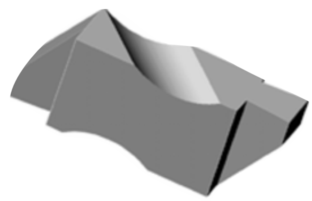
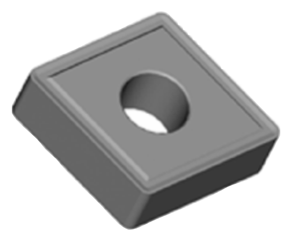
SPE-D-CUT

Tool Company

INDEXABLE CARBIDE CUTTING TOOLS

Note - Click any page header to go to the index.
Click any Tab to go to the table of contents.





SPE-D-LOK
SPE-D-MILL
SPE-D-TURN
SPE-D-THREAD
SPE-D-SOLUTIONS

Contents

SPE-D-CUT

SPE-D-CUT

Insert Grade & Geometry Selection

For information regarding insert grades and specific chip control insert geometry, please refer to the Grade and Geometry section on page 2 through 12

Index on pages 275-276

CVD Coated Carbide Grades

CVD- (Chemical Vapor Deposition coating)
Exceptional adhesion to the substrate. Resists thermal fatigue when machining steels at lower cutting temperatures.

Multi-Oxide and Carbonitride

A repeating sequence of aluminum oxide, titanium carbide, carbonitride and nitride coatings designed to provide maximum resistance to both abrasive and chemical wear.

SA 200 NEW

Finishing to light roughing of alloy steels, carbon steels, stainless steels, cast, malleable and nodular cast irons.

Complex Al_2O_3 – TiC–N

Superior oxide coating eliminates oxidation wear, reduces heating of wear resistant carbonitride subcoats. This permits more efficient use of the subcoat during high speed and resultant high temperature applications.

SA 210 NEW

Wear-resistant, multi-range carbide grade for roughing and finishing of steel and cast materials with higher cutting speeds. Good resistance to plastic deformation.

SA 220 NEW

Wear-resistant, universal carbide grade for turning of steel, stainless steel and cast iron with medium to high cutting speeds. Good toughness, even under adverse conditions. Excellent cutting edge stability.

SA 150 NEW

Semi-finishing to roughing of alloy steels, carbon steels, stainless steels, cast, malleable and nodular irons; substrate has been modified to increase edge strength and coa ting resilience.

SA 180

Finishing to light roughing of steels, cast, nodular and malleable iron, many stainless steels and some high temperature alloys.

SA 250

Semi-finishing to roughing of steels, cast, nodular and malleable iron, and many stainless steels.

SA 550

Semi-finishing to heavy roughing of steels, cast, nodular and malleable iron with medium speed, high feed and/or heavy shock.

SA 280

Finishing to light roughing of cast, nodular and malleable irons; some resistance to cratering.

SA 230

Finishing to moderate roughing of cast, nodular and malleable irons; some resistance to cratering.

SA 740

For wet or dry milling of the high temp alloys with nickel, iron and cobalt bases. Well suited for titanium and ductile, malleable, and grey irons.

Complex TiN–TiCN–TiC

A sequence of titanium carbide, carbonitride and nitride coatings formulated to provide maximum resistance to wear from abrasion and welding particularly on steels and ductile irons.

SN 150 NEW

Semi-finishing to roughing of alloy steels, carbon steels, stainless steels, cast, malleable & nodular irons; substructure of this grade has been modified to increase edge strength and coating resilience.

SN 230

Finishing to light roughing at high speeds in stainless steel, some high temperature alloys, plastics and other nonmetals.

SN 180

Finishing to light roughing steels and stainless steels.

SN 160

Semi-finishing to roughing steels and stainless steels.

SN 027

Semi-finishing to roughing stainless steel, nonferrous materials and nonmetals; used where there is light shock.

SN 170

Finishing to rough milling steels and stainless steels where there is light to moderate shock.

SN 550

Semi-finishing to heavy roughing low alloy steels and stainless steels in heavy shock.

PVD Grades

PVD- (Physical Vapor Deposition coating)
An excellent coating that can be applied to sharp edges to resist build-up and aid in improving surface finishes especially in tough to machine materials.

SP321

For finishing operations; TiN-PVD coated grade for applications where reduced affinity of the tool to the material is required; particularly beneficial for high temperature alloys where high strength, and sharp cutting edges are required

SP 201

A TiN-PVD coated grade for general purpose applications on materials where the lubricity of TiN added to a stable, higher temperature base is beneficial for high temperature alloys, stainless steel and milling operations.

SP 026

(Threading & Grooving) Good shock resistance plus resistance to built-up edge when threading and grooving of nonferrous metals; used in threading and grooving stainless steels and nonferrous materials with moderate to no shock

SP 621

(Threading & Grooving) Mid-range grade with resistance to wear and buildup that can occur when threading and grooving; for threading and grooving steels, cast steels and stainless steels with moderate to no shock

PVD Grades (Cont.)

SP 541 NEW

(Threading & Grooving) Tough, durable TiN PVD coating over an alloyed substrate. Developed for cutting high temperature alloys, most stainless steels and titanium alloys at low to moderate speeds. Unique resistance to mechanical and thermal shock and build-up.

SP 742

Tough substrate and a patented multilayered PVD TiN/TiCN/TiN coating. An excellent grade for high productivity milling, wet or dry, in carbon and alloy steels. It is an ideal grade for the austenitic, ferritic and ph stainless steels. Gives sustained and dependable tool life in a broad field of applications.

Uncoated Carbide Grades

Steel Cutting Grades

SS xx

Uncoated grades for machining steel, steel castings and other long chipping materials where crater resistance is required

SS 140

For high speed finishing steels and other long chipping materials

SS 70

For finishing to light roughing when milling steel and steel alloys

SS 210

A premium grade offering an excellent balance of wear, crater and shock resistance for threading and grooving of all steels.

SS 30

Superior steel milling grade with high resistance to thermal fatigue

SS 160

General purpose grade for machining steels and long chipping materials

SS 550

For irregular work surfaces, heavy interruptions at low speeds, high feeds and/or heavy depths of cut

Non-Ferrous Grades

SC xx

Uncoated grades for machining nonferrous metals and short chipping materials; also for machining high temperature alloys and some stainless steels.

SC 230

For finish to light rough machining of aluminum, high temperature alloys, stainless steels, irons, plastics and other nonmetals.

SC 280

Finish to light rough milling of nonferrous metals and automotive irons; some resistance to cratering.

SC 20

Best uncoated general purpose grade for machining nonferrous metals, cast irons, high temperature alloys, nonmetals; also for machining hardened steels.

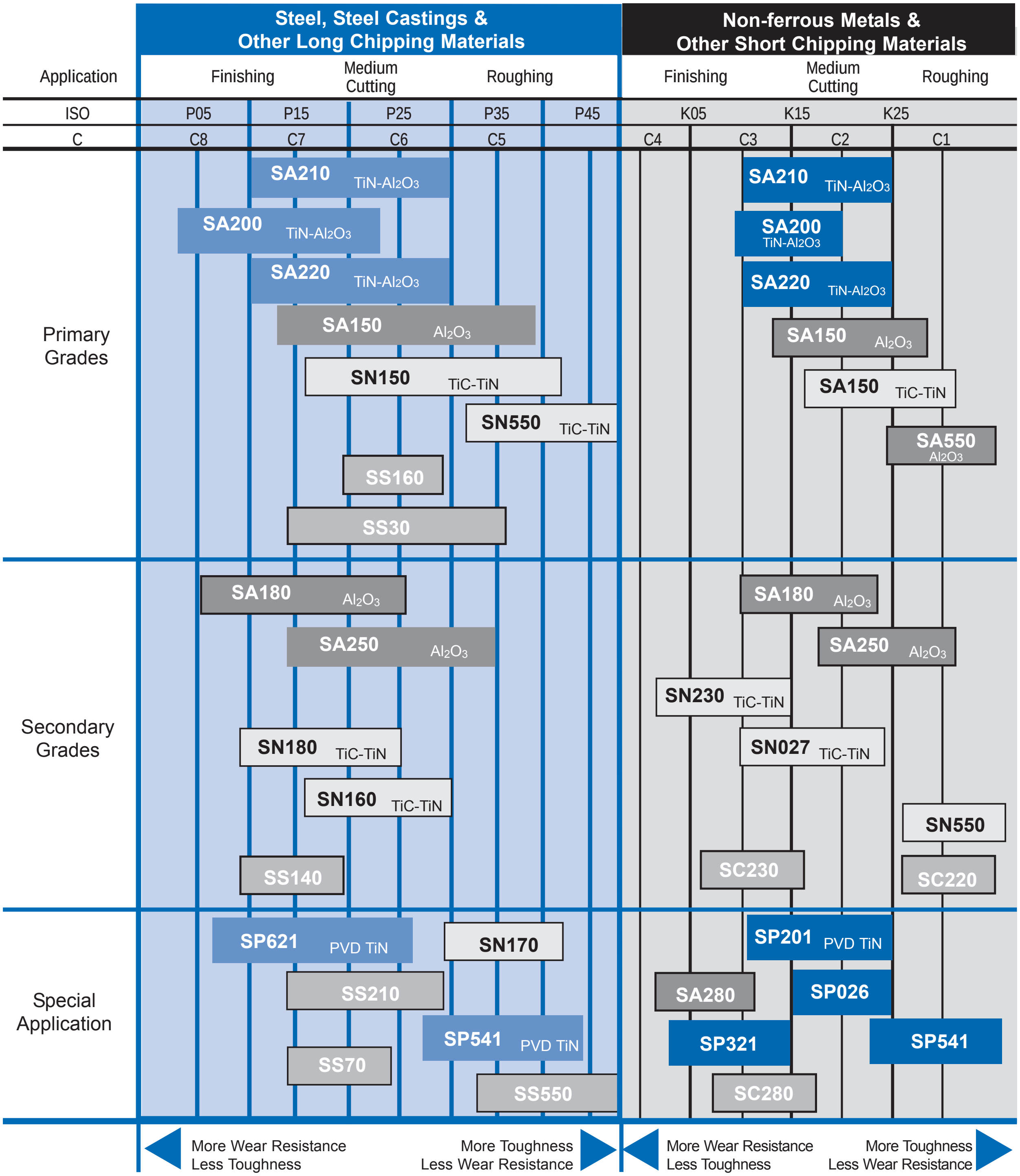
SC 220

Excellent, use where there is moderate to heavy shock loads in nonferrous metals, cast irons and high temperature alloys

Legend

- For general turning operations.
- For general milling operations.
- For Threading & Grooving.
- For Thread Milling

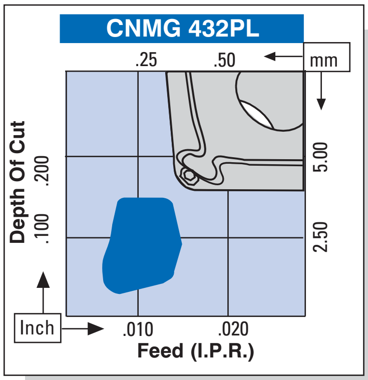
SPE-D-CUT Grade Information



NEW Spe-D-Cut introduces three new chip control geometries in two new advanced performance grades for general machining operations in all classifications of steel and most cast irons.

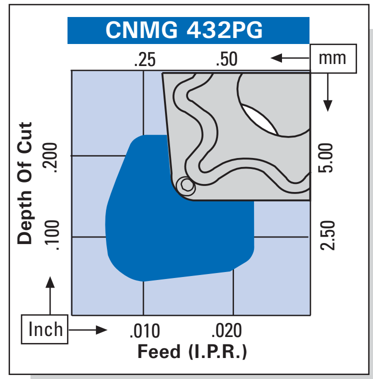
"PL" Finishing & Profiling

The new PL geometry is designed for fine finishing and light machining of steel materials and cast iron. There is reliable chip control in lower feeds and depth of cuts normally associated with finishing operations yet can withstand the additional depth of cut requirements when profiling contours.



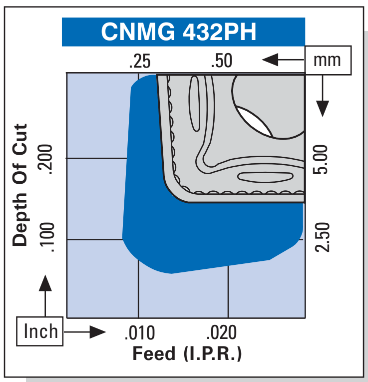
"PG" General Purpose to Semi-roughing

The new PG geometry is especially suitable for semi-roughing and semi-finishing of forgings, castings and irregular shapes with light to moderate interruptions in long production runs. A good choice for light to moderate feeds when machining high strength, heat resistant alloys.



"PH" Medium to Heavy Roughing

The very stable PH geometry is designed for medium to heavy roughing of steel and cast materials even in severe conditions. The sinusoidal cutting edge decreases cutting forces and helps to reduce frictional heat associated with heavy feeds and depth of cuts.



Two new Spe-D-Cut grades

Grade SA210

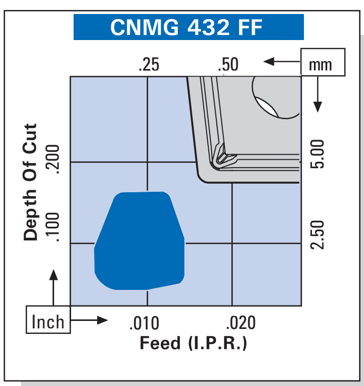
Wear-resistant, multi-coated carbide grade for general turning and finishing of steel and cast materials at higher cutting speeds. Good resistance to plastic deformation.

Grade SA220

Good general purpose carbide grade for turning of steel, stainless steel and cast irons at medium cutting speeds. Good toughness, even under adverse conditions. Excellent cutting edge stability.

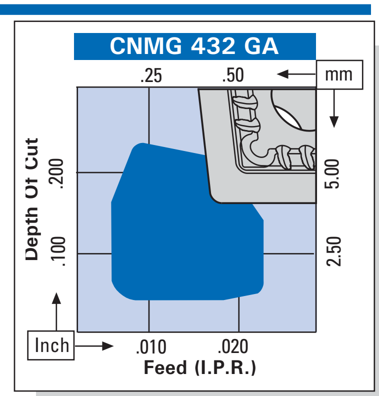
"FF" Fine Finisher

- Double-sided insert geometry
- Designed to control chips, improve finish and reduce radial cutting forces in light feeds and shallow DOC's.
- Small land for edge strength
- Effective 15° positive axial rake angle
- Primarily for finishing, but will permit light roughing due to unique design and strong edge.



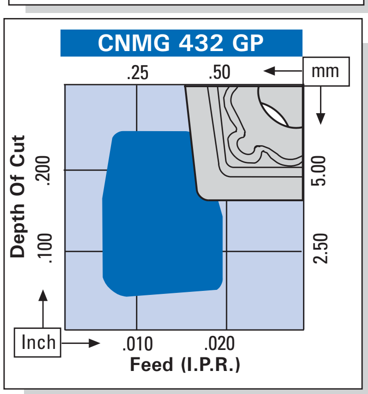
"GA" General Application

- Double-sided insert
- Superb chip control over a wide range of feed rate and depths of cut on turning, facing and boring applications
- Designed with a strong cutting edge for free cutting, and coolant flow closer to the cutting edge.



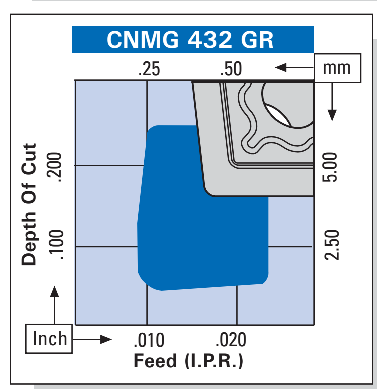
"GP" General Purpose

- Double-sided insert
- Superb chip control over a wide range of feed rates and depths of cut on turning, facing and boring applications
- Excellent choice on automated CNC machines where chip control is a necessity



"GR" General Rougher

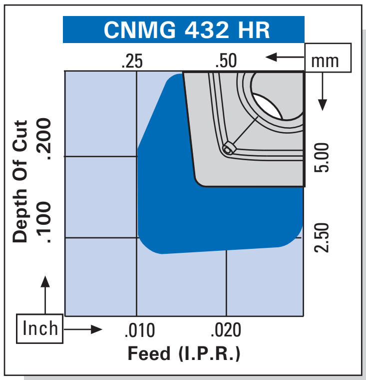
- Double-sided roughing insert
- Use when a stronger insert is required but conditions do not require a single-sided insert
- Strong cutting edge performs well under unfavorable conditions such as scale, interruptions or hard spots
- Design reduces cutting forces; reduces cutting temperature, extending tool life.



SPE-D-CUT Chip Control Information

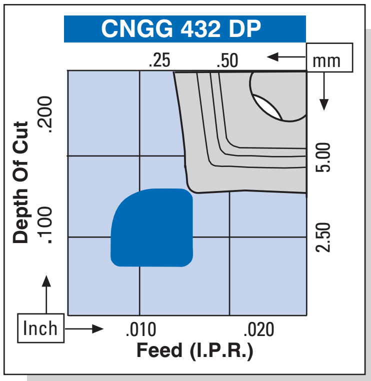
"HR" Heavy Rougher

- Single-sided insert with a positive radial and axial rake allowing high metal removal rates yet reducing power requirements.
- Extremely strong cutting edge, withstands the requirements of heavy roughing.
- Relief on bottom of insert assures periphery of insert seats flat on the shim.



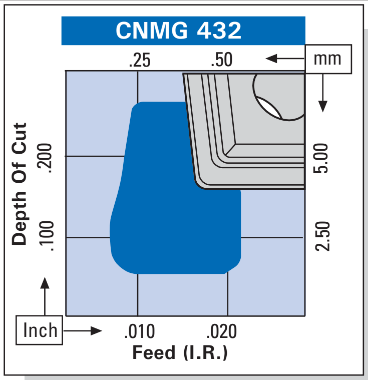
"DP" Ground Chipbreaker

- Precision ground on periphery chipbreaker.
- Only available with Cermet grades.



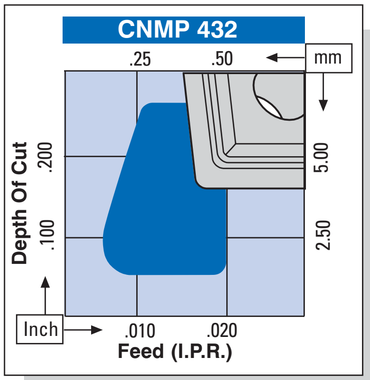
Standard "G" Style

- Double-sided insert with the conventional "G" chip groove.
- Offers a wide range of chip control at medium feeds.
- Can be used in most materials.



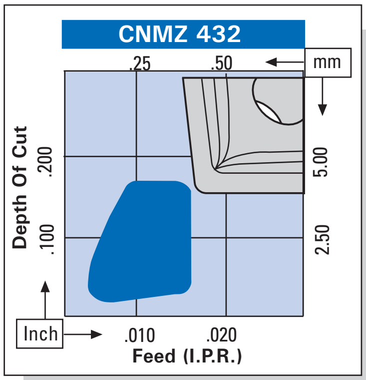
Standard "P" Style

- Double-sided insert
- 5°effective positive rake and no T-land
- Positive cutting action of the edge greatly reduces the cutting forces yet maintains excellent chip control
- Ideal for machining soft low carbon material as well as 300 series stainless and monels.



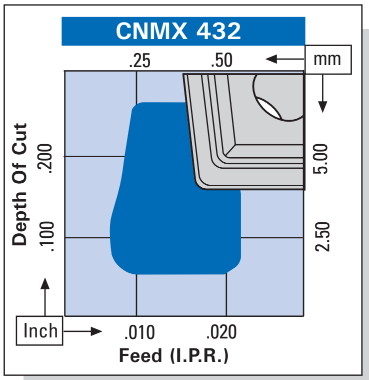
Standard "Z" Style

- Double-sided insert
- 10° effective positive top rake, no T-land.
- High shear angle is very free cutting.
- Ideal geometry for continuous smooth cutting of work hardening materials.



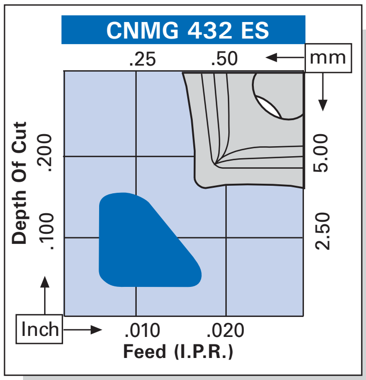
Standard "X" Style

- Double-sided insert
- 5° effective positive rake angle and 25° negative T-land
- Positive action of the standard "P" style but with additional strength of negative T-land
- Although the T-land increases edge strength, some positive shear effect is sacrificed.
- Works well in rough machining of soft low carbon material under unfavorable conditions.

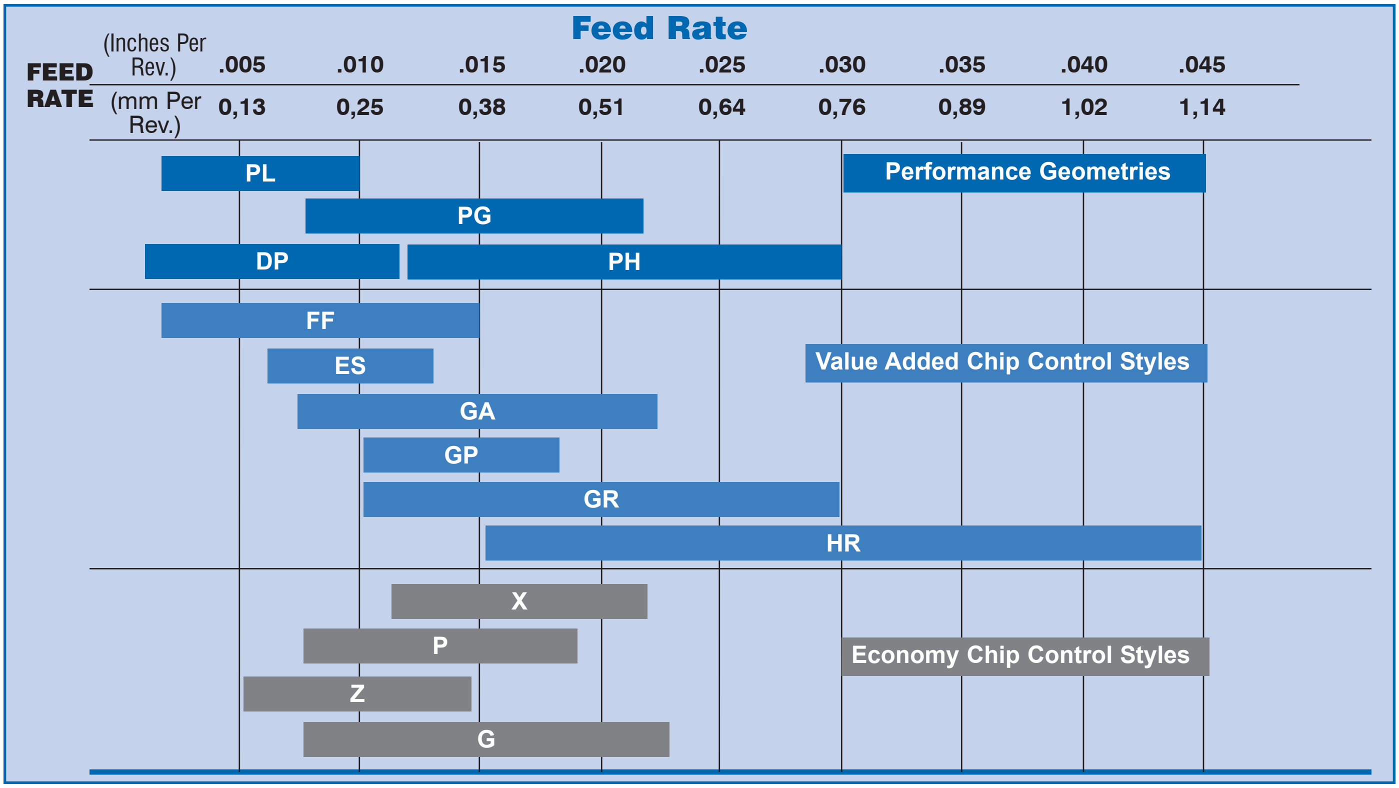


"ES" Style

- Double-sided finishing insert
- 10° effective positive top rake and no T-land
- High shear angle makes it a very free cutting finishing insert geometry for continuous smooth cutting at light feeds and shallow depths of cut



Chip Control Range By Chipbreaker Style

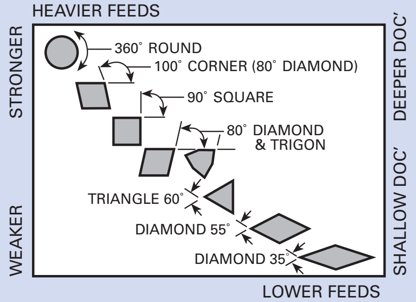


Note: The chip control charts shown on the previous two pages have been created under lab conditions cutting AISI 1045 Cold Rolled Steel and are intended for guide lines only. Your actual machining conditions and workpiece material may vary.

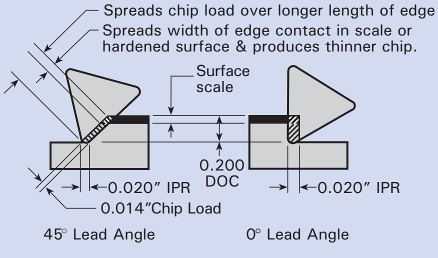
Whenever Possible, Use The Following Guidelines For Optimum Performance:

1. Largest Insert Corner Angle

- The larger the corner angle, the stronger the insert.
- Stronger inserts last longer.
- Stronger inserts allow the use of more wear resistant grades.



2. Largest Lead Angle Possible



3. Largest Nose Radius Possible

(that does not result in chatter)

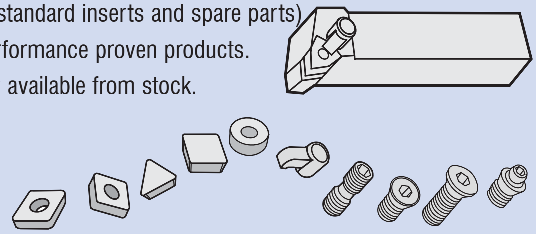
Larger insert nose radii:

- Are stronger, which allows the use of more wear resistant grades.
- Thins the chip, which dissipates the heat better.
- Produces better finishes.
- Permits higher feed rates.
- Increases radial and axial pressure resulting in chatter, vibration, or deflection.

4. Standard Tooling

Standards are:

- Interchangeable within suppliers . (most standard inserts and spare parts)
- Are performance proven products.
- Readily available from stock.



C N M G 4 3 2 * F FF

1 2 3 4 5 6 7 8 9 10

1. Insert Shape

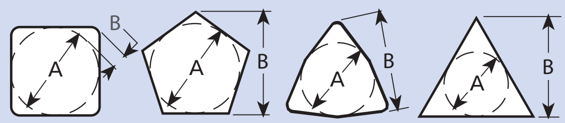
A	85°	Parallelogram
B	82°	Parallelogram
C	80°	Diamond
D	55°	Diamond
E	75°	Diamond
H	120°	Hexagon
K	55°	Parallelogram
L	90°	Rectangle
M	85°	Diamond
O	135°	Octagon
P	108°	Pentagon
R		Round
S	90°	Square
T	60°	Triangle
V	35°	Diamond
W	80°	Trigon

2. Relief Angle

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

"O" designation is used when relief is different from any angle shown.

3. Tolerance Class



Tolerance Class

	± Tolerance B	± Tolerance A	Thickness
A	0.0002	0.001	0.001
B	0.0002	0.001	0.005
C	0.0005	0.001	0.001
D	0.0005	0.001	0.005
E	0.0010	0.001	0.001
F	0.0002	0.0005	0.001
G	0.0010	0.001	0.005
H	0.0005	0.0005	0.001
J	0.0002	*	0.001
K	0.0005	*	0.001
L	0.0010	*	0.001
M	*	*	0.005
U	*	*	0.005
N	*	*	0.001

* See chart right

±Tolerances for Shape D

Dimensions:

I.C.	A	B
7/32	0.002	0.004
1/4	0.002	0.004
5/16	0.002	0.004
3/8	0.002	0.004
1/2	0.003	0.006
5/8	0.004	0.007
3/4	0.004	0.007

±Tolerance for Shapes: C, E, H, M, O, P, S, T, R, W

A Dimension:

I.C.	JKLMN	U
3/16	0.002	0.003
7/32	0.002	0.003
1/4	0.002	0.003
5/16	0.002	0.003
3/8	0.002	0.003
1/2	0.003	0.005
5/8	0.004	0.007
3/4	0.004	0.007
1	0.005	0.010
1¼	0.006	0.010

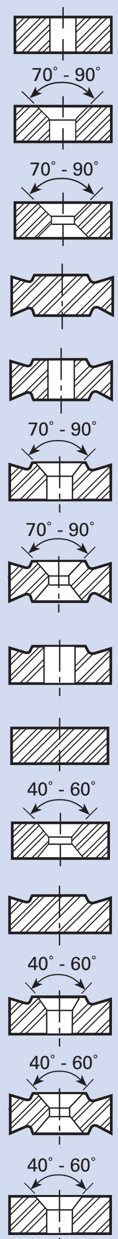
B Dimension:

I.C.	MN	U
3/16	0.003	0.005
7/32	0.003	0.005
1/4	0.003	0.005
5/16	0.003	0.005
3/8	0.003	0.005
1/2	0.005	0.008
5/8	0.006	0.011
3/4	0.006	0.011
1	0.007	0.015
1¼	0.008	0.015

NOTES:

1. This insert Nomenclature System is per ANSI Specification B212.4 - 1988

4. Insert Type



A

B

C

F

G

H

J

M

N

Q

R

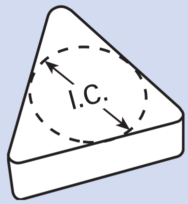
T

U

W

X Other
Requiring detailed explanation or drawing.

5. Insert Size



Equal sided inserts:

Number indicates inscribed circle (I.C.) in 1/8 of an inch.

Examples:

6 = 6/8 = 3/4" I.C.
4 = 4/8 = 1/2" I.C.
2.5 = 2.5/8 = 5/16" I.C.

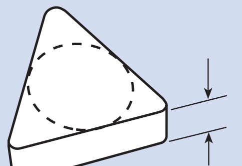
Rectangles & Parallelograms:

2 digits are necessary.

1st digit = width in 1/8 of an inch

2nd digit = length in 1/4 of an inch

6. Insert Thickness



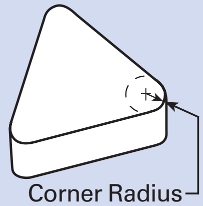
Number indicates insert thickness in 1/16 of an inch Measured from:

- Cutting edge to opposite pad on insert types F, G, J & U.
- Cutting edge to bottom on insert types H, M, R and T.
- Top to bottom on types A, B, C, N, Q, W.

Examples:

- 3 = 3/16" thick.
- 1.5 = 3/32" thick

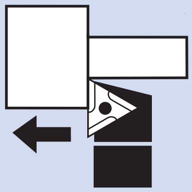
7. Insert Corner Radius



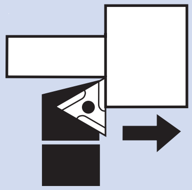
All inserts with rounded corners:

Symbol	Radius
0.2	0.004”
0.5	0.008”
1	1/64
2	1/32
3	3/64
4	1/16
5	5/64
6	3/32
7	7/64
8	1/8

8. Insert Hand*



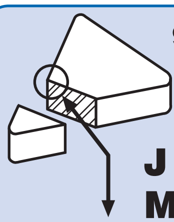
Right Hand Insert



Left Hand Insert

* Position is Omitted when insert is designed for bi-directional usage.

9. Insert Edge*

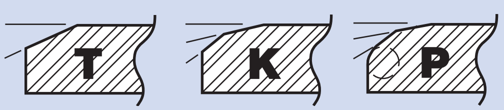


*NOTE: Position is omited for inserts with chip control grooves having application specific usage as indicated in position 10.

J = Polished Surface, 4 Microinch

M = Edge Prep For Stainless Steel

Sharp Edge | Radius Hone | Radius & Chamfer



Single Chamfer | Double Chamfer | Double Chamfer & Hone

10. Insert Chipbreaker

(Manufacturer’s Designation)

PL
Light Finishing

FF
Fine Finishing

ES
Finishing to Light Duty Positive Rake

Z
High Positive Rake, Finishing To Medium

P
Positive Rake, Finishing To Medium Duty

X
For Extreme Shock

PG
Semi Finishing to Semi-Roughing

G
General Purpose Applications

GP & GA
General Purpose Applications

GR
General Roughing

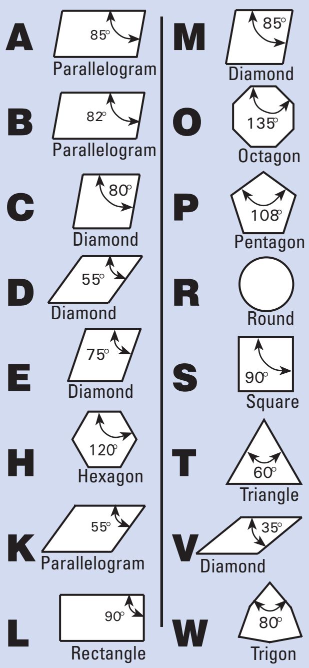
PH
Heavy Roughing

HR
Single Sided Heavy Roughing

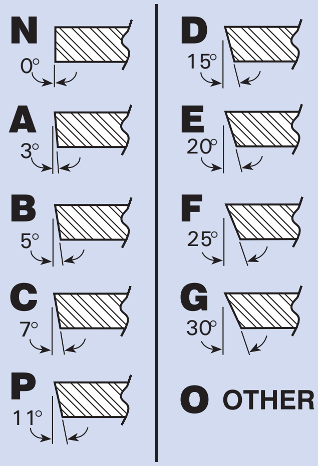
ISO Insert Identification

C	N	M	G	12	04	04	*	F	FF
1	2	3	4	5	6	7	8	9	10

1. Insert Shape

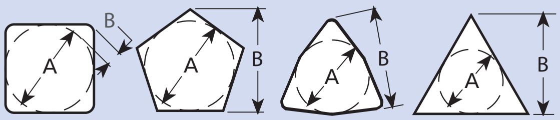


2. Relief Angle



"O" designation is used when relief is different from any angle shown.

3. Tolerance Class



Tolerance Class	± Tolerance B	± Tolerance A	Thickness
A	0,005	0,025	0,025
C	0,013	0,025	0,025
E	0,025	0,025	0,025
F	0,005	0,013	0,025
G	0,025	0,025	0,130
H	0,013	0,013	0,025
J	0,005	*	0,025
K	0,013	*	0,025
L	0,025	*	0,025
M	*	*	0,130
U	*	*	0,130
N	*	*	0,025

* See chart right

±Tolerances for Shape D

Dimensions:

I.C.	A	B
5,56	0,05	0,11
6,35	0,05	0,11
7,94	0,05	0,11
9,52	0,05	0,11
11,11	0,06	0,15
12,70	0,08	0,15
15,88	0,10	0,18
17,46	0,10	0,18
19,05	0,10	0,18

±Tolerance for Shapes: C, E, H, M, O, P, S, T, R, W

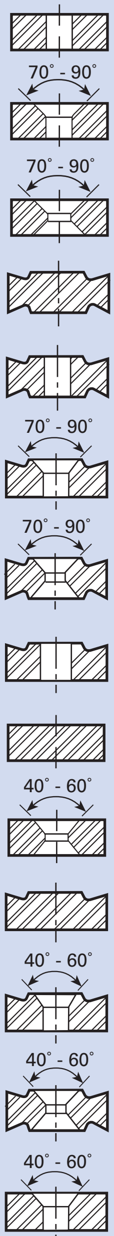
A Dimension:

I.C.	JKLMN	U
4,76	0,05	0,06
5,56	0,05	0,06
6,35	0,05	0,06
7,94	0,05	0,06
9,52	0,05	0,06
12.70	0,06	0,13
15.88	0,10	0,18
19,05	0,10	0,18
25,40	0,13	0,25
31,75	0,15	0,25

B Dimension:

I.C.	MN	U
4,76	0,06	0,13
5,56	0,06	0,13
6,35	0,06	0,13
7,94	0,06	0,13
9,52	0,06	0,13
12,70	0,13	0,20
15,88	0,15	0,27
19,05	0,15	0,27
25,40	0,18	0,38
31,75	0,20	0,38

4. Insert Type

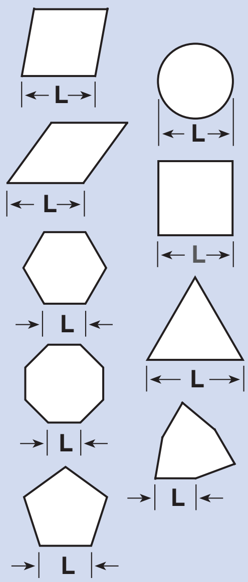


A
B
C
F
G
H
J
M
N
Q
R
T
U
W

X Other Requiring detailed explanation or drawing.

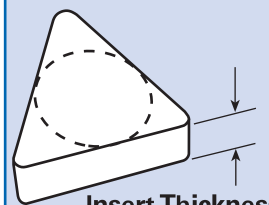
5. Insert Size

Cutting edge length over sharp corners or diameter of round insert



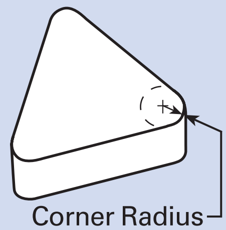
See page 12 for L dimensions with specific nose radii.

6. Insert Thickness



Thickness	
symbol	mm
T0	1,00
01	1,59
T1	1,98
02	2,38
03	3,18
T3	3,97
04	4,76
05	5,56
06	6,35
07	7,94
09	9,52
11	11,11
12	12,70

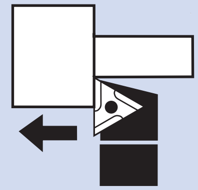
7. Insert Corner Radius



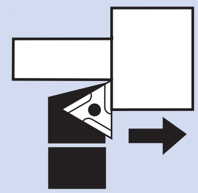
All inserts with rounded corners:

Symbol	Radius
01	0,01
02	0,2
04	0,4
08	0,8
12	1,2
16	1,6
20	2,0
24	2,4
28	2,8
32	3,2

8. Insert Hand*



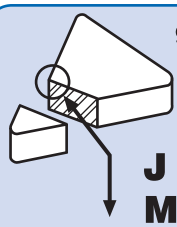
Right Hand Insert



Left Hand Insert

* Position is Omitted when insert is designed for bi-directional usage.

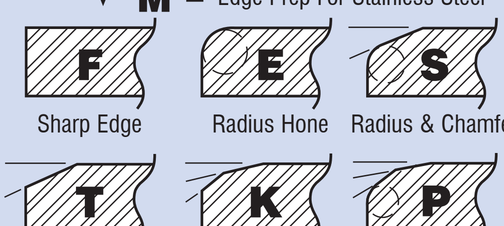
9. Insert Edge*



*NOTE: Position is omitted for inserts with chip control grooves having application specific usage as indicated in position 10.

J = Polished Surface, 4 Microinch

M = Edge Prep For Stainless Steel



Sharp Edge | Radius Hone | Radius & Chamfer | Single Chamfer | Double Chamfer | Double Chamfer & Hone

10. Insert Chipbreaker

(Manufacturer's Designation)

PL Light Finishing

FF Fine Finishing

ES Finishing to Light Duty Positive Rake

Z High Positive Rake, Finishing To Medium

P Positive Rake, Finishing To Medium Duty

X For Extreme Shock

PG Semi Finishing to Semi-Roughing

G General Purpose Applications

GP & GA General Purpose Applications

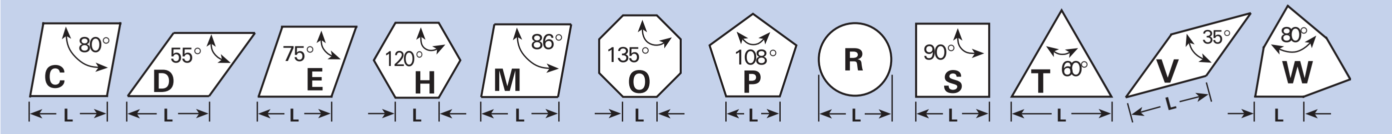
GR General Roughing

PH Heavy Roughing

HR Single Sided Heavy Roughing

SPE-D-CUT ANSI To ISO Comparison

ISO To ANSI Cutting Edge Length By Shape & I.C. Size* (over sharp corner)



IC Size		C	D	E	H	M	O	P	R	S	T	V	W
4,76	ISO No.	04	05	04	—	04	—	—	04	04	08	08	—
3/16	"L" Dim.	.190	.197	.194	.108	.188	.078	.136	.188	.188	.324	.327	.128
5,56	ISO No.	05	06	05	—	05	—	—	05	05	09	09	03
7/32	"L" Dim.	.222	.236	.226	.126	.219	.091	.159	.219	.219	.370	.381	.150
6,35	ISO No.	06	07	06	03	06	02	04	06	06	11	11	04
1/4	"L" Dim.	.254	.305	.259	.144	.250	.104	.182	.250	.250	.433	.436	.171
7,94	ISO No.	08	09	08	04	07	03	05	07	07	13	13	05
5/16	"L" Dim.	.317	.382	.324	.180	.312	.129	.227	.312	.312	.541	.545	.214
9,52	ISO No.	09	11	09	05	09	04	07	09	09	16	16	06
3/8	"L" Dim.	.381	.458	.388	.216	.375	.155	.272	.375	.375	.650	.654	.256
12,70	ISO No.	12	15	13	07	12	05	09	12	12	22	22	08
1/2	"L" Dim.	.508	.610	.518	.289	.500	.207	.363	.500	.500	.866	.872	.342
15,88	ISO No.	16	19	16	09	15	06	11	15	15	27	27	10
5/8	"L" Dim.	.635	.763	.647	.361	.625	.259	.454	.625	.625	1.08	1.09	.428
19,05	ISO No.	19	23	19	11	19	07	13	19	19	33	33	13
3/4	"L" Dim.	.762	.916	.776	.433	.750	.311	.545	.750	.750	1.30	1.31	.513
25,40	ISO No.	25	31	26	14	25	10	18	25	25	44	44	17
1"	"L" Dim.	1.02	1.22	1.04	.577	1.00	.414	.727	1.00	1.00	1.73	1.74	.684
31,75	ISO No.	32	38	32	18	31	13	23	31	31	54	54	22
1-1/4"	"L" Dim.	1.27	1.52	1.29	.722	1.25	.518	.908	1.25	1.25	2.16	2.16	.855

* ISO measures insert size in cutting edge length (mm); ANSI measures inscribed circle (I.C.")
All ANSI dimensions are given in decimal inches.

ANSI To ISO Thickness Code

ANSI			ISO	
Code	Fraction	Decimal	Code	mm
1	1/16	.062	01	1,59
1.2	5/64	.078	T1	1,98
1.5	3/32	.094	02	2,38
2	1/8	.125	03	3,18
2.5	5/32	.156	T3	3,97
3	3/16	.188	04	4,76
3.5	7/32	.219	05	5,56
4	1/4	.250	06	6,35
5	5/16	.312	07	7,94

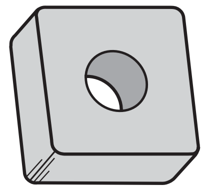
ANSI To ISO Radius Code

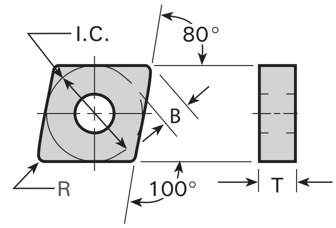
ANSI			ISO	
Code	Fraction	Decimal	Code	mm
0	—	.004	00	0,10
0.5	—	.008	02	0,20
1	1/64	.015	04	0,40
2	1/32	.032	08	0,79
3	3/64	.047	12	1,19
4	1/16	.062	16	1,59
5	5/64	.078	20	1,98
6	3/32	.094	24	2,38
7	7/64	.109	28	2,78

NOTES

CNGA

80° Diamond, precision ground periphery, top and bottom. No chipbreaker, with hole.

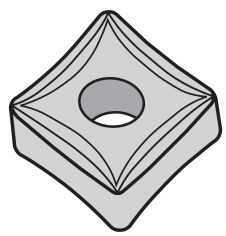


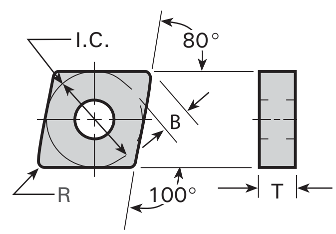


		Dimensions				Order Grade By EDP Number	
Item Desc.	**I.S.O.**	**I.C.**	**T**	**R**	**B**	**SA180**	**SC20**
CNGA 432F	CNGA 12 04 08	1/2	3/16	1/32	0.122	—	070573
CNGA 433	CNGA 12 04 12	1/2	3/16	3/64	0.113	088680	—

CNGG-DP

80° Diamond, two sided, double positive chipbreaker, no hone with hole.

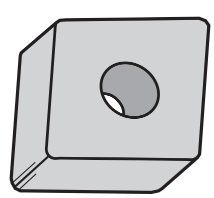


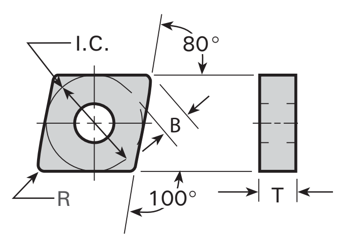


		Dimensions				Order Grade By EDP Number	
Item Desc.	**I.S.O.**	**I.C.**	**T**	**R**	**B**	**SP321**	**SC230**
CNGG 430.2F DP	CNGG 12 04 00 DP	1/2	3/16	0.004	0.140	090651	090648
CNGG 430.5F DP	CNGG 12 04 02 DP	1/2	3/16	0.008	0.135	081089	081088
CNGG 431F DP	CNGG 12 04 04 DP	1/2	3/16	1/64	0.130	090652	090649
CNGG 432F DP	CNGG 12 04 08 DP	1/2	3/16	1/32	0.122	090653	090650

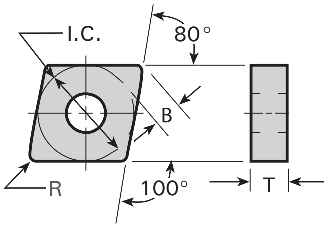
CNMA

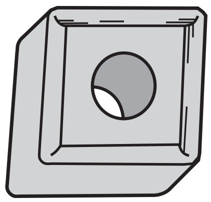
80° Diamond, ground flat top & bottom, no chipbreaker with hole.





		Dimensions				Order Grade By EDP Number									
Item Desc.	**I.S.O.**	**I.C.**	**T**	**R**	**B**	**SA150**	**SA180**	**SA250**	**SA550**	**SA200**	**SA280**	**SN150**	**SS160**	**SC20**	**SC230**
CNMA 432	CNMA 12 04 08	1/2	3/16	1/32	0.122	070021	074701	077844	—	070314	090547	070020	071894	071893	071478
CNMA 433	CNMA 12 04 12	1/2	3/16	3/64	0.113	—	088239	077878	071482	070315	—	—	—	—	071481
CNMA 434	CNMA 12 04 16	1/2	3/16	1/16	0.104	—	070762	077880	—	—	090549	—	—	—	—
CNMA 543	CNMA 16 06 12	5/8	1/4	3/64	0.148	—	074119	—	—	070316	—	—	—	071033	—
CNMA 643	CNMA 19 06 12	3/4	1/4	3/64	0.182	—	074120	077942	—	070317	—	—	—	087356	087357
CNMA 644	CNMA 19 06 16	3/4	1/4	1/16	0.174	—	070763	—	—	—	—	—	—	—	—





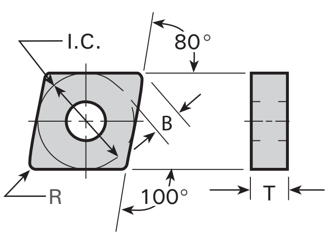
CNMG

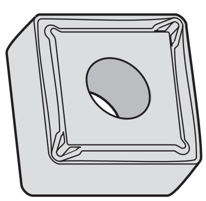
80° Diamond, general purpose "G" style chipbreaker, wide range of chip control.

		Dimensions				Order Grade By EDP Number									
Item Desc.	**I.S.O.**	**I.C.**	**T**	**R**	**B**	**SA150**	**SA180**	**SA250**	**SA550**	**SA200**	**SN180**	**SN160**	**SN150**	**SN550**	**SN027**
CNMG 431	CNMG 12 04 04	1/2	3/16	0.016	0.130	070017	074121	076074	—	070318	074624	071910	070016	—	—
CNMG 432	CNMG 12 04 08	1/2	3/16	0.031	0.122	070023	074122	076076	088013	—	074625	070999	070022	075823	071206
CNMG 433	CNMG 12 04 12	1/2	3/16	0.047	0.113	—	074124	—	088014	070325	074627	—	—	075824	—
CNMG 434	CNMG 12 04 16	1/2	3/16	0.063	0.104	—	088671	076079	—	070328	071488	—	—	071502	—
CNMG 542	CNMG 16 06 08	5/8	1/4	0.031	0.156	—	074127	—	—	070329	074629	—	—	—	—
CNMG 543	CNMG 16 06 12	5/8	1/4	0.047	0.148	070039	074128	076080	088015	—	074630	—	070038	075825	—
CNMG 544	CNMG 16 06 16	5/8	1/4	0.063	0.139	—	—	—	—	—	071514	—	—	—	—
CNMG 642	CNMG 19 06 08	3/4	1/4	0.031	0.191	—	074131	—	—	070333	074632	—	—	—	—
CNMG 643	CNMG 19 06 12	3/4	1/4	0.047	0.182	070045	074132	076082	—	070334	074633	071000	070044	075827	—
CNMG 644	CNMG 19 06 16	3/4	1/4	0.063	0.174	070055	074134	076084	088018	070336	—	—	070054	075828	—

		Dimensions				Order Grade By EDP Number				
Item Desc.	**I.S.O.**	**I.C.**	**T**	**R**	**B**	**SP201***	**SS140**	**SS160**	**SC20***	**SC230***
CNMG 431	CNMG 12 04 04	1/2	3/16	0.016	0.130	090601	—	—	090600	099600
CNMG 432	CNMG 12 04 08	1/2	3/16	0.031	0.122	090603	—	070587	090602	099604
CNMG 433	CNMG 12 04 12	1/2	3/16	0.047	0.113	090605	—	—	090604	099608
CNMG 434	CNMG 12 04 16	1/2	3/16	0.063	0.104	—	—	—	—	—
CNMG 542	CNMG 16 06 08	5/8	1/4	0.031	0.156	—	—	071082	—	—
CNMG 543	CNMG 16 06 12	5/8	1/4	0.047	0.148	—	—	071034	—	—
CNMG 544	CNMG 16 06 16	5/8	1/4	0.063	0.139	—	—	—	—	—
CNMG 642	CNMG 19 06 08	3/4	1/4	0.031	0.191	—	087364	087365	—	—
CNMG 643	CNMG 19 06 12	3/4	1/4	0.047	0.182	090607	083802	083803	090606	—
CNMG 644	CNMG 19 06 16	3/4	1/4	0.063	0.174	090609	—	071891	090608	—

* Grades SP201, SC20 & SC230 are stocked with a "M" hone. Grade SC20 & SC230 can be ordered with a larger hone at nominal additional charge.



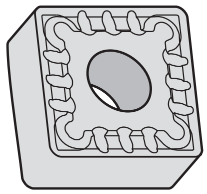


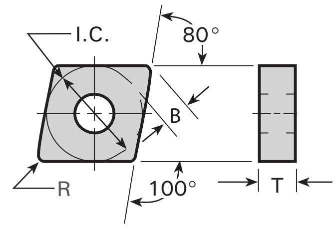
CNMG-FF

80° Diamond finishing "FF" chip groove offers excellent chip control in light feed rates and shallow depth of cuts.

		Dimensions				Order Grade By EDP Number						
Item Desc.	**I.S.O.**	**I.C.**	**T**	**R**	**B**	**SA150**	**SA180**	**SA250**	**SA200**	**SN150**	**SN180**	**SC230***
CNMG 431FF	CNMG 12 04 04 FF	1/2	3/16	1/64	0.130	070019	—	—	070319	070018	077171	099602
CNMG 432FF	CNMG 12 04 08 FF	1/2	3/16	1/32	0.122	070025	077175	077176	070322	070024	—	—
CNMG 433FF	CNMG 12 04 12 FF	1/2	3/16	3/64	0.113	—	—	—	—	—	077177	—

CNMG-GA

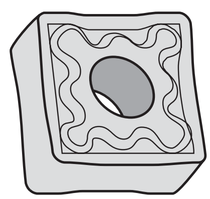


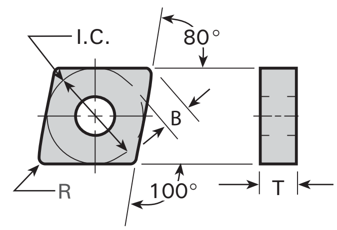


80° Diamond, “GA” style chipbreaker. Excellent chip control in a wide range of feed rates and depth of cuts.

		Dimensions				Order Grade By EDP Number			
Item Desc.	**I.S.O.**	**I.C.**	**T**	**R**	**B**	**SA150**	**SA200**	**SN150**	**SN550**
CNMG 431 GA	CNMG 12 04 04 GA	1/2	3/16	1/64	0.130	091002	091001	091000	—
CNMG 432 GA	CNMG 12 04 08 GA	1/2	3/16	1/32	0.122	091006	091005	091003	091004
CNMG 433 GA	CNMG 12 04 12 GA	1/2	3/16	3/64	0.113	091010	091009	091007	091008
CNMG 543 GA	CNMG 16 06 12 GA	5/8	1/4	3/64	0.148	091014	—	—	091012
CNMG 544 GA	CNMG 16 06 16 GA	5/8	1/4	1/16	0.139	—	091017	—	—
CNMG 643 GA	CNMG 19 06 12 GA	3/4	1/4	3/64	0.182	091022	091021	091019	—
CNMG 644 GA	CNMG 19 06 16 GA	3/4	1/4	1/16	0.174	—	091025	—	091024

CNMG-GP



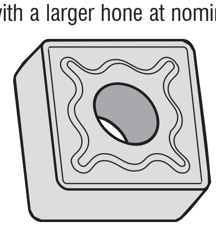


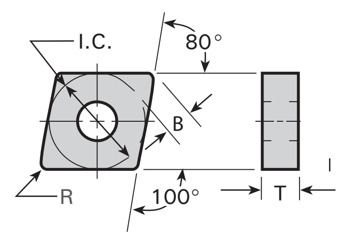
80° Diamond, standard “General Purpose” geometry. Good chip control in all steels and irons.

		Dimensions				Order Grade By EDP Number								
Item Desc.	**I.S.O.**	**I.C.**	**T**	**R**	**B**	**SA150**	**SA180**	**SA250**	**SA550**	**SA200**	**SN180**	**SN150**	**SN550**	**SC230***
CNMG 431E GP	CNMG 12 04 04 GP	1/2	3/16	1/64	0.130	—	077269	077268	—	—	077267	—	—	099603
CNMG 432E GP	CNMG 12 04 08 GP	1/2	3/16	1/32	0.122	—	077276	077275	077274	070323	077272	—	077271	099607
CNMG 433E GP	CNMG 12 04 12 GP	1/2	3/16	3/64	0.113	—	077282	077281	—	070326	077279	—	—	—
CNMG 542E GP	CNMG 16 06 08 GP	5/8	1/4	1/32	0.156	—	077286	—	—	—	—	—	—	—
CNMG 543E GP	CNMG 16 06 12 GP	5/8	1/4	3/64	0.148	070041	077292	077291	077290	—	077289	070040	—	—
CNMG 642E GP	CNMG 19 06 08 GP	3/4	1/4	1/32	0.191	—	—	077301	—	—	—	—	—	—
CNMG 643E GP	CNMG 19 06 12 GP	3/4	1/4	3/64	0.182	070047	077308	077307	—	—	—	070046	—	—
CNMG 644E GP	CNMG 19 06 16 GP	3/4	1/4	1/16	0.174		077313	077312	—	—	—	—	—	—

* Grade SC230 is stocked with a “M” hone. Grade SC230 can be ordered with a larger hone at nominal additional charge.

CNMG-GR

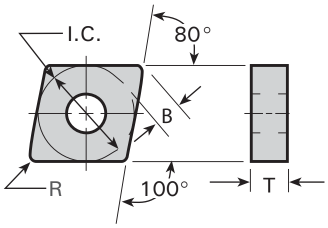


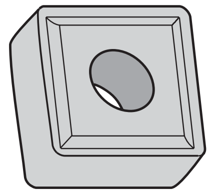


80° Diamond, “GR” is general to moderate roughing geometry. Good chip control and excellent edge strength.

		Dimensions				Order Grade By EDP Number						
Item Desc.	**I.S.O.**	**I.C.**	**T**	**R**	**B**	**SA150**	**SA180**	**SA250**	**SA550**	**SA200**	**SN150**	**SC230***
CNMG 432 GR	CNMG 12 04 08 GR	1/2	3/16	1/32	0.122	070027	077820	077822	077821	070324	070026	—
CNMG 433 GR	CNMG 12 04 12 GR	1/2	3/16	3/64	0.113	070035	077823	077825	077824	070327	070034	—
CNMG 434 GR	CNMG 12 04 16 GR	1/2	3/16	1/16	0.104	070037	—	—	—	—	070036	—
CNMG 542 GR	CNMG 16 06 08 GR	5/8	1/4	1/32	0.156	—	—	077225	—	070330	—	—
CNMG 543 GR	CNMG 16 06 12 GR	5/8	1/4	3/64	0.148	070043	—	077229	078840	070332	070042	—
CNMG 642 GR	CNMG 19 06 08 GR	3/4	1/4	1/32	0.191	—	—	078008	078849	—	—	—
CNMG 643 GR	CNMG 19 06 12 GR	3/4	1/4	3/64	0.182	070049	—	077243	—	070335	070048	099611
CNMG 644 GR	CNMG 19 06 16 GR	3/4	1/4	1/16	0.174	—	—	—	078861	070337	—	—

* Grade SC230 is stocked with a “M” hone. Grade SC230 can be ordered with a larger hone at nominal additional charge.



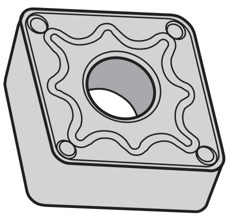


CNMP

80° Diamond, positive action chip control in finishing to light duty applications. Excellent chip control in softer steels and ductile irons.

