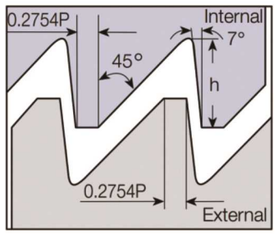
Metric Serrated Thread Blade (3°/30°) (DIN513) U-Type

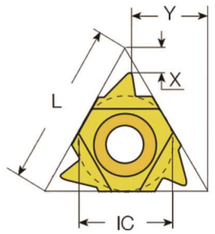




Insert Shape	I.C.	Pitch	External	Internal	L	X	Y
		TPI	Right and Left	Right and Left			
	1/2" U	4	22U ER4ABUT 22U EL4ABUT	22U IR4ABUT 22U IL4ABUT	22	2.3	9.5
	5/8" U	3	27U ER3ABUT 27U EL3ABUT	27U IR3ABUT 27U IL3ABUT	27	3.1	11.7

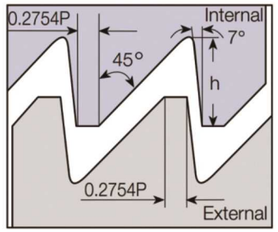
British Serrated Thread Blade (7°/45°) BBUT U-Type

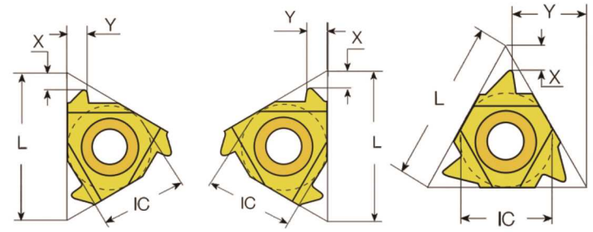


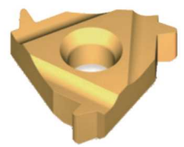


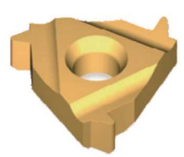
Insert Shape	I.C.	Pitch	External	Internal	L	X	Y
		TPI	Right and Left	Right and Left			
	1/2" U	4	22U ER4BBUT 22U EL4BBUT	22U IR4BBUT 22U IL4BBUT	22	2.3	9.5
	5/8" U	3	27U ER3BBUT 27U EL3BBUT	27U IR3BBUT 27U IL3BBUT	27	3.1	11.7

BBUT British serrated thread blade (7°/45°)

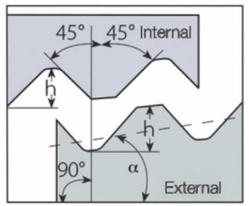




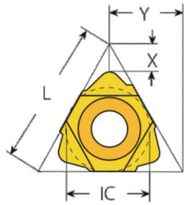
Insert Shape	I.C.	Pitch	External		L	X	Y
		TPI	Right-hand	Left-hand			
 External	1/4"	20	11ER20BBUT	11EL20BBUT	11	1.0	1.3
		16	11ER16BBUT	11EL16BBUT		1.0	1.5
	3/8"	20	16ER20BBUT	16EL20BBUT	16	1.0	1.3
		16	16ER16BBUT	16EL16BBUT		1.0	1.5
		12	16ER12BBUT	16EL12BBUT		1.4	2.0
		10	16ER10BBUT	16EL10BBUT		1.5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

Insert Shape	I.C.	Pitch	Internal		L	X	Y
		TPI	Right-hand	Left-hand			
 Internal	1/4"	20	11IR20BBUT	111L20BBUT	11	1.0	1.3
		16	11IR16BBUT	11IL16BBUT		1.0	1.5
	3/8"	20	16IR20BBUT	16IL20BBUT	16	1.0	1.3
		16	16IR16BBUT	16IL16BBUT		1.0	1.5
		12	16IR12BBUT	16IL12BBUT		1.4	2.0
		10	16IR10BBUT	16IL10BBUT		1.5	2.3
 U-Type	1/2"	8	22IR8 BBUT	22IL8 BBUT	22	2.1	3.3
		6	22IR6 BBUT	22IL6 BBUT		2.1	3.4
	1/2" U	4	22UIR4BBUT	22UIL4BBUT	22	2.3	9.5
	5/8" U	3	27UIR3BBUT	27UIL3BBUT	27	3.1	11.7

Hughes Special Thread H-90

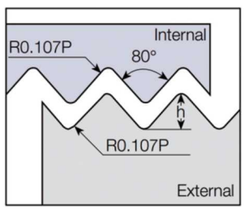


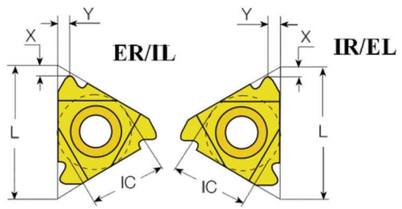
α=arctg (IPF/24)
Standard: American API thread STD, 5B: 1979
Tolerance class standard

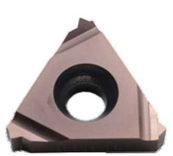


Insert Shape	I.C.	Pitch	External		L	X	Y
		TPI	Right-hand				
 External	1/2" U	3.5	22UER3.5H902	31/2"~65/8"	22	4.2	11
		3.5	22UER3.5H903	7"~85/8"		4.2	11
	5/8" U	3	27UER3H90	23/8"~31/2"	27	5.5	13.5
 Internal	1/2" U	3.5	22UIR3.5H902	31/2"~65/8"	22	4.2	11
		3.5	22UIR3.5H903	7"~85/8"		4.2	11
	5/8" U	3	27UIR3H90SL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

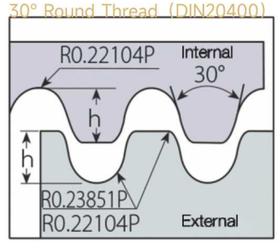
German Steel Pipe Thread PG DIN40430



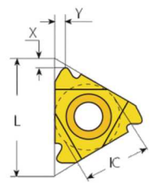


Insert Shape	I.C.	Pitch	Thread			L	X	Y
		TPI	External	Internal				
	3/16"	20		08IR20PG	PG7	08	0.8	0.9
	1/4"	20	11ER20PG	11IR20PG	PG7	11	0.8	0.9
		18	11ER18PG	11IR18PG	PG9/11/13.5/16	11	0.8	1.0
		16	11ER16PG	11IR16PG	PG21/29/36/42/48	11	0.9	1.1
	3/8"	20	16ER20PG	16IR20PG	PG7	16	0.8	0.9
		18		16IR18PG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

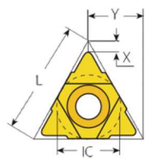
30° Round Thread (DIN20400)



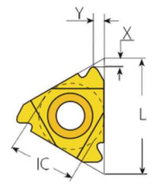
Standard DIN 20400
Tolerance class standard



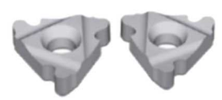
Standard Type



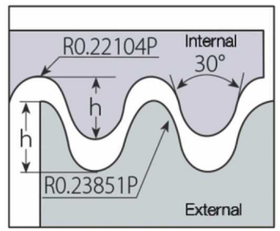
U Type



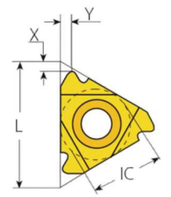
Standard Type

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

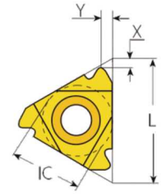
30° Round Thread (DIN405)



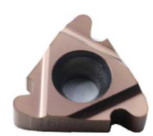
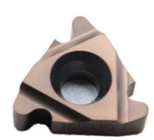
Standard DIN 405
Tolerance class :7h/7H



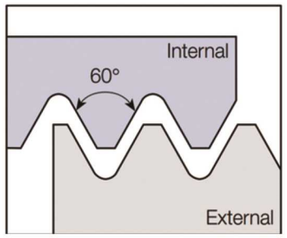
Standard Type

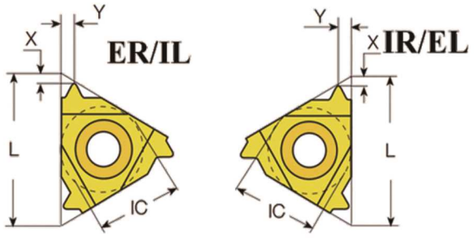


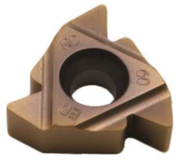
Standard Type

Insert Shape	I.C.	Pitch	Thread		L	X	Y
		mm	External	Internal			
 		6.0	16ER6RD405	16IR6RD405	16	1.4	1.4
		8.0	16ER8RD405	16IR8RD405	16	1.2	1.3
		10.0	16ER10RD405	16IR10RD405	16	1.1	1.2
	1/2"	4.0	22ER4RD405	22IR4RD405	22	2.0	2.1
		5.0	22ER5RD405	22IR5RD405	22	1.6	1.7
		6.0	22ER6RD405	22IR6RD405	22	1.45	1.45
		4	27ER4RD405	27IR4RD405	27	2.0	2.1

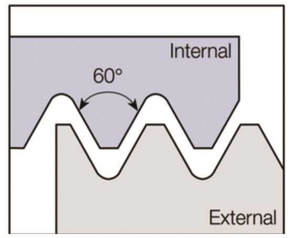
Pressed M Thread

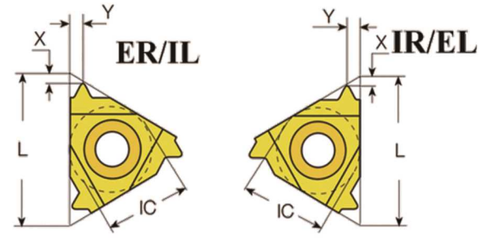


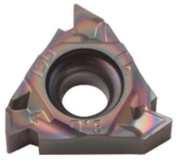


Insert Shape		Size（mm）				Pitch	
		I.C.	L	X	Y	mm	TPI
	11IRA60	1/4	11	0.6	0.8	0.5-1.5	48-16
	11IR1.0ISO	1/4	11	0.8	0.8	1.00	25
	11IR1.5ISO	1/4	11	0.8	0.8	1.50	16
	11IR2.0ISO	1/4	11	0.8	0.8	2.00	12
	16E/IRAG55	3/8	16	0.6	0.7	0.5-1.5	48-16
	16E/IRAG60	3/8	16	1.2	1.7	0.5-3.0	48-8
	16E/IR1.0ISO	3/8	16	0.6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

Press The Fine Thread





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

Petroleum Pipe Threading Insert Modeling Instructions

B	17	V	E	R	8	RD	2	-	3	

1、 Insert stytle for machine tools

L Prism	
S Square and rectangle	
B Butterfly	
T Trangle	
R Parallelogram	
Used For PMC Machine Tools (USA) Used For Colinet Machiine Tools (Belgium)	

2、 Insert Size

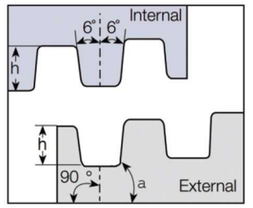
3、 Insert mounting type

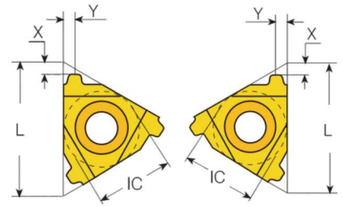
- Horizontal Centring Thread Inserts
- Vertical (Vertical) Threaded Inserts
- Nothing Means Others

4、 Type Of Cutting

- External Threaded Inserts
- I

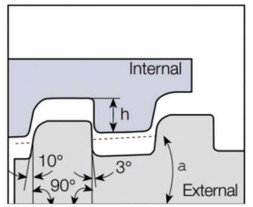
Extreme Connection Tube Threads EL Type

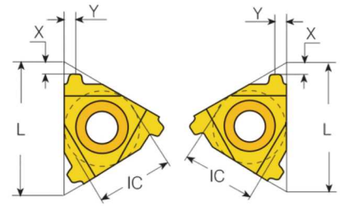




Threads	L	I.C	Taper	External	Internal	X	Y	No. Size
6	22	1/2"	1.5	22ER6EL1.5	22IR6EI1.5	1.9	1.9	4~75/8
5	22	1/2"	1.25	22ER5EL1.25	22IR5EI1.25	2.4	2.3	85/8~103/4

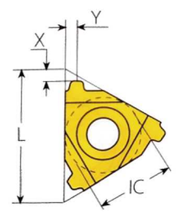
Oil Pipe Thread BUT Type





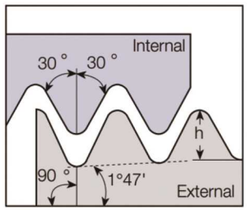
Threads	L	I.C	Taper	External	Internal	X	Y	No. Size
5	22	5/8"	0.75	22ER5BUT0.75	22IR5BUT0.75	2.2	2.4	41/2~133/8
5	22	5/8"	1.0	22ER5BUT1.0	22IR5BUT1.0	2.3	2.4	16~20

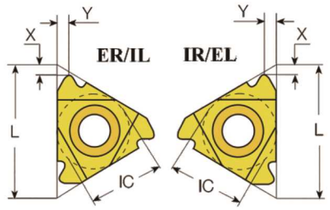
Warmer Thread

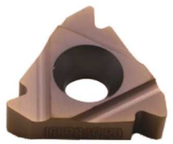


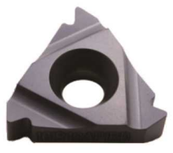
L	I.C	Pitch Of Spiral	Taper	External	Internal	X	Y
16	3/8"	8	0.75	16ER8VAM	16IR8VAM	1.8	1.8
22	1/2"	6	0.75	22ER6VAM	22IR6VAM	2.3-2.5	2.3-2.5
22	1/2"	5	0.75	22ER5VAM	22IR5VAM	2.3	2.3-2.5

American Petroleum Pipe Spiral Standard API Complete Type

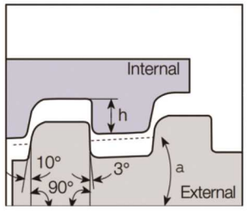


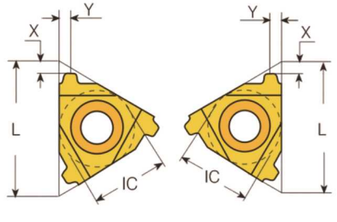


Insert Shape	I.C.	Pitch	External		L	X	Y
		TPI	Right-hand	Left-hand			
	3/8"	10	16ER10 API RD	16EL10 API RD	16	1.1	1.2
		8	16ER8 API RD	16EL8 API RD		1.4	1.3
	1/2"	10	22ER10 API RD	22EL10 API RD	22	1.5	1.7
		8	22ER8 API RD	22EL8 API RD		2.2	2.3

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

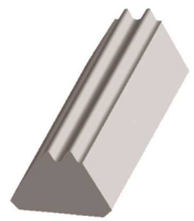
Oil Pipe Screw BUT Type

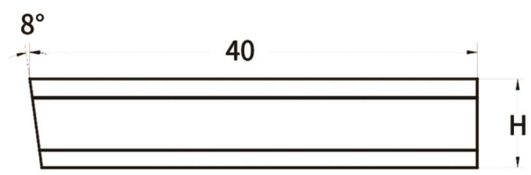


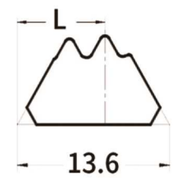


Threads	L	I.C	Taper	External	Internal	X	Y	No. Size
5	16.5	3/8"	0.75	16ER5BUT0.75	16IR5BUT0.75	1.3	1.5	41/2~133/8
5	16.5	3/8"	1.0	16ER5BUT1.0	16IR5BUT1.0	1.3	1.5	16~20

Long Oil And Casing Male Thread Inserts (External API Round Inserts)

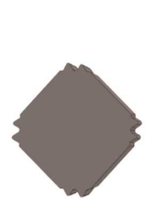


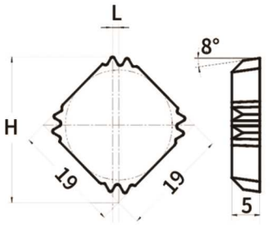




Model	Teeth Per Inch	Taper	H	L
L40VER8RD1-2	8	1:16	1.3	1.5
L40VER10RD1-2	10	1:16	1.3	1.5

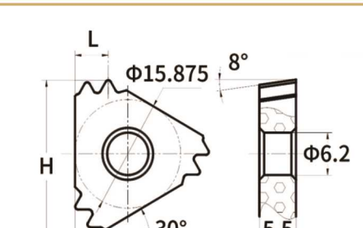
Quadrilateral Oil And Casing Internal Thread Inserts (Internal API Round Inserts)





Model	Teeth Per Inch	Taper	H	L	Chipbreaker
S19IR8RD4-2	8	1:16	1.3	1.5	M10(8)N4-DXQ
S19IR10RD4-2	10	1:16	1.3	1.5	M10(8)N4-DXQ

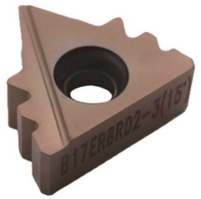
Petroleum Oil, Casing Triangle Round Buckle Two Teeth External Thread Cutter

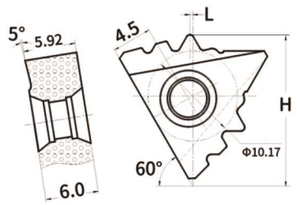


Model	Teeth Per Inch	Taper	H	L	Chipbreaker
T27IR8RD3-2	8	1:16	24.3	5.0	J10(8)N3-DXQ
T27IR10RD3-2	10	1:16	24.5	4.7	J10(8)N3-DXQ

External API Round Inserts

Disc-shaped Oil And Casing Male Thread Inserts

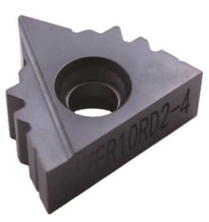


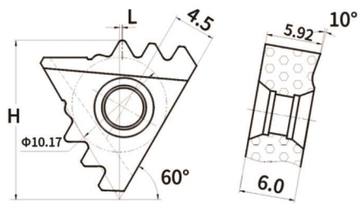


Model	Teeth Per Inch	Taper	H	L
B17ER8RD2-3(15°)	8	1:16	17.09	0.32
B17ER8RD2-3(12°)	8	1:16	17.09	0.32
B17ER10RD2-4	10	1:16	17.09	0.01

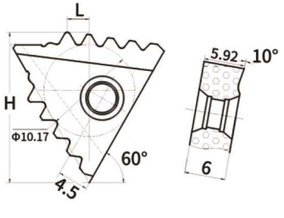
Internal API Round Inserts

Disc-shaped Oil And Casing Male Thread Inserts





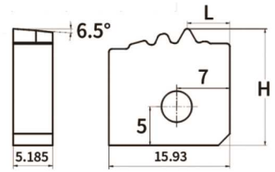
Model	Teeth Per Inch	Taper	H	L
B17IR8RDN2-3	8	1:16	17.09	0.32
B17IR10RDN2-4	10	1:16	17.09	0.01



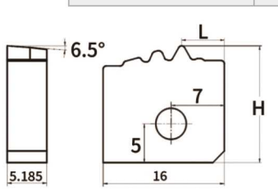
Model	Teeth Per Inch	Taper	H	L
B23IR8RD2-5	8	1:16	21.84	3.24

External API Round Inserts For PMC Machine Tools(USA)

PMC (USA) Oil And Casing Round Button Male Thread Inserts For Wire Turning Machines

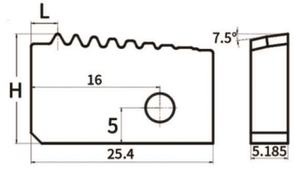


Model	Teeth Per Inch	Taper	H	L
	8	1:16		7
	8	1:16		
	8	1:16		
	8	1:16		
	8	1:16		
	8	1:16		



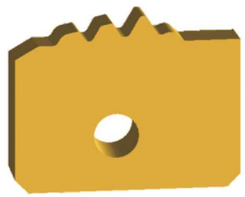
Internal API Round Inserts For PMC Machine Tools(USA)

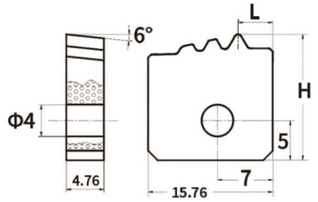
PMC (USA) Oil And Casing Round Button Male Thread Inserts For Wire Turning Machines



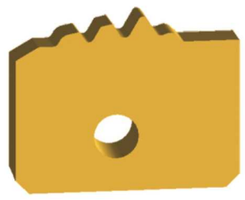
External API Round Inserts for Colinet Machine Tools

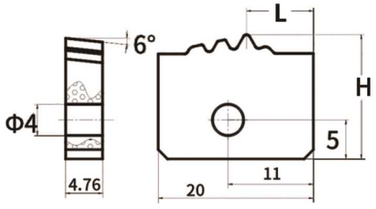
Belgium (Colinet) Oil, Casing Round Button Male Thread Inserts For Wire Turning Machines



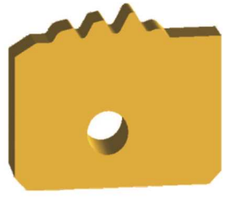


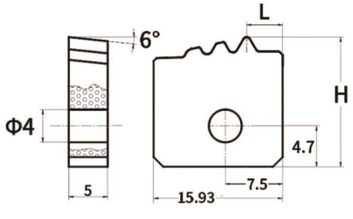
Model	Teeth Per Inch	Taper	H	L	Chipbreaker
C16ER8RD1-31(15°)	8	1:16	15.54	5.98	BXCQW1BI
C16ER8RD1-32(15°)	8	1:16	15.86	4.393	BXCQW1BI
C16ER10RD1-31	10	1:16	15.16	5.67	BXCQW1BI
C16ER10RD1-32	10	1:16	15.45	4.4	BXCQW1BI





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

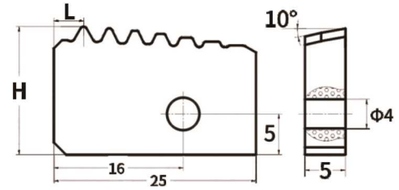




Model	Teeth Per Inch	Taper	H	L	Chipbreaker
C16ER8RD1-3	8	1:16	15.75	4.4	BXCQW1BI
C16ER10RD1-3	10	1:16	15.75	2.5	BXCQW1BI

Internal API Round Inserts for Colinet Machine Tools

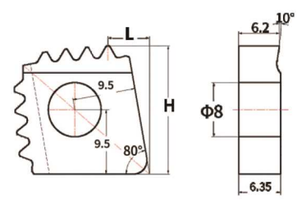
Belgian (Colinet) Inserts For Oil, Casing And Pipe Internal Threads For Wire Turning Machines With Round Button



Model	Teeth Per Inch	Taper	Threaded Buckle Type	H	L	Chipbreaker
C25IR8RD1-7	8	1:16	API	15.715	3.7	XCQN1BIII
C25IR10RD1-8	10	1:16	API	15.49	2.5	XCQN1BIII

External API Round Inserts

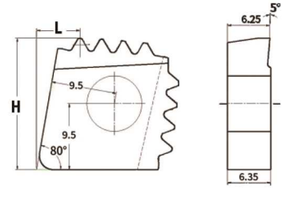
Petroleum Oil, Casing 80 ° Prismatic Round Buckle External Thread Inserts



