

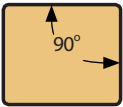
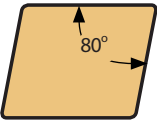
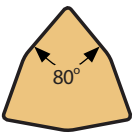
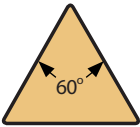
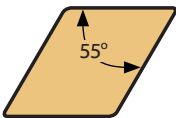
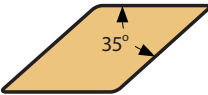


INSERT SELECTION GUIDE



SHAPE | APPLICATION CONDITIONS | CONSIDERATIONS

INDEXABLE INSERTS

Insert Shape	Application Conditions (+)	Considerations (-)
 <p>S - Square</p>	<ul style="list-style-type: none"> • Very strong 90° corner with excellent economy (8 edges on double-sided inserts). • Most often used for rough facing operations – especially on castings, forgings and rough-sawed blanks. 	<ul style="list-style-type: none"> • Unable to turn or face up to a shoulder (must be used in a tool-holder with minimum 5° lead angle). • High radial forces push against the workpiece when used for turning. • Should always be used in a stable set-up.
 <p>C - 80° Diamond</p>	<ul style="list-style-type: none"> • The most popular insert shape due to high versatility. • Strong cutting edge with secure seating in the insert pocket. • 80° corner can be used for both turning and facing operations. • Opposite 100° corners can be used for general roughing applications (especially facing), providing maximum economy of 8 total cutting edges. 	<ul style="list-style-type: none"> • With only 5° of clearance between the trailing side of the insert and the workpiece, chip jamming can occur when boring.
 <p>W - 80° Corner Trigon</p>	<ul style="list-style-type: none"> • Six-corner 80° diamond shape that can increase economy compared to CNMG-style inserts. • Generally used on more moderate depths of cut and feedrates than CNMG-style inserts. 	<ul style="list-style-type: none"> • Seating of insert in pocket is not as stable as CNMG-style inserts. • Cannot take as deep a depth of cut as similar sized CNMG-type inserts.
 <p>T - Triangle</p>	<ul style="list-style-type: none"> • Very versatile insert shape – can be used for turning, facing, boring, copy turning and basic profiling. • Good economy with up to 6 cutting edges. • Excellent choice for general boring due to very stable seating of the insert in the boring bar pocket, and extra side clearance between the insert and the workpiece bore (greatly reducing the risk of chip jamming). 	<ul style="list-style-type: none"> • Edge is measurably weaker than 80° diamond shaped inserts. • Be sure not to use a triangle insert that is “too large” for the application, as the cost per edge can increase. For example, a 3/8” iC (Inscribed Circle) triangle insert (TNMG-33x) can manage up to .375” depth of cut in most situations with nearly the same insert strength – but a much lower cost - than a 1/2” iC triangle insert (TNMG-43x).
 <p>D - 55° Diamond</p>	<ul style="list-style-type: none"> • Generally the first choice for profile / copy turning applications. • Able to “In-Copy” (plunge turn into a smaller diameter) at an angle of 30°. • Commonly used when machining close to the tailstock / live center. 	<ul style="list-style-type: none"> • Somewhat weaker edge strength than a triangle insert. • Cost per edge is higher than most other turning inserts (except 35° diamond shape).
 <p>V - 35° Diamond</p>	<ul style="list-style-type: none"> • First choice for intricate shape copy turning. • Can “In-Copy” (plunge turn into a smaller diameter) at an angle up to 49°. • Can work extremely close to the tailstock / live center. 	<ul style="list-style-type: none"> • The weakest turning insert shape / corner – depths of cut and feedrates must be lighter. • Highest cost per edge. • Negative style (VNMG) should mainly be used for external applications. • Positive style (VCMT) can be used for external and internal applications, and in many cases improved performance outweighs the increased cost per edge (2 edges vs. the 4 edges of a negative 35° diamond VNMG).









INDEXABLE INSERTS

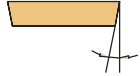
CODE KEY-CATALOG NUMBERS

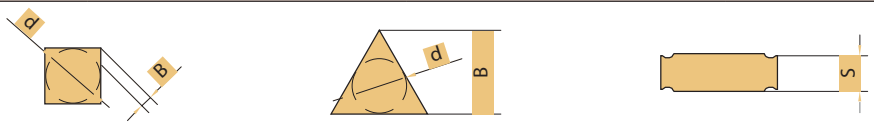


EXAMPLE 1

C	N	M	G	4	3	2		QM
1	2	3	4	5	6	7	8	9

1		
Insert Shape		
C	80° Diamond	
D	55° Diamond	
S	Square	
T	Triangle	
V	35° Diamond	
W	80° Corner Trigon	

2	
Clearance Angle	
	
B	5° Positive Rake
C	7° Positive Rake
N	0° Negative Rake
P	11° Positive Rake

3			
Tolerances, inch			
			
Tolerance Class	tolerance on 'd'	tolerance on 'B'	tolerance on 's'
G	± .001	± .001	± .005
M	see table below	see table below	± .005

Tolerance Class M, inch				
d	tolerance on 'd'	tolerance on 'B'		
	All Shapes	C, S, T, W Shapes	D Shape	V Shape
7/32	± .002	± .003	± .004	N/A
1/4	± .002	± .003	± .004	± .007
3/8	± .002	± .003	± .004	± .007
1/2	± .003	± .005	± .006	± .010
5/8	± .004	± .006	± .007	N/A
3/4	± .004	± .006	± .007	N/A