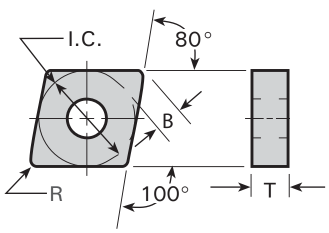
		Dimensions				Order Grade By EDP Number										
Item Desc.	**I.S.O.**	**I.C.**	**T**	**R**	**B**	**SA150**	**SA180**	**SA200**	**SN180**	**SN160**	**SN150**	**SP201***	**SP321***	**SS160**	**SC20***	**SC230***
CNMP 431	CNMP 12 04 04	1/2	3/16	1/64	0.130	—	074139	070338	074638	071913	—	090612	090613	—	090610	090611
CNMP 432	CNMP 12 04 08	1/2	3/16	1/32	0.122	070029	074140	070339	074639	071001	070028	090616	090617	071897	090614	090615
CNMP 433	CNMP 12 04 12	1/2	3/16	3/64	0.113	—	—	—	—	—	—	—	090621	—	—	090619
CNMP 543	CNMP 16 06 12	5/8	1/4	3/64	0.148	—	074141	—	074733	—	—	—	—	—	—	—
CNMP 642	CNMP 19 06 08	3/4	1/4	1/32	0.191	—	075856	—	—	—	—	—	—	071932	—	—
CNMP 643	CNMP 19 06 12	3/4	1/4	3/64	0.182	—	—	—	074640	—	—	—	—	—	—	099717

Grades SP201, SP321, SC20, SC230 are stocked with a “M” hone. Grades SC20, SC230 can be ordered with a larger hone at a nominal additional charge.

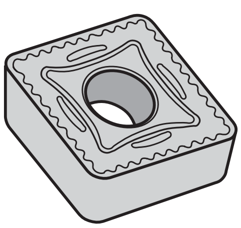


80° Diamond, positive action chip control in light to medium duty applications. Excellent chip control in softer steels and ductile irons.

CNMG-PG

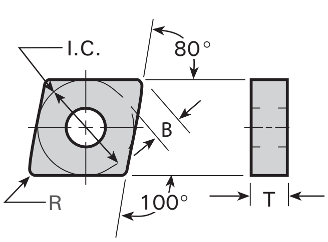


		Dimensions				Order Grade By EDP Number	
Item Desc.	**ISO**	**I.C.**	**T**	**R**	**B**	**SA210**	**SA220**
CNMG 321 PG	CNMG 09 03 04 PG	3/8	1/8	0.016	0.0955	—	085910
CNMG 322 PG	CNMG 09 03 08 PG	3/8	1/8	0.031	0.0868	—	085911
CNMG 431 PG	CNMG 12 04 04 PG	1/2	3/16	0.016	0.130	085912	085913
CNMG 432 PG	CNMG 12 04 08 PG	1/2	3/16	0.031	0.122	085915	085916
CNMG 433 PG	CNMG 12 04 12 PG	1/2	3/16	0.047	0.113	085918	085919
CNMG 434 PG	CNMG 12 04 16 PG	1/2	3/16	0.063	0.104	—	085922
CNMG 542 PG	CNMG 16 06 08 PG	5/8	1/4	0.031	0.156	085924	085925
CNMG 543 PG	CNMG 16 06 12 PG	5/8	1/4	0.047	0.146	085927	085928
CNMG 544 PG	CNMG 16 06 16 PG	5/8	1/4	0.063	0.139	—	085931
CNMG 642 PG	CNMG 19 06 08 PG	3/4	1/4	0.031	0.191	—	085933
CNMG 643 PG	CNMG 19 06 12 PG	3/4	1/4	0.047	0.182	085935	085936
CNMG 644 PG	CNMG 19 06 16 PG	3/4	1/4	0.063	0.174	—	085939



For roughing operations to medium turning even in the most severe conditions. Excellent chip control even in heavier feeds and depth of cuts.

CNMG-PH

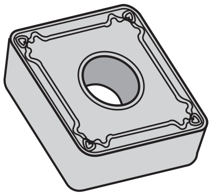


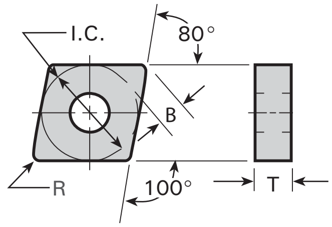
		Dimensions				Order Grade By EDP Number	
Item Desc.	**ISO**	**I.C.**	**T**	**R**	**B**	**SA210**	**SA220**
CNMG 432 PH	CNMG 12 04 08 PH	1/2	3/16	0.031	0.122	085941	085942
CNMG 433 PH	CNMG 12 04 12 PH	1/2	3/16	0.047	0.113	085944	085945
CNMG 434 PH	CNMG 12 04 16 PH	1/2	3/16	0.063	0.104	—	085947
CNMG 542 PH	CNMG 16 06 08 PH	5/8	1/4	0.031	0.156	—	085949
CNMG 543 PH	CNMG 16 06 12 PH	5/8	1/4	0.047	0.146	—	085951
CNMG 544 PH	CNMG 16 06 16 PH	5/8	1/4	0.063	0.139	—	085953
CNMG 643 PH	CNMG 19 06 12 PH	3/4	1/4	0.047	0.182	—	085958
CNMG 644 PH	CNMG 19 06 16 PH	3/4	1/4	0.063	0.174	—	085960

Negative Rake Inserts

CNMG-PL

80° Diamond for finishing operations and light duty turning. Excellent chip control even in light feeds and shallow depth of cuts.

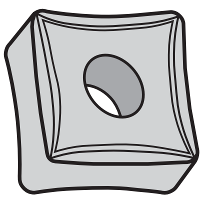


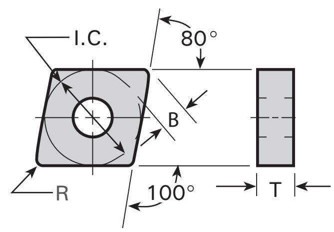


		Dimensions				Order Grade By EDP Number	
Item Desc.	I.S.O.	I.C.	T	R	B	SA210	SA220
CNMG 322 PL	CNMG 09 03 08 PL	3/8	1/8	1/32	0.087	085902	085903
CNMG 431 PL	CNMG 12 04 04 PL	1/2	3/16	1/64	0.130	085905	085906
CNMG 432 PL	CNMG 12 04 08 PL	1/2	3/16	1/32	0.122	085907	085908
CNMG 433 PL	CNMG 12 04 12 PL	1/2	3/16	3/64	0.113	085909	—

CNMG-ES

"ES" style chip breaker has positive action chip control in finishing to light duty applications. Good chip control in softer carbon steels and most stainless.

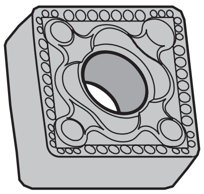


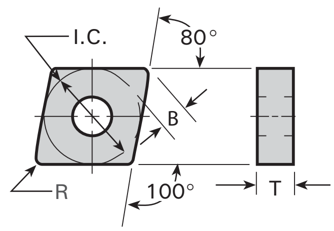


		Dimensions				Order Grade By EDP Number			
Item Desc.	I.S.O.	I.C.	T	R	B	SA180	SA200	SN180	SC230
CNMG 431 ES	CNMG 12 04 04 ES	1/2	3/16	1/64	0.130	—	—	088795	099601
CNMG 432 ES	CNMG 12 04 08 ES	1/2	3/16	1/32	0.122	088799	070321	—	099605

CNMG-ST

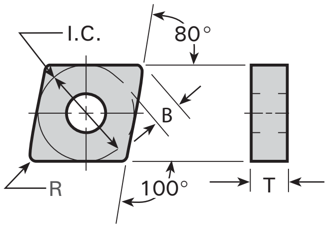
Excellent geometry for stainless steels, some high temp and other non-ferrous materials.

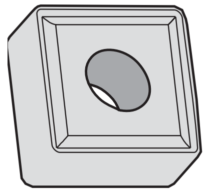




		Dimensions				Order Grade By EDP Number	
Item Desc.	I.S.O.	I.C.	T	R	B	SA150	SN150
CNMG 431M ST	CNMG 12 04 04 ST	1/2	3/16	1/64	0.130	082625	082600
CNMG 432M ST	CNMG 12 04 08 ST	1/2	3/16	1/32	0.122	082626	082601
CNMG 433M ST	CNMG 12 04 12 ST	1/2	3/16	3/64	0.113	—	082602
CNMG 643M ST	CNMG 19 06 12 ST	3/4	1/4	3/64	0.182	082629	082604

CNMX

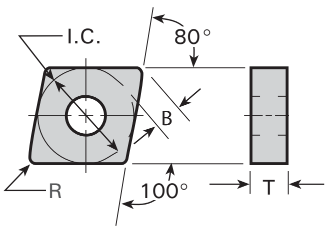


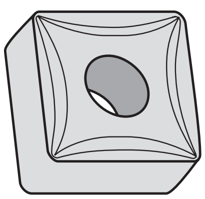


"X" style chipbreaker has -25° land. Excellent geometry for interrupted cuts in all steels and cast irons.

		Dimensions				Order Grade By EDP Number				
Item Desc.	I.S.O.	I.C.	T	R	B	SA180	SA250	SA200	SN180	SN550
CNMX 432	CNMX 12 04 08	1/2	3/16	1/32	0.122	—	076086	070340	—	075832
CNMX 433	CNMX 12 04 12	1/2	3/16	3/64	0.113	—	076090	—	—	071538
CNMX 543	CNMX 16 06 12	5/8	1/4	3/64	0.148	074740	076091	—	074716	—
CNMX 643	CNMX 19 06 12	3/4	1/4	3/64	0.182	074517	076106	—	074700	—
CNMX 644	CNMX 19 06 16	3/4	1/4	1/16	0.174	074047	076107	070343	—	—
CNMX 866	CNMX 25 09 24	1	3/8	3/32	0.226	—	—	—	087964	—

CNMZ



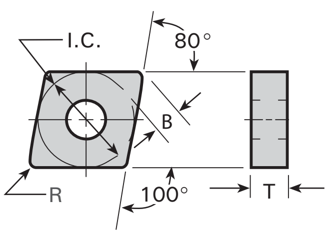


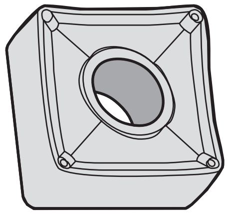
Excellent geometry for aluminum, brass or soft low carbon steel.

		Dimensions				Order Grade By EDP Number				
Item Desc.	I.S.O.	I.C.	T	R	B	SA180	SN180	SN160	SN150	SC20*
CNMZ 432	CNMZ 12 04 08	1/2	3/16	1/32	0.122	074143	074641	071004	070032	099614
CNMZ 433	CNMZ 12 04 12	1/2	3/16	3/64	0.113	—	—	—	—	099615

* Grade SC20 is stocked with a "M" hone. Grade SC20 can be ordered with a larger hone at nominal additional charge.

CNMM-HR





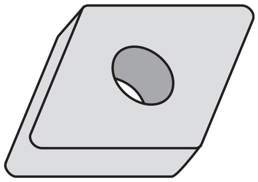
80° Diamond, positive action chip. Single sided rougher.

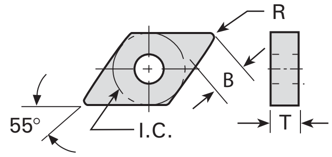
		Dimensions					Order Grade By EDP Number
Item Desc.	I.S.O.	I.C.	T	R	H	B	SN150
CNMM 643 HR	CNMG 19 06 12 HR	3/4	1/4	3/64	0.312	0.182	070050

Negative Rake Inserts

DNGA

55° Diamond precision ground top, bottom and periphery, no chip-breaker, with hole.



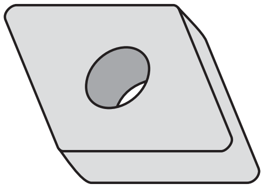


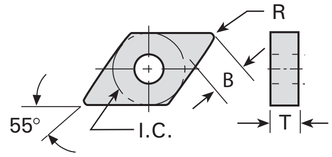
		Dimensions				Order Grade By EDP Number		
Item Desc.	I.S.O.	I.C.	T	R	B	SA180	SA200	SC20*
DNGA 432	DNGA 15 04 08	1/2	3/16	1/32	0.255	088216	070353	—
DNGA 433	DNGA 15 04 12	1/2	3/16	3/64	0.237	088218	—	070597

* Grade SC20 is stocked with no hone.

DNMA

55° Diamond, ground flat top and bottom, no chip-breaker, with hole.

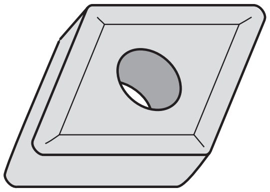


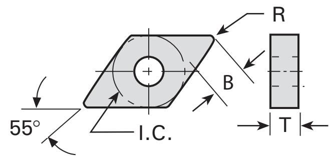


		Dimensions				Order Grade By EDP Number	
Item Desc.	I.S.O.	I.C.	T	R	B	SA280	SA250
DNMA 432	DNMA 15 04 08	1/2	3/16	1/32	0.255	—	077946
DNMA 433	DNMA 15 04 12	1/2	3/16	3/64	0.237	090555	—

DNMG

55° Diamond, two sided with standard chip-breaker for general purpose use in long chipping materials; with hole.

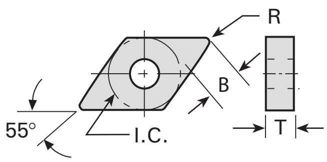


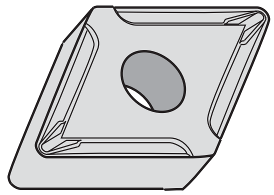


		Dimensions				Order Grade By EDP Number											
Item Desc.	I.S.O.	I.C.	T	R	B	SA150	SA180	SA250	SA200	SN180	SN160	SN150	SN550	SP201*	SS160	SC20*	SC230*
DNMG 322	DNMG 11 03 08	3/8	1/8	1/32	0.182	—	—	—	—	—	073077	—	—	—	073076	099616	—
DNMG 431	DNMG 15 04 04	1/2	3/16	1/64	0.273	070079	074144	076125	070354	074736	071919	070078		090623	—	090622	—
DNMG 432	DNMG 15 04 08	1/2	3/16	1/32	0.255	070085	074145	076127	070356	074642	071009	070084	075830	090625	070611	090624	—
DNMG 433	DNMG 15 04 12	1/2	3/16	3/64	0.237	—	074147	—	070360	074644	—	—	—	—	—	—	070304
DNMG 533	DNMG 19 04 12	5/8	3/16	3/64	0.310	—	—	—	—	—	—	—	—	—	071080	—	—
DNMG 542	DNMG 19 06 08	5/8	1/4	1/32	0.328	—	074148	077995	—	—	—	—	—	—	070617	099621	—
DNMG 543	DNMG 19 06 12	5/8	1/4	3/64	0.310	—	074149	077996	—	074646	—	—	075831	—	071078	099622	—

* Grades SP201, SC20 & SC230 are stocked with a “M” hone. Grades SC20 & SC230 can be ordered with a larger hone at nominal additional charge.

DNMG-FF



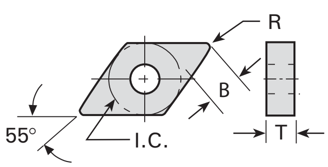


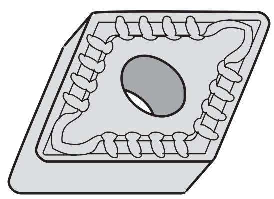
55° Diamond. Finishing "FF" style chip-breaker; has excellent chip control in light feed rates and shallow depth of cuts.

		Dimensions				Order Grade By EDP Number					
Item Desc.	**I.S.O.**	**I.C.**	**T**	**R**	**B**	**SA150**	**SA180**	**SA200**	**SN180**	**SN150**	**SC230***
DNMG 431 FF	DNMG 15 04 04 FF	1/2	3/16	1/64	0.273	070081	077181	070355	077180	070080	099618
DNMG 432 FF	DNMG 15 04 08 FF	1/2	3/16	1/32	0.255	070087	—	070358	—	—	—

* Grade SC230 is stocked with a "M" hone. Grade SC230 can be ordered with a larger hone at nominal additional charge.

DNMG-GA

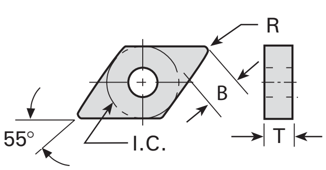


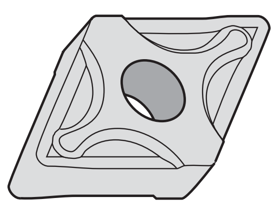


55° Diamond. "GA" style chipbreaker has excellent chip control in a wide range of feeds and depth of cuts. For general purpose applications in long chipping materials and cast iron.

		Dimensions				Order Grade By EDP Number		
Item Desc.	**I.S.O.**	**I.C.**	**T**	**R**	**B**	**SA150**	**SA200**	**SN150**
DNMG 431 GA	DNMG 15 04 04 GA	1/2	3/16	1/64	0.273	091029	091028	091027
DNMG 432 GA	DNMG 15 04 08 GA	1/2	3/16	1/32	0.255	091033	091032	091030
DNMG 433 GA	DNMG 15 04 12 GA	1/2	3/16	3/64	0.237	091036	—	091034
DNMG 442 GA	DNMG 15 06 08 GA	1/2	1/4	1/32	0.255	091039	091038	091037
DNMG 443 GA	DNMG 15 06 12 GA	1/2	1/4	3/64	0.237	091042	—	091040

DNMG-GP



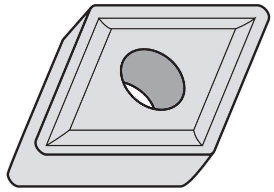


55° Diamond. The "GP" chip control surfaces produce good chip control in all steels and ductile irons.

		Dimensions				Order Grade By EDP Number							
Item Desc.	**I.S.O.**	**I.C.**	**T**	**R**	**B**	**SA150**	**SA180**	**SA250**	**SA550**	**SA200**	**SN180**	**SN150**	**SC230***
DNMG 431 GP	DNMG 15 04 04 GP	1/2	3/16	1/64	0.273	—	077758	077757	—	—	—	—	—
DNMG 432 GP	DNMG 15 04 08 GP	1/2	3/16	1/32	0.255	070089	077764	077763	077762	070359	077761	070088	099620
DNMG 433 GP	DNMG 15 04 12 GP	1/2	3/16	3/64	0.237	070095	—	077766	—	—	—	070094	—
DNMG 442 GP	DNMG 15 06 08 GP	1/2	1/4	1/32	0.255	—	077771	077770	—	—	077769	—	—
DNMG 443 GP	DNMG 15 06 12 GP	1/2	1/4	3/64	0.237	—	—	077773	—	—	—	—	—

* Grade SC230 is stocked with a "M" hone. Grade SC230 can be ordered with a larger hone at nominal additional charge.

DNMP

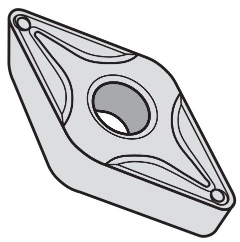


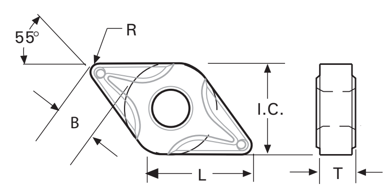
55° Diamond "P" style chip-breaker. Excellent chip control in low carbon and stainless steels.

		Dimensions				Order Grade By EDP Number								
Item Desc.	**I.S.O.**	**I.C.**	**T**	**R**	**B**	**SA150**	**SA180**	**SA250**	**SN180**	**SN150**	**SP201***	**SP321***	**SC20***	**SC230***
DNMP 431	DNMP 15 04 04	1/2	3/16	1/64	0.273	070083	074151	076154	074648	—	090628	090629	090626	090627
DNMP 432	DNMP 15 04 08	1/2	3/16	1/32	0.255	070091	088267	—	—	070090	090632	090633	090630	090631
DNMP 542	DNMP 19 06 08	5/8	1/4	1/32	0.328	—	088223	—	—	—	—	—	—	—
DNMP 543	DNMP 19 06 12	5/8	1/4	3/64	0.310	—	075857	—	—	—	—	—	—	—

* Grades SP201, SP321, SC20 & SC230 are stocked with a "M" hone. Grades SC20 & SC230 can be ordered with a larger hone at nominal additional charge.

DNMG-PG

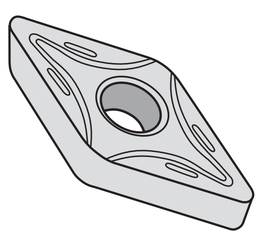


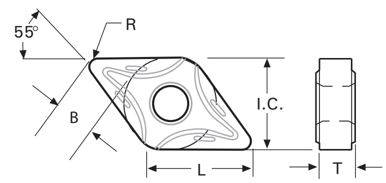


55° Diamond insert for all general purpose use from roughing to semi-finishing applications. Excellent chip control in a wide range of feeds and depth of cuts.

		Dimensions				Order Grade By EDP Number	
Item Desc.	**ISO**	**I.C.**	**T**	**R**	**B**	**SA210**	**SA220**
DNMG 331 PG	DNMG 11 04 04 PG	3/8	3/16	0.016	0.200	—	085978
DNMG 332 PG	DNMG 11 04 08 PG	3/8	3/16	0.031	0.182	085979	085980
DNMG 333 PG	DNMG 11 04 12 PG	3/8	3/16	0.047	0.164	085981	085982
DNMG 431 PG	DNMG 15 04 04 PG	1/2	3/16	0.016	0.273	—	085984
DNMG 432 PG	DNMG 15 04 08 PG	1/2	3/16	0.031	0.255	085985	085986
DNMG 433 PG	DNMG 15 04 12 PG	1/2	3/16	0.047	0.237	085988	085989
DNMG 441 PG	DNMG 15 06 04 PG	1/2	1/4	0.016	0.273	—	085992
DNMG 442 PG	DNMG 15 06 08 PG	1/2	1/4	0.031	0.255	085993	085994
DNMG 443 PG	DNMG 15 06 12 PG	1/2	1/4	0.047	0.237	085996	085997
DNMG 542 PG	DNMG 19 06 08 PG	5/8	1/4	0.031	0.328	—	085999

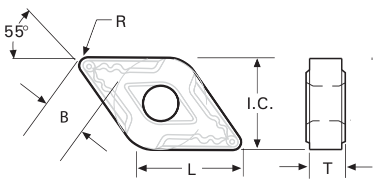
DNMG-PH

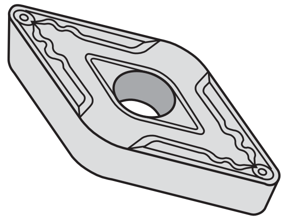




55° Diamond insert for roughing operations to medium turning even in the most severe conditions. Excellent chip control in heavy feed applications.

		Dimensions				Order Grade By EDP Number
Item Desc.	**ISO**	**I.C.**	**T**	**R**	**B**	**SA220**
DNMG 432 PH	DNMG 15 04 08 PH	1/2	3/16	0.031	0.255	086000
DNMG 433 PH	DNMG 15 04 12 PH	1/2	3/16	0.047	0.237	086002
DNMG 442 PH	DNMG 15 06 08 PH	1/2	1/4	0.031	0.255	086004
DNMG 443 PH	DNMG 15 06 12 PH	1/2	1/4	0.047	0.237	086006
DNMG 444 PH	DNMG 15 06 16 PH	1/2	1/4	0.063	0.219	086008

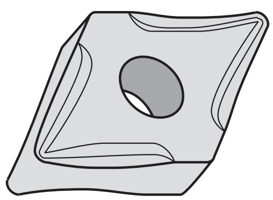




DNMG-PL

55° Diamond insert for finishing operations and moderate duty profiling. Excellent chip control in the lightest feeds and shallow depth of cuts.

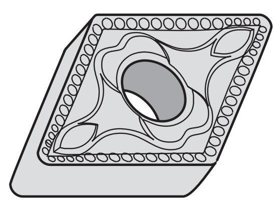
		Dimensions				Order Grade By EDP Number	
Item Desc.	ISO	I.C.	T	R	B	SA210	SA220
DNMG 332 PL	DNMG 11 04 08 PL	3/8	3/16	0.031	0.182	085965	—
DNMG 431 PL	DNMG 15 04 04 PL	1/2	3/16	0.016	0.273	085967	085968
DNMG 432 PL	DNMG 15 04 08 PL	1/2	3/16	0.031	0.255	085969	085970
DNMG 433 PL	DNMG 15 04 12 PL	1/2	3/16	0.047	0.237	085971	—
DNMG 441 PL	DNMG 15 06 04 PL	1/2	1/4	0.016	0.273	085972	085973
DNMG 442 PL	DNMG 15 06 08 PL	1/2	1/4	0.031	0.255	085974	085975



DNMG-ES

The "S" style 55° Diamond insert is an excellent choice for finishing and profiling in stainless and some high temp alloys. Features positive rake chip control.

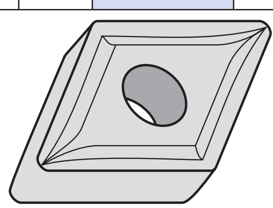
		Dimensions				Order Grade By EDP Number	
Item Desc.	I.S.O.	I.C.	T	R	B	SN180	SC230
DNMG 431 ES	DNMG 15 04 04 ES	1/2	3/16	1/64	0.273	—	099617
DNMG 432 ES	DNMG 15 04 08 ES	1/2	3/16	1/32	0.255	088807	—



DNMG-ST

The "ST" chip control surface is best suited for stainless steels and other soft work hardening materials. Excellent chip control in light to medium feed applications.

		Dimensions				Order Grade By EDP Number	
Item Desc.	I.S.O.	I.C.	T	R	B	SA150	SN150
DNMG 431M ST	DNMG 15 04 04M ST	1/2	3/16	1/64	0.273	082630	082605
DNMG 432M ST	DNMG 15 04 08M ST	1/2	3/16	1/32	0.255	082631	082606



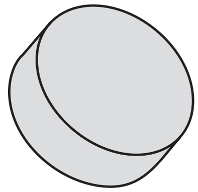
DNMZ

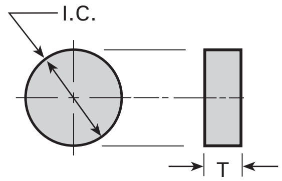
Excellent for use in aluminums, brass and non-ferrous materials.

		Dimensions				Order Grade By EDP Number						
Item Desc.	I.S.O.	I.C.	T	R	B	SA150	SA180	SN180	SN160	SN150	SS160	SC20*
DNMZ 431	DNMZ 15 04 04	1/2	3/16	1/64	0.273	—	—	—	—	—	071921	099623
DNMZ 432	DNMZ 15 04 08	1/2	3/16	1/32	0.255	070093	074152	074707	071011	070092	—	099624
DNMZ 433	DNMZ 15 04 12M	1/2	3/16	3/64	0.237	—	—	—	—	—	—	099625

* Grade SC20 is stocked with a "M" hone. Grade SC20 can be ordered with a larger hone at nominal additional charge.

RNG

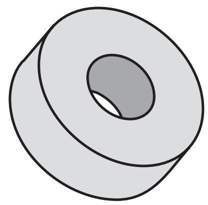


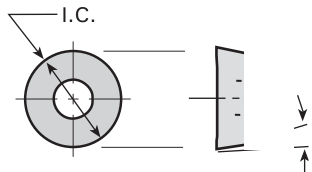


"G" tolerance class insert ground top, bottom and full diameter. Stocked with no hone. Edge hone available at nominal charge.

		Dimensions		Order Grade By EDP Number	
Item Desc.	I.S.O.	I.C.	T	SS160	SC20
RNG 32F	RNG 09 03 00F	3/8	1/8	083115	083111
RNG 42F	RNG 12 03 00F	1/2	1/8	083121	083116
RNG 43F	RNG 12 04 00F	1/2	3/16	083125	083122

RNMA

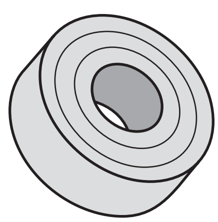


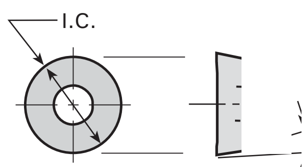


"M" tolerance utility insert ground top and bottom. Edge hone available at nominal charge.

		Dimensions		Order Grade By EDP Number		
Item Desc.	I.S.O.	I.C.	T	SA250	SS160	SC20
RNMA 32F	RNMA 09 03 00F	3/8	1/8	—	—	083745
RNMA 43E	RNMA 12 04 00	1/2	3/16	077949	—	—
RNMA 43F	RNMA 12 04 00F	1/2	3/16	—	—	083747
RNMA 64E	RNMA 19 06 00	3/4	1/4	077950	—	—
RNMA 64F	RNMA 19 06 00F	3/4	1/4	—	083750	083749
RNMA 86F	RNMA 25 09 00F	1	3/8	—	—	083751

RNMG

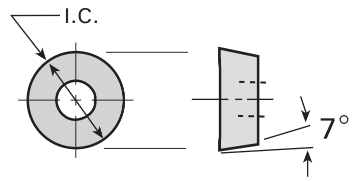


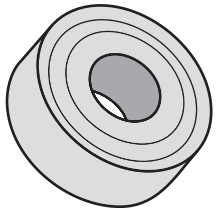


General purpose standard "G" style chipbreaker, wide range of chip control.

		Dimensions		Order Grade By EDP Number												
Item Desc.	I.S.O.	I.C.	T	SA150	SA180	SA250	SA200	SN180	SN160	SN150	SN550	SN027	SS170	SS160	SC20*	SC230*
RNMG 32	RNMG 09 03 00	3/8	1/8	070101	—	—	—	—	071021	070100	—	—	—	083847	099626	—
RNMG 43	RNMG 12 04 00	1/2	3/16	070103	071557	—	070365	—	071022	070102	075829	071216	—	083851	099628	099629
RNMG 54	RNMG 15 06 00	5/8	1/4	—	—	076202	—	—	—	—	—	—	087398	—	—	—
RNMG 64	RNMG 19 06 00	3/4	1/4	070105	—	076204	—	—	071023	070104	—	—	—	083855	099630	—
RNMG 86	RNMG 25 09 00	1	3/8	070107	—	076210	—	071063	—	070106	—	—	—	083860	—	—
RNMG 106	RNMG 31 09 00	1-1/4	3/8	—	—	—	—	—	—	—	—	—	—	083865	—	—

* Grades SC20 & SC230 are stocked with a "M" hone. Grades SC20 & SC230 can be ordered with a larger hone at nominal additional charge.

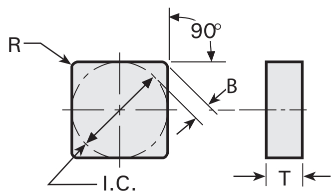


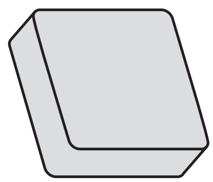


RNMP

Excellent chip control in softer steels and non-ferrous materials.

		Dimensions		Order Grade by EDP Number
Item Desc.	I.S.O.	I.C.	T	SC20
RNMP 43M	RNMP 12 04 00	1/2	3/16	099632

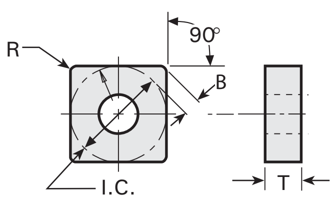


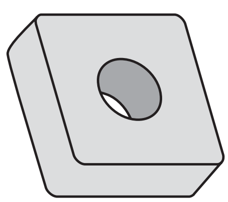


SNG

"G" tolerance class insert ground top, bottom and full periphery.

		Dimensions				Order Grade By EDP Number										
Item Desc.	I.S.O.	I.C.	T	R	B	SA150	SA180	SA250	SA200	SN180	SN160	SN150	SN550	SS160*	SC20*	SC230*
SNG 322	SNG 09 03 08	3/8	1/8	1/32	0.065	—	074153	—	—	—	—	—	—	—	083200	—
SNG 420.2	SNG 12 03 01	1/2	1/8	0.004	0.109	—	—	—	—	—	—	—	—	083215	—	—
SNG 422	SNG 12 03 08	1/2	1/8	1/32	0.091	—	—	—	—	—	070962	—	—	083226	083219	083220
SNG 423	SNG 12 03 12	1/2	1/8	3/64	0.084	—	—	—	—	—	—	—	—	—	083229	—
SNG 432	SNG 12 04 08	1/2	3/16	1/32	0.091	—	—	—	—	—	—	—	—	083255	083249	—
SNG 433	SNG 12 04 12	1/2	3/16	3/64	0.084	070125	—	076044	070366	074650	—	070124	071736	—	083258	—
SNG 434	SNG 12 04 16	1/2	3/16	1/16	0.078	—	—	—	—	—	—	—	—	083271	083266	—
SNG 632	SNG 19 04 08	3/4	3/16	1/32	0.142	—	—	—	—	—	—	—	—	083281	083277	—
SNG 633	SNG 19 04 12	3/4	3/16	3/64	0.136	—	—	—	—	—	070966	—	—	083288	083282	—
SNG 634	SNG 19 04 16	3/4	3/16	1/16	0.129	—	—	—	—	—	070967	—	071831	083297	083291	—





SNMA

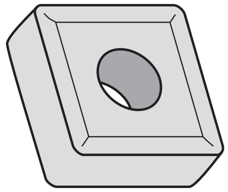
90° Square, Ground flat top and bottom, no chipbreaker, with hole.

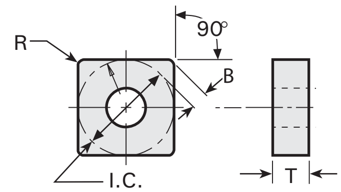
		Dimensions				Order Grade By EDP Number											
Item Desc.	I.S.O.	I.C.	T	R	B	SA150	SA180	SA250	SA550	SA200	SA280	SN150	SN160	SN027	SS160*	SC20*	SC230*
SNMA 322	SNMA 09 03 08	3/8	1/8	1/32	0.065	—	—	—	—	—	—	—	—	071221	—	083755	083756
SNMA 432	SNMA 12 04 08	1/2	3/16	1/32	0.091	—	074169	—	—	070367	—	—	—	—	083759	083757	083758
SNMA 433	SNMA 12 04 12	1/2	3/16	3/64	0.084	070127	074170	—	071847	—	090559	070126	071580	—	—	083760	—
SNMA 434	SNMA 12 04 16	1/2	3/16	1/16	0.078	—	088212	—	—	—	—	—	—	—	—	—	—
SNMA 543	SNMA 15 06 12	5/8	1/4	3/64	0.110	—	074171	—	—	—	—	—	—	—	—	083762	083763
SNMA 643	SNMA 19 06 12	3/4	1/4	3/64	0.136	—	074174	—	—	—	—	—	—	—	—	—	—
SNMA 644	SNMA 19 06 16	3/4	1/4	1/16	0.129	—	074175	077987	—	—	—	—	—	—	—	083765	083766

* Grades SS160, SC20 & SC230 are stocked with up sharp "F" edge. Grade SC20 & SC230 can be ordered with any specified hone at nominal additional charge.

SNMG

90° Square, two sided, general purpose chipbreaker, with hole."M" tolerance class.



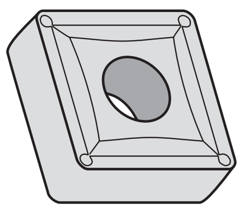


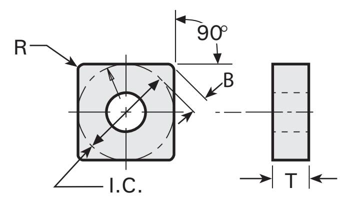
		Dimensions				Order Grade By EDP Number											
Item Desc.	**I.S.O.**	**I.C.**	**T**	**R**	**B**	**SA150**	**SA180**	**SA250**	**SA550**	**SA200**	**SN150**	**SN180**	**SN160**	**SN550**	**SP201***	**SS160**	**SC20***
SNMG 322	SNMG 09 03 08	3/8	1/8	1/32	0.065	070119	074176	075989	—	—	070118	074657	070982	—	—	083869	099633
SNMG 323	SNMG 09 03 12	3/8	1/8	3/64	0.058	—	—	—	—	—	—	—	070983	—	—	—	—
SNMG 432	SNMG 12 04 08	1/2	3/16	1/32	0.091	070123	074177	075990	088005	070368	070122	074658	070984	075815	090635	083876	090634
SNMG 433	SNMG 12 04 12	1/2	3/16	3/64	0.084	070129	074179	075991	—	—	070128	—	070985	—	090637	083880	090636
SNMG 434	SNMG 12 04 16	1/2	3/16	1/16	0.078	070133	—	075992	—	—	070132	—	—	075817	—	—	—
SNMG 543	SNMG 15 06 12	5/8	1/4	3/64	0.110	070135	074182	075993	088008	070370	070134	074662	070986	075818	—	083888	099638
SNMG 544	SNMG 15 06 16	5/8	1/4	1/16	0.104	070139	071863	—	—	—	070138	—	—	—	—	—	—
SNMG 634	SNMG 19 04 16	3/4	3/16	1/16	0.129	—	—	—	—	—	—	—	—	—	—	087401	—
SNMG 642	SNMG 19 06 08	3/4	1/4	1/32	0.136	—	—	—	—	—	—	—	—	—	—	083891	099639
SNMG 643	SNMG 19 06 12	3/4	1/4	3/64	0.136	—	074185	076003	088010	—	—	—	070987	075820	—	—	099640
SNMG 644	SNMG 19 06 16	3/4	1/4	1/16	0.129	—	074187	—	088011	070376	070146	—	070988	075821	—	083899	—
SNMG 866	SNMG 25 09 24	1	3/8	3/32	0.168	070153	—	077818	088012	—	070152	—	—	075822	—	083904	099643

* Grades SP201 & SC20 are stocked with a "M" hone. Grade SC20 can be ordered with a larger hone at nominal additional charge.

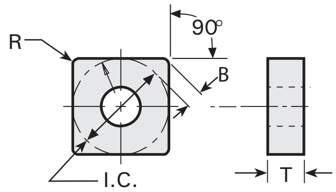
SNMG-CF1

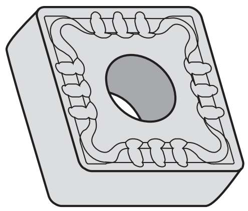
"CF1" style chipbreaker features excellent chip control in all steels and ductile irons. Has excellent chip control in varying depth of cuts and feed rates.





		Dimensions				Order Grade By EDP Number
Item Desc.	**I.S.O.**	**I.C.**	**T**	**R**	**B**	**SA180**
SNMG 433 CF1	SNMG 12 04 12 CF1	1/2	3/16	3/64	0.084	074180
SNMG 643 CF1	SNMG 19 06 12 CF1	3/4	1/4	3/64	0.136	074186

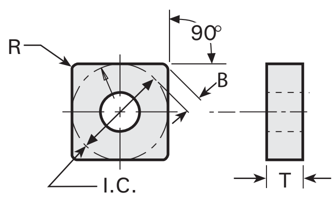


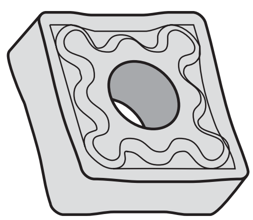


SNMG-GA

"GA" style chipbreaker, excellent chip control in a wide range of feed rates and depth of cuts. For general applications in long chipping materials & irons.

		Dimensions				Order Grade By EDP Number			
Item Desc.	**I.S.O.**	**I.C.**	**T**	**R**	**B**	**SA150**	**SA200**	**SN150**	**SN550**
SNMG 432 GA	SNMG 12 04 08 GA	1/2	3/16	1/32	0.091	091045	091044	091043	—
SNMG 433 GA	SNMG 12 04 12 GA	1/2	3/16	3/64	0.084	091049	091048	091046	091047
SNMG 434 GA	SNMG 12 04 16 GA	1/2	3/16	1/16	0.078	—	—	091050	091051
SNMG 543 GA	SNMG 15 06 12 GA	5/8	1/4	3/64	0.110	091057	—	091054	091055
SNMG 544 GA	SNMG 15 06 16 GA	5/8	1/4	1/16	0.104	091061	—	—	—
SNMG 643 GA	SNMG 19 06 12 GA	3/4	1/4	3/64	0.136	091065	—	091062	091063
SNMG 644 GA	SNMG 19 06 16 GA	3/4	1/4	1/16	0.129	—	—	091066	—

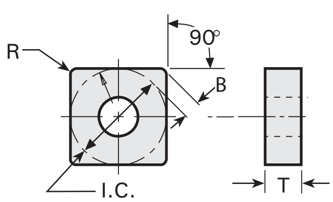


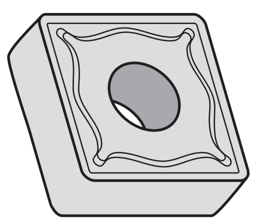


SNMG-GP

Standard "general purpose" geometry, Good chip control in all steels and irons

		Dimensions				Order Grade By EDP Number				
Item Desc.	**I.S.O.**	**I.C.**	**T**	**R**	**B**	**SA180**	**SA250**	**SA550**	**SN180**	**SC230***
SNMG 432 GP	SNMG 12 04 08 GP	1/2	3/16	1/32	0.091	077507	077475	077473	077472	099635
SNMG 434 GP	SNMG 12 04 16 GP	1/2	3/16	1/16	0.078	077612	—	—	—	—
SNMG 543 GP	SNMG 15 06 12 GP	5/8	1/4	3/64	0.110	—	077672	—	—	—
SNMG 544 GP	SNMG 15 06 16 GP	5/8	1/4	1/16	0.104	077678	—	—	—	—
SNMG 643 GP	SNMG 19 06 12M GP	3/4	1/4	3/64	0.136	—	—	—	—	099641





SNMG-GR

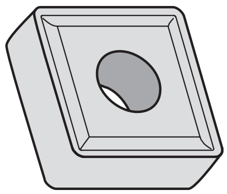
"GR" is general to moderate roughing geometry, Good chip control and excellent edge strength.

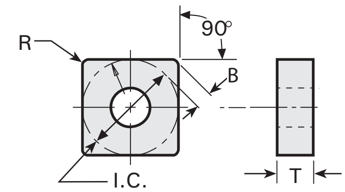
		Dimensions				Order Grade By EDP Number				
Item Desc.	**I.S.O.**	**I.C.**	**T**	**R**	**B**	**SA150**	**SA550**	**SA200**	**SN150**	**SC230***
SNMG 542 GR	SNMG 15 06 08 GR	5/8	1/4	1/32	0.091	—	078864	—	—	—
SNMG 543 GR	SNMG 15 06 12 GR	5/8	1/4	3/64	0.110	070137	—	—	070136	—
SNMG 643 GR	SNMG 19 06 12 GR	3/4	1/4	3/64	0.136	—	—	—	070142	—
SNMG 644 GR	SNMG 19 06 16 GR	3/4	1/4	1/16	0.129	070149	078888	070377	070148	—
SNMG 866 GR	SNMG 25 09 24 GR	1	3/8	3/32	0.168	070155	078921	070378	070154	099644

* Grade SC230 is stocked with "M" hone. Grade SC230 can be ordered with a larger hone at nominal additional charge.

SNMP

Excellent chip control in softer steels and non-ferrous materials.



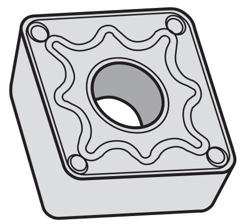


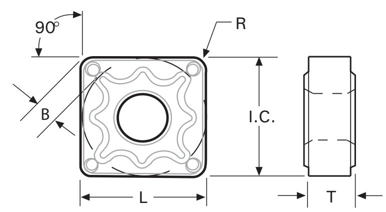
		Dimensions				Order Grade By EDP Number			
Item Desc.	I.S.O.	I.C.	T	R	B	SA180	SN160	SC20*	SC230*
SNMP 432	SNMP 12 04 08	1/2	3/16	1/32	0.091	088268	—	099645	099647
SNMP 433	SNMP 12 04 12	1/2	3/16	3/64	0.084	—	070990	—	—
SNMP 643	SNMP 19 06 12	3/4	1/4	3/64	0.136	088269	—	099650	—

* Grades SC20 & SC230 are stocked with a “M” hone. Grades SC20 & SC230 can be ordered with a larger hone at nominal additional charge.

SNMG-PG

For all general purpose use from roughing to semifinishing operations. Excellent chip control in a wide range of feeds and depth of cuts.

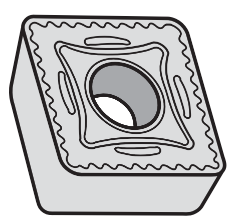


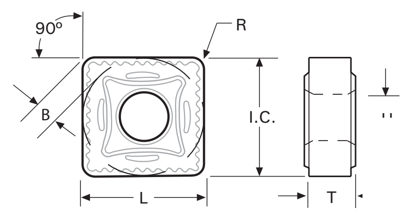


		Dimensions				Order Grade By EDP Number	
Item Desc.	ISO	I.C.	T	R	B	SA210	SA220
SNMG 322 PG	SNMG 09 03 08 PG	3/8	1/8	0.031	0.065	086026	086027
SNMG 432 PG	SNMG 12 04 08 PG	1/2	3/16	0.031	0.091	086031	086032
SNMG 433 PG	SNMG 12 04 12 PG	1/2	3/16	0.047	0.084	086034	086035
SNMG 543 PG	SNMG 15 06 12 PG	1/2	1/4	0.047	0.110	086040	086041
SNMG 643 PG	SNMG 19 06 12 PG	3/4	1/4	0.047	0.136	—	086047
SNMG 644 PG	SNMG 19 06 16 PG	3/4	1/4	0.063	0.130	—	086050

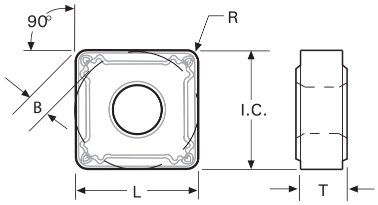
SNMG-PH

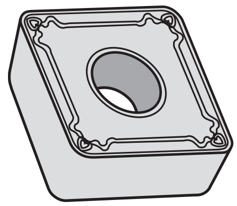
For heavy duty roughing operations to medium turning even in the most severe conditions. Excellent chip control even in heavier feeds and depth of cuts.





		Dimensions				Order Grade By EDP Number
Item Desc.	ISO	I.C.	T	R	B	SA220
SNMG 432 PH	SNMG 12 04 08 PH	1/2	3/16	0.031	0.091	086052
SNMG 433 PH	SNMG 12 04 12 PH	1/2	3/16	0.047	0.084	086054
SNMG 434 PH	SNMG 12 04 16 PH	1/2	3/16	0.063	0.078	086056
SNMG 543 PH	SNMG 15 06 12 PH	5/8	1/4	0.047	0.110	086058
SNMG 544 PH	SNMG 15 06 16 PH	5/8	1/4	0.063	0.103	086060
SNMG 643 PH	SNMG 19 06 12 PH	3/4	1/4	0.047	0.136	086062
SNMG 644 PH	SNMG 19 06 16 PH	3/4	1/4	0.063	0.130	086064
SNMG 866 PH	SNMG 25 09 24 PH	1	3/8	0.094	0.168	086066

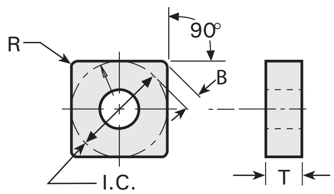


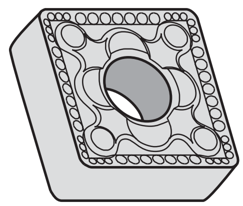


SNMG-PL

For finishing operations and moderate duty turning. Excellent chip control even in light feeds and shallow depth of cuts.

		Dimensions				Order Grade By EDP Number	
Item Desc.	**ISO**	**I.C.**	**T**	**R**	**B**	**SA210**	**SA220**
SNMG 431 PL	SNMG 12 04 04 PL	1/2	3/16	0.016	0.097	086022	086023
SNMG 432 PL	SNMG 12 04 08 PL	1/2	3/16	0.031	0.091	086024	086025

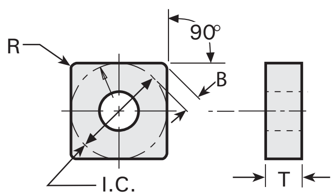


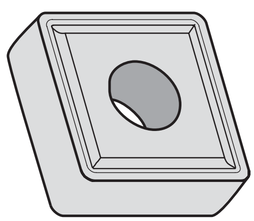


SNMG-ST

Excellent geometry for stainless steels and non-ferrous materials.

		Dimensions				Order Grade By EDP Number	
Item Desc.	**I.S.O.**	**I.C.**	**T**	**R**	**B**	**SA150**	**SN150**
SNMG 432M ST	SNMG 12 04 08M ST	1/2	3/16	1/32	0.091	082632	082607
SNMG 433M ST	SNMG 12 04 12M ST	1/2	3/16	3/64	0.084	—	082608

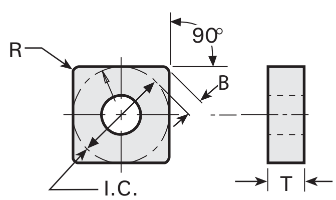


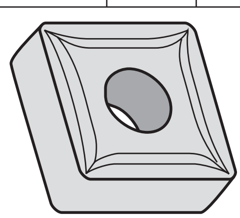


SNMX

"X" style chipbreaker has -25° T-land. Excellent geometry for interrupted cuts in all steels and cast or ductile irons.

		Dimensions				Order Grade By EDP Number				
Item Desc.	**I.S.O.**	**I.C.**	**T**	**R**	**B**	**SA180**	**SA250**	**SN180**	**SN550**	**SA550**
SNMX 432	SNMX 12 04 08	1/2	3/16	1/32	0.091	074969	076005	—	—	—
SNMX 433	SNMX 12 04 12	1/2	3/16	3/64	0.084	074035	076006	074016	071985	—
SNMX 543	SNMX 15 06 12	5/8	1/4	3/64	0.110	—	076008	074967	072004	—
SNMX 544	SNMX 15 06 16	5/8	1/4	1/16	0.104	—	—	—	—	072009
SNMX 643	SNMX 19 06 12	3/4	1/4	3/64	0.136	—	—	—	072016	—
SNMX 644	SNMX 19 06 16	3/4	1/4	1/16	0.129	074971	—	—	075838	—
SNMX 866	SNMX 25 09 24	1	3/8	3/32	0.168	—	—	—	075863	—





SNMZ

Excellent chip control in soft non-ferrous materials.

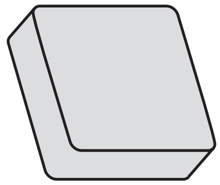
		Dimensions				Order Grade By EDP Number				
Item Desc.	**I.S.O.**	**I.C.**	**T**	**R**	**B**	**SA150**	**SA180**	**SN160**	**SN150**	**SC20***
SNMZ 322	SNMZ 09 03 08	3/8	1/8	1/32	0.065	070121	—	070992	070120	—
SNMZ 432	SNMZ 12 04 08	1/2	3/16	1/32	0.091	—	074191	070993	—	099652
SNMZ 643M	SNMZ 19 06 12	3/4	1/4	3/64	0.136	—	—	—	—	099653

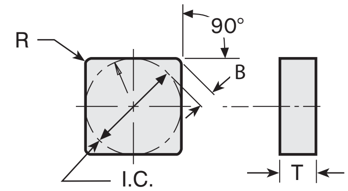
* Grade SC20 is stocked with a "M" hone. Grade SC20 can be ordered with a larger hone at nominal additional charge.

Negative Rake Inserts

SNU

Standard "utility" insert. An insert style for general applications, Good economy choice when lower tool cost is the objective.

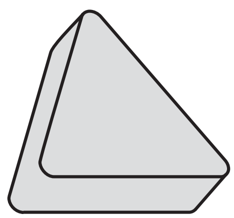


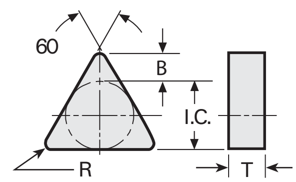


		Dimensions				Order Grade By EDP Number		
Item Desc.	I.S.O.	I.C.	T	R	B	SN160	SS160	SC20
SNU 322F	SNU 09 03 08F	3/8	1/8	1/32	0.065	—	083309	083303
SNU 422F	SNU 12 03 08F	1/2	1/8	1/32	0.091	—	083317	—
SNU 432F	SNU 12 04 08F	1/2	3/16	1/32	0.091	—	083333	083329
SNU 433	SNU 12 04 12	1/2	3/16	3/64	0.084	070971	—	—
SNU 433F	SNU 12 04 12F	1/2	3/16	3/64	0.084	—	083340	—
SNU 434F	SNU 12 04 16F	1/2	3/16	1/16	0.078	—	083345	083341
SNU 633	SNMG 19 04 12	3/4	3/16	1/16	0.136	070972	—	—
SNU 633F	SNMG 19 04 12F	3/4	3/16	1/16	0.136	—	083351	—
SNU 634	SNMG 19 04 16	3/4	3/16	1/16	0.129	070973	—	—
SNU 634F	SNMG 19 04 16F	3/4	3/16	1/16	0.129	—	083358	083352

TNG

"G" tolerance class insert ground top, bottom and full periphery. No chip-breaker, no hole.

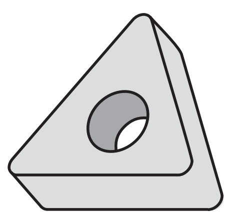


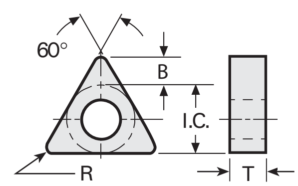


		Dimensions				Order Grade By EDP Number					
Item Desc.	I.S.O.	I.C.	T	R	B	SA180	SN160	SS160	SS170	SC20	SC230
TNG 221F	TNG 11 03 04F	3/8	1/8	1/64	0.547	—	—	083470	—	083464	—
TNG 222F	TNG 11 03 08F	3/8	1/8	1/32	0.344	—	—	083479	—	083473	083475
TNG 321F	TNG 16 03 04F	3/8	1/8	1/64	0.547	—	—	083498	—	083494	—
TNG 322	TNG 16 03 08	3/8	1/8	1/32	0.531	074192	—	—	—	—	—
TNG 322F	TNG 16 03 08F	3/8	1/8	1/32	0.531	—	—	083506	—	083501	—
TNG 323F	TNG 16 03 12F	3/8	1/8	3/64	0.516	—	—	083515	—	—	—
TNG 331F	TNG 16 04 04F	3/8	3/16	1/64	0.547	—	—	—	—	083521	—
TNG 332	TNG 16 04 08	3/8	3/16	1/32	0.531	074193	070906	—	—	—	—
TNG 332F	TNG 16 04 08F	3/8	3/16	1/32	0.531	—	—	083528	—	083523	—
TNG 333F	TNG 16 04 12F	3/8	3/16	3/64	0.516	—	—	083535	—	083531	083532
TNG 431F	TNG 22 04 04F	1/2	3/16	1/64	0.734	—	—	083549	—	083548	—
TNG 432	TNG 22 04 08	1/2	3/16	1/32	0.719	074195	—	—	—	—	—
TNG 432F	TNG 22 04 08F	1/2	3/16	1/32	0.719	—	—	083558	—	083552	083553
TNG 433	TNG 22 04 12	1/2	3/16	3/64	0.703	074196	—	—	—	—	—
TNG 433F	TNG 22 04 12F	1/2	3/16	3/64	0.703	—	—	083567	087538	083561	—
TNG 434F	TNG 22 04 16F	1/2	3/16	1/16	0.688	—	—	083576	—	—	—
TNG 544F	TNG 27 06 16F	5/8	1/4	1/16	0.875	—	—	—	—	083580	—

TNGA

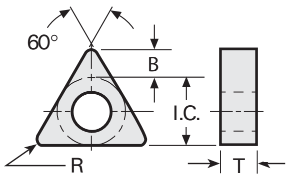
"G" tolerance class insert ground flat top, bottom and full periphery. No chip-breaker, with hole.

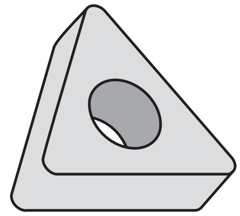




		Dimensions				Order Grade By EDP Number
Item Desc.	I.S.O.	I.C.	T	R	B	SA180
TNGA 332	TNGA 16 04 08	3/8	3/16	1/32	0.531	088219

TNMA



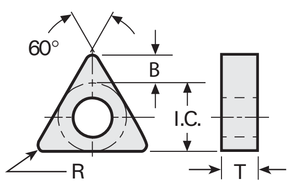


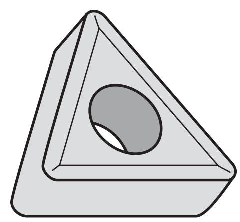
General purpose 60° triangle, ground flat top and bottom, no chipbreaker, with hole.

		Dimensions				Order Grade By EDP Number								
Item Desc.	I.S.O.	I.C.	T	R	B	SA180	SA250	SA200	SN160	SN150	SN027	SS160*	SC20*	SC230*
TNMA 222	TNMA 11 03 08	1/4	1/8	1/32	0.344	—	—	—	—	—	—	—	083771	—
TNMA 322	TNMA 16 03 08	3/8	1/8	1/32	0.531	074209	—	—	071577	—	—	—	083772	—
TNMA 323	TNMA 16 03 12	3/8	1/8	3/64	0.516	—	—	—	—	—	—	—	083774	—
TNMA 324	TNMA 16 03 16	3/8	1/8	1/16	0.500	—	—	—	—	—	—	087410	087409	—
TNMA 332	TNMA 16 04 08	3/8	3/16	1/32	0.531	074210	—	—	—	—	—	—	—	—
TNMA 333	TNMA 16 04 12	3/8	3/16	3/64	0.516	—	—	—	—	—	—	—	087411	—
TNMA 431	TNMA 22 04 04	1/2	3/16	1/64	0.734	—	—	—	—	—	—	—	083776	—
TNMA 432	TNMA 22 04 08	1/2	3/16	1/32	0.719	074211	077989	070388	—	—	071273	083780	083778	083779
TNMA 433	TNMA 22 04 12	1/2	3/16	3/64	0.703	074212	—	070389	071578	—	—	—	083781	083782
TNMA 434	TNMA 22 04 16	1/2	3/16	1/16	0.688	074213	—	070390	—	070210	—	—	083783	083784
TNMA 438	TNMA 22 04 32	1/2	3/16	1/8	0.625	074214	—	070391	071579	—	—	—	087412	—
TNMA 542	TNMA 27 06 08	5/8	1/4	1/32	0.906	—	—	—	—	—	—	—	083786	083787
TNMA 543	TNMA 27 06 12	5/8	1/4	3/64	0.891	088210	—	—	—	—	—	—	—	—
TNMA 544	TNMA 27 06 16	5/8	1/4	1/16	0.875	074215	077994	—	—	—	—	—	083789	083790
TNMA 666	TNMA 33 09 24	3/4	3/8	3/32	1.031	—	—	—	—	—	—	—	083792	—

* Grades SS160, SC20 & SC230 are stocked with up sharp "F" edge. These grades can be ordered with any specified hone at nominal additional charge.

TNMG





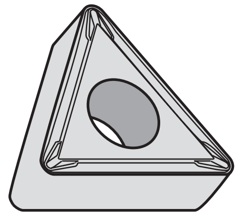
For all general purpose use from roughing to semi-finishing operations. Good chip control in a wide range of feeds and depth of cuts.