Model	Teeth Per Inch	Taper	H	L
R19ER8RD2-4	8	1:16	18.93	6.29
R19ER10RD2-4	10	1:16	18.93	6.29

Internal API Round Inserts

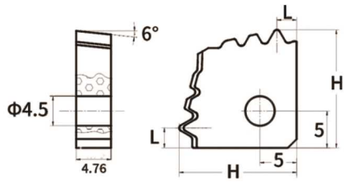
Petroleum Oil, Casing 80 ° Prismatic Round Buckle Internal Thread Inserts



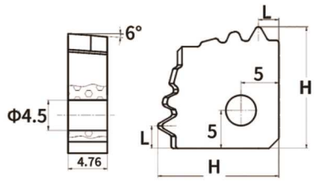
Model	Teeth Per Inch	Taper	H	L
R19IR8RD2-4	8	1:16	18.93	6.29
R19IR10RD2-4	10	1:16	18.93	6.29

External API Round Inserts

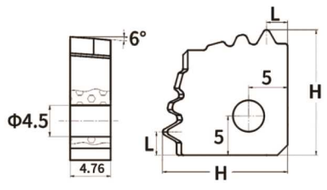
Double-sided Cutting Edge Petroleum Oil, Casing Round Buckle External Thread Inserts



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



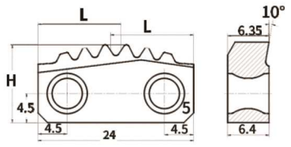
Model	Teeth Per Inch	Taper	H	L	Chipbreaker
S16ER10RD2-31	10	1:16	15.2	4.39	TA2118B
S16ER10RD2-32	10	1:16	15.53	3.547	TA2118B
S16ER10RD2-33	10	1:16	15.6	2.7	TA2118B
S16ER8RD2-31(15°)	8	1:16	15.67	4.817	TA2118B
S16ER8RD-32(15°)	8	1:16	15.92	3.76	TA2118B
S16ER8RD2-33(15°)	8	1:16	16	2.7	TA2118B



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

External API Round Inserts

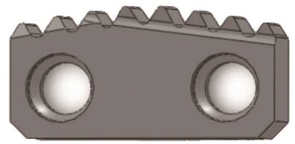
Double-hole, Double-edged Flush Mounted Petroleum Pipe Round Button External Thread Inserts

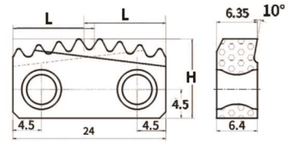


Model	Teeth Per Inch	Taper	H	L
S24ER8RD2-3	8	1:16	12	12.815
S24ER10RD2-3	10	1:16	11.93	16.48

Internal API Round Inserts

Double-hole, Double-edged Flush-mounted Petroleum Pipe Round-button Internal Thread Inserts

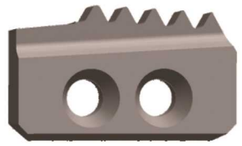


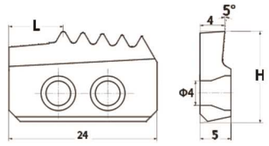


Model	Teeth Per Inch	Taper	H	L
S24ER8RD2-4	8	1:16	12.4	12.815
S24ER10RD2-4	10	1:16	12.4	12.815

Internal API Round Inserts

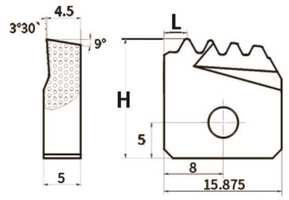
Double Hole Single Edge Flush Mounted Oil Pipe Round Buckle Internal Threading Inserts



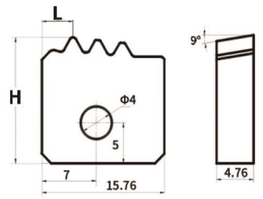


Model	Teeth Per Inch	Taper	H	L
24IR8RD1-5	8	1:16	14.85	8.8
24IR8RD1-5F	8	1:16	14.85	2
S24IR8RD1-7	8	1:16	14.85	3.4
S24IR8RD1-7F	8	1:16	14.85	3.4
S24IR10RD1-7	10	1:16	14.85	7.4

Internal API Round Inserts
Flush-mounted, Single-sided Blade Petroleum Pipe Round Button Female Thread Inserts

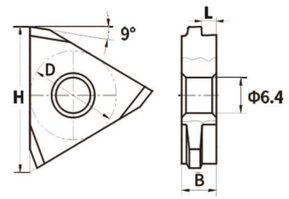


Model	Teeth Per Inch	Taper	H	L	Chipbreaker
S16IR8RD1-4	8	1:16	15.7	3.1	XCQN1BII
S16IR10RD1-5	10	1:16	15.75	2.5	XCQN1BII



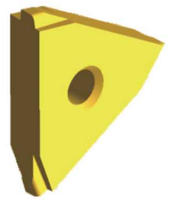
Model	Teeth Per Inch	Taper	H	L	Chipbreaker
S16IR8RD1-3	8	1:16	15.5	4.0	XCQN1BI
S16IR8RD1-3F	8	1:16	15.7	3.15	XCQN1BI

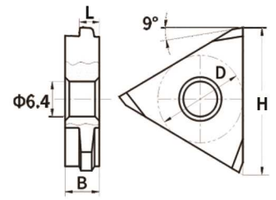
External API Round Inserts（V Style）
Oil Casing Riser Mounted Offset Ladder Button Male Thread Inserts



Model	Teeth Per Inch	Taper	Threaded Buckle Type	H	L	D	B
T28VER5BU3-1	5	1:16	API	26.2	2.76	16	6.45
T27VER5BU3-1	5	1:16	API	26.7	2.65	15.875	6.90

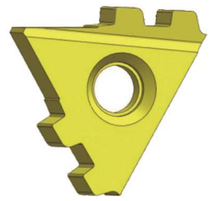
Internal API Buttress Inserts（V Style）
Oil Casing Riser Mounted Offset Ladder Button Female Thread Inserts

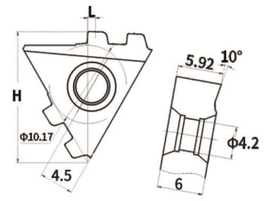




Model	Teeth Per Inch	Taper	Threaded Buckle Type	H	L	D	B
T28VIR5RU3-1	5	1:16	API	26.7	3.69	16	6.45
T27VIR5RU3-1	5	1:16	API	26.75	3.40	15.875	6.90

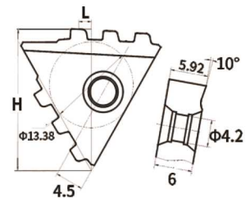
Internal API Round Inserts
Oil Casing Disc Offset Ladder Button Two Teeth Internal Thread Inserts





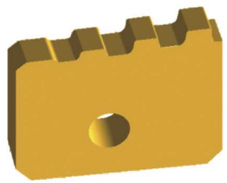
Model	Teeth Per Inch	Taper	H	L
B17IR5BU2-2	5	1:16	17.05	1.0

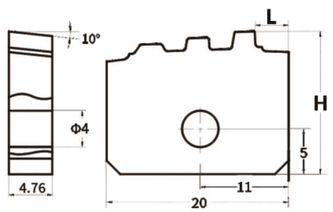
Internal API Round Inserts
Oil Casing Disc Offset Ladder Button Three Teeth Internal Thread Inserts



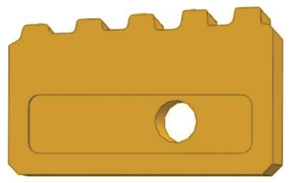
Model	Teeth Per Inch	Taper	Threaded Buckle Type	H	L
B23IR5BU2-3	5	1:16	API	22.075	2.0

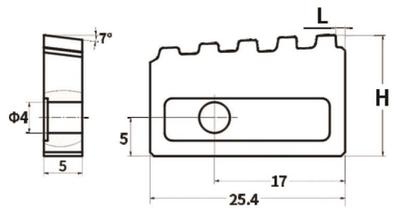
External API Round Inserts for Colinet Machine Tools
Belgian (Colinet) Inserts for Oil Casing Offset Threads for Wire Turning Machines



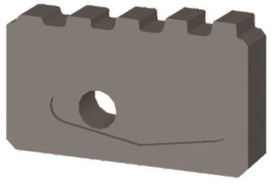


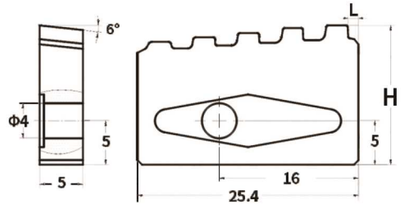
Model	Teeth Per Inch	Taper	Threaded Buckle Type	H	L
C20ER5BU1-31	5	1:16	API	26.7	3.69
C20ER5BU1-32	5	1:16	API	26.75	3.40
C5BW1-31B	5	1:16	API		
C5BW1-32B	5	1:16	API		





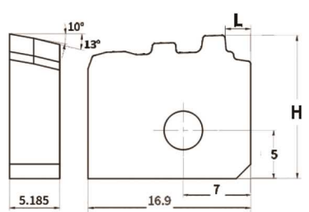
Model	Teeth Per Inch	Taper	Threaded Buckle Type	H	L	Chipbreaker
C25ER5BU1-5	5	1:16	API	15.736	1.185	BXCQW-BIII





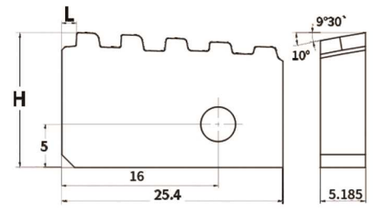
Model	Teeth Per Inch	Taper	Threaded Buckle Type	H	L	Chipbreaker
C25ER5BU1-5D	5	1:12	API	15.875	1.2	BXCQW1-BIII

External API Buttress Inserts for PMC Machine Tools
PMC (USA) Oil Casing Offset Ladder Button Male Thread Inserts For Heavy Wire Machines



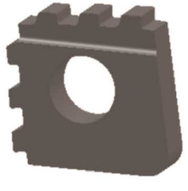
Model	Teeth Per Inch	Taper	H	L	Chipbreaker
P16ER5BU1-31	5	1:16	14.57	4.46	XP5BW1-31、XP5BW1-B
P16ER5BU1-32	5	1:16	14.84	2.74	XP5BW1-32、XP5BW1-B
P16ER5BU1-33	5	1:16	14.97	0.97	XP5BW1-33、XP5BW1-B

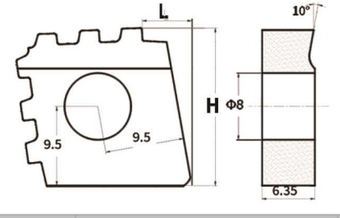
Internal API Buttress Inserts for PMC Machine Tools
PMC (USA) Oil Casing Offset Ladder Button Female Thread Inserts For Heavy Wire Machines



Model	Teeth Per Inch	Taper	H	L	Chipbreaker
P25IR5BU1-5	5	1:16	15.608	1.7	XP5BI1-5、BXPQN1C、XP5BI1-5A

External API Buttress Inserts
Oil Casing 80° Prismatic Offset Ladder Button Male Thread Inserts

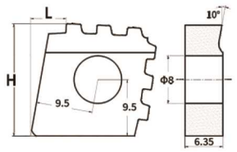




Model	Teeth Per Inch	Taper	H	L
R19ER5BU2-3	5	1:16	18.9	5.95
R19ER5BU2-3D	5	1:12	18.9	5.95

Internal API Buttress Inserts

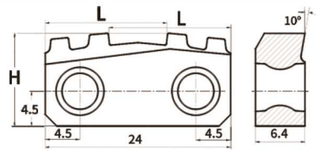
Petroleum Casing 80° Prismatic Offset Ladder Buckle With Internal Thread Blade



Model	Teeth Per Inch	Taper	H	L
R19ER5BU2-3	5	1:16	18.9	5.95
R19ER5BU2-3D	5	1:12	18.9	5.95

External API Buttress Inserts

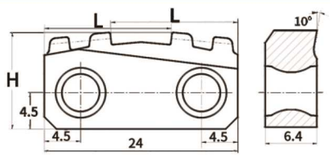
Double-hole, Double-edged Flush-mounted Petroleum Pipe Offset Ladder Button Male Thread Inserts



Model	Teeth Per Inch	Taper	H	L
S24ER5BU2-2	5	1:16	12.0	15.76

Internal API Buttress Inserts

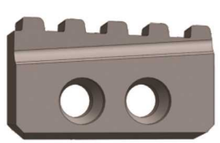
Double-hole, Double-edged, Flush-mounted Petroleum Pipe Offset Ladder Button Female Thread Inserts

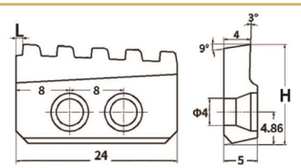


Model	Teeth Per Inch	Taper	H	L
S24IR5BU2-2	5	1:16	12.0	15.76

Internal API Buttress Inserts

Double Hole Single Edge Flush Mounted Petroleum Pipe Offset Ladder Buckle Female Threaded Inserts

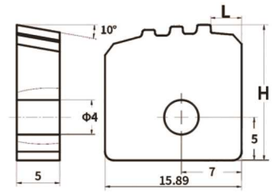




Model	Teeth Per Inch	Taper	H	L
S24IR5BU1-5	5	1:16	14.85	1
S24IR5BU1-5F	5	1:12	14.85	3.6

External API Buttress Inserts

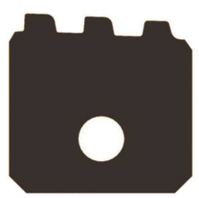
Flush Mounted Single Sided Inserts For Petroleum Pipes With Offset Ladder Button Male Threads

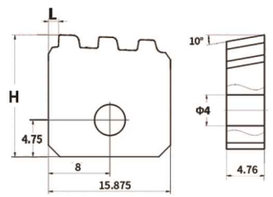


Model	Teeth Per Inch	Taper	Threaded Buckle Type	H	L	Chipbreaker
S16ER5BU1-3	5	1:16	API	15.73	1.85	BXCQW1-BI

Internal API Buttress Inserts

Flush Mounted Single Sided Inserts For Petroleum Pipes With Offset Ladder Button Female Threads

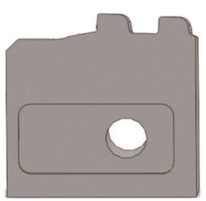


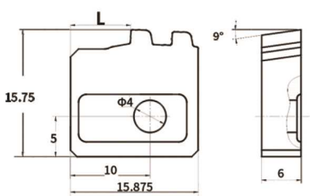


Model	Teeth Per Inch	Taper	H	L	Chipbreaker
S16IR5BU1-3	5	1:16	15.75	1.34	TG2-8T

Internal API Buttress Inserts

Flush-mounted Single-sided Cutting Edge Api Petroleum Pipe Offset Ladder Button Female Thread Cutter





Model	Teeth Per Inch	Taper	H	L	Chipbreaker
S16IR5BU1-2	5	1:16	15.75	7.65	BXCQN1B、XC5BI1-2

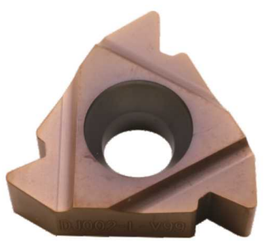
Petroleum Drill Pipe Threaded Inserts Model Numbering Instructions

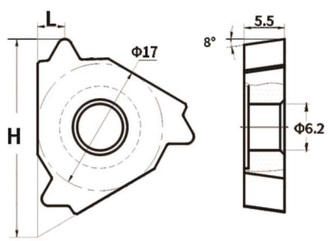
22	E	R	V38R	-	04	02	A
1	2	3	4		5	6	7

2、Thread Standard

External Threaded Inserts
I

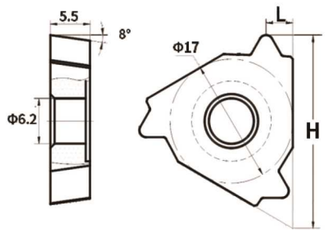
Petroleum Drill Pipe (joint) Type A External threaded inserts





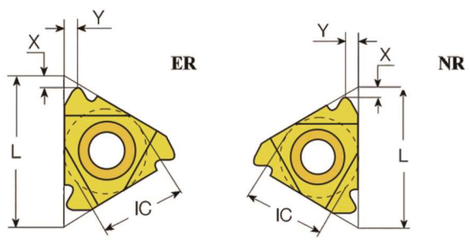
Model	Teeth Per Inch	Taper	Tbutton Type	H	L
29ERV38R-0405A	4	1:16	V-0.038R	26.51	3.7
29ERV38R-0402A	4	1:6	V-0.038R	26.51	3.7
29ERV38R-0403A	4	1:4	V-0.038R	26.51	3.7
29ERV40-0503A	5	1:4	V-0.040	26.96	3.7
29ERV50-0403A	4	1:4	V-0.050	26.83	3.7
29ERV50-0402A	4	1:6	V-0.050	26.83	3.7
29ERV50-0404A	4	1:12	V-0.050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

Petroleum Drill Pipe (Joint) Type A Internal threaded inserts



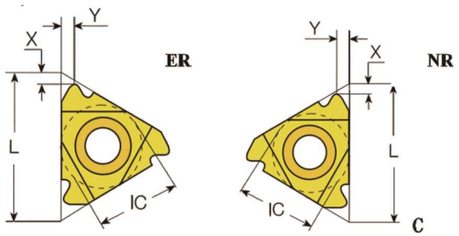
Model	Teeth Per Inch	Taper	Tbutton Type	H	L
29IRV38R-0405A	4	1:16	V-0.038R	26.51	3.7
29IRV38R-0402A	4	1:6	V-0.038R	26.51	3.7
29IRV38R-0403A	4	1:4	V-0.038R	26.9	3.7
29IRV40-0503A	5	1:4	V-0.040	26.51	3.7
29IRV50-0403A	4	1:4	V-0.050	26.96	3.7
29IR4V50-0402A	4	1:6	V-0.050	26.83	3.7
29IRV50-0404A	4	1:12	V-0.050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

Petroleum Drill Pipe (Joint) Type B Internal threaded inserts



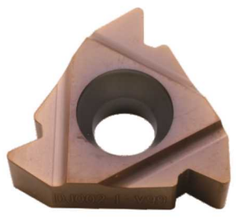
Teeth	L	I.C	Taper	External	Internal	Tbutton Type	X	Y	No. Size
5	27	5/8"	1:4	27ERV40-0503B	27IRV40-0503B	V-0.040	1.8	2.5	23/8~21/2REG
4	27	5/8"	1:6	27ERV38R-0402B	27IRV38R-0402B	V-0.038R	2.1	2.8	NC23~NC50
4	27	5/8"	1:4	27ERV38R-0403B	27IRV38R-0403B	V-0.038R	2.1	2.8	NC56~NC77
4	27	5/8"	1:6	27ERV50-0402B	27IRV50-0402B	V-0.050	2.0	3.0	25/8REG
4	27	5/8"	1:4	27ERV50-0403B	27IRV50-0403B	V-0.050	2.0	3.0	51/2、75/8 85/8REG

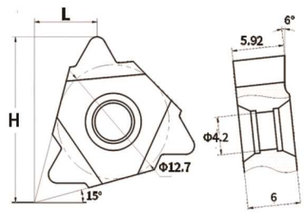
Petroleum Drill Pipe (Joint) Type C Threaded Inserts



Teeth	L	I.C	Taper	Tbutton Type	External	Internal	X	Y
4	22	1/2"	1:6	V-0.038R	22ERV38R-0402C	22IRV38R-0402C	2.1	2.8
4	22	1/2"	1:4	V-0.038R	22ERV38R-0403C	22IRV38R-0403C	2.1	2.8
5	22	1/2"	1:4	V-0.040	22ERV40-0503C	22IRV40-0503C	1.8	2.5
4	22	1/2"	1:6	V-0.050	22ERV50-0402C	22IRV50-0402C	2.0	3.0
4	22	1/2"	1:4	V-0.050	22ERV50-0403C	22IRV50-0403C	2.0	3.0
6	22	1/2"	1:8	V-0.055	22ERV55-0601C	22IRV55-0601C	1.7	2.0
4	22	1/2"	1:6	V-0.065	22ERV65-0402C	22IRV65-0402C	2.2	2.65

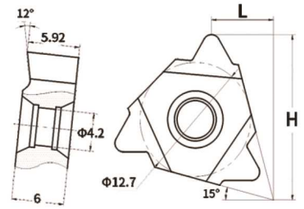
Petroleum Drill Pipe (Joint) Type D External Threaded Inserts





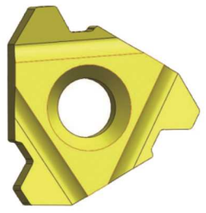
Model	Teeth Per Inch	Taper	Tbutton Type	H	L
22ERV38R-0402D	4	1:6	V-0.038R	18.43	7.13
22ERV38R-0403D	4	1:4	V-0.038R	18.43	7.13
22ERV40-0503D	5	1:4	V-0.040	18.43	7.13
22ERV50-0403D	4	1:4	V-0.050	18.58	7.13
22ERV50-0402D	4	1:6	V-0.050	18.43	7.13
22ERV55-0601D	6	1:8	V-0.055	17.75	6.85
22ERV65-0402D	4	1:6	V-0.065	18.50	7.3

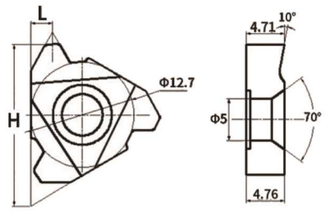
Petroleum Drill Pipe (Joint) Type D Internal Threaded Inserts



Model	Teeth Per Inch	Taper	Tbutton Type	H	L
22IR4API382D	4	1:6	V-0.038R	18.43	7.13
22IR4API383D	4	1:4	V-0.038R	18.43	7.13
22IR5API403D	4	1:4	V-0.038R	18.43	7.13
22IR4API503D	5	1:4	V-0.040	18.58	7.13
22IR4API502D	4	1:6	V-0.050	18.43	7.13
22IR4API575D	4	1:8	V-0.050	18.43	7.13
22IR4AP1652D	4	1:6	V-0.050	18.50	7.3

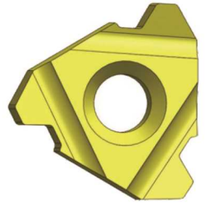
Petroleum Drill Pipe Type PAC Internal Threaded Inserts

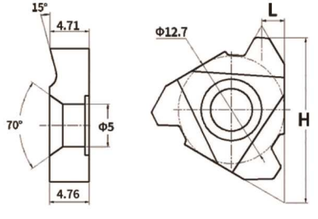




Model	Teeth Per Inch	Taper	扣型 Tbutton Type	H	L
22ER4PAC	4	1:8	V-0.076	19.5	2.7

Petroleum Drill Pipe Type PAC External Threaded Inserts



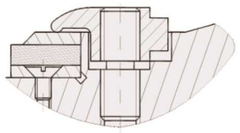
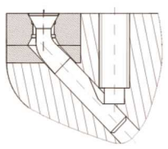
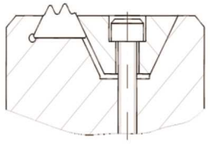


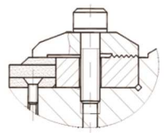
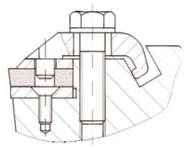
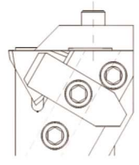
Model	Teeth Per Inch	Taper	Tbutton Type	H	L
22IR4PAC	4	1:8	V-0.076	19.5	2.7

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

1、

The Letters M, C, P, J, F And G Are Used To Indicate The Different Types Of Blade Clamping Methods, The Specific Meanings Of Which Are Shown In The Table Below:

Clamping Form	Clamping Code	Diagram Form
	M	
M: Hook Nut Top Press		
	P	
P: Skewed bar inner pull taper compression		
	F	
F: Lateral compression of wedge ramps		

Clamping Form	Clamping Code	Diagram Form
	C	
C: Serrated Platen Top Press		
	J	
J: with mandrel lever bevelled for bi-directional pressing		
	G	
G: Vertical blade side compression		

2、 Toolbar	
E	External Toolbar
I	Internal Toolbar

3、 Gesture	
R	Right-handed
L	Left-handed

4、

The Use Of 00 Indicates An Internally Threaded Round Shank Toolholder, The Square Shank Toolholder Is The Centre Height Of The Tool (mm).