INDEXABLE INSERTS






INDEXABLE INSERTS


CODE KEY-CATALOG NUMBERS

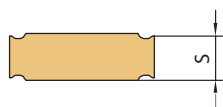


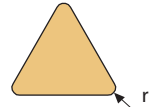
EXAMPLE 2

V	C	G	T	3	3	1		-	GP
1	2	3	4	5	6	7	8		9

4		
Insert Type		
G	With hole, Pin / Top Clamp Double-sided	
T	With hole, Screw-down Clamping Single-sided	
X	Manufacturer-Specific Design	

5	
Insert Size	
Inscribed Circle, d, inch	
	
Symbol indicates number of 1/8ths of an inch	
Symbol	d
1.8	7/32
2	1/4
3	3/8
4	1/2
5	5/8
6	3/4

6	
Thickness, inch	
	
Symbol indicates number of 1/16ths of an inch	
Symbol	s
1.5	3/32
2	1/8
2.5	5/32
3	3/16
4	1/4

7	
Nose Radius, inch	
	
Symbol indicates number of 1/64ths of an inch	
Symbol	r
0.5	.008
1	1/64
2	1/32
3	3/64
4	1/16

8	
Hand of Insert (optional)	
R	Right-hand
L	Left-hand

9	
Chipbreaker Designation	
Indicates the machining properties or chipbreaker features Manufacturer-specific	









INDEXABLE INSERTS

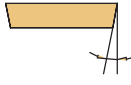
CODE KEY-ISO DESIGNATION

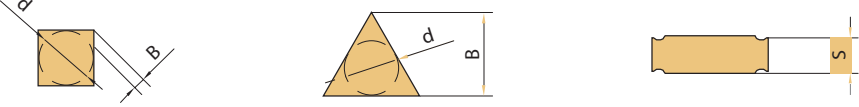


EXAMPLE 1

C	N	M	G	12	04	08		-	QM
1	2	3	4	5	6	7	8		9

1		
Insert Shape		
C	80° Diamond	
D	55° Diamond	
S	Square	
T	Triangle	
V	35° Diamond	
W	80° Corner Trigon	

2	
Clearance Angle	
	
B	5° Positive Rake
C	7° Positive Rake
N	0° Negative Rake
P	11° Positive Rake

3			
Tolerances, mm			
			
Tolerance Class	tolerance on 'd'	tolerance on 'B'	tolerance on 's'
G	± 0.025	± 0.025	± 0.13
M	see table below	see table below	± 0.13

Tolerance Class M, mm				
d	tolerance on 'd'	tolerance on 'B'		
	All Shapes	C, S, T, W Shapes	D Shape	V Shape
5.556	± 0.05	± 0.08	± 0.10	N/A
6.350	± 0.05	± 0.08	± 0.10	± 0.18
9.525	± 0.05	± 0.08	± 0.10	± 0.18
12.700	± 0.08	± 0.13	± 0.15	± 0.25
15.875	± 0.10	± 0.15	± 0.18	N/A
19.050	± 0.10	± 0.15	± 0.18	N/A

INDEXABLE INSERTS

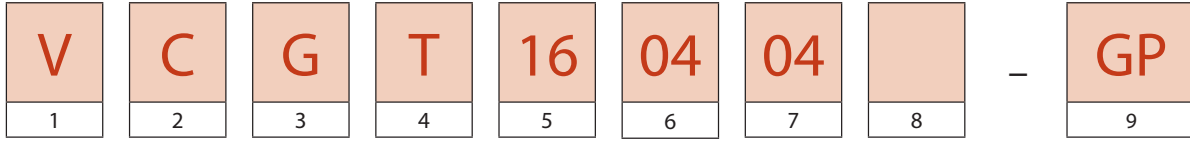


INDEXABLE INSERTS

CODE KEY-ISO DESIGNATION



EXAMPLE 2



4	
Insert Type	
G	With hole, Pin / Top Clamp Double-sided
T	With hole, Screw-down Clamping Single-sided
X	Manufacturer-Specific Design

6	
Thickness, mm	
Symbol	s
02	2.38
03	3.18
T3	3.97
04	4.76
05	5.56
06	6.35

5						
Insert Size						
Cutting Edge Length, mm						
Symbol						
06	6.5					6.5
07		7.8				
08						8.7
09	9.7		9.5	9.6		
11		11.6		11.0	11.1	
12	12.9		12.7			
15		15.5	15.9			
16	16.1			16.5	16.6	
19	19.4		19.1			
22				22.0	22.2	
27				27.5		

7	
Nose Radius, mm	
Symbol	r
02	0.2
04	0.4
08	0.8
12	1.2
16	1.6
30	3.0

8	
Hand of Insert (optional)	
R	Right-hand
L	Left-hand

9	
Chipbreaker Designation	
Indicates the machining properties or chipbreaker features	
Manufacturer-specific	



INDEXABLE INSERTS

GRADES FOR GENERAL TURNING



INDEXABLE INSERTS

WORKPIECE MATERIAL	ANSI	ISO	Coating Type		
			CVD	PVD	
P Steel	C8	01	GPI115		
	C7	10			
		20			
	C6	30			GPI225
	40				
M Stainless Steel	-	01	GMI125	GS3115	
	-	10			
	-	20			GM3125
	-	30			
K Cast Iron	C4	01	GKI115		
	C3	10			
		20			
	C1	30			GKI125
S Heat-Resistant Super Alloys	-	01		GS3115	
	-	10			
	-	20			
	-	30			

