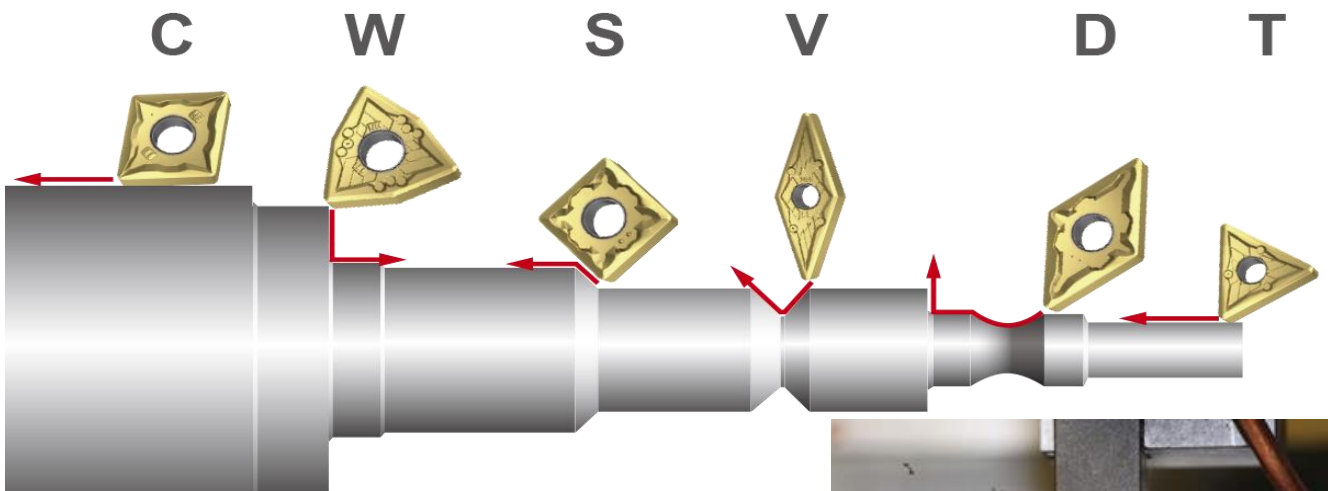




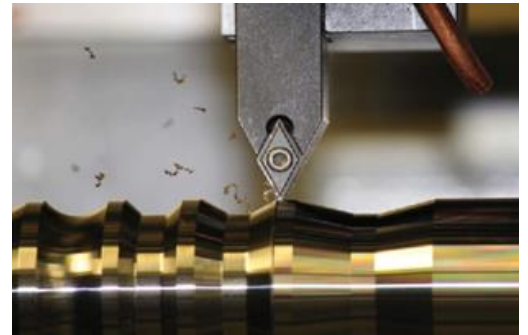
SHREE TRADERS

Cutting tools and Pneumatics Automation



INSERTS

Inserts are essential tools in machining, mainly for turning operations, to cut and shape materials. Knowing their use, design, and features helps improve machining efficiency.



Applications of Turning Inserts

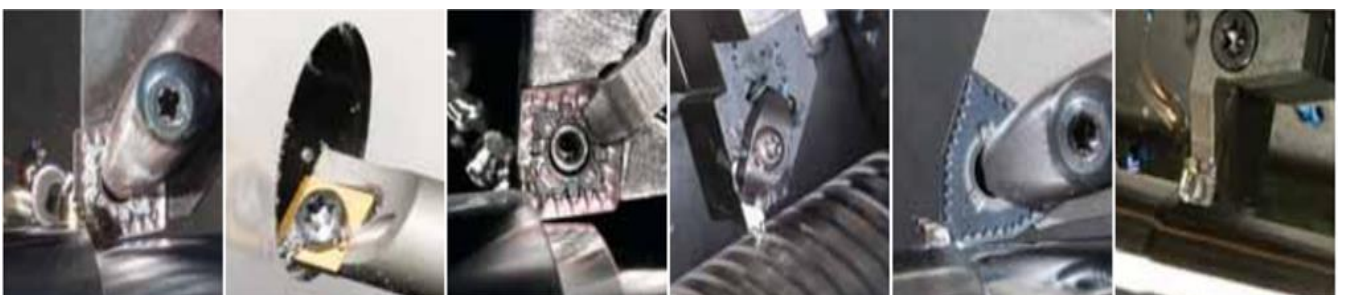
Turning inserts are mainly used in metalworking to shape and finish materials. Their applications include:

- **Heavy-duty machining:** Inserts with a negative rake angle handle tough materials with strong cutting forces.
- **Precision machining:** Inserts are chosen based on shape and material to ensure high accuracy.