5、

Shank Thickness (mm) For Square Shank Shanks And Shank Diameter (mm) For Round Shank Shanks.

6、

Indicates The Total Length Of The Toolholder (mm).

7、

Indicates The Form Of The Blade, With "/" Separating Multiple Blades Of A Composite Toolholder.

8、

The Letters A, B, C And D Are Used To Denote The Range Of Diameters Of Oil Pipes, Casing And Drill Pipes Being Processed As Shown In The Table Below:

Name of Petroleum Pipe	Pipe Diameter			
	A	B	C	D
Petroleum Oil Pipe, Casing (processing Of V-shaped Round Threads)	$2\frac{3}{8}$" ~ $3\frac{1}{2}$"	$4\frac{3}{8}$" ~ $5\frac{1}{2}$"	$6\frac{5}{8}$" ~ $8\frac{5}{8}$"	$9\frac{5}{8}$" ~ $13\frac{3}{8}$"
Petroleum Drill Pipe	$2\frac{3}{8}$" ~ $3\frac{1}{2}$"	4" ~ $5\frac{1}{2}$"	$6\frac{5}{8}$" ~ $8\frac{5}{8}$"	
Petroleum Casing (machining Of Offset Trapezoidal Threads)		$4\frac{1}{2}$" ~ $6\frac{5}{8}$"	7" ~ $11\frac{3}{4}$"	$13\frac{3}{8}$" ~ 20"

9、

Special Remarks May Be Omitted If No Such Remarks Are Required.

The Use Of Carbide Petroleum Pipe Threading Tools

1、The Three Elements That Affect The Processing Quality Of Petroleum Pipe Threads And The Cutting Performance Of Tools

(a) External elements of the tool itself. Contain:

① Rationality of tool structure design:

② Precision of blade edge and tooth shape, finish and surface tissue

③ Blade edge strengthening quality;

④ Tool bar manufacturing accuracy and accessories such as chip breaker quality.

(b) Intrinsic elements of the blade itself. Mainly includes:

① Blade base material quality and properties;

② Blade surface coating quality and performance;

③ Tool rod material and heat treatment performance.

(c) Elements of blade use. Mainly contains:

① The correct selection and use of the tool;

② Thread processing equipment status;

③ Cutting cooling method and effect;

④ The machinability and material uniformity of the processed material;

⑤ Correct selection of thread machining cutting specifications.

Elements (a) and (b) depend on the tool producer unit, and elements (c) depend on the tool user unit. The importance of rational use of tools can be seen.

2、Two Ways Of Threading Petroleum Pipes

The first: thread turning method :(oil, casing and drill pipe thread processing are used)

The characteristics of its cutting movement are:

Workpiece (tube body or collar, joint)- rotating motion. Generate the main cutting motion.

Tools (thread tools and pull-out knives)- for cutting motion and intermittent cutting along the direction of the taper thread bus.The thread turning method is the most widely used thread processing method of petroleum pipeline. Among them, there are single blade cutting and a group of blades (generally two blades) with a combination of cutting tools, depending on the conditions and the wire turning machine. The thread processing of drill pipe joint adopts the single tool thread turning method.

The second: threading head processing method :(only oil, casing thread processing)

The characteristics of its cutting movement are:

The workpiece (tube or collar)- is positioned firmly and stationary during cutting.

Tool (thread tool and cutting tool)- for the main cutting motion rotating around the axis of the workpiece and at the same time for the direction of the taper thread bus and intermittent cutting motion.

The machining methods of thread cutting head are divided into two kinds: external cutting head and internal cutting head. Used for mass production of tubing, casing and its coupling processing, high production efficiency. The outer cutting head generally contains a group of threaded blades with three blades and a group of cutting knives, and the inner cutting head contains a threaded blade and multiple cutting blades.

3、Suggestions For The Selection Of Carbide Petroleum Pipe Thread Inserts

1. Tubing casing thread blade:
(A) Conditions for mass production
(a) Selected blades for thread turning machines with thread cutting head processing:
Machining external thread (group blade) has:
P16ER8RD1-31; P16ER8RD1-32; P16ER8RD1-33; P16ER10RD1-31; P16ER10RD1-32; P16ER10RD1-33; P16ER5BU1-31; P16ER5BU1-32; P16ER5BU1-33and so on.
Machining internal threads are:
P25IR8RD1-7; P25IR10RD1-8; P25IR5BU1-5;
(b) Selected blades for thread turning machines:
Machining external thread group blades are:
C16ER8RD1-31; C16ER8RD1-32; C16ER10RD1-31; C16ER10RD1-32; C20ER5BU1-31; C20ER5BU1-32
Single blade has:
B17ER8RD2-3; B17ER10RD2-4; B17ER5BU2-2;S24ER8RD2-3; S24ER5BU2-2; SC16ER8RD2-3; SC16ER10RD2-4;R19ER8RD2-4; R19ER5BU2-3; R19ER5BU2-3D;
S24IR8RD1-7; S24IR8RD1-7F; S24IR10RD1-7; S24ER5BRD1-3,C25ER5BU1-5; C16ER8RD1-3; C16ER10RD1-4;
Machining internal thread:
C25IR8RD1-7; C25IR10RD1-8; C25IR5BU1-5; C16IR5BU1-2; C16IR5BU1-3;B17IR8RD2-3; B23IR8RD2-5; B17IR10RD2-4; B23IR5BU2-3; B17IR5BU2-2;S16IR8RD2-4;
S16IR5BU2-2;R19IR8RD2-4; R19IR5BU2-3; S19IR5BU2-3D; S24IR5BU1-5; S25IR5BU1-5F; S24IR8RD1-3; S24IR8RD1-5
(B) Small batch production conditions (all using thread turning processing) selected blades:
Machining external thread:
L40ER10RD1-2; L40ER8RD1-2; T27ER8RD3-2; T27ER10RD3-2;16ER8APIRD; 16ER1OAPIRD; T28ER5BU3-1;
Machining internal thread:
S19IR10RD4-2; S19IR8RD4-2; T27IR10RD3-2; T27IR8RD3-2;16IR8APIRD; 16IR10APIRD; T28IR5BU3-1.
2、drill pipe thread blade (all using thread turning processing):
Type A blade: universal.
Type B blade: preferably, the blade and the tool bar have strong universal interchangeability.
Type C blade: mainly suitable for the processing of internal and external threads of rod joints of small size below 3 ".

4、Petroleum Pipe Thread Insert Cutting Graphics

It is very important to improve thread machining quality, efficiency and tool life that how to design the cutting pattern of each tooth structure reasonably and how to distribute the cutting load of each tooth. Single-tooth blades (such as drill pipe joint blades) have the cutting pattern problem that different feed designs and cutting methods determine each cutting stroke, and are not determined by the shape structure of the tool teeth.

1、A cutting stroke to complete the full thread cutting:

When the power and rigidity of the machine tool are large enough, the scheme to complete the full-thread cutting with one stroke is the best scheme, which can significantly improve the efficiency, and the most reasonable cutting pattern can be designed to improve the life of the thread blade. It must be noted that whether it is a thread cutting stroke or multiple strokes to complete the thread cutting blade, the last fine turning tooth is to ensure the accuracy of the thread shape, must cover the full thread shape and contain a reasonable cutting amount in each part. (The side of the two teeth is 0.07-0.12mm, the base of the tooth is 0.10-0.20mm)

Example 1: Cutting diagram of internal thread of casing collar round thread of P25IR8RD1-7 (Figure 1)

Example 2: P16ER8RD1-31/P16ER8RD1-32/P16ER8RD1-33 three piece casing pipe body round thread cutting diagram (Figure 2)

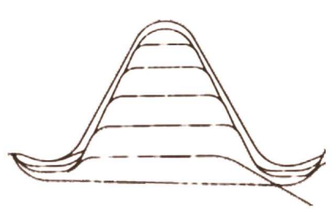


Fig. 1

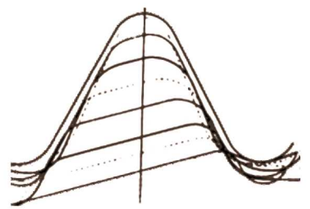


Fig. 2

2、 Multiple cutting stroke to complete the full thread cutting:

The power and rigidity of the wire turning machine can not meet the condition that the full thread cutting can only be completed by multiple cutting strokes. At this time, the first stroke cuts the main margin, especially for the blade with more than 3 teeth, so the cutting graphic design of the threaded blade is based on the distribution of the first stroke. The subsequent stroke for each coarse gear, the cutting amount is small.

Example 1: Female thread cutting pattern for B23IR8RD2-5 casing coupling threads (Fig. 3)

First Trip Fig. 3 Second Trip

Example 2: Female thread cutting pattern for P25IR5BU1-5 casing coupling offset trapezoidal thread (Fig. 4)

First Trip Fig. 4 Second Trip

5、Petroleum Oil Pipe Casing Round Thread Insert Fine Turning Tooth Bottom "double Arc" Structure

As shown in Figure 5, oil pipeline and casing and its hoop processing of circular thread inserts, the bottom of the teeth on both sides of the fine-turning teeth using a "double arc" structure, that is: R1 and R2 two arc segments, and R2≈R1+(0.2-0.3), (R1 0.508mm or 0.432mm), practice has proved that, to avoid workpiece It has been proved that it can avoid the defects such as "small flat top buckle" and "butt" marking on the top of threaded teeth.

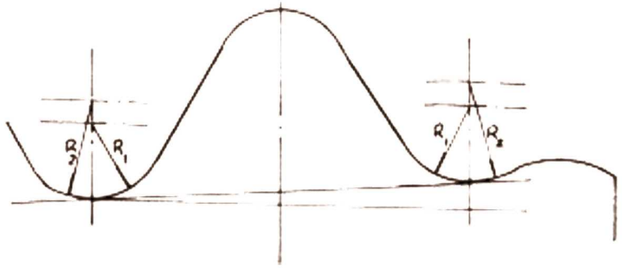


Fig. 5 Blade Fine Turning Teeth

6、Several Types Of Petroleum Pipe Thread Insert Grooves And Cut-offs

Four types of threaded insert slot or chipbreaker configurations are used as shown in figure 6.

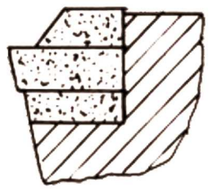
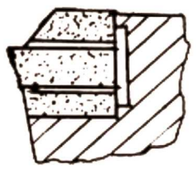
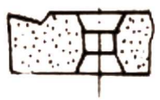
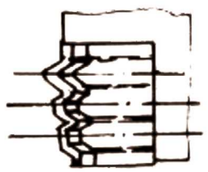
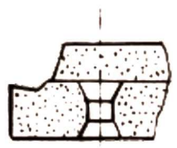
		
		Type III Chipbreaker
		
Type I Flat Type Chip Breaker	Type II Toothed Chip Breaker	Type IV Chip Breaker + Chip Breaker

Fig. 6

It must be pointed out that the problem of chip breakage in oil pipe thread machining is one of today's technical problems, and it is more preferable in multi-tooth inserts, especially the chip breakage of fine-turned teeth is the most difficult. The above insert groove shape and chipbreaker structure can significantly improve the chip removal and rolled chip condition, as well as partially break the chip.

7、Several Forms Of Petroleum Pipe Thread Insert Clamping Structure And Toolholder Structure

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

The head of the tool bar is the part that holds the blade, and the handle is the part that is loaded into the tool holder (or tool seat).

The structure of the head of the tool bar, that is, the part of the clamping blade, is mainly determined according to the shape of the blade. In addition to the requirement that it has sufficient strength and rigidity, it is also necessary to ensure the rigidity of the clamping blade, the reliability and accuracy of the positioning, the convenience of use, and the requirements of chip removal and chip breaking.

Blades with different structural shapes have corresponding clamping structures. Refer to cemented carbide oil pipe thread tool rod model annotation.

The upper pressure type (M and C structure) is a clamping structure of a square blade (or a sector blade) without holes. Mostly used for processing oil, casing collar internal thread. Both ends of the screw of the hook nut have left and right threads and act as a clamping plate to clamp the blade and the chip guide plate into the inner pull type (P structure) of the inner pull type clamping structure with a double taper hole blade. Two-way clamping function. The blade double taper holes shall ensure the required precision. It is characterized by compact structure, reliable positioning and high blade material utilization. Oil, casing, drill pipe and other blades (double taper hole blades) are suitable.

The bevel bidirectional clamping structure (J structure) with the core rod press plate is mainly used in the clamping of the threaded blade of the drill rod joint and the triangular straight hole blade of the tubing thread of the sucker rod component.

Wedge bevel side clamping (F structure) is used for the clamping structure of ribbed long strip uncoated regrindable blades. Used in oil, casing pipe external threading processing, clamping firmly, the blade can be worn along the front edge surface for regrinding to use. The center height of the blade can be adjusted as needed.

Vertical blade side compression (G structure) is mainly used for vertical triangular indexable partial trapezoidal casing thread single-tooth blade mounting structure. The strength and rigidity of the blade are good, and the clamping is firm. The structure is clamped in two directions of upper pressure and side pressure respectively.

The handle of the tool bar is loaded into the tool holder (or tool holder), and the general tool bar handle section is square or rectangular. In some CNC wire turning machines that process internal threads, the stem section is circular. The size of the handle should ensure that the tool bar has sufficient strength and rigidity, and the extension length of the tool bar head should be as small as possible to prevent cutting vibration and thread surface ripple.

In most cases, the shank and head of the tool bar are an integral structure, but there are also modular assembly structures that partially separate the head and handle, mainly used on the internal thread tool bar, as shown in the figure. When the head is damaged, only the head needs to be replaced, not the whole tool bar.

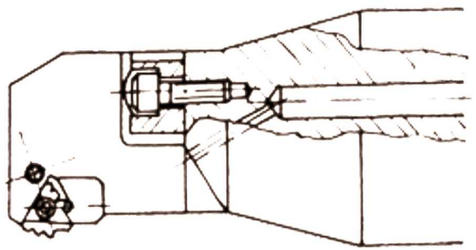


Fig. 7

In order to keep both sides of the insert have approximately the same side edge normal back angle when machining threads, the insert needs to be mounted on the shank and tilted at an angle, the value of which should be equal to or close to the helix angle of rise of the thread. The value should be equal to or close to the spiral rise angle of the thread. Therefore, it is related to the pitch and the diameter of the thread. This tilt angle has been processed in the toolholder, about 0 ° ~ 120 ° between, divided into four grades. Therefore, the user should select the corresponding toolholder specifications after the pipe thread specifications (diameter and pitch) have been determined. A, B, C and D in the description of the toolholder in this catalogue indicate the specifications of the toolholder for different pipe diameters.

The shanks and shank parts should be made of high quality steel and heat treated to maintain and achieve the required hardness and strength, and the chip breaker should be made of hard alloy with good performance. The base surface and positioning surface of the toolholder should be ground to achieve the required precision.

8、Suggestions For Selecting The Cutting Volume Of Petroleum Pipe Thread Inserts

Cutting Speed Recommendation Table

Insert Type	Workpiece Steel Grade					
	Ordinary Grade Steel	Next Highest Steel Grade	High Steel Grade	Anti-s	Anti-extrusion	High Cr, High Ni
	J55 As A Representative Of Other Such As H40, K55, M65, etc.	N80 For Others Such As C75, L80, etc.	P110 For Others Such As C90, T95, Q125, etc.	N80+S、P110+S，etc	N80+T、P110+T，etc	13Cr，etc
	Cutting Speed (m/min)					
Uncoated Inserts	90~120	80~100	—	—	—	—
Coated Inserts	170~220	150~200	120~180	120~180	100~160	50~100

Note: Tabulated Data Are For Selection With Adequate Cooling With Coolant; For Dry Cutting The Speed Should Be 20 Per Cent Lower.

Recommended Number Of Passes And Depth Of Draft For Each Pass

Insert Type Specification			Tool Travel Sequence											
			1	2	3	4	5	6	7	8	9	10	11	12
			Depth Of Cutter Eating (mm)											
8 Round Threads Per Inch	Internal	2-teeth Inserts	0.60	0.40	0.35	0.30	0.20	0.20						
		3-teeth Inserts	0.80	0.60	0.40	0.20								
		5-teeth Inserts	1.75	0.25										
		7-teeth Inserts (2 Times)	1.80	0.20										
		7-teeth Inserts (1 Times)	2.00											
	External	2-teeth Inserts	0.70	0.45	0.40	0.20	0.20							
		2-teeth Inserts	0.85	0.60	0.35	0.25								
		3-teeth Inserts(2-piece set)	2.00											
		3-teeth Inserts(2-piece set)	2.00											
10 Round Threads Per Inch	Internal	2-teeth Inserts	0.55	0.40	0.35	0.20	0.15							
		3-teeth Inserts	0.80	0.55	0.20									
		4-teeth Inserts	1.00	0.50	0.15									
		8-teeth Inserts	1.60											
	External	2-teeth Inserts	0.55	0.50	0.35									
		3-teeth Inserts	0.90	0.55	0.15	0.20								
		4-teeth Inserts	1.05	0.50	0.15									
		3-teeth Inserts(2、3-piece set)	1.60											
5 offset trapezoidal round threads per inch	Internal	Single Toothed Vertical Inserts	0.35	0.30	0.25	0.25	0.20	0.20	0.20					
		3-teeth	0.50	0.40	0.35	0.30	0.20							
		5-teeth	1.30	0.45										
	External	Single Toothed Vertical Inserts	0.45	0.35	0.30	0.25	0.25	0.20						
		2-teeth	0.45	0.40	0.35	0.35	0.20							
		3-teeth	0.55	0.50	0.40	0.30								
		3-teeth (3-piece set)	1.75											
5 offset trapezoidal round threads per inch	Internal	Single Tooth Inserts	0.50	0.45	0.40	0.40	0.35	0.30	0.25	0.20	0.15	0.15	0.10	
		Single Tooth Inserts	0.50	0.45	0.45	0.40	0.35	0.35	0.35	0.30	0.30	0.25	0.15	0.10
		Single Tooth Inserts	0.45	0.45	0.40	0.40	0.30	0.30	0.25	0.20	0.20	0.10		
	External	Single Tooth Inserts	0.50	0.45	0.45	0.40	0.35	0.30	0.30	0.25	0.20	0.10		
		Single Tooth Inserts	0.55	0.50	0.45	0.40	0.40	0.35	0.35	0.35	0.30	0.20	0.10	
		Single Tooth Inserts	0.50	0.45	0.40	0.40	0.35	0.35	0.25	0.20	0.10			

9、A Number Of Issues Should Be Noted In The Use Of Petroleum Pipe Threading Tools

(1) Before use, the user should understand the tool structure, processing requirements and use requirements.

(2) The tool bar must be correctly and firmly installed on the tool holder (or tool holder). Before installation, the base surface of the tool holder and tool bar should be wiped clean. The base surface of the tool bar handle of the ordinary turning machine should be straightened by a dial indicator so that it is parallel or perpendicular to the thread axis. The alignment error should be within 0.015MM/100MM. Otherwise, it will cause thread profile error or even overshoot.

(3) The threaded blade should be correctly installed in the blade slot of the tool bar. Hold the side positioning surface of the blade firmly by hand, and then wipe the ash tightly and discharge the screw. Blade positioning should be correct and reliable, clamping firmly. The clamping screw discharge or other clamping parts and chip breakers should be replaced in time if they are harmful to the soil, so as not to damage the thread blade during cutting. Each time the blade is changed, the blade groove on the tool bar and the base surface of the blade should be wiped clean, and no debris should be inserted, otherwise the positioning accuracy will be affected or the blade will be broken.

(4) The machine tool plate must be adjusted to reduce the machining thread error.

(5) According to the different thread diameter and pitch size, the bottom surface of the blade groove on the threaded tool bar has different edge angles to adapt to the changing needs of the spiral Angle and improve the situation of the side and back Angle of the blade. The user should pay attention to the selection of the tool bar. (See original sample K12 true)

(6) In the processing process, attention should be paid to the surface state of the thread, the blade edge shape of the bear and the running state of the wire machine, in order to adjust the operation in time and maintain the normal processing. Thread surface defects are the most common ripple and trace, the shadow of its appearance more factors, there are threaded blades, machine tools and so on. Scratches may occur because of the finish of the blade, or because the blade has a small chip or notch, or because the blade is stuck to the chip or because of chip scratching. When the bottom arc is full arc on one side, it is most likely to appear "butt" marking (referring to the oil and casing round thread). When machining the thread, the depth of the cutting tool is not so that the margin of the withdrawal can not be completed, and there will be obvious scratches on the top of the thread. When the rigidity of the machine tool system is poor, it is easy to buckle the top notch at the end of the pipe (when the blade is cut). The ripple on the surface of the thread is caused by the vibration of the system, which may be caused by poor system stiffness, poor machine power, or because the blade is too sharp (such as the edge of the unlip blade is not strengthened), or because the blade is too worn, or because the natural vibration frequency of the system is close to the forced vibration frequency during cutting. If the above marking and ripple defects occur, they should be treated according to the specific circumstances and causes.

(7) When processing oil pipe threads, the thread accuracy must be checked by single filling instrument and thread gauge machine. If the height and shape Angle in the thread parameter check are abnormal, it is usually related to the shape accuracy of the blade. The blade shape accuracy must be checked by machine or replaced with a new blade. If the sharp point of the finishing tool is produced, it is easy to cause high increase overshoot. Tip wear is easy to cause height reduction and overshoot. Correspondingly, it will also affect the shape of the Angle. Other thread parameters such as pitch, degree, tightness and other differences are often related to improper adjustment of the machine tool, the need to readjust the machine tool.

(8) The correct sharpening of the blade edge is crucial to the threading process. The finished product of the coated thread blade itself has undergone a reasonable cutting edge strengthening process in the manufacturer. The cutting edge rounding radius should be selected as R= 0.04-0.06mm. The chamfering radius of the top and bottom of the blade should be uniform, and the difference should not be too large. Uncoated resharpenable blades are often not strengthened at the manufacturer's edge. If there is an abnormal situation (such as ripples, etc.) during the processing, the operator can use a small triangular stone (silicon carbide or diamond stone) to carefully grind the blade along the direction of the cutting edge to achieve the cutting edge strengthening requirements. The edge of the resharpened blade should also be treated in the same way.