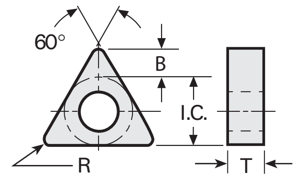
		Dimensions				Order Grade By EDP Number															
Item Desc.	I.S.O.	I.C.	T	R	B	SA150	SA180	SA250	SA550	SA200	SN180	SN160	SN150	SN550	SN027	SP201*	SS140	SS160	SS170	SC20*	SC230*
TNMG 221	TNMG 11 03 04	1/4	1/8	1/64	0.359	—	—	—	—	—	072129	—	—	—	—	—	—	—	—	—	099654
TNMG 222	TNMG 11 03 08	1/4	1/8	1/32	0.344	—	—	—	—	—		070925	—	—	—	—	083906	083907	—	099655	—
TNMG 321	TNMG 16 03 04	3/8	1/8	1/64	0.547	070179	074216	075920	—	070392	074677	070926	070178	—	—	—	083910	083911	—	099656	099657
TNMG 322	TNMG 16 03 08	3/8	1/8	1/32	0.531	070183	074217	075921	087999	070394	074678	070927	070182	075809	—	—	—	083915	085733	099660	099661
TNMG 323	TNMG 16 03 12	3/8	1/8	3/64	0.516	—	074218	—	—	—	—	070928	—	—	—	—	—	083919	—	—	—
TNMG 324	TNMG 16 03 16	3/8	1/8	1/16	0.500	—	—	—	—	—	—	070929	—	—	—	—	—	083922	—	—	—
TNMG 331	TNMG 16 04 04	3/8	3/16	1/64	0.547	—	—	075922	—	—	087998	—	—	—	—	—	—	—	—	—	099666
TNMG 332	TNMG 16 04 08	3/8	3/16	1/32	0.531	070187	074705	075923	—	070396	074706	074515	070186	072134	—	—	—	074514	—	099668	—
TNMG 333	TNMG 16 04 12	3/8	3/16	3/64	0.516	070191	074703	—	—	—	074704	070930	—	—	—	—	—	—	—	—	070305
TNMG 334	TNMG 16 04 16	3/8	3/16	1/16	0.500	—	—	—	—	—	—	—	—	—	—	—	—	087417	—	—	—
TNMG 431	TNMG 22 04 04	1/2	3/16	1/64	0.734	070193	074219	075924	—	—	074679	070931	070192	—	—	—	—	083929	—	099671	—
TNMG 432	TNMG 22 04 08	1/2	3/16	1/32	0.719	070197	074220	075925	088000	070399	074680	070932	070196	075810	071291	090639	—	083933	085734	090638	099675
TNMG 433	TNMG 22 04 12	1/2	3/16	3/64	0.703	070207	074222	075926	—	—	074682	070933	070206	072136	—	—	—	083937	—	099678	099679
TNMG 434	TNMG 22 04 16	1/2	3/16	1/16	0.688	070213	074224	075928	088001	—	—	070934	070212	075811	—	—	—	083941	—	099680	—
TNMG 436	TNMG 22 04 24	1/2	3/16	3/32	0.656	—	—	—	—	—	—	087419		—	—	—	—	—	—	—	—
TNMG 438	TNMG 22 04 32	1/2	3/16	1/8	0.625	070217	080393	—	—	—	—	070935	070216	—	—	—	083944	083945	—	099681	—
TNMG 542	TNMG 27 06 08	5/8	1/4	1/32	0.906	070219	074226	075929	—	—	074685	070936	070218	—	—	—	—	083949	—	099682	—
TNMG 543	TNMG 27 06 12	5/8	1/4	3/64	0.891	070221	074228	075930	088002	—	074687	070937	070220	075812	—	—	—	083953	—	099683	—
TNMG 544	TNMG 27 06 16	5/8	1/4	1/16	0.875	070225	074230	075931	—	070406	—	—	070224	075813	—	—	—	083957	—	—	—
TNMG 548	TNMG 27 06 32	5/8	1/4	1/8	0.813	—	—	—	—	—	—	—	—	—	—	—	—	087423	—	—	—
TNMG 666	TNMG 33 09 24	3/4	3/8	3/32	1.031	—	074234	—	—	070407	074691	070939	—	075814	—	—	—	083961	—	—	—

* Grades SP201, SC20 & SC230 are stocked with a "M" hone. Grades SC20 & SC230 can be ordered with a larger hone at nominal additional charge.

Negative Rake Inserts

TNMG-FF

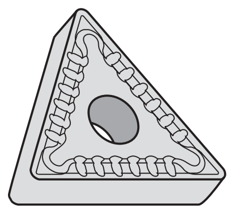


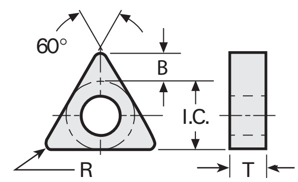


Finishing "FF" style chipbreaker, excellent chip control in light feed rates and shallow depth of cuts.

		Dimensions				Order Grade By EDP Number					
Item Desc.	**I.S.O.**	**I.C.**	**T**	**R**	**B**	**SA150**	**SA180**	**SA200**	**SN180**	**SN150**	**SC230***
TNMG 321 FF	TNMG 16 03 04 FF	3/8	1/8	1/64	0.547	070181	—	—	—	070180	099658
TNMG 322 FF	TNMG 16 03 08 FF	3/8	1/8	1/32	0.531	070185	077155	070395	077152	070184	—
TNMG 431 FF	TNMG 22 04 04 FF	1/2	3/16	1/64	0.734	070195	—	070398	—	070194	099673
TNMG 432 FF	TNMG 22 04 08 FF	1/2	3/16	1/32	0.719	070199	—	070400	—	070198	—

TNMG-GA

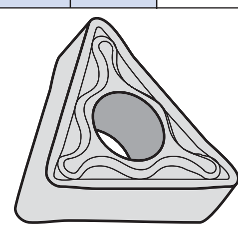


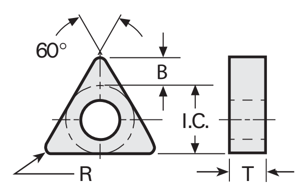


"GA" style chipbreaker, excellent chip control in a wide range of feed rates and depth of cuts. For general applications in long chipping materials & irons.

		Dimensions				Order Grade By EDP Number			
Item Desc.	**I.S.O.**	**I.C.**	**T**	**R**	**B**	**SA150**	**SA200**	**SN150**	**SN550**
TNMG 321 GA	TNMG 16 03 04 GA	3/8	1/8	1/64	0.547	091072	091071	091070	—
TNMG 322 GA	TNMG 16 03 08 GA	3/8	1/8	1/32	0.531	091075	091074	091073	—
TNMG 331 GA	TNMG 16 04 04 GA	3/8	3/16	1/64	0.547	091078	091077	091076	—
TNMG 332 GA	TNMG 16 04 08 GA	3/8	3/16	1/32	0.531	091082	091081	091079	—
TNMG 431 GA	TNMG 22 04 04 GA	1/2	3/16	1/64	0.734	091085	091084	091083	—
TNMG 432 GA	TNMG 22 04 08 GA	1/2	3/16	1/32	0.719	091089	091088	091086	091087
TNMG 433 GA	TNMG 22 04 12 GA	1/2	3/16	3/64	0.703	091093	091092	091090	091091
TNMG 434 GA	TNMG 22 04 16 GA	1/2	3/16	1/16	0.688	091097	—	091094	—
TNMG 542 GA	TNMG 27 06 08 GA	5/8	1/4	1/32	0.906	091100	091099	091098	—
TNMG 543 GA	TNMG 27 06 12 GA	5/8	1/4	3/64	0.891	091103	091102	091101	—
TNMG 544 GA	TNMG 27 06 16 GA	5/8	1/4	1/16	0.875	—	—	091104	—

TNMG-GP

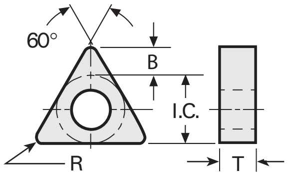


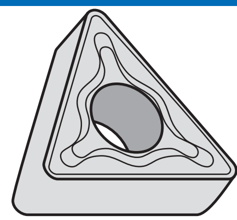


Standard "general purpose" geometry, Good chip control in all steels and irons.

		Dimensions				Order Grade By EDP Number							
Item Desc.	**I.S.O.**	**I.C.**	**T**	**R**	**B**	**SA150**	**SA180**	**SA250**	**SA550**	**SN180**	**SN150**	**SN550**	**SC230***
TNMG 321 GP	TNMG 16 03 04 GP	3/8	1/8	1/64	0.547	—	—	077317	—	—	—	—	099659
TNMG 322 GP	TNMG 16 03 08 GP	3/8	1/8	1/32	0.531	—	077325	077324	077323	077322	—	077321	099663
TNMG 331 GP	TNMG 16 04 04 GP	3/8	3/16	1/64	0.547	—	—	077328	—	077327	—	—	099667
TNMG 332 GP	TNMG 16 04 08 GP	3/8	3/16	1/32	0.531	—	—	077337	—	077335	—	077332	099670
TNMG 431 GP	TNMG 22 04 04 GP	1/2	3/16	1/64	0.734	—	—	077342	—	—	—	—	—
TNMG 432 GP	TNMG 22 04 08 GP	1/2	3/16	1/32	0.719	070201	077350	077349	—	077347	070200	077345	099677
TNMG 433 GP	TNMG 22 04 12 GP	1/2	3/16	3/64	0.703	—	—	077355	—	—	—	—	—
TNMG 434 GP	TNMG 22 04 16 GP	1/2	3/16	1/16	0.688	—	—	—	—	077359	—	—	—
TNMG 542 GP	TNMG 27 06 08 GP	5/8	1/4	1/32	0.906	—	—	077372	—	077369	—	—	—
TNMG 543 GP	TNMG 27 06 12 GP	5/8	1/4	3/64	0.891	—	—	077459	—	—	—	—	—
TNMG 544 GP	TNMG 27 06 16 GP	5/8	1/4	1/16	0.875	—	—	—	—	077464	—	—	—

* Grade SC230 is stocked with a "M" hone. Grade SC230 can be ordered with a larger hone at nominal additional charge.

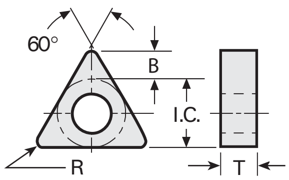


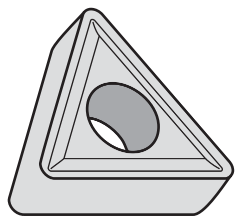


TNMG-GR

"GR" is general to moderate roughing geometry, Good chip control and excellent edge strength.

		Dimensions				Order Grade By EDP Number			
Item Desc.	**I.S.O.**	**I.C.**	**T**	**R**	**B**	**SA150**	**SA250**	**SA550**	**SN150**
TNMG 432 GR	TNMG 22 04 08 GR	1/2	3/16	1/32	0.719	070203	077832	077831	070202
TNMG 433 GR	TNMG 22 04 12 GR	1/2	3/16	3/64	0.703	070209	—	077834	070208
TNMG 434 GR	TNMG 22 04 16 GR	1/2	3/16	1/16	0.688	070215	—	—	070214
TNMG 543 GR	TNMG 27 06 12 GR	5/8	1/4	3/64	0.891	070223	077208	—	070222
TNMG 666 GR	TNMG 33 09 24 GR	3/4	3/8	3/32	1.031	091149	—	—	—



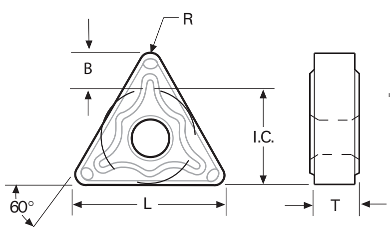


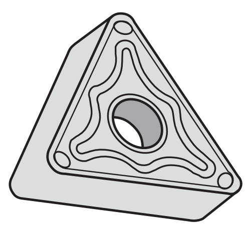
TNMP

Excellent chip control in softer steels and non-ferrous materials.

		Dimensions				Order Grade By EDP Number							
Item Desc.	**I.S.O.**	**I.C.**	**T**	**R**	**B**	**SA150**	**SA180**	**SN180**	**SN160**	**SN150**	**SS160**	**SC20***	**SC230***
TNMP 321	TNMP 16 03 04	3/8	1/8	1/64	0.547	—	—	—	071900	—	—	099685	—
TNMP 322	TNMP 16 03 08	3/8	1/8	1/32	0.531	—	074238	074693	070942	—	085370	099686	099687
TNMP 332	TNMP 16 04 08	3/8	3/16	1/32	0.531	070189		072142	070943	070188	—	—	099688
TNMP 431	TNMP 22 04 04	1/2	3/16	1/64	0.734	—	074239	074725	—	—	071902	099689	—
TNMP 432	TNMP 22 04 08	1/2	3/16	1/32	0.719	—	074240	074694	070944	—	—	099690	099692
TNMP 433	TNMP 22 04 12	1/2	3/16	3/64	0.703	—	—	—	070945	—	—	—	099694
TNMP 434	TNMP 22 04 16	1/2	3/16	1/16	0.688	—	—	—	—	—	087557	—	099695
TNMP 542	TNMP 27 06 08	5/8	1/4	1/32	0.906	—	075860	—	—	—	—	—	—
TNMP 543	TNMP 27 06 12	5/8	1/4	3/64	0.891	—	—	—	—	—	087559	—	—
TNMP 544	TNMP 27 06 16	5/8	1/4	1/16	0.875	—	—	—	—	—	087424	—	—

* Grades SC20 & SC230 are stocked with a "M" hone. These grades can be ordered with a larger hone at nominal additional charge.



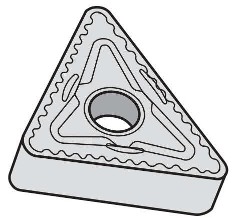
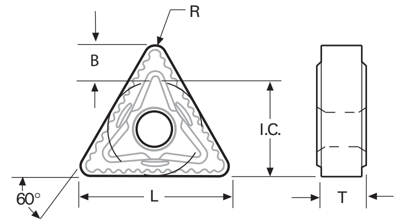


TNMG-PG

For all general purpose use from roughing to semifinishing operations. Excellent chip control in a wide range of feeds and depth of cuts.

		Dimensions						Order Grade By EDP Number	
Item Desc.	**ISO**	**I.C.**	**T**	**R**	**B**	**L**	**H**	**SA210**	**SA220**
TNMG 322 PG	TNMG 16 03 08 PG	3/8	1/8	0.031	0.531	0.650	0.150	086082	086083
TNMG 331 PG	TNMG 16 04 04 PG	3/8	3/16	0.016	0.546	0.650	0.150	—	086086
TNMG 332 PG	TNMG 16 04 08 PG	3/8	3/16	0.031	0.531	0.650	0.150	086088	086089
TNMG 333 PG	TNMG 16 04 12 PG	3/8	3/16	0.047	0.615	0.650	0.150	086091	086092
TNMG 431 PG	TNMG 22 04 04 PG	1/2	3/16	0.016	0.734	0.866	0.203	—	086095
TNMG 432 PG	TNMG 22 04 08 PG	1/2	3/16	0.031	0.719	0.866	0.203	086097	086098
TNMG 433 PG	TNMG 22 04 12 PG	1/2	3/16	0.047	0.703	0.866	0.203	086100	086101
TNMG 543 PG	TNMG 27 06 12 PG	5/8	1/4	0.047	0.891	1.080	0.250	086105	086106

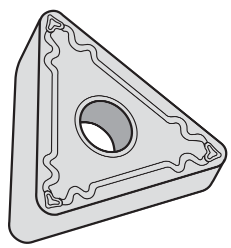
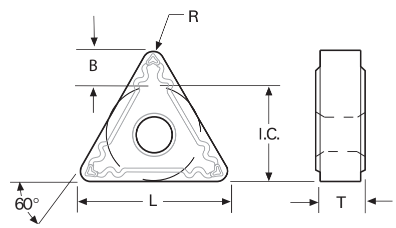
TNMG-PH

For roughing operations to medium turning even in the most severe conditions. Excellent chip control even in heavier feeds and depth of cuts.

		Dimensions						Order Grade By EDP Number	
Item Desc.	ISO	I.C.	T	R	B	L	H	SA210	SA220
TNMG 332 PH	TNMG 16 04 08 PH	3/8	3/16	0.031	0.531	0.650	0.150	—	086110
TNMG 333 PH	TNMG 16 04 12 PH	3/8	3/16	0.047	0.615	0.650	0.150	—	086112
TNMG 432 PH	TNMG 22 04 08 PH	1/2	3/16	0.031	0.719	0.866	0.203	—	086114
TNMG 433 PH	TNMG 22 04 12 PH	1/2	3/16	0.047	0.703	0.866	0.203	—	086116
TNMG 434 PH	TNMG 22 04 16 PH	1/2	3/16	0.063	0.703	0.866	0.203	—	086118
TNMG 436 PH	TNMG 22 04 24 PH	1/2	3/16	0.094	0.656	0.866	0.203	—	—
TNMG 544 PH	TNMG 27 06 16 PH	5/8	1/4	0.063	0.875	1.080	0.250	—	086121
TNMG 666 PH	TNMG 33 09 24 PH	3/4	3/8	0.094	1.031	1.300	0.312	—	086123

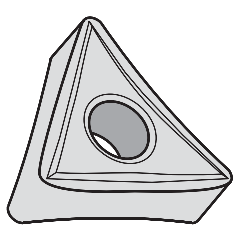
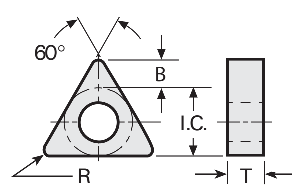
TNMG-PL

For finishing operations and moderate duty profiling. Excellent chip control in light feeds and shallow depth of cuts.

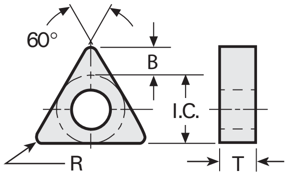
		Dimensions						Order Grade By EDP Number	
Item Desc.	ISO	I.C.	T	R	B	L	H	SA210	SA220
TNMG 321 PL	TNMG 16 03 04 PL	3/8	1/8	0.016	0.546	0.650	0.150	086068	086069
TNMG 322 PL	TNMG 16 03 08 PL	3/8	1/8	0.031	0.531	0.650	0.150	0700611	—
TNMG 331 PL	TNMG 16 04 04 PL	3/8	3/16	0.016	0.546	0.650	0.150	086071	086072
TNMG 332 PL	TNMG 16 04 08 PL	3/8	3/16	0.031	0.531	0.650	0.150	086073	086074
TNMG 333 PL	TNMG 16 04 12 PL	3/8	3/16	0.047	0.615	0.650	0.150	086075	086076
TNMG 431 PL	TNMG 22 04 04 PL	1/2	3/16	0.016	0.734	0.866	0.203	—	086079
TNMG 432 PL	TNMG 22 04 08 PL	1/2	3/16	0.031	0.719	0.866	0.203	086080	086081

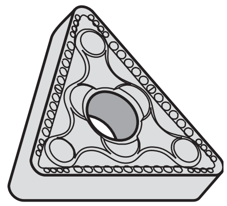
TNMG-ES

"S" style chipbreaker has positive action chip control in finishing to light duty applications. Excellent chip control in softer steels and ductile irons.

		Dimensions				Order Grade By EDP Number	
Item Desc.	I.S.O.	I.C.	T	R	B	SA180	SC230
TNMG 331 ES	TNMG 16 04 04 ES	3/8	3/16	1/64	0.547	088814	—
TNMG 332 ES	TNMG 16 04 08 ES	3/8	3/16	1/32	0.531	—	099669

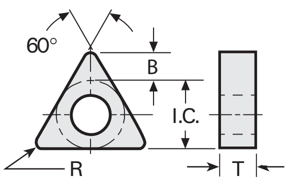


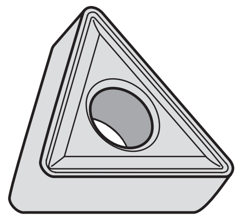


TNMG-ST

Excellent geometry for stainless steels and high temp alloys.

Item Desc.	I.S.O.	Dimensions I.C.	T	R	B	Order Grade By EDP Number SA150	SN150
TNMG 321M ST	TNMG 16 03 04M ST	3/8	1/8	1/64	0.547	082635	082610
TNMG 322M ST	TNMG 16 03 08M ST	3/8	1/8	1/32	0.531	082636	082611
TNMG 331M ST	TNMG 16 04 04M ST	3/8	3/16	1/64	0.547	082637	082612
TNMG 332M ST	TNMG 16 04 08M ST	3/8	3/16	1/32	0.531	082638	082613
TNMG 431M ST	TNMG 22 04 04M ST	1/2	3/16	1/64	0.734	082639	082614
TNMG 432M ST	TNMG 22 04 08M ST	1/2	3/16	1/32	0.719	082640	082615
TNMG 433M ST	TNMG 22 04 12M ST	1/2	3/16	3/64	0.703	082641	082616

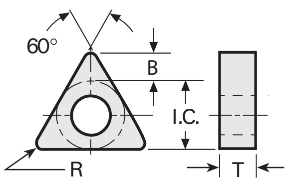


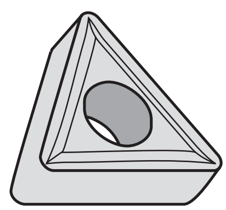


TNMX

“X” style chipbreaker has -25° T-land. Excellent geometry for interrupted cuts in all steels and cast or ductile irons.

Item Desc.	I.S.O.	Dimensions I.C.	T	R	B	Order Grade By EDP Number SA250	SA550	SN180	SN550
TNMX 432	TNMX 22 04 08	1/2	3/16	1/32	0.719	075938	—	—	—
TNMX 433	TNMX 22 04 12	1/2	3/16	3/64	0.703	075940	—	—	075835
TNMX 543	TNMX 27 06 12	5/8	1/4	3/64	0.891	—	072150	—	072151
TNMX 544	TNMX 27 06 16	5/8	1/4	1/16	0.875	075948	—	074031	075836





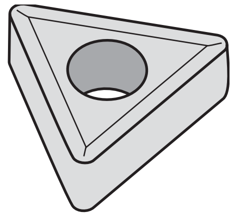
TNMZ

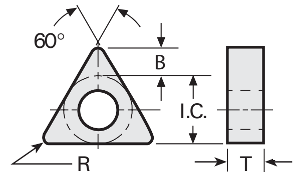
For all general purpose use and semifinish operations. Excellent chip control in a wide range of feeds and depth of cuts.

Item Desc.	I.S.O.	Dimensions I.C.	T	R	B	Order Grade By EDP Number SA150	SA180	SN150	SN160	SN027	SS160	SC20*	SC230*
TNMZ 321	TNMZ 16 03 04	3/8	1/8	1/64	0.547	—	—	—	070954	—	070725	099696	—
TNMZ 331	TNMZ 16 04 04	3/8	3/16	1/64	0.547	—	—	—	—	—	070732	—	099697
TNMZ 332	TNMZ 16 04 08	3/8	3/16	1/32	0.531	—	—	—	070956	071311	070738	099698	—
TNMZ 334	TNMZ 16 04 16	3/8	3/16	1/16	0.500	—	—	—	070957	—	—	—	—
TNMZ 432	TNMZ 22 04 08	1/2	3/16	1/32	0.719	070205	074242	070204	070958	—	070751	099699	—
TNMZ 433	TNMZ 22 04 12	1/2	3/16	3/64	0.703	—	074243	—	—	—	—	—	—

* Grades SC20 & SC230 are stocked with a “M” hone. These grades can be ordered with a larger hone at nominal additional charge.

TNMM

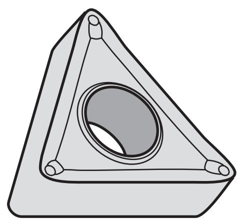


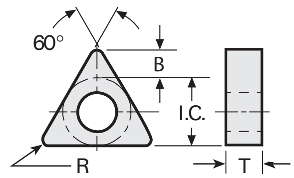


Same chip control as general purpose standard "G" style chipbreaker, but with single side configuration only.

		Dimensions				Order Grade By EDP Number	
Item Desc.	I.S.O.	I.C.	T	R	B	SN160	SS160
TNMM 332	TNMM 16 04 08	3/8	3/16	1/32	0.531	—	071879
TNMM 432	TNMM 22 04 08	1/2	3/16	1/32	0.719	071884	071882

TNMM-HR

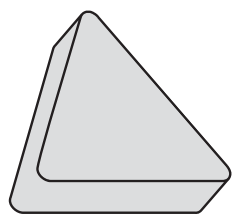


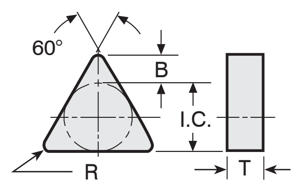


"HR" chip control geometry is for medium to heavy roughing. This geometry features strongest edge strength. Single sided.

		Dimensions				Order Grade By EDP Number
Item Desc.	I.S.O.	I.C.	T	R	B	SA180
TNMM 543E HR	TNMM 27 06 12 HR	5/8	1/4	3/64	0.891	077814

TNU

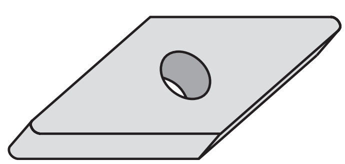


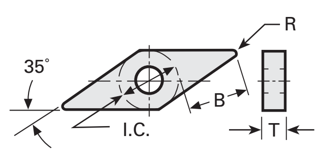


Standard "utility" insert. An insert style for general applications, Economical choice where lower tool cost is the objective.

		Dimensions				Order Grade By EDP Number		
Item Desc.	I.S.O.	I.C.	T	R	B	SN160	SS160	SC20
TNU 221F	TNU 11 03 04F	1/4	1/8	1/64	0.359	—	083589	—
TNU 322	TNU 16 03 08	3/8	1/8	1/32	0.531	070911	—	—
TNU 322F	TNU 16 03 08F	3/8	1/8	1/32	0.531	—	083486	—
TNU 333F	TNU 16 04 12F	3/8	3/16	3/64	0.516	—	—	083606
TNU 334F	TNU 16 04 16F	3/8	3/16	1/16	0.500	—	—	083612

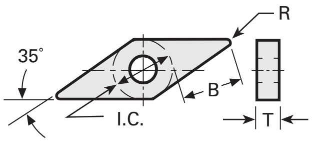
VNMA

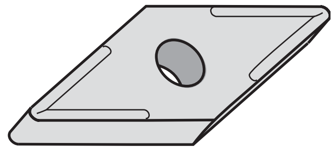




General purpose, 35° Diamond, ground flat top and bottom with hole but no chipbreaker.

		Dimensions				Order Grade By EDP Number	
Item Desc.	I.S.O.	I.C.	T	R	B	SA180	SS160
VNMA 332	VNMA 16 04 08	3/8	3/16	1/32	0.363	074244	—
VNMA 332F	VNMA 16 04 08F	3/8	3/16	1/32	0.363	—	071769



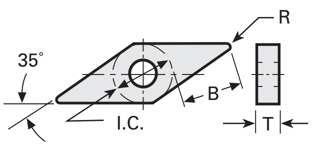


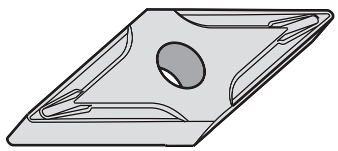
VNMG

35° Diamond, two sided, general purpose chip-breaker, with hole. “M” tolerance class.

		Dimensions				Order Grade By EDP Number										
Item Desc.	I.S.O.	I.C.	T	R	B	SA150	SA180	SA250	SA550	SA200	SN180	SN160	SN150	SP201*	SS160	SC20*
VNMG 331	VNMG 16 04 04	3/8	3/16	1/64	0.400	070267	—	076170	—	—	—	071924	070266	090641	—	090640
VNMG 332	VNMG 16 04 08	3/8	3/16	1/32	0.363	070273	074245	076172	—	070426	074696	071015	070272	—	—	090642
VNMG 333	VNMG 16 04 12	3/8	3/16	3/64	0.327	—	—	—	—	—	—	—	—	—	—	099705
VNMG 431	VNMG 22 04 04	1/2	3/16	1/64	0.545	070279	074246	—	—	—	074737	071927	070278	—	071926	—
VNMG 432	VNMG 22 04 08	1/2	3/16	1/32	0.509	070281	074247	076176	—	070428	074697	071016	070280	—	070770	099706
VNMG 433	VNMG 22 04 12	1/2	3/16	3/64	0.472	—	—	—	—	—	—	071017	—	—	—	099707

* Grades SP201 & SC20 are stocked with a “M” hone. Grade SC20 can be ordered with a larger hone at nominal additional charge.



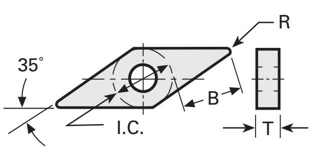


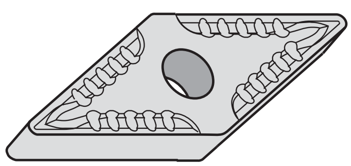
VNMG-FF

Finishing “FF” style chipbreaker, excellent chip control in light feed rates and shallow depth of cuts.

		Dimensions				Order Grade By EDP Number			
Item Desc.	I.S.O.	I.C.	T	R	B	SA150	SA200	SN150	SC230*
VNMG 331 FF	VNMG 16 04 04 FF	3/8	3/16	1/64	0.400	070269	070425	070268	099701
VNMG 332 FF	VNMG 16 04 08 FF	3/8	3/16	1/32	0.363	070275	070427	070274	099703

* Grade SC230 is stocked with a “M” hone. Grade SC230 can be ordered with a larger hone at nominal additional charge.



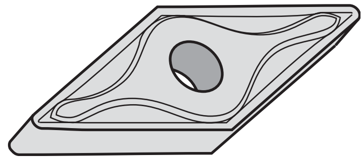


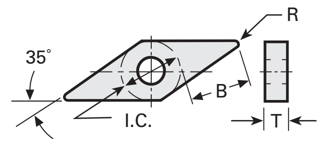
VNMG-GA

“GA” style chipbreaker, excellent chip control in a wide range of feed rates and depth of cuts. For general applications in long chipping materials & irons.

		Dimensions				Order Grade By EDP Number		
Item Desc.	I.S.O.	I.C.	T	R	B	SA150	SA200	SN150
VNMG 331 GA	VNMG 16 04 04 GA	3/8	3/16	1/64	0.400	091109	091108	091107
VNMG 332 GA	VNMG 16 04 08 GA	3/8	3/16	1/32	0.363	091112	091111	091110
VNMG 431 GA	VNMG 22 04 04 GA	1/2	3/16	1/64	0.545	091115	091114	091113
VNMG 432 GA	VNMG 22 04 08 GA	1/2	3/16	1/32	0.509	091118	091117	091116

VNMG-GP



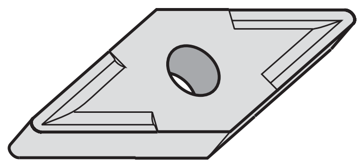


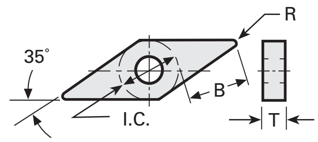
Standard GP, "general purpose" geometry, Good chip control in all steels and irons

		Dimensions				Order Grade By EDP Number			
Item Desc.	**I.S.O.**	**I.C.**	**T**	**R**	**B**	**SA180**	**SA250**	**SN180**	**SC230***
VNMG 331 GP	VNMG 16 04 04 GP	3/8	3/16	1/64	0.400	077789	077788	077787	—
VNMG 332 GP	VNMG 16 04 08 GP	3/8	3/16	1/32	0.363	077793	077792	077791	099704
VNMG 432 GP	VNMG 22 04 08 GP	1/2	3/16	1/32	0.509	077799	077798	077797	—

* Grade SC230 is stocked with a "M" hone. Grade SC230 can be ordered with a larger hone at nominal additional charge.

VNMP



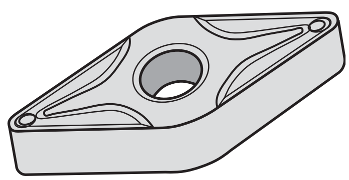


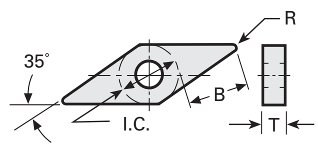
Excellent chip control in softer steels and non-ferrous materials.

		Dimensions				Order Grade By EDP Number												
Item Desc.	**I.S.O.**	**I.C.**	**T**	**R**	**B**	**SA150**	**SA180**	**SA250**	**SA550**	**SA200**	**SN180**	**SN160**	**SN150**	**SS160**	**SP201***	**SP321***	**SC20***	**SC230***
VNMP 331	VNMP 16 04 04	3/8	3/16	1/64	0.400	070271	074248	076178	—	070429	074698	071938	070270	071937	090646	090647	090644	090645
VNMP 431	VNMP 22 04 04	1/2	3/16	1/64	0.545	—	—	—	—	—	—	—	—	—	—	—	099708	—
VNMP 432	VNMP 22 04 08	1/2	3/16	1/32	0.509	—	—	076196	—	—	—	—	—	—	—	—	—	099709

* Grades SP201, SP321, SC230 & SC20 are stocked with a "M" hone. Grades SC20 & SC230 can be ordered with a larger hone at nominal additional charge.

VNMG-PG

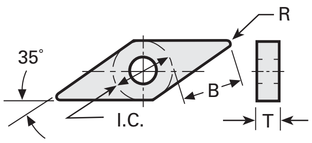


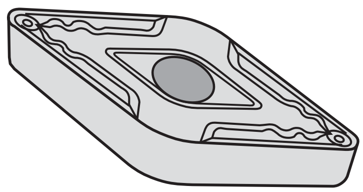


For all general purpose profiling to semifinishing operations. Excellent chip control in a wide range of feeds and depth of cuts.

		Dimensions				Order Grade By EDP Number	
Item Desc.	**ISO**	**I.C.**	**T**	**R**	**B**	**SA210**	**SA220**
VNMG 332 PG	VNMG 16 04 08 PG	3/8	3/16	0.031	0.363	086135	086136
VNMG 433 PG	VNMG 22 04 12 PG	1/2	3/16	0.047	0.472	—	086142

VNMG-PL

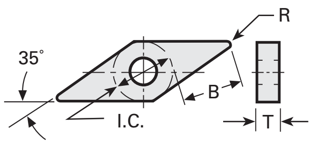


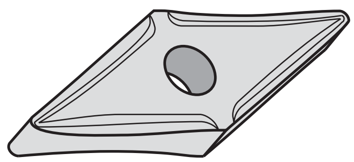


For finishing and profiling operations at accelerated speeds. Excellent chip control even in softer low carbon steels.

		Dimensions				Order Grade By EDP Number	
Item Desc.	ISO	I.C.	T	R	B	SA210	SA220
VNMG 331 PL	VNMG 16 04 04 PL	3/8	3/16	0.016	0.400	086127	086128
VNMG 332 PL	VNMG 16 04 08 PL	3/8	3/16	0.031	0.363	086129	086130
VNMG 431 PL	VNMG 22 04 04 PL	1/2	3/16	0.016	0.545	—	086132
VNMG 432 PL	VNMG 22 04 08 PL	1/2	3/16	0.031	0.509	086133	086134

VNMG-ES

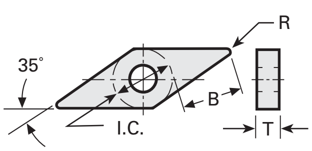


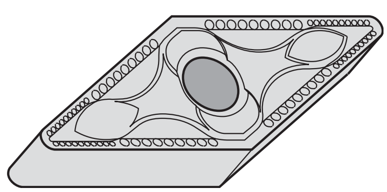


“S” style chipbreaker has positive action chip control in finishing to light duty applications. Excellent chip control in softer steels and ductile irons.

		Dimensions				Order Grade By EDP Number
Item Desc.	I.S.O.	I.C.	T	R	B	SC230
VNMG 331 ES	VNMG 16 04 04 ES	3/8	3/16	1/64	0.400	099700
VNMG 332 ES	VNMG 16 04 08 ES	3/8	3/16	1/32	0.363	099702
VNMG 432 ES	VNMG 22 04 08 ES	1/2	3/16	1/32	0.509	088836

VNMG-ST



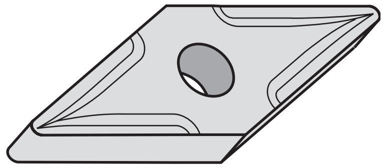


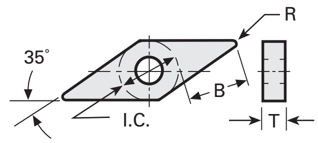
Excellent geometry for stainless steels and non-ferrous materials.

		Dimensions				Order Grade By EDP Number	
Item Desc.	I.S.O.	I.C.	T	R	B	SA150	SN150
VNMG 331M ST	VNMG 16 04 04M ST	3/8	3/16	1/64	0.400	082642	082617
VNMG 332M ST	VNMG 16 04 08M ST	3/8	3/16	1/32	0.363	082643	082618

VNMZ

Excellent chip control in soft non-ferrous materials.



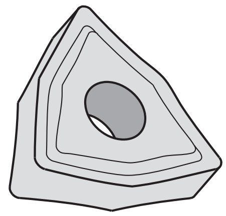


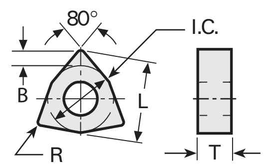
		Dimensions				Order Grade By EDP Number				
Item Desc.	**I.S.O.**	**I.C.**	**T**	**R**	**B**	**SA150**	**SN180**	**SN160**	**SN150**	**SC20***
VNMZ 332	VNMZ 16 04 08	3/8	3/16	1/32	0.363	070277	—	071018	070276	—
VNMZ 431	VNMZ 22 04 04	1/2	3/16	1/64	0.545	—	—	—	—	099710
VNMZ 432	VNMZ 22 04 08	1/2	3/16	1/32	0.509	—	074699	—	—	—
VNMZ 432	VNMZ 22 04 08	1/2	3/16	1/32	0.509	—	—	—	—	099711

* Grade SC20 is stocked with a "M" hone. Grade SC20 can be ordered with a larger hone at nominal additional charge.

WNGG-DP

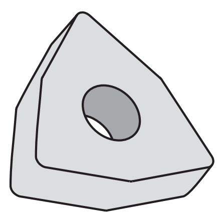
Excellent chip control in softer steels and non-ferrous materials.

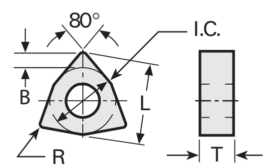




		Dimensions				Order Grade By EDP Number	
Item Desc.	**I.S.O.**	**I.C.**	**T**	**R**	**B**	**SP321**	**SC230**
WNGG 430.2F DP	WNGG 08 04 01F DP	1/2	3/16	0.004	0.137	081036	081035
WNGG 430.5F DP	WNGG 08 04 02F DP	1/2	3/16	0.008	0.135	081087	081086
WNGG 431F DP	WNGG 08 04 04F DP	1/2	3/16	1/64	0.130	081060	081059
WNGG 432F DP	WNGG 08 04 08F DP	1/2	3/16	1/32	0.122	081062	081061

WNMA

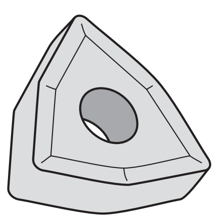


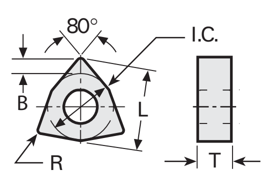


General purpose 80° trigon, ground flat top and bottom, no chipbreaker, with hole.

		Dimensions				Order Grade By EDP Number	
Item Desc.	**I.S.O.**	**I.C.**	**T**	**R**	**B**	**SA180**	**SA280**
WNMA 432	WNMA 08 04 08	1/2	3/16	1/32	0.122	090050	090569
WNMA 433	WNMA 08 04 12	1/2	3/16	3/64	0.113	—	090570

WNMG

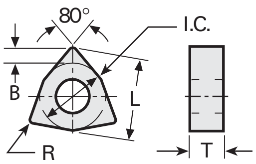


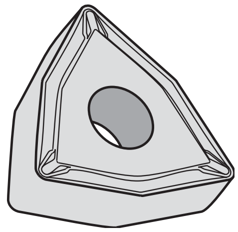


80° trigon, two sided, general purpose chip chipbreaker, with hole. "M" tolerance class.

		Dimensions				Order Grade By EDP Number	
Item Desc.	**I.S.O.**	**I.C.**	**T**	**R**	**B**	**SA180**	**SN550**
WNMG 432	WNMG 08 04 08	1/2	3/16	1/32	0.122	080404	080407
WNMG 433	WNMG 08 04 12	1/2	3/16	3/64	0.113	—	080412

WNMG-FF



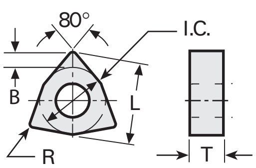


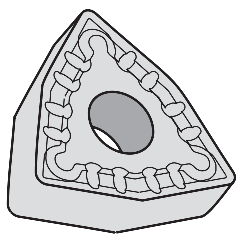
Finishing "FF" style chip-breaker, excellent chip control in light feed rates and shallow depth of cuts.

		Dimensions				Order Grade By EDP Number			
Item Desc.	**I.S.O.**	**I.C.**	**T**	**R**	**B**	**SA150**	**SA200**	**SN150**	**SC230***
WNMG 431 FF	WNMG 08 04 04 FF	1/2	3/16	1/64	0.130	070287	070432	070286	099712
WNMG 432 FF	WNMG 08 04 08 FF	1/2	3/16	1/32	0.122	070289	070433	070288	—

* Grade SC230 is stocked with a "M" hone. Grade SC230 can be ordered with a larger hone at nominal additional charge.

WNMG-GA

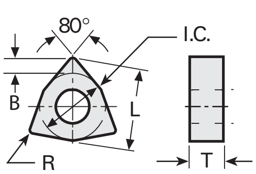


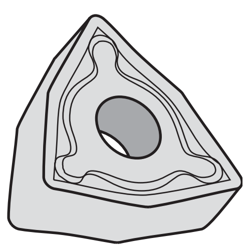


80° trigon insert with "GA" style chip-breaker. Good chip control through a wide range of feed rates and depth of cuts.

		Dimensions				Order Grade By EDP Number			
Item Desc.	**I.S.O.**	**I.C.**	**T**	**R**	**B**	**SA150**	**SA200**	**SN150**	**SN550**
WNMG 32.51 GA	WNMG 06 T3 04 GA	3/8	5/32	1/64	0.096	081276	—	081275	—
WNMG 32.52 GA	WNMG 06 T3 08 GA	3/8	5/32	1/32	0.087	081278	—	081277	—
WNMG 331 GA	WNMG 06 04 04 GA	3/8	3/16	1/64	0.096	091121	—	091119	—
WNMG 332 GA	WNMG 06 04 08 GA	3/8	3/16	1/32	0.087	091125	091124	091122	—
WNMG 431 GA	WNMG 08 04 04 GA	1/2	3/16	1/64	0.130	091128	091127	091126	—
WNMG 432 GA	WNMG 08 04 08 GA	1/2	3/16	1/32	0.122	091132	091131	091129	091130
WNMG 433 GA	WNMG 08 04 12 GA	1/2	3/16	3/64	0.113	091136	091135	091133	—
WNMG 542 GA	WNMG 10 06 08 GA	5/8	1/4	1/32	0.775	091140	—	091137	—
WNMG 543 GA	WNMG 10 06 12 GA	5/8	1/4	3/64	0.766	091144	—	091141	—
WNMG 544 GA	WNMG 10 06 16 GA	5/8	1/4	1/16	0.758	091148	—	091145	—

WNMG-GP





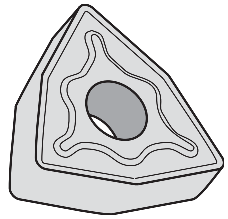
Standard "general purpose" geometry, Good chip control in all steels and irons

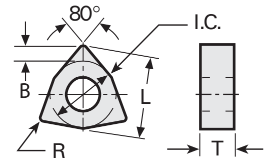
		Dimensions				Order Grade By EDP Number					
Item Desc.	**I.S.O.**	**I.C.**	**T**	**R**	**B**	**SA180**	**SA250**	**SA550**	**SA200**	**SN180**	**SC230***
WNMG 431 GP	WNMG 08 04 04 GP	1/2	3/16	1/64	0.130	090065	090066	—	—	090067	099713
WNMG 432 GP	WNMG 08 04 08 GP	1/2	3/16	1/32	0.122	090069	090070	090071	070434	090072	099715
WNMG 433 GP	WNMG 08 04 12 GP	1/2	3/16	3/64	0.113	—	090076	—	—	—	099716

* Grade SC230 is stocked with a "M" hone. Grade SC230 can be ordered with a larger hone at nominal additional charge.

WNMG-GR

"GR" is a general to moderate roughing geometry, Good chip control and excellent edge strength.

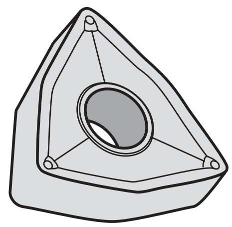


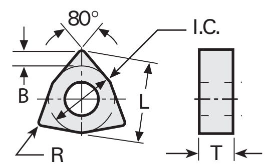


		Dimensions				Order Grade By EDP Number				
Item Desc.	**I.S.O.**	**I.C.**	**T**	**R**	**B**	**SA150**	**SA250**	**SA550**	**SA200**	**SN150**
WNMG 432 GR	WNMG 08 04 08 GR	1/2	3/16	1/32	0.122	070291	090082	090083	070435	070290
WNMG 433 GR	WNMG 08 04 12 GR	1/2	3/16	3/64	0.113	070293	—	—	—	070292
WNMG 542 GR	WNMG 10 06 08 GP	5/8	1/4	1/32	0.775	070295	—	—	—	070294
WNMG 543 GR	WNMG 10 06 12 GP	5/8	1/4	3/64	0.766	070297	090587	—	—	070296
WNMG 544 GR	WNMG 10 06 16 GP	5/8	1/4	1/16	0.758	070301	—	—	—	070300

WNMG-HR

"HR" chip control geometry is for medium to heavy roughing. This single sided geometry features strongest edge strength.

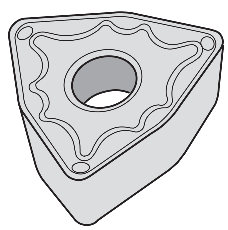


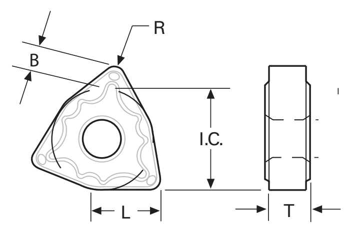


		Dimensions				Order Grade By EDP Number	
Item Desc.	**I.S.O.**	**I.C.**	**T**	**R**	**B**	**SA150**	**SN150**
WNMM 543 HR	WNMG 10 06 12 HR	5/8	1/4	3/64	0.766	070299	070298
WNMM 544 HR	WNMG 10 06 16 HR	5/8	1/4	1/16	0.758	070303	070302

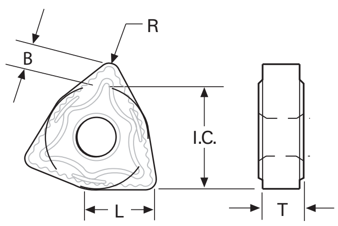
WNMG-PG

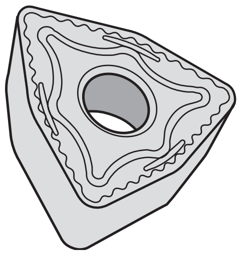
For all general purpose use from roughing to semifinishing operations. Excellent chip control in a wide range of feeds and depth of cuts.





		Dimensions				Order Grade By EDP Number	
Item Desc.	**ISO**	**I.C.**	**T**	**R**	**B**	**SA210**	**SA220**
WNMG 32.52 PG	WNMG 06 T3 08 PG	3/8	5/32	0.031	0.458	—	086155
WNMG 332 PG	WNMG 06 04 08 PG	3/8	3/16	0.031	0.458	086159	086160
WNMG 431 PG	WNMG 08 04 04 PG	1/2	3/16	0.031	0.625	086183	086184
WNMG 432 PG	WNMG 08 04 08 PG	1/2	3/16	0.031	0.616	086162	086163
WNMG 433 PG	WNMG 08 04 12 PG	1/2	3/16	0.047	0.608	086165	086166

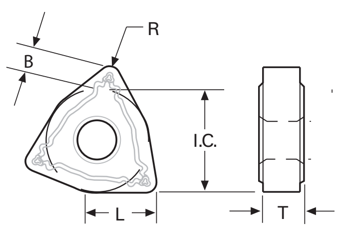


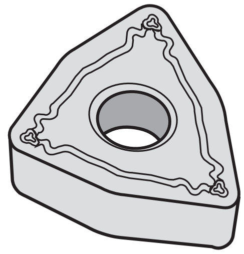


WNMG-PH

For heavy duty roughing operations to medium turning even in the most severe conditions. Excellent chip control even in heavier feeds and depth of cuts.

		Dimensions				Order Grade By EDP Number
Item Desc.	**ISO**	**I.C.**	**T**	**R**	**B**	**SA220**
WNMG432 PH	WNMG 08 04 08 PH	1/2	3/16	0.031	0.122	086172
WNMG433 PH	WNMG 08 04 12 PH	1/2	3/16	0.047	0.113	086174
WNMG434 PH	WNMG 08 04 16 PH	1/2	3/16	0.063	0.104	086176

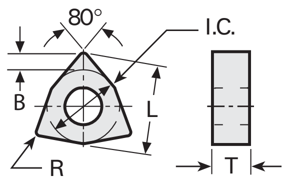


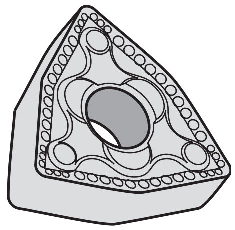


WNMG-PL

For finishing operations and moderate duty profiling. Excellent chip control even in light feeds and shallow depth of cuts.

		Dimensions				Order Grade By EDP Number	
Item Desc.	**ISO**	**I.C.**	**T**	**R**	**B**	**SA210**	**SA220**
WNMG 32.51 PL	WNMG 06 T3 04 PL	3/8	5/32	0.016	0.466	086144	—
WNMG 32.52 PL	WNMG 06 T3 08 PL	3/8	5/32	0.031	0.458	086145	086146
WNMG 331 PL	WNMG 06 04 04 PL	3/8	3/16	0.016	0.458	086148	—
WNMG 332 PL	WNMG 06 04 08 PL	3/8	3/16	0.031	0.458	086149	—
WNMG 431 PL	WNMG 08 04 04 PL	1/2	3/16	0.016	0.625	086150	086151
WNMG 432 PL	WNMG 08 04 08 PL	1/2	3/16	0.031	0.616	086152	086153



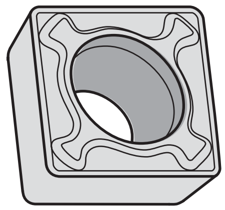


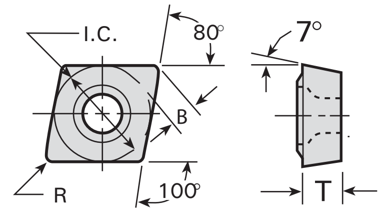
WNMG-ST

Excellent geometry for stainless steels and high temp alloys.

		Dimensions				Order Grade By EDP Number	
Item Desc.	**I.S.O.**	**I.C.**	**T**	**R**	**B**	**SA150**	**SN150**
WNMG 32.51M ST	WNMG 06 T3 04M ST	3/8	5/32	1/64	0.096	082648	082623
WNMG 32.52M ST	WNMG 06 T3 08M ST	3/8	5/32	1/32	0.087	082649	082624
WNMG 331M ST	WNMG 06 04 04M ST	3/8	3/16	1/64	0.096	082646	082621
WNMG 332M ST	WNMG 06 04 08M ST	3/8	3/16	1/32	0.087	082647	082622
WNMG 431M ST	WNMG 08 04 04M ST	1/2	3/16	1/64	0.130	082645	082620
WNMG 432M ST	WNMG 08 04 08M ST	1/2	3/16	1/32	0.122	082644	082619

CCMT-GP

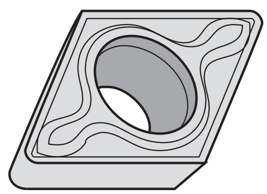


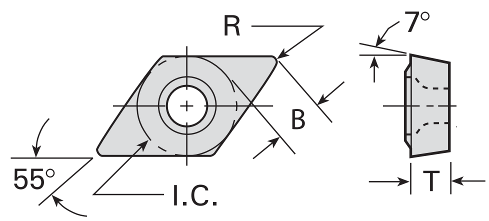


"GP" is a general purpose geometry. Good chip control with excellent edge strength.

		Dimensions				Order Grade By EDP Number											
Item Desc.	**I.S.O.**	**I.C.**	**T**	**R**	**B**	**SA150**	**SA180**	**SA250**	**SA550**	**SA200**	**SN180**	**SN150**	**SN550**	**SP321**	**SS250**	**SC20***	**SC230***
CCMT 21.50.5 GP	CCMT 06 02 02 GP	1/4	3/32	0.008	0.066	070001	—	096465	—	—	—	070000	—	096339	—	096466	—
CCMT 21.51 GP	CCMT 06 02 04 GP	1/4	3/32	1/64	0.061	070003	096302	096304	—	070310	096303	070002	—	096297	—	—	096300
CCMT 21.52 GP	CCMT 06 02 08 GP	1/4	3/32	1/32	0.052	070005	096307	096309	—	070311	096308	070004	—	—	—	—	096305
CCMT 32.50.5 GP	CCMT 09 T3 02 GP	3/8	5/32	0.008	0.100	—	—	—	—	—	—	—	—	096242	—	—	080940
CCMT 32.51 GP	CCMT 09 T3 04 GP	3/8	5/32	1/64	0.096	070007	096312	096314	096316	070312	096313	070006	096315	096126	—	—	096310
CCMT 32.52 GP	CCMT 09 T3 08 GP	3/8	5/32	1/32	0.087	070009	096319	096321	096323	070313	096320	070008	096322	096120	096318	—	096317
CCMT 431 GP	CCMT 12 04 04 GP	1/2	3/16	1/64	0.130	070011	—	—	—	—	096327	070010	096329	—	—	—	096324
CCMT 432 GP	CCMT 12 04 08 GP	1/2	3/16	1/32	0.122	070013	—	096335	—	—	096334	070012	096336	—	—	—	096331
CCMT 433 GP	CCMT 12 04 12 GP	1/2	3/16	3/64	0.113	070015	096340	—	—	—	—	070014	096343	—	—	—	—

DCMT-GP



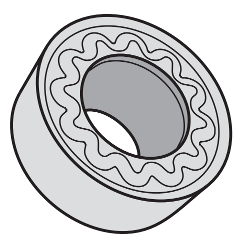


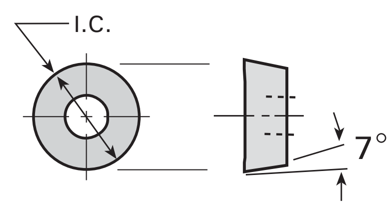
"GP" is a general purpose geometry. Good chip control with excellent edge strength.

		Dimensions				Order Grade By EDP Number									
Item Desc.	**I.S.O.**	**I.C.**	**T**	**R**	**B**	**SA150**	**SA180**	**SA250**	**SA200**	**SN180**	**SN150**	**SP321**	**SS250**	**SC20***	**SC230***
DCMT 21.50.5 GP	DCMT 07 02 02 GP	1/4	3/32	0.008	0.137	070069	—	—	—	—	070068	096405	—	096470	—
DCMT 21.51 GP	DCMT 07 02 04 GP	1/4	3/32	1/64	0.128	070071	096347	096349	—	096348	070070	096421	096346	—	096345
DCMT 21.52 GP	DCMT 07 02 08 GP	1/4	3/32	1/32	0.109	070073	—	—	070350	096353	070072	—	096351	—	096350
DCMT 32.51 GP	DCMT 11 T3 04 GP	3/8	5/32	1/64	0.200	070075	096357	096359	070351	096358	070074	096475	096356	—	096355
DCMT 32.52 GP	DCMT 11 T3 08 GP	3/8	5/32	1/32	0.182	070077	096362	096364	070352	096363	070076	096476	096361	—	096360

* Grade SC20 & SC230 is stocked with up sharp "F" edge. This grade can be ordered with any specified hone at nominal additional charge.

RCMT

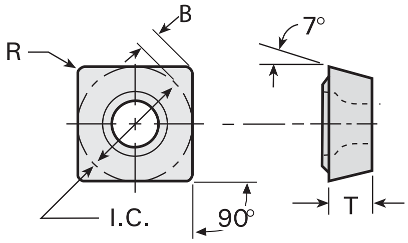


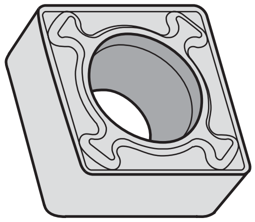


For all general purpose use from roughing to semifinishing operations. Excellent chip control in a wide range of feeds and depth of cuts.

		Dimensions		Order Grade By EDP Number									
Item Desc.	**I.S.O.**	**I.C.**	**T**	**SA150**	**SA180**	**SA250**	**SA200**	**SN180**	**SN150**	**SN550**	**SP321**	**SS250**	**SC230***
RCMT 32.5	RCMT 09 T3 00	3/8	5/32	070097	096454	096456	070363	096455	070096	—	096490	096453	096452
RCMT 43	RCMT 12 04 00	1/2	3/16	070099	096458	096460	070364	—	070098	096461	—	—	096457

* Grade SC230 is stocked with up sharp "F" edge. This grade can be ordered with any specified hone at nominal additional charge.





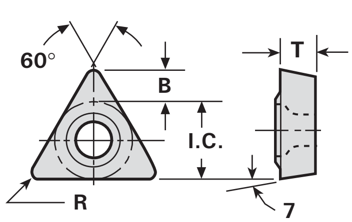
SCMT-GP

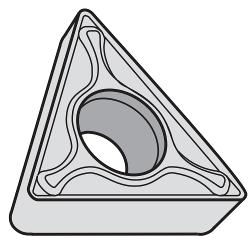
For finishing operations and moderate duty profiling. Excellent chip control even in light feeds and shallow depth of cuts.

Positive Rake Inserts

		Dimensions				Order Grade By EDP Number							
Item Desc.	**I.S.O.**	**I.C.**	**T**	**R**	**B**	**SA150**	**SA180**	**SA250**	**SN150**	**SN550**	**SP321**	**SS250**	**SC230***
SCMT 32.51 GP	SCMT 09 T3 04 GP	3/8	5/32	0.008	0.071	070109	096398	—	070108	096401	096491	—	096396
SCMT 32.52 GP	SCMT 09 T3 08 GP	3/8	5/32	1/64	0.065	070111	—	096407	070110	096408	096639	096404	096403
SCMT 431 GP	SCMT 12 08 04 GP	1/2	3/16	1/64	0.097	070113	—	—	070112	—	—	—	096410
SCMT 432 GP	SCMT 12 08 08 GP	1/2	3/16	1/32	0.091	070115	—	—	070114	096422	—	096418	096417
SCMT 433 GP	SCMT 12 08 12 GP	1/2	3/16	3/64	0.084	070117	—	—	070116	096429	—	—	096424

* Grade SC230 is stocked with up sharp "F" edge. Grade SC230 can be ordered with any specified hone at nominal additional charge.



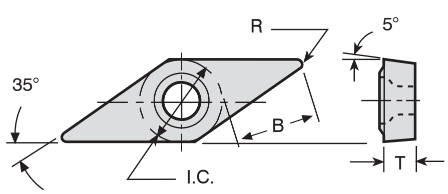


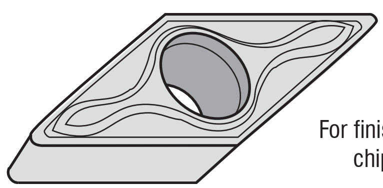
TCMT-GP

For finishing operations and moderate duty profiling. Excellent chip control even in light feeds and shallow depth of cuts.