**USED IN
CNC
MACHINE**

• Uses of Turning Inserts

- **Metal Cutting:** They are essential in lathes for turning operations, where they remove material from a workpiece to achieve desired dimensions and surface finishes.
- **Finishing Operations:** Inserts are used for finishing cuts to improve surface quality and dimensional accuracy.
- **Roughing Operations:** In heavy-duty machining, inserts are designed to handle significant material removal rates, making them suitable for roughing operations.





Structure and Anatomy of Turning Inserts

- Size and shape: Inserts come in various sizes and shapes, which influence their cutting performance.
- Geometric features: Important aspects include the insert's point angle, corner radius, and overall design, which affect cutting efficiency and tool life.
- Material composition: Most inserts are made from carbide or ceramic materials, chosen for their hardness and wear resistance.

Post-coat treatment

- Improves edge toughness.
- Long, predictable tool life.
- Reduces depth-of-cut notching.
- Wide range of applications.

Improved edge toughness

- Provides smooth outer surface to reduce forces, friction, and workpiece sticking.

Post-coat grinding

- Provides secure seating surface.

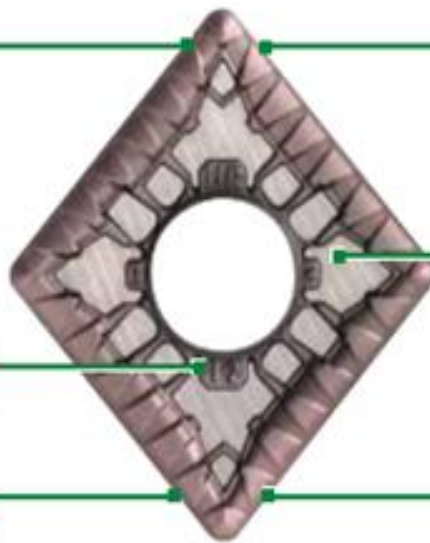
New geometry identification system.

MT-CVD/CVD-TiN-TiCN-
 Al_2O_3 -ZrCN



Alpha alumina layer

- Provides coating integrity at elevated speeds.
- Higher productivity and dependability at high cutting temperatures.



Cutting edge

Peripheral stabilising t-land

Clamping hole

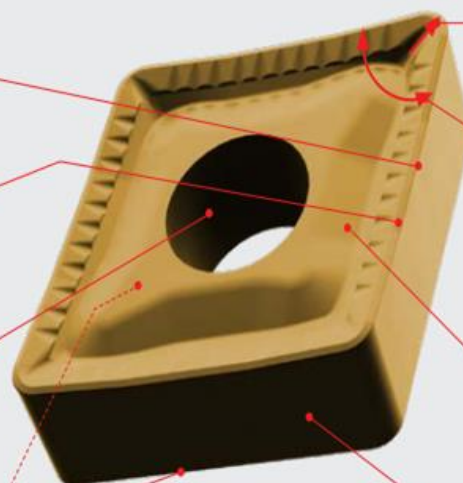
(Face) insert seating

Corner radius

Corner angle

Face (Chip breaker = groove),
(insert seating)