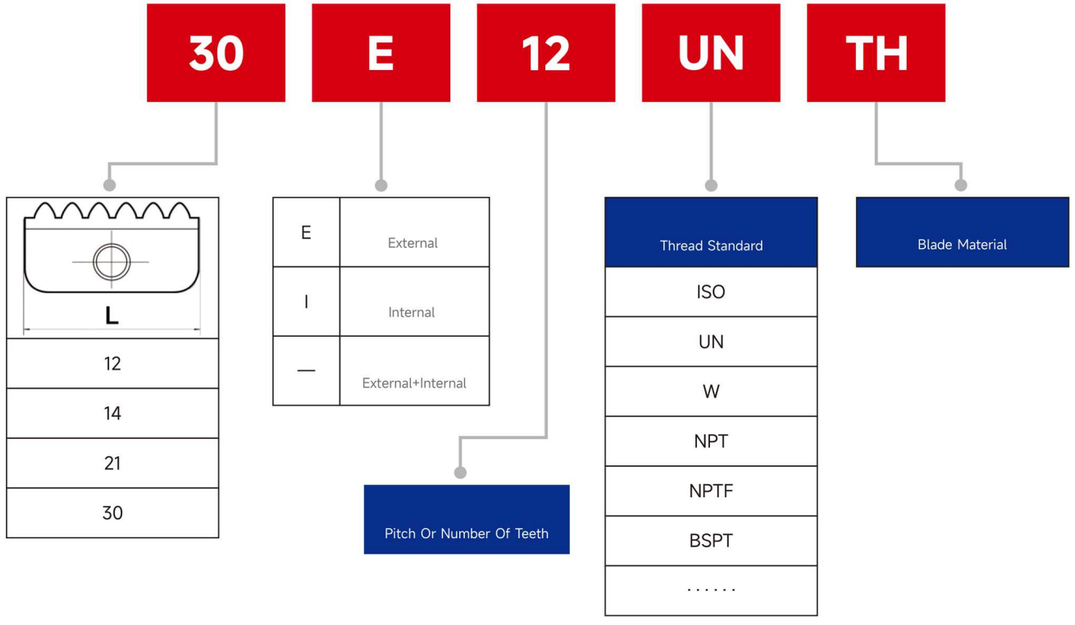
(9) Under the current circumstances, the oil pipe thread processing must be fully cooled, still in the form of cold liquid supply. This is an important factor to improve the quality of threaded products and tool durability. The cold liquid should be sprayed right into the cutting part of the knife. High pressure cold liquid injection is available when conditions permit. The cold liquid is directly injected into the cutting area of the blade at high pressure through the front edge or bottom surface of the blade and the small groove of the chip breaker or gasket, and the effect is clear. And it is beneficial to increase the chip removal effect.

(10) Regrinding of the blade: the coated blade is generally not suitable for regrinding. Uncoated blades should generally be reground. During regrinding, only the front edge surface of the blade is sharpened, and the direction of the front edge surface of the original blade is re-sharpened. The blade or bar should not be reground by hand on the grinder, but should be reground with a special fixture on the tool grinder. Grinding wheel specification push:

JR1, 120#-180# particle size, 75% concentration: S. BW100×20×35

Causes Of Common Problems In Use And Recommended Solutions

FAQ	Causes And Recommended Actions
Vibration and ripples during cutting	(1) Check whether the rigidity of the system is enough, whether the extension of the workpiece and the tool bar is too long, whether the main shaft bearing is properly adjusted, whether the blade is firmly clamped, etc. (2) Reduce or increase the spindle one to two speed test processing, choose to avoid the number of revolutions generated by ripples. (3) For non-coated blades, if the blade has not been strengthened, the cutting edge can be gently ground with a fine stone on the spot (along the direction of the cutting edge). Or after machining a workpiece at a new cutting edge, the ripple can be reduced or eliminated.
Blades wear out quickly and have low durability	(1) Check whether the cutting amount is too high, especially whether the cutting speed and the depth of the cutting tool are too large. Make adjustments. (2) Whether sufficient coolant is not supplied. (3) Cutting squeezes the edge, causing a slight edge collapse and increasing tool wear. (4) The blade clip is not firmly fixed, or it is loosened during the cutting process. (5) The quality of the blade itself.
Large chunks of blade chipped or shattered	(1) Whether there is debris or hard particles in the slot of the blade, and cracks or stresses have been generated during clamping. (2) The chips are wound and peed during the cutting process. (3) The blade is accidentally collided during the cutting process. (4) The pre-cutting tool of the cutting tool, such as the cutting tool, causes the subsequent cracking of the thread blade. (5) When the machine tool is operated by hand, when it is withdrawn for many times, the blade load will increase abruptly due to the slow repulsive action of the following times. (6) The material of the workpiece is uneven or the machinability is poor. (7) The quality of the blade itself.
Pipe thread tooth shape error exceeds the tolerance	(1) The cutting edge of the blade finishing gear has been worn, and a new blade needs to be replaced. (2) The "sharp" phenomenon of blade precision turning should be properly reduced cutting speed and cutting depth.(3) The blade or tool holder is not installed correctly. For example, when the tool bar is installed, the base surface is not found, and the base surface of the blade is not secure. (4) The blade has a small collapse edge, should be changed in time. (5) The chip on the blade, should be appropriate to increase the cutting speed, or gently grind with a fine stone to remove the chip, or replace the blade.



Recommended Cutting Parameters Table

ISO	Workpiece Materials	Workpiece Materials	
		GY01	GY03
P	Mild And Medium Carbon Steel	100-250	115-280
	High Carbon Steel	110-180	130-200
	Alloy Steel	90-160	105-180
M	Stainless Steels	110-170	130-190
	Cast Steel		150-190
K	Foundry Iron	130-170	80-150
N	Nonferrous Metals	70-150	180-340
	Synthetic Materials, Thermoplastics	160-300	115-460
S	Mild And Medium Carbon Steel	100-400	25-90

进给速度：0.05-0.15

20-80

Precautions For Milling Threads

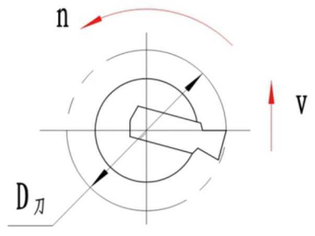
In most cases, select the mid-range value when you first start using the tool, and reduce the cutting speed for harder materials.
For deep hole machining, reduce the cutting speed and feed rate to 20%-40% of the original speed (depending on the workpiece material, tooth pitch and overhang) when the overhang of the toolholder is large.
For large pitch (tooth shape asymmetry) must be divided into coarse and fine milling, hard or elastic material, large depth-to-diameter ratio need to be divided into 2-3 cutter processing, otherwise there will be vibration, poor surface quality, plug gauge can not be in and other issues. In the processing, also pay attention to the threaded shank out as short as possible to increase rigidity, reduce vibration, improve feed.

Tool Selection Procedure

Selection of inserts according to the pitch to be machined.
Select the rotary diameter dc smaller than the size to be machined.
Compare the table above and select the tool that meets the above two conditions according to the maximum tool diameter.

Thread Milling Programming

In the thread milling cut-in method, arc cut-in method, radial cut-in method, tangential cut-in method. We explore with 1/8 or 1/4 arc cutting method, thread milling cutter go through 1/8 or 1/4 pitch, tangent cut into the workpiece, and then go 360 ° whole circle cutting interpolation one week, axial movement of a lead, and finally go through 1/8 or 1/4 pitch cut out the workpiece.
With the arc cutting method, the tool cuts in and out in a balanced manner, leaving no traces and generating no vibration, even when machining hard materials.



1、Thread Milling Parameters And Calculation Formulas

(1) Calculation of tool rotation speed

The rotational speed of the tool is equal to the rotational speed of the machine tool spindle, that is, n = 1000v / D cutter

Where: n - Tool speed (r / min); v - Tool linear speed (m / min); D cutter - Milling cutter rotary diameter (including inserts) (mm);

(2), tool radial feed speed calculationThe radial feed rate of the tool is the rotary diameter of the milling cutter (including inserts) feed rate, also known as the feed per minute, that is, F1 = fzn

Where: F1 - Tool radial feed rate (mm / min); f - Per edge per revolution feed (mm / r); z - Number of cutting edges of the tool;

(3), tool centre feed rate calculation

Most of the CNC machine tools, in the programming requirements of the tool centre feed speed programming. The feed speed of the tool is determined by the size of the feed speed of the tool centre, which is not directly given, but can be obtained from the equation of the relationship between the tool feed speed and the tool centre. The program is written according to the tool centre trajectory. This programming method does not consider the tool radius compensation and wear offset, and the program is simple and easy to modify.

The tool centre feed rate when machining external threads, i.e. F2= F1X (D+D Tool)/D

Where: F2 - tool centre feed speed (mm/min); D - thread nominal diameter (thread diameter) (mm);

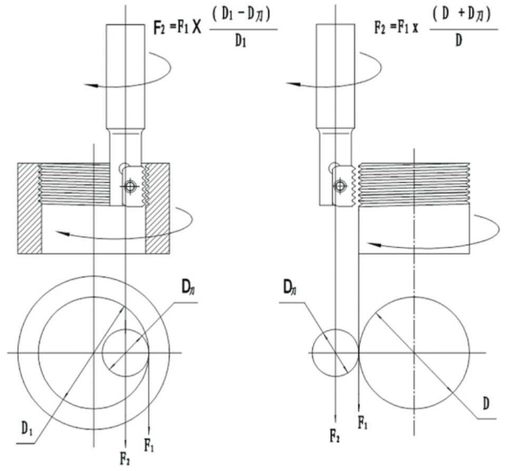
Feed speed of tool centre when machining internal thread, i.e. F2= F1X(D1-D Tool)/D1

Where: D1-Thread small diameter (mm);

In the case of unknown diameter in the production site, the nominal diameter of the thread (thread diameter) can be easily calculated.

Thread Milling General Programmes

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

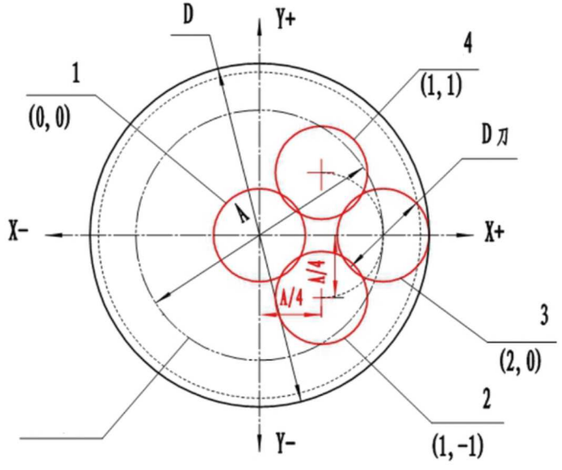


The above data is given by theoretical projection, in the actual thread milling process, due to the depth of thread machining, pitch size, processing materials, cooling conditions and other different changes. In the processing, also pay attention to the threaded toolholder's outstretched body short to increase rigidity, reduce vibration, improve feed. For blind hole threads, in order to prevent processing to the bottom of the hole, the machining part is covered by chips, chip accumulation and tool interference, the use of the bottom of the hole to the outside of the processing direction of the tool.

2、Thread milling programming examples

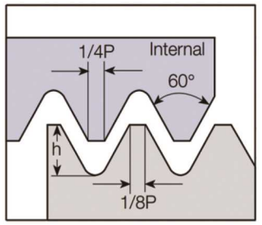
Programming M25×1.5 internal thread with thread depth 18mm, workpiece material 45*;
According to the thread size, select the tool model: ST90-21R1T21-B20, tool rotary diameter Φ21mm;
Insert model: 21 I 1.51S0, material grade: GY03.
Tool line speed 153m/min; one piece of milling cutter processing, feed per revolution 0.07mm/r;
Data system is FANUC0i.

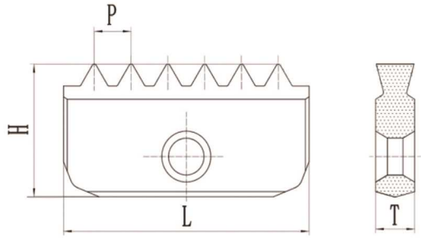
N10	G40 G80;
N20	G91 G28 Z0;
N30	M6 T1;
N40	G17 G54 G90 G0 X0 Y0 M3 S2320;
N50	G43 H1 Z60;
N60	G01 Z-18. 188 F5000 M08;
N70	G91;
N80	G41 D10 X1. Y1. Z0 F26;
N90	G03 X1. Y1. Z0. 188 I0 J1.;
N100	G03 X0 Y0 Z1. 5 I-2. J0;
N110	G03 X-1. YI. Z0. 188 I-1. J0;
N120	G01 G40 X-I. YI. Z0. F5000;
N130	G01 Z25 . ·
N140	G90 GO X0 YO Z50 ;
N150	G91 G28 Z0 ;
N160	M30 ;



A=D-D 刀

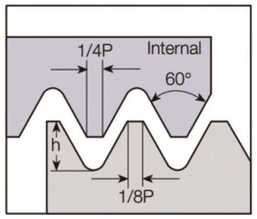
ISO Metric Compact

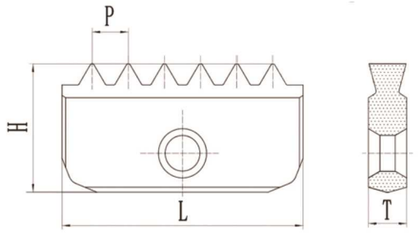




Model	P (mm)		L (mm)	H (mm)	T (mm)
	Ext.	Int.			
12 I 0.5 IS0		0.5	12	6.3	2.9
12 I 0.75 IS0		0.75	12	6.3	2.9
12 I 1.0 IS0		1.0	12	6.3	2.9
12 I 1.25 IS0		1.25	12	6.3	2.9
12 I 1.5 IS0		1.5	12	6.3	2.9
14 I 0.5 IS0		0.5	14	7.5	3.1
14 E 0.75 IS0	0.75		14	7.5	3.1
14 I 0.75 IS0		0.75	14	7.5	3.1
14 E 1.0 IS0	1.0		14	7.5	3.1
14 I 1.0 IS0		1.0	14	7.5	3.1
14 E 1.25 IS0	1.25		14	7.5	3.1
14 I 1.25 IS0		1.25	14	7.5	3.1
14 E 1.5 IS0	1.5		14	7.5	3.1
14 I 1.5 IS0		1.5	14	7.5	3.1
14 E 1.75 IS0	1.75		14	7.5	3.1
14 I 1.75 IS0		1.75	14	7.5	3.1
14 E 2.0 IS0	2.0		14	7.5	3.1
14 I 2.0 IS0		2.0	14	7.5	3.1
14 E 2.5 IS0	2.5		14	7.5	3.1
14 I 2.5 IS0		2.5	14	7.5	3.1
21 E 1.0 IS0	1.0		21	12	4.7
21 I 1.0 IS0		1.0	21	12	4.7
21 E 1.5 IS0	1.5		21	12	4.7
21 I 1.5 IS0		1.5	21	12	4.7
21 I 1.75 IS0		1.75	21	12	4.7
21 E 2.0 IS0	2.0		21	12	4.7
21 I 2.0 IS0		2.0	21	12	4.7
21 E 2.5 IS0	2.5		21	12	4.7
21 I 2.5 IS0		2.5	21	12	4.7
21 E 3.0 IS0	3.0		21	12	4.7
21 I 3.0 IS0		3.0	21	12	4.7
21 I 3.5 IS0		3.5	21	12	4.7
30 E 1.5 ISO	1.5		30	16	5.5
30 I 1.5 ISO		1.5	30	16	5.5
30 E 2.0 ISO	2.0		30	16	5.5
30 I 2.0 ISO		2.0	30	16	5.5
30 E 3.0 ISO	3.0		30	16	5.5
30 I 3.0 ISO		3.0	30	16	5.5
30 E 3.5 ISO	3.5		30	16	5.5
30 I 3.5 ISO		3.5	30	16	5.5
30 E 4.0 ISO	4.0		30	16	5.5
30 I 4.0 ISO		4.0	30	16	5.5
30 I 4.5 ISO		4.5	30	16	5.5
40 E 1.5 ISO	1.5		40	20	6.3
40 I 1.5 ISO		1.5	40	20	6.3
40 E 2.0 ISO	2.0		40	20	6.3
40 I 2.0 ISO		2.0	40	20	6.3
40 E 3.0 ISO	3.0		40	20	6.3
40 I 3.0 ISO		3.0	40	20	6.3
40 I 3.5 ISO		3.5	40	20	6.3
40 E 4.0 ISO	4.0		40	20	6.3
40 I 4.0 ISO		4.0	40	20	6.3
40 I 4.5 ISO		4.5	40	20	6.3
40 E 5.0 ISO	5.0		40	20	6.3
40 I 5.0 ISO		5.0	40	20	6.3
40 I 5.5 ISO		5.5	40	20	6.3
40 E 6.0 ISO	6.0		40	20	6.3
40 I 6.0 ISO		6.0	40	20	6.3

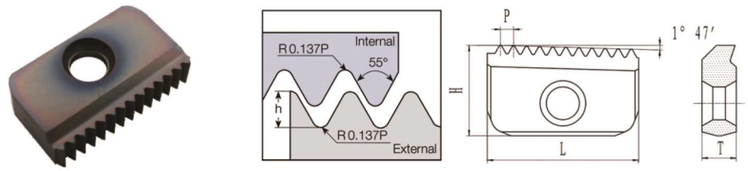
UN US Unified Thread 60° Complete (UN, UNC, UNF)





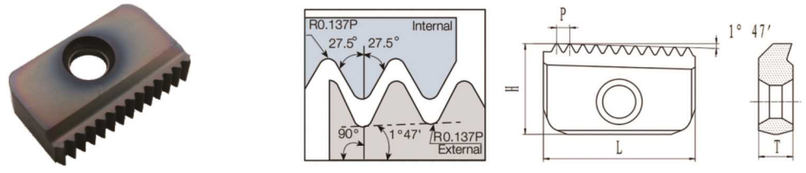
Model	P (TPI)		L (mm)	H (mm)	T (mm)
	Ext.	Int.			
12 I 32 UN		32	12	6.3	2.9
12 I 28 UN		28	12	6.3	2.9
12 I 24 UN		24	12	6.3	2.9
12 I 20 UN		20	12	6.3	2.9
12 I 18 UN		18	12	6.3	2.9
12 I 16 UN		16	12	6.3	2.9
14 E 32 UN	32		14	7.5	3.1
14 I 32 UN		32	14	7.5	3.1
14 E 28 UN	28		14	7.5	3.1
14 I 28 UN		28	14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

Imperial Whitworth 55° Complete (BSW, BSF, BSP)



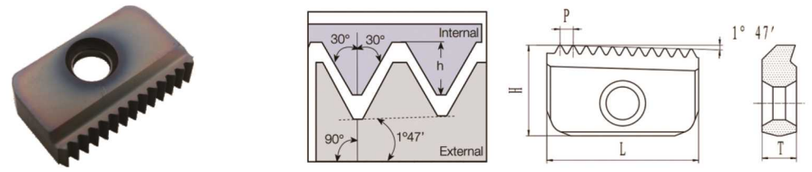
Model	P TPI	L (mm)	H (mm)	T (mm)
12-19 W	19	12	6.3	2.9
14-24 W	24	14	7.5	3.1
14-20 W	20	14	7.5	3.1
14-19 W	19	14	7.5	3.1
14-16 W	16	14	7.5	3.1
14-14 W	14	14	7.5	3.1
21-20 W	20	21	12	4.7
21-19 W	19	21	12	4.7
21-16 W	16	21	12	4.7
21-14 W	14	21	12	4.7
21-11 W	11	21	12	4.7
30-16 W	16	30	16	5.5
30-14 W	14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

British Standard Pipe Thread BSPT



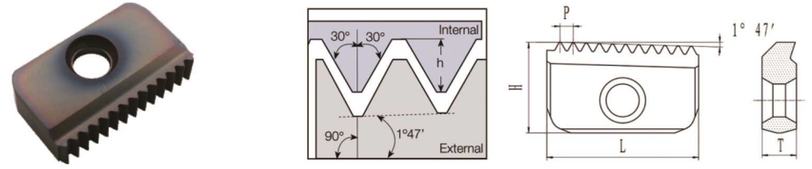
Model	P TPI	L (mm)	H (mm)	T (mm)
12-19 BSPT	19	12	6.3	2.9
14-19 BSPT	19	14	7.5	3.1
14-14 BSPT	14	14	7.5	3.1
21-14 BSPT	14	21	12	4.7
21-11 BSPT	11	21	12	4.7
30-11 BSPT	11	30	16	5.5
40-11 BSPT	11	40	20	6.3

U.S. Standard Pipe Thread NPT



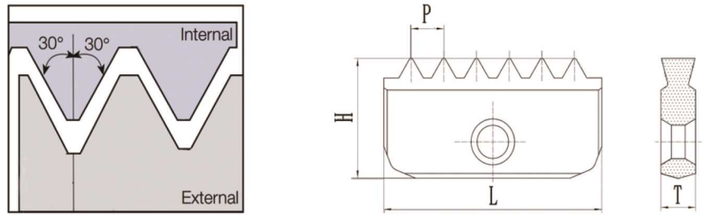
Model	P TPI	L (mm)	H (mm)	T (mm)
12-18 NPT	18	12	6.3	2.9
14-18 NPT	18	14	7.5	3.1
14-14 NPT	14	14	7.5	3.1
21-14 NPT	14	21	12	4.7
21-11.5 NPT	11.5	21	12	4.7
30-11.5 NPT	11.5	30	16	5.5
30-8 NPT	8	30	16	5.5
40-11.5 NPT	11.5	40	20	6.3
40-8 NPT	8	40	20	6.3

U.S. Standard Pipe Thread NPTF



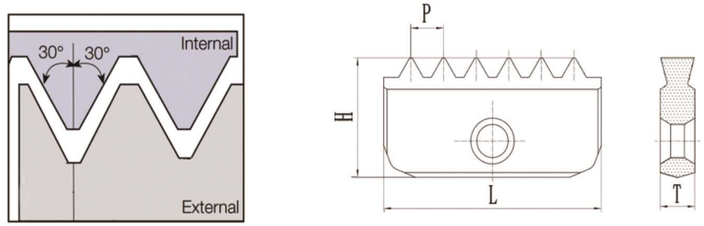
Model	P TPI	L (mm)	H (mm)	T (mm)
12-18 NPTF	18	12	6.3	2.9
14-18 NPTF	18	14	7.5	3.1
14-14 NPTF	14	14	7.5	3.1
21-14 NPTF	14	21	12	4.7
21-11.5 NPTF	11.5	21	12	4.7
30-11.5 NPTF	11.5	30	16	5.5
30-8 NPTF	8	30	16	5.5
40-11.5 NPTF	11.5	40	20	6.3
40-8 NPTF	8	40	20	6.3