		Dimensions				Order Grade By EDP Number											
Item Desc.	**I.S.O.**	**I.C.**	**T**	**R**	**B**	**SA150**	**SA180**	**SA250**	**SA550**	**SA200**	**SN180**	**SN150**	**SN550**	**SP321**	**SS250**	**SC20***	**SC230***
TCMT 21.50.5 GP	TCMT 11 02 02 GP	1/4	3/32	0.008	0.367	070167	—	—	—	—	—	070166	—	096764	—	096474	—
TCMT 21.51 GP	TCMT 11 02 04 GP	1/4	3/32	1/64	0.359	070169	096367	096369	—	070383	096368	070168	—	096792	—	—	096365
TCMT 21.52 GP	TCMT 11 02 08 GP	1/4	3/32	1/32	0.344	070171	096372	096374	—	070384	096373	070170	—	096816	096371	—	096370
TCMT 32.51 GP	TCMT 16 T3 04 GP	3/8	5/32	1/64	0.547	070173	096377	096379	—	070385	096378	070172	096380	096884	096376	—	096375
TCMT 32.52 GP	TCMT 16 T3 08 GP	3/8	5/32	1/32	0.531	070175	096384	096386	—	070386	096385	070174	096387	096892	096383	—	096382
TCMT 432 GP	TCMT 22 04 08 GP	3/8	5/32	1/32	0.516	—	—	096393	—	070387	—	070176	096394	—	096390	—	096389

* Grades SC20 & SC230 are stocked with up sharp "F" edge. Grade SC20 & SC230 can be ordered with any specified hone at nominal additional charge.





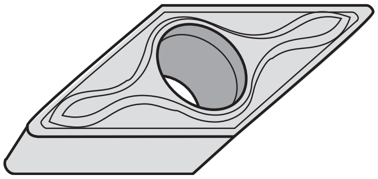
VBGT-GP

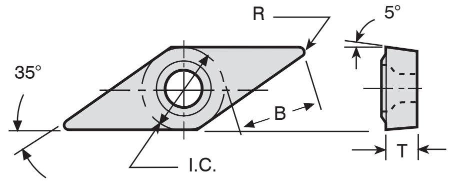
For finishing operations and moderate duty profiling. Excellent chip control even in light feeds and shallow depth of cuts.

		Dimensions				Order Grade By EDP Number		
Item Desc.	**I.S.O.**	**I.C.**	**T**	**R**	**B**	**SA150**	**SA200**	**SN150**
VBGT 21.50.5 GP	VBGT 11 03 02 GP	1/4	3/32	0.008	0.272	081170	081168	081167
VBGT 21.51 GP	VBGT 11 03 04 GP	1/4	3/32	1/64	0.254	081173	081172	081171
VBGT 21.52 GP	VBGT 11 03 08 GP	1/4	3/32	1/32	0.218	081178	081177	081176

VBMT-GP

"GP" is a general purpose geometry, features good chip control and a strong cutting edge for general profiling of most long chipping materials and cast irons.

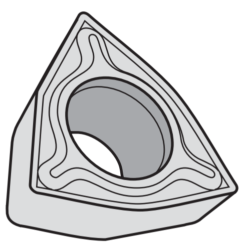


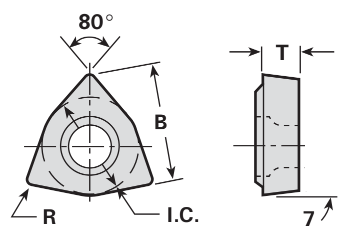


		Dimensions				Order Grade By EDP Number										
Item Desc.	I.S.O.	I.C.	T	R	B	SA150	SA180	SA250	SA550	SA200	SN150	SN180	SN550	SP321	SS250	SC230*
VBMT 331 GP	VBMT 16 04 04 GP	3/8	5/32	1/64	0.4	070261	—	096435	—	070422	070260	096434	096436	096078	096432	096431
VBMT 332 GP	VBMT 16 04 08 GP	3/8	5/32	132	0.363	070263	096440	096442	096444	070423	070262	096441	096443	096072	096439	096438
VBMT 333 GP	VBMT 16 04 12 GP	3/8	5/32	3/64	0.327	070265	—	—	—	070424	070264	—	—	096066	—	096445

* Grade SC230 is stocked with up sharp "F" edge. This grade can be ordered with any specified hone at nominal additional charge.

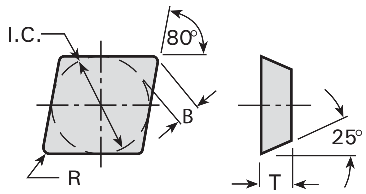
WCMT-GP

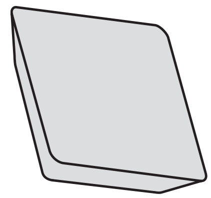




The "GP" chip control on this 80° trigon style insert features a strong edge and good chip control in a wide range of long chipping materials as well as cast iron.

		Dimensions				Order Grade By EDP Number		
Item Desc.	I.S.O.	I.C.	T	R	B	SA150	SA200	SN150
WCMT 21.50.5 GP	WCMT 04 02 02 GP	1/4	3/32	0.008	0.312	081122	081121	081120
WCMT 21.51 GP	WCMT 04 02 04 GP	1/4	3/32	1/64	0.308	081125	081124	081123
WCMT 21.52 GP	WCMT 04 02 08 GP	1/4	3/32	1/32	0.300	081128	081127	081126
WCMT 32.50.5 GP	WCMT 06 T3 02 GP	3/8	5/32	0.008	0.466	081131	081130	081129
WCMT 32.51 GP	WCMT 06 T3 04 GP	3/8	5/32	1/64	0.466	081134	081133	081132
WCMT 32.52 GP	WCMT 06 T3 08 GP	3/8	5/32	1/32	0.458	081137	081136	081135



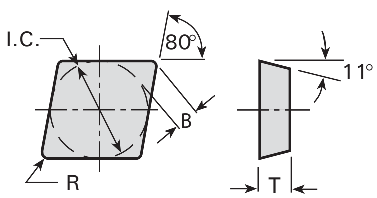


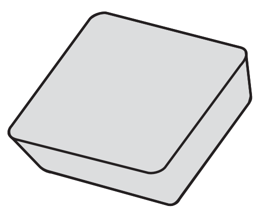
CFG

The 25° relief provides a 15° high positive back rake in the holder. Excellent for all aluuminums and softer malleable materials.

		Dimensions				Order Grade By EDP Number		
Item Desc.	**ISO**	**I.C.**	**T**	**R**	**B**	**SS160**	**SC20**	**SC230**
CFG 4620.2F	CFGN 11 03 01	0.464	1/8	0.004	0.128	083035	083032	071332
CFG 4621F	CFGN 11 03 04	0.464	1/8	0.016	0.120	083040	083037	071333
CFG 4622F	CFGN 11 03 08	0.464	1/8	0.031	0.112	083046	083042	071334
CFG 4623F	CFGN 11 03 12	0.464	1/8	0.047	0.103	083051	083047	—

Note: All styles are stocked with up sharp “F” edge. Any grade can be ordered with any specified hone at nominal additional charge.



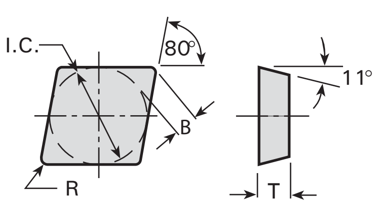


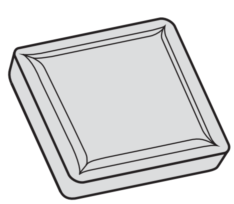
CPG

A general purpose 11° side relief insert that provides an effective 5° back rake in the pocket. Good for general purpose work where an economical insert is required.

		Dimensions				Order Grade By EDP Number		
Item Desc.	**ISO**	**I.C.**	**T**	**R**	**B**	**SS170**	**SS160**	**SC20**
CPG 422F	CPG 12 03 08	1/2	1/8	0.031	0.122	072909	070852	070850
CPG 4621F	CPG 11 03 04	0.464	1/8	0.031	0.120	—	071766	—
CPG 4622F	CPG 11 03 08	0.464	1/8	0.031	0.112	—	083061	083058
CPG 632F	CPG 19 04 08	3/4	3/16	0.031	0.191	—	070858	070856
CPG 633F	CPG 19 04 12	3/4	3/16	0.047	0.182	—	—	070859

Note: All styles are stocked with up sharp “F” edge. Any grade can be ordered with any specified hone at nominal additional charge.





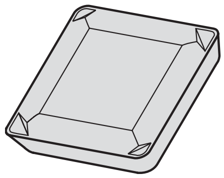
CPGR

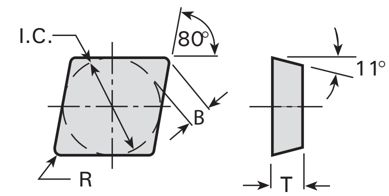
An 11° relief insert providing an effective 5° positive back rake when in the pocket. The raised chip control surface is excellent for light finishing of softer steels and ductile irons.

		Dimensions				Order Grade By EDP Number		
Item Desc.	**ISO**	**I.C.**	**T**	**R**	**B**	**SA150**	**SA180**	**SA250**
CPGR 422	CPGR 12 03 08					070067	—	077148

Positive Rake Inserts

CPGR-W

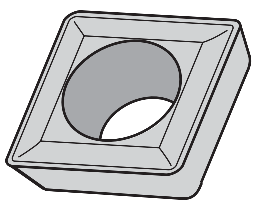


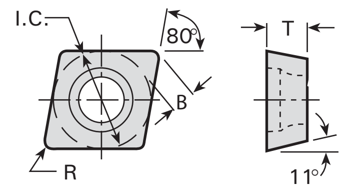


80° diamond insert, ground bottom and periphery. Special "W" chipbreaker provides excellent chip control for light to medium operations.

		Dimensions				Order Grade By EDP Number
Item Desc.	**ISO**	**I.C.**	**T**	**R**	**B**	**SA180**
CPGR 422 W	CPGRW 12 03 08	1/2	1/8	0.031	0.122	080781

CPGT



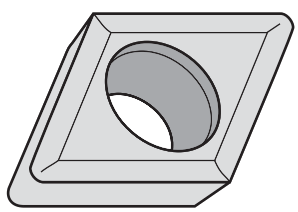


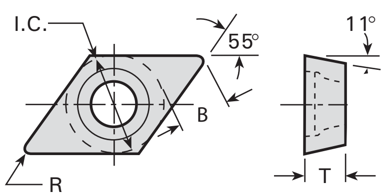
80° diamond insert, ground top, bottom and periphery. Insert features general purpose chip control for most steel and irons.

		Dimensions				Order Grade By EDP Number									
Item Desc.	**ISO**	**I.C.**	**T**	**R**	**B**	**SA150**	**SA180**	**SA250**	**SA200**	**SN180**	**SN150**	**SN027**	**SS70**	**SC20**	**SC20***
CPGT 21.50.5	CPGT 06 02 02	1/4	3/32	0.008	0.065	—	074750	076108	070344	074747	—	074753	074744	074741	080941
CPGT 21.51	CPGT 06 02 04	1/4	3/32	0.016	0.061	070059	074751	076109	070345	074748	070058	074754	074745	074742	080942
CPGT 21.52	CPGT 06 02 08	1/4	3/32	0.031	0.052	070061	074752	076112	070346	074749	070060	074755	074746	074743	080943
CPGT 32.51	CPGT 09 T3 04	3/8	5/32	0.016	0.096	070063	074949	076116	070347	074948	070062	074947	074946	074945	080944
CPGT 32.52	CPGT 09 T3 08	3/8	5/32	0.031	0.087	070065	074954	076123	070348	074953	070064	074952	074951	074950	080945

* Grade SC20 is stocked with up sharp "F" edge. This grade can be ordered with any specified hone at nominal additional charge.

DPGT

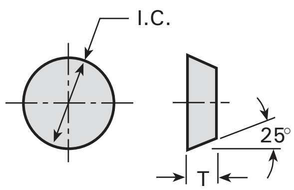


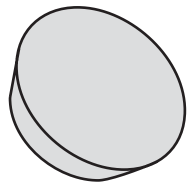


55° diamond insert, ground top, bottom and periphery. Insert features general purpose chip control for profilie operations in steel and irons.

		Dimensions				Order Grade By EDP Number							
Item Desc.	**ISO**	**I.C.**	**T**	**R**	**B**	**SA180**	**SA250**	**SA200**	**SN180**	**SN027**	**SS70**	**SC20**	**SC20***
DPGT 21.50.5	DPGT 07 02 02	1/4	3/32	0.008	0.137	074772	076164	070361	074770	074774	074768	074766	080946
DPGT 21.51	DPGT 07 02 04	1/4	3/32	0.016	0.128	074773	076168	070362	074771	074775	074769	074767	080947

* Grade SC20 is stocked with up sharp "F" edge. This grade can be ordered with any specified hone at nominal additional charge.

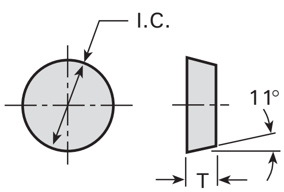


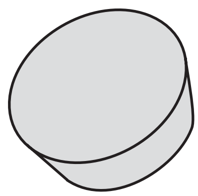


RFG

A round insert, precision ground top, bottom and periphery. The 25° relief provides a 15° high positive back rake in the holder. Excellent for all aluuminums and softer malleable materials.

		Dimensions		Order Grade By EDP Number	
Item Desc.	ISO	I.C.	T	SS160	SC20
RFG 21F	RFGN 07 02 00	5/16	3/32	083110	083106

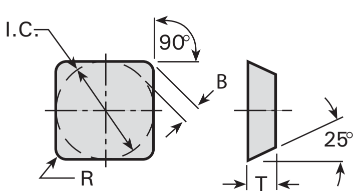


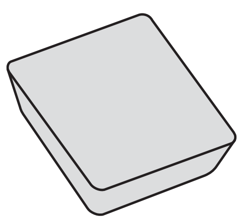


RPG

A round insert, precision ground top, bottom and periphery. The 11° side relief insert provides an effective 5° side rake in the pocket.

		Dimensions		Order Grade By EDP Number	
Item Desc.	ISO	I.C.	T	SS160	SC20
RPG 32F	RPGN 09 03 00	3/8	1/8	083128	083126
RPG 42F	RPGN 12 04 00	1/2	1/8	083131	083129



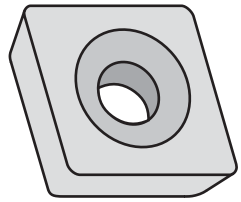


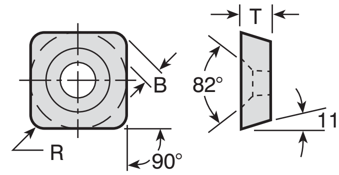
SFG

A 90° square insert, precision ground top, bottom and periphery. The 11° side relief provides an effective 10° positive back rake when in the pocket.

		Dimensions				Order Grade By EDP Number		
Item Desc.	ISO	I.C.	T	R	B	SS160	SC20	SC230
SFG 211F	SFGN 06 02 04	5/16	3/32	0.016	0.068	083136	083132	—
SFG 320.2F	SFGN 09 03 01	3/8	1/8	0.004	0.078	—	083137	—
SFG 321F	SFGN 09 03 04	3/8	1/8	0.016	0.071	083147	083143	—
SFG 322F	SFGN 09 03 08	3/8	1/8	0.031	0.065	083153	083149	071338
SFG 421F	SFGN 12 03 04	1/2	1/8	0.016	0.097	083171	083167	—
SFG 422F	SFGN 12 03 08	1/2	1/8	0.031	0.091	083177	083173	—
SFG 423F	SFGN 12 03 12	1/2	1/8	0.047	0.084	—	083179	—

SD



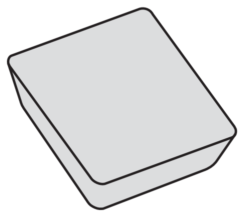


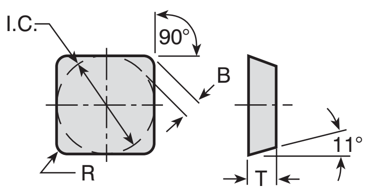
90° square insert, ground top, bottom and periphery. Insert is flat, no chip-breaker and has 82° countersink with hole through.

		Dimensions				Order Grade By EDP Number	
Item Desc.	**ISO**	**I.C.**	**T**	**R**	**B**	**SS160***	**SC20***
SD 7P	SPGB 32.52	7/16	1/8	0.031	0.078	—	082941
SD 8P	SPGB 422	1/2	1/8	0.031	0.091	082945	082943
SD 9P	SPGB 4.522	9/16	1/8	0.031	0.104	—	082946
SD 12P	SPGB 633	3/4	3/16	0.047	0.136	082949	082948

* Grades SS160 & SC20 is stocked with up sharp "F" edge. These grades can be ordered with any specified hone at nominal additional charge.

SPG



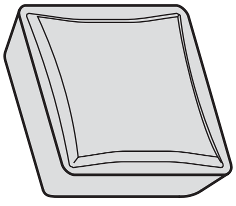


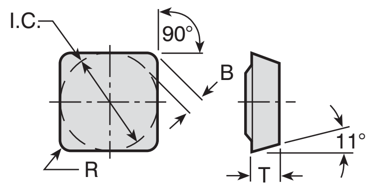
A 90° square insert, precision ground top, bottom and periphery.

		Dimensions				Order Grade By EDP Number														
Item Desc.	**ISO**	**I.C.**	**T**	**R**	**B**	**SA150**	**SA180**	**SA250**	**SA550**	**SA200**	**SN180**	**SN160**	**SN150**	**SN550**	**SN027**	**SS140***	**SS160***	**SS170***	**SC20***	**SC230***
SPG 321	SPGN 09 03 04	3/8	1/8	0.016	0.071	—	—	—	—	—	—	—	—	—	—	—	083363	—	083359	072024
SPG 322	SPGN 09 03 08	3/8	1/8	0.031	0.065	—	074162	076052	—	070381	074653	070974	096692	—	—	—	083371	—	083365	083366
SPG 323	SPGN 09 03 12	3/8	1/8	0.047	0.058	—	—	—	—	—	—	—	—	—	—	—	085844	—	—	—
SPG 420.2	SPGN 12 03 01	1/2	1/8	0.004	0.104	—	—	—	—	—	—	—	—	—	—	—	083379	—	083375	—
SPG 421	SPGN 12 03 04	1/2	1/8	0.016	0.097	—	—	—	—	—	—	—	—	—	—	—	085851	—	085847	072026
SPG 422	SPGN 12 03 08	1/2	1/8	0.031	0.091	070159	074163	076057	072035	070382	074654	070975	070158	072039	071258	083387	083388	—	083381	083383
SPG 423	SPGN 12 03 12	1/2	1/8	0.047	0.084	—	—	—	—	—	—	—	—	—	—	—	083395	—	083391	085366
SPG 424	SPGN 12 03 16	1/2	1/8	0.063	0.078	—	—	—	—	—	—	—	—	—	—	—	083397	—	083396	—
SPG 432	SPGN 12 04 08	1/2	3/16	0.031	0.091	070161	—	—	072046	—	—	070976	070160	072049	—	—	087406	—	087403	087405
SPG 433	SPGN 12 04 12	1/2	3/16	0.047	0.084	—	—	—	072053	—	—	—	096693	072055	—	—	087408	—	087407	072050
SPG 632	SPGN 19 04 08	3/4	3/16	0.031	0.142	—	074166	076060	072070	—	—	—	—	072066	—	—	085732	—	085731	072065
SPG 633	SPGN 19 04 12	3/4	3/16	0.047	0.136	070163	074167	076065	072075	—	074655	—	070162	072076	—	—	083404	087537	083398	083399
SPG 634	SPGN 19 04 16	3/4	3/16	0.063	0.130	—	074168	—	—	—	—	—	—	072081	—	—	083413	076681	083407	083408

* Grades SS140, SS160, SS170, SC230 & SC20 are stocked with up sharp "F" edge. These grades can be ordered with any specified hone at nominal additional charge.

SPGR



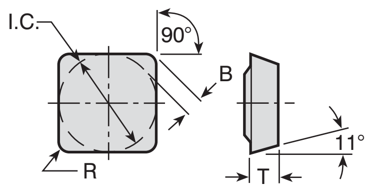


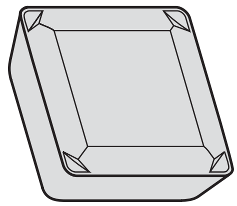
90° square insert, ground bottom and periphery. Insert features a raised chip control surface for finishing operations in most long chipping materials and irons.

		Dimensions				Order Grade By EDP Number	
Item Desc.	**ISO**	**I.C.**	**T**	**R**	**B**	**SA250**	**SC230***
SPGR 322	SPGR 09 03 08	3/8	1/8	0.031	0.065	077080	077076
SPGR 422	SPGR 12 03 08	1/2	1/8	0.031	0.091	077107	—

* Grade SC20 is stocked with up sharp "F" edge. This grade can be ordered with any specified hone at nominal additional charge.

SPGR-W

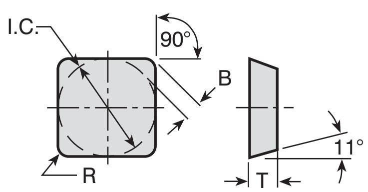


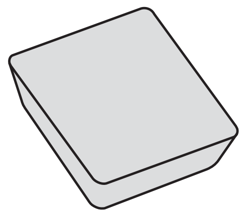


90° square insert, precision ground bottom and periphery. 11° relief is excellent for light to medium operations in softer malleable materials.

		Dimensions				Order Grade By EDP Number			
Item Desc.	**ISO**	**I.C.**	**T**	**R**	**B**	**SA150**	**SA180**	**SA250**	**SN150**
SPGR 321 W	SPGR 09 03 04W	3/8	1/8	0.016	0.071	—	—	080793	—
SPGR 322 W	SPGR 09 03 08W	3/8	1/8	0.031	0.065	070157	—	080796	070156
SPGR 422 W	SPGR 12 03 08W	1/2	1/8	0.031	0.091	—	080802	—	—

SPU



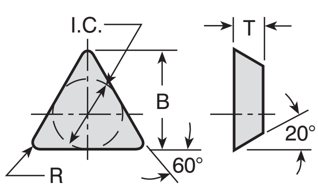


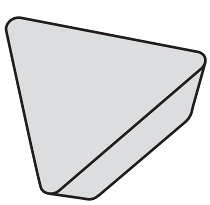
90° square insert, ground top & bottom. This general purpose insert is a low cost alternative for applications in all materials where a positive top rake is desired.

		Dimensions				Order Grade By EDP Number			
Item Desc.	**ISO**	**I.C.**	**T**	**R**	**B**	**SA180**	**SS160***	**SC20***	**SC230***
SPU 321	SPUN 09 03 04	3/8	1/8	0.016	0.071	—	083417	—	—
SPU 422	SPUN 12 03 08	1/2	1/8	0.031	0.091	075913	083423	083419	083420
SPU 633	SPUN 19 04 12	3/4	3/16	0.047	0.136	—	083428	083424	083425

* Grades SS160, SC20 & SC230 are stocked with up sharp "F" edge. These grades can be ordered with any specified hone at nominal additional charge.

TEGE





60° triangle insert, ground top, bottom and periphery. For general internal bore applications in most materials.

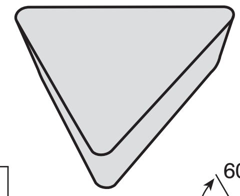
		Dimensions				Order Grade By EDP Number		
Item Desc.	**ISO**	**I.C.**	**T**	**R**	**B**	**SS160***	**SC20***	**SC230***
TEGE 730.2	TEGE 09 02 01	7/32	3/32	0.004	0.324	072908	072907	—
TEGE 731	TEGE 09 02 04	7/32	3/32	0.016	0.312	083434	083430	071339

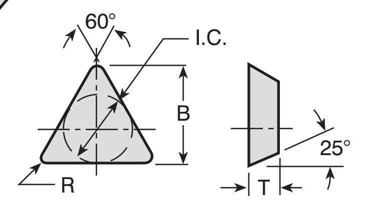
* Grades SS160, SC20 & SC230 are stocked with up sharp "F" edge. These grades can be ordered with any specified hone at nominal additional charge.

Positive Rake Inserts

TFG

60° triangle insert, precision ground top, bottom and periphery. Insert is flat, no chip-breaker, with 25° side relief and has an effective 15° positive back top rake in holder.



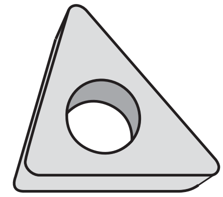


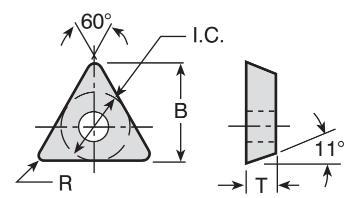
		Dimensions				Order Grade By EDP Number		
Item Desc.	**ISO**	**I.C.**	**T**	**R**	**B**	**SS160***	**SC20***	**SC230***
TFG 320.2	TFGN 16 03 01	3/8	1/8	0.004	0.563	083439	083435	—
TFG 321	TFGN 16 03 04	3/8	1/8	0.016	0.546	083445	083441	071340
TFG 322	TFGN 16 03 08	3/8	1/8	0.031	0.531	083451	083447	071341
TFG 323	TFGN 16 03 12	3/8	1/8	0.047	0.516	—	083453	—

* Grades SS160, SC20 & SC230 are stocked with up sharp "F" edge. These grades can be ordered with any specified hone at nominal additional charge.

TP

A 60° triangle insert, precision ground top, bottom and periphery and has straight hole through.

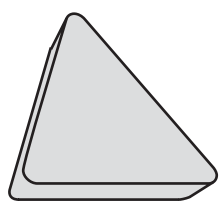


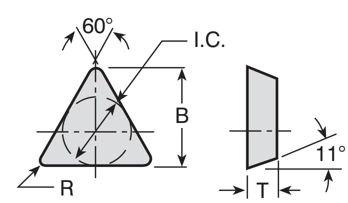


		Dimensions				Order Grade By EDP Number								
Item Desc.	**ISO**	**I.C.**	**T**	**R**	**B**	**SA150**	**SN160**	**SN150**	**SN027**	**SS160***	**SS140***	**SP321**	**SC20***	**SC230***
TP 40.2	TP 11 02 01	1/4	3/32	0.004	0.375	—	—	—	—	—	—	—	072905	—
TP 41	TP 11 02 04	1/4	3/32	0.016	0.359	070165	072153	070164	—	—	—	096936	—	—
TP 41F	TP 11 02 01	1/4	3/32	0.016	0.359	—	—	—	—	087440	087439	—	087436	087438
TP 42	TP 11 02 01	1/4	3/32	0.031	0.344	—	—	—	072166	072154	—	—	072161	—
TP 62	TP 11 02 01	3/8	1/8	0.031	0.531	—	—	—	—	087444	—	—	087442	—

*Grades SS160, SS140, SC20 & SC230 are stocked with up sharp "F" edge. These grades can be ordered with any specified hone at nominal additional charge.

TPG



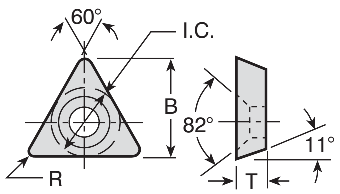


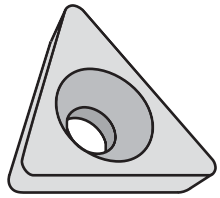
60° triangle insert, precision ground top, bottom and periphery with no hole.

		Dimensions				Order Grade By EDP Number																
Item Desc.	**ISO**	**I.C.**	**T**	**R**	**B**	**SA150**	**SA180**	**SA250**	**SA550**	**SA200**	**SN180**	**SN160**	**SN150**	**SN550**	**SN027**	**SP321**	**SS140***	**SS160***	**SS170***	**SS220***	**SC20***	**SC230***
TPG 221	TPGN 11 03 04	1/4	1/8	0.016	0.359	—	088229	—	—	—	—	—	—	—	—	096644	—	083646	—	—	083641	071342
TPG 222	TPGN 11 03 08	1/4	1/8	0.031	0.344	—	088215	—	—	—	—	—	—	—	—	096108	083653	083654	—	—	083649	083651
TPG 320.2F	TPGN 16 03 01	3/8	1/8	0.004	0.563	—	—	—	—	—	—	—	—	—	—	—	—	083663	—	—	083657	083659
TPG 321	TPGN 16 03 04	3/8	1/8	0.016	0.546	070235	074202	075964		070410	074671	070916	070234	—	—	—	083669	083670	—	—	083665	083667
TPG 322	TPGN 16 03 08	3/8	1/8	0.031	0.531	070239	074203	075968	072175	070411	074672	070917	070238	072177	071315	—	083678	083679	085738	072168	083673	083675
TPG 323	TPGN 16 03 12	3/8	1/8	0.047	0.516	070245	074204	075970	—	—	—	070918	070244	—	—	—	—	083683	—	—	083682	—
TPG 324	TPGN 16 03 16	3/8	1/8	0.063	0.500	—	—	—	—	—	—	—	—	—	—	096096	—	083687	—	—	083684	096102
TPG 430.2F	TPGN 22 04 01	1/2	3/16	0.004	0.750	—	—	—	—	—	—	—	—	—	—	—	—	083693	—	—	—	—
TPG 431	TPGN 22 04 04	1/2	3/16	0.016	0.734	070247		075971	—	—	070777		070246	—	—	—	—	083697	—	—	083694	083695
TPG 432	TPGN 22 04 08	1/2	3/16	0.031	0.719	070249	074205	075975	072183	070412	074673	070919	070248	072181	071316	—	083703	083704	—	—	083699	083701
TPG 433	TPGN 22 04 12	1/2	3/16	0.047	0.703	070257	074206	075979	072187		074722	070920	070256	072186	—	—	—	083710	—	—	083705	083706
TPG 434	TPGN 22 04 16	1/2	3/16	0.063	0.688	070259	074207	—	—	070413	074723	070921	070258	—	—	—	—	083716	—	—	083713	083714
TPG 436	TPGN 22 04 24	1/2	3/16	0.094	0.656	—	088233	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
TPG 543	TPGN 27 06 12	5/8	1/4	0.047	0.891	—	072200	—	072196	—	072217	—	—	—	—	—	—	—	—	—	071075	—
TPG 544F	TPGN 27 06 16	5/8	1/4	0.063	0.875	—	—	—	—	—	—	—	—	—	—	—	—	083718	—	—	—	—

* Grades SS140, SS160, SS170, SS220, SC20 & SC230 are stocked with up sharp "F" edge. These grades can be ordered with any specified hone at nominal additional charge.

TPGB

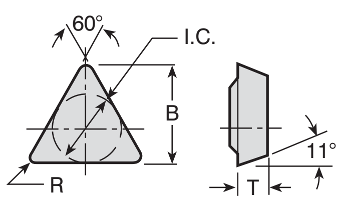


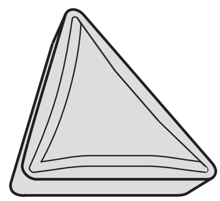


60° triangle insert, precision ground top, bottom and periphery with an 82° countersink hole.

		Dimensions				Order Grade By EDP Number	
Item Desc.	ISO	I.C.	T	R	B	SS140	SC20
TPGB 322F	TPGB 16 03 08	3/8	1/8	0.031	0.541	087779	082950
TPGB 3.522F	TPGB 19 03 08	7/16	1/8	0.031	0.625	—	082952
TPGB 432F	TPGB 22 04 08	1/2	3/16	0.031	0.719	087780	082953
TPGB 534F	TPGB 27 04 16	5/8	3/16	0.063	0.875	—	082957

TPGR



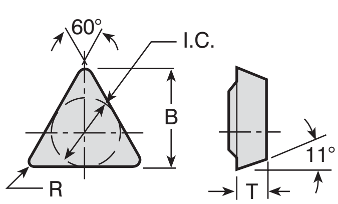


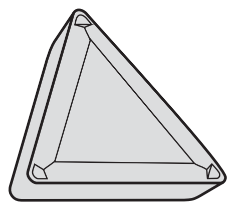
60° triangle insert, precision ground bottom & sides. Insert has a raised top with chip control for finishing operations in most materials.

		Dimensions				Order Grade By EDP Number							
Item Desc.	ISO	I.C.	T	R	B	SA150	SA180	SA250	SA200	SN180	SN150	SS140*	SC230*
TPGR 221	TPGR 11 03 04	1/4	1/8	0.016	0.359	—	—	076964	—	076960	—	—	076957
TPGR 222	TPGR 11 03 08	1/4	1/8	0.031	0.344	—	—	076971	—	—	—	—	—
TPGR 321	TPGR 16 03 04	3/8	1/8	0.016	0.546	070237	076991	076992	070414	076990	070236	—	076988
TPGR 322	TPGR 16 03 08	3/8	1/8	0.031	0.531	070241	076996	076997	—	076995	070240	076994	076993
TPGR 432	TPGR 22 04 08	1/2	3/16	0.031	0.719	070251	077021	077028	070415	077020	070250	—	—

* Grades SS140 & SC230 are stocked with up sharp "F" edge. These grades can be ordered with any specified hone at nominal additional charge.

TPGR-W



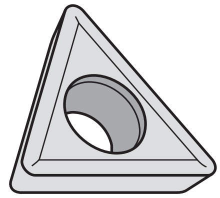


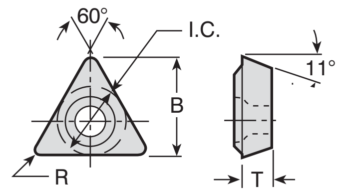
60° triangle insert, ground bottom & periphery. Insert features raised top with chip-breaker. For light to medium feeds and depth of cuts.

		Dimensions				Order Grade By EDP No					
Item Desc.	ISO	I.C.	T	R	B	SA180	SA250	SN150	SN550	SS160*	SC230*
TPGR 221 W	TPGR 11 03 04W	1/4	1/8	0.016	0.359	080827	—	—	—		—
TPGR 321 W	TPGR 16 03 04W	3/8	1/8	0.016	0.546	—	—	—	—	080837	—
TPGR 322 W	TPGR 16 03 08W	3/8	1/8	0.031	0.531	080838	080839	—	080841	080842	080843
TPGR 432 W	TPGR 22 04 08W	1/2	3/16	0.031	0.719	080846	—	070252	—	—	080854

* Grades SS160 SC230 are stocked with up sharp "F" edge. These grades can be ordered with any specified hone at nominal additional charge.

TPGT

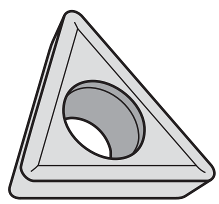


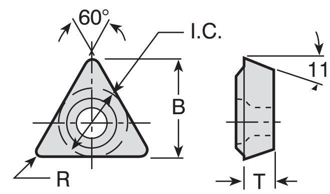


60° triangle insert, precision ground top, bottom and periphery. Insert has chip control groove, and countersink hole through. Good for general purpose light duty to semi-finishing.

		Dimensions				Order Grade By EDP Number								
Item Desc.	ISO	I.C.	T	R	B	SA150	SA180	SA250	SA200	SN150	SN180	SN027	SS70	SC20
TPGT 21.50.5	TPGT 11 02 02	1/4	3/32	0.008	0.367	070229	074762	075987	070416	070228	074760	074764	074758	074756
TPGT 21.50.5F	TPGT 11 02 02F	1/4	3/32	0.008	0.367	—	—	—	—	—	—	—	—	080948
TPGT 21.51	TPGT 11 02 04	1/4	3/32	0.016	0.359	070231	074763	075988	070417	070230	074761	074765	074759	074757
TPGT 21.51F	TPGT 11 02 04F	1/4	3/32	0.016	0.359	—	—	—	—	—	—	—	—	080949
TPGT 21.52	TPGT 11 02 08	1/4	3/32	0.031	0.344	070233	077841	077840	070418	070232	—	—	—	077839
TPGT 21.52F	TPGT 11 02 08F	1/4	3/32	0.031	0.344	—	—	—	—	—	—	—	—	080950

TPMT

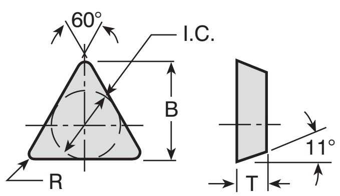


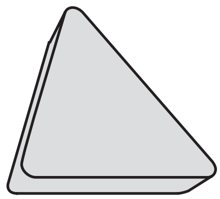


60° triangle insert, ground top & bottom with countersink hole. Insert has 11° side relief with chip control groove for general machining applications.

		Dimensions				Order Grade By EDP Number		
Item Desc.	ISO	I.C.	T	R	B	SA180	SA200	SN180
TPMT 321	TPMT 16 03 04	3/8	1/8	0.016	0.546	—	070419	089142
TPMT 322	TPMT 16 03 08	3/8	1/8	0.031	0.541	089139	070420	089140

TPU





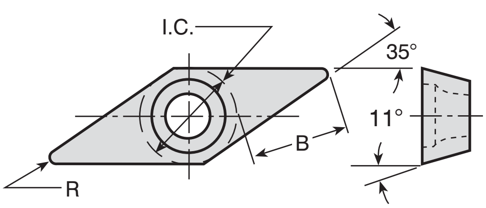
60° triangle insert, ground top & bottom with no hole. The insert has an 11° side relief and is a good choice when a utility tolerance insert is acceptable.

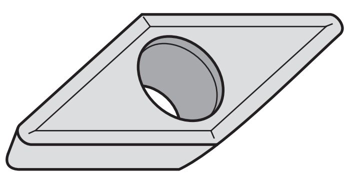
Positive Rake Inserts

		Dimensions				Order Grade By EDP Number												
Item Desc.	ISO	I.C.	T	R	B	SA150	SA180	SA250	SA200	SN150	SN180	SN160	SP321	SS170*	SS160*	SS140*	SC20*	SC230*
TPU 221	TPUN 11 03 04	1/4	1/8	0.016	0.359	—	—	—	—	—	072219	—	—	—	083721	—	—	—
TPU 222F	TPUN 11 03 08F	1/4	1/8	0.031	0.344	—	—	—	—	—	—	—	—	—	—	083723	083722	—
TPU 321	TPUN 16 03 04	3/8	1/8	0.016	0.546	—	—	—	—	—	072243	—	—	—	072238	—	072220	—
TPU 322	TPUN 16 03 08	3/8	1/8	0.031	0.531	070243	074208	075983	070421	070242	074720	070922	096084	—	083729	—	083724	096090
TPU 431F	TPUN 22 04 04	1/2	3/16	0.016	0.734	—	—	—	—	—	—	—	—	—	—	—	072442	—
TPU 432	TPUN 22 04 08	1/2	3/16	0.031	0.719	070255	—	075984	—	070254	072447	—	—	—	071905	—	071904	—
TPU 433F	TPUN 22 04 12	1/2	3/16	0.047	0.703	—	—	—	—	—	—	—	—	087542	083734	—	083730	—

* Grades SS170, SS160, SS140, SC20 & SC230 are stocked with up sharp "F" edge. These grades can be ordered with any specified hone at nominal additional charge.

VPGT

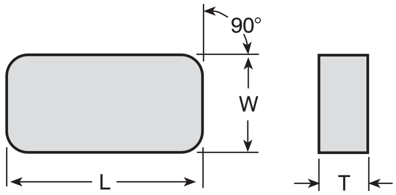




35° triangle insert, precision ground top, bottom & periphery. General purpose chip control groove for profiling or finishing operations in most materials.

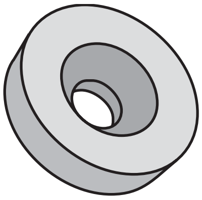
		Dimensions				Order Grade By EDP Number								
Item Desc.	ISO	I.C.	T	R	B	SA150	SA180	SA250	SA200	SN180	SN150	SN027	SS70	SC20
VPGT 221	VPGT 12 03 04	1/4	1/8	0.016	0.254	070283	074782	076197	070430	074780	070282	074784	074778	074776
VPGT 221F	VPGT 12 03 04F	1/4	1/8	0.016	0.254	—	—	—	—	—	—	—	—	080951
VPGT 222	VPGT 12 03 08	1/4	1/8	0.031	0.218	070285	074783	—	070431	074781	070284	074785	074779	074777
VPGT 222F	VPGT 12 03 08F	1/4	1/8	0.031	0.218	—	—	—	—	—	—	—	—	080952

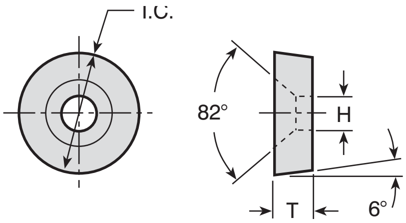
LNU



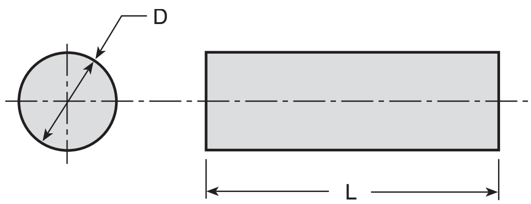
		Dimensions				Order Grade By EDP Number	
Item Desc.	**ISO**	**W**	**T**	**R**	**L**	**SN160**	**SS160**
LNU 5464	LNUN 25 09 12	5/8	3/8	0.063	1.000	690155716	083099

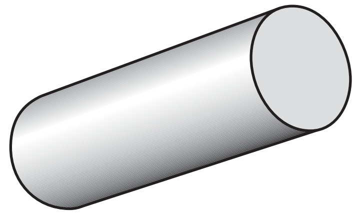
RD





		Dimensions			Order Grade By EDP Number	
Item Desc.	**ISO**	**I.C.**	**T**	**H**	**SN027**	**SC20**
RD 8P	RD 12 03 00	1/2	1/8	0.125	690183027	082933
RD 10P	RD 15 03 00	5/8	1/8	0.190	690184027	082935
RD 12P	RD 19 04 00	3/4	3/16	0.200	690185027	082937
RD 16P	RD 25 06 00	1	1/4	0.260	690186027	082939

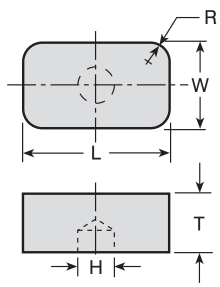


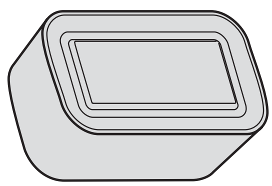


SC

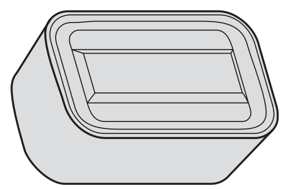
		Dimensions		Order Grade By EDP Number
Item Desc.	**ISO**	**D**	**L**	**SC20**
SC 12	SC 09 38 00	3/8	1-1/2	082967

Railroad turning inserts





LNUM-V

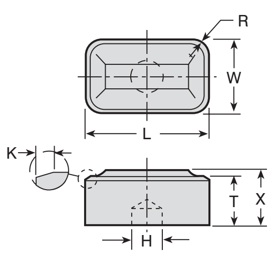


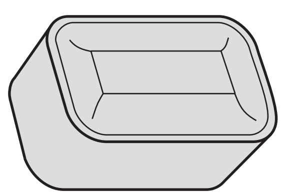
LNUM-R

LNUM

By quotation only.

		Dimensions					
Item Desc.	**ISO**	**T**	**L**	**W**	**R**	**H**	**K**
LNUM 65812R	LNUM 32 12 48R	1/2	1.250	0.750	0.188	0.312	—
LNUM 65812 S27V	LNUM 32 12 48 S25V	1/2	1.250	0.750	0.188	0.312	0.027

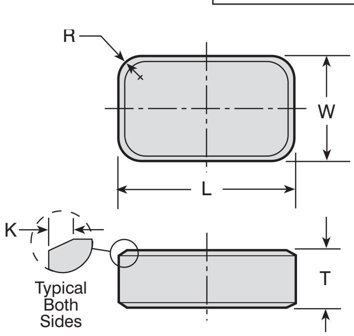


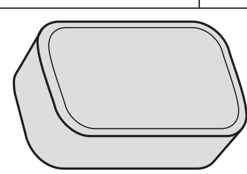


LNUM LNUR

By quotation only.

		Dimensions						
Item Desc.	**ISO**	**T**	**X**	**L**	**W**	**R**	**H**	**K**
LNUM 65812 H	LNUM 32 12 48 H	1/2	0.625	1.250	0.750	0.188	0.312	-
LNUM 65812 S10H	LNUM 32 12 48 S10H	1/2	0.625	1.250	0.750	0.188	0.312	0.010
LNUM 65812 S20L	LNUM 32 12 48 S20L	1/2	0.562	1.250	0.750	0.188	0.312	0.020
LNUM 65812 S25L	LNUM 32 12 48 S25L	1/2	0.562	1.250	0.750	0.188	0.312	0.025
LNUR 55412 H	LNUR 32 06 48 H	1/4	0.375	1.250	0.500	0.188	—	—
LNUR 65612	LNUR 32 09 48	3/8	0.500	1.250	0.750	0.188	—	—
LNUR 65612 H	LNUR 32 09 48 H	3/8	0.500	1.250	0.750	0.188	—	—
LNUR 65612 S25H	LNUR 32 09 48 S25H	3/8	0.500	1.250	0.750	0.188	—	0.025





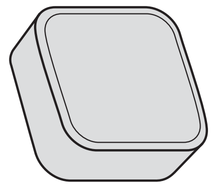
LNUN

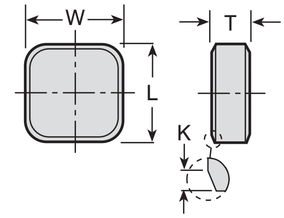
By quotation only.

		Dimensions				
Item Desc.	**ISO**	**T**	**L**	**W**	**R**	**K**
LNUN 55412	LNUN 32 06 48R	1/4	1.250	0.625	0.188	—
LNUN 65612 S	LNUN 32 09 48 S	3/8	1.250	0.750	0.188	
LNUN 65612 S25	LNUN 32 09 48 S25	3/8	1.250	0.750	0.188	0.025

Railroad turning inserts

SNU

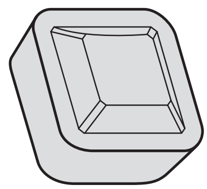


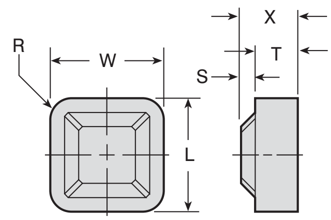


By quotation only.

Item Desc.	ISO	Dimensions T	Dimensions L	Dimensions W	Dimensions R	Dimensions K
SNU 8612	SNUR 25 09 48 S30	0.375	1.000	1.000	0.188	0.030

SNUR

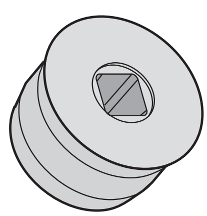


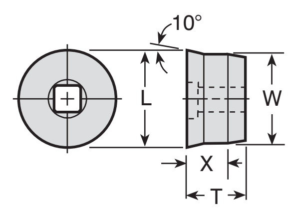


By quotation only.

Item Desc.	ISO	Dimensions T	Dimensions X	Dimensions L	Dimensions W	Dimensions R
SNUR 8612H	SNUR 26 09 48 H	0.375	0.500	1.000	1.000	0.188

WTT

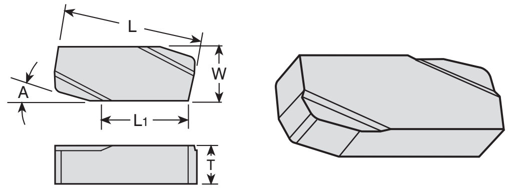




By quotation only.

Item Desc.	ISO	Dimensions T	Dimensions X	Dimensions L	Dimensions W
WTT 10	WTT 15 09 00	0.375	0.112	0.625	0.573

LNUZ

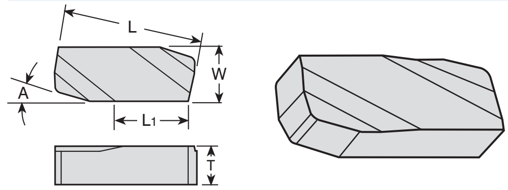


Max. Radial DOC: 0.071”
Number of cutting edges: 2

By quotation only.

Item Desc.	ISO	Dimensions W	L	T	A	L1
LNUZ 12 07 203L	LNUZ 12 07 203L	0.473	1.201	0.294	20°	0.030

LNUZ

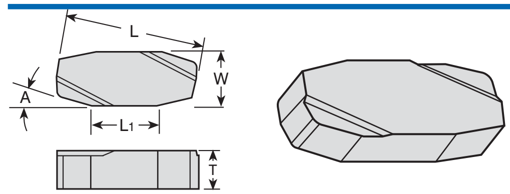


Max. Radial DOC: 0.134”
Number of cutting edges: 2
Relief reduction: 5° x 0.020”

By quotation only.

Item Desc.	ISO	Dimensions W	L	T	A	R	L1
LNUZ 17 12 200L	LNUZ 17 12 200L	0.688	1.500	0.475	20°	0.810	1.011

LNUZ

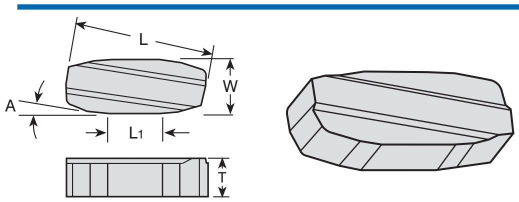


Max. Radial DOC: 0.222”
Number of cutting edges: 4

By quotation only.

Item Desc.	ISO	Dimensions W	L	T	A	R	L1
LNUZ 18 11 200N	LNUZ 18 11 200N	0.709	1.413	0.460	20°	0.300	0.735

LNUX

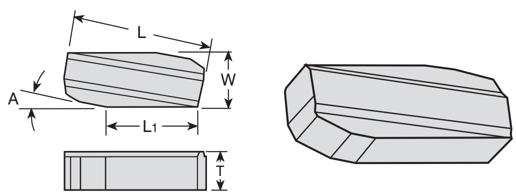


Max. Radial DOC: 0.130”
Number of cutting edges: 2

By quotation only.

Item Desc.	ISO	Dimensions W	L	T	A	R	L1
LNUX18 12 10N	LNUX 18 12 10N	0.472	1.170	0.297	10°	0.125	0.438

LNUX

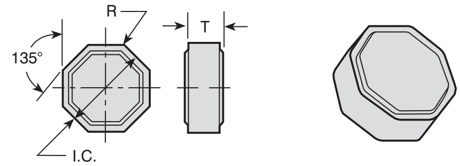


Max. Radial DOC: 0.029”
Number of cutting edges: 2

By quotation only.

Item Desc.	ISO	Dimensions W	L	T	A	R	L1
LNUX 18 12 10L	LNUX 18 12 10L	0.472	1.170	0.293	10°	0.040	0.584

ONMF

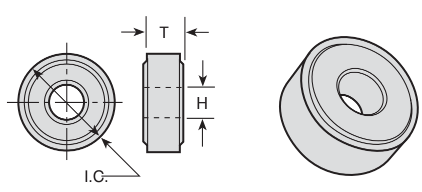


Max. Radial DOC: 0.165”
Number of cutting edges: 16

By quotation only.

Item Desc.	ISO	Dimensions I.C.	W	L	T	A	R	L1
ONMF 542	ONMF 12 07 20	0.625	0.625	0.625	0.250	45°	0.030	0.235

RNMG

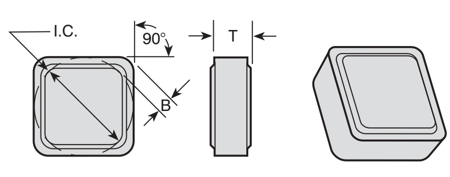


Max. Radial DOC: 0.500”
Number of cutting edges: 6 Min.

By quotation only.

Item Desc.	ISO	Dimensions I.C.	T	H
RNMG 86	RNMG 12 07 00	1.000	0.375	0.359

SNMF

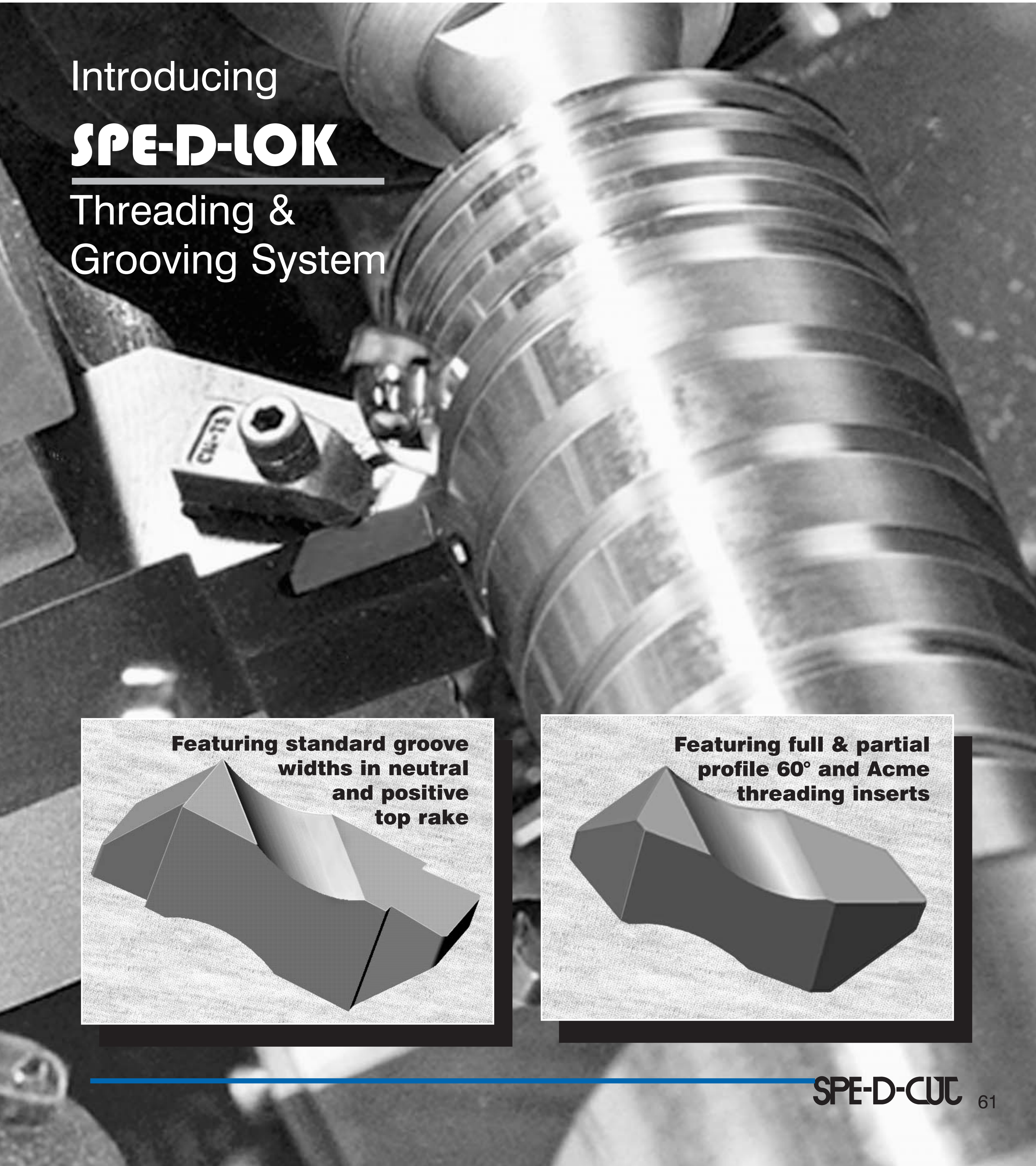


Max. Radial DOC: 0.0625”
Number of cutting edges: 8

By quotation only.

Item Desc.	ISO	Dimensions I.C.	W	L	T	A	L1
SNMF 544	SNMF 12 07 203L	0.625	0.625	0.625	0.250	90°	0.375

NOTES



Introducing

SPE-D-LOK

Threading & Grooving System

Featuring standard groove widths in neutral and positive top rake

Featuring full & partial profile 60° and Acme threading inserts

SPE-D-LOK Single Point Indexable Threading System

Selection of the optimum threading insert for your particular application is best determined by using the easy three step process.

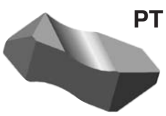
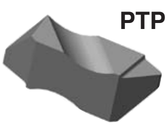
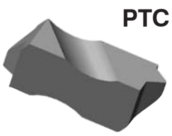
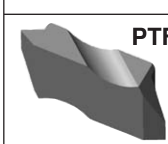
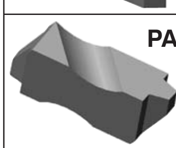
1 The major diameter and pitch of thread or number of threads per inch (TPI) to be produced will determine the specific style & size of insert to selected. If the thread pitch is coarse, then the insert size must be large enough to produce the full thread form. The thread pitch range for any style of thread insert is shown below.

2 The second step is to select the specific style insert to produce an internal or external thread. For external applications, the size of insert will be determined by pitch range available for a given pitch of thread. Right hand inserts are used in right hand holders to produce right hand external threads when threading from the tailstock to the chuck.

Internal thread applications require an internal bar diameter which will allow adequate room for the tool to enter the bore and have enough clearance to return to center and make repetitive passes without packing the chips produced in each successive pass. Therefore, the minimum bore diameter of the ID bar will limit the final diameter of thread to be produced. Most often, this determines the size insert and thread pitch range available for internal applications.

3 The last step is to select the optimum grade of carbide for the type of material(s) to be threaded. The grade chart on the following page detail the optimum grades available for the majority of materials being machined today.

SPE-D-LOK Single Point Insert Styles & Application Data:

Insert Style	Thread Form	Application	Rake Angle	Full Form or Partial Profile*	External TPI Range	Internal TPI Range	Additional Information
 PT	60° "V" UN Class 2 ISO Metric	General Purpose	0° Neutral Top Rake	Partial Profile or Non-Topping	Size 2 = 8 - 36 Size 3 = 6 - 20 Size 4 = 4 - 20	Size 2 = 7- 20 Size 3 = 5- 12 Size 4 = 4- 12	Insert features neutral top rake and offers satisfactory results in steels, cast irons and other long chipping materials
 PTP	60° "V" UN Class 2 ISO Metric	General Purpose	5° Positive Top Rake	Partial Profile or Non-Topping	Size 2 = 8 - 36 Size 3 = 6 - 20 Size 4 = 4 - 20	Size 2 = 7- 20 Size 3 = 5- 12 Size 4 = 4- 12	Insert features precision ground, positive top rake with up sharp edge. Excellent for Stainless, low carbon steels and aluminum
 PTC	60° "V" UN Class 2 & 3	Full Thread Form Profile For Long Run Production	0° Neutral Top Rake	Full Root and Crest Profile	Insert is Made For Specific Pitch With Full Profile Crest & Root	Insert is Made For Specific Pitch With Full Profile Crest & Root	Insert features neutral top rake and offers the best results in steels, cast irons and most long chipping materials. The thread profile is full form.
 PTF	Fine Pitch 60° "V" UN Class 2 ISO Metric	General Purpose Fine Pitch, Close To Shoulder	0° Neutral Top Rake	Partial Profile or Non-Topping	Size 2 = 14 - 44 Size 3 = 10 - 44 Size 4 = 10 - 44	Size 2 = 12- 24 Size 3 = 9 - 24 Size 4 = 9 - 24	Insert features neutral top rake and offers satisfactory results in cast irons, steels & most long chipping materials.
 PA	29° Acme	General Purpose Acme Threads	0° Neutral Top Rake	Partial Profile or Non-Topping	Insert is Made For Specific Pitch or TPI	Insert is Made For Specific Pitch or TPI	This strong insert design offers best support for a difficult to cut thread form. For all carbon & alloy steels, as well as cast materials.