Flank





Manufacturing of Turning Inserts

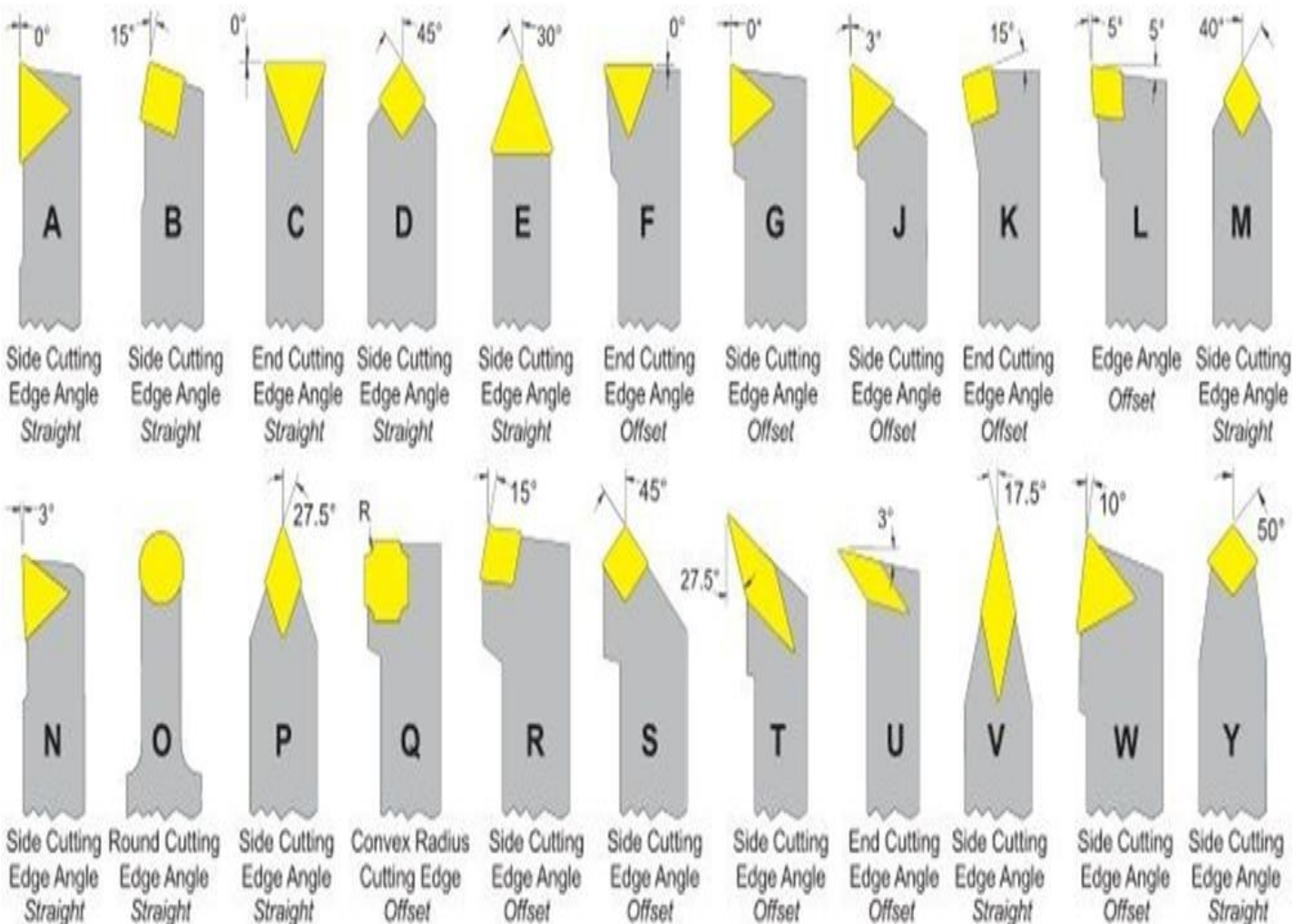
- **Material selection:** Durable carbide or ceramic materials are chosen.
- **Shaping:** Precision machining creates the required geometry.
- **Coating:** Applied to improve performance and wear resistance.

Dimensions and Specifications

- **Insert size:** Must match the tool holder and machining needs.
- **Cutting edge specifications:** Includes number of edges and geometry for efficiency.
- **ISO standards:** Defines dimensions and performance criteria.

TYPES OF MATERIAL USED FOR MANUFACTURING

- CARBIDE
- CERAMIC
- CNB



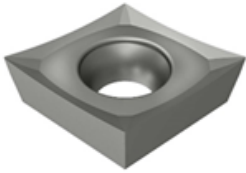


Holding Mechanism

- **Clamping Mechanism:** Secures inserts to the tool holder for stability and easy replacement.
- **Tool Holders:** Provide rigidity and support, matching insert geometry for stability.
- **Insert Geometry:** Designed to enhance clamping force and prevent movement during machining.