U.S. Standard for General Purpose Sealed Cylindrical Threads NPS



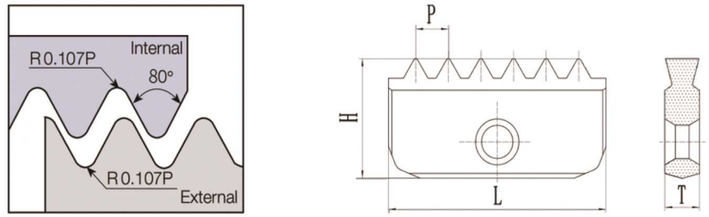
Model	P TPI	L (mm)	H (mm)	T (mm)
12-18 NPS	18	12	6.3	2.9
14-18 NPS	18	14	7.5	3.1
14-14 NPS	14	14	7.5	3.1
21-14 NPS	14	21	12	4.7
21-11.5 NPS	11.5	21	12	4.7
30-11.5 NPS	11.5	30	16	5.5
30-8 NPS	8	30	16	5.5
40-11.5 NPS	11.5	40	20	6.3
40-8 NPS	8	40	20	6.3

American Standard for Dry Seal Cylindrical Threads NPSF



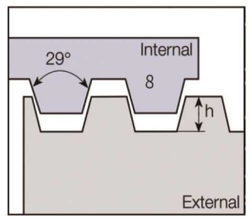
Model	P TPI	L (mm)	H (mm)	T (mm)
12-18 NPSF	18	12	6.3	2.9
14-18 NPSF	18	14	7.5	3.1
14-14 NPSF	14	14	7.5	3.1
21-14 NPSF	14	21	12	4.7
21-11.5 NPSF	11.5	21	12	4.7
30-11.5 NPSF	11.5	30	16	5.5
30-8 NPSF	8	30	16	5.5
40-11.5 NPSF	11.5	40	20	6.3
40-8 NPSF	8	40	20	6.3

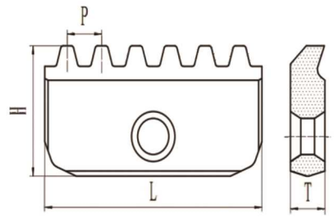
German steel conduit thread PG DIN40430



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

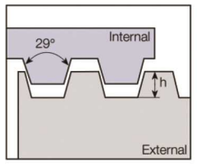
APIRD American Petroleum Pipe Threads Standard 60°

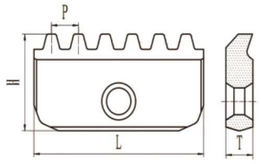




Model	P TPI	L (mm)	H (mm)	T (mm)
21-10 APIRD	10	21	12	4.7
21-8 APIRD	8	21	12	4.7
30-10 APIRD	10	30	16	5.5
30-8 APIRD	8	30	16	5.5
40-10 APIRD	10	40	20	6.3
40-8 APIRD	8	40	20	6.3

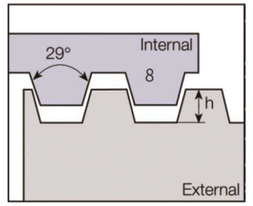
TR Metric Trapezoidal Thread 30°

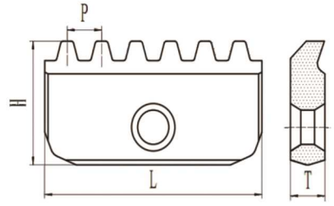




Model	P (mm)		L (mm)	H (mm)	T (mm)
	Ext.	Int.			
14 E 1.5 TR	1.5		14	7.5	3.1
14 I 1.5 TR		1.5	14	7.5	3.1
14 E 2.0 TR	2		14	7.5	3.1
14 I 2.0 TR		2	14	7.5	3.1
21 E 1.5 TR	1.5		21	12	4.7
21 I 1.5 TR		1.5	21	12	4.7
21 E 2.0 TR	2		21	12	4.7
21 I 2.0 TR		2	21	12	4.7
21 E 2.5 TR	2.5		21	12	4.7
21 I 2.5 TR		2.5	21	12	4.7
21 E 3.0 TR	3		21	12	4.7
21 I 3.0 TR		3	21	12	4.7
30 E 1.5 TR	1.5		30	16	5.5
30 I 1.5 TR		1.5	30	16	5.5
30 E 2.0 TR	2		30	16	5.5
30 I 2.0 TR		2	30	16	5.5
30 E 2.5 TR	2.5		30	16	5.5
30 I 2.5 TR		2.5	30	16	5.5
30 E 3.0 TR	3		30	16	5.5
30 I 3.0 TR		3	30	16	5.5
30 E 4.0 TR	4		30	16	5.5
30 I 4.0 TR		4	30	16	5.5
30 E 5.0 TR(S)	5		30	20	6.3
30 I 5.0 TR(S)		5	30	20	6.3
30 E 6.0 TR(S)	6		30	20	6.3
30 I 6.0 TR(S)		6	30	20	6.3
30 E 7.0 TR(S)	7		30	20	6.3
30 I 7.0 TR(S)		7	30	20	6.3
40 E 2.0 TR	2		40	20	6.3
40 I 2.0 TR		2	40	20	6.3
40 E 2.5 TR	2.5		40	20	6.3
40 I 2.5 TR		2.5	40	20	6.3
40 E 3.0 TR	3		40	20	6.3
40 I 3.0 TR		3	40	20	6.3
40 E 4.0 TR	4		40	20	6.3
40 I 4.0 TR		4	40	20	6.3
40 E 5.0 TR	5		40	20	6.3
40 I 5.0 TR		5	40	20	6.3
40 E 6.0 TR	6		40	20	6.3
40 I 6.0 TR		6	40	20	6.3
40 E 7.0 TR	7		40	20	6.3
40 I 7.0 TR		7	40	20	6.3

STACME US Short Trapezoidal (acme) 29° Thread

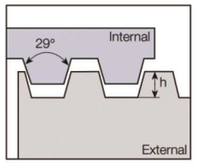


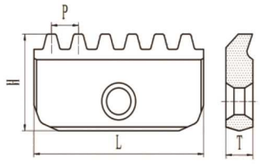


注：S：加厚毛坯

Model	P TPI	L (mm)	H (mm)	T (mm)
14N16STACME	16	14	7.5	3.1
14N14STACME	14	14	7.5	3.1
21N16STACME	16	21	12	4.7
21N14STACME	14	21	12	4.7
21N12STACME	12	21	12	4.7
30 I 16STACME	16	30	16	5.5
30 I 14STACME	14	30	16	5.5
30 I 12STACME	12	30	16	5.5
30 I 10STACME	10	30	16	5.5
30 I 8STACME	8	30	16	5.5
30 I 6STACME	6	30	16	5.5
30 I 16STACME(S)	16	30	20	6.3
30 I 14STACME(S)	14	30	20	6.3
30 I 12STACME(S)	12	30	20	6.3
30 I 10STACME(S)	10	30	20	6.3
30 I 8STACME(S)	8	30	20	6.3
30 I 6STACME(S)	6	30	20	6.3
30 I 5STACME(S)	5	30	20	6.3
30 I 4STACME(S)	4	30	20	6.3
30 I 3STACME(S)	3	30	20	6.3
40 I 16STACME	16	40	20	6.3
40 I 14STACME	14	40	20	6.3
40 I 12STACME	12	40	20	6.3
40 I 10STACME	10	40	20	6.3
40 I 8STACME	8	40	20	6.3
40 I 6STACME	6	40	20	6.3
40 I 5STACME	5	40	20	6.3
40 I 4STACME	4	40	20	6.3
40 I 3STACME	3	40	20	6.3

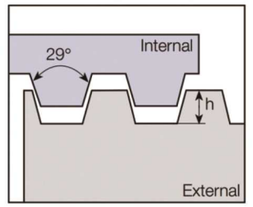
ABUT US Serrated Threaded Inserts (7°/45°)

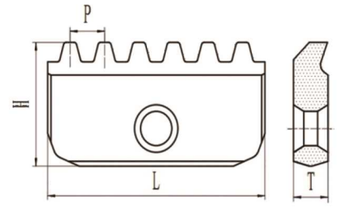




Model	P (mm)		L (mm)	H (mm)	T (mm)
	Ext.	Int.			
14 E 1.5 ABUT	1.5		14	7.5	3.1
14 I 1.5 ABUT		1.5	14	7.5	3.1
14 E 2.0 ABUT	2		14	7.5	3.1
14 I 2.0 ABUT		2	14	7.5	3.1
21 E 1.5 ABUT	1.5		21	12	4.7
21 I 1.5 ABUT		1.5	21	12	4.7
21 E 2.0 ABUT	2		21	12	4.7
21 I 2.0 ABUT		2	21	12	4.7
21 E 2.5 ABUT	2.5		21	12	4.7
21 I 2.5 ABUT		2.5	21	12	4.7
21 E 3.0 ABUT	3		21	12	4.7
21 I 3.0 ABUT		3	21	12	4.7
30 E 1.5 ABUT	1.5		30	16	5.5
30 I 1.5 ABUT		1.5	30	16	5.5
30 E 2.0 ABUT	2		30	16	5.5
30 I 2.0 ABUT		2	30	16	5.5
30 E 2.5 ABUT	2.5		30	16	5.5
30 I 2.5 ABUT		2.5	30	16	5.5
30 E 3.0 ABUT	3		30	16	5.5
30 I 3.0 ABUT		3	30	16	5.5
30 E 4.0 ABUT	4		30	16	5.5
30 I 4.0 ABUT		4	30	16	5.5
30 E 5.0 ABUT(S)	5		30	20	6.3
30 I 5.0 ABUT(S)		5	30	20	6.3
30 E 6.0 ABUT(S)	6		30	20	6.3
30 I 6.0 ABUT(S)		6	30	20	6.3
30 E 7.0 ABUT(S)	7		30	20	6.3
30 I 7.0 ABUT(S)		7	30	20	6.3
40 E 2.0 ABUT	2		40	20	6.3
40 I 2.0 ABUT		2	40	20	6.3
40 E 2.5 ABUT	2.5		40	20	6.3
40 I 2.5 ABUT		2.5	40	20	6.3
40 E 3.0 ABUT	3		40	20	6.3
40 I 3.0 ABUT		3	40	20	6.3
40 E 4.0 ABUT	4		40	20	6.3
40 I 4.0 ABUT		4	40	20	6.3
40 E 5.0 ABUT	5		40	20	6.3
40 I 5.0 ABUT		5	40	20	6.3
40 E 6.0 ABUT	6		40	20	6.3
40 I 6.0 ABUT		6	40	20	6.3
40 E 7.0 ABUT	7		40	20	6.3
40 I 7.0 ABUT		7	40	20	6.3

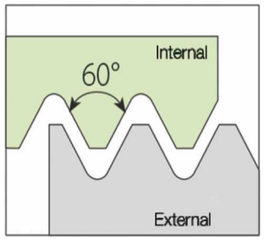
ACME American Trapezoidal (Acme) Thread 29°

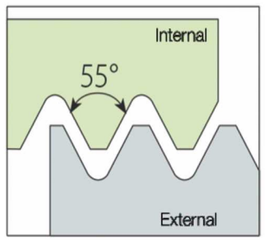


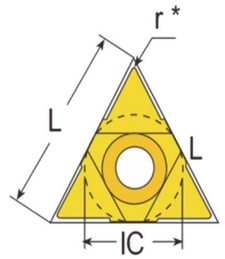


Model	P TPI	L (mm)	H (mm)	T (mm)
14 I 16 ACME	16	14	7.5	3.1
14 I 14 ACME	14	14	7.5	3.1
21 I 16 ACME	16	21	12	4.7
21 I 14 ACME	14	21	12	4.7
21 I 12 ACME	12	21	12	4.7
30 I 16 ACME	16	30	16	5.5
30 I 14 ACME	14	30	16	5.5
30 I 12 ACME	12	30	16	5.5
30 I 10 ACME	10	30	16	5.5
30 I 8 ACME	8	30	16	5.5
30 I 6 ACME	6	30	16	5.5
30 I 16 ACME (S)	16	30	20	6.3
30 I 14 ACME (S)	14	30	20	6.3
30 I 12 ACME (S)	12	30	20	6.3
30 I 10 ACME (S)	10	30	20	6.3
30 I 8 ACME (S)	8	30	20	6.3
30 I 6 ACME (S)	6	30	20	6.3
30 I 5 ACME (S)	5	30	20	6.3
30 I 4 ACME (S)	4	30	20	6.3
30 I 3 ACME (S)	3	30	20	6.3
40 I 16 ACME	16	40	20	6.3
40 I 14 ACME	14	40	20	6.3
40 I 12 ACME	12	40	20	6.3
40 I 10 ACME	10	40	20	6.3
40 I 8 ACME	8	40	20	6.3
40 I 6 ACME	6	40	20	6.3
40 I 5 ACME	5	40	20	6.3
40 I 4 ACME	4	40	20	6.3
40 I 3 ACME	3	40	20	6.3

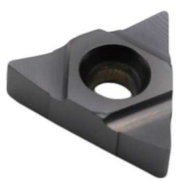
ABUT US Serrated Threaded Inserts (7°/45°)



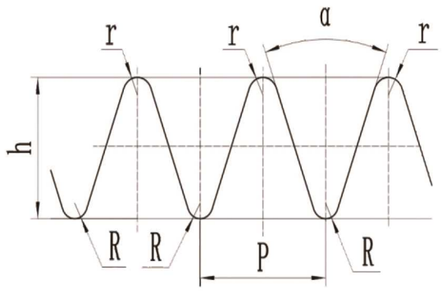




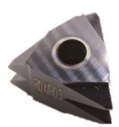
U Type

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

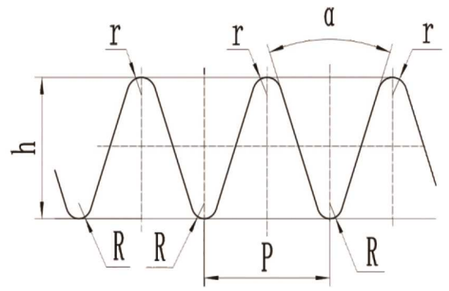
Belt Pulley Insert Series



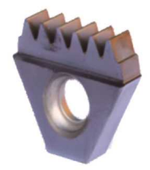
Note: Can be made according to user needs 注：可根据用户需求制作

Shape	Model	P	α	H	S	R	r	Unit Price
	PDL40-22	2.34	40	16.2	4.7	0.2	0.4	
		2.34	40	16.2	4.7	0.4	0.2	
		3.56	40	16.2	4.7	0.4	0.2	
		3.56	40	16.2	4.7	0.4	0.25	
		3.56	40	16.2	4.7	0.4	0.3	
		3.56	40	16.2	4.7	0.4	0.35	
		3.56	40	16.2	4.7	0.4	0.4	
	PDL40-12	3.56	40	26.3	4.7	0.4	0.2	
		3.56	40	26.3	4.7	0.4	0.3	
		3.56	40	26.3	4.7	0.2	0.4	
	PDLM40-12	3.56	40	25.2	4.0	0.4	0.2	
		3.56	40	25.2	4.0	0.4	0.3	
		3.56	40	25.2	4.0	0.2	0.4	
	PDLF40-23	3.56	40	21.3	7.0	0.4	0.2	
		3.56	40	21.3	7.0	0.4	0.3	
		3.56	40	21.3	7.0	0.2	0.4	
	PDLS4018234	3.56	40	17.3	4.8	0.3	0.25	
		3.56	40	17.3	4.8	0.4	0.3	
		3.56	40	17.3	4.8	0.2	0.4	

Belt Pulley Insert Series



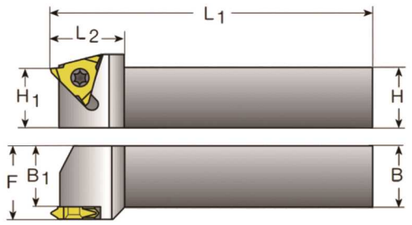
Note: Can be made according to user needs

Shape	Model	h	P	α	H	S	R	r	Teeth	Unit Price
	VDL34RO.41	3.39	3.56	40	27.6	6.3	0.4	0.36	3	
	VDL44R0.41	3.39	3.56	40	27.6	6.3	0.4	0.36	4	
	VDL64R0.41-3	3.39	3.56	40	27.6	6.3	0.4	0.36	6	
	VDL44R0.41-3	3.49	3.56	40	27.6	6.3	0.4	0.36	4	
	VDL54R0.41-3B	3.36	3.56	40	27.6	6.3	0.4	0.37	5	
	VDL54R0.41-3A	3.22	3.56	40	27.6	6.3	0.4	0.44	5	

Grooving Tool Cutting Speed

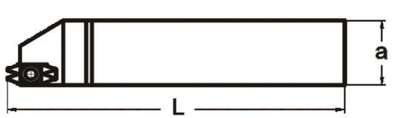
International Standard	Materials	Cutting Speed
P		20-100
		30-80
		40-90
M		30-80
		30-90
K		30-90
N		20-200

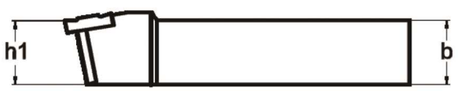
Forming Pulley Grooving Cutter Bar



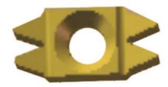
Toolholder Model	Main Size					Cutter	Torx Screw	Spanner
	H1	B	H	L1	F			
CSER2020K22V	25	20	20	125	20	DL22VER□□	M4.5x12	T15
CSER2525M22V	25	25	25	150	25	DL22VER□□	M4.5x12	T15
CSER2020K22V2M	25	20	20	125	20	DL22VER□□-2	M4.5x12	T15
CSER2525M22V	25	25	25	150	25	DL22VER□□-2	M4.5x12	T15

Parts	Cutter	Torx Screw	Torx Screwdriver	Pressure Plate	Spanner
Illustrative					

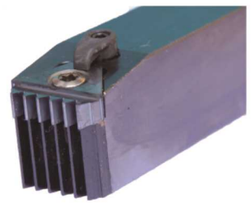


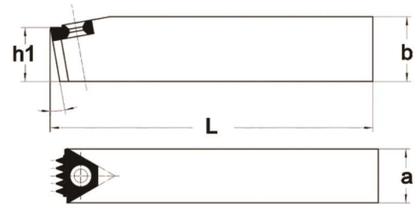


Toolholder Model	Main Size				Cutter	Torx Screw	Spanner
	a	b	h1	L			
DPDL2525M37-3.8	25	25	25	150	PDL37(3.8)	M4.0x8	T10
DPDL2525M40-2.2					PDL40(2.2)		
DPDL2525M40-3.04					PDL40(3.04)		
DPDL2525M40-3.45					PDL40(3.45)		

Parts	Cutter	Torx Screw	Torx Screwdriver
Illustrative			

Comb Pulley Grooving Cutter Bar





Note: The tool bar must be customized according to the blade

Toolholder Model	Main Size				Cutter	Torx Screw	Spanner
	a	b	h1	L			
CVDL2530M VDL34R0.41	25	30	25	150	VDL34R0.41	M6.0x12	T20

Parts	Cutter	Torx Screw	Torx Screwdriver	Pressure Plate	Spanner
Illustrative					

Shape Symbol

 A	 B	 C
 D	 E	 H
 K	 L	 M
 O	 P	 R
 S	 T	 W
 V	Other	Z

Chip Breakers And Clamping Forms

Symbol	Holes	Chip Breaker	Profile	Symbol	Holes	Chip Breaker	Profile
B	Have	Not		N	Not	Not	
H	Have	Single Face		R	Not	Single Face	
C	Have	Not		F	Not	Double Face	
J	Have	Double Face		A	Have	Not	
W	Have	Not		M	Have	Single Face	
T	Have	Single Face		G	Have	Double Face	
Q	Have	Not		X	-	-	
U	Have	Double Face					

Linear Cutting Edge

Inscribed Circle Diameter (mm)	Shape C	D	R	S	T	V	W	K
32.00			32					
31.75			31					
25.40			25	25				
25.00	25	25	25					
20.00			20					
19.05	19		19	19	33			
16.00		19	16					
15.875	16		15	16	27			
12.70	12	15	12	12	22	22	08	
12.00			12					
10.00			10					
9.525	09	11	09	09	16	16	06	16
8.00			08					
6.35	06	07			11	11		
6.00			06					
5.56					09			
5.50			05					
3.97					06			

Thickness

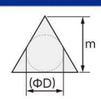
Symbol	Thicknesses
12	12.70
10	11.11
T9	9.72
09	9.52
07	7.94
T6	6.75
06	6.35
T5	5.95
05	5.56
T4	4.96
04	4.76
T3	3.97
03	3.18
T2	2.58
02	2.38
T1	1.98
01	1.59
T0	0.99
00	0.79

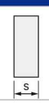
A P M T — 16 05 PD E R — FM

Back Angle Of Main Cutting Edge

Symbol	Back Angle
A	3°
B	5°
C	7°
D	15°
E	20°
F	25°
G	30°
N	0°
P	11°
O	Other

Dimensional Tolerance





Symbol	Tip Height (m)	Incircle (ΦD)	Thicknesses (S)
A	±0.005	±0.025	±0.025
F	±0.005	±0.013	±0.025
C	±0.013	±0.025	±0.025
H	±0.013	±0.013	±0.025
E	±0.025	±0.025	±0.025
G	±0.025	±0.025	±0.13
J	±0.005	±0.05~±0.13	±0.025
K	±0.013	±0.05~±0.13	±0.025
L	±0.025	±0.05~±0.13	±0.025
M	±0.08~±0.18	±0.05~±0.13	±0.13
N	±0.08~±0.18	±0.05~±0.13	±0.025
U	±0.13~±0.38	±0.08~±0.25	±0.13

· M-grade accuracy requirements (differentiated by shape and internal circle size)

· Tip Height (m) Tolerance

Incircle	Regular Triangle	Square	80°diamond	55°diamond	35°diamond	Circle
6.35	±0.08	±0.08	±0.08	±0.11	±0.16	-
9.525	±0.08	±0.08	±0.08	±0.11	±0.16	-
12.7	±0.13	±0.13	±0.13	±0.15	-	-
15.875	±0.15	±0.15	±0.15	±0.18	-	-
19.05	±0.15	±0.15	±0.15	±0.18	-	-
25.4	-	±0.18	-	-	-	-

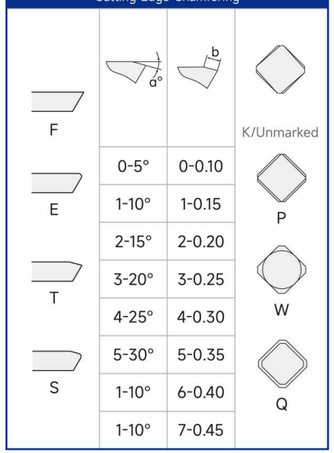
· Tolerance Of Inscribed Circle

Incircle	Regular Triangle	Square	80°diamond	55°diamond	35°diamond	Circle
6.35	±0.05	±0.05	±0.05	±0.05	±0.05	-
9.525	±0.05	±0.05	±0.05	±0.05	±0.05	±0.05
12.7	±0.08	±0.08	±0.08	±0.08	-	±0.08
15.875	±0.10	±0.10	±0.10	±0.10	-	±0.10
19.05	±0.10	±0.10	±0.10	±0.10	-	±0.10
25.4	-	±0.13	-	-	-	±0.13

Amelioration Blade

A	45°	A	3°
D	60°	B	5°
E	75°	C	7°
F	85°	D	15°
P	90°	E	20°
Z	(other)	F	25°
		G	30°
		N	0°
		P	11°
		Z	(other)