**Partial Profile insert forms are designed to produce the flanks and the root of the thread form only. The internal minor diameter flat, or external crest flat is to be controlled by the finish bore or major turned diameter respectively prior to the threading operation.*

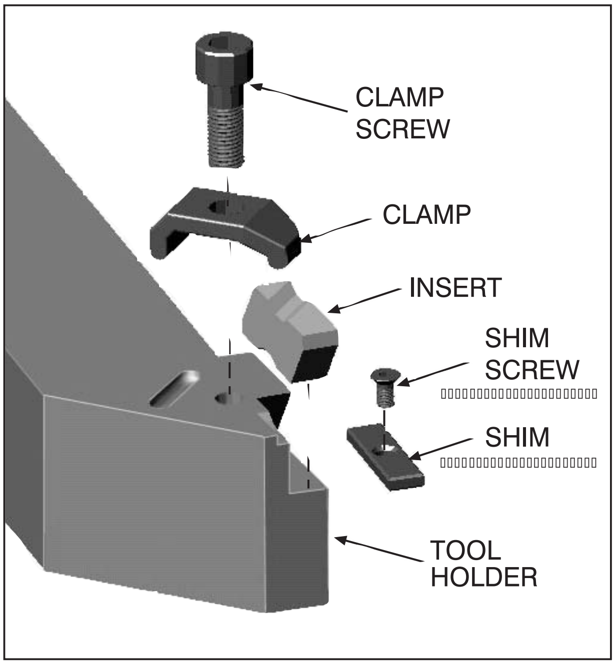
SPE-D-LOK Insert Grade Selection

Grade selection is important when optimizing a threading operation. If the requirement is for a general purpose insert to thread a wide range of materials, the SP-541 grade is more forgiving and features excellent edge strength. When cutting speed is not great enough to produce higher temperatures, then SP-541 would be an economical choice.

If the application is more specific, as in alloy steels only, then grade SN-150 would be a good first choice. The grade selection chart below is intended to show the general range of material application. The final selection should also consider whether a lower tool cost or increased speed/part production is the primary consideration for the job to be produced.

Carbide Grade	ISO Class.	"C" Class.	Grade Description	Material Application
SP-321	K20-K10	C2 - C3	A micrograin tungsten / cobalt grade with a PVD TiN coating. Base grade offers excellent edge strength and wear resistance characteristics.	First choice for accelerated threading of 300 & 400 series stainless steels, high nickel / chrome alloys and abrasive composites and castings
SP-541	K25 - K15	C2	Tungsten / cobalt grade with a PVD TiN gold coating. Unique resistance to shock and BUE	General purpose nonferrous threading grade for cast irons, aluminum and low to medium hard high temp alloys.
SC-230	K20-K10	C2 - C3	An Uncoated micrograin tungsten-cobalt grade. Has excellent wear resistance in low to moderate shock loads. Edge is up sharp.	Good choice for economical GP threading on manual lathes or low RPM CNC threading operations when a coated tool cannot optimize the application.
SN-150	P30 - P20	C5 - C6	An excellent general purpose steel cutting grade. The substrate combines a complex carbide base grade with a CVD TiN gold coating.	First choice when cutting carbon and alloyed steels from 100 to 380 BHn hardness. Has excellent resistance to higher cutting temperatures and wear.

SPE-D-LOK Threading & Grooving System Features:



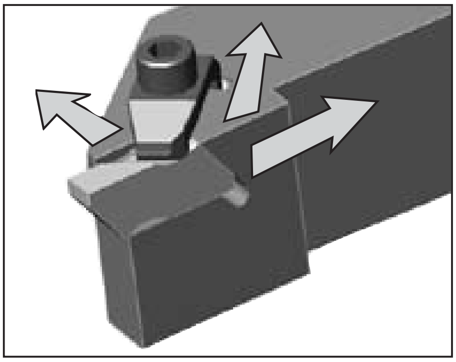
The SPE-D-LOK threading and grooving system uses a minimum of parts to provide a strong and flexible system to produce a wide range of grooving widths and thread forms.

All tool holders and bars use a clamp and cap screw to draw the insert securely into the tool pocket. Insert sizes 2 & 3 do not require a shim.

The design is strong and reliable. Indexing is quick and fast since only the clamp screw is loosened, insert repositioned to new edge and the clamp re-tightened.

No lost time looking for small screws lost in the chip conveyor.

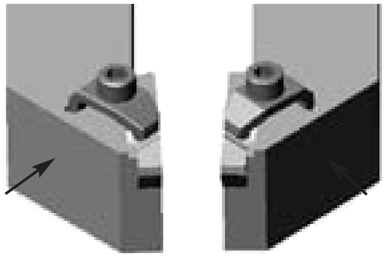
The wedge lock design securely locates the insert in the pocket first time, every time as shown in the drawing right.



SPE-D-LOK 60° Threading Inserts

Note: Before ordering holders and inserts, be sure to select the correct holder and insert combination.

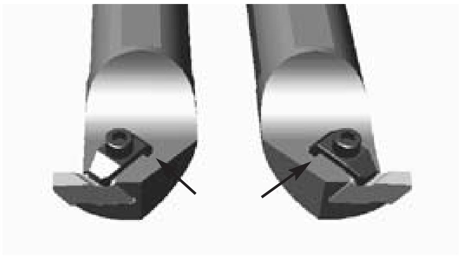
O.D. Threading Holders & Inserts



Right hand holders use right hand inserts

Left hand holders use left hand inserts

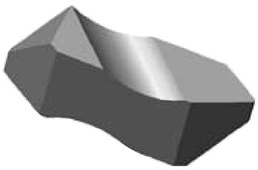
I.D. Threading Bars & Inserts

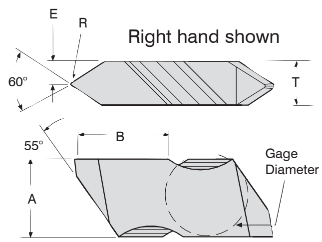


Left hand bars use right hand inserts

Right hand bars use left hand inserts

Style PT



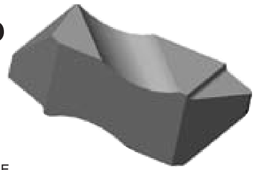


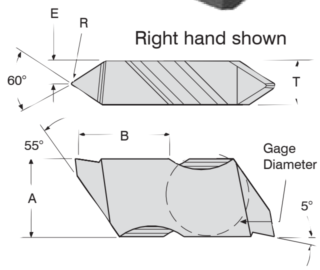
Right Hand Inserts	SP321 No.	SP541 No.	SN150 No.	PKG. QUAN.	A	T	R	E ±0.001	B ±0.0015	GAGE DIA.	TPI* RANGE
PT-2R	**094701**	-	**094702**	10	0.219	0.150	0.004	0.075	0.2661	0.1875	8 - 36 7 - 20
PT-3R	**094707**	**094706**	**094708**	10	0.344	0.195	0.0075	0.098	0.3999	0.3750	6 - 20 5 - 12
PT-4R	**094713**	-	**094714**	10	0.453	0.255	0.0075	0.128	0.6293	0.3750	4 - 20 4 - 12
Left Hand											
PT-2L	**094704**	-	**094705**	10	0.219	0.150	0.004	0.075	0.2661	0.1875	8 - 36 7 - 20
PT-3L	**094710**	-	**094711**	10	0.344	0.195	0.0075	0.098	0.3999	0.3750	6 - 20 5 - 12
PT-4L	**094716**	-	**094717**	10	0.453	0.255	0.0075	0.128	0.6293	0.3750	4 - 20 4 - 12

*** For TPI ranges shown, the first range applies for external threading and the bottom range for internal threading applications.**

*Order numbers shown in **Bold** are stock items and can be shipped same day. Order numbers in light face are non stock items. Normal delivery is 2 to 3 weeks delivery, ARO.*

Style PTP





Right Hand Inserts	SP321 No.	SP541 No.	SN150 No.	PKG. QUAN.	A	T	R	E ±0.001	B ±0.0015	GAGE DIA.	TPI* RANGE
PTP-2R	**094739**	**094738**	N/A	10	0.219	0.150	0.004	0.075	0.2661	0.1875	8 - 36 7 - 20
PTP-3R	**094743**	**094742**	N/A	10	0.344	0.195	0.0075	0.098	0.3999	0.3750	6 - 20 5 - 12
Left Hand											
PTP-2L	**094741**	-	N/A	10	0.219	0.150	0.004	0.075	0.2661	0.1875	8 - 36 7 - 20
PTP-3L	**094745**	**094744**	N/A	10	0.344	0.195	0.0075	0.098	0.3999	0.3750	6 - 20 5 - 12

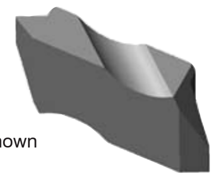
*** For TPI ranges shown, the first range applies for external threading and the bottom range for internal threading applications.**

*Order numbers shown in **Bold** are stock items and can be shipped same day. Order numbers in light face are non stock items. Normal delivery is 2 to 3 weeks delivery, ARO.*

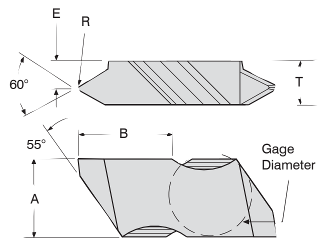
NOTE: Partial profile inserts can be used for production of Unified National and ISO metric Threads. Full form topping style PTC inserts are ground to specification for a given pitch and are intended for Unified National threading applications only.

SPE-D-LOK 60° Threading Inserts

Style PTF



Right hand shown

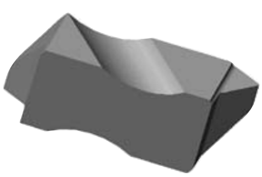


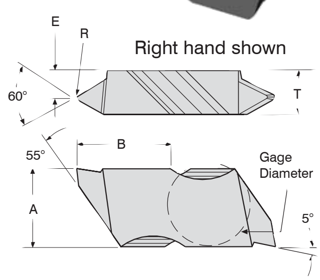
Right Hand Inserts	SP321 No.	SN150 No.	PKG. QUAN.	A	T	R ±0.001	E ±0.001	B ±0.0015	GAGE DIA.	TPI RANGE
PTF-2R	**094719**	**094720**	10	0.219	0.150	0.003	0.110	0.2679	0.1875	14 - 44 12 - 24
PTF-3R	**094725**	**094726**	10	0.344	0.195	0.003	0.141	0.4022	0.3750	10 - 44 9 - 24
Left Hand										
PTF-2L	**094722**	**094723**	10	0.219	0.150	0.003	0.110	0.2679	0.1875	14 - 44 12 - 24
PTF-3L	**094728**	**094729**	10	0.344	0.195	0.003	0.141	0.4022	0.3750	10 - 44 9 - 24

*** For TPI ranges shown, the first range applies for external threading and the bottom range for internal threading applications.**

*Order numbers shown in **Bold** are stock items and can be shipped same day. Order numbers in light face are non stock items. Normal delivery is 2 to 3 weeks delivery, ARO.*

Style PTK





Right Hand Inserts	SP321 No.	SP541 No.	SN150 No.	PKG. QUAN.	A	T	R ±0.001	E ±0.001	B ±0.0015	GAGE DIA.	TPI RANGE
PTK-2R	**094731**	-	N/A	10	0.219	0.150	0.003	0.110	0.2679	0.1875	14 - 44 12 - 24
Left Hand											
PTK-2L	**094733**	-	N/A	10	0.219	0.150	0.003	0.110	0.2679	0.1875	14 - 44 12 - 24

Right Hand Inserts	SP321 No.	SP541 No.	SN150 No.	PKG. QUAN.	A	T	R ±0.001	E ±0.001	B ±0.0015	GAGE DIA.	TPI RANGE
PTK-3R	**094735**	**094734**	N/A	10	0.344	0.195	0.003	0.141	0.4022	0.3750	10 - 44 9 - 24
Left Hand											
PTK-3L	**094737**	-	N/A	10	0.344	0.195	0.003	0.141	0.4022	0.3750	10 - 44 9 - 24

*** For TPI ranges shown, the first range applies for external threading and the bottom range for internal threading applications.**

*Order numbers shown in **Bold** are stock items and can be shipped same day. Order numbers in light face are non stock items. Normal delivery is 2 to 3 weeks delivery, ARO.*

SPE-D-LOK 60° Threading Inserts

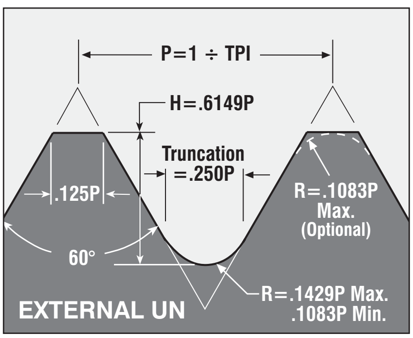
Unified National Thread Form

PTC style inserts are ground to produce the full form of a specific pitch UN thread application. The insert is purchased for a given TPI application. Every style features 100% of the thread form ground to UN specifications. Each insert has a controlled root radius, crest flat with radius corners and thread height that meets the UN form specifications.

These inserts have the pitch diameter controlled within the form itself. This means control of the pitch diameter can be measured from the minor diameter of internal applications or major diameter on external threads.

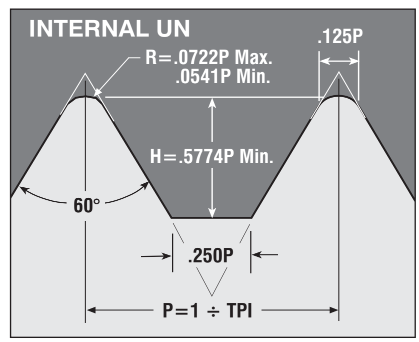
If high volume production of threads for a given application is required, these inserts will yield the highest quality, shortest cycle time and greater number of parts per edge with the minimum of set up time and QC. Since the insert has the specific root radius for the TPI to be produced, the number of passes for coarse pitch thread production is reduced. And the full form topping feature virtually eliminates any bur on the thread crests.

The specifications for both External and Internal UN thread forms are shown below. ***Note: External inserts cannot be used to produce Internal UN threads nor vice versa.***



External

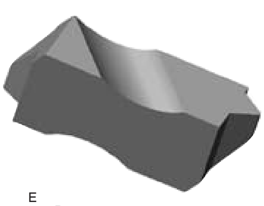
To determine any decimal dimension of any UN thread form, multiply the decimal pitch (P) times the multiplier shown in the drawings left or right. This will provide the actual decimal dimension for that portion of the thread form.

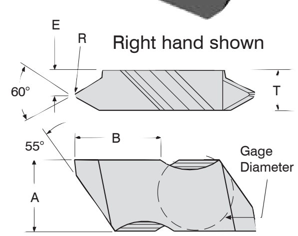


Internal

Style PTC

For Unified National threads only (Inch).





External

Right Hand External	SP321 No.	PKG. QUAN.	A	T	R MIN.	R MAX.	E ±0.001	B ±0.0015	GAGE DIA.	TPI
PTC-3R12E	**094756**	10	0.344	0.195	0.009	0.011	0.148	0.4025	0.3750	12
PTC-3R16E	**094760**	10	0.344	0.195	0.007	0.009	0.148	0.4025	0.3750	16
PTC-3R18E	**094764**	10	0.344	0.195	0.006	0.008	0.148	0.4025	0.3750	18
Left Hand External										
PTC-3L12E	**094757**	10	0.344	0.195	0.009	0.011	0.148	0.4025	0.3750	12
PTC-3L16E	**094761**	10	0.344	0.195	0.007	0.009	0.148	0.4025	0.3750	16
PTC-3L18E	**094765**	10	0.344	0.195	0.006	0.008	0.148	0.4025	0.3750	18

Internal

Right Hand Internal	SP321 No.	PKG. QUAN.	A	T	R MIN.	R MAX.	E ±0.001	B ±0.0015	GAGE DIA.	TPI
PTC-3R12I	**094758**	10	0.344	0.195	0.0030	0.0050	0.148	0.4025	0.3750	12
PTC-3R16I	**094762**	10	0.344	0.195	0.0020	0.0040	0.148	0.4025	0.3750	16
Left Hand Internal										
PTC-3L12I	**094759**	10	0.344	0.195	0.0030	0.0050	0.148	0.4025	0.3750	12
PTC-3L16I	**094763**	10	0.344	0.195	0.0020	0.0040	0.148	0.4025	0.3750	16

Be Sure To Order The Correct Insert & Holder.

When threading from tailstock toward the chuck, the following holder and insert combination must be used:

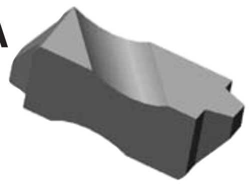
For External Right Hand Thread:
Order Right Hand External insert with Right hand Holder.
For External Left Hand Thread:
Order Left Hand External insert with Left hand Holder
For Internal Right Hand Thread:
Order Left Hand Internal insert with Right hand Bar
For Internal Left Hand Thread:
Order Right Hand Internal insert with Left hand Bar

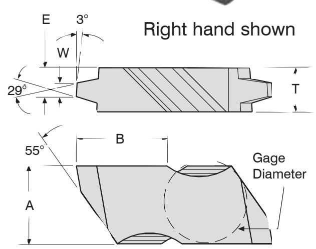
*Order numbers shown in **Bold** are stock items and can be shipped same day. Order numbers in light face are non stock items. Normal delivery is 2 to 3 weeks delivery, ARO.*

SPE-D-LOK 60° Threading Inserts

Style PA

For Acme threads only.

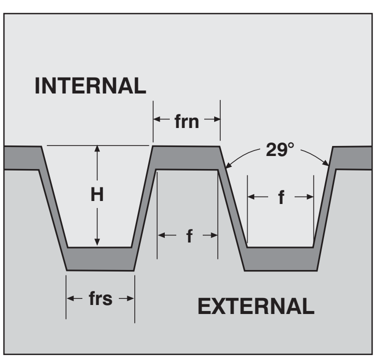




Right Hand Inserts	SN150 No.	PKG. QUAN.	A	T	W	E ±0.001	B ±0.0015	GAGE DIA.	TPI
PA-3R4	**094746**	10	0.344	0.195	0.0875	0.133	0.4018	0.3750	4
PA-3R5	**094748**	10	0.344	0.195	0.0689	0.149	0.4026	0.3750	5
PA-3R6	**094750**	10	0.344	0.195	0.0556	0.149	0.4026	0.3750	6
PA-3R8	**094752**	10	0.344	0.195	0.0411	0.149	0.4026	0.3750	8
PA-3R10	**094754**	10	0.344	0.195	0.0319	0.149	0.4026	0.3750	10
Left Hand									
PA-3L4	**094747**	10	0.344	0.195	0.0875	0.133	0.4018	0.3750	4
PA-3L5	**094749**	10	0.344	0.195	0.0689	0.149	0.4026	0.3750	5
PA-3L6	**094751**	10	0.344	0.195	0.0556	0.149	0.4026	0.3750	6
PA-3L8	**094753**	10	0.344	0.195	0.0411	0.149	0.4026	0.3750	8
PA-3L10	**094755**	10	0.344	0.195	0.0319	0.149	0.4026	0.3750	10

*Order numbers shown in **Bold** are stock items and can be shipped same day. Order numbers in light face are non stock items. Normal delivery is 2 to 3 weeks delivery, ARO.*

29° Acme Thread Form Dimensional Data



Standard Acme Thread Dimensions

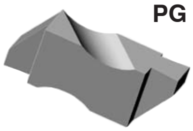
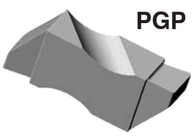
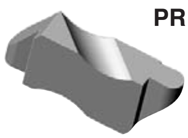
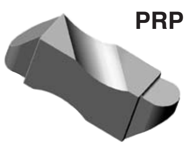
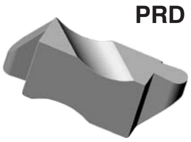
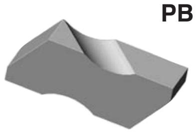
T.P.I.	H	f	frn / frs
2	0.2600	0.1854	0.1802
3	0.1767	0.1236	0.1184
4	0.1350	0.0927	0.0875
5	0.1100	0.0741	0.0689
6	0.0933	0.0618	0.0566
7	0.0814	0.0530	0.0478
8	0.0725	0.0463	0.0411
9	0.0656	0.0412	0.0360
10	0.0600	0.0371	0.0319
12	0.0467	0.0309	0.0283
14	0.0407	0.0265	0.0239
16	0.0363	0.0232	0.0206

Stub Acme Thread Dimensions

T.P.I.	H	f	frn / frs
2	0.1600	0.2112	0.2060
3	0.1100	0.1408	0.1356
4	0.0850	0.1056	0.1004
5	0.0700	0.0845	0.0793
6	0.0600	0.0704	0.0652
7	0.0429	0.0603	0.0551
8	0.0375	0.0528	0.0476
9	0.0333	0.0469	0.0417
10	0.0300	0.0422	0.0370
12	0.0250	0.0352	0.0326
14	0.0214	0.0302	0.0276
16	0.0188	0.0264	0.0238

SPE-D-LOK Indexable Shallow Grooving & Profile Inserts

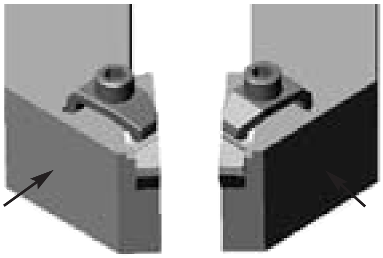
SPE-D-LOK Shallow Grooving & Profile Insert Styles - Application Data:

Insert Style	Application	Rake Angle	Standard Groove Width Range	Additional Information
PG 	• General purpose shallow grooving • “O” ring grooving • Circlip grooving	0° Neutral Top Rake	Size 2 = 0.031 to 0.128 Size 3 = 0.047 to 0.189 Size 4 = 0.125 to 0.250	• The most popular grooving insert • 3° offset of holder pocket permits grooving next to a shoulder • For applications in cast iron, carbon and alloy steels $\geq$ 180BHn
PGP 	• General purpose shallow grooving • “O” ring grooving • Circlip grooving	5° Positive Top Rake	Size 2 = 0.031 to 0.128 Size 3 = 0.047 to 0.189 Size 4 = 0.125 to 0.250	• Ground positive rake reduces cutting forces • Recommended for grooving soft nonferrous and difficult to machine chrome nickel alloys
PR 	• Full radius end form • General purpose grooving • General purpose profiling	0° Neutral Top Rake	Radius size: Size 3 = 0.031 to 0.094	• Most popular insert for full radius shallow grooving • Strong design allows profiling radius forms and straight finish turning cuts
PRP 	• Full radius end form with positive top • General purpose grooving • General purpose profiling	5° Positive Top Rake	Radius size: Size 3 = 0.031 to 0.094	• Ground positive rake reduces cutting forces • Recommended for grooving soft nonferrous and difficult to machine chrome nickel alloys
PRD 	• Deep grooving with full radius end form • General purpose grooving	0° Neutral Top Rake	Radius size: Size 3 = 0.031 to 0.062	• Deep grooving with full radius up to 1/4” depth. • Strong design allows profiling radius forms and straight finish turning cuts
PB 	• Uncoated blank for custom grinds • General purpose micrograin	0° Neutral Top Rake	Size 2 Size 3 Size 4	• Standard uncoated blank for custom ginding forms in your own shop or local fabricator • Available in micrograin C2 -C3 class carbide grade SC230

SPE-D-LOK
Shallow Grooving Inserts

Note: Before ordering holders and inserts, be sure to select the correct holder and insert combination.

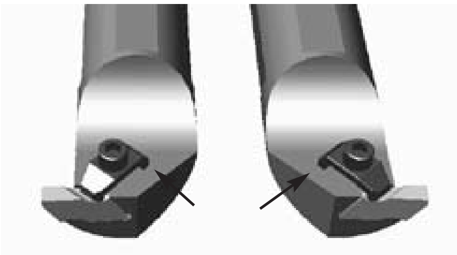
O.D. Grooving Holders & Inserts



Right hand holders use right hand inserts

Left hand holders use left hand inserts

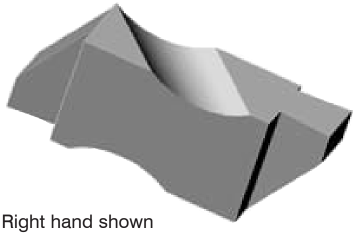
I.D. Grooving Bars & Inserts



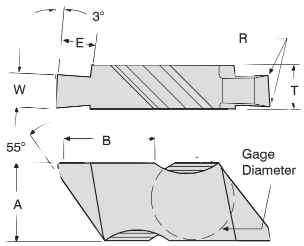
Left hand bars use right hand inserts

Right hand bars use left hand inserts

Style PG, #2 Size



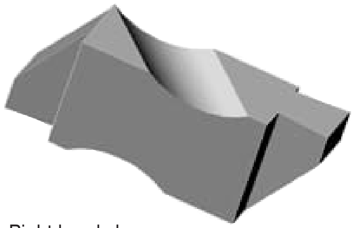
Right hand shown



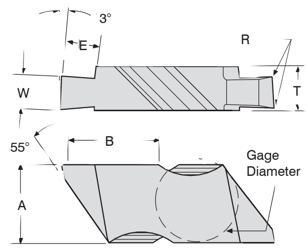
Right Hand Inserts	SC230 No.	SN150 No.	PKG. QUAN.	W ±0.001	R	E ±0.005	A	T	B ±0.0015	GAGE DIA.
PG-2031R	**0701068**	0700943	10	0.031	0.002 0.005	0.050	0.219	0.150	0.2700	0.1875
PG-2062R	**0701070**	0700947	10	0.062	0.005 0.010	0.110	0.219	0.150	0.2700	0.1875
PG-2094R	**0701072**	0700951	10	0.094	0.005 0.010	0.110	0.219	0.150	0.2700	0.1875
PG-2125R	**0701074**	0700955	10	0.125	0.005 0.010	0.110	0.219	0.150	0.2700	0.1875
Left Hand										
PG-2031L	**0701069**	0700945	10	0.031	0.002 0.005	0.050	0.219	0.150	0.2700	0.1875
PG-2062L	**0701071**	0700949	10	0.062	0.005 0.010	0.110	0.219	0.150	0.2700	0.1875
PG-2094L	**0701073**	0700953	10	0.094	0.005 0.010	0.110	0.219	0.150	0.2700	0.1875
PG-2125L	**0701075**	0700957	10	0.125	0.005 0.010	0.110	0.219	0.150	0.2700	0.1875

*Order numbers shown in **Bold** are stock items and can be shipped same day. Order numbers in light face are non stock items. Normal delivery is 2 to 3 weeks delivery, ARO.*

Style PG, #3 Size

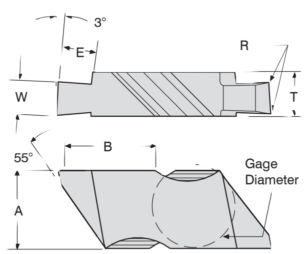


Right hand shown



Right Hand Inserts	SC230 No.	SN150 No.	PKG. QUAN.	W ±0.001	R	E ±0.005	A	T	B ±0.0015	GAGE DIA.
PG-3047R	**0701076**	0700959	10	0.047	0.005 0.0010	0.075	0.344	0.195	0.4050	0.3750
PG-3062R	**0701078**	0700963	10	0.062	0.005 0.010	0.094	0.344	0.195	0.4050	0.3750
PG-3072R	**0701080**	0700967	10	0.072	0.005 0.010	0.094	0.344	0.195	0.4050	0.3750
PG-3078R	**0701082**	0700971	10	0.078	0.005 0.010	0.094	0.344	0.195	0.4050	0.3750
PG-3094R	**0701084**	0700975	10	0.094	0.005 0.010	0.150	0.344	0.195	0.4050	0.3750
PG-3125R	**0701085**	0700977	10	0.125	0.005 0.010	0.150	0.344	0.195	0.4050	0.3750
PG-3156R	**0701087**	0700981	10	0.156	0.005 0.010	0.150	0.344	0.195	0.4050	0.3750
PG-3189R	**0701089**	0700985	10	0.189	0.020 0.025	0.150	0.344	0.195	0.4050	0.3750
Left Hand										
PG-3047L	**0701077**	0700961	10	0.047	0.005 0.0010	0.075	0.344	0.195	0.4050	0.3750
PG-3062L	**0701079**	0700965	10	0.062	0.005 0.010	0.094	0.344	0.195	0.4050	0.3750
PG-3072L	**0701081**	0700969	10	0.072	0.005 0.010	0.094	0.344	0.195	0.4050	0.3750
PG-3078L	**0701083**	0700973	10	0.078	0.005 0.010	0.094	0.344	0.195	0.4050	0.3750
PG-3094L	**0701140**	0701061	10	0.094	0.005 0.010	0.150	0.344	0.195	0.4050	0.3750
PG-3125L	**0701086**	0700979	10	0.125	0.005 0.010	0.150	0.344	0.195	0.4050	0.3750
PG-3156L	**0701088**	0700983	10	0.156	0.005 0.010	0.150	0.344	0.195	0.4050	0.3750
PG-3189L	**0701090**	0700987	10	0.189	0.020 0.025	0.150	0.344	0.195	0.4050	0.3750

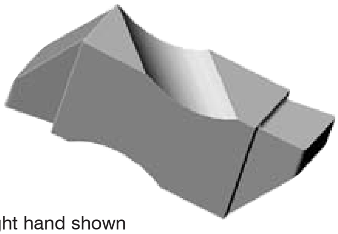
Style PG, #4 Size



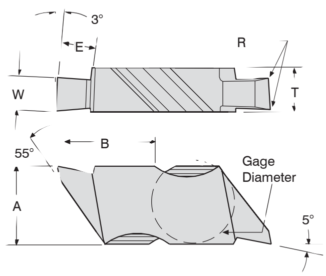
Right Hand Inserts	SC230 No.	SN150 No.	PKG. QUAN.	W ±0.001	R	E ±0.005	A	T	B ±0.0015	GAGE DIA.
PG-4125R	**0701091**	0700988	10	0.125	0.005 0.010	0.150	0.453	0.255	0.6360	0.3750
PG-4189R	**0701093**	0700990	10	0.189	0.020 0.025	0.250	0.453	0.255	0.6360	0.3750
PG-4250R	**0701095**	0700992	10	0.250	0.005 0.010	0.110	0.453	0.255	0.6360	0.3750
Left Hand										
PG-4125L	**0701092**	0700989	10	0.125	0.005 0.010	0.150	0.453	0.255	0.6360	0.3750
PG-4189L	**0701094**	0700991	10	0.189	0.020 0.025	0.250	0.453	0.255	0.6360	0.3750
PG-4250L	**0701096**	0700993	10	0.250	0.005 0.010	0.110	0.453	0.255	0.6360	0.3750

*Order numbers shown in **Bold** are stock items and can be shipped same day. Order numbers in light face are non stock items. Normal delivery is 2 to 3 weeks delivery, ARO.*

Style PGP



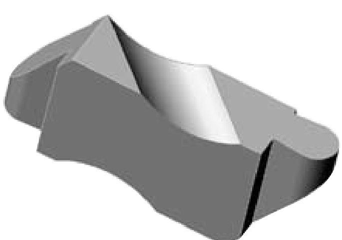
Right hand shown



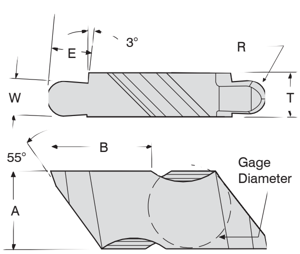
Right Hand Inserts	SC230 No.	SP321 No.	SN150 No.	PKG. QUAN.	W ±0.001	R	E ±0.005	A	T	B ±0.0015	GAGE DIA.
PGP-2031R	**0701097**	**094878**	**094879**	10	0.031	0.002 0.005	0.050	0.219	0.150	0.2700	0.1875
PGP-3088R	**0701099**	**094882**	**094883**	10	0.088	0.005 0.010	0.094	0.344	0.195	0.4050	0.3750
PGP-3125R	**0701101**	**094886**	**094887**	10	0.125	0.005 0.010	0.150	0.344	0.195	0.4050	0.3750
PGP-4250R	NA	NA	**094890**	10	0.250	0.020 0.025	0.250	0.453	0.255	0.6360	0.3750
Left Hand											
PGP-2031L	-	**094880**	**094881**	10	0.031	0.002 0.005	0.050	0.219	0.150	0.2700	0.1875
PGP-3088L	**0701100**	**094884**	**094885**	10	0.250	0.005 0.010	0.094	0.344	0.195	0.4050	0.3750
PGP-3125L	**0701102**	**094888**	**094889**	10	0.125	0.005 0.010	0.150	0.344	0.195	0.4050	0.3750
PGP-4250L	NA	NA	**094892**	10	0.250	0.020 0.025	0.250	0.453	0.255	0.6360	0.3750

*Order numbers shown in **Bold** are stock items and can be shipped same day. Order numbers in light face are non stock items. Normal delivery is 2 to 3 weeks delivery, ARO.*

Style PR



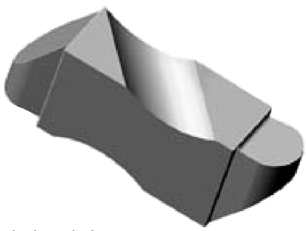
Right hand shown



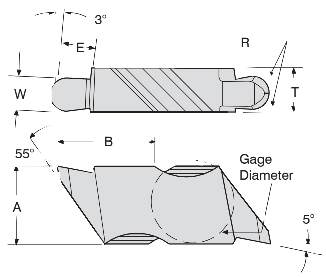
Right Hand Inserts	SC230 No.	SP321 No.	SN150 No.	PKG. QUAN.	W ±0.001	R	E ±0.005	A	T	B ±0.0015	GAGE DIA.
PR-3031R	NA	**094923**	**094924**	10	0.062	0.031	0.094	0.344	0.195	0.4033	0.3750
PR-3047R	**0701105**	NA	0701003	10	0.094	0.047	0.150	0.344	0.195	0.4025	0.3750
PR-3062R	**0701107**	NA	0701007	10	0.125	0.062	0.150	0.344	0.195	0.4017	0.3750
PR-3078R	**0701109**	NA	0701011	10	0.156	0.078	0.150	0.344	0.195	0.4008	0.3750
PR-3094R	NA	NA	0701063	10	0.188	0.094	0.150	0.344	0.195	0.4000	0.3750
Left Hand											
PR-3031L	NA	**094925**	**094926**	10	0.062	0.031	0.094	0.344	0.195	0.4033	0.3750
PR-3047L	**0701106**	NA	0701005	10	0.094	0.047	0.150	0.344	0.195	0.4025	0.3750
PR-3062L	**0701108**	NA	0701009	10	0.125	0.062	0.150	0.344	0.195	0.4017	0.3750
PR-3078L	**0701110**	NA	0701013	10	0.156	0.078	0.150	0.344	0.195	0.4008	0.3750

*Order numbers shown in **Bold** are stock items and can be shipped same day. Order numbers in light face are non stock items. Normal delivery is 2 to 3 weeks delivery, ARO.*

Style PRP



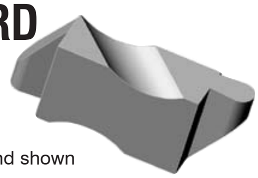
Right hand shown



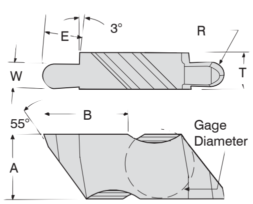
Right Hand Inserts	SC230 No.	SP321 No.	SN150 No.	PKG. QUAN.	W ±0.001	R	E ±0.005	A	T	B ±0.0015	GAGE DIA.
PRP-3031R	**0701111**	**094943**	**094944**	10	0.062	0.031	0.094	0.344	0.195	0.4033	0.3750
PRP-3047R	NA	**094947**	**094948**	10	0.094	0.047	0.150	0.344	0.195	0.4025	0.3750
PRP-3062R	NA	**094951**	**094952**	10	0.125	0.062	0.150	0.344	0.195	0.4017	0.3750
PRP-3094R	NA	**094955**	**094956**	10	0.188	0.094	0.150	0.344	0.195	0.4000	0.3750
Left Hand											
PRP-3031L	NA	**094945**	**094946**	10	0.062	0.031	0.094	0.344	0.195	0.4033	0.3750
PRP-3047L	NA	**094949**	**094950**	10	0.094	0.047	0.150	0.344	0.195	0.4025	0.3750
PRP-3062L	NA	**094953**	**094954**	10	0.125	0.062	0.150	0.344	0.195	0.4017	0.3750
PRP-3094L	NA	**094957**	**094958**	10	0.188	0.094	0.150	0.344	0.195	0.4000	0.3750

*Order numbers shown in **Bold** are stock items and can be shipped same day. Order numbers in light face are non stock items. Normal delivery is 2 to 3 weeks delivery, ARO.*

Style PRD



Right hand shown



Right Hand Inserts	SC230 No.	SP321 No.	SN150 No.	PKG. QUAN.	W ±0.001	R	E ±0.005	A	T	B ±0.0015	GAGE DIA.
PRD-3031R	NA	**094939**	NA	10	0.062	0.031	0.125	0.344	0.195	0.4033	0.3750
PRD-3062R	NA	**094941**	NA	10	0.125	0.062	0.250	0.344	0.195	0.5016	0.3750
Left Hand											
PRD-3031L	NA	**094940**	NA	10	0.062	0.031	0.125	0.344	0.195	0.4033	0.3750
PRD-3062L	NA	**094942**	NA	10	0.125	0.062	0.250	0.344	0.195	0.5016	0.3750

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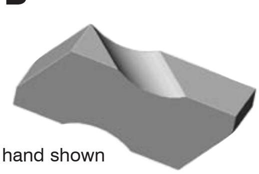
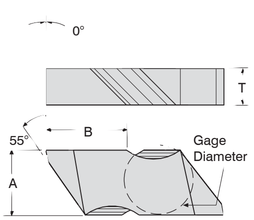
Style PB

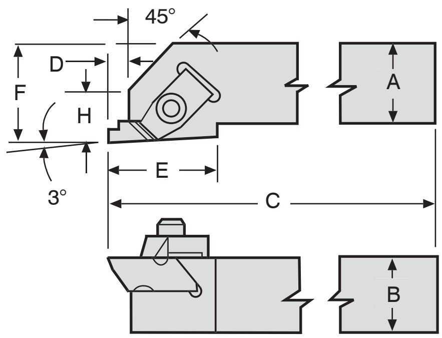


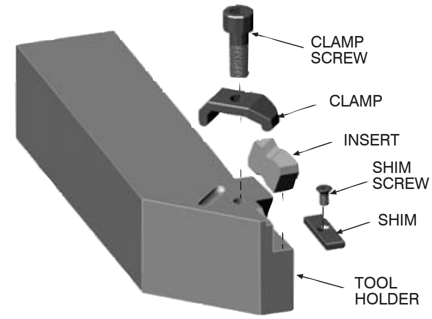
Right hand shown



Right Hand Inserts	SC230 No.	Left Hand Inserts	SC 230 No.	PKG. QUAN.	W ±0.001	R	E ±0.005	A	T	B ±0.0015	GAGE DIA.
PB-2R	**094965**	PB-2L	**094966**	10	-	-	-	0.219	0.150	0.3850	0.1875
PB-3R	**094967**	PB-3L	**094968**	10	-	-	-	0.344	0.195	0.5120	0.3750
PB-4R	**094969**	PB-4L	**094970**	10	-	-	-	0.453	0.255	0.8930	0.3750

Tool Holders
Style PS
External Threading & Grooving Tool Holders





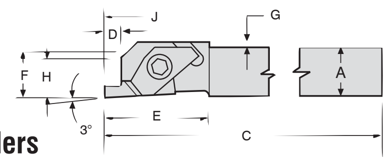
Right Hand	Order No.	Gage Insert	A	B	C	D	E	F†	H	Shim	Shim Screw	Clamp	Clamp Screw
PSR-062*	**094632**	PG-2R	0.375	0.375	2.50	0.138	0.75	0.562	0.35	-	-	CM-74	S-310
PSR-082V	**094633**	PG-2R	0.500	0.500	3.50	0.138	0.75	0.750	0.35	-	-	CM-74	S-310
PSR-102B	**094634**	PG-2R	0.625	0.625	4.50	0.138	0.75	0.875	0.35	-	-	CM-74	S-310
PSR-122B	**094635**	PG-2R	0.750	0.750	4.50	0.138	0.75	1.000	0.35	-	-	CM-74	S-310
PSR-162C	**094638**	PG-2R	1.000	1.000	5.00	0.138	0.75	1.250	0.35	-	-	CM-74	S-310
PSR-123A	**094636**	PG-3R	0.750	0.750	4.00	0.210	1.25	1.000	0.50	-	-	CM-72	S-412
PSR-123B	**094637**	PG-3R	0.750	0.750	4.25	0.210	1.25	1.000	0.50	-	-	CM-72	S-412
PSR-163C	**094639**	PG-3R	1.000	1.000	5.00	0.210	1.25	1.250	0.50	-	-	CM-72	S-412
PSR-163D	**094640**	PG-3R	1.000	1.000	6.00	0.210	1.25	1.250	0.50	-	-	CM-72	S-412
PSR-203D	**094643**	PG-3R	1.250	1.250	6.00	0.210	1.25	1.500	0.50	-	-	CM-72	S-412
PSR-164C	**094641**	PG-4R	1.000	1.000	5.00	0.294	1.38	1.250	0.54	SM-420	SL-344	CM-72	S-412
PSR-164D	**094642**	PG-4R	1.000	1.000	6.00	0.294	1.38	1.250	0.54	SM-420	SL-344	CM-72	S-412
PSR-204D	**094644**	PG-4R	1.250	1.250	6.00	0.294	1.38	1.500	0.54	SM-420	SL-344	CM-72	S-412
PSR-243D	**094645**	PG-3R	1.250	1.250	6.00	0.294	1.38	2.000	0.54	-	-	CM-72	S-412
PSR-244D	**094646**	PG-4R	1.250	1.250	6.00	0.294	1.50	2.000	0.54	SM-420	SL-344	CM-72	S-412
Left Hand													
PSL-062*	**094617**	PG-2L	0.375	0.375	2.50	0.138	0.75	0.562	0.35	-	-	CM-74	S-310
PSL-082V	**094618**	PG-2L	0.500	0.500	3.50	0.138	0.75	0.750	0.35	-	-	CM-74	S-310
PSL-102B	**094619**	PG-2L	0.625	0.625	4.50	0.138	0.75	0.875	0.35	-	-	CM-74	S-310
PSL-122B	**094620**	PG-2L	0.750	0.750	4.50	0.138	0.75	1.000	0.35	-	-	CM-74	S-310
PSL-162C	**094623**	PG-2L	1.000	1.000	5.00	0.138	0.75	1.250	0.35	-	-	CM-74	S-310
PSL-123A	**094621**	PG-3L	0.750	0.750	4.00	0.210	1.25	1.000	0.50	-	-	CM-72	S-412
PSL-123B	**094622**	PG-3L	0.750	0.750	4.25	0.210	1.25	1.000	0.50	-	-	CM-72	S-412
PSL-163C	**094624**	PG-3L	1.000	1.000	5.00	0.210	1.25	1.250	0.50	-	-	CM-72	S-412
PSL-163D	**094625**	PG-3L	1.000	1.000	6.00	0.210	1.25	1.250	0.50	-	-	CM-72	S-412
PSL-203D	**094628**	PG-3L	1.250	1.250	6.00	0.210	1.25	1.500	0.50	-	-	CM-72	S-412
PSL-164C	**094626**	PG-4L	1.000	1.000	5.00	0.294	1.38	1.250	0.54	SM-420	SL-344	CM-72	S-412
PSL-164D	**094627**	PG-4L	1.000	1.000	6.00	0.294	1.38	1.250	0.54	SM-420	SL-344	CM-72	S-412
PSL-204D	**094629**	PG-4L	1.250	1.250	6.00	0.294	1.38	1.500	0.54	SM-420	SL-344	CM-72	S-412
PSL-244D	**094631**	PG-4L	1.250	1.250	6.00	0.294	1.50	2.000	0.54	SM-420	SL-344	CM-72	S-412
PSL-243D	**094630**	PG-3L	1.250	1.250	6.00	0.210	1.25	2.000	0.50	-	-	CM-72	S-412

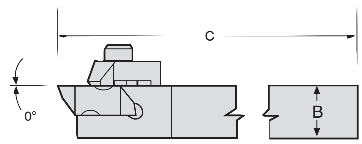
† "F" dimension over sharp point of gage insert.
** "C" dimension qualified to ±0.20.*

*Order numbers shown in **Bold** are stock items and can be shipped same day.*
Order numbers in light face are non stock items. Normal delivery is 2 to 3 weeks delivery, ARO.
Holders or Bars are delivered with appropriate hardware installed. Back up hardware can be ordered separately.

Tool Holders Style PAS

External Threading & Grooving Tool Holders





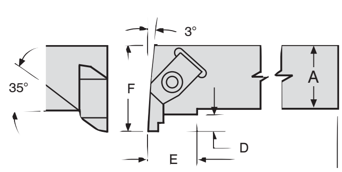
† "F" dimension over sharp point of gage insert.

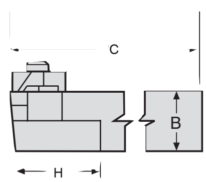
	Item Desc.	Right Hand EDP No.	Left Hand EDP No.	Gage Insert	A	B	C	D	E	F †	G	H	J	Shim	Shim Screw	Clamp	Clamp Screw
INCH	PASR/L-062D	**094588**	**094583**	PG-2R/L	0.375	0.375	6.00	0.138	0.75	0.375	0.07	0.35	0.88	-	-	CM-182R/183L	S-310
INCH	PASR/L-082D	**094589**	**094584**	PG-2R/L	0.500	0.500	6.00	0.138	0.75	0.500	-	0.35	-	-	-	CM-182	S-310
INCH	PASR/L-102B	**094591**	**094586**	PG-2R/L	0.625	0.625	4.50	0.138	0.75	0.625	-	0.35	-	-	-	CM-74	S-310
INCH	PASR/L-083D	**094590**	**094585**	PG-3R/L	0.500	0.500	6.00	0.210	1.25	0.500	0.125	0.50	1.32	-	-	CM-184	S-412
INCH	PASR/L-103B	**094592**	**094587**	PG-3R/L	0.625	0.625	4.50	0.210	1.25	0.625	-	0.50	-	-	-	CM-184	S-412
METRIC	PASR/L-1010M2Q	**0730385**	**0730386**	PG-2R/L	10	10	150	3.51	20	10	1.8	9	22	-	-	CM-182	MS-1025
METRIC	PASR/L-1020M2Q	**0730387**	**0730388**	PG-2R/L	20	10	150	3.51	20	20	-	9	-	-	-	CM-74R/75L	MS-1025
METRIC	PASR/L-1212M2Q	**0730399**	**0730400**	PG-2R/L	12	12	150	3.51	20	12	-	9	-	-	-	CM-182R/183L	MS-1025
METRIC	PASR/L-1616K3Q	**0730401**	**0730402**	PG-3R/L	16	16	125	5.51	32	16	-	12	-	-	-	CM-184R/185L	MS-412

Style PE

External Threading & Grooving Tool Holders.

Right Hand Holders Use Left Hand Inserts.
Left Hand Holders Use Right Hand Inserts.





† "F" dimension over sharp point of gage insert.

Right Hand	Order No.	Gage Insert	A	B	C	D	E	F †	G	H	J	Shim	Shim Screw	Clamp	Clamp Screw
PER-062†	**094605**	PG-2L	0.375	0.375	2.50	0.138	0.50	0.750	-	1.0	-	-	-	CM-75	S-310
PER-082V	**094606**	PG-2L	0.500	0.500	3.50	0.138	0.50	0.750	-	1.0	-	-	-	CM-75	S-310
PER-102B	**094607**	PG-2L	0.625	0.625	4.50	0.138	-	0.750	-	1.0	-	-	-	CM-75	S-310
PER-122B	**094608**	PG-2L	0.750	0.750	2.50	0.138	0.50	1.000	-	1.0	-	-	-	CM-75	S-310
PER-162C	**094610**	PG-2L	1.000	1.000	5.00	0.138	0.50	1.250	-	1.0	-	-	-	CM-75	S-310
PER-123B	**094609**	PG-3L	0.750	0.750	4.50	0.210	0.75	1.125	-	2.0	-	-	-	CM-75	S-310
PER-163C	**094611**	PG-3L	1.000	1.000	5.00	0.210	0.75	1.250	-	2.0	-	-	-	CM-73	S-412
PER-163D	**094612**	PG-3L	1.000	1.000	6.00	0.210	0.75	1.250	-	2.0	-	-	-	CM-73	S-412
PER-203D	**094615**	PG-3L	1.250	1.250	6.00	0.210	0.75	1.500	-	2.0	-	-	-	CM-73	S-412
PER-164C	**094613**	PG-4L	1.000	1.000	5.00	0.294	0.75	1.375	-	2.0	-	-	-	CM-73	S-412
PER-164D	**094614**	PG-4L	1.000	1.000	6.00	0.294	0.75	1.375	-	2.0	-	-	-	CM-73	S-412
PER-204D	**094616**	PG-4L	1.250	1.250	6.00	0.294	0.75	1.625	-	2.0	-	-	-	CM-73	S-412
Left Hand															
PEL-062†	**094593**	PG-2R	0.375	0.375	2.50	0.138	0.50	0.750	-	1.0	-	-	-	CM-74	S-310
PEL-082V	**094594**	PG-2R	0.500	0.500	3.50	0.138	0.50	0.750	-	1.0	-	-	-	CM-74	S-310
PEL-102B	**094595**	PG-2R	0.625	0.625	4.50	0.138	-	0.750	-	1.0	-	-	-	CM-74	S-310
PEL-122B	**094596**	PG-2R	0.375	0.375	4.50	0.138	0.50	1.000	-	1.0	-	-	-	CM-74	S-310
PEL-162C	**094598**	PG-2R	1.000	1.000	5.00	0.138	0.50	1.250	-	1.0	-	-	-	CM-74	S-310
PEL-123B	**094597**	PG-3R	0.750	0.750	4.50	0.210	0.75	1.125	-	2.0	-	-	-	CM-74	S-310
PEL-163C	**094599**	PG-3R	1.000	1.000	5.00	0.210	0.75	1.250	-	2.0	-	-	-	CM-72	S-412
PEL-203D	**094603**	PG-3R	1.250	1.250	6.00	0.210	0.75	1.500	-	2.0	-	-	-	CM-72	S-412
PEL-163D	**094600**	PG-3R	1.000	1.000	6.00	0.210	0.75	1.250	-	2.0	-	-	-	CM-72	S-412
PEL-164C	**094601**	PG-4R	1.000	1.000	5.00	0.294	0.75	1.375	-	2.0	-	-	-	CM-72	S-412
PEL-164D	**094602**	PG-4R	1.000	1.000	6.00	0.294	0.75	1.375	-	2.0	-	-	-	CM-72	S-412
PEL-204D	**094604**	PG-4R	1.250	1.250	6.00	0.294	0.75	1.625	-	2.0	-	-	-	CM-72	S-412

*Order numbers shown in **Bold** are stock items and can be shipped same day.*
Order numbers in light face are non stock items. Normal delivery is 2 to 3 weeks delivery, ARO.
Holders or Bars are delivered with appropriate hardware installed. Back up hardware can be ordered separately.

Spe-D-Lok Boring Bar and Head Nomenclature

style	A	32	S	-	E	R	3
	1	2	3		4	5	6

1 Bar Type
A- Steel with coolant
S- Steel
E- Carbide with coolant
C- Carbide

2 Bar Diameter
A two digit number which indicates the bar diameter in 1/16" increments

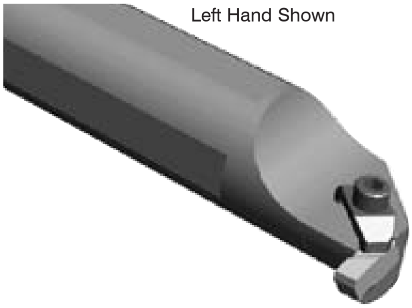
3 Spe-D-Notch Insert Holding Method

4 Insert Location
E- End mount

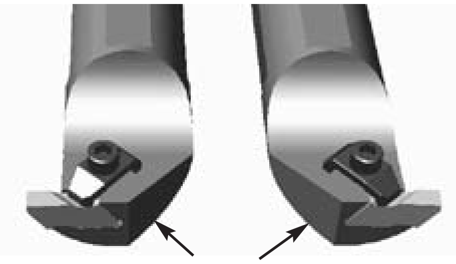
5 Hand of Bar
R- Right Hand
L- Left Hand

6 Insert Size

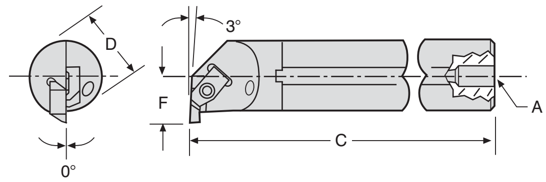
Insert No.	T
1	.100
2	.150
3	.195
4	.255
5	.380
6	.383
8	.438


Left Hand Shown

I.D. Threading Bars & Inserts



Threading & Grooving Bars



Style A-PE

Internal Threading & Grooving Bars
With Through Hole Coolant, Standard

† "F" dimension over sharp point of gage insert.

Right Hand	Order No.	Gage Insert	D	C	F †	Min. Bore	A	Clamp	Clamp Screw
A08PER2	**094664**	PG-2L	0.500	8.0	0.437	0.730	1/16-27 NPT	CM-147	S-39
A10PER2	**094666**	PG-2L	0.625	10.0	0.500	1.000	1/8-27 NPT	CM-75	S-310
A12PER2	**094668**	PG-2L	0.750	10.0	0.562	1.125	1/8-27 NPT	CM-75	S-310
A16PER2	**094671**	PG-2L	1.000	12.0	0.688	1.375	1/4-18 NPT	CM-75	S-310
A16PER3	**094672**	PG-3L	1.000	12.0	0.688	1.375	1/4-18 NPT	CM-73	S-412
A20PER3	**094674**	PG-3L	1.250	14.0	0.875	1.750	1/4-18 NPT	CM-73	S-412
A24PER3	**094676**	PG-3L	1.500	14.0	1.000	2.000	1/4-18 NPT	CM-73	S-412
A28PER3	**094679**	PG-3L	1.750	14.0	1.125	2.250	1/4-18 NPT	CM-73	S-412
A28PER4	**094680**	PG-4L	1.750	14.0	1.250	2.500	1/4-18 NPT	CM-73	S-412
A32PER3	**094683**	PG-3L	2.000	16.0	1.250	2.500	1/4-18 NPT	CM-73	S-412
A32PER4	**094684**	PG-4L	2.000	16.0	1.375	2.750	1/4-18 NPT	CM-72	S-412
Left Hand									
A08PEL2	**094663**	PG-2L	0.500	8.0	0.437	0.730	1/16-27 NPT	CM-146	S-39
A10PEL2	**094665**	PG-2R	0.625	10.0	0.500	1.000	1/8-27 NPT	CM-74	S-310
A12PEL2	**094667**	PG-2R	0.750	10.0	0.562	1.125	1/8-27 NPT	CM-74	S-310
A16PEL2	**094669**	PG-2R	1.000	12.0	0.688	1.375	1/4-18 NPT	CM-74	S-310
A16PEL3	**094670**	PG-3R	1.000	12.0	0.688	1.375	1/4-18 NPT	CM-72	S-412
A20PEL3	**094673**	PG-3R	1.250	14.0	0.875	1.750	1/4-18 NPT	CM-72	S-412
A24PEL3	**094675**	PG-3R	1.500	14.0	1.000	2.000	1/4-18 NPT	CM-72	S-412
A28PEL3	**094677**	PG-3R	1.750	14.0	1.125	2.250	1/4-18 NPT	CM-72	S-412
A28PEL4	**094678**	PG-4R	1.750	14.0	1.250	2.500	1/4-18 NPT	CM-72	S-412
A32PEL3	**094681**	PG-4L	2.000	16.0	1.250	2.500	1/4-18 NPT	CM-73	S-412
A32PEL4	**094682**	PG-4R	2.000	16.0	1.375	2.750	1/4-18 NPT	CM-72	S-412

*Order numbers shown in **Bold** are stock items and can be shipped same day.*
Order numbers in light face are non stock items. Normal delivery is 2 to 3 weeks delivery, ARO.
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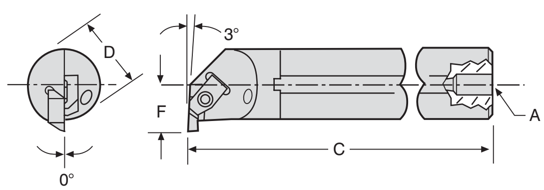
E-PE

Carbide shank boring bars with through coolant.