Positive and Negative Insert Styles



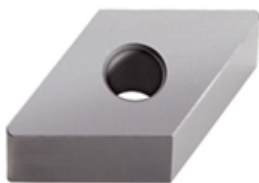
Positive Inserts

- Screw-on inserts are first choice for I.D. turning of all materials and O.D. turning on small to medium lathes
- Suitable for workpiece materials.



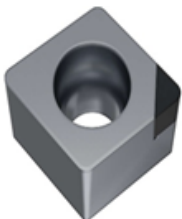
Negative Inserts

- Negative style inserts are your first choice for general machining of materials on medium to large lathes.
- Negative style inserts offer the best economy for high metal removal rates
- Available in flat-top and chip-control geometries with both molded and ground peripheries



Ceramic Insert

- Ceramic inserts are a great choice for productive machining of high-temp alloys.
- Negative rake inserts are also recommended for the machining of hardened materials and cast irons.
- Available in flat-top geometries with molded and ground peripheries.

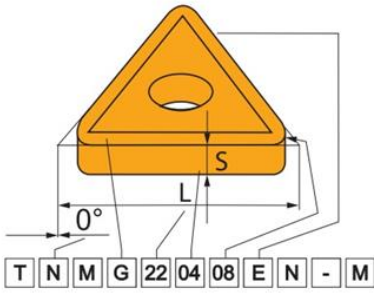


PcBN and PCD

- PcBN can be used for machining steels with a hardness higher than the 48 HRC.
- PcBN inserts can also be used for productivity improvements in machining cast irons and high-temp alloys.
- PCD inserts are used for machining non-ferrous materials.



Insert ISO Code System



ISO	1	2	3	4
	T	N	U	N
ANSI	1	2	3	4
	T	N	U	
	T	N	M	G

1	2	3	4	5	6	7	8	9
C	N	M	G	12	04	08	-UG	YG3020
Shape	Clearance	Tolerance	Clamping & Chipbreaker	Insert Size	Insert Thickness	Corner Radius	Chipbreaker Geometry	Grade



1 - Shape

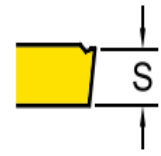
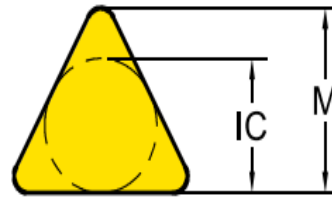
Symbol	Shape	
H	Hexagonal	
O	Octagonal	
P	Pentagonal	
S	Square	
T	Triangular	
C	Rhombic 80°	
D	Rhombic 55°	
V	Rhombic 35°	
W	Trigon	
L	Rectangular	
K	Parallelogram 55°	
R	Round	

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



2 - Relief Angle (AN)

Symbol	Relief Angle (AN)	
N	No Relief Angle	
B	Relief 5°	
C	Relief 7°	
P	Relief 11°	
D	Relief 15°	
E	Relief 20°	
F	Relief 25°	
O	Special	



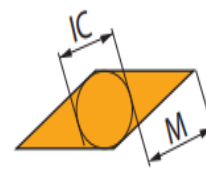
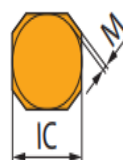
3 - Tolerance Class

Symbol	Inner Circle IC (mm)	Nose Height M (mm)	Thickness S (mm)
E	±0.025	±0.025	±0.025
G	±0.025	±0.025	±0.13
K*	±0.05~0.15*	±0.013	±0.025
M*	±0.05~0.15*	±0.08~0.2*	±0.13
U*	±0.08~0.25*	±0.13~0.38*	±0.13