Cutting Edge Chamfering



	0-5°	0-0.10
	1-10°	1-0.15
	2-15°	2-0.20
	3-20°	3-0.25
	4-25°	4-0.30
	5-30°	5-0.35
	1-10°	6-0.40
	1-10°	7-0.45

Chip-breaker

Cutting Direction

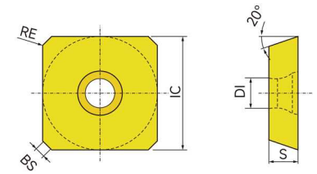
Symbol	Direction
R	(Right)
L	(Left)
N	(Two Way)

Grade	Grade	Application	Color
HS530	PVD	Milling grades for soft steel and stainless steel	Grey
HS5115	PVD	Suitable for milling of higher hardness materials	Purple Copper
HS5120	PVD	For general-purpose milling of steel, stainless steel, cast iron and other types of materials, especially in the milling of steel HRC35-50 materials	Purple Copper
HS5130	PVD	For universal milling of steel, stainless steel, cast iron and other materials, preferred grades for milling conditions.	Grey
HS5210	PVD	New second-generation milling grade, preferred grade for milling of high hardness materials, suitable for milling of HRC50-65 high hardness materials.	Colorful
HS5220	PVD	New second generation milling grade, the first recommended grade for pre-hardened materials. Used for universal milling of P, M, K and other types of materials, especially suitable for hardness in HRC45-50 material processing.	Bronze Colour
HS6130	CVD	The preferred grade for machining castings. Suitable for semi-finishing and rough milling of P and K materials.	Black/Yellow

Workpiece material

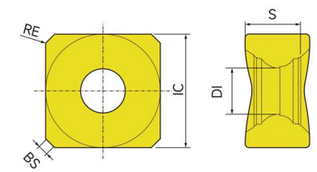
P	M	K	N	S		H
Carbon Steel	Stainless Steel	Cast Iron	Non-ferrous Metal	High Temperature Alloy	Titanium	Dead-Hard Steel

Plane Milling Inserts



Shape

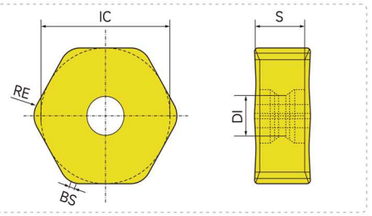
Coating	Mark	Specification	Workpiece Material
PVD PVD Coating	HS5120	SEMT1204AFTN-FM	P M K N S H
		SEMT13T3AGTN-FM	P M K N S H
		SEMR1203AFTN	P M K N S H
		SEET13T3-GM	P M K N S H
	HS5130	SEMT1204AFTN-FM	P M K N S H
		SEMT13T3AGTN-FM	P M K N S H
		SEMR1203AFTN	P M K N S H
		SEET13T3-GM	P M K N S H



Shape

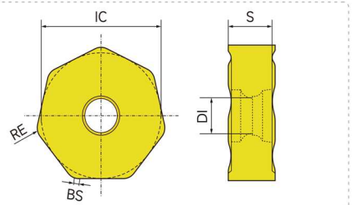
Coating	Mark	Specification	Workpiece Material
PVD PVD Coating	HS5120	SNMX1205ANN-M	P M K N S H
		SNMX1205-M	P M K N S H
		SNGX1205ZNN-M	P M K N S H
	HS5130	SNMX1205ANN-M	P M K N S H
		SNMX1205-M	P M K N S H
		SNGX1205ZNN-M	P M K N S H
CVD CVD Coating	HS6130	SNMX1205ANN-M	P M K N S H
		SNMX1205-M	P M K N S H
		SNGX1205ZNN-M	P M K N S H

Plane Milling Inserts



Shape

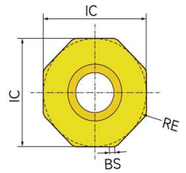
Coating	Mark	Specification	Workpiece Material
PVD PVD Coating	HS5120	HNMX0906ANSN-M	P M K N S H
		HNMX0906ANSN-R	P M K N S H
	HS5130	HNMX0906ANSN-M	P M K N S H
		HNMX0906ANSN-R	P M K N S H
CVD CVD Coating	HS6130	HNMX0906ANSN-M	P M K N S H
		HNMX0906ANSN-R	P M K N S H



Shape

Coating	Mark	Specification	Workpiece Material
PVD PVD Coating	HS5120	XNGX0705ANN-R	P M K N S H
		XNMX0705ANN-M	P M K N S H
		XNMX070508-M	P M K N S H
	HS5130	XNGX0705ANN-R	P M K N S H
		XNMX0705ANN-M	P M K N S H
		XNMX070508-M	P M K N S H
CVD CVD Coating	HS6130	XNGX0705ANN-R	P M K N S H
		XNMX0705ANN-M	P M K N S H
		XNMX070508-M	P M K N S H

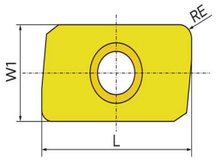
Plane Milling Inserts



Shape

Coating	Mark	Specification	Workpiece Material
PVD PVD Coating	HS5120	ODMT050408-M	P M K N S H
		ODMT060508-M	P M K N S H
	HS5130	ODMT050408-M	P M K N S H
		ODMT060508-M	P M K N S H

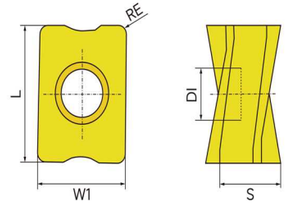
Square Shoulder Milling Inserts



Shape

Coating	Mark	Specification	Workpiece Material
PVD PVD Coating	HS5115	APMT1135PDER-FM	P M K N S H
		APMT1604PDER-FM	P M K N S H
		APMT1605PDER-FM	P M K N S H
	HS5210	APMT1135PDER-FM	P M K N S H
		APMT1604PDER-FM	P M K N S H
		APMT1605PDER-FM	P M K N S H
	HS5120	APMT1135PDER-FM	P M K N S H
		APMT1604PDER-FM	P M K N S H
		APMT1605PDER-FM	P M K N S H
	HS5220	APMT1135PDER-FM	P M K N S H
		APMT1604PDER-FM	P M K N S H
		APMT1605PDER-FM	P M K N S H
	HS5130	APMT1135PDER-FM	P M K N S H
		APMT1604PDER-FM	P M K N S H
		APMT1605PDER-FM	P M K N S H
	HS530	APMT1135PDER-FM	P M K N S H
		APMT1604PDER-FM	P M K N S H
		APMT1605PDER-FM	P M K N S H
CVD CVD Coating	HS6130	APMT1604PDER-FM	P M K N S H
		APMT1605PDER-FM	P M K N S H

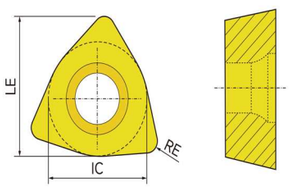
Square Shoulder Milling Inserts



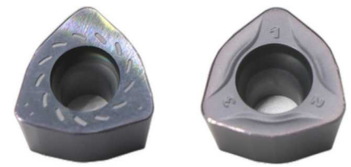
Shape

Coating	Mark	Specification	Workpiece Material
PVD PVD Coating	HS5120	LNGX120508ER-M	P M K N S H
	HS5130	LNGX120508ER-M	P M K N S H

High Feed Milling Inserts

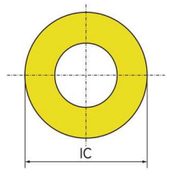


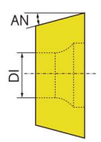
Shape



Coating	Mark	Specification	Workpiece Material
PVD PVD Coating	HS5120	LNGX120508ER-M	P M K N S H
	HS5130	LNGX120508ER-M	P M K N S H

Profiled Milling Inserts



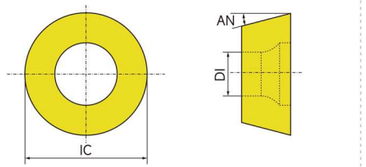


Shape

Coating	Mark	Specification	Workpiece Material
PVD PVD Coating	HS5115	RDMW0802MO-FM	P M K N S H
		RDMW1003MO-FM	P M K N S H
		RDMW10T3MO-FM	P M K N S H
		RDMW1204MO-FM	P M K N S H
		RDMW12T3MO-FM	P M K N S H
		RDMW1605MO-FM	P M K N S H
	HS5210	RDMW0802MO-FM	P M K N S H
		RDMW1003MO-FM	P M K N S H
		RDMW10T3MO-FM	P M K N S H
		RDMW1204MO-FM	P M K N S H
		RDMW12T3MO-FM	P M K N S H
		RDMW1605MO-FM	P M K N S H
	HS5120	RDMW0802MO-FM	P M K N S H
		RDMW1003MO-FM	P M K N S H
		RDMW10T3MO-FM	P M K N S H
		RDMW1204MO-FM	P M K N S H
		RDMW12T3MO-FM	P M K N S H
		RDMW1605MO-FM	P M K N S H
	HS5220	RDMW0802MO-FM	P M K N S H
		RDMW1003MO-FM	P M K N S H
		RDMW10T3MO-FM	P M K N S H
		RDMW1204MO-FM	P M K N S H
		RDMW12T3MO-FM	P M K N S H
		RDMW1605MO-FM	P M K N S H

Coating	Mark	Specification	Workpiece Material
PVD PVD Coating	HS5130	RDMW0802MO-FM	P M K N S H
		RDMW1003MO-FM	P M K N S H
		RDMW10T3MO-FM	P M K N S H
		RDMW1204MO-FM	P M K N S H
		RDMW12T3MO-FM	P M K N S H
		RDMW1605MO-FM	P M K N S H

Profiled Milling Inserts



Shape

Coating	Mark	Specification	Workpiece Material
PVD PVD Coating	HS5115	RPMT08T2MO-FM	P M K N S H
		RPMT1003MO-FM	P M K N S H
		RPMT10T3MO-FM	P M K N S H
		RPMT1204MO-FM	P M K N S H
		RPMW1003MO-FM	P M K N S H
	HS5210	RPMT08T2MO-FM	P M K N S H
		RPMT1003MO-FM	P M K N S H
		RPMT10T3MO-FM	P M K N S H
		RPMT1204MO-FM	P M K N S H
		RPMW1003MO-FM	P M K N S H
	HS5120	RPMT08T2MO-FM	P M K N S H
		RPMT1003MO-FM	P M K N S H
		RPMT10T3MO-FM	P M K N S H
		RPMT1204MO-FM	P M K N S H
		RPMW1003MO-FM	P M K N S H
	HS5220	RPMT08T2MO-FM	P M K N S H
		RPMT1003MO-FM	P M K N S H
		RPMT10T3MO-FM	P M K N S H
		RPMT1204MO-FM	P M K N S H
		RPMW1003MO-FM	P M K N S H
	HS5130	RPMT08T2MO-FM	P M K N S H
		RPMT1003MO-FM	P M K N S H
		RPMT10T3MO-FM	P M K N S H
		RPMT1204MO-FM	P M K N S H
		RPMW1003MO-FM	P M K N S H

Coating	Mark	Specification	Workpiece Material
PVD PVD Coating	HS530	RPMT08T2MO-FM	P M K N S H
		RPMT1003MO-FM	P M K N S H
		RPMT10T3MO-FM	P M K N S H
		RPMT1204MO-FM	P M K N S H
		RPMW1003MO-FM	P M K N S H

Shape Symbol

 A	 B	 C
 D	 E	 H
 K	 L	 M
 O	 P	 R
 S	 T	 W
 V	Other	Z

Chip Breakers And Clamping Forms

Symbol	Holes	Chip Breaker	Profile	Symbol	Holes	Chip Breaker	Profile
B	Have	Not		N	Not	Not	
H	Have	Single Face		R	Not	Single Face	
C	Have	Not		F	Not	Double Face	
J	Have	Double Face		A	Have	Not	
W	Have	Not		M	Have	Single Face	
T	Have	Single Face		G	Have	Double Face	
Q	Have	Not		X	-	-	
U	Have	Double Face					

Linear Cutting Edge

Inscribed Circle Diameter (mm)	Shape C	D	R	S	T	V	W	K
32.00			32					
31.75			31					
25.40			25	25				
25.00	25	25	25					
20.00			20					
19.05	19		19	19	33			
16.00		19	16					
15.875	16		15	16	27			
12.70	12	15	12	12	22	22	08	
12.00			12					
10.00			10					
9.525	09	11	09	09	16	16	06	16
8.00			08					
6.35	06	07			11	11		
6.00			06					
5.56					09			
5.50			05					
3.97					06			

Thickness

Symbol	Thicknesses
12	12.70
10	11.11
T9	9.72
09	9.52
07	7.94
T6	6.75
06	6.35
T5	5.95
05	5.56
T4	4.96
04	4.76
T3	3.97
03	3.18
T2	2.58
02	2.38
T1	1.98
01	1.59
T0	0.99
00	0.79

C N M G

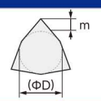
12 04 08 – MA (ISO)

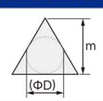
4 3 2 (inch)

Back Angle Of Main Cutting Edge

Symbol	Back Angle
A	3°
B	5°
C	7°
D	15°
E	20°
F	25°
G	30°
N	0°
P	11°
O	Other

Dimensional Tolerance





Symbol	Tip Height (m)	Incircle (ΦD)	Thicknesses (S)
A	±0.005	±0.025	±0.025
F	±0.005	±0.013	±0.025
C	±0.013	±0.025	±0.025
H	±0.013	±0.013	±0.025
E	±0.025	±0.025	±0.025
G	±0.025	±0.025	±0.13
J	±0.005	±0.05~±0.13	±0.025
K	±0.013	±0.05~±0.13	±0.025
L	±0.025	±0.05~±0.13	±0.025
M	±0.08~±0.18	±0.05~±0.13	±0.13
N	±0.08~±0.18	±0.05~±0.13	±0.025
U	±0.13~±0.38	±0.08~±0.25	±0.13

· M-grade accuracy requirements (differentiated by shape and internal circle size)

· Tip Height (m) Tolerance

Incircle	Regular Triangle	Square	80°diamond	55°diamond	35°diamond	Circle
6.35	±0.08	±0.08	±0.08	±0.11	±0.16	-
9.525	±0.08	±0.08	±0.08	±0.11	±0.16	-
12.7	±0.13	±0.13	±0.13	±0.15	-	-
15.875	±0.15	±0.15	±0.15	±0.18	-	-
19.05	±0.15	±0.15	±0.15	±0.18	-	-
25.4	-	±0.18	-	-	-	-

· Tolerance Of Inscribed Circle

Incircle	Regular Triangle	Square	80°diamond	55°diamond	35°diamond	Circle
6.35	±0.05	±0.05	±0.05	±0.05	±0.05	-
9.525	±0.05	±0.05	±0.05	±0.05	±0.05	±0.05
12.7	±0.08	±0.08	±0.08	±0.08	-	±0.08
15.875	±0.10	±0.10	±0.10	±0.10	-	±0.10
19.05	±0.10	±0.10	±0.10	±0.10	-	±0.10
25.4	-	±0.13	-	-	-	±0.13

Incircle

Symbol	Inradius
2	6.35
3	9.525
4	12.7
5	15.875
6	19.05
8	25.4

Thickness

Symbol	Thickness
2	3.18
3	4.76
4	6.35
5	7.94
6	9.52

Corner Radius

Symbol	Corner Radius
0	0.2
1	0.4
2	0.8
3	1.2
4	1.6
5	2.0
6	2.4

Corner Radius Symbol

Symbol	Corner Radius
00	(No Rounding)
02	0.2
04	0.4
08	0.8
12	1.2
16	1.6
20	2.0
24	2.4
32	3.2
X	(other)
Blade Diameter Size Mo (Metric)	Circular Blades

Corner Radius Symbol

Symbol	Illustrate
GT	
M	
MT	
BR	
BM	
BF	
AK	

Grade	Grade	Application	Color
HS8115	CVD	For turning of steel parts in stable conditions	Black/Yellow
HS8125	CVD	For continuous and interrupted cutting of steel parts	Black/Yellow
HS8215	CVD	Suitable for continuous and light intermittent cutting of steel parts with high wear-resistant properties	Black/Yellow
HS8225	CVD	Preferred grade for steel turning, good toughness, high strength new coating to reduce chip bonding. Suitable for continuous and intermittent cutting of steel parts, universal wall	Black/Yellow
HS7120	CVD	For efficient roughing and semi-finishing of stainless steel at higher speeds	Yellow
HS7125	PVD	For continuous and interrupted cutting of stainless steel	Grey-black
HS7225	PVD	Stainless Steel Turning Preferred Grades	Purple Copper
HS6115	CVD	The preferred grade for turning grey and ductile iron, with good all-round performance, also suitable for general interrupted machining. Can beFor rough turning of hardened and high strength steels at lower speeds	Black
HS6120	CVD	The preferred grade for turning grey and ductile iron, with good all-round performance, also suitable for general interrupted machining. Can beRough turning at lower speeds on hard and high strength steels	Hole Yellow

Turning Grooves For Steel Parts

GF

Optimised chipbreaking pattern ensures the same chipbreaking capacity under small depth of cut conditions, lower cutting resistance and smoother chip removal.

Preferred groove type for steel finishing

GR

Strong cutting ribbons and large chip holding grooves. Adapt to intermittent and other unstable cutting conditions, optimised chipbreaking groove type, adapt to the requirements of chipbreaking at different depths of cut.

GT

Chipbreaker for finishing and semi-finishing;

The tip edge combines sharpness and strength;

Variable rake angle design combined with a spherical chipformer allows for a wider machining range;

Good chipformer performance and high versatility.

GX

Used for turning of many materials with good versatility;

Can reduce vibration and tool letting phenomenon, thus improving machining accuracy and surface quality;

Can reduce cutting force and cutting temperature, reduce tool wear and extend tool life;

Helps to control the shape and size of chips, making it easier to discharge chips and reducing the interference of chips in the machining process.

GZ

Used for turning of many materials with good versatility;

Can reduce vibration and tool letting phenomenon, thus improving machining accuracy and surface quality;

Can reduce cutting force and cutting temperature, reduce tool wear and extend tool life;

Helps to control the shape and size of chips, making it easier to discharge chips and reducing the interference of chips in the machining process.

MT

Chipbreaker groove cutting prongs +6° front angle and the front blade face form a large arc of smooth transition design, smooth chip cutting;

Good edge strength and versatility.

Recommended cutting parameters: ap:1.00-5.00 fn:0.20-0.50

Turning Grooves For Steel Parts

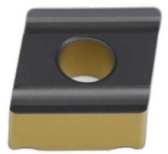
R/L-M

Fast and smooth cutting in light-cutting semi-finishing, for low to medium speeds on poor steel;

Improved edge safety and reliability in interrupted, rough machining;

Smooth chip breakage and high versatility.

Recommended cutting parameters: ap:1.00-4.00 fn:0.20-0.50



Stainless Steel Turning Groove Type

BF

Chipbreaker grooves for finishing and semi-finishing;

Sharp cutting edges, less cutting resistance;

Good chip handling even at small depth of cut;

Micro-processing technology for cutting edges, which reduces the generation of chip-accumulation tumours.

BM

Chipbreaker type for semi-finishing and roughing;

Tip edge combines sharpness and strength to accommodate a wider range of machining;

Good chip removal performance and lower cutting resistance.

MA

Roughing and semi-finishing groove type M material, double-sided chipbreaker, for stainless steel, rigid and cast iron;

The materials are all very light and versatile. Edge strength is good, can be capable of general amount of impact occasions processing.

Recommended cutting parameters: ap: 0.50-4.00 fn: 0.20-0.50

MS

Universal groove for M materials, double-sided chipbreaker, universal groove;

A full circumference groove type with strong versatility for stainless steel, soft steel, and difficult-to-machine materials, with sharp edges, light and fast cutting, and capable of roughing and finishing at lower speeds.

Recommended cutting parameters: ap: 0.20-4.00 fn: 0.15-0.40

R/L-S

Roughing and semi-finishing groove type for M type materials, double-sided chipbreaker, sharp edge, wider chipbreaker;

Suitable for stainless steel, soft steel, hard-to-machine materials and other sticky and soft materials at lower line speed;

Recommended parameters: ap: 0.8~4.5, f: 0.15~0.35

Cast Iron Turning Groove Type

Through Slot

General-purpose machining groove, double-sided chipbreaker, especially suitable for machining K materials.

Recommended cutting parameters: ap: 0.20-8.00 fn: 0.15-0.60

GH Slot

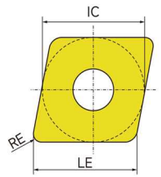
Combination of wide prongs and wide chipbreaker grooves for high-feed machining. Suitable for intermittent turning and black turning.

Chip breaking range ap：1.50~6.00 fn：0.24~0.6

Plane Groove

Brittle material, high hard material groove type, high structural strength, good fit with toolholder, more suitable for cast iron unstable turning.