Item Desc.	Right Hand EDP No.	Left Hand EDP No.	Gage Insert	D	C	F	Min. Bore	A	Steel Head	Clamp	Clamp Screw
E08-PER/L2	**094648**	**094647**	PG-2R/L	1/2	8	.437	.730	1/8	08-PER/L2	CM-147R/CM-146L	S-39
E10-PER/L2	**094650**	**094649**	PG-2R/L	5/8	10	.500	1.000	1/8	10-PER/L2	CM-75R/CM-74L	S-310
E12-PER/L2	**094652**	**094651**	PG-2R/L	3/4	10	.562	1.125	5/32	12-PER/L2	CM-75R/CM-74L	S-310
E16-PER/L3	**094654**	**094653**	PG-3R/L	1	12	.688	1.375	5/32	16-PER/L2	CM-73R/CM-72L	S-412

Threading & Grooving

ANSI Nomenclature - T & G Inserts

style	T	N	M	C	-	4	3	NT	6P	
	1	2	3	4		5	6	7	8	9

1 Insert Shape
T- Triangle 60°

2 Rake Angle
N- 0°
P- 10°

3 Tolerance
M- Ground on all outside surfaces

4 Insert Type
A- Through hole
C- Through hole & two countersinks

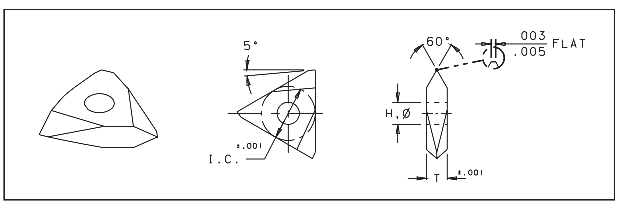
5 Insert IC Size
This indicates the inscribed circle in 1/8"

6 Thickness
Number of 1/16" of insert thickness

7 Cutting Configuration
NG- Grooving
NT- ACME threading insert
NV- 60° "V" threading insert

8 Threading
XXP- Number of threads per inch followed by "P"
Grooving
Inserts less than full width:
R- Right hand
L- Left hand
Full width inserts: blank

9 Groove Width
XXX-Groove width in .000"

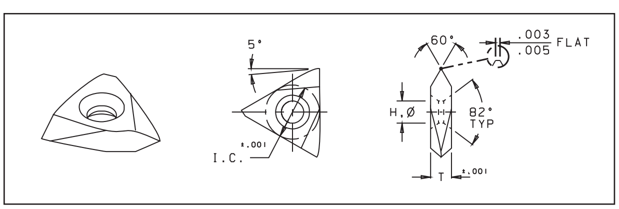


TNMA-NV

60° Partial Profile

Item Desc.	Dimensions			Min	Order Grade By EDP Number			
	IC	T	H	TPI	SN160	SN550	SC20	SS160
TNMA 32NV	3/8	.130	.150	8	071446	071448	071447	071445
TNMA 43NV	1/2	.192	.203	6	071455	071457	071456	071452
TNMA 54NV	5/8	.255	.250	4	071461	071464	—	071459

0° top rake, straight hole

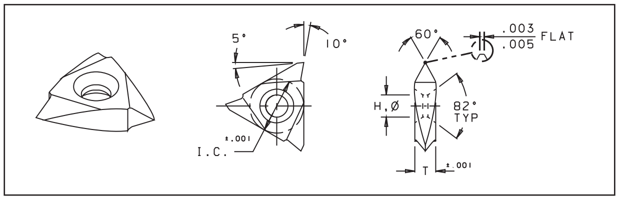


TNMC-NV

Item Desc.	Dimensions			Min	Order Grade By EDP Number						
	IC	T	H	TPI	SN027	SN160	SN550	SC20	SS160	SA250	SA180
TNMC 32NV	3/8	.130	.150	8	071952	071775	071465	071499	071500	078397	074963
TNMC 43NV	1/2	.192	.203	6	071953	071776	071466	071503	071504	078399	—
TNMC 54NV	5/8	.255	.250	4	—	071955	071468	071507	071508	078402	—
TNMC 66NV	3/4	.380	.312	3	—	071959	—	—	071516	—	—

0° top rake, hole & two countersinks

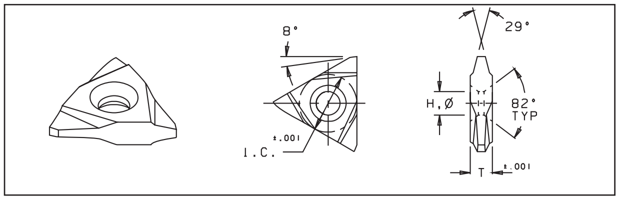
TPMC-NV



Item Desc.	Dimensions			MIN	Order Grade By EDP Number				
	IC	T	H	TPI	SN027	SN160	SC20	SS160	SA250
TPMC 32NV	3/8	.130	.150	8	071960	071961	071519	071520	078403
TPMC 43NV	1/2	.192	.203	6	071962	071963	071523	071524	078407
TPMC 54NV	5/8	.255	.250	4	074253	074255	074252	074254	—
TPMC 64NV	3/4	.255	.312	4	—	—	074256	074258	—
TPMC 66NV	3/4	.380	.312	3	—	—	074260	074262	—

10° positive top rake, hole & two countersinks

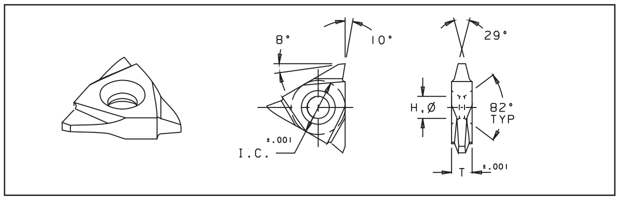
TNMC-NT-P



Item Desc.	Dimensions			Min	Order Grade By EDP Number			
	IC	T	H	TPI	SN027	SN160	SC20	SS160
TNMC 32NT 16P	3/8	.130	.150	16	—	—	—	071964
TNMC 32NT 12P	3/8	.130	.150	12	—	074282	—	071966
TNMC 32NT 10P	3/8	.130	.150	10	074278	074279	—	071528
TNMC 32NT 8P	3/8	.130	.150	8	—	074277	071531	071532
TNMC 32NT 6P	3/8	.130	.150	6	—	074275	—	—
TNMC 43NT 6P	1/2	.192	.203	6	—	074273	—	071540
TNMC 43NT 5P	1/2	.192	.203	5	—	074271	071543	071544
TNMC 43NT 4P	1/2	.192	.203	4	074268	074269	071547	071548
TNMC 54NT 3P	5/8	.255	.250	3	—	074267	—	071552
TNMC 66NT 2P	3/4	.380	.312	2	—	074265	—	071556

0° top rake, hole & two countersinks

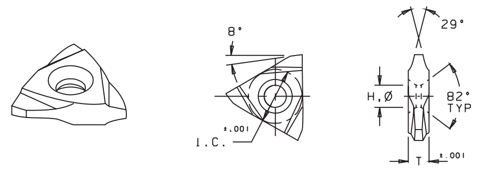
TPMC-NT-P



Item Desc.	Dimensions			Min	Order Grade By EDP Number		
	IC	T	H	TPI	SN160	SC20	SS160
TPMC 32NT 16P	3/8	.130	.150	16	074326	—	074325
TPMC 32NT 12P	3/8	.130	.150	12	074322	—	074321
TPMC 32NT 10P	3/8	.130	.150	10	074318	074315	074317
TPMC 32NT 8P	3/8	.130	.150	8	074314	074311	074313
TPMC 32NT 6P	3/8	.130	.150	6	074310	074307	074309
TPMC 43NT 6P	1/2	.192	.203	6	074306	074303	074305
TPMC 43NT 5P	1/2	.192	.203	5	074302	074299	074301
TPMC 43NT 4P	1/2	.192	.203	4	074298	074295	074297
TPMC 54NT 3P	5/8	.255	.250	3	074294	—	074293
TPMC 66NT 2P	3/4	.380	.312	2	074290	—	074289

10° positive top rake, hole & two countersinks

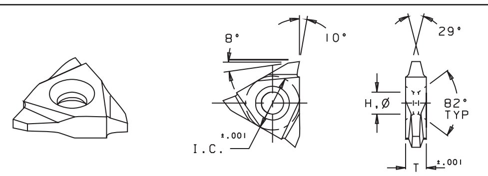
Stub ACME Profile



TNMC-NT-PSA

Item Description	Dimensions			Min	Order Grade By EDP Number		
	IC	T	H	TPI	SN160	SC20	SS160
TNMC 32NT 12PSA	3/8	.130	.150	12	-	074335	—
TNMC 32NT 8PSA	3/8	.130	.150	8	074334	—	071973
TNMC 43NT 6PSA	1/2	.192	.203	6	074332	—	071977
TNMC 43NT 4PSA	1/2	.192	.203	4	074330	—	—

0° top rake, hole & two countersinks



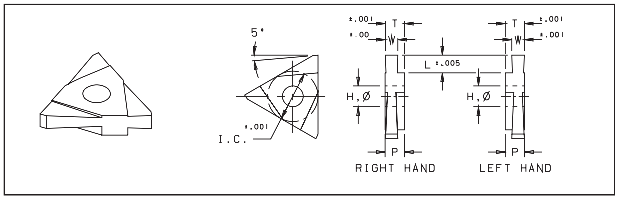
TPMC-NT-PSA

Item Description	Dimensions			Min	Order Grade By EDP Number		
	IC	T	H	TPI	SN160	SC20	SS160
TPMC 32NT 8PSA	3/8	.130	.150	8	074353	—	—
TPMC 43NT 6PSA	1/2	.192	.203	6	074349	074346	—
TPMC 43NT 4PSA	1/2	.192	.203	4	074345	—	074344

10° positive top rake, hole & two countersinks

0° Top Rake

TNMA-NGR/L



Item Description	Dimensions						Order Grade By EDP Number		
	IC	T	H	W	L	P	SN160	SC20	SS160
TNMA 32NGR 032	3/8	.127	.150	.032	.057	.130	071345	—	071343
TNMA 32NGR 063	3/8	.127	.150	.063	.156	.130	071365	—	—
TNMA 43NGR 063	1/2	.190	.203	.063	.156	.192	071379	—	071378
TNMA 43NGR 094	1/2	.190	.203	.094	.156	.192	—	—	071392
TNMA 43NGR 125	1/2	.190	.203	.125	.234	.192	071405	071406	071404
TNMA 54NGR 187	5/8	.252	.250	.187	.297	.255	—	—	071430
TNMA 32NGL 063	3/8	.127	.150	.063	.156	.130	—	—	071373
TNMA 43NGL 063	1/2	.190	.203	.063	.156	.192	071388	—	—
TNMA 43NGL 125	1/2	.190	.203	.125	.234	.192	071410	071411	—

0° top rake, straight hole

TNMA-NGR/L

Item Description	Dimensions						Order Grade By EDP Number		
	IC	T	H	W Range	L	P	SN160	SC20	SS160
TNMA 32NGR *	3/8	.127	.150	.020-.125	**	.130	771345	—	771343
TNMA 43NGR *	1/2	.190	.203	.063-.187	**	.192	771379	771380	771378
TNMA 54NGR *	5/8	.252	.250	.187-.250	**	.255	771433	771435	771430
TNMA 32NGL *	3/8	.127	.150	.020-.125	**	.130	771355	771357	771348
TNMA 43NGL *	1/2	.190	.203	.063-.187	**	.192	771388	—	771382
TNMA 54NGL *	5/8	.252	.250	.187-.250	**	.255	771442	—	771437

0° top rake, straight hole

Ordering Information

* Specify the Groove Width
** Maximum Groove Depth is (1.5 x Groove Width) + .010

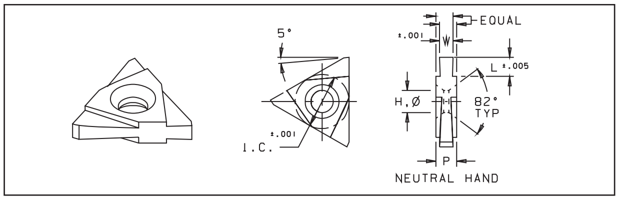
Ordering Example:

The need is a **TNMA 32NGR** with a groove width of **.030**

Order: **TNMA 32NGR 030**

The "**L**" dimension will be **.055** = (1.5 x .030) + .010 unless otherwise specified

0° Top Rake



TNMC-NGR/L

Item Description	Dimensions						Order Grade By EDP Number			
	IC	T	H	W	L	P	SN027	SN160	SC20	SS160
TNMC 32NGR 032	3/8	.127	.150	.032	.057	.130	074394	074395	071749	071750
TNMC 32NGR 063	3/8	.127	.150	.063	.156	.130	074400	074401	071751	071752
TNMC 43NGR 063	1/2	.190	.203	.063	.156	.192	—	074407	071753	071754
TNMC 43NGR 094	1/2	.190	.203	.094	.156	.192	—	074413	071755	071756
TNMC 43NGR 125	1/2	.190	.203	.125	.234	.192	—	074419	071757	071758
TNMC 43NGR 156	1/2	.190	.203	.156	.234	.192	—	074425	071759	071760
TNMC 54NGR 187	5/8	.252	.250	.187	.297	.255	—	074431	071763	071764
TNMC 32NGL 032	3/8	.127	.150	.032	.057	.130	—	074399	074396	074398
TNMC 32NGL 063	3/8	.127	.150	.063	.156	.130	—	074405	074402	074404
TNMC 43NGL 063	1/2	.190	.203	.063	.156	.192	—	074411	—	074410
TNMC 43NGL 094	1/2	.190	.203	.094	.156	.192	—	—	074414	074416
TNMC 43NGL 125	1/2	.190	.203	.125	.234	.192	—	074423	074420	074422
TNMC 43NGL 156	1/2	.190	.203	.156	.234	.192	—	074429	—	074428
TNMC 54NGL 187	5/8	.252	.250	.187	.297	.255	—	074435	074432	074434

0° top rake, hole & two countersinks

TNMC-NGR/L

Item Description	IC	Dimensions					Order Grade By EDP Number			
		T	H	W Range	L	P	SN027	SN160	SC20	SS160
TNMC 32NGR *	3/8	.127	.150	.020-.125	**	.130	774394	774395	771749	771750
TNMC 43NGR *	1/2	.190	.203	.063-.187	**	.192	774406	774407	771753	771754
TNMC 54NGR *	5/8	.252	.250	.187-.250	**	.255	774430	774431	771763	771764
TNMC 32NGL *	3/8	.127	.150	.020-.125	**	.130	774397	774399	774396	774398
TNMC 43NGL *	1/2	.190	.203	.063-.187	**	.192	774409	774411	774408	774410
TNMC 54NGL *	5/8	.252	.250	.187-.250	**	.255	774433	774435	774432	774434

0° top rake, hole & two countersinks

Ordering Information

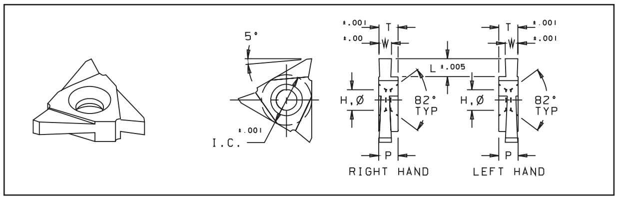
* Specify the Groove Width
** Maximum Groove Depth is (1.5 x Groove Width) + .010

Ordering Example:

The need is a **TNMC 32NGR** with a groove width of **.030**
Order: **TNMC 32NGR 030**
The "**L**" dimension will be **.055** = (1.5 x .030) + .010 unless otherwise specified

10° Positive Top Rake

TPMC-NGR/L



Item Description	Dimensions						Order Grade By EDP Number			
	IC	T	H	W	L	P	SN027	SN160	SC20	SS160
TPMC 32NGR 032	3/8	.127	.150	.032	.057	.130	074437	074439	074436	074438
TPMC 32NGR 063	3/8	.127	.150	.063	.156	.130	074445	074447	074444	074446
TPMC 43NGR 063	1/2	.190	.203	.063	.156	.192	074453	074455	074452	074454
TPMC 43NGR 094	1/2	.190	.203	.094	.156	.192	074461	074463	074460	074462
TPMC 43NGR 125	1/2	.190	.203	.125	.234	.192	074469	074471	074468	074470
TPMC 43NGR 156	1/2	.190	.203	.156	.234	.192	074477	074479	074476	074478
TPMC 54NGR 187	5/8	.252	.250	.187	.297	.255	—	074487	074484	074486
TPMC 32NGL 032	3/8	.127	.150	.032	.057	.130	074441	074443	074440	074442
TPMC 32NGL 063	3/8	.127	.150	.063	.156	.130	074449	074451	—	074450
TPMC 43NGL 063	1/2	.190	.203	.063	.156	.192	—	074459	074456	074458
TPMC 43NGL 094	1/2	.190	.203	.094	.156	.192	—	074467	074464	074466
TPMC 43NGL 125	1/2	.190	.203	.125	.234	.192	—	074475	074472	074474
TPMC 43NGL 156	1/2	.190	.203	.156	.234	.192	074481	—	074480	074482
TPMC 54NGL 187	5/8	.252	.250	.187	.297	.255	074489	074491	074488	074490

Hole & two countersinks

Threading & Grooving

TPMC-NGR/L

Item Description	Dimensions						Order Grade By EDP Number			
	IC	T	H	W Range	L	P	SN027	SN160	SC20	SS160
TPMC 32NGR *	3/8	.127	.150	.020-.125	**	.130	774437	774439	774436	774438
TPMC 43NGR *	1/2	.190	.203	.063-.187	**	.192	774453	774455	774452	774454
TPMC 54NGR *	5/8	.252	.250	.187-.250	**	.255	774485	774487	774484	774486
TPMC 32NGL *	3/8	.127	.150	.020-.125	**	.130	774441	774443	774440	774442
TPMC 43NGL *	1/2	.190	.203	.063-.187	**	.192	774457	774459	774456	774458
TPMC 54NGL *	5/8	.252	.250	.187-.250	**	.255	774489	774491	774488	774490

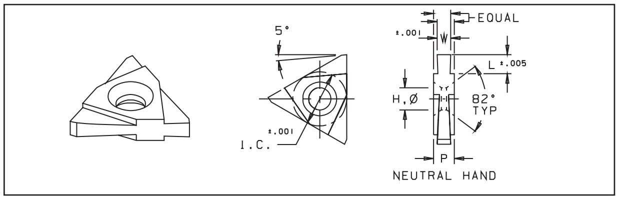
Hole & two countersinks

Ordering Information

* Specify the Groove Width
** Maximum Groove Depth is (1.5 x Groove Width) + .010

Ordering Example:
The need is a **TPMC 32NGR** with a groove width of **.030**
Order: **TPMC 32NGR 030**
The “**L**” dimension will be **.055** = (1.5 x .030) + .010 unless otherwise specified

0° Top Rake



TNMC-NG

Item Description	Dimensions						Order Grade By EDP No.			
	IC	T	H	W	L	P	SC20	SS160	SN550	SA180
TNMC 32NG 125	3/8	.127	.150	.125	.156	.130	071729	071730	071469	074965
TNMC 43NG 187	1/2	.190	.203	.187	.234	.192	071731	071732	071470	—
TNMC 54NG 250	5/8	.252	.250	.250	.297	.255	071733	071734	071471	—
TNMC 64NG 250	3/4	.252	.312	.250	.297	.255	071737	071738	—	—
TNMC 66NG 375	3/4	.377	.312	.375	.375	.380	071739	071740	—	—

Hole & two countersinks

Item Description	Dimensions						Order Grade By EDP Number	
	IC	T	H	W Range	L	P	SC20	SS160
TNMC 32NG*	3/8	.127	.150	.020-.125	**	.130	771729	771730
TNMC 43NG*	1/2	.190	.203	.063-.187	**	.192	771731	771732
TNMC 54NG*	5/8	.252	.250	.187-.250	**	.255	771733	771734
TNMC 64NG*	3/4	.252	.312	.187-.250	**	.255	771737	771738
TNMC 66NG*	3/4	.377	.312	.250-.375	**	.380	771739	771740

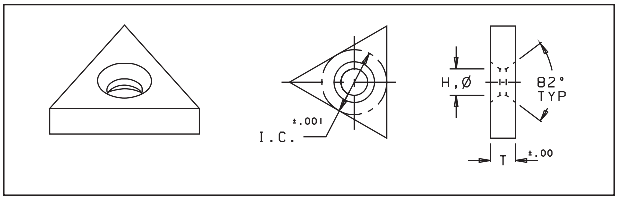
Hole & two countersinks

Ordering Information

* Specify the Groove Width
** Maximum Groove Depth is (1.5 x Groove Width) + .010

Ordering Example:
The need is a **TNMC 32NG** with a groove width of **.030**
Order: **TNMC 32NG 030**
The "**L**" dimension will be **.055** = (1.5 x .030) + .010 unless otherwise specified

Precision Ground Blank



TNMC

Item Description	Dimensions			Order Grade By EDP Number	
	IC	T	H	SC20	SS160
TNMC 32	3/8	.150	.130	071489	071490
TNMC 43	1/2	.203	.192	071491	071492
TNMC 54	5/8	.250	.255	071493	071494
TNMC 64	3/4	.312	.255	—	071496
TNMC 66	3/4	.312	.380	071497	071498

Hole & two countersinks

On Edge Toolholders — External

S	T	V	O	R	8	3	B
Holding System	Insert Shape	Toolholder Style	Rake Altitude	Hand	Shank Size	I.C. Size	Qualifications
M = Multiple Lock Ass'y S = Screw	T = Triangle	H = Offset Shank for I.D. Threading & Shallow Grooving V = Offset Shank for O.D. Threading & Shallow Grooving Z = Offset Shank for Reverse Hand Threading	N = Negative O = Neutral P = Positive	L = Left N = Neutral R = Right	Toolholders: number of 1/8" in width & height Bars: 1st digit = number of 1/8" in width 2nd digit = number of 1/4" in height	Number of 1/8" in Insert I.C.	B = Qualified Back & End 4.5" long C = Qualified Back & End 5" Long D = qualified Back & End 6" long

On Edge Bars — External

S	20	S	T	H	O	R	4
Bar Composition	Bar Diameter	Holding Method	Insert Shape	Style	Rake Altitude	Hand	I.C. Size
S = Steel	In 1/8" Increments	S= Screw Assembly	T = Triangle	H = Offset Shank for I.D. Threading & Shallow Grooving	N = Negative O = Neutral P = Positive	L = Left N = Neutral R = Right	Number of 1/8" in Insert I.C.

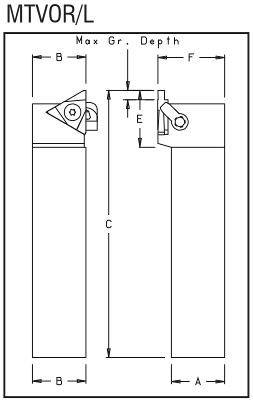
MTVOR/L On Edge Toolholders, External

Description	RH EDP	LH EDP	A	B	Max. Groove Depth	C	E	F	Insert I.C.	Insert T	Insert Screw	Clamp Clamp	Clamp Screw	Wrench
MTVOR/L 83B	088110	088111	1/2	1/2	.125	4.5	1.000	.750	3/8	1/8	GTS1	CL6	XNS35	T10
MTVOR/L 103B	088112	088113	5/8	5/8	.125	4.5	1.000	.875	3/8	1/8	GTS1	CL6	XNS35	T10
MTVOR/L 123B	088114	088115	3/4	3/4	.125	4.5	1.000	1.000	3/8	1/8	GTS1	CL6	XNS35	T10
MTVOR/L 124B	088118	088119	3/4	3/4	.219	4.5	1.062	1.000	1/2	3/16	GTS2	CL6	XNS36	T20
MTVOR/L 163C	076354	076345	1	1	.125	5.0	1.062	1.250	3/8	1/8	GTS1	CL6	XNS35	T10
MTVOR/L 163D	088116	088117	1	1	.125	6.0	1.062	1.250	3/8	1/8	GTS1	CL6	XNS35	T10
MTVOR/L 164C	076358	076348	1	1	.219	5.0	1.062	1.250	1/2	3/16	GTS2	CL6	XNS36	T20
MTVOR/L 164D	088120	088121	1	1	.219	6.0	1.062	1.250	1/2	3/16	GTS2	CL6	XNS36	T20
MTVOR/L 165C	076360	076349	1	1	.297	5.0	1.250	1.250	5/8	1/4	GTS3	CL6	XNS36	T20
MTVOR/L 165D	088128	088129	1	1	.297	6.0	1.250	1.250	5/8	1/4	GTS3	CL6	XNS36	T20
MTVOR/L 204D	088122	088123	1-1/4	1-1/4	.219	6.0	1.062	1.500	1/2	3/16	GTS2	CL6	XNS36	T20
MTVOR/L 205D	088130	088131	1-1/4	1-1/4	.297	6.0	1.250	1.500	5/8	1/4	GTS3	CL6	XNS36	T20
MTVOR/L 2064	088138	—	1-1/4	1-1/4	.375	6.0	1.250	1.500	3/4	1/4	GTS4	CL12	XNS59	T30
MTVOR/L 2064D	—	088139	1-1/4	1-1/4	.375	6.0	1.500	1.500	3/4	1/4	GTS4	CL12	XNS59	T30
MTVOR/L 2066	088140	088141	1-1/4	1-1/4	.375	7.0	1.500	1.500	3/4	3/8	GTS4	CL12	XNS59	T30
MTVOR/L 244D	076390	076351	1-1/4	1-1/4	.219	6.0	1.500	2.000	1/2	3/16	GTS2	CL6	XNS36	T20
MTVOR/L 244E	088124	088125	1-1/2	1-1/2	.219	7.0	1.062	2.000	1/2	3/16	GTS2	CL6	XNS36	T20
MTVOR/L 245D	076392	—	1-1/2	1-1/2	.297	6.0	1.062	2.000	5/8	1/4	GTS3	CL6	XNS36	T20
MTVOR/L 245E	088132	—	1-1/2	1-1/2	.297	7.0	1.250	2.000	5/8	1/4	GTS3	CL6	XNS36	T20
MTVOR/L 2464	088142	088143	1-1/2	1-1/2	.375	7.0	1.562	2.000	3/4	1/4	GTS4	CL12	XNS59	T30
MTVOR/L 2466	088144	088145	1-1/2	1-1/2	.375	7.0	1.562	2.000	3/4	3/8	GTS4	CL12	XNS59	T30
MTVOR/L 644	088126	—	3/4	1	.219	6.0	1.062	1.000	1/2	3/16	GTS2	CL6	XNS36	T20
MTVOR/L 855D	088134	—	1	1-1/4	.297	6.0	1.250	1.250	5/8	1/4	GTS3	CL6	XNS36	T20
MTVOR/L 865D	088136	088137	1	1-1/2	.207	6.0	1.250	1.250	5/8	1/4	GTS3	CL6	XNS36	T20

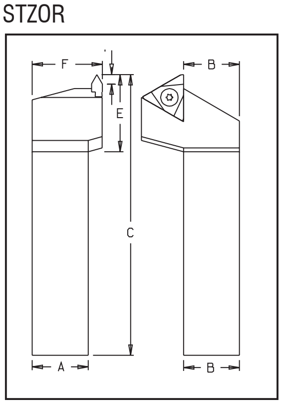
STZOR, On Edge Toolholder, External

Description	RH EDP	A	B	Max. Groove Depth	C	E	F	Insert I.C.	Insert T	Insert Screw	Wrench
STZOR 163C	088146	1	1	.141	5.0	1.000	1.250	3/8	1/8	GTS1	T10
STZOR 164C	088154	1	1	.219	5.0	1.375	1.250	1/2	3/16	GTS2	T20
STZOR 165C	088162	1	1	.297	5.0	1.500	1.250	5/8	1/4	GTS3	T20
STZOR 204D	088156	1-1/4	1-1/4	.219	6.0	1.375	1.500	1/2	3/16	GTS2	T20
STZOR 205D	088164	1-1/4	1-1/4	.207	6.0	1.500	1.500	5/8	1/4	GTS3	T20

MTVOR/L



STZOR



Inserts and Spare Parts can be found in their respective sections of this catalog.

Threading & Grooving

STVOR/L - On Edge Toolholder, External

Description	RH EDP	LH EDP	A	B	Max. Groove Depth	C	E	F	Insert I.C.	Insert T	Insert Screw	Wrench
STVOR/L 63	088090	088091	3/8	3/8	.125	3.5	1.000	0.625	3/8	1/8	GTS1	T10
STVOR/L 83B	088092	088093	1/2	1/2	.125	4.5	1.000	0.750	3/8	1/8	GTS1	T10
STVOR/L 103B	088094	088095	5/8	5/8	.125	4.5	1.000	0.875	3/8	1/8	GTS1	T10
STVOR/L 123B	088096	088097	3/4	3/4	.125	4.5	1.000	1.000	3/8	1/8	GTS1	T10
STVOR/L 124B	088098	088099	3/4	3/4	.219	4.5	1.062	1.000	1/2	3/16	GTS2	T20
STVOR/L 164C	076522	076518	1	1	.219	5.0	1.062	1.250	1/2	3/16	GTS2	T20
STVOR/L 164D	088100	088101	1	1	.219	5.0	1.062	1.250	1/2	3/16	GTS2	T20
STVOR 165C	076546	—	1	1	.297	5.0	1.250	1.250	5/8	1/4	GTS3	T20
STVOR 165D	088104	—	1	1	.297	5.0	1.250	1.250	5/8	1/4	GTS3	T20
STVOR 205D	088106	—	1-1/4	1-1/4	.297	5.0	1.250	1.500	5/8	1/4	GTS3	T20

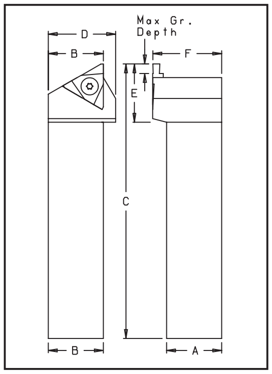
STHOR/L - On Edge Toolholder, Internal

Description	RH EDP	LH EDP	A	B	Max. Groove Depth	Min. Bore	C	E	F	Insert I.C.	Insert T	Insert Screw	Wrench
STHOR/L 83B	088188	088189	1/2	1/2	.094	2.00	4.5	0.500	0.750	3/8	1/8	GTS1	T10
STHOR/L 103B	088190	088191	5/8	5/8	.094	2.00	4.5	0.500	0.750	3/8	1/8	GTS1	T10
STHOR/L 124B	088192	088193	3/4	3/4	.156	3.00	4.5	0.500	0.969	1/2	3/16	GTS2	T20
STHOR/L 164C	076517	076516	1	1	.156	3.00	5.0	0.500	1.219	1/2	3/16	GTS2	T20
STHOR/L 164D	088195	088196	1	1	.156	3.00	6.0	0.500	1.219	1/2	3/16	GTS2	T20
STHOR/L 644	088194	-	3/4	1	.156	3.00	7.0	0.500	0.969	1/2	3/16	GTS2	T20

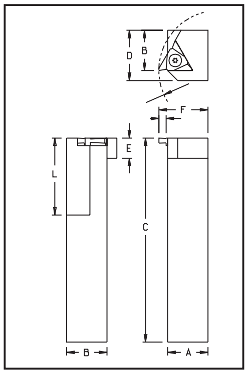
S-STHNR/L and S-STHOR/L - On Edge Bar, Internal

Description	RH EDP	LH EDP	A	Min. Bore	Max. Groove Depth	C	F	K°	Insert I.C.	Insert T	Insert Screw	Wrench
S16-STHNR/L 3	088174	088175	1.00	1.25	.094	10.0	0.656	-10	3/8	1/8	GTS1	T10
S20-STHNR/L 4	088176	088177	1.25	1.75	.560	12.0	0.843	-10	1/2	3/16	GTS2	T20
S24-STHNR/L 4	088178	088179	1.50	2.25	.560	14.0	0.968	-10	1/2	3/16	GTS2	T20
S32-STHNR/L 4	088180	088181	2.00	3.00	.560	14.0	1.218	-10	1/2	3/16	GTS2	T20
S32-STHOR/L 5	088182	088183	2.00	4.00	.219	14.0	1.250	0	5/8	1/4	GTS3	T20
S32-STHOR/L 64	088184	088185	2.00	4.00	.250	14.0	1.250	0	3/4	1/4	GTS4	T30
S32-STHOR/L 66	088186	088187	2.00	4.00	.250	14.0	1.281	0	3/4	3/8	GTS4	T30

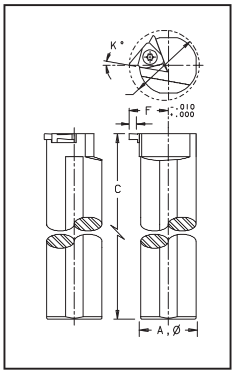
STVOR/L



STHOR/L

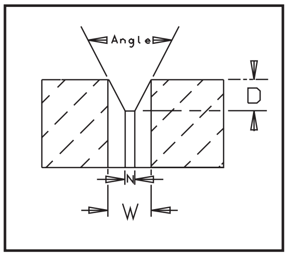


S-STHNR/L and S-STHOR/L



Inserts and Spare Parts can be found in their respective sections of this catalog.

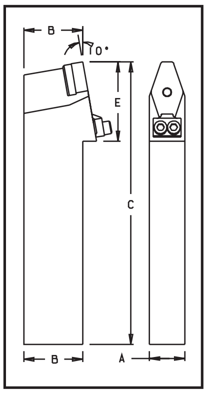
Grooves



Pully/Sheave Grooves

For V Belt	Pitch Diameter	Groove Depth D	Width W	N	Angle°	Use Insert	Holder
A	2.6 to 5.4	.490	.494	.195	34	PGT 2	MVGT 2
A	over 5.4	.490	.504	.167	38	PGT 3	MVGT 3
B	4.6 to 7.0	.580	.637	.283	34	PGT 4	MVGT 4
B	over 7.0	.580	.650	.251	38	PGT 5	MVGT 5
C	7.0 to 7.9	.780	.879	.403	34	PGT 6	MVGT 6
C	8.0 to 12.0	.780	.887	.381	36	PGT 7	MVGT 7
C	over 12.0	.780	.895	.358	38	PGT 8	MVGT 8
AB	up to 7.35	.612	.612	.238	34	PGT 9	MVGT 9
AB	over 7.35	.612	.625	.203	38	PGT 10	MVGT 10

MVGT

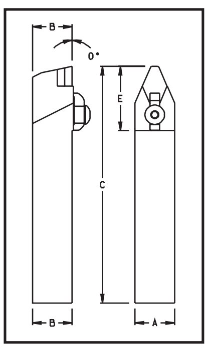


Pully/Sheave Toolholders, External

Toolholder Number	EDP	A	B	C	E	Insert	Shim	Lock Pin	Set Screw	Pin Ret. Ring	Clamp	Clamp Screw
MVGT 2	085028	5/8	1-1/4	6.0	1.500	PGT 2	PGS2	GPL1	S107	OR3	HC13	S86
MVGT 3	085029	5/8	1-1/4	6.0	1.500	PGT 3	PGS3	GPL1	S107	OR3	HC13	S86
MVGT 4	085030	3/4	1-1/4	6.0	1.687	PGT 4	PGS4	GPL1	S108	OR3	HC13	S86
MVGT 5	085031	3/4	1-1/4	6.0	1.687	PGT 5	PGS5	GPL1	S108	OR3	HC13	S86
MVGT 6	085032	1	1-1/2	6.0	2.000	PGT 6	PGS6	GPL1	S109	OR3	HC15	S86
MVGT 7	085033	1	1-1/2	6.0	2.000	PGT 7	PGS7	GPL1	S109	OR3	HC15	S86
MVGT 8	085034	1	1-1/2	6.0	2.000	PGT 8	PGS8	GPL1	S109	OR3	HC15	S86
MVGT 9	071780	3/4	1-1/4	6.0	1.812	PGT 9	PGS9	GPL1	S108	OR3	HC13	S86
MVGT 10	071781	3/4	1-1/4	6.0	1.812	PGT 10	PGS10	GPL1	S106	OR3	HC13	S86

Carbide inserts can be found on the next page.

CFGN

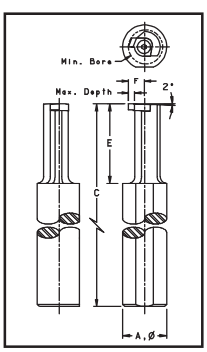


API Ring Toolholders, External

Toolholder Number	EDP	A	B	C	E	Insert I.C.	Insert T	Shim	Shim Screw	Clamp	Clamp Screw	Clamp Clip
CFGN 16	084200	1	1	6.0	1.375	.475	3/16	FGS1A	S632	HC12L	CS126	CLP12
CFGN 16A	084201	1	1	6.0	1.625	.573	3/16	FGS2A	S632	HC12L	CS126	CLP12
CFGN 85	084202	1	1-1/4	6.0	1.375	.475	3/16	FGS1A	S632	HC12L	CS126	CLP12
CFGN 85A	084203	1	1-1/4	6.0	1.625	.573	3/16	FGS2A	S632	HC12L	CS126	CLP12
CFGN 86	084204	1	1-1/2	6.0	1.375	.475	3/16	FGS1A	S632	HC12L	CS126	CLP12
CFGN 86A	084205	1	1-1/2	6.0	1.625	.573	3/16	FGS2A	S632	HC12L	CS126	CLP12

Carbide inserts can be found on the next page.

TIGHR



TIGHR Bars, Internal

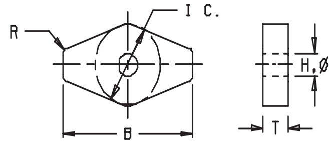
Toolholder Number	EDP	A	Min. Bore	Max. Groove Depth	F	C	E	Insert Thd.	Insert Grv.	Insert Screw
TIGHR 08 2	074936	.500	.484	.062	.230	4.0	1.250	T I	G I	S632S
TIGHR 10 2	074937	.625	.484	.062	.230	4.0	1.250	T I	G I	S632S
TIGHR 12 2	074938	.750	.484	.062	.230	4.0	1.250	T I	G I	S632S

Inserts can be found on the next page.

Pulley/Sheave Inserts

Dimensions

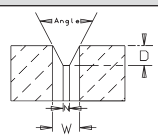
Description	IC	R	T	H	B
PGT 2	.510	1/16	1/4	3/16	1.125
PGT 3	.519	1/16	1/4	3/16	1.125
PGT 4	.648	1/16	1/4	3/16	1.312
PGT 5	.658	1/16	1/4	3/16	1.312
PGT 6	.889	1/16	1/4	3/16	1.750
PGT 7	.895	1/16	1/4	3/16	1.750
PGT 8	.900	1/16	1/4	3/16	1.750
PGT 9	.628	1/16	1/4	3/16	1.390
PGT 10	.638	1/16	1/4	3/16	1.390



Description	Uncoated Grade	EDP No.	SS	Coated Grade	EDP No.	SS
PGT 2	SC20	083738	S	—	—	—
PGT 3	SC20	083739	S	—	—	—
PGT 4	SC20	083740	S	—	—	—
PGT 5	SC20	083741	S	—	—	—
PGT 6	SC20	083742	S	—	—	—
PGT 7	SC20	083743	S	—	—	—
PGT 8	SC20	083744	S	—	—	—
PGT 9	SC20	071782	S	—	—	—
PGT 10	SC20	071783	S	—	—	—

Pulley/Sheave Grooves

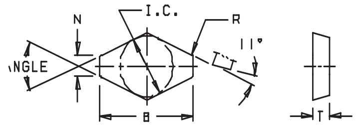
For V Belt	Pitch Diameter	Groove Depth D	Groove Width W	Q	Angle °	Use Insert	Use Holder
A	2.6 to 5.4	.490	.494	.195	34	PGT 2	MVGT 2
A	over 5.4	.490	.504	.167	38	PGT 3	MVGT 3
B	4.6 to 7.0	.580	.637	.283	34	PGT 4	MVGT 4
B	over 7.0	.580	.650	.251	38	PGT 5	MVGT 5
C	7.0 to 7.9	.780	.879	.403	34	PGT 6	MVGT 6
C	8.0 to 12.0	.780	.887	.381	36	PGT 7	MVGT 7
C	over 12.0	.780	.895	.358	38	PGT 8	MVGT 8
AB	up to 7.35	.612	.612	.238	34	PGT 9	MVGT 9
AB	over 7.35	.612	.625	.203	38	PGT 10	MVGT 10



API Ring

Dimensions

Description	IC	R	T	B	Q	Angle°
PGN 1A	.457	1/32	3/16	.750	.198	46
PGN 2A	.573	1/32	3/16	1.000	.198	46



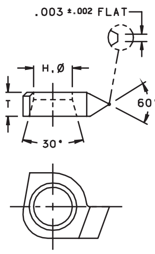
Description	Uncoated Grade	EDP No.	SS	Coated Grade	EDP No.	SS
PGN 1 A	SS160	083102	S	—	—	—
PGN 2 A	SS160	083105	S	—	—	—

TIGHR

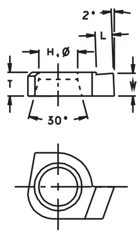
Dimensions

Description	T	H	W
G I	.092	.152	.090
T I	.094	.152	—

TI



GI

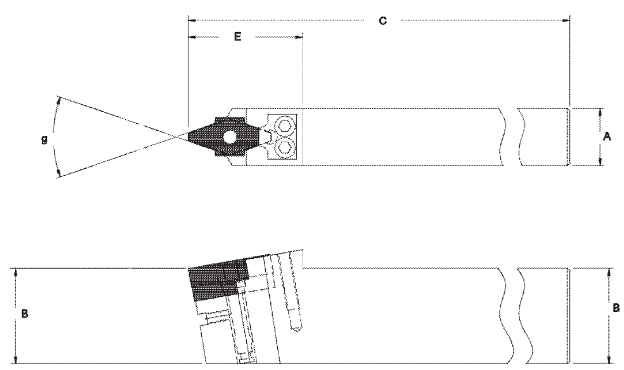


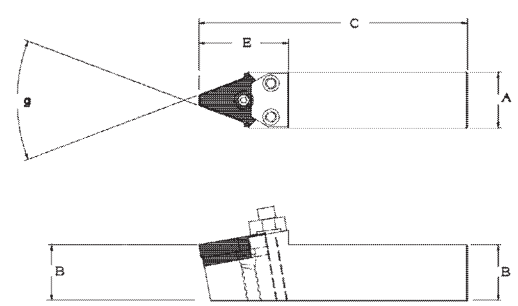
Description	Uncoated Grade	EDP No.	SS	Coated Grade	EDP No.	SS
G I	SC20	074942	S	SA180	074944	S
	SS70	074943	S	—	—	—
T I	SC20	074939	S	SA180	074941	S
	SS70	074940	S	—	—	—

Style	EDP	G	A	B	C	Shim EDP	Clamp
T3V36-DB	090770	36 DEG.	.750"	1.250"	6.000"	090785	HC-13
T3V38-DB	090771	38 DEG.	.750"	1.250"	6.000"	090786	HC-13
T3V40-DB	090772	40 DEG.	.750"	1.250"	6.000"	090787	HC-13
T3V42-DB	090773	42 DEG.	.750"	1.250"	6.000"	090788	HC-13
T5V38-DB	090774	38 DEG.	1.000"	1.250"	6.000"	090789	HC-15
T5V40-DB	090775	40 DEG.	1.000"	1.250"	6.000"	090790	HC-15
T5V42-DB	090776	42 DEG.	1.000"	1.250"	6.000"	090791	HC-15
T8V-XX-DB	090781	38-40-42 DEG.	1.250"	1.250"	6.000"	090796	CV8V
TCV-XX-DB	090784	34-36-38 DEG.	1.250"	1.250"	6.000"	090797	CV8V
TAB34-DB	090777	34 DEG.	1.000"	1.250"	6.000"	090792	HC-15
TAB38-DB	090778	38 DEG.	1.000"	1.250"	6.000"	090793	HC-15

Carbide inserts can be found on next page.

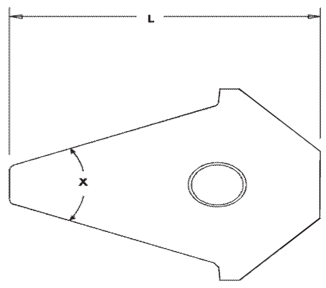
Threading & Grooving

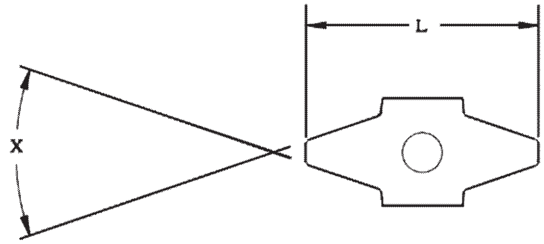




T3V, T5V, TAB are for double ended inserts

Style	EDP	Grade	X	L
3V36-DB	090800	SA20	36	1.086"
3V38-DB	090801	SA20	38	1.086"
3V40-DB	090802	SA20	40	1.086"
3V42-DB	090803	SA20	42	1.086"
5V38-DB	090804	SA20	38	1.581"
5V40-DB	090805	SA20	40	1.581"
5V42-DB	090806	SA20	42	1.581"
8V38-DB	090809	SA20	38	1.500"
8V40-DB	090810	SA20	40	1.500"
8V42-DB	090811	SA20	42	1.500"
AB34-DB	090807	SA20	34	1.482"
AB38-DB	090808	SA20	38	1.482"
CV34-DB	090812	SA20	34	1.482"
CV36-DB	090813	SA20	36	1.300"
CV38-DB	090814	SA20	38	1.300"





3V, 5V, AB are double ended inserts

On Edge Threading

The recommended cutting speed is shown as a range due to the variable hardness of the workpiece material.

1. Use the lower end of the cutting speed range as the material gets harder
2. Use the higher end of the cutting speed range as the material gets softer

Caution:

When setting the speed for threading, check to make sure that you have not exceeded the inches per minute capacity of the machine. To calculate the inches per minute of the cutting tool, **RPM x Thread Pitch (TPI)**

Free Machining Steels
i.e. 1018-1025

	Carbide Grade	Speed SFM
• Hardness 100-150hb	SS160	350-450
	SN160	450-550
	SN550	250-350

Carbon Steels
i.e. 1045-1586

	Carbide Grade	Speed SFM
• Hardness 175-325hb	SS160	250-350
	SN160	350-450
	SN550	150-250

Alloy Steels
i.e. 4140-8620

	Carbide Grade	Speed SFM
• Hardness 150-425hb	SS160	150-250
	SN160	250-350
	SN550	100-200

Tool Steels
i.e. M3, T4, H13, A7, W5

	Carbide Grade	Speed SFM
• Hardness 100-250hb	SS160	150-250
	SN160	250-350

Stainless Steels
i.e. 200 Series, 300 Series

	Carbide Grade	Speed SFM
• Hardness 135-185hb	SC20	150-250
• Free Machining	SN027	250-350
• Austenitic	SN550	100-200
• Annealed		

Stainless Steels
i.e. 400 Series, 500 Series

	Carbide Grade	Speed SFM
• Hardness 135-185hb	SC20	250-350
• Free Machining	SN027	350-450
• Ferritic	SN550	250-350
• Martensitic		
• Annealed		

Stainless Steels
i.e. 17-4ph

	Carbide Grade	Speed SFM
• Hardness 150-440hb	SC20	150-250
• Precipitation Hardening (PH Series)	SN027	200-300
	SN550	125-225

Cast Irons

	Carbide Grade	Speed SFM
• Hardness 120-220hb	SC20	250-350
	SN027	275-375
	SN550	225-325

Aluminum, Copper, Brass, Plastic

	Carbide Grade	Speed SFM
• Hardness 150-425hb	SC20	MAX

Titanium
i.e. Ti-6AL-4V

	Carbide Grade	Speed SFM
• Hardness 320-440hb	SC20	80-100
• Alpha		
• Alpha Beta		
• Solution treated		
• Aged		

Nickel Based Alloys

	Carbide Grade	Speed SFM
	SC20	80-100

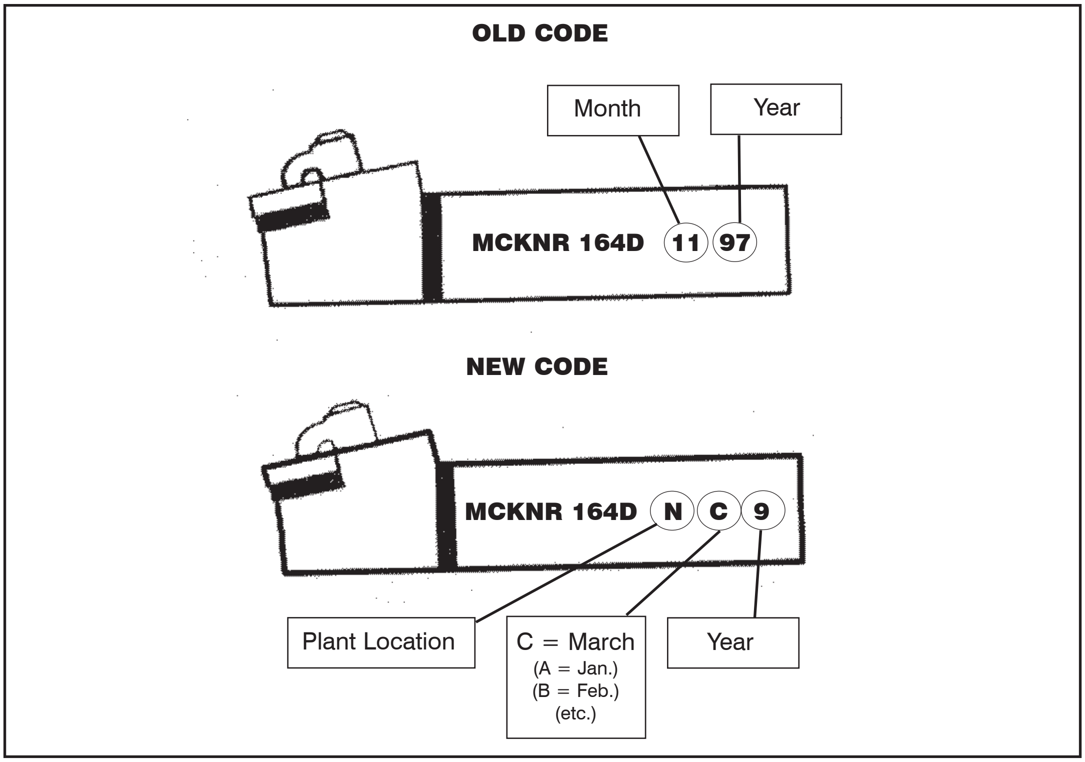
NOTES

NOTES

NOTIFICATION OF POSSIBLE TOOLHOLDER HARDWARE OR NOMENCLATURE CHANGES

DATE CODES ARE THE KEY TO PROPER IDENTIFICATION!

Refer to the drawing below to determine by date code, if you have new or old style. If your holder is old style, refer to catalog page detail for correct components. If holder is new style, call Spe-D-Cut for proper components. Some new style holders will have a nomenclature change, indicating a slight difference in rake angle. See example below. (Old SCLOR has 0° top rake — New SCLPR has +3° top rake).



ANSI Nomenclature - Toolholders

style	M	W	L	N	R	16	4	D
	1	2	3	4	5	6	7	8

1 Holding Method
S- Screw only
M- Clamp and locking pin
C- Clamp only
P- Locking pin only

2 Insert Shape

A-	Parallelogram	85°	M-	Diamond	86°
B-	Parallelogram	82°	O-	Octagon	135°
C-	Diamond	80°	P-	Pentagon	108°
D-	Diamond	55°	R-	Round	360°
E-	Diamond	75°	S-	Square	90°
H-	Hexagon	120°	T-	Triangle	60°
K-	Parallelogram	55°	V-	Diamond	35°
L-	Rectangle	90°	W-	Trigon	80°

3 Toolholder Style
A- Straight shank, 0° side cutting
B- Straight shank, 15° side cutting
C- Straight shank, 0° end cutting
D- Straight shank, 45° side cutting
F- Offset shank, 0° end cutting
G- Offset shank, 0° side cutting
J- Offset shank, -3° side cutting
K- Offset shank, 15° end cutting
L- Offset shank, -5° side & end cutting
M- Straight shank, 40° side cutting
N- Straight shank, 27° side cutting
P- Straight shank, 27.5° side cutting
R- Offset shank, 15° side cutting
S- Offset shank, 45° side cutting
T- Offset shank, 30° side cutting
U- Offset shank, -3° end cutting
V- Straight shank, 17.5° side cutting
W- Offset shank, 30° end cutting

4 Insert Relief Angle
A- 3°
B- 5°
C- 7°
D- 15°
E- 20°
F- 25°
G- 30°
N- 0°
P- 11°

5 Hand of Tool
L- Left
N- Neutral
R- Right

6 Holder Shank Size

Square-	Number of 1/16" of width and height
Rectangular-	First digit - number of 1/8" of width
	Second digit - number of 1/4" of height

7 Insert IC size
This indicates the inscribed circle in 1/8"

8 Shank Qualification
A- Qualified back and end, 4.0" long
B- Qualified back and end, 4.5" long
C- Qualified back and end, 5.0" long
D- Qualified back and end, 6.0" long
E- Qualified back and end, 7.0" long
F- Qualified back and end, 8.0" long
G- Qualified back and end, 5.5" long
H- Qualified front and end, 5.5" long
M- Qualified front and end, 4.0" long
N- Qualified front and end, 4.5" long
P- Qualified front and end, 5.0" long
R- Qualified front and end, 6.0" long
S- Qualified front and end, 7.0" long
T- Qualified front and end, 8.0" long

• All qualified surfaces are ±.003 over proper gage insert radius master gage insert nose radius chart for qualified holders. ±.005 for single wall pocket holders.

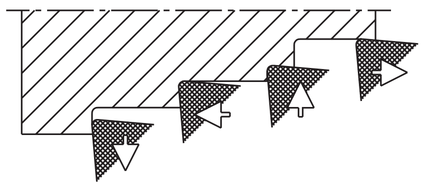
Master Gage Insert Nose Radius Chart

Insert IC	Insert Nose Radius
1/4 5/16	.015
3/8 1/2	.031
5/8 3/4	.047
1.0	.062

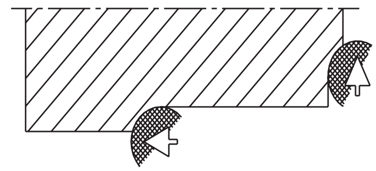
Holders & Swiss Style Tooling

Selection Guide - Side & End Cutting

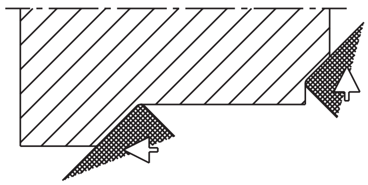
MCLNR/L
MWLNR/L
SCLCR/L
CCLPR/L
CCLFR/L



MRGNR/L
SRGCR/L
CRGPR/L
CRGFR/L

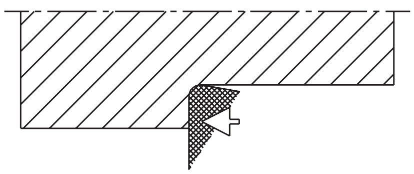


MSSNR/L
CSSPR/L

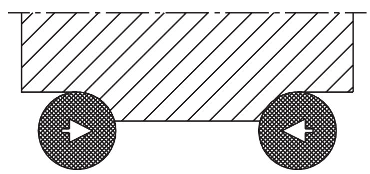


Selection Guide - Side Cutting

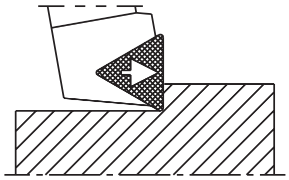
MCGNR/L
MTGNR/L
STGCR/L
CTGPR/L
MTANR/L
CTAPR/L
CTAFR/L



CRCFN

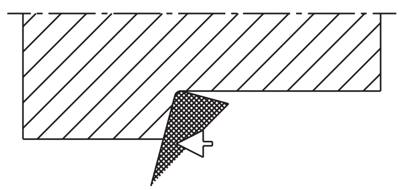


MTWNR
CTWPR

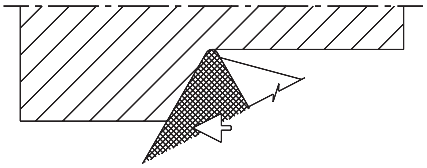


Designed specifically to cut a shoulder when set in 10° overarm bars, cutter holder or knee tools, ie: Warner & Swasey single spindle bar turners or chuck lathes. Also used in 10° lead turning applications.