* Tolerance is different by insert IC size. Please see ISO 1832

Tolerances

	(mm)			(")		
	M(±)	S(±)	IC(±)	M(±)	S(±)	IC(±)
A	0.005	0.025	0.025	.0002"	.001"	.0010"
F	0.005	0.025	0.013	.0002"	.001"	.0005"
C	0.013	0.025	0.025	.0005"	.001"	.0010"
H	0.013	0.025	0.013	.0005"	.001"	.0005"
E	0.025	0.025	0.025	.0010"	.001"	.0010"
G	0.025	0.130	0.025	.0010"	.005"	.0010"
J	0.005	0.025	0.05 - 0.13	.0002"	.001"	.002 - 0.005"
K	0.013	0.025	0.05 - 0.13	.0005"	.001"	.002 - 0.005"
L	0.025	0.025	0.05 - 0.13	.0010"	.001"	.002 - 0.005"
M	0.08 - 0.18	0.130	0.05 - 0.13	.003 - 0.007"	.005"	.002 - 0.005"
N	0.08 - 0.18	0.025	0.05 - 0.13	.003 - 0.007"	.001"	.002 - 0.005"
U	0.05 - 0.38	0.130	0.05 - 0.13	.005 - 0.015"	.005"	.003 - 0.010"



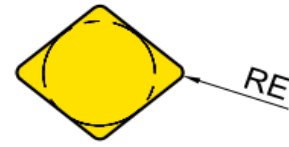
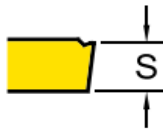


4 - Clamping & Chipbreaker

Symbol	Clamping	Chipbreaker	Figure
N	No clamping hole	X	
R		One Face	
A	Cylindrical Clamping hole	X	
M		One Face	
G		Both Faces	
W	Screw Hole	X	
T		One Face	
U		Both Faces	
X	Special		

5 - Insert Size

Metric							Inner Circle IC (mm)	Inch
06	11	06	07	11			6.35	2
07							7.94	2.5
09	16	09	11	16	06	09 (00)	9.525	3
12	22	12	15	22	08	12 (00)	12.7	4
15		16					15.875	5
		19					19.05	6
						06 (M0)	6	
						08 (M0)	8	
						10 (M0)	10	
						12 (M0)	12	
						16 (M0)	16	



6 - Insert Thickness (S)

Metric	Thickness - S (mm)	Inch
T1	1.98	1.2
02	2.38	1.5
03	3.18	2
T3	3.97	2.5
04	4.76	3
05	5.56	3.5
06	6.35	4
07	7.94	5

7 - Corner Radius (RE)

Metric	Corner Radius - RE (mm)	Inch
01	0.1	0
02	0.2	0.5
04	0.4	1
08	0.8	2
12	1.2	3
16	1.6	4
20	2.0	5
24	2.4	6

Turning Grades	P Steel				M Stainless steel			K Cast iron			N Non-ferrous		S Superalloys	
	P10	P20	P30	P40	M10	M20	M30	K10	K20	K30	N10	N20	S10	S20
CVD	YG1001	1001						1001						
	YG3010	3010						3010						
	YG3020		3020											
	YG3030			3030			3030							
PVD	YG801	801												
	YG211					211							211	
	YG213						213							213
	YG214							214						214
DLC	YG100										100			
-	YG10										10			








Chipbreaker, Feed Rate and Depth of Cut

		Sharp Edge	General	Strong Edge
	Continuous			
	General			
	Heavy Interrupt			









Turning Inserts Overview

Negative Inserts

Shape	Series	Size			
C 	CNMA	12	16	19	
	CNMG	12		19	
D 	DNMA		1506		
	DNMG	1504	1506		
K 	KNUX	16			
S 	SNMA	12			
	SNMG	12			
T 	TNMA	16			
	TNMG	16	22		
	TNUX	16			
V 	VNMG	16			
W 	WNMA		08		
	WNMG	06	08		

Positive Inserts

Shape	Series	Size			
C 	CCGT		09	12	
	CCMT	06	09	12	
D 	DCGT		11		
	DCMT	07	11		
R 	RCMT	06	08	10	12
S 	SCMT	09	12		
T 	TCGT		16		
	TCMT	11	16		
V 	VBMT	16			
	VCMT / VCGT	16			