80°CNMG

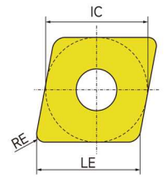


Shape

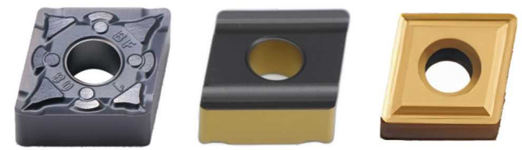
GT MT

Coating	Mark	Specification	Workpiece Material
CVD CVD Coating	HS8115	CNMG120404-GT	P M K N S H
		CNMG120408-GT	P M K N S H
		CNMG120412-GT	P M K N S H
	HS8125	CNMG120404-GT	P M K N S H
		CNMG120408-GT	P M K N S H
		CNMG120412-GT	P M K N S H
	HS8215	CNMG120404-GT	P M K N S H
		CNMG120408-GT	P M K N S H
		CNMG120412-GT	P M K N S H
	HS8225	CNMG120404-GT	P M K N S H
		CNMG120408-GT	P M K N S H
		CNMG120412-GT	P M K N S H
CVD CVD Coating	HS8115	CNMG120404-MT	P M K N S H
		CNMG120408-MT	P M K N S H
		CNMG120412-MT	P M K N S H
	HS8125	CNMG120404-MT	P M K N S H
		CNMG120408-MT	P M K N S H
		CNMG120412-MT	P M K N S H
	HS8215	CNMG120404-MT	P M K N S H
		CNMG120408-MT	P M K N S H
		CNMG120412-MT	P M K N S H
	HS8225	CNMG120404-MT	P M K N S H
		CNMG120408-MT	P M K N S H
		CNMG120412-MT	P M K N S H

80°CNMG



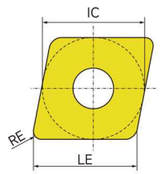
Shape



BF M MS

Coating	Mark	Specification	Workpiece Material
PVD PVD Coating	HS7125	CNMG120404-BF	P M K N S H
		CNMG120408-BF	P M K N S H
	HS7225	CNMG120404-BF	P M K N S H
		CNMG120408-BF	P M K N S H
CVD CVD Coating	HS8115	CNMG120404R-M	P M K N S H
		CNMG120408R-M	P M K N S H
		CNMG120404L-M	P M K N S H
		CNMG120408L-M	P M K N S H
	HS8125	CNMG120404R-M	P M K N S H
		CNMG120408R-M	P M K N S H
		CNMG120404L-M	P M K N S H
		CNMG120408L-M	P M K N S H
	HS8215	CNMG120404R-M	P M K N S H
		CNMG120408R-M	P M K N S H
		CNMG120404L-M	P M K N S H
		CNMG120408L-M	P M K N S H
	HS8225	CNMG120404R-M	P M K N S H
		CNMG120408R-M	P M K N S H
		CNMG120404L-M	P M K N S H
		CNMG120408L-M	P M K N S H
PVD PVD Coating	HS7125	CNMG120404-MS	P M K N S H
		CNMG120408-MS	P M K N S H
	HS7225	CNMG120404-MS	P M K N S H
		CNMG120408-MS	P M K N S H

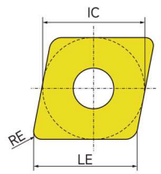
80°CNMG



Shape

Coating	Mark	Specification	Workpiece Material
CVD CVD Coating	HS7120	CNMG120404-BM	P M K N S H
		CNMG120408-BM	P M K N S H
		CNMG120412-BM	P M K N S H
PVD PVD Coating	HS7125	CNMG120404-BM	P M K N S H
		CNMG120408-BM	P M K N S H
		CNMG120412-BM	P M K N S H
	HS7225	CNMG120404-BM	P M K N S H
		CNMG120408-BM	P M K N S H
PVD PVD Coating	HS7125	CNMG120404-MA	P M K N S H
		CNMG120408-MA	P M K N S H
	HS7225	CNMG120404-MA	P M K N S H
		CNMG120408-MA	P M K N S H
CVD CVD Coating	HS6120	CNMG120408-GH	P M K N S H
		CNMG120412-GH	P M K N S H
CVD CVD Coating	HS6120	CNMG120404	P M K N S H
		CNMG120408	P M K N S H
		CNMG120412	P M K N S H
		CNMG120416	P M K N S H
		CNMG160608	P M K N S H
		CNMG160612	P M K N S H
		CNMG160616	P M K N S H
		CNMG190612	P M K N S H
		CNMG190616	P M K N S H

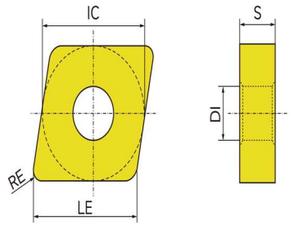
80°CNMG



Shape

Coating	Mark	Specification	Workpiece Material
CVD CVD Coating	HS8115	CNMG120404-GF	P M K N S H
		CNMG120408-GF	P M K N S H
	HS8125	CNMG120404-GF	P M K N S H
		CNMG120408-GF	P M K N S H
	HS8215	CNMG120404-GF	P M K N S H
		CNMG120408-GF	P M K N S H
	HS8225	CNMG120404-GF	P M K N S H
		CNMG120408-GF	P M K N S H
CVD CVD Coating	HS8115	CNMG120408-GR	P M K N S H
		CNMG120412-GR	P M K N S H
	HS8125	CNMG120408-GR	P M K N S H
		CNMG120412-GR	P M K N S H
	HS8215	CNMG120408-GR	P M K N S H
		CNMG120412-GR	P M K N S H
	HS8225	CNMG120408-GR	P M K N S H
		CNMG120412-GR	P M K N S H
		CNMG190608-GR	P M K N S H
		CNMG190612-GR	P M K N S H
		CNMG190616-GR	P M K N S H
PVD PVD Coating	HS7125	CNMG120408-BR	P M K N S H
		CNMG120412-BR	P M K N S H
		CNMG190616-BR	P M K N S H
	HS7225	CNMG120408-BR	P M K N S H
		CNMG120412-BR	P M K N S H
		CNMG190616-BR	P M K N S H

80°CNMM

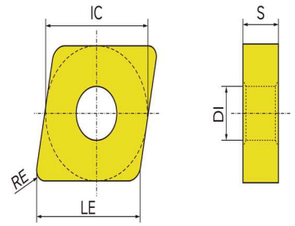


Shape

GX GZ

Coating	Mark	Specification	Workpiece Material
CVD CVD Coating	HS8225	CNMM190608-GX	P M K N S H
		CNMM190612-GX	P M K N S H
		CNMM190616-GX	P M K N S H
		CNMM190624-GX	P M K N S H
		CNMM250716-GX	P M K N S H
		CNMM250724-GX	P M K N S H
		CNMM250732-GX	P M K N S H
		CNMM250916-GX	P M K N S H
		CNMM250924-GX	P M K N S H
		CNMM250932-GX	P M K N S H
CVD CVD Coating	HS8225	CNMM190608-GZ	P M K N S H
		CNMM190612-GZ	P M K N S H
		CNMM190616-GZ	P M K N S H
		CNMM190624-GZ	P M K N S H
		CNMM250924-GZ	P M K N S H
		CNMM250932-GZ	P M K N S H

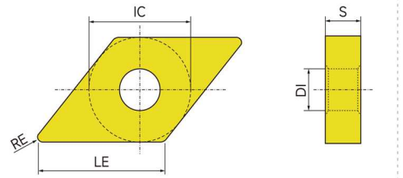
80°CNMA



Shape

Coating	Mark	Specification	Workpiece Material
CVD CVD Coating	HS6120	CNMA120404	P M K N S H
		CNMA120408	P M K N S H
		CNMA120412	P M K N S H
		CNMA120416	P M K N S H
		CNMA160608	P M K N S H
		CNMA160612	P M K N S H
		CNMA160616	P M K N S H
		CNMA190612	P M K N S H
		CNMA190616	P M K N S H

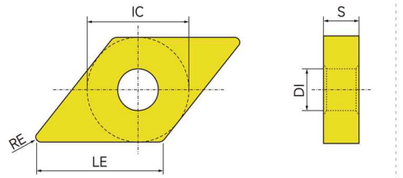
55°DNMG



Shape

Coating	Mark	Specification	Workpiece Material
CVD CVD Coating	HS8115	DNMG150404-GF	P M K N S H
		DNMG150408-GF	P M K N S H
		DNMG150604-GF	P M K N S H
		DNMG150608-GF	P M K N S H
	HS8125	DNMG150404-GF	P M K N S H
		DNMG150408-GF	P M K N S H
		DNMG150604-GF	P M K N S H
		DNMG150608-GF	P M K N S H
	HS8215	DNMG150404-GF	P M K N S H
		DNMG150408-GF	P M K N S H
		DNMG150604-GF	P M K N S H
		DNMG150608-GF	P M K N S H
	HS8225	DNMG150404-GF	P M K N S H
		DNMG150408-GF	P M K N S H
		DNMG150604-GF	P M K N S H
		DNMG150608-GF	P M K N S H
PVD PVD Coating	HS7125	DNMG150404-BF	P M K N S H
		DNMG150408-BF	P M K N S H
	HS7225	DNMG150404-BF	P M K N S H
		DNMG150408-BF	P M K N S H

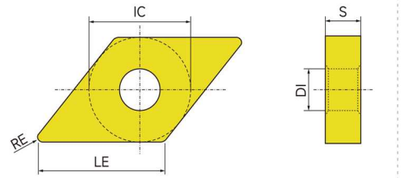
55°DNMG



Shape

Coating	Mark	Specification	Workpiece Material
CVD CVD Coating	HS8115	DNMG150404-GT	P M K N S H
		DNMG150408-GT	P M K N S H
		DNMG150412-GT	P M K N S H
		DNMG150604-GT	P M K N S H
		DNMG150608-GT	P M K N S H
		DNMG150612-GT	P M K N S H
	HS8125	DNMG150404-GT	P M K N S H
		DNMG150408-GT	P M K N S H
		DNMG150412-GT	P M K N S H
		DNMG150604-GT	P M K N S H
		DNMG150608-GT	P M K N S H
		DNMG150612-GT	P M K N S H
	HS8215	DNMG150404-GT	P M K N S H
		DNMG150408-GT	P M K N S H
		DNMG150412-GT	P M K N S H
		DNMG150604-GT	P M K N S H
		DNMG150608-GT	P M K N S H
		DNMG150612-GT	P M K N S H
	HS8225	DNMG150404-GT	P M K N S H
		DNMG150408-GT	P M K N S H
		DNMG150412-GT	P M K N S H
		DNMG150604-GT	P M K N S H
		DNMG150608-GT	P M K N S H
		DNMG150612-GT	P M K N S H

55°DNMG

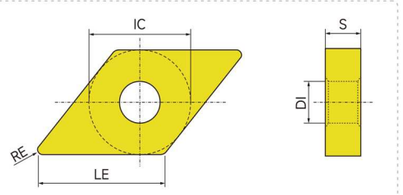


Shape

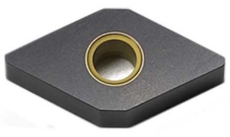
GR

Coating	Mark	Specification	Workpiece Material
CVD Coating	HS8115	DNMG150608-GR	P M K N S H
		DNMG150612-GR	P M K N S H
	HS8125	DNMG150608-GR	P M K N S H
		DNMG150612-GR	P M K N S H
	HS8215	DNMG150608-GR	P M K N S H
		DNMG150612-GR	P M K N S H
	HS8225	DNMG150608-GR	P M K N S H
		DNMG150612-GR	P M K N S H

55°DNMA



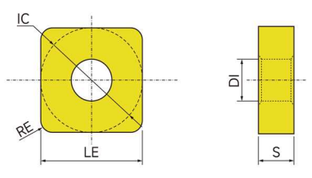
Shape



GR

Coating	Mark	Specification	Workpiece Material
CVD Coating	HS6120	DNMA150404	P M K N S H
		DNMA150408	P M K N S H
		DNMA150412	P M K N S H
		DNMA150604	P M K N S H
		DNMA150608	P M K N S H
		DNMA150612	P M K N S H

90°SNMG

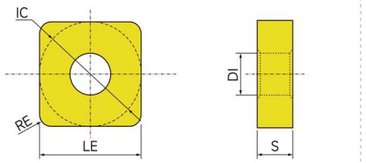


Shape

GF BF GT

Coating	Mark	Specification	Workpiece Material
CVD Coating	HS8115	SNMG120404-GF	P M K N S H
		SNMG120408-GF	P M K N S H
	HS8125	SNMG120404-GF	P M K N S H
		SNMG120408-GF	P M K N S H
	HS8215	SNMG120404-GF	P M K N S H
		SNMG120408-GF	P M K N S H
	HS8225	SNMG120404-GF	P M K N S H
		SNMG120408-GF	P M K N S H
PVD Coating	HS7125	SNMG120404-BF	P M K N S H
		SNMG120408-BF	P M K N S H
	HS7225	SNMG120404-BF	P M K N S H
		SNMG120408-BF	P M K N S H
CVD Coating	HS8115	SNMG120404-GT	P M K N S H
		SNMG120408-GT	P M K N S H
		SNMG120412-GT	P M K N S H
	HS8125	SNMG120404-GT	P M K N S H
		SNMG120408-GT	P M K N S H
		SNMG120412-GT	P M K N S H
	HS8215	SNMG120404-GT	P M K N S H
		SNMG120408-GT	P M K N S H
		SNMG120412-GT	P M K N S H
	HS8225	SNMG120404-GT	P M K N S H
		SNMG120408-GT	P M K N S H
		SNMG120412-GT	P M K N S H

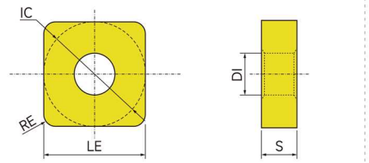
90°SNMG



Shape

Coating	Mark	Specification	Workpiece Material
CVD Coating	HS8115	SNMG120404-MT	P
		SNMG120408-MT	P
	HS8125	SNMG120404-MT	P
		SNMG120408-MT	P
	HS8215	SNMG120404-MT	P
		SNMG120408-MT	P
	HS8225	SNMG120404-MT	P
		SNMG120408-MT	P
CVD Coating	HS8115	SNMG120404R-M	P
		SNMG120408R-M	P
		SNMG120404L-M	P
		SNMG120408L-M	P
	HS8125	SNMG120404R-M	P
		SNMG120408R-M	P
		SNMG120404L-M	P
		SNMG120408L-M	P
	HS8215	SNMG120404R-M	P
		SNMG120408R-M	P
		SNMG120404L-M	P
		SNMG120408L-M	P
	HS8225	SNMG120404R-M	P
		SNMG120408R-M	P
		SNMG120404L-M	P
		SNMG120408L-M	P

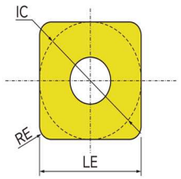
90°SNMG



Shape

Coating	Mark	Specification	Workpiece Material
CVD Coating	HS7120	SNMG120404-BM	M
		SNMG120408-BM	M
		SNMG120412-BM	M
PVD Coating	HS7125	SNMG120404-BM	M
		SNMG120408-BM	M
		SNMG120412-BM	M
	HS7225	SNMG120404-BM	M
		SNMG120408-BM	M
		SNMG120412-BM	M
PVD Coating	HS7125	SNMG120404-MA	M
		SNMG120408-MA	M
	HS7225	SNMG120404-MA	M
		SNMG120408-MA	M
PVD Coating	HS7125	SNMG120408-MS	M
	HS7225	SNMG120408-MS	M
CVD Coating	HS6120	SNMG120404	K
		SNMG120408	K
		SNMG120412	K
		SNMG150608	K
		SNMG150612	K
		SNMG150616	K
		SNMG190612	K
		SNMG190616	K

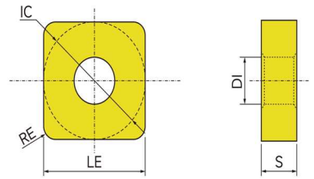
90°SNMG



Shape

Coating	Mark	Specification	Workpiece Material
CVD Coating	HS8115	SNMG120408-GR	P M K N S H
		SNMG120412-GR	P M K N S H
	HS8125	SNMG120408-GR	P M K N S H
		SNMG120412-GR	P M K N S H
	HS8215	SNMG120408-GR	P M K N S H
		SNMG120412-GR	P M K N S H
	HS8225	SNMG120408-GR	P M K N S H
		SNMG120412-GR	P M K N S H
		SNMG190608-GR	P M K N S H
		SNMG190612-GR	P M K N S H
		SNMG190616-GR	P M K N S H
PVD Coating	HS7125	SNMG120408-BR	P M K N S H
		SNMG120412-BR	P M K N S H
	HS7225	SNMG120408-BR	P M K N S H
		SNMG120412-BR	P M K N S H

90°SNMM

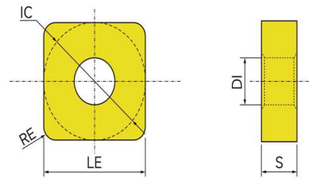


Shape

GZ

Coating	Mark	Specification	Workpiece Material
CVD Coating	HS8225	SNMM190612-GZ	P M K N S H
		SNMM190624-GZ	P M K N S H

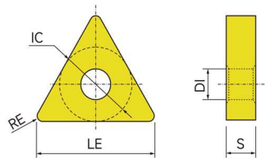
90°SNMA



Shape

Coating	Mark	Specification	Workpiece Material
CVD Coating	HS8225	SNMA120404	P M K N S H
		SNMA120408	P M K N S H
		SNMA120412	P M K N S H
		SNMA150608	P M K N S H
		SNMA150612	P M K N S H
		SNMA150616	P M K N S H
		SNMA190612	P M K N S H
		SNMA190616	P M K N S H

60°TNMG

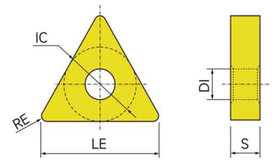


Shape

GF BF GT

Coating	Mark	Specification	Workpiece Material
CVD Coating	HS8115	TNMG160404-GF	P
		TNMG160408-GF	P
	HS8125	TNMG160404-GF	P
		TNMG160408-GF	P
	HS8215	TNMG160404-GF	P
		TNMG160408-GF	P
	HS8225	TNMG160404-GF	P
		TNMG160408-GF	P
PVD Coating	HS7125	TNMG160404-BF	M
		TNMG160408-BF	M
	HS7225	TNMG160404-BF	M
		TNMG160408-BF	M
CVD Coating	HS8115	TNMG160404-GT	P
		TNMG160408-GT	P
		TNMG160412-GT	P
	HS8125	TNMG160404-GT	P
		TNMG160408-GT	P
		TNMG160412-GT	P
	HS8215	TNMG160404-GT	P
		TNMG160408-GT	P
		TNMG160412-GT	P
	HS8225	TNMG160404-GT	P
		TNMG160408-GT	P
		TNMG160412-GT	P

60°TNMG

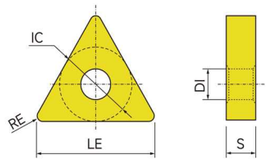


Shape

MT BM

Coating	Mark	Specification	Workpiece Material
CVD Coating	HS8115	TNMG160404-MT	P
		TNMG160408-MT	P
		TNMG160412-MT	P
	HS8125	TNMG160404-MT	P
		TNMG160408-MT	P
		TNMG160412-MT	P
	HS8215	TNMG160404-MT	P
		TNMG160408-MT	P
		TNMG160412-MT	P
	HS8225	TNMG160404-MT	P
		TNMG160408-MT	P
		TNMG160412-MT	P
CVD Coating	HS7120	TNMG160404-BM	M
		TNMG160408-BM	M
		TNMG160412-BM	M
PVD Coating	HS7125	TNMG160404-BM	M
		TNMG160408-BM	M
		TNMG160412-BM	M
	HS7225	TNMG160404-BM	M
		TNMG160408-BM	M
		TNMG160412-BM	M

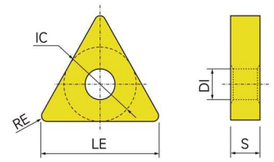
60°TNMG



Shape

Coating	Mark	Specification	Workpiece Material
CVD Coating	HS8115	TNMG160404R-M	P
		TNMG160408R-M	P
		TNMG160404L-M	P
		TNMG160408L-M	P
	HS8125	TNMG160404R-M	P
		TNMG160408R-M	P
		TNMG160404L-M	P
		TNMG160408L-M	P
	HS8215	TNMG160404R-M	P
		TNMG160408R-M	P
		TNMG160404L-M	P
		TNMG160408L-M	P
	HS8225	TNMG160404R-M	P
		TNMG160408R-M	P
		TNMG160404L-M	P
		TNMG160408L-M	P
PVD Coating	HS7125	TNMG160404-MA	M
		TNMG160408-MA	M
	HS7225	TNMG160404-MA	M
		TNMG160408-MA	M
PVD Coating	HS7125	TNMG160404-MS	M
		TNMG160408-MS	M
	HS7225	TNMG160404-MS	M
		TNMG160408-MS	M

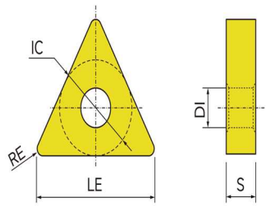
60°TNMG



Shape

Coating	Mark	Specification	Workpiece Material
PVD Coating	HS7125	TNMG160404R-S	M
		TNMG160408R-S	M
		TNMG160404L-S	M
		TNMG160408L-S	M
	HS7225	TNMG160404R-S	M
		TNMG160408R-S	M
		TNMG160404L-S	M
		TNMG160408L-S	M
CVD Coating	HS6120	TNMG160404	K
		TNMG160408	K
		TNMG160412	K
		TNMG220408	K
		TNMG220412	K
		TNMG220416	K
CVD Coating	HS8115	TNMG160408-GR	P
		TNMG160412-GR	P
	HS8125	TNMG160408-GR	P
		TNMG160412-GR	P
	HS8215	TNMG160408-GR	P
		TNMG160412-GR	P
	HS8225	TNMG160408-GR	P
		TNMG160412-GR	P

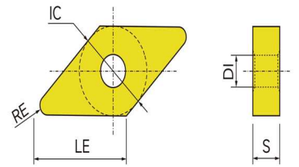
60°TNMA



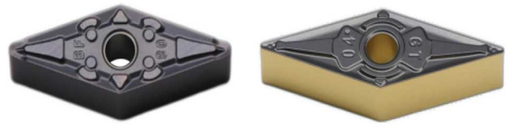
Shape

Coating	Mark	Specification	Workpiece Material
CVD Coating	HS6120	TNMA160404	P M **K** N S H
		TNMA160408	P M **K** N S H
		TNMA160412	P M **K** N S H
		TNMA220408	P M **K** N S H
		TNMA220412	P M **K** N S H
		TNMA220416	P M **K** N S H

35°VNMG



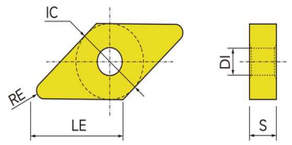
Shape



BF GT

Coating	Mark	Specification	Workpiece Material
PVD Coating	HS7115	VNMG160404-BF	P **M** K N S H
		VNMG160408-BF	P **M** K N S H
	HS7225	VNMG160404-BF	P **M** K N S H
		VNMG160408-BF	P **M** K N S H
CVD Coating	HS8115	VNMG160404-GT	**P** M K N S H
		VNMG160408-GT	**P** M K N S H
		VNMG160412-GT	**P** M K N S H
	HS8125	VNMG160404-GT	**P** M K N S H
		VNMG160408-GT	**P** M K N S H
		VNMG160412-GT	**P** M K N S H
	HS8215	VNMG160404-GT	**P** M K N S H
		VNMG160408-GT	**P** M K N S H
		VNMG160412-GT	**P** M K N S H
	HS8225	VNMG160404-GT	**P** M K N S H
		VNMG160408-GT	**P** M K N S H
		VNMG160412-GT	**P** M K N S H

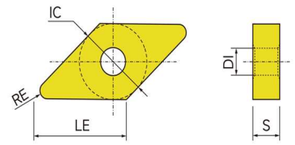
60°VNMG



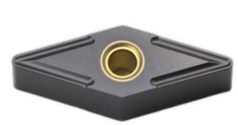
Shape

Coating	Mark	Specification	Workpiece Material
CVD Coating	HS8115	VNMG160404-MT	P M K N S H
		VNMG160408-MT	P M K N S H
		VNMG160412-MT	P M K N S H
	HS8125	VNMG160404-MT	P M K N S H
		VNMG160408-MT	P M K N S H
		VNMG160412-MT	P M K N S H
	HS8215	VNMG160404-MT	P M K N S H
		VNMG160408-MT	P M K N S H
		VNMG160412-MT	P M K N S H
	HS8225	VNMG160404-MT	P M K N S H
		VNMG160408-MT	P M K N S H
		VNMG160412-MT	P M K N S H
CVD Coating	HS7120	VNMG160404-BM	P M K N S H
		VNMG160408-BM	P M K N S H
		VNMG160412-BM	P M K N S H
PVD Coating	HS7120	VNMG160404-BM	P M K N S H
		VNMG160408-BM	P M K N S H
		VNMG160412-BM	P M K N S H
	HS7120	VNMG160404-BM	P M K N S H
		VNMG160408-BM	P M K N S H
		VNMG160412-BM	P M K N S H