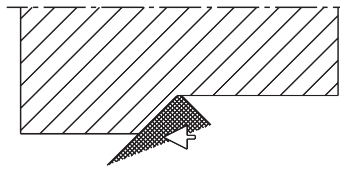
MCRNR/L
MTRNR/L
MSRNR/L
SSRCR/L
CSRPR/L
CTRPR/L
CSRFR/L
CTRFR/L
CSBPR/L
CSBFR/L
CTBFR/L



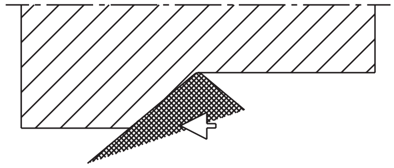
CTTPR/L
CTEPR/L*



MSDNN
SSDCN
CSDPN
CSDFN

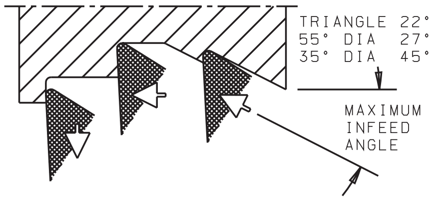


MCYNN*

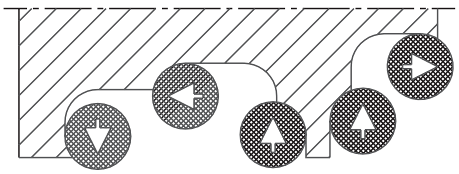


* SPE-D-CUT designation only - not an ANSI standard

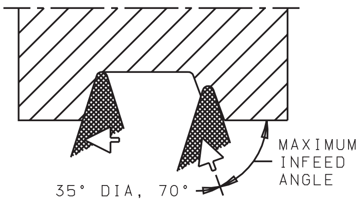
Selection Guide - Profiling



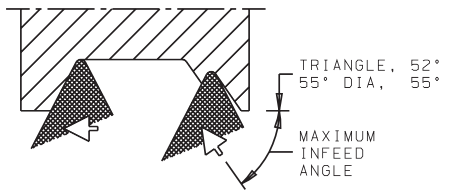
MTJNR/L
MDJNR/L
MVJNR/L
SDJCR/L
SVJBR/L



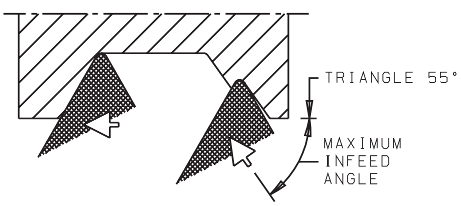
SRSCR/L



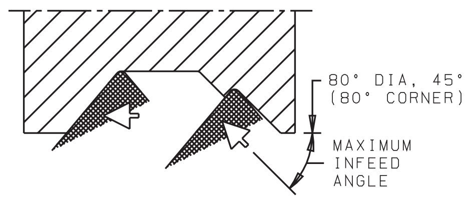
SVVBN



MTPNR/L
MDPNN

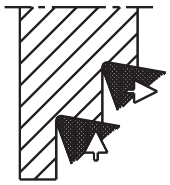


MTENNS

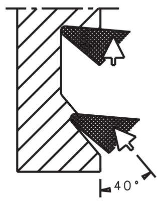


MCMNN

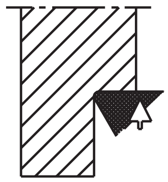
Selection Guide - End Cutting



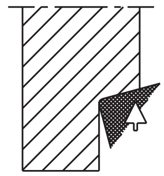
CTCFR/L



MVLNR/L*

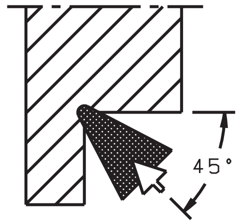


MCFNR/L
MTFNR/L
MTCNN
STFCR/L
CTFPR
CTCPR/L
CTCON



MCKNR/L
MSKNR/L

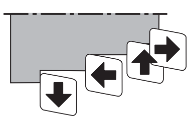
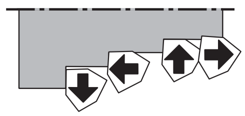
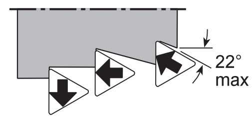
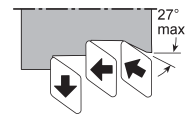
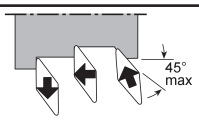
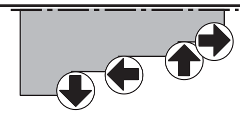
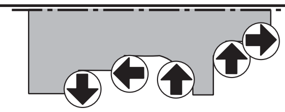
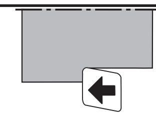
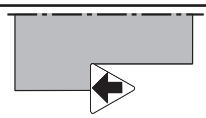
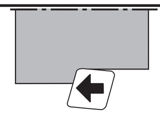
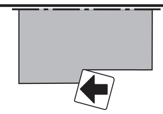
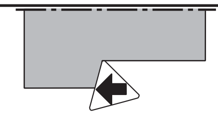
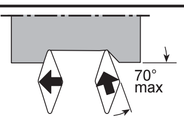
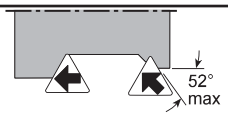
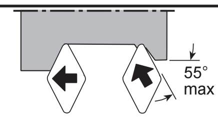
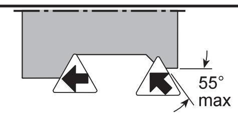
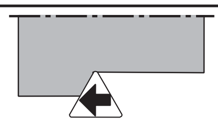
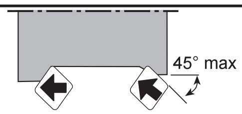
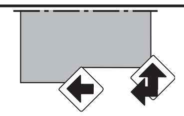
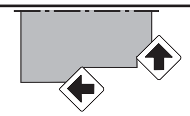
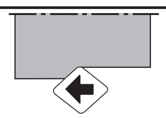
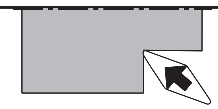
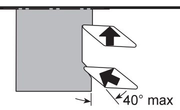
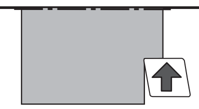
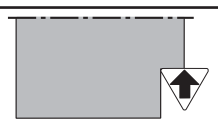
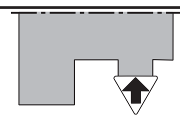
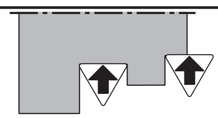
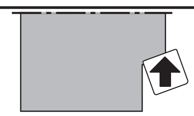
Selection Guide - Specialty Cutting



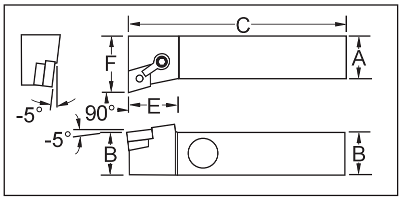
MVNNR/L

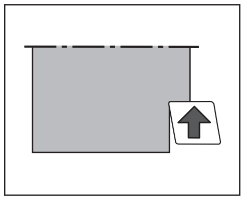
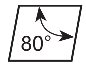
* SPE-D-CUT designation only - not an ANSI standard

Applications

 -5° Side & End Cutting MCLNR/L, SCLCR/L, CCLFR/L, CCLPR/L, SCLOR/L	 -5° Side & End Cutting MWLNR/L	 -3° Side Cutting MTJNR/LS	 -3° Side Cutting MDJNR/L, SDJCR/L, SDJOR/L
 -3° Side Cutting MVJNR/L, SVJBR/L, SVJOR/L	 Side & End Cutting RGPR/L, MRGNR/L, SRGCR/L, CRGFR/L	 Side & End Cutting SRSCR/L	 0° Side Cutting MCGNR/L, SCGOR/L
 0° Side Cutting MTGNR/L, STGCR/L, CTGPR/L, STGOR/L, CTAPR/L, MTANR/L, CTAER/L, CTAFR/L	 15° Side Cutting MCRNR/L, SCROR/L	 15° Side Cutting CSBFR/L, CSBPR/L, CSRFR/L, CSRPR/L, MSRNR/L, SSRCR/L	 15° Side Cutting CTBER/L, CTBFR, CTRFR/L, CTRPR/L, MTRNR/L
 17.5° Side Cutting SVVBN	 27.5° Side Cutting MTNNR/L	 27.5° Side Cutting MDNNN	 30° Side Cutting MTENNS
 30° Side Cutting CTEPR/L, CTTPR/L	 40° Side Cutting MCMNN, SCMON	 45° Side Cutting MSDNN, SSDCN, CSDFN, CSDPN, CSSPR	 45° Side Cutting MSSNR
 50° Side Cutting MCYNN	 -27.5° End Cutting MVNNR/L	 -5° End Cutting MVLNR/L	 0° End Cutting MCFNR/L, SCFOR/L
 0° End Cutting CTFPR/L, STFOR/L, MTFNR/L, STFCR/L	 0° End Cutting MTCNN	 0° End Cutting CTCPR/L, CTCON	 15° End Cutting MCKNR/L, MSKNR/L

MCFNR/L

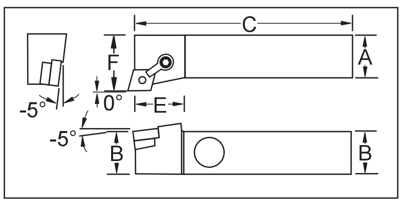


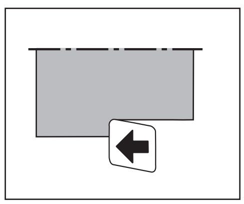
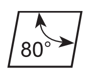



0° End Cutting, Offset Shank, Negative Rake.
CNG, CNGA, CNGG, CNMA, CNMM, CNMG, CNMP, CNMX, CNMZ

Item Desc.	RH EDP	LH EDP	Dimension A	B	C	E	F	Insert IC	T	Shim	Lock Pin	Clamp	Clamp Screw	Shim Screw
MCFNR/L 124	073037	073023	0.750	0.750	4.500	1.250	1.000	1/2	3/16	ICSN 433	NL46	CL20	XNS48	S46
MCFNR/L 164C	076264	076263	1.000	1.000	5.000	1.250	1.250	1/2	3/16	ICSN 433	NL46	CL20	XNS48	S46
MCFNR/L 164D	072468	072460	1.000	1.000	6.000	1.250	1.250	1/2	3/16	ICSN 433	NL46	CL20	XNS48	S46
MCFNR/L 165D	072469	072461	1.000	1.000	6.000	1.380	1.250	5/8	1/4	ICSN 533	NL58	CL12	XNS510	S58
MCFNR/L 166D	072470	072462	1.000	1.000	6.000	1.500	1.250	3/4	1/4	ICSN 633	NL68	CL9	XNS510	S68

MCGNR/L

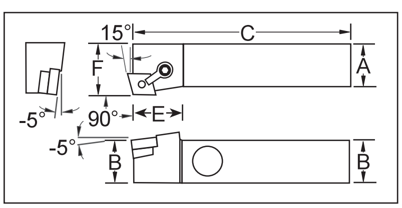


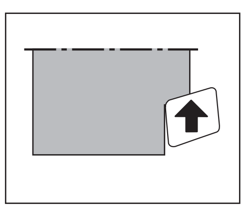
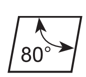



0° Side Cutting, Offset Shank, Negative Rake
CNG, CNGA, CNGG, CNMA, CNMG, CNMM, CNMP, CNMX, CNMZ

Item Desc.	RH EDP	LH EDP	Dimension A	B	C	E	F	Insert IC	T	Shim	Lock Pin	Clamp	Clamp Screw	Shim Screw
MCGNR 124	072395	–	0.750	0.750	4.500	1.250	1.000	1/2	3/16	ICSN 433	NL46	CL20	XNS48	S46
MCGNR/L 164C	076266	076265	1.000	1.000	5.000	1.250	1.250	1/2	3/16	ICSN 433	NL46	CL20	XNS48	S46
MCGNR/L 164D	072396	072386	1.000	1.000	6.000	1.250	1.250	1/2	3/16	ICSN 433	NL46	CL20	XNS48	S46
MCGNR/L 165D	072397	072387	1.000	1.000	6.000	1.312	1.250	5/8	1/4	ICSN 533	NL58	CL12	XNS510	S58
MCGNR/L 166D	072398	072388	1.000	1.000	6.000	1.625	1.250	3/4	1/4	ICSN 633	NL68	CL12	XNS510	S68
MCGNL 856	–	072393	1.000	1.250	6.000	1.625	1.250	3/4	1/4	ICSN 633	NL68	CL12	XNS510	S68

MCKNR/L



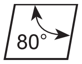



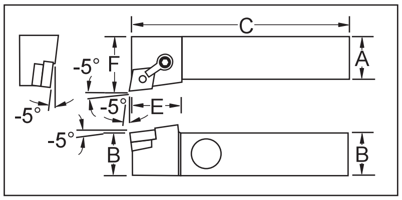
15° End Cutting, Offset Shank, Negative Rake
CNG, CNGA, CNGG, CNMA, CNMG, CNMM, CNMP, CNMX, CNMZ

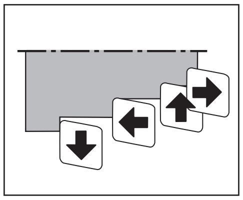
Item Desc.	RH EDP	LH EDP	Dimension A	B	C	E	F	Insert IC	T	Shim	Lock Pin	Clamp	Clamp Screw	Shim Screw
MCKNR 206D	072614	–	1.250	1.250	6.000	1.437	1.500	3/4	1/4	ICSN 633	NL68	CL12	XNS510	S68
MCKNR/L 124B	072611	072603	0.750	0.750	4.500	1.187	1.000	1/2	3/16	ICSN 433	NL46	CL20	XNS48	S46
MCKNR/L 164C	076269	076268	1.000	1.000	5.000	1.187	1.250	1/2	3/16	ICSN 433	NL46	CL20	XNS48	S46
MCKNR/L 164D	072612	072604	1.000	1.000	6.000	1.187	1.250	1/2	3/16	ICSN 433	NL46	CL20	XNS48	S46
MCKNR/L 165D	072613	072605	1.000	1.000	6.000	1.312	1.250	5/8	1/4	ICSN 533	NL58	CL9	XNS59	S58
MCKNR/L 166D	073008	073009	1.000	1.000	6.000	1.437	1.250	3/4	1/4	ICSN 633	NL68	CL12	XNS510	S68

MCLNR/L

-5° Side & End Cutting, Offset Shank
Negative Rake
CNG, CNGA, CNGG, GNMA, CNMG, CNMM, CNMP, CNMX





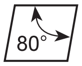


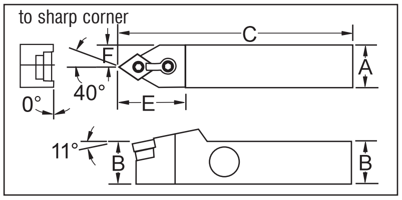
Item Desc.	RH EDP	LH EDP	Dimension A	B	C	E	F	Insert IC	T	Shim	Lock Pin	Clamp	Clamp Screw	Shim Screw
MCLNR/L 124B	072634	072619	0.750	0.750	4.500	1.187	1.000	1/2	3/16	ICSN 433	NL46	CL20	XNS48	S46
MCLNR/L 164C	076275	076270	1.000	1.000	5.000	1.187	1.250	1/2	3/16	ICSN 433	NL46	CL20	XNS48	S46
MCLNR/L 164D	072635	072620	1.000	1.000	6.000	1.187	1.250	1/2	3/16	ICSN 433	NL46	CL20	XNS48	S46
MCLNR 165C	076276	—	1.000	1.000	5.000	1.375	1.250	5/8	1/4	ICSN 533	NL58	CL12	XNS510	S58
MCLNR 165D	072636	—	1.000	1.000	6.000	1.375	1.250	5/8	1/4	ICSN 533	NL58	CL12	XNS510	S58
MCLNR/L 166C	076277	076272	1.000	1.000	5.000	1.500	1.250	3/4	1/4	ICSN 633	NL68	CL12	XNS510	S68
MCLNR/L 166D	072637	072622	1.000	1.000	6.000	1.500	1.250	3/4	1/4	ICSN 633	NL68	CL12	XNS510	S68
MCLNR/L 204D	072638	072623	1.250	1.250	6.000	1.187	1.500	1/2	3/16	ICSN 433	NL46	CL20	XNS48	S46
MCLNR/L 205D	072639	072624	1.250	1.250	6.000	1.375	1.500	5/8	1/4	ICSN 533	NL58	CL12	XNS510	S58
MCLNR/L 206D	072640	072625	1.250	1.250	6.000	1.500	1.500	3/4	1/4	ICSN 633	NL68	CL12	XNS510	S68
MCLNR/L 244D	076278	076273	1.500	1.500	6.000	1.187	2.000	1/2	3/16	ICSN 433	NL46	CL20	XNS48	S46
MCLNR/L 244E	072641	072626	1.500	1.500	7.000	1.187	2.000	1/2	3/16	ICSN 433	NL46	CL20	XNS48	S46
MCLNR/L 246D	076280	076274	1.500	1.500	6.000	1.500	2.000	3/4	1/4	ICSN 633	NL68	CL12	XNS510	S68
MCLNR/L 246E	072642	072627	1.500	1.500	7.000	1.500	2.000	3/4	1/4	ICSN 633	NL68	CL12	XNS510	S68
MCLNR/L 854D	072644	072629	1.000	1.250	6.000	1.187	1.250	1/2	3/16	ICSN 433	NL46	CL20	XNS48	S46
MCLNR/L 856D	072646	072631	1.000	1.250	6.000	1.500	1.250	3/4	1/4	ICSN 633	NL68	CL12	XNS510	S68
MCLNR/L 865E	072647	072632	1.000	1.500	7.000	1.375	1.250	5/8	1/4	ICSN 533	NL58	CL12	XNS510	S58
MCLNR/L 866	—	072633	1.000	1.500	7.000	1.500	1.250	3/4	1/4	ICSN 633	NL68	CL12	XNS510	S68
MCLNR/L 866E	072648	—	1.000	1.500	7.000	1.500	1.250	3/4	1/4	ICSN 633	NL68	CL12	XNS510	S68

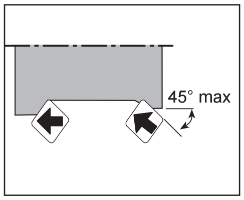
Holders & Swiss Style Tooling

MCMNN

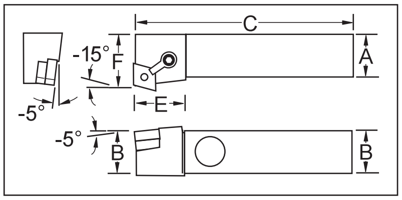
40° Side Cutting, Straight Shank, Negative Rake
CNG, CNGA, CNGG, CNMA, CNMG, CNMM, CNMP, CNMX, CNMZ

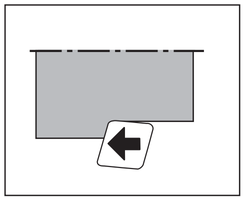




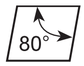


Item Desc.	EDP	Dimension A	B	C	E	F	Insert IC	T	Shim	Lock Pin	Clamp	Clamp Screw	Shim Screw
MCMNN 124 B	072007	0.750	0.750	4.500	1.468	0.375	1/2	3/16	ICSN 433	NL46	CL12	XNS59	S46
MCMNN 164 D	072008	1.000	1.000	6.000	1.468	0.500	1/2	3/16	ICSN 433	NL46	CL12	XNS510	S46
MCMNN 165 D	072010	1.000	1.000	6.000	1.625	0.500	5/8	1/4	ICSN 533	NL58	CL12	XNS510	S58
MCMNN 166 D	072012	1.000	1.000	6.000	1.812	0.500	3/4	1/4	ICSN 633	NL68	CL30	XNS59	S68
MCMNN 206 D	072013	1.250	1.250	7.000	1.812	0.625	3/4	1/4	ICSN 633	NL68	CL30	XNS510	S68



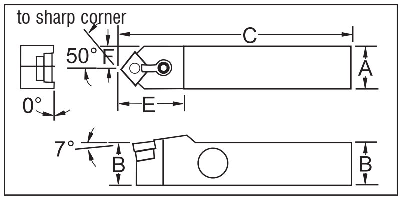


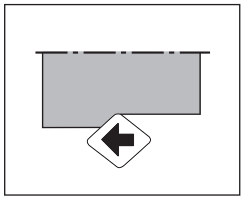
MCRNR/L



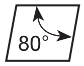
15° Side Cutting, Offset Shank, Negative Rake
CNG, CNGA, CNGG, CNMA, CNMG, CNMM, CNMP, CNMX, CNMZ

Item Desc.	RH EDP	LH EDP	Dimension					Insert		Shim	Lock Pin	Clamp	Clamp Screw	Shim Screw
			A	B	C	E	F	IC	T					
MCRNR/L 124B	072336	072326	0.750	0.750	4.500	1.250	0.751	1/2	3/16	ICSN 433	NL46	CL9	XNS58	S46
MCRNR/L 164C	076282	076281	1.000	1.000	5.000	1.250	1.251	1/2	3/16	ICSN 433	NL46	CL9	XNS58	S46
MCRNR/L 164D	072337	072327	1.000	1.000	6.000	1.250	1.251	1/2	3/16	ICSN 433	NL46	CL9	XNS58	S46
MCRNR/L 165D	072338	072328	1.000	1.000	6.000	1.343	1.251	5/8	1/4	ICSN 533	NL58	CL9	XNS510	S58
MCRNR/L 166	072339	072329	1.000	1.000	6.000	1.375	1.251	3/4	1/4	ICSN 633	NL68	CL12	XNS510	S68
MCRNR/L 205	072340	072330	1.250	1.250	7.000	1.343	1.501	5/8	1/4	ICSN 533	NL58	CL9	XNS510	S58
MCRNR/L 206	072341	072331	1.250	1.250	6.000	1.375	1.501	3/4	1/4	ICSN 633	NL68	CL12	XNS510	S68
MCRNL 246E	072342	072332	1.500	1.500	7.000	1.375	2.001	3/4	1/4	ICSN 633	NL68	CL12	XNS510	S68





MCYNN



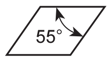
50° Side Cutting, Straight Shank, Negative Rake
CNG, CNGA, CNGG, CNMA, CNMM, CNMG, CNMP, CNMX, CNMZ

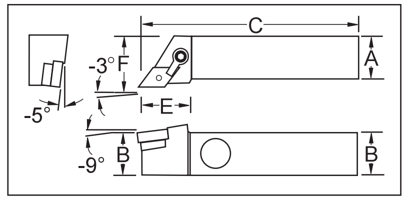
Item Desc.	EDP	Dimension					Insert		Shim	Lock Pin	Clamp	Clamp Screw	Shim Screw
		A	B	C	E	F	IC	T					
MCYNN 124	073053	0.750	0.750	4.500	1.250	0.375	1/2	3/16	ICSN 433	NL46	CL20	XNS46	S46
MCYNN 164	073054	1.000	1.000	6.000	1.250	0.500	1/2	3/16	ICSN 433	NL46	CL20	XNS46	S46
MCYNN 165	073055	1.000	1.000	6.000	1.500	0.500	5/8	1/4	ICSN 533	NL58	CL12	XNS510	S58
MCYNN 166	073056	1.000	1.000	6.000	1.687	0.500	3/4	1/4	ICSN 633	NL68	CL12	XNS510	S68
MCYNN 205	073057	1.250	1.250	7.000	1.500	0.625	5/8	1/4	ICSN 533	NL58	CL12	XNS510	S58
MCYNN 246	073059	1.500	1.500	7.000	1.687	0.750	3/4	1/4	ICSN 633	NL68	CL12	XNS510	S68
MCYNN 854	073060	1.000	1.250	6.000	1.250	0.500	1/2	3/16	ICSN 433	NL46	CL20	XNS46	S46

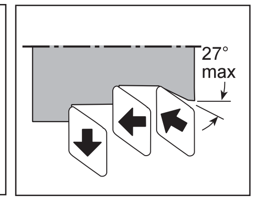
Note: For right/left hand tools, dimensional drawing shows R.H. view, L.H. is opposite.

MDJNR/L

-3° Side Cutting, Offset Shank, Negative Rake
DNGA, DNGG, DNMA, DNMG,
DNMM, DNMP, DNMZ





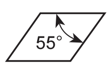


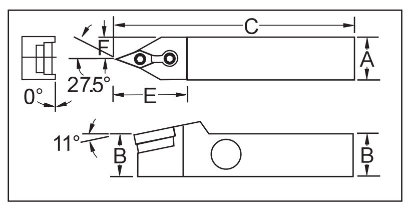
Item Desc.	RH EDP	LH EDP	Dimension					Insert		Shim	Lock Pin	Clamp	Clamp Screw	Shim Screw
			A	B	C	E	F	IC	T					
MDJNR/L 83	073073	073074	0.500	0.500	4.500	1.187	0.750	3/8	1/8	–	NL33	CL7	XNS36	–
MDJNR/L 124B	080389	080390	0.750	0.750	4.500	1.250	1.000	1/2	3/16	IDSN 433	NL46	CL6	XNS36	S46
MDJNR/L 164C	076287	076283	1.000	1.000	5.000	1.250	1.250	1/2	3/16	IDSN 433	NL46	CL20	XNS48	S46
MDJNR/L 164D	072518	072508	1.000	1.000	6.000	1.250	1.250	1/2	3/16	IDSN 433	NL46	CL20	XNS48	S46
MDJNR/L 165C	076288	076284	1.000	1.000	5.000	1.469	1.250	5/8	1/4	IDSN 533	NL58	CL12	XNS510	S58
MDJNR/L 165D	072519	072509	1.000	1.000	6.000	1.469	1.250	5/8	1/4	IDSN 533	NL58	CL12	XNS510	S58
MDJNR/L 204D	072520	072510	1.250	1.250	6.000	1.250	1.500	1/2	3/16	IDSN 433	NL46	CL20	XNS48	S46
MDJNR/L 205D	072521	072511	1.250	1.250	6.000	1.469	1.500	5/8	1/4	IDSN 533	NL58	CL12	XNS510	S58
MDJNR/L 244D	076290	076285	1.500	1.500	6.000	1.250	2.000	1/2	3/16	IDSN 433	NL46	CL20	XNS48	S46
MDJNR/L 244E	072522	072512	1.500	1.500	7.000	1.250	2.000	1/2	3/16	IDSN 433	NL46	CL20	XNS48	S46
MDJNR/L 245D	076291	076286	1.500	1.500	6.000	1.469	2.000	5/8	1/4	IDSN 533	NL58	CL12	XNS510	S58
MDJNR/L 245E	072523	072513	1.500	1.500	7.000	1.469	2.000	5/8	1/4	IDSN 533	NL58	CL12	XNS510	S58
MDJNR 854D	072525	–	1.000	1.000	6.000	1.250	1.250	1/2	3/16	IDSN 433	NL46	CL20	XNS48	S46
MDJNR 865E	072527	–	1.000	1.000	7.000	1.469	1.250	5/8	1/4	IDSN 533	NL58	CL12	XNS510	S58

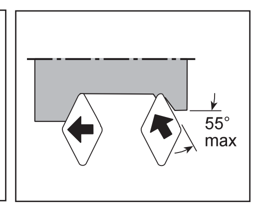
Holders & Swiss Style Tooling

MDNNN

27.5° Side Cutting, Straight Shank, Negative Rake
DNGA, DNGG, DNMA, DNMG,
DNMM, DNMP, DNMZ

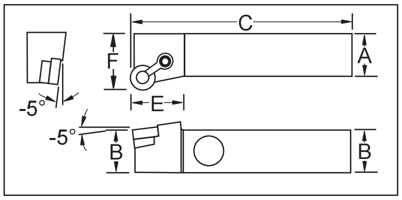


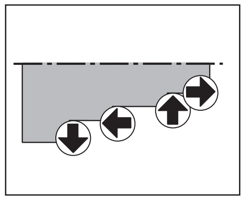




Item Desc.	EDP	Dimension					Insert		Shim	Lock Pin	Clamp	Clamp Screw	Shim Screw
		A	B	C	E	F	IC	T					
MDNNN 164D	072573	1.000	1.000	6.000	1.625	0.500	1/2	3/16	IDSN 433	NL46	CL12	XNS510	S46
MDNNN 165D	072574	1.000	1.000	6.000	1.922	0.500	5/8	1/4	IDSN 533	NL58	CL12	XNS510	S58
MDNNN 205D	072575	1.250	1.250	6.000	1.922	0.625	5/8	1/4	IDSN 533	NL58	CL12	XNS510	S58
MDNNN 245D	076292	1.500	1.500	6.000	1.922	0.750	5/8	1/4	IDSN 533	NL58	CL12	XNS510	S58
MDNNN 245E	072576	1.500	1.500	7.000	1.922	0.750	5/8	1/4	IDSN 533	NL58	CL12	XNS510	S58

Note: For right/left hand tools, dimensional drawing shows R.H. view, L.H. is opposite.

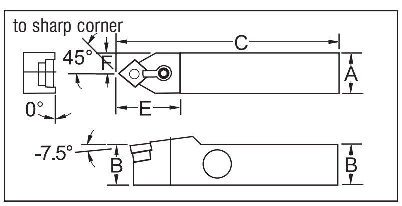


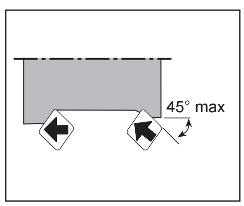


MRGNR/L

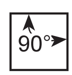
Side & End Cutting, Offset Shank, Negative Rake
RNG, RNMA, RNMG, RNMP

Item Desc.	RH EDP	LH EDP	Dimension A	B	C	E	F	Insert IC	T	Shim	Lock Pin	Clamp	Clamp Screw	Shim Screw
MRGNR/L 83	073013	073014	0.500	0.500	4.500	0.937	0.750	3/8	1/8	IRSN 32	NL34	CL6	XNS36	S34
MRGNR/L 123B	072454	072448	0.750	0.750	4.500	0.937	1.000	3/8	1/8	IRSN 32	NL34	CL6	XNS36	S34
MRGNR 124B	072455	–	0.750	0.750	4.500	1.187	1.000	1/2	3/16	IRSN 43	NL46	CL9	XNS59	S46
MRGNR/L 163	073015	–	1.000	1.000	6.000	0.937	1.250	3/8	1/8	IRSN 32	NL34	CL6	XNS36	S34
MRGNR/L 164C	076294	076293	1.000	1.000	5.000	1.187	1.250	1/2	3/16	IRSN 43	NL46	CL9	XNS59	S46
MRGNR/L164D	072456	072450	1.000	1.000	6.000	1.187	1.250	1/2	3/16	IRSN 43	NL46	CL9	XNS59	S46
MRGNR/L 204D	072457	072451	1.250	1.250	6.000	1.187	1.500	1/2	3/16	IRSN 43	NL46	CL9	XNS59	S46
MRGNR/L 206D	073019	073020	1.250	1.250	6.000	1.125	1.500	3/4	1/4	IRSN 63	NL68	CL12	XNS58	S68
MRGNR/L 246	072990	072989	1.500	1.500	7.000	1.125	2.000	3/4	1/4	IRSN 63	NL68	CL12	XNS58	S68
MRGNR 248	073021	–	1.500	1.500	7.000	1.562	2.000	1	3/8	IRSN 84	NL810	CL24	XNS610	S810
MRGNR/L 854D	072458	072452	1.000	1.000	6.000	1.187	1.250	1/2	3/16	IRSN 43	NL46	CL9	XNS59	S46
MRGNL 864	072459	072453	1.000	1.000	7.000	1.187	1.250	1/2	3/16	IRSN 43	NL46	CL9	XNS59	S46





MSDNN



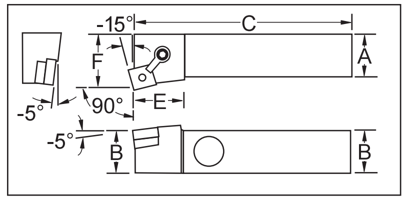
45° Side Cutting, Straight Shank, Negative Rake
SNG, SNGA, SNMA, SNMG, SNMM,
SNMP, SNMX, SNMZ, SNU

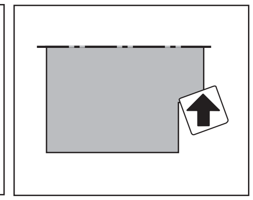
Item Desc.	EDP	Dimension A	B	C	E	F	Insert IC	T	Shim	Lock Pin	Clamp	Clamp Screw	Shim Screw
MSDNN 83	072373	0.500	0.500	4.500	1.000	0.250	3/8	1/8	ISSN 322	NL34	CL6	XNS36	S34
MSDNN 103	072374	0.625	0.625	4.500	1.000	0.312	3/8	1/8	ISSN 322	NL34	CL6	XNS36	S34
MSDNN 123	072375	0.750	0.750	4.500	1.000	0.375	3/8	1/8	ISSN 322	NL34	CL6	XNS36	S34
MSDNN 124	072376	0.750	0.750	4.500	1.375	0.375	1/2	3/16	ISSN 433	NL46	CL9	XNS59	S46
MSDNN 164	072377	1.000	1.000	6.000	1.375	0.500	1/2	3/16	ISSN 433	NL46	CL9	XNS59	S46
MSDNN 165	072378	1.000	1.000	6.000	1.609	0.500	5/8	1/4	ISSN 533	NL58	CL12	XNS510	S58
MSDNN 166	072996	1.000	1.000	6.000	1.625	0.500	3/4	1/4	ISSN 633	NL68	CL12	XNS510	S68
MSDNN 206	072379	1.250	1.250	7.000	1.625	0.625	3/4	1/4	ISSN 633	NL68	CL12	XNS510	S68
MSDNN 246	072380	1.500	1.500	7.000	1.625	0.750	3/4	1/4	ISSN 633	NL68	CL12	XNS510	S68
MSDNN 854	072995	1.000	1.250	6.000	1.375	0.500	1/2	3/16	ISSN 433	NL46	CL9	XNS59	S46
MSDNN 855	072381	1.000	1.250	6.000	1.609	0.500	5/8	1/4	ISSN 533	NL58	CL12	XNS510	S58
MSDNN 856	072382	1.000	1.250	6.000	1.625	0.500	3/4	1/4	ISSN 633	NL68	CL12	XNS510	S68
MSDNN 865	072383	1.000	1.500	7.000	1.609	0.500	5/8	1/4	ISSN 533	NL58	CL12	XNS510	S58
MSDNN 866	072384	1.000	1.500	7.000	1.625	0.500	3/4	1/4	ISSN 633	NL68	CL12	XNS510	S68

Note: For right/left hand tools, dimensional drawing shows R.H. view, L.H. is opposite.

MSKNR/L

15° End Cutting, Offset Shank, Negative Rake
SNG, SNGA, SNGG, SNMA, SNMG, SNMM, SNMP, SNMX, SNMZ, SNU

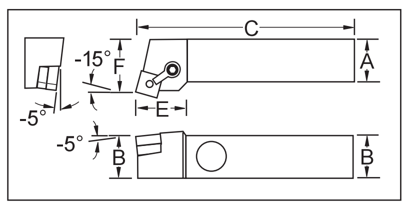


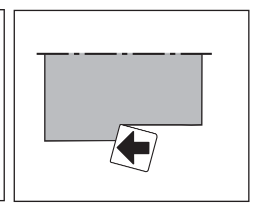


Item Desc.	RH EDP	LH EDP	Dimension A	B	C	E	F	Insert IC	T	Shim	Lock Pin	Clamp	Clamp Screw	Shim Screw
MSKNR/L 83	072561	072549	0.500	0.500	4.500	1.000	0.625	3/8	1/8	ISSN 322	NL34	CL6	XNS36	S34
MSKNR/L 103	072562	072550	0.625	0.625	4.500	1.000	0.750	3/8	1/8	ISSN 322	NL34	CL6	XNS36	S34
MSKNR/L 123	072563	072551	0.750	0.750	4.500	1.000	0.875	3/8	1/8	ISSN 322	NL34	CL6	XNS36	S34
MSKNR/L 124B	072564	072552	0.750	0.750	4.500	1.219	1.000	1/2	3/16	ISSN 433	NL46	CL9	XNS59	S46
MSKNR/L 164C	076298	076297	1.000	1.000	5.000	1.219	1.250	1/2	3/16	ISSN 433	NL46	CL9	XNS59	S46
MSKNR/L 164D	072565	072553	1.000	1.000	6.000	1.219	1.250	1/2	3/16	ISSN 433	NL46	CL9	XNS59	S46
MSKNL 165	–	072554	1.000	1.000	6.000	1.344	1.250	5/8	1/4	ISSN 533	NL58	CL12	XNS510	S58
MSKNR 165D	072566	–	1.000	1.000	6.000	1.344	1.250	5/8	1/4	ISSN 533	NL58	CL12	XNS510	S58
MSKNR/L 205D	072567	072555	1.250	1.250	6.000	1.344	1.500	5/8	1/4	ISSN 533	NL58	CL12	XNS510	S58
MSKNL 206	–	072556	1.250	1.250	6.000	1.500	1.500	3/4	1/4	ISSN 633	NL68	CL12	XNS510	S68
MSKNR 206D	072568	–	1.250	1.250	6.000	1.500	1.500	3/4	1/4	ISSN 633	NL68	CL12	XNS510	S68
MSKNR 246D	076301	–	1.500	1.500	6.000	1.500	2.000	3/4	1/4	ISSN 633	NL68	CL12	XNS510	S68
MSKNR 246E	072569	–	1.500	1.500	7.000	1.500	2.000	3/4	1/4	ISSN 633	NL68	CL12	XNS510	S68
MSKNR/L 855D	072570	072558	1.000	1.250	6.000	1.344	1.250	5/8	1/4	ISSN 533	NL58	CL12	XNS510	S58

MSRNR/L

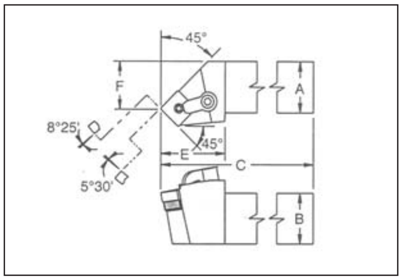
15° Side Cutting, Offset Shank, Negative Rake
SNG, SNGA, SNGG, SNMA, SNMG, SNMM, SNMP, SNMX, SNMZ, SNU

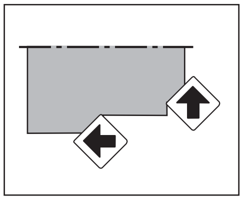




Item Desc.	RH EDP	LH EDP	Dimension A	B	C	E	F	Insert IC	T	Shim	Lock Pin	Clamp	Clamp Screw	Shim Screw
MSRNR/L 83	072308	072295	0.500	0.500	4.500	1.062	0.660	3/8	1/8	ISSN 322	NL34	CL6	XNS36	S34
MSRNR/L 103	072309	072296	0.625	0.625	4.500	1.062	0.785	3/8	1/8	ISSN 322	NL34	CL6	XNS36	S34
MSRNR/L 123	072310	072297	0.750	0.750	4.500	1.062	0.910	3/8	1/8	ISSN 322	NL34	CL6	XNS36	S34
MSRNR/L 124B	072311	072298	0.750	0.750	4.500	1.234	0.880	1/2	3/16	ISSN 433	NL46	CL9	XNS59	S46
MSRNR/L 164C	076304	076302	1.000	1.000	5.000	1.234	1.130	1/2	3/16	ISSN 433	NL46	CL9	XNS59	S46
MSRNR/L 164D	072312	072299	1.000	1.000	6.000	1.234	1.130	1/2	3/16	ISSN 433	NL46	CL9	XNS59	S46
MSRNR/L 165	072313	072300	1.000	1.000	6.000	1.343	1.103	5/8	1/4	ISSN 533	NL58	CL12	XNS510	S58
MSRNR 165C	076305	–	1.000	1.000	5.000	1.343	1.103	5/8	1/4	ISSN 533	NL58	CL12	XNS510	S58
MSRNR/L 166	073033	073034	1.000	1.000	6.000	1.500	1.071	3/4	1/4	ISSN 633	NL68	CL12	XNS510	S68
MSRNR/L 205D	072314	072301	1.250	1.250	6.000	1.343	1.353	5/8	1/4	ISSN 533	NL58	CL12	XNS510	S58
MSRNR/L 206D	072315	072302	1.250	1.250	6.000	1.500	1.315	3/4	1/4	ISSN 633	NL68	CL12	XNS510	S68
MSRNR/L 246D	076306	076303	1.500	1.500	6.000	1.500	1.821	3/4	1/4	ISSN 633	NL68	CL12	XNS510	S68
MSRNR/L 246E	072316	072303	1.500	1.500	7.000	1.500	1.821	3/4	1/4	ISSN 633	NL68	CL12	XNS510	S68
MSRNR/L 248	073035	073036	1.500	1.500	7.000	1.625	1.772	1	3/8	ISSN 846	NL810	CL24	XNS610	S810
MSRNR/L 328	072317	-	2.000	2.000	8.000	1.625	2.266	1	3/8	ISSN 846	NL810	CL24	XNS610	S810
MSRNR/L 854	073030	073031	1.000	1.250	6.000	1.234	1.130	1/2	3/16	ISSN 433	NL46	CL9	XNS59	S46
MSRNR/L 855D	072318	072305	1.000	1.250	6.000	1.343	1.103	5/8	1/4	ISSN 533	NL58	CL12	XNS510	S58
MSRNR/L 856D	072319	072306	1.000	1.250	6.000	1.500	1.071	3/4	1/4	ISSN 633	NL68	CL12	XNS510	S68
MSRNR/L 866	072320	072307	1.000	1.500	7.000	1.500	1.071	3/4	1/4	ISSN 633	NL68	CL12	XNS510	S68

Note: For right/left hand tools, dimensional drawing shows R.H. view, L.H. is opposite.

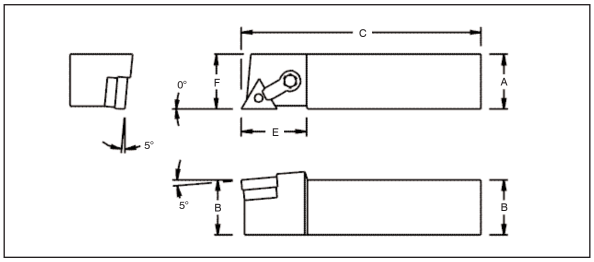




MSSNR/L

45° Side Cutting, Offset Shank, Negative Rake
SNG, SNGA, SNGG, SNMA, SNMG, SNMM, SNMP, SNMX, SNMZ, SNU

Item Desc.	RH EDP	LH EDP	Dimension A	B	C	E	F	H	Insert IC	T	Shim	Lock Pin	Clamp	Clamp Screw
MSSNR/L 83	073038	073039	0.500	0.500	4.500	1.000	0.404	0.239	3/8	1/8	ISSN 322	NL34	CL6	XNS36
MSSNR/L 124B	072670	072657	0.750	0.750	4.500	1.234	0.675	0.328	1/2	3/16	ISSN 433	NL46	CL9	XNS59
MSSNR/L 164C	076308	076307	1.000	1.000	5.000	1.234	0.925	0.328	1/2	3/16	ISSN 433	NL46	CL9	XNS59
MSSNR/L 164D	072671	072658	1.000	1.000	6.000	1.234	0.925	0.328	1/2	3/16	ISSN 433	NL46	CL9	XNS59
MSSNR/L 205D	072673	072660	1.250	1.250	6.000	1.375	1.097	0.403	5/8	1/4	ISSN 533	NL58	CL9	XNS510
MSSNR/L 206D	072674	072661	1.250	1.250	6.000	1.484	1.011	0.491	3/4	1/4	ISSN 633	NL68	CL9	XNS510
MSSNR 328	072676	—	2.000	2.000	8.000	1.906	1.858	0.655	1	3/8	ISSN 846	NL810	CL24	XNS610



MTANR/L

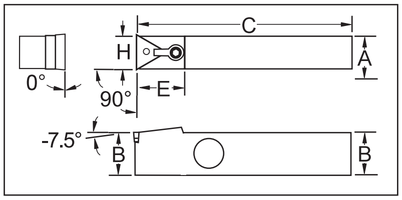
0° Side Cutting, Straight Shank, Negative Rake
TNG, TNGG, TNMA, TNMG, TNMM, TNMP, TNMX, TNMZ, TNU

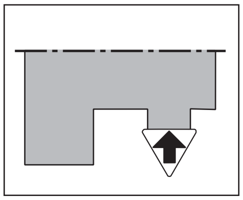
Item Desc.	RH EDP	LH EDP	Dimension A	B	C	E	F	Insert IC	T	Shim	Lock Pin	Clamp	Clamp Screw	Shim Screw
MTANR/L 82	072267	072281	0.500	0.500	4.500	0.875	0.500	1/4	1/8	—	NL23	CL19	XNS36	—
MTANR 102	072268	—	0.625	0.625	4.500	0.875	0.625	1/4	1/8	—	NL23	CL19	XNS36	—
MTANR/L 103	072269	072283	0.625	0.625	4.500	1.000	0.625	3/8	1/8	ITSN 333	NL34L	CL6	XNS36	S34
MTANR/L 123	072270	072284	0.750	0.750	4.500	1.000	0.750	3/8	1/8	ITSN 333	NL34L	CL6	XNS36	S34
MTANR/L 163	072271	072285	1.000	1.000	6.000	1.000	1.000	3/8	1/8	ITSN 333	NL34L	CL6	XNS36	S34
MTANR/L 164	072272	072286	1.000	1.000	6.000	1.218	1.000	1/2	3/16	ITSN 432	NL46	CL9	XNS59	S46
MTANR 165	072273	—	1.000	1.000	6.000	1.375	1.000	5/8	1/4	ITSN 533	NL58	CL9	XNS510	S58
MTANR/L 204	073026	—	1.250	1.250	7.000	1.218	1.250	1/2	3/16	ITSN 432	NL46	CL9	XNS59	S46
MTANR/L 205	072274	072288	1.250	1.250	7.000	1.375	1.250	5/8	1/4	ITSN 533	NL58	CL9	XNS510	S58
MTANR/L 246	072275	—	1.500	1.500	7.000	1.484	1.500	3/4	3/8	ITSN 636	NL68L	CL12	XNS510	S68
MTANR/L 643	072276	072290	0.750	1.000	6.000	1.000	0.750	3/8	1/8	ITSN 333	NL34L	CL6	XNS36	S34
MTANR 854	072277	—	1.250	1.250	6.000	1.218	1.250	1/2	3/16	ITSN 432	NL46	CL9	XNS59	S46
MTANR/L 864	072279	072293	1.500	1.500	7.000	1.218	1.500	1/2	3/16	ITSN 432	NL46	CL9	XNS59	S46

Note: For right/left hand tools, dimensional drawing shows R.H. view, L.H. is opposite.

MTCNN

0° End Cutting, Insert Centered on Shank, Negative Rake. TNG, TNGG, TNMA, TNMG, TNMM, TNMP, TNMX, TNMZ, TNU





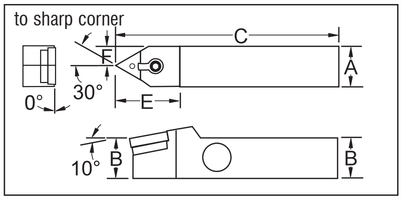
Item Desc.	RH EDP	Dimension A	B	C	E	F	Insert IC	T	Shim	Lock Pin	Clamp	Clamp Screw	Shim Screw
MTCNN 83	072321	0.500	0.500	4.500	1.125	—	3/8	1/8	ITSN322	NL34	CL7	XNS36	S34
MTCNN 124	072322	0.750	0.750	4.500	1.375	—	1/2	3/16	ITSN432	NL46	CL12	XNS59	S46
MTCNN 443	072323	0.500	1.000	8.000	1.125	—	3/8	1/8	ITSN333	NL34L	CL7	XNS36	S34
MTCNN 644	072324	0.750	1.000	8.000	1.375	—	1/2	3/16	ITSN432	NL46	CL12	XNS59	S46
MTCNN 664	072325	0.750	1.500	8.000	1.375	—	1/2	3/16	ITSN432	NL46	CL12	XNS59	S46

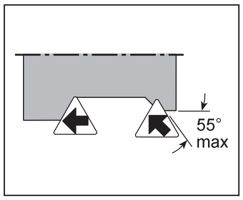
H Dimension

Insert	TNMx321	TNMx322	TNMx323	TNMx324	TNMx431	TNMx432	TNMx433	TNMx434	TNMx438
H Dimension	.626	.603	.580	.557	.843	.820	.797	.774	.683

MTENNS

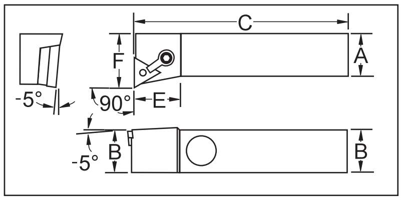
30° Side Cutting, Straight Shank, Negative Rake TNGG, TNMA, TNMG, TNMM, TNMP, TNMX, TNMZ

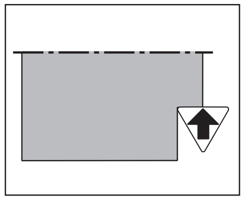




Item Desc.	RH EDP	Dimension A	B	C	E	F	Insert IC	T	Shim	Lock Pin	Clamp	Clamp Screw
MTENNS 82	072405	0.500	0.500	4.500	1.000	2.500	1/4	1/8	—	NL23	CL6	XNS36
MTENNS 103	072406	0.625	0.625	4.500	1.156	0.312	3/8	1/8	ITSN 333	NL34L	CL6	XNS36
MTENNS 123	072407	0.750	0.750	4.500	1.156	0.375	3/8	1/8	ITSN 333	NL34L	CL6	XNS36
MTENNS 164	072408	1.000	1.000	6.000	1.406	0.500	1/2	3/16	ITSN 432	NL46	CL9	XNS59
MTENNS 205	072409	1.250	1.250	7.000	1.620	0.625	5/8	1/4	ITSN 533	NL58	CL9	XNS510
MTENNS 854	072410	1.000	1.250	6.000	1.406	0.500	1/2	3/16	ITSN 432	NL46	CL9	XNS59
MTENNS 864	072412	1.000	1.500	7.000	1.406	0.500	1/2	3/16	ITSN 432	NL46	CL9	XNS59
MTENNS 865	072413	1.000	1.500	7.000	1.620	0.500	5/8	1/4	ITSN 533	NL58	CL9	XNS510

Note: For right/left hand tools, dimensional drawing shows R.H. view, L.H. is opposite.



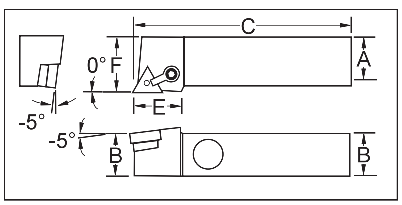


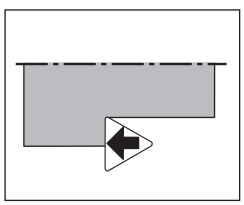
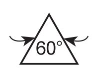

MTFNR/L

0° End Cutting, Offset Shank, Negative Rake
TNG, TNGG, TNMA, TNMG, TNMM, TNMP, TNMX, TNMZ, TNU

Item Desc.	RH EDP	LH EDP	Dimension A	Dimension B	Dimension C	Dimension E	Dimension F	Insert IC	Insert T	Shim	Lock Pin	Clamp	Clamp Screw	Shim Screw
MTFNR/L 82	072426	072414	0.500	0.500	4.500	0.813	0.750	1/4	1/8	—	NL23	CL19	XNS36	—
MTFNR/L 103	072428	072416	0.625	0.625	4.500	0.875	0.875	3/8	1/8	ITSN 333	NL34L	CL6	XNS36	S34
MTFNR/L 122	073004	073005	0.750	0.750	4.500	0.813	1.000	1/4	1/8	—	NL23	CL19	XNS36	—
MTFNR/L 123B	072429	072417	0.750	0.750	4.500	0.875	1.000	3/8	1/8	ITSN 333	NL34L	CL6	XNS36	S34
MTFNR/L 163C	076314	076309	1.000	1.000	5.000	0.875	1.250	3/8	1/8	ITSN 333	NL34L	CL6	XNS36	S34
MTFNR/L 163D	072430	072418	1.000	1.000	6.000	0.875	1.250	3/8	1/8	ITSN 333	NL34L	CL6	XNS36	S34
MTFNR/L 164C	076315	076310	1.000	1.000	5.000	1.218	1.250	1/2	3/16	ITSN 432	NL46	CL9	XNS510	S46
MTFNR/L 164D	072431	072419	1.000	1.000	6.000	1.218	1.250	1/2	3/16	ITSN 432	NL46	CL9	XNS510	S46
MTFNR/L 165C	076316	076311	1.000	1.000	5.000	1.375	1.250	5/8	1/4	ITSN 533	NL58	CL12	XNS510	S58
MTFNR/L 165D	072432	072420	1.000	1.000	6.000	1.375	1.250	5/8	1/4	ITSN 533	NL58	CL12	XNS510	S58
MTFNR/L 204D	072433	072421	1.250	1.250	6.000	1.218	1.500	1/2	3/16	ITSN 432	NL46	CL9	XNS510	S46
MTFNR/L 205D	072434	072422	1.250	1.250	6.000	1.375	1.500	5/8	1/4	ITSN 533	NL58	CL12	XNS510	S58
MTFNL 244D	—	076312	1.500	1.500	6.000	1.218	2.000	1/2	3/16	ITSN 432	NL46	CL9	XNS510	S46
MTFNL 244E	—	072423	1.500	1.500	7.000	1.218	2.000	1/2	3/16	ITSN 432	NL46	CL9	XNS510	S46
MTFNR/L 246D	076317	076313	1.500	1.500	6.000	1.500	2.000	3/4	3/8	ITSN 636	NL68L	CL12	XNS510	S68
MTFNR/L 246E	072437	072425	1.500	1.500	7.000	1.500	2.000	3/4	3/8	ITSN 636	NL68L	CL12	XNS510	S68
MTFNL 854	—	072444	1.000	1.250	6.000	1.218	1.250	1/2	3/16	ITSN 432	NL46	CL9	XNS510	S46
MTFNR 854D	072439	—	1.000	1.250	6.000	1.218	1.250	1/2	3/16	ITSN 432	NL46	CL9	XNS510	S46
MTFNR/L 855D	072440	072445	1.000	1.250	6.000	1.375	1.250	5/8	1/4	ITSN 533	NL58	CL12	XNS510	S58
MTFNL 865	—	072446	1.000	1.500	7.000	1.375	1.250	5/8	1/4	ITSN 533	NL58	CL12	XNS510	S58

Holders & Swiss Style Tooling



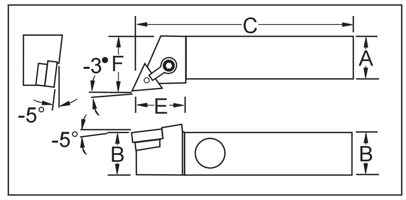
MTGNR/L

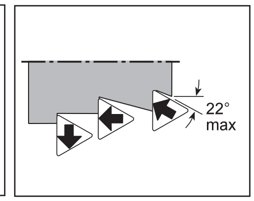
0° Side Cutting, Offset Shank, Negative Rake
TNG, TNGG, TNMA, TNMG, TNMM, TNMP, TNMX, TNMZ, TNU

Item Desc.	RH EDP	LH EDP	Dimension A	Dimension B	Dimension C	Dimension E	Dimension F	Insert IC	Insert T	Shim	Lock Pin	Clamp	Clamp Screw	Shim Screw
MTGNR/L 82A	072492	072476	0.500	0.500	4.000	0.875	0.625	1/4	1/8	—	NL23	CL19	XNS36	—
MTGNR/L 102A	072493	072477	0.625	0.625	4.000	0.875	0.750	1/4	1/8	—	NL23	CL19	XNS36	—
MTGNR/L 103B	072494	072478	0.625	0.625	4.000	0.937	0.875	3/8	1/8	ITSN 333	NL34L	CL6	XNS36	S34
MTGNR/L 123B	072495	072479	0.750	0.750	4.500	0.937	1.000	3/8	1/8	ITSN 333	NL34L	CL6	XNS36	S34
MTGNR/L 163C	076328	076318	1.000	1.000	5.000	0.937	1.250	3/8	1/8	ITSN 333	NL34L	CL6	XNS36	S34
MTGNR/L 163D	072496	072480	1.000	1.000	6.000	0.937	1.250	3/8	1/8	ITSN 333	NL34L	CL6	XNS36	S34
MTGNR/L 164C	076329	076319	1.000	1.000	5.000	1.187	1.250	1/2	3/16	ITSN 432	NL46	CL9	XNS510	S46
MTGNR/L 164D	072497	072481	1.000	1.000	6.000	1.187	1.250	1/2	3/16	ITSN 432	NL46	CL9	XNS510	S46
MTGNR/L 165C	076332	076321	1.000	1.000	5.000	1.375	1.250	5/8	1/4	ITSN 533	NL58	CL9	XNS510	S58
MTGNR/L 165D	072498	072482	1.000	1.000	6.000	1.375	1.250	5/8	1/4	ITSN 533	NL58	CL9	XNS510	S58
MTGNR/L 204D	072499	072483	1.250	1.250	6.000	1.187	1.500	1/2	3/16	ITSN 432	NL46	CL9	XNS510	S46
MTGNR/L 205D	072500	072484	1.250	1.250	6.000	1.375	1.500	5/8	1/4	ITSN 533	NL58	CL9	XNS510	S58
MTGNR/L 244D	—	076322	1.500	1.500	6.000	1.187	2.000	1/2	3/16	ITSN 432	NL46	CL9	XNS510	S46
MTGNR/L 244E	072501	072485	1.500	1.500	7.000	1.187	2.000	1/2	3/16	ITSN 432	NL46	CL9	XNS510	S46
MTGNR/L 245D	076337	076323	1.500	1.500	6.000	1.375	2.000	5/8	1/4	ITSN 533	NL58	CL9	XNS510	S58
MTGNR/L 245E	072999	072880	1.500	1.500	7.000	1.375	2.000	5/8	1/4	ITSN 533	NL58	CL9	XNS510	S58
MTGNR/L 246D	076339	076325	1.500	1.500	6.000	1.500	2.000	3/4	3/8	ITSN 636	NL68L	CL12	XNS510	S68
MTGNR/L 246E	072502	072486	1.500	1.500	7.000	1.500	2.000	3/4	3/8	ITSN 636	NL68L	CL12	XNS510	S68
MTGNR/L 854D	072504	072488	1.000	1.250	6.000	1.187	1.250	1/2	3/16	ITSN 432	NL46	CL9	XNS510	S46
MTGNR 855D	072505	—	1.000	1.250	6.000	1.375	1.250	5/8	1/4	ITSN 533	NL58	CL9	XNS510	S58

Note: For right/left hand tools, dimensional drawing shows R.H. view, L.H. is opposite.

MTJNR/LS

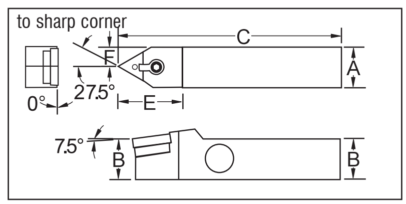


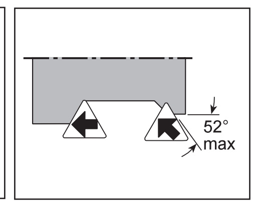


-3° Side Cutting, Offset Shank, Negative Rake
TNGG, TNMA, TNMG, TNMM,
TNMP, TNMX, TNMZ

Item Desc.	RH EDP	LH EDP	Dimension A	B	C	E	F	Insert IC	T	Shim	Lock Pin	Clamp	Clamp Screw
MTJNR/LS 123	072591	072579	0.750	0.750	4.500	1.000	1.000	3/8	1/8	ITSN 333	NL34L	CL6	XNS36
MTJNR/LS 163	072592	072580	1.000	1.000	6.000	1.000	1.250	3/8	1/8	ITSN 333	NL34L	CL6	XNS36
MTJNR/LS 164	072593	072581	1.000	1.000	6.000	1.188	1.250	1/2	3/16	ITSN 432	NL46	CL9	XNS510
MTJNR/LS 165	072594	072582	1.000	1.000	6.000	1.375	1.250	5/8	1/4	ITSN 533	NL58	CL9	XNS510
MTJNR/LS 204	072595	072583	1.250	1.250	7.000	1.188	1.500	1/2	3/16	ITSN 432	NL46	CL9	XNS510
MTJNR/LS 205	072596	072584	1.250	1.250	7.000	1.375	1.500	5/8	1/4	ITSN 533	NL58	CL9	XNS510
MTJNR/LS 245	072597	072585	1.500	1.500	7.000	1.375	2.000	5/8	1/4	ITSN 533	NL58	CL9	XNS510
MTJNR/LS 246	072598	072586	1.500	1.500	7.000	1.672	2.000	3/4	3/8	ITSN 636	NL68L	CL12	XNS510
MTJNR/LS 854	072599	072587	1.000	1.250	6.000	1.188	1.250	1/2	3/16	ITSN 432	NL46	CL9	XNS510
MTJNRS 865	072602	—	1.000	1.500	7.000	1.375	1.250	5/8	1/4	ITSN 533	NL58	CL9	XNS510

MTNNR/L

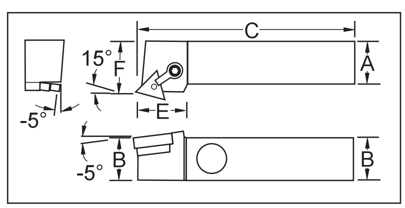


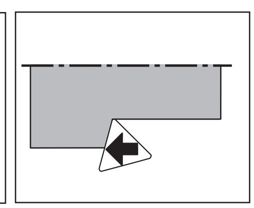


27.5° Side Cutting, Straight Shank, Negative Rake
TNGG, TNMA, TNMG, TNMM,
TNMP, TNMX, TNMZ

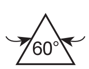
Item Desc.	RH EDP	LH EDP	Dimension A	B	C	E	F	Insert IC	T	Shim	Lock Pin	Clamp	Clamp Screw
MTNNR/L 164	073051	073065	1.000	1.000	6.000	1.500	0.500	1/2	3/16	ITSN 432	NL46	CL9	XNS59
MTNNR/L 165	073052	073066	1.000	1.000	6.000	1.625	0.500	5/8	1/4	ITSN 533	NL58	CL9	XNS510

MTRNR/L



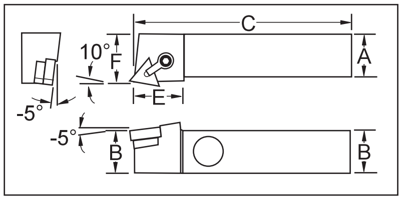


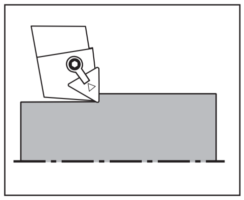
15° Side Cutting, Offset Shank, Negative Rake
TNG, TNGG, TNMA, TNMG, TNMM, TNMP,
TNMX, TNMZ, TNU



Item Desc.	RH EDP	LH EDP	Dimension A	B	C	E	F	Insert IC	T	Shim	Lock Pin	Clamp	Clamp Screw	Shim Screw
MTRNR/L 82	072359	072346	0.500	0.500	4.500	1.016	0.651	1/4	1/8	—	NL23	CL19	XNS36	—
MTRNR/L 102	072360	073012	0.625	0.625	4.500	1.016	0.776	1/4	1/8	—	NL23	CL19	XNS36	—
MTRNR/L 103	072361	072347	0.625	0.625	4.500	1.203	0.730	3/8	1/8	ITSN 333	NL34L	CL20	XNS46	S34
MTRNR/L 123	072362	072348	0.750	0.750	4.500	1.203	0.855	3/8	1/8	ITSN 333	NL34L	CL20	XNS46	S34
MTRNR/L 163	072363	072349	1.000	1.000	6.000	1.203	1.105	3/8	1/8	ITSN 333	NL34L	CL20	XNS46	S34
MTRNR/L 164	072364	072350	1.000	1.000	6.000	1.250	1.048	1/2	3/16	ITSN 432	NL46	CL9	XNS510	S46
MTRNR/L 165	072365	072351	1.000	1.000	6.000	1.500	1.002	5/8	1/4	ITSN 533	NL58	CL9	XNS510	S58
MTRNR/L 204	072366	072352	1.250	1.250	7.000	1.250	1.298	1/2	3/16	ITSN 432	NL46	CL9	XNS510	S46
MTRNR/L 205	072367	072353	1.250	1.250	7.000	1.500	1.252	5/8	1/4	ITSN 533	NL58	CL9	XNS510	S58
MTRNR/L 246	072369	072355	1.500	1.500	7.000	1.687	1.697	3/4	3/8	ITSN 636	NL68L	CL12	XNS510	S68
MTRNR 854	072370	—	1.000	1.250	6.000	1.250	1.048	1/2	3/16	ITSN 432	NL46	CL9	XNS510	S46

Note: For right/left hand tools, dimensional drawing shows R.H. view, L.H. is opposite.