EXAMPLES OF INSERT NAMES

NEGATIVE INSERTS

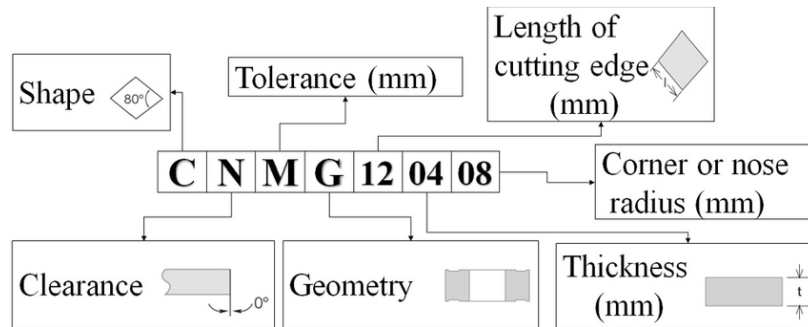
- YG TNMG 160408-XPM-YG3115
- YG CNMG 120408-UC-YG3010
- YG WNMG 060404-UM-YG1001
- YG DNMG 150604-UG-YG3115
- YG SNMG 120412-UG-YG3115
- YG VNMG 160404-UC-YG1001

POSITIVE INSERTS

- YG VBMT 160402-MF-YG211
- YG DCMT 117308-UG-YG3010
- YG TCMT 110204-PF-YG3115
- YG CCMT 060204-UF-G3010



TOOL HOLDER FOR TURNING INSERTS:



INSERT HOLDER	SERIES NAME	INSERT SERIES
	DDJNR 2525 M1506 T00BF0259	DNMG 150604-UG-YG3115
	DCLNL 2525 M12 T00HB0015	CNMG 120408-UC-YG3010
	DVJNL 2525 M16 T00HB0270	VNMG 160404-UC-YG1001
	PSDNN 4040 S19 T00HB1136	SNMG 120412-UG-YG3115
	DWLNR 2525 M08 T000018	WNMG 060404-UM-YG1001
	DTJNR 2525 M16 T00HB0122	TNMG 160408-XPM-YG3115



■ ANSI/ISO Turning Inserts

Step 1 • Select Insert Style



Carbide Inserts,
Negative



Carbide Inserts,
Positive



Ceramic
Inserts



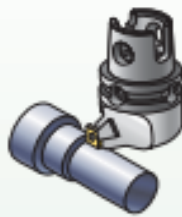
PcBN/PCD
Inserts












			Carbide Inserts, Negative	Carbide Inserts, Positive	Ceramic Inserts	PcBN/PCD Inserts
C	Rhomboid 80°		B35-B45	B30-B43 B45-B46	B179-B181	B197-B203
D	Rhomboid 55°		B51-B63	B47-B50 B63-B64	B182-B183	B206-B210
R	Round		B67	B65-B66	B184-B186	B210
S	Square 90°		B70-B77	B68-B70 B78-B80	B187-B192	B210-B212
T	Triangular 60°		B83-B91	B91-B93	B193-B195	B212-B215
V	Rhomboid 35°		B95-B99	B94-B95	B196	B216-B218
W	Trigon 80° with enlarged corner angles		B99-B105	B105	B196	B218



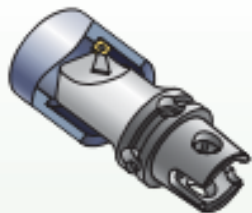
Step 2 • Select Application and Clamping System












External Machining



							
			D-Style Clamping	Negative C-Style Clamping	S-Style Clamping	Positive C-Style Clamping	
C	Rhomboid 80°		conventional	C8-C10	C19	C25-C26	-
D	Rhomboid 55°			C11-C12	-	C27	-
R	Round		conventional	C13	-	-	C23-C24
S	Square 90°		conventional	C13-C15	C19-C20	C27	C21
T	Triangular 60°		conventional	C15-C16	-	C28	C21-C23
V	Rhomboid 35°		conventional	C17-C18	-	C29	-
W	Trigon 80° with enlarged corner angles		conventional	C18	C20	-	-

Internal Machining



							
			D-Style Clamping	Negative C-Style Clamping	S-Style Clamping	Positive C-Style Clamping	
C	Rhomboid 80°		conventional	C36-C37	-	C40-C44	-
D	Rhomboid 55°			C38	-	C45-C48	-
R	Round		conventional	-	-	-	-
S	Square 90°		conventional	C39	-	-	-
T	Triangular 60°		conventional	-	-	C49-C50	C39
V	Rhomboid 35°		conventional	-	-	C51	-
W	Trigon 80° with enlarged corner angles		conventional	-	-	-	-