35°VNMG

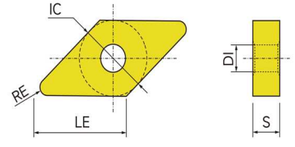


Shape

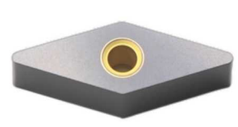


Coating	Mark	Specification	Workpiece Material
CVD Coating	HS6120	VNMG160404	P M K N S H
		VNMG160408	P M K N S H

35°VNMA

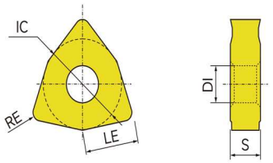


Shape



Coating	Mark	Specification	Workpiece Material
CVD Coating	HS6120	VNMA160404	P M K N S H
		VNMA160408	P M K N S H

80°WNMG

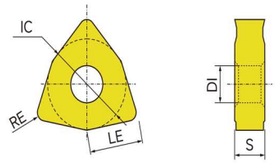


Shape

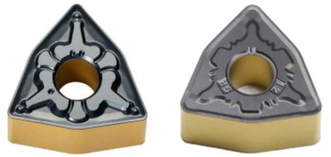
GF GT

Coating	Mark	Specification	Workpiece Material
CVD Coating	HS8115	WNMG080404-GF	P M K N S H
		WNMG080408-GF	P M K N S H
	HS8125	WNMG080404-GF	P M K N S H
		WNMG080408-GF	P M K N S H
	HS8215	WNMG080404-GF	P M K N S H
		WNMG080408-GF	P M K N S H
	HS8225	WNMG080404-GF	P M K N S H
		WNMG080408-GF	P M K N S H
CVD Coating	HS8115	WNMG080404-GT	P M K N S H
		WNMG080408-GT	P M K N S H
		WNMG080412-GT	P M K N S H
	HS8125	WNMG080404-GT	P M K N S H
		WNMG080408-GT	P M K N S H
		WNMG080412-GT	P M K N S H
	HS8215	WNMG080404-GT	P M K N S H
		WNMG080408-GT	P M K N S H
		WNMG080412-GT	P M K N S H
	HS8225	WNMG080404-GT	P M K N S H
		WNMG080408-GT	P M K N S H
		WNMG080412-GT	P M K N S H

80°WNMG



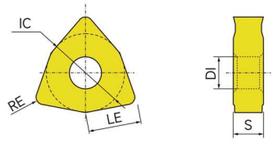
Shape



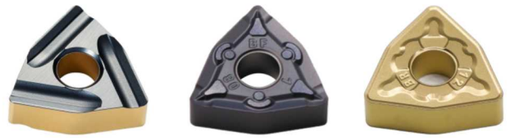
MT GR

Coating	Mark	Specification	Workpiece Material
CVD Coating	HS8115	WNMG080404-MT	P M K N S H
		WNMG080408-MT	P M K N S H
		WNMG080412-MT	P M K N S H
	HS8125	WNMG080404-MT	P M K N S H
		WNMG080408-MT	P M K N S H
		WNMG080412-MT	P M K N S H
	HS8215	WNMG080404-MT	P M K N S H
		WNMG080408-MT	P M K N S H
		WNMG080412-MT	P M K N S H
	HS8225	WNMG080404-MT	P M K N S H
		WNMG080408-MT	P M K N S H
		WNMG080412-MT	P M K N S H
CVD Coating	HS8115	WNMG080408-GR	P M K N S H
		WNMG080412-GR	P M K N S H
	HS8125	WNMG080408-GR	P M K N S H
		WNMG080412-GR	P M K N S H
	HS8215	WNMG080408-GR	P M K N S H
		WNMG080412-GR	P M K N S H
	HS8225	WNMG080408-GR	P M K N S H
		WNMG080412-GR	P M K N S H

80°WNMG

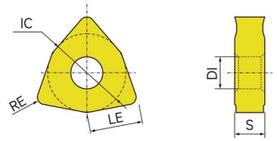


Shape



Coating	Mark	Specification	Workpiece Material
CVD Coating	HS8115	WNMG080404R-M	P M K N S H
		WNMG080408R-M	P M K N S H
		WNMG080404L-M	P M K N S H
		WNMG080408L-M	P M K N S H
	HS8125	WNMG080404R-M	P M K N S H
		WNMG080408R-M	P M K N S H
		WNMG080404L-M	P M K N S H
		WNMG080408L-M	P M K N S H
	HS8215	WNMG080404R-M	P M K N S H
		WNMG080408R-M	P M K N S H
		WNMG080404L-M	P M K N S H
		WNMG080408L-M	P M K N S H
	HS8225	WNMG080404R-M	P M K N S H
		WNMG080408R-M	P M K N S H
		WNMG080404L-M	P M K N S H
		WNMG080408L-M	P M K N S H
PVD Coating	HS7125	WNMG080404-BF	P M K N S H
		WNMG080408-BF	P M K N S H
	HS7225	WNMG080404-BF	P M K N S H
		WNMG080408-BF	P M K N S H
PVD Coating	HS7125	WNMG080408-BR	P M K N S H
		WNMG080412-BR	P M K N S H
	HS7225	WNMG080408-BR	P M K N S H
		WNMG080412-BR	P M K N S H

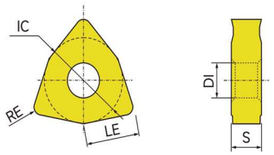
80°WNMG



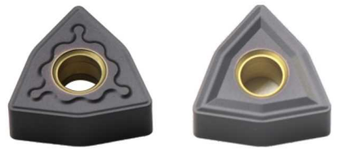
Shape

Coating	Mark	Specification	Workpiece Material
CVD Coating	HS7120	WNMG06T312-BM	P M K N S H
		WNMG060412-BM	P M K N S H
		WNMG080404-BM	P M K N S H
		WNMG080408-BM	P M K N S H
		WNMG080412-BM	P M K N S H
PVD Coating	HS7125	WNMG06T312-BM	P M K N S H
		WNMG060412-BM	P M K N S H
		WNMG080404-BM	P M K N S H
		WNMG080408-BM	P M K N S H
		WNMG080412-BM	P M K N S H
	HS7225	WNMG06T312-BM	P M K N S H
		WNMG060412-BM	P M K N S H
		WNMG080404-BM	P M K N S H
		WNMG080408-BM	P M K N S H
		WNMG080412-BM	P M K N S H
PVD Coating	HS7125	WNMG080404-MA	P M K N S H
		WNMG080408-MA	P M K N S H
	HS7225	WNMG080404-MA	P M K N S H
		WNMG080408-MA	P M K N S H
PVD Coating	HS7125	WNMG080404-MS	P M K N S H
		WNMG080408-MS	P M K N S H
	HS7225	WNMG080404-MS	P M K N S H
		WNMG080408-MS	P M K N S H

80°WNMG

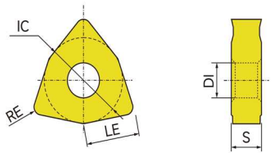


Shape

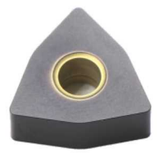


Coating	Mark	Specification	Workpiece Material
CVD Coating	HS6120	WNMG080408-GH	P M **K** N S H
		WNMG080412-GH	P M **K** N S H
CVD Coating	HS6120	WNMG080404	P M **K** N S H
		WNMG080408	P M **K** N S H
		WNMG080412	P M **K** N S H

80°WNMA

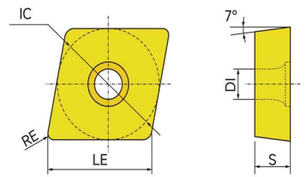


Shape



Coating	Mark	Specification	Workpiece Material
CVD Coating	HS6120	WNMA060404	P M **K** N S H
		WNMA060408	P M **K** N S H
		WNMA080404	P M **K** N S H
		WNMA080408	P M **K** N S H
		WNMA080412	P M **K** N S H
		WNMA080416	P M **K** N S H

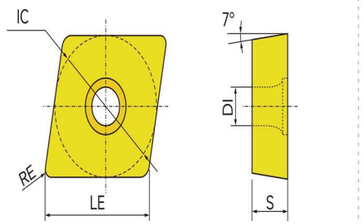
80°CCMT



Shape

Coating	Mark	Specification	Workpiece Material
CVD Coating	HS8115	CCMT060204-TM	**P** M K N S H
		CCMT060208-TM	**P** M K N S H
		CCMT09T304-TM	**P** M K N S H
		CCMT09T308-TM	**P** M K N S H
		CCMT120404-TM	**P** M K N S H
		CCMT120408-TM	**P** M K N S H
		CCMT120412-TM	**P** M K N S H
	HS8125	CCMT060204-TM	**P** M K N S H
		CCMT060208-TM	**P** M K N S H
		CCMT09T304-TM	**P** M K N S H
		CCMT09T308-TM	**P** M K N S H
		CCMT120404-TM	**P** M K N S H
		CCMT120408-TM	**P** M K N S H
		CCMT120412-TM	**P** M K N S H
	HS8215	CCMT060204-TM	**P** M K N S H
		CCMT060208-TM	**P** M K N S H
		CCMT09T304-TM	**P** M K N S H
		CCMT09T308-TM	**P** M K N S H
		CCMT120404-TM	**P** M K N S H
		CCMT120408-TM	**P** M K N S H
		CCMT120412-TM	**P** M K N S H

80°CCMT

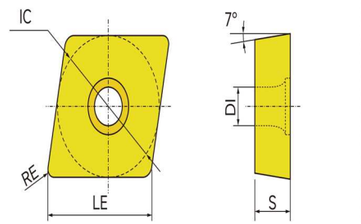


Shape

TM

Coating	Mark	Specification	Workpiece Material
CVD Coating	HS8225	CCMT060204-TM	**P** M K N S H
		CCMT060208-TM	**P** M K N S H
		CCMT09T304-TM	**P** M K N S H
		CCMT09T308-TM	**P** M K N S H
		CCMT120404-TM	**P** M K N S H
		CCMT120408-TM	**P** M K N S H
		CCMT120412-TM	**P** M K N S H
	HS6115	CCMT060204-TM	P M **K** N S H
		CCMT060208-TM	P M **K** N S H
		CCMT09T304-TM	P M **K** N S H
		CCMT09T308-TM	P M **K** N S H
		CCMT120404-TM	P M **K** N S H
		CCMT120408-TM	P M **K** N S H
		CCMT120412-TM	P M **K** N S H

80°CCMT

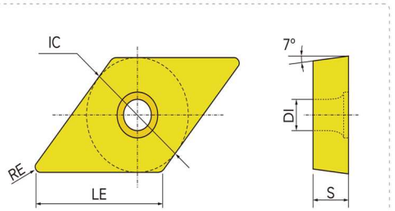


Shape

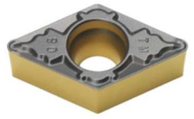
TM

Coating	Mark	Specification	Workpiece Material
PVD Coating	HS7125	CCMT060204-TM	P **M** K N S H
		CCMT060208-TM	P **M** K N S H
		CCMT09T304-TM	P **M** K N S H
		CCMT09T308-TM	P **M** K N S H
		CCMT120404-TM	P **M** K N S H
		CCMT120408-TM	P **M** K N S H
		CCMT120412-TM	P **M** K N S H
	HS7225	CCMT060204-TM	P **M** K N S H
		CCMT060208-TM	P **M** K N S H
		CCMT09T304-TM	P **M** K N S H
		CCMT09T308-TM	P **M** K N S H
		CCMT120404-TM	P **M** K N S H
		CCMT120408-TM	P **M** K N S H
		CCMT120412-TM	P **M** K N S H

55°DCMT



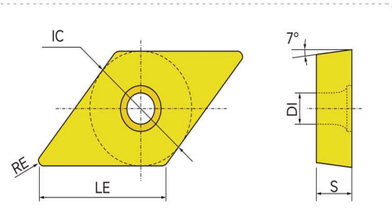
Shape



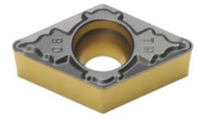
TM

Coating	Mark	Specification	Workpiece Material
CVD Coating	HS8115	DCMT070204-TM	P M K N S H
		DCMT070208-TM	P M K N S H
		DCMT11T304-TM	P M K N S H
		DCMT11T308-TM	P M K N S H
		DCMT11T312-TM	P M K N S H
	HS8125	DCMT070204-TM	P M K N S H
		DCMT070208-TM	P M K N S H
		DCMT11T304-TM	P M K N S H
		DCMT11T308-TM	P M K N S H
		DCMT11T312-TM	P M K N S H
	HS8215	DCMT070204-TM	P M K N S H
		DCMT070208-TM	P M K N S H
		DCMT11T304-TM	P M K N S H
		DCMT11T308-TM	P M K N S H
		DCMT11T312-TM	P M K N S H
	HS8225	DCMT070204-TM	P M K N S H
		DCMT070208-TM	P M K N S H
		DCMT11T304-TM	P M K N S H
		DCMT11T308-TM	P M K N S H
		DCMT11T312-TM	P M K N S H

55°DCMT



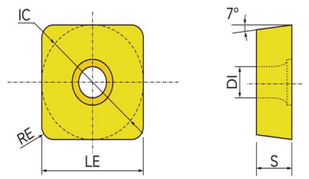
Shape



TM

Coating	Mark	Specification	Workpiece Material
CVD Coating	HS6115	DCMT070204-TM	P M K N S H
		DCMT070208-TM	P M K N S H
		DCMT11T304-TM	P M K N S H
		DCMT11T308-TM	P M K N S H
		DCMT11T312-TM	P M K N S H
PVD Coating	HS7125	DCMT070204-TM	P M K N S H
		DCMT070208-TM	P M K N S H
		DCMT11T304-TM	P M K N S H
		DCMT11T308-TM	P M K N S H
		DCMT11T312-TM	P M K N S H
	HS7225	DCMT070204-TM	P M K N S H
		DCMT070208-TM	P M K N S H
		DCMT11T304-TM	P M K N S H
		DCMT11T308-TM	P M K N S H
		DCMT11T312-TM	P M K N S H

90°SCMT

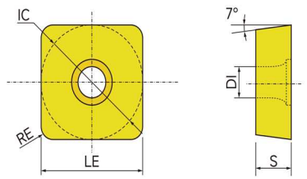


Shape

TM

Coating	Mark	Specification	Workpiece Material
CVD Coating	HS8115	SCMT09T304-TM	P M K N S H
		SCMT09T308-TM	P M K N S H
		SCMT120404-TM	P M K N S H
		SCMT120408-TM	P M K N S H
		SCMT120412-TM	P M K N S H
	HS8125	SCMT09T304-TM	P M K N S H
		SCMT09T308-TM	P M K N S H
		SCMT120404-TM	P M K N S H
		SCMT120408-TM	P M K N S H
		SCMT120412-TM	P M K N S H
	HS8215	SCMT09T304-TM	P M K N S H
		SCMT09T308-TM	P M K N S H
		SCMT120404-TM	P M K N S H
		SCMT120408-TM	P M K N S H
		SCMT120412-TM	P M K N S H
	HS8225	SCMT09T304-TM	P M K N S H
		SCMT09T308-TM	P M K N S H
		SCMT120404-TM	P M K N S H
		SCMT120408-TM	P M K N S H
		SCMT120412-TM	P M K N S H

90°SCMT

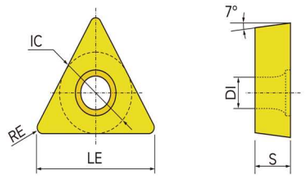


Shape

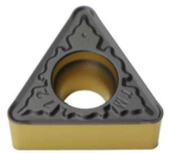
TM

Coating	Mark	Specification	Workpiece Material
CVD Coating	HS6115	SCMT09T304-TM	P M K N S H
		SCMT09T308-TM	P M K N S H
		SCMT120404-TM	P M K N S H
		SCMT120408-TM	P M K N S H
		SCMT120412-TM	P M K N S H
PVD Coating	HS7125	SCMT09T304-TM	P M K N S H
		SCMT09T308-TM	P M K N S H
		SCMT120404-TM	P M K N S H
		SCMT120408-TM	P M K N S H
		SCMT120412-TM	P M K N S H
	HS7225	SCMT09T304-TM	P M K N S H
		SCMT09T308-TM	P M K N S H
		SCMT120404-TM	P M K N S H
		SCMT120408-TM	P M K N S H
		SCMT120412-TM	P M K N S H

60°TCMT



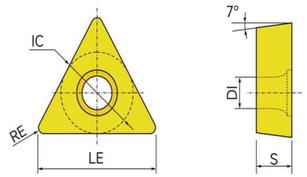
Shape



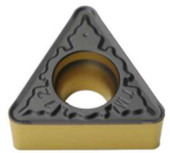
TM

Coating	Mark	Specification	Workpiece Material
CVD Coating	HS8115	TCMT110204-TM	P M K N S H
		TCMT110208-TM	P M K N S H
		TCMT16T304-TM	P M K N S H
		TCMT16T308-TM	P M K N S H
		TCMT16T312-TM	P M K N S H
	HS8125	TCMT110204-TM	P M K N S H
		TCMT110208-TM	P M K N S H
		TCMT16T304-TM	P M K N S H
		TCMT16T308-TM	P M K N S H
		TCMT16T312-TM	P M K N S H
	HS8215	TCMT110204-TM	P M K N S H
		TCMT110208-TM	P M K N S H
		TCMT16T304-TM	P M K N S H
		TCMT16T308-TM	P M K N S H
		TCMT16T312-TM	P M K N S H
	HS8225	TCMT110204-TM	P M K N S H
		TCMT110208-TM	P M K N S H
		TCMT16T304-TM	P M K N S H
		TCMT16T308-TM	P M K N S H
		TCMT16T312-TM	P M K N S H

60°TCMT



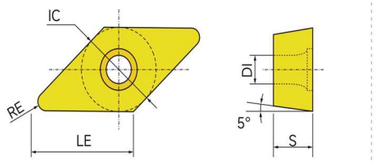
Shape



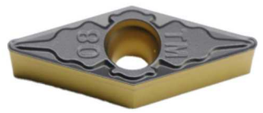
TM

Coating	Mark	Specification	Workpiece Material
CVD Coating	HS6115	TCMT110204-TM	P M K N S H
		TCMT110208-TM	P M K N S H
		TCMT16T304-TM	P M K N S H
		TCMT16T308-TM	P M K N S H
		TCMT16T312-TM	P M K N S H
PVD Coating	HS7125	TCMT110204-TM	P M K N S H
		TCMT110208-TM	P M K N S H
		TCMT16T304-TM	P M K N S H
		TCMT16T308-TM	P M K N S H
		TCMT16T312-TM	P M K N S H
	HS7225	TCMT110204-TM	P M K N S H
		TCMT110208-TM	P M K N S H
		TCMT16T304-TM	P M K N S H
		TCMT16T308-TM	P M K N S H
		TCMT16T312-TM	P M K N S H

35°VBMT



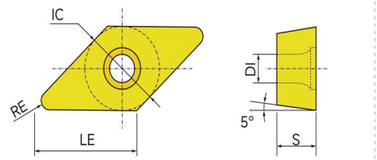
Shape



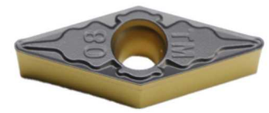
TM

Coating	Mark	Specification	Workpiece Material
CVD Coating	HS8115	VBMT110304-TM	P M K N S H
		VBMT110308-TM	P M K N S H
		VBMT160404-TM	P M K N S H
		VBMT160408-TM	P M K N S H
		VBMT160412-TM	P M K N S H
	HS8125	VBMT110304-TM	P M K N S H
		VBMT110308-TM	P M K N S H
		VBMT160404-TM	P M K N S H
		VBMT160408-TM	P M K N S H
		VBMT160412-TM	P M K N S H
	HS8215	VBMT110304-TM	P M K N S H
		VBMT110308-TM	P M K N S H
		VBMT160404-TM	P M K N S H
		VBMT160408-TM	P M K N S H
		VBMT160412-TM	P M K N S H
	HS8225	VBMT110304-TM	P M K N S H
		VBMT110308-TM	P M K N S H
		VBMT160404-TM	P M K N S H
		VBMT160408-TM	P M K N S H
		VBMT160412-TM	P M K N S H

35°VBMT



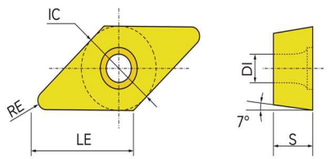
Shape



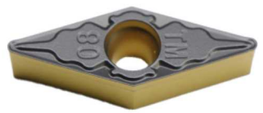
TM

Coating	Mark	Specification	Workpiece Material
CVD Coating	HS6115	VBMT110304-TM	P M K N S H
		VBMT110308-TM	P M K N S H
		VBMT160404-TM	P M K N S H
		VBMT160408-TM	P M K N S H
		VBMT160412-TM	P M K N S H
PVD Coating	HS7125	VBMT110304-TM	P M K N S H
		VBMT110308-TM	P M K N S H
		VBMT160404-TM	P M K N S H
		VBMT160408-TM	P M K N S H
		VBMT160412-TM	P M K N S H
	HS7225	VBMT110304-TM	P M K N S H
		VBMT110308-TM	P M K N S H
		VBMT160404-TM	P M K N S H
		VBMT160408-TM	P M K N S H
		VBMT160412-TM	P M K N S H

35°VCMT



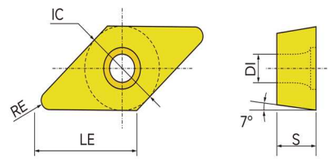
Shape



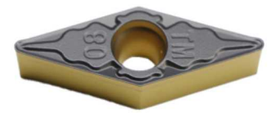
TM

Coating	Mark	Specification	Workpiece Material
CVD Coating	HS8115	VCMT110304-TM	P M K N S H
		VCMT110308-TM	P M K N S H
		VCMT160404-TM	P M K N S H
		VCMT160408-TM	P M K N S H
		VCMT160412-TM	P M K N S H
	HS8125	VCMT110304-TM	P M K N S H
		VCMT110308-TM	P M K N S H
		VCMT160404-TM	P M K N S H
		VCMT160408-TM	P M K N S H
		VCMT160412-TM	P M K N S H
	HS8215	VCMT110304-TM	P M K N S H
		VCMT110308-TM	P M K N S H
		VCMT160404-TM	P M K N S H
		VCMT160408-TM	P M K N S H
		VCMT160412-TM	P M K N S H
	HS8225	VCMT110304-TM	P M K N S H
		VCMT110308-TM	P M K N S H
		VCMT160404-TM	P M K N S H
		VCMT160408-TM	P M K N S H
		VCMT160412-TM	P M K N S H

35°VCMT



Shape



TM

Coating	Mark	Specification	Workpiece Material
CVD Coating	HS6115	VCMT110304-TM	P M K N S H
		VCMT110308-TM	P M K N S H
		VCMT160404-TM	P M K N S H
		VCMT160408-TM	P M K N S H
		VCMT160412-TM	P M K N S H
PVD Coating	HS7125	VCMT110304-TM	P M K N S H
		VCMT110308-TM	P M K N S H
		VCMT160404-TM	P M K N S H
		VCMT160408-TM	P M K N S H
		VCMT160412-TM	P M K N S H
	HS7225	VCMT110304-TM	P M K N S H
		VCMT110308-TM	P M K N S H
		VCMT160404-TM	P M K N S H
		VCMT160408-TM	P M K N S H
		VCMT160412-TM	P M K N S H