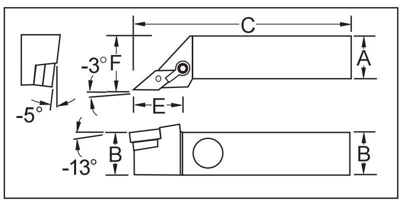


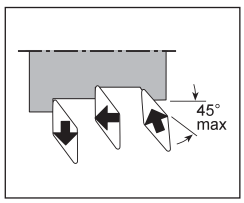


MTWNR

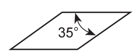
10° Side Cutting, Offset Shank, Negative Rake
TNG, TNGG, TNMA, TNMG, TNMM, TNMP, TNMX, TNMZ, TNU

Item Desc.	RH EDP	Warner Swasey 10° Bar No.	Dimension					Insert		Shim	Lock Pin	Clamp	Clamp Screw	Shim Screw
			A	B	C	E	F	IC	T					
MTWNR 123	072652	M1901	0.750	0.750	4.500	1.193	0.880	3/8	1/8	ITSN 333	NL34L	CL6	XNS36	S34
MTWNR 164	072653	M1902	1.000	1.000	6.000	1.750	1.098	1/2	3/16	ITSN 432	NL46	CL9	XNS510	S46
MTWNR 204	072654	M1904	1.250	1.250	6.000	1.750	1.137	1/2	3/16	ITSN 432	NL46	CL9	XNS510	S46



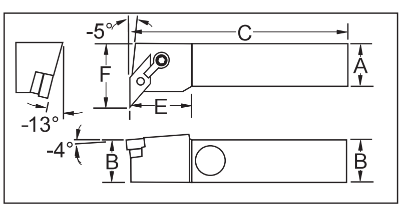


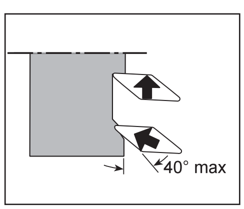
MVJNR/L



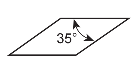
-3° Side Cutting, Offset Shank, Negative Rake
VNGA, VNMA, VNMG, VNMP, VNMZ

Item Desc.	RH EDP	LH EDP	Dimension					Insert		Shim	Lock Pin	Clamp	Clamp Screw	Shim Screw
			A	B	C	E	F	IC	T					
MVJNR/L 123B	072538	072528	0.750	0.750	4.500	1.687	1.000	3/8	3/16	IVSN 322	NL34L	CL30	XNS510	S34
MVJNR/L124	072539	072529	0.750	0.750	6.000	2.000	1.000	1/2	3/16	IVSN 432	NL46	CL30	XNS510	S46
MVJNL 163	—	072530	1.000	1.000	6.000	1.687	1.250	3/8	3/16	IVSN 322	NL34L	CL30	XNS510	S34
MVJNR/L 163C	076454	076393	1.000	1.000	5.000	1.687	1.250	3/8	3/16	IVSN 322	NL34L	CL30	XNS510	S34
MVJNR 163D	072540	—	1.000	1.000	6.000	1.687	1.250	3/8	3/16	IVSN 322	NL34L	CL30	XNS510	S34
MVJNR/L 164C	076460	076394	1.000	1.000	5.000	2.000	1.250	1/2	3/16	IVSN 432	NL46	CL30	XNS510	S46
MVJNR/L 164D	072541	072531	1.000	1.000	6.000	2.000	1.250	1/2	3/16	IVSN 432	NL46	CL30	XNS510	S46
MVJNR/L 203D	072542	072532	1.250	1.250	6.000	1.687	1.500	3/8	3/16	IVSN 322	NL34L	CL30	XNS510	S34
MVJNR/L 204D	072543	072533	1.250	1.250	6.000	2.000	1.500	1/2	3/16	IVSN 432	NL46	CL30	XNS510	S46
MVJNR/L 243	072544	072534	1.500	1.500	7.000	1.687	2.000	3/8	3/16	IVSN 322	NL34L	CL30	XNS510	S34
MVJNR/L 244	072545	072535	1.500	1.500	8.000	2.000	2.000	1/2	3/16	IVSN 432	NL46	CL30	XNS510	S46





MVLNR/L



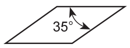
-5° End Cutting, Offset Shank, Negative Rake
VNGA, VNMA, VNMG, VNMP, VNMZ

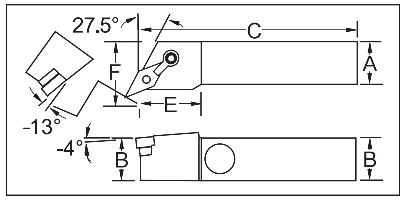
Item Desc.	RH EDP	LH EDP	Dimension					Insert		Shim	Lock Pin	Clamp	Clamp Screw	Shim Screw
			A	B	C	E	F	IC	T					
MVLNR/L 164C	076496	076462	1.000	1.000	5.000	1.500	1.750	1/2	3/16	IVSN 432	NL46	CL12	XNS510	S46
MVLNR/L 164D	072714	072709	1.000	1.000	6.000	1.500	1.750	1/2	3/16	IVSN 432	NL46	CL12	XNS510	S46
MVLNR/L 204D	072715	072710	1.250	1.250	6.000	1.500	2.000	1/2	3/16	IVSN 432	NL46	CL12	XNS510	S46
MVLNR/L 244D	076505	—	1.500	1.500	6.000	1.500	2.250	1/2	3/16	IVSN 432	NL46	CL12	XNS510	S46
MVLNR/L 244E	072716	072711	1.500	1.500	7.000	1.500	2.250	1/2	3/16	IVSN 432	NL46	CL12	XNS510	S46

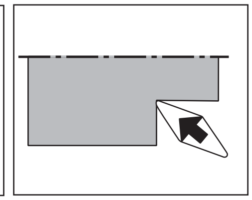
Note: For right/left hand tools, dimensional drawing shows R.H. view, L.H. is opposite.

MVNNR/L

-27.5° Side & End Cutting, Offset Shank,
Undercutting, Negative Rake
VNGA, VNMA, VNMG, VNMP, VNMZ



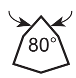


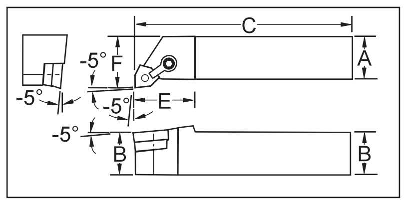


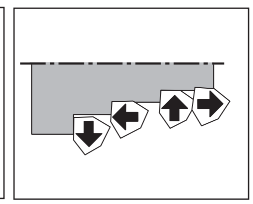
Item Desc.	RH EDP	LH EDP	Dimension A	B	C	E	F	Insert IC	T	Shim	Lock Pin	Clamp	Clamp Screw	Shim Screw
MVNNL 123B	—	072719	0.750	0.750	4.500	1.562	1.000	3/8	3/16	IVSN 322	NL34L	CL30	XNS510	S34
MVNNR/L 163C	076514	076513	1.000	1.000	5.000	1.562	1.250	3/8	3/16	IVSN 322	NL34L	CL30	XNS510	S34
MVNNR/L 163D	072726	072720	1.000	1.000	6.000	1.562	1.250	3/8	3/16	IVSN 322	NL34L	CL30	XNS510	S34
MVNNR/L 203D	072727	072721	1.250	1.250	6.000	1.562	1.500	3/8	3/16	IVSN 322	NL34L	CL30	XNS510	S34
MVNNL 243E	—	072722	1.500	1.500	7.000	1.562	1.750	3/8	3/16	IVSN 322	NL34L	CL30	XNS510	S34

MWLNR/L

-5° Side & End Cutting, Offset Shank,
Negative Rake
WNGG, WNMA, WNMG



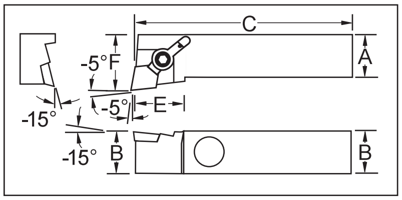


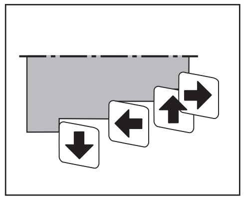


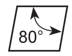
Item Desc.	RH EDP	LH EDP	Dimension A	B	C	E	F	Insert IC	T	Shim	Lock Pin	Clamp	Clamp Screw
MWLNR/L 103A	091152	091153	0.625	0.625	4.000	0.875	0.875	3/8	5/32 (3/16)	IWSN32.52 (322)	NL34L	CL6	XNS36
MWLNR/L 123B	091154	091155	0.750	0.750	4.500	0.875	1.000	3/8	5/32 (3/16)	IWSN32.52 (322)	NL34L	CL6	XNS36
MWLNR/L 163C	081317	—	1.000	1.000	6.000	1.125	1.250	3/8	5/32 (3/16)	IWSN32.52 (322)	NL34L	CL6	XNS36
MWLNR/L 163D	081318	081322	1.000	1.000	6.000	1.125	1.250	3/8	5/32 (3/16)	IWSN32.52 (322)	NL34L	CL6	XNS36
MWLNR/L 124B	090088	090091	0.750	0.750	4.500	1.125	1.000	1/2	3/16	IWSN 432	NL46	CL9	XNS59
MWLNR/L 164D	090089	090092	1.000	1.000	6.000	1.125	1.250	1/2	3/16	IWSN 432	NL46	CL9	XNS59
MWLNR/L 165C	080524	080522	1.000	1.000	5.000	1.125	1.250	5/8	1/4	IWSN 533	NL58	CL9	XNS59
MWLNR/L 165D	080528	080526	1.000	1.000	6.000	1.125	1.250	5/8	1/4	IWSN 533	NL58	CL9	XNS59
MWLNR/L 204D	090090	090093	1.250	1.250	6.000	1.125	1.500	1/2	3/16	IWSN 432	NL46	CL9	XNS59
MWLNR/L 205D	080538	080530	1.250	1.250	6.000	1.125	1.500	5/8	1/4	IWSN 533	NL58	CL9	XNS59
MWLNR/L 245E	080546	080545	1.500	1.500	7.000	1.125	2.000	5/8	1/4	IWSN 533	NL58	CL9	XNS59

Note: For right/left hand tools, dimensional drawing shows R.H. view, L.H. is opposite.

CCLFR/L



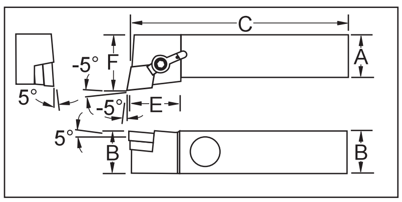


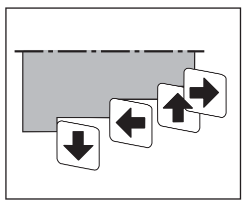


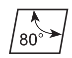
-5° Side & End Cutting, Offset Shank
Hi Positive Rake, 25° Relief Angle, CFG

Item Desc.	RH EDP	LH EDP	Dimension A	B	C	E	F	Insert IC	T	Clamp Clip	Clamp	Clamp Screw
CCLFR/L 84	084180	084176	0.500	0.500	3.500	1.000	1.000	0.464	1/8	CLP9	HC9	CS94
CCLFR/L 104	084181	084177	0.625	0.625	4.500	1.000	1.125	0.464	1/8	CLP12	HC12	CS126
CCLFR/L 124	084182	084178	0.750	0.750	4.500	1.000	1.250	0.464	1/8	CLP12	HC12	CS126
CCLFR/L 164	084183	084179	1.000	1.000	6.000	1.000	1.250	0.464	1/8	CLP12	HC12	CS126

CCLPR/L



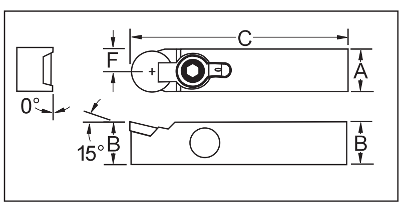


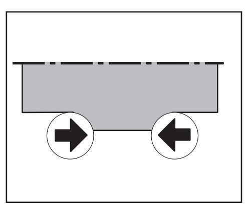


-5° Side & End Cutting, Offset Shank
Positive Rake, 11° Relief Angle
CPG, CPGR

Item Desc.	RH EDP	LH EDP	Dimension A	B	C	E	F	Insert IC	T	Shim	Lock Pin	Clamp	Clamp Screw	Shim Screw
CCLPR/L 124	070809	070800	0.750	0.750	4.500	1.250	1.000	1/2	1/8	CSP 432	CLP12	HC12	CS126	S440
CCLPR/L 164	070810	070801	1.000	1.000	6.000	1.250	1.250	1/2	1/8	CSP 432	CLP12	HC12	CS126	S440
CCLPR/L 205	070813	070804	1.250	1.250	7.000	1.000	1.500	5/8	3/16	CSP 532	CLP12	HC12	CS126	S832
CCLPR/L 206	070816	—	1.250	1.250	7.000	1.375	1.500	3/4	3/16	CSP 632	CLP12	HC12	CS126	S832

CRCFN

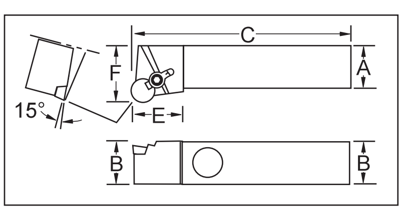


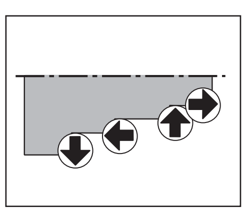


0° End Cutting, Straight Shank
Hi Positive Rake, 25° Relief Angle, RFG

Item Desc.	EDP	Dimension A	B	C	E	F	Insert IC	T	Insert Screw	Wrench
CRCFN 62.5	084264	3/8	3/8	2-1/2	—	3/16	5/16	3/32	HC7	SHC7

CRGFR/L





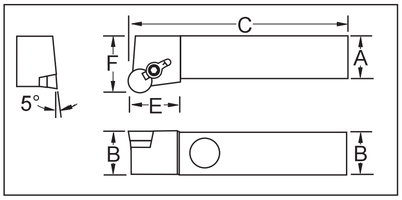
0° Side Cutting, Offset Shank
Hi Positive Rake, 25° Relief Angle, RFG

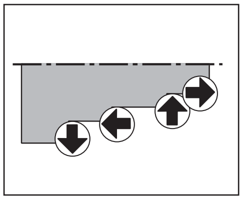
Item Desc.	RH EDP	LH EDP	Dimension A	B	C	E	F	Insert IC	T	Clamp	Clamp Screw
CRGFR/L 62.5	084233	084232	3/8	3/8	2-1/2	5/8	1/2	5/16	3/32	HC7	SHC7

Note: For right/left hand tools, dimensional drawing shows R.H. view, L.H. is opposite.

CRGPR/L

0° Side Cutting, Offset Shank
Positive Rake, 11° Relief Angle, RPG

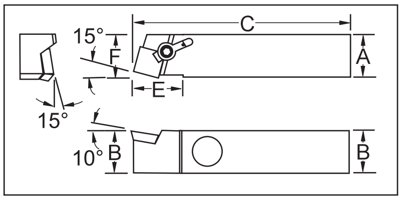


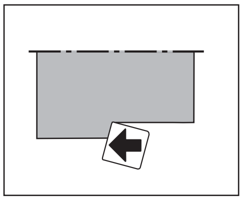


Item Desc.	RH EDP	LH EDP	Dimension A	B	C	E	F	Insert IC	T	Shim	Lock Pin	Clamp	Clamp Screw	Shim Screw
CRGPR/L 123	084242	—	0.750	0.750	4.500	0.812	0.875	3/8	1/8	PRS 3	CLP9	HC9	CS96	S632S
CRGPR/L 163	084244	084237	1.000	1.000	6.000	0.940	1.125	3/8	1/8	PRS 3	CLP9	HC9	CS96	S632S
CRGPR/L 164	084243	084236	1.000	1.000	6.000	1.062	1.125	1/2	1/8	PRS 4	CLP12	HC12	CS126	S440

CSBFR/L

15° Side Cutting, Straight Shank
Hi Positive Rake, 25° Relief Angle, SFG

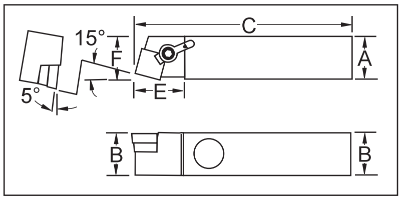


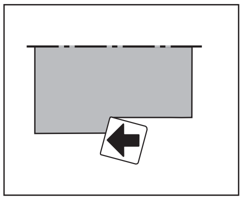


Item Desc.	RH EDP	LH EDP	Dimension A	B	C	E	F	Insert IC	T	Clamp Clip	Clamp	Clamp Screw
CSBFR/L 62.5	084272	084265	0.375	0.375	2.500	0.672	0.313	5/16	3/32	—	HC7	SHC7
CSBFR/L 164	084276	084269	1.000	1.000	6.000	1.234	0.877	1/2	1/8	CLP12	HC12	CS126

CSBPR/L

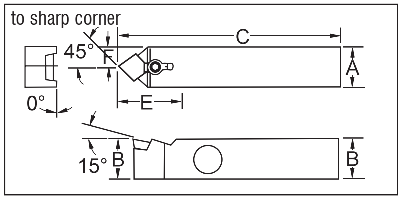
15° Side Cutting, Straight Shank
Positive Rake, 11° Relief Angle
SPG, SPU, SPGR

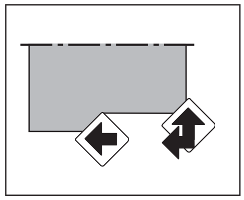




Item Desc.	RH EDP	LH EDP	Dimension A	B	C	E	F	Insert IC	T	Shim	Clamp Clip	Clamp	Clamp Screw	Shim Screw
CSBPR 103	084294	—	0.625	0.625	4.500	0.906	0.533	3/8	1/8	—	CLP9	HC9	CS96	—
CSBPR 123	084295	—	0.750	0.750	4.500	0.906	0.658	3/8	1/8	—	CLP9	HC9	CS96	—
CSBPR/L 124	084296	084283	0.750	0.750	4.500	1.187	0.627	1/2	1/8	PSQ 3	CLP12	HC12	CS126	S440
CSBPR/L 164	084297	084284	1.000	1.000	6.000	1.218	0.877	1/2	1/8	PSQ 3	CLP12	HC12	CS126	S440
CSBPR/L 206	084299	084286	1.250	1.250	7.000	1.500	1.065	3/4	3/16	PSQ 4	CLP12	HC12	CS126	S832
CSBPR 854	084302	—	1.000	1.250	6.000	1.187	0.877	1/2	1/8	PSQ 3	CLP12	HC12	CS126	S440

Note: For right/left hand tools, dimensional drawing shows R.H. view, L.H. is opposite.

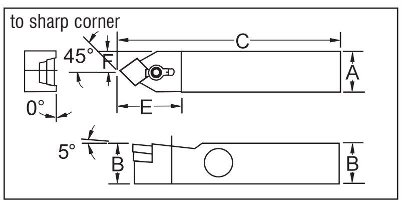


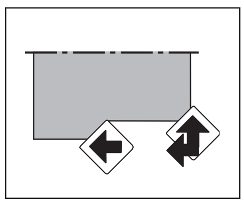


CSDFN

45° Side Cutting, Straight Shank
Hi Positive Rake, 25° Relief Angle, SFG

Item Desc.	EDP	Dimension A	B	C	E	F	Insert IC	T	Clamp Clip	Clamp	Clamp Screw
CSDFN 62.5	084345	0.375	0.375	2.500	0.734	0.187	5/16	3/32	—	HC7	SHC7
CSDFN 83	084346	0.500	0.500	3.500	1.000	0.250	3/8	1/8	CLP9	HC9	CS94
CSDFN 103	084347	0.625	0.625	4.500	1.000	0.312	3/8	1/8	CLP9	HC9	CS96
CSDFN 123	084348	0.750	0.750	4.500	1.000	0.375	3/8	1/8	CLP9	HC9	CS96
CSDFN 164	084349	1.000	1.000	6.000	1.312	0.500	1/2	1/8	CLP12	HC12	CS126

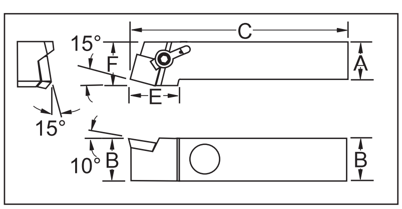


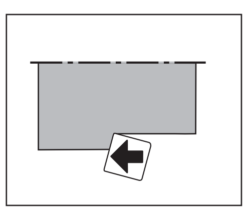


CSDPN

45° Side Cutting, Straight Shank
Positive Rake, 11° Relief Angle
SPG, SPGR, SPU

Item Desc.	EDP	Dimension A	B	C	E	F	Insert IC	T	Shim	Clamp Clip	Clamp	Clamp Screw	Shim Screw
CSDPN 83	084353	0.500	0.500	3.500	1.000	0.250	3/8	1/8	—	CLP9	HC9	CS96	—
CSDPN 103	084354	0.625	0.625	4.500	1.000	0.312	3/8	1/8	—	CLP9	HC9	CS96	—
CSDPN 123	084355	0.750	0.750	4.500	1.000	0.375	3/8	1/8	—	CLP9	HC9	CS96	—
CSDPN 124	084356	0.750	0.750	4.500	1.312	0.375	1/2	1/8	PSQ 3	CLP12	HC12	CS126	S440
CSDPN 164	084357	1.000	1.000	6.000	1.312	0.500	1/2	1/8	PSQ 3	CLP12	HC12	CS126	S440
CSDPN 166	084358	1.000	1.000	6.000	1.625	0.500	3/4	3/16	PSQ 4	CLP12	HC12	CS126	S832
CSDPN 644	084360	0.750	1.000	6.000	1.312	0.375	1/2	1/8	PSQ 3	CLP12	HC12	CS126	S440
CSDPN 654	084361	0.750	1.250	6.000	1.312	0.375	1/2	1/8	PSQ 3	CLP12	HC12	CS126	S440
CSDPN 854	084363	1.000	1.250	6.000	1.312	0.500	1/2	1/8	PSQ 3	CLP12	HC12	CS126	S440
CSDPN 856	084364	1.000	1.250	6.000	1.625	0.500	3/4	3/16	PSQ 4	CLP12	HC12	CS126	S832
CSDPN 866	084366	1.000	1.500	7.000	1.625	0.500	3/4	3/16	PSQ 4	CLP12	HC12	CS126	S832





CSRFR/L

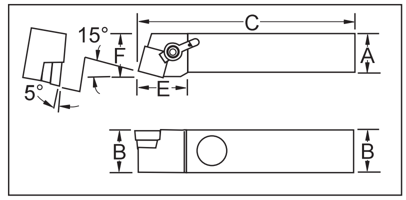
15° Side Cutting, Offset Shank
Hi Positive Rake, 25° Relief Angle, SFG

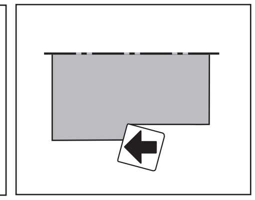
Item Desc.	RH EDP	LH EDP	Dimension A	B	C	E	F	Insert IC	T	Clamp Clip	Clamp	Clamp Screw
CSRFR/L 83	084273	084266	0.500	0.500	3.500	0.906	0.533	3/8	1/8	CLP9	HC9	CS94

Note: For right/left hand tools, dimensional drawing shows R.H. view, L.H. is opposite.

CSRPR/L

15° Side Cutting, Offset Shank
Positive Rake, 11° Relief Angle
SPG, SPU, SPGR

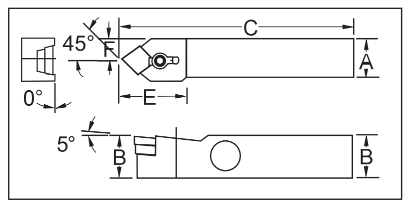


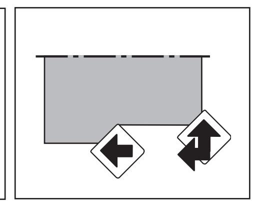


Item Desc.	RH EDP	LH EDP	Dimension A	B	C	E	F	Insert IC	T	Shim	Clamp Clip	Clamp	Clamp Screw	Shim Screw
CSRPR 63	084292	—	0.375	0.375	3.500	0.906	0.533	3/8	1/8	—	CLP9	HC9	CS94	—
CSRPR/L 83	084293	084280	0.500	0.500	3.500	0.906	0.533	3/8	1/8	—	CLP9	HC9	CS94	—
CSRPR/L 166	084298	084285	1.000	1.000	6.000	1.500	1.003	3/4	3/16	PSQ 4	CLP12	HC12	CS126	S832
CSRPR/L 856	084303	084290	1.000	1.250	6.000	1.500	1.003	3/4	3/16	PSQ 4	CLP12	HC12	CS126	S832
CSRPR/L 866	084304	084291	1.000	1.500	7.000	1.500	1.003	3/4	3/16	PSQ 4	CLP12	HC12	CS126	S832

CSSPR

45° Side Cutting, Straight Shank
Positive Rake, 11° Relief Angle
SPU, SPG, SPGR

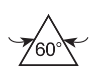


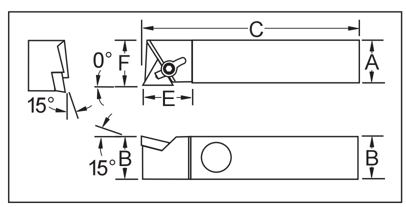


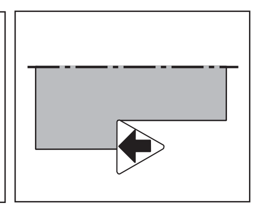
Item Desc.	RH EDP	Dimension A	B	C	E	F	Insert IC	T	Shim	Clamp Clip	Clamp
CSSPR 63	084352	0.375	3.500	1.000	0.250	3/8	1/8	—	CLP9	HC9	CS94

CTAER/L

0° Side Cutting,Straight Shank
Hi Positive Rake, 20° Relief Angle
TEGE 73X (20° insert relief angle)



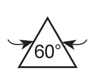


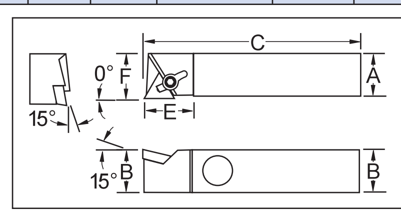


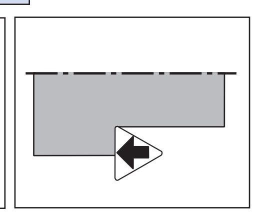
Item Desc.	RH EDP	LH EDP	Dimension A	B	C	E	F	Insert IC	T	Clamp Clip	Clamp	Clamp Screw
CTAER/L 67	084424	084417	0.375	0.375	2.500	0.625	0.375	7/32	3/32	—	HC7	SHC7

CTAFR/L

0° Side Cutting, Straight Shank
Hi Positive Rake, 25° Relief Angle, TFG



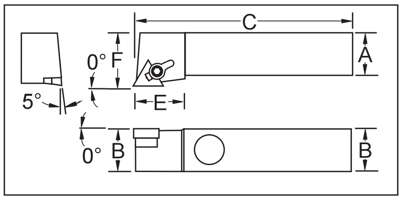


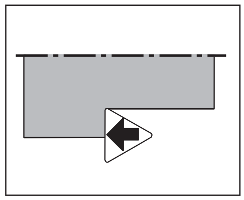


Item Desc.	RH EDP	LH EDP	Dimension A	B	C	E	F	Insert IC	T	Clamp Clip	Clamp	Clamp Screw
CTAFR/L 83	084425	084418	0.500	0.500	3.500	1.000	0.641	3/8	1/8	CLP9	HC9	CS94
CTAFR/L 103	084426	084419	0.625	0.625	4.500	1.000	0.641	3/8	1/8	CLP9	HC9	CS94
CTAFR/L 123	084427	084420	0.750	0.750	4.500	1.000	0.766	3/8	1/8	CLP9	HC9	CS96
CTAFR/L 163	084428	084421	1.000	1.000	6.000	1.000	1.016	3/8	1/8	CLP9	HC9	CS96
CTAFR 853	084429	—	1.000	1.250	6.000	1.000	1.016	3/8	1/8	CLP9	HC9	CS96

Note: For right/left hand tools, dimensional drawing shows R.H. view, L.H. is opposite.

CTAPR/L

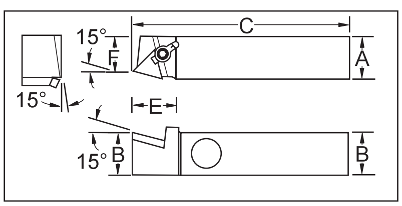


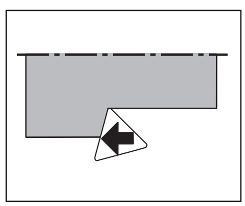


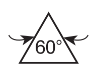
0° Side Cutting, Straight Shank
Positive Rake, 11° Relief Angle
TPG, TPGR, TPU

Item Desc.	RH EDP	LH EDP	Dimension					Insert		Shim	Clamp Clip	Clamp	Clamp Screw	Shim Screw
			A	B	C	E	F	IC	T					
CTAPR/L 62	084441	084431	0.375	0.375	3.500	0.843	0.515	1/4	1/8	—	CLP9	HC9	CS94	—
CTAPR/L 82	084442	084432	0.500	0.500	3.500	0.843	0.515	1/4	1/8	—	CLP9	HC9	CS96	—
CTAPR/L 102	084443	084433	0.625	0.625	4.500	0.843	0.640	1/4	1/8	—	CLP9	HC9	CS96	—
CTAPR/L 123	084444	084434	0.750	0.750	4.500	1.062	0.765	3/8	1/8	PTP 3	CLP12	HC12	CS126	S440
CTAPR/L 163	084445	084435	1.000	1.000	6.000	1.062	1.015	3/8	1/8	PTP 3	CLP12	HC12	CS126	S440
CTAPR/L 164	084446	084436	1.000	1.000	6.000	1.187	1.015	1/2	3/16	PTP 4	CLP12	HC12	CS126	S832
CTAPR/L 552	084447	084437	0.625	1.250	6.000	0.843	0.640	1/4	1/8	—	CLP9	HC9	CS96	—
CTAPR 653	084448	—	0.750	1.250	6.000	1.062	0.765	3/8	1/8	PTP 3	CLP12	HC12	CS126	S440
CTAPL 854	—	084439	1.000	1.250	6.000	1.187	1.015	1/2	3/16	PTP 4	CLP12	HC12	CS126	S832

CTBER/L



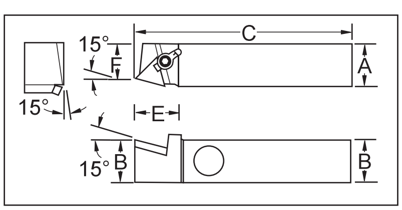


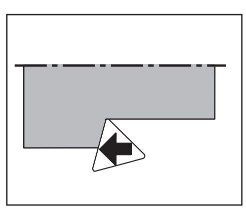


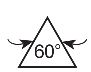
15° Side Cutting, Straight Shank
Hi Positive Rake, 20° Relief Angle, TEGE 73x

Item Desc.	RH EDP	LH EDP	Dimension					Insert		Clamp Clip	Clamp	Clamp Screw
			A	B	C	E	F	IC	T			
CTBER/L 67	084496	084489	0.375	0.375	2.500	0.656	0.301	7/32	3/32	—	HC7	SHC7

CTBFR







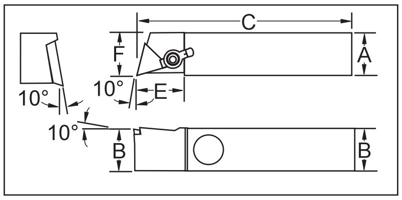
15° Side Cutting, Straight Shank
Hi Positive Rake, 25° Relief Angle, TFG

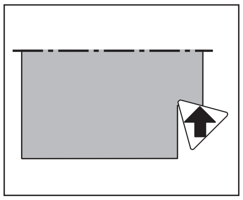
Item Desc.	RH EDP	LH EDP	Dimension					Insert		Clamp Clip	Clamp	Clamp Screw
			A	B	C	E	F	IC	T			
CTBFR 163	084500	—	1.000	1.000	6.000	1.000	0.836	3/8	1/8	CLP9	HC9	CS96

Note: For right/left hand tools, dimensional drawing shows R.H. view, L.H. is opposite.

CTCER/L

-10° End Cutting, Straight Shank
Hi Positive Rake, 20° Relief Angle, TEGE

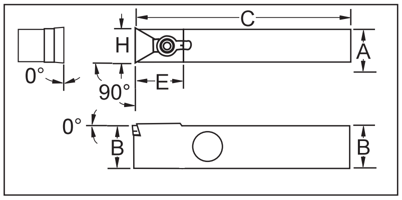


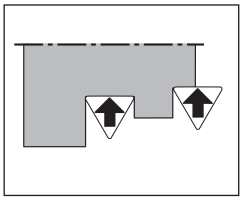


Item Desc.	RH EDP	LH EDP	Dimension A	B	C	E	F	Insert IC	T	Clamp	Clamp Screw
CTCER/L 67	084550	084549	3/8	3/8	2 1/2	5/8	25/64	7/32	3/32	HC7	SHC7

CTCON

0° End Cutting,
Insert Centered on Shank
Positive Rake, 11° Relief Angle
TPG, TPGR, TPU

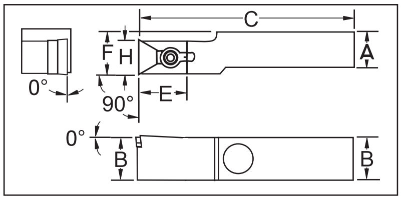


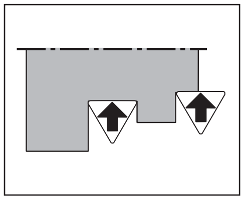


Item Desc.	EDP	Dimension A	B	C	E	F	Insert IC	T	Shim	Clamp Clip	Clamp	Clamp Screw	Shim Screw
CTCON 83	084551	0.500	0.500	3.500	1.062	—	3/8	1/8	—	CLP9	HC9	CS96	—
CTCON 124	084552	0.750	0.750	4.500	1.375	—	1/2	3/16	PTP 4	CLP12	HC12	CS126	S832
CTCON 443	084553	0.500	1.000	8.000	1.062	—	3/8	1/8	PTP 3	CLP9	HC9	CS96	S440
CTCON 644	084554	0.750	1.000	8.000	1.375	—	1/2	3/16	PTP 4	CLP12	HC12	CS126	S832
CTCON 664	084555	0.750	1.500	8.000	1.375	—	1/2	3/16	PTP 4	CLP12	HC12	CS126	S832

CTCPR/L

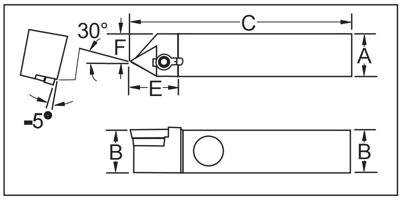
0° End Cutting, Offset Shank
Positive Rake, 11° Relief Angle
TPG, TPU, TPGR

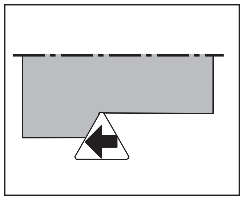




Item Desc.	RH EDP	LH EDP	Dimension A	B	C	E	F	Insert IC	T	Shim	Clamp Clip	Clamp	Clamp Screw	Shim Screw
CTCPR/L 123B	070846	070842	0.750	0.750	4.500	1.125	1.000	3/8	1/8	PTP 3	CLP9	HC9	CS96	S440
CTCPR/L 164C	076242	076225	1.000	1.000	5.000	1.375	1.250	1/2	3/16	PTP 4	CLP12	HC12	CS126	S832
CTCPR/L 164D	070847	070843	1.000	1.000	6.000	1.375	1.250	1/2	3/16	PTP 4	CLP12	HC12	CS126	S832
CTCPR/L 204D	070848	070844	1.250	1.250	6.000	1.375	1.250	1/2	3/16	PTP 4	CLP12	HC12	CS126	S832
CTCPR 244D	070849	—	1.500	1.500	6.000	1.375	2.000	1/2	3/16	PTP 4	CLP12	HC12	CS126	S832

Note: For right/left hand tools, dimensional drawing shows R.H. view, L.H. is opposite.

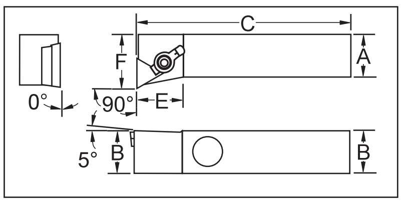


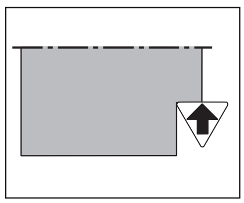



CTEPR/L

30° Side Cutting, Straight Shank
Positive Rake, 11° Relief Angle
TPG, TPU, TPGR

Item Desc.	RH EDP	LH EDP	Dimension A	B	C	E	F	Insert IC	T	Shim	Clamp Clip	Clamp	Clamp Screw	Shim Screw
CTEPR/L 82	084565	084557	0.500	0.500	3.500	0.875	0.290	1/4	1/8	—	CLP9	HC9	CS96	—
CTEPR/L 102	084566	084558	0.625	0.625	4.500	0.875	0.415	1/4	1/8	—	CLP9	HC9	CS96	—
CTEPR/L 123	084567	084559	0.750	0.750	4.500	1.250	0.455	3/8	1/8	PTP 3	CLP12	HC12	CS126	S440
CTEPR/L 163	084568	084560	1.000	1.000	6.000	1.250	0.737	3/8	1/8	PTP 3	CLP12	HC12	CS126	S440
CTEPR/L 854	084570	084562	1.000	1.250	6.000	1.375	0.643	1/2	3/16	PTP 4	CLP12	HC12	CS126	S832

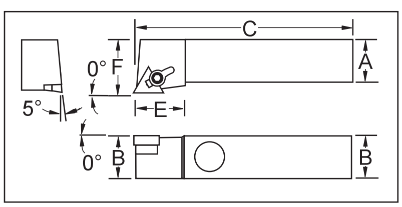


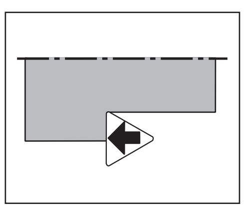
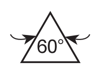



CTFPR/L

0° End Cutting, Offset Shank
Positive Rake, 11° Relief Angle
TPG, TPU, TPGR

Item Desc.	RH EDP	LH EDP	Dimension A	B	C	E	F	Insert IC	T	Shim	Clamp Clip	Clamp	Clamp Screw	Shim Screw
CTFPR/L 103	070825	070818	0.625	0.625	4.500	1.062	0.875	3/8	1/8	PTP 3	CLP12	HC12	CS126	S440
CTFPR/L 123	070826	070819	0.750	0.750	4.500	1.000	1.000	3/8	1/8	PTP 3	CLP12	HC12	CS126	S440
CTFPR/L 164C	076250	076246	1.000	1.000	5.000	1.000	1.250	1/2	3/16	PTP 4	CLP12	HC12	CS126	S832
CTFPR/L 164D	070827	070820	1.000	1.000	6.000	1.000	1.250	1/2	3/16	PTP 4	CLP12	HC12	CS126	S832
CTFPR/L 165	070829	070822	1.000	1.000	6.000	1.125	1.250	5/8	1/4	PTP 5	CLP12	HC12	CS126	S1024
CTFPR/L 205	070830	070823	1.250	1.250	7.000	1.125	1.500	5/8	1/4	PTP 5	CLP12	HC12	CS126	S1024
CTFPR/L 245	070831	070824	1.500	1.500	7.000	1.250	2.000	5/8	1/4	PTP 5	CLP12	HC12	CS126	S1024
CTFPR/L 854D	070828	070821	1.000	1.250	6.000	1.000	1.250	1/2	3/16	PTP 4	CLP12	HC12	CS126	S832



CTGPR/L

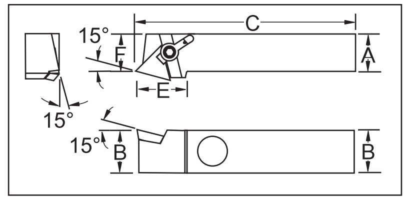
0° Side Cutting, Offset Shank
Positive Rake, 11° Relief Angle
TPG, TPU, TPGR

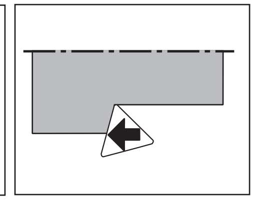
Item Desc.	RH EDP	LH EDP	Dimension A	B	C	E	F	Insert IC	T	Shim	Clamp Clip	Clamp	Clamp Screw	Shim Screw
CTGPR/L 103	070793	070786	0.625	0.625	4.500	1.062	0.875	3/8	1/8	PTP 3	CLP12	HC12	CS126	S440
CTGPR/L 123	070794	070787	0.750	0.750	4.500	1.062	1.000	3/8	1/8	PTP 3	CLP12	HC12	CS126	S440
CTGPR/L 164C	076260	076258	1.000	1.000	5.000	1.250	1.250	1/2	3/16	PTP 4	CLP12	HC12	CS126	S832
CTGPR/L 164D	070795	070788	1.000	1.000	6.000	1.250	1.250	1/2	3/16	PTP 4	CLP12	HC12	CS126	S832
CTGPR/L 165	070797	070790	1.000	1.000	6.000	1.375	1.250	5/8	1/4	PTP 5	CLP12	HC12	CS126	S1024
CTGPR/L 204D	072087	072088	1.250	1.250	6.000	1.250	1.500	1/2	3/16	PTP 4	CLP12	HC12	CS126	S832
CTGPR/L 205D	070798	—	1.250	1.250	6.000	1.375	1.500	5/8	1/4	PTP 5	CLP12	HC12	CS126	S1024
CTGPL 854	—	070789	1.000	1.000	6.000	1.250	1.250	1/2	3/16	PTP 4	CLP12	HC12	CS126	S832
CTGPR 854D	070796	—	1.000	1.000	6.000	1.250	1.250	1/2	3/16	PTP 4	CLP12	HC12	CS126	S832

Note: For right/left hand tools, dimensional drawing shows R.H. view, L.H. is opposite.

CTRFR

15° Side Cutting, Offset Shank
Hi Positive Rake, 25° Relief Angle, TFG

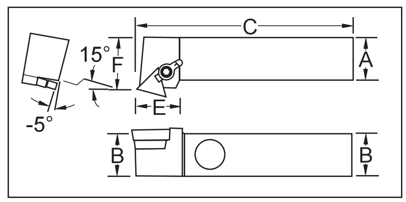


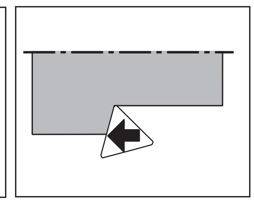


Item Desc.	EDP	Dimension					Insert		Clamp Clip	Clamp	Clamp Screw
		A	B	C	E	F	IC	T			
CTRFR 83	084497	0.500	0.500	3.500	1.000	0.586	0.375	1/8	CLP9	HC9	CS94
CTRFR 103	084498	0.625	0.625	4.500	1.000	0.586	0.375	1/8	CLP9	HC9	CS96

CTRPR/L

15° Side Cutting, Offset Shank
Positive Rake, 11° Relief Angle
TPG, TPU, TPGR

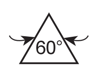


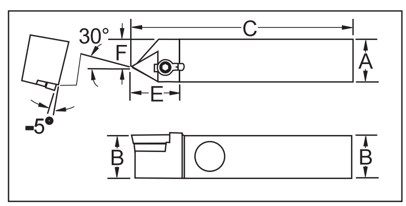


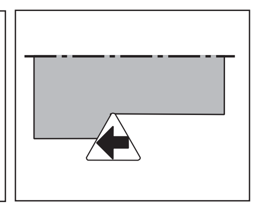
Item Desc.	RH EDP	LH EDP	Dimension					Insert		Shim	Clamp Clip	Clamp	Clamp Screw	Shim Screw
			A	B	C	E	F	IC	T					
CTRPR/L 102	070837	070832	0.625	0.625	4.500	0.937	0.776	1/4	1/8	—	CLP9	HC9	CS96	—
CTRPR/L 123	070838	070833	0.750	0.750	4.500	1.125	0.855	3/8	1/8	PTP 3	CLP12	HC12	CS126	S440
CTRPR/L 163	070839	070834	1.000	1.000	6.000	1.125	1.105	3/8	1/8	PTP 3	CLP12	HC12	CS126	S440
CTRPR/L 854	070840	070835	1.000	1.000	6.000	1.375	1.048	1/2	3/16	PTP 4	CLP12	HC12	CS126	S832

CTTPR/L

30° Side Cutting, Offset Shank
Positive Rake, 11° Relief Angle
TPG, TPGR, TPU



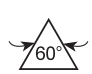


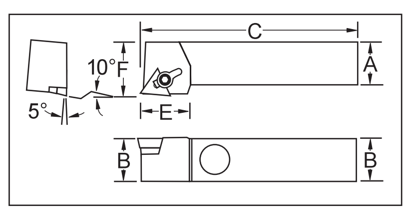


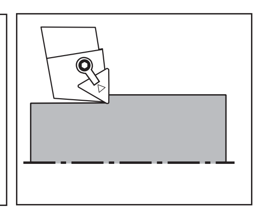
Item Desc.	RH EDP	LH EDP	Dimension					Insert		Shim	Clamp Clip	Clamp	Clamp Screw	Shim Screw
			A	B	C	E	F	IC	T					
CTTPR/L 62	084564	084556	0.375	0.375	3.500	0.875	0.290	1/4	1/8	—	CLP9	HC9	CS94	—

CTWPR*

10° Side Cutting, Offset Shank
11° Relief Angle Positive Rake
TPG, TPU, TPGR



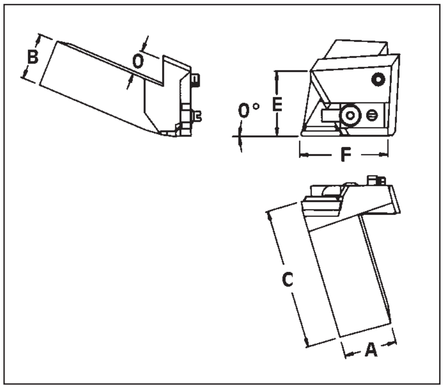


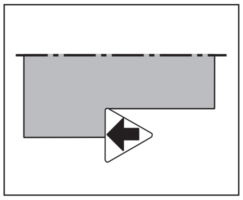


* Not ANSI code. Designed specifically to cut a 90° shoulder when set in 10° overarm bars, cutter holders or knee tools such as used on Warner & Swasey single spindle bar tuners of chucker lathes. These tools may also be used for 10° lead turning applications.

Item Desc.	EDP	Dimension					Insert		Shim	Clamp Clip	Clamp	Clamp Screw	Shim Screw
		A	B	C	E	F	IC	T					
CTWPR 82	084710	0.500	0.500	4.000	0.921	0.611	1/4	1/8	—	CLP9	HC9	CS96	—
CTWPR 123	084711	0.750	0.750	6.000	1.223	0.880	3/8	1/8	PTP 3	CLP12	HC12	CS126	S440
CTWPR 163	084712	1.000	1.000	7.000	1.208	1.130	3/8	1/8	PTP 3	CLP12	HC12	CS126	S440
CTWPR 204	084713	1.250	1.250	8.000	1.383	1.474	1/2	3/16	PTP 4	CLP12	HC12	CS126	S832

Note: For right/left hand tools, dimensional drawing shows R.H. view, L.H. is opposite.

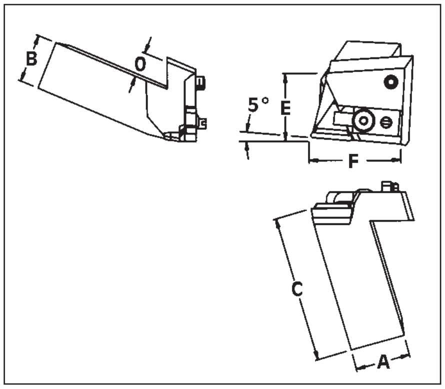


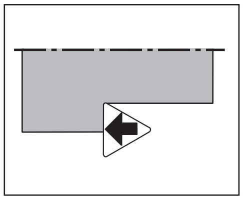


WSA Bar Turners

Warner & Swasey Bar Turners
0° Lead, Shoulder Cutting
11° Relief Angle, Right Hand
TPG, TPU

Item Desc.	RH EDP	Mfr Roller Turner No	Dimension A	B	C	E	F	Insert IC	T	Shim	Ht Adj Screw	Clamp	Clamp Screw	Shim Screw
WSA 720	084732	M-1372	0.812	0.625	2.625	0.937	1.500	3/8	1/8	PTP 3S	10-32	HC8	CS96	S440
WSA 730	084734	M-1372	1.062	0.937	3.000	1.187	1.687	1/2	3/16	PTP 4S	1/4-28	HC8	CS96	S832
WSA 740	084736	M-1374	1.187	1.062	3.500	1.187	1.687	1/2	3/16	PTP 4S	1/4-28	HC8	CS96	S832
WSA 750	084738	M-1375	1.375	1.187	3.875	1.187	1.750	1/2	3/16	PTP 4S	1/4-28	HC8	CS96	S832

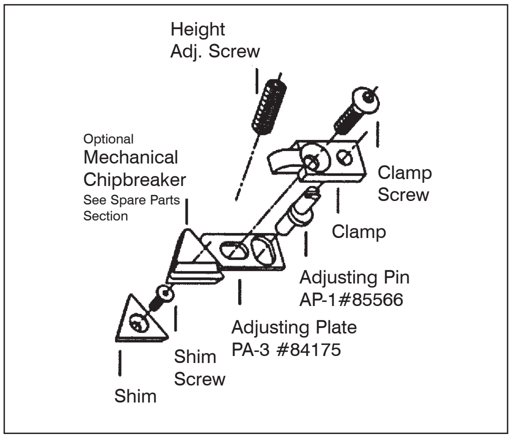




WSA Bar Turners

Warner & Swasey Bar Turners
5° Lead, Shoulder Cutting
11° Relief Angle, Right Hand
TPG, TPU

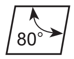
Item Desc.	RH EDP	Mfr Roller Turner No	Dimension A	B	C	E	F	Insert IC	T	Shim	Ht Adj Screw	Clamp	Clamp Screw	Shim Screw
WSA 725	084733	M-1372	0.812	0.625	2.625	0.937	1.500	3/8	1/8	PTP 3S	10-32	HC8	CS96	S440
WSA 755	084739	M-1375	1.375	1.187	3.875	1.187	1.750	1/2	3/16	PTP 4S	1/4-28	HC8	CS96	S832

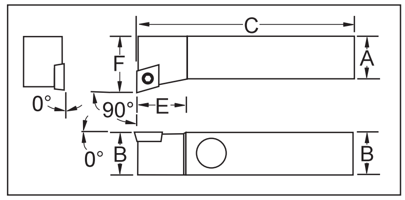


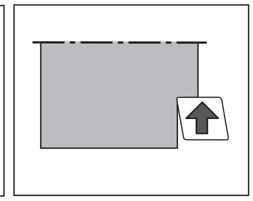
Note: For right/left hand tools, dimensional drawing shows R.H. view, L.H. is opposite.

SCFOR/L*

0° End Cutting, Offset Shank
11° Relief Angle, Screw Down, CPGT





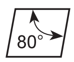


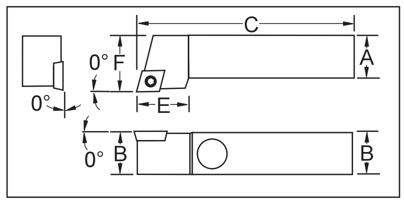
*Not ANSI Code

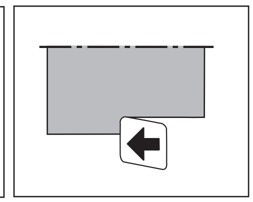
Item Desc.	RH EDP	LH EDP	Dimension A	B	C	E	F	Insert IC	T	Insert Screw	Wrench
SCFOR/L 62	074801	—	0.375	0.375	2.500	0.437	0.500	1/4	0.094	WS1017	T7M
SCFOR/L 82	074803	—	0.500	0.500	3.500	0.437	0.625	1/4	0.094	WS1017	T7M
SCFOR/L 102	074805	074806	0.625	0.625	4.000	0.437	0.750	1/4	0.094	WS1017	T7M
SCFOR/L 123	074809	074810	0.750	0.750	4.500	0.562	0.875	3/8	0.156	WS1018	T15M

SCGOR/L*

0° End Cutting, Offset Shank
11° Relief Angle, Screw Down
CPGT





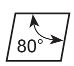


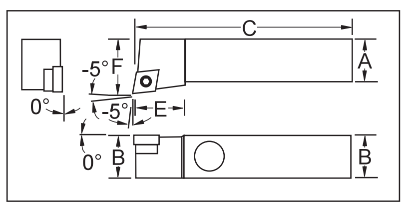
*Not ANSI Code

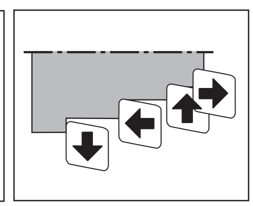
Item Desc.	RH EDP	LH EDP	Dimension A	B	C	E	F	Insert IC	T	Insert Screw	Wrench
SCGPR/L 62	0740000	0740001	0.375	0.375	2.500	0.440	0.500	1/4	0.094	MS1153	FT-07
SCGOR/L 82	074823	074824	0.500	0.500	3.500	0.500	0.625	1/4	0.094	WS1017	T7M
SCGOR/L 102	074825	074826	0.625	0.625	4.000	0.500	0.750	1/4	0.094	WS1017	T7M
SCGOR/L 122	074827	074828	0.750	0.750	4.500	0.500	0.875	1/4	0.094	WS1017	T7M
SCGOR/L 123	074829	074830	0.750	0.750	4.000	0.562	0.875	3/8	0.156	WS1018	T15M

SCLCR/L

-5° Side & End Cutting, Offset Shank
7° Relief Angle, S-Lock, CCMT

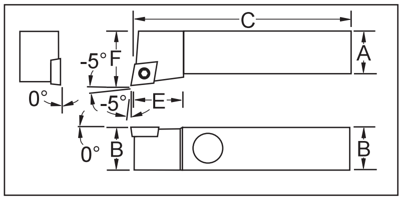


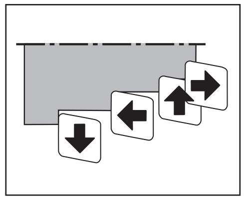
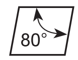




Item Desc.	RH EDP	LH EDP	Dimension A	B	C	E	F	Insert IC	T	Shim	Insert Screw	Wrench	Shim Screw
SCLCR/L 62	096558	096614	0.375	0.375	2.500	0.390	0.500	1/4	3/32	—	TCS-1M-02	T7M	—
SCLCR/L 83	096559	096615	0.500	0.500	3.500	0.625	0.625	3/8	5/32	—	SIS32	T15M	—
SCLCR/L 103A	096560	096616	0.625	0.625	4.000	0.625	0.750	3/8	5/32	—	SIS32	T15M	—
SCLCR/L 123B	096561	096617	0.750	0.750	4.500	0.625	1.000	3/8	5/32	—	SIS32	T15M	—
SCLCR/L 164D	096562	096618	1.000	1.000	6.000	0.830	1.250	1/2	3/16	SC 42	TCM-1M-07	T154	CSS-13M-02
SCLCR/L 204D	096563	096619	1.250	1.250	6.000	0.830	1.500	1/2	3/16	SC 42	TCM-1M-07	T154	CSS-13M-02

Note: For right/left hand tools, dimensional drawing shows R.H. view, L.H. is opposite.

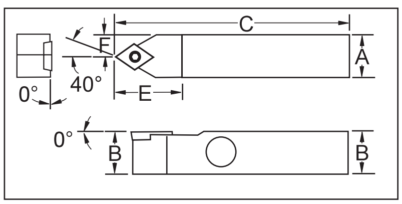


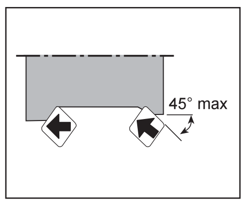



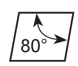
SCLOR/L

-5° Side & End Cutting, Offset Shank
11° Relief Angle, Screw Down, CPGT

Item Desc.	RH EDP	LH EDP	Dimension A	B	C	E	F	Insert IC	T	Insert Screw	Wrench
SCLOR/L 62	074811	074812	0.375	0.375	2.500	0.500	0.500	1/4	0.094	WS1017	T7M
SCLOR/L 82	074813	074814	0.500	0.500	3.500	0.500	0.625	1/4	0.094	WS1017	T7M
SCLOR/L 102	074815	074816	0.625	0.625	4.000	0.500	0.750	1/4	0.094	WS1017	T7M
SCLOR/L 122	074817	074818	0.750	0.750	4.500	0.500	0.875	1/4	0.094	WS1017	T7M
SCLOR/L 123	074819	074820	0.750	0.750	4.500	0.562	0.875	3/8	0.156	WS1018	T15M





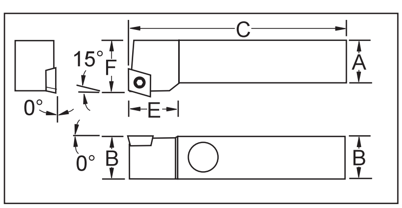


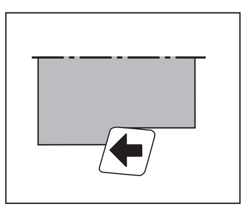
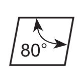
SCMON*

40° Side Cutting, Straight Shank
11° Relief Angle, Screw Down, CPGT

*Not ANSI Code

Item Desc.	RH EDP	Dimension A	B	C	E	F	Insert IC	T	Screw	Insert Wrench
SCMON 62	074849	0.375	0.375	2.500	0.500	0.187	1/4	0.094	WS1017	T7M
SCMON 82	074850	0.500	0.500	3.500	0.500	0.250	1/4	0.094	WS1017	T7M
SCMON 102	074851	0.625	0.625	4.000	0.500	0.312	1/4	0.094	WS1017	T7M
SCMON 122	074852	0.750	0.750	4.500	0.500	0.375	1/4	0.094	WS1017	T7M
SCMON 123	074853	0.750	0.750	4.500	0.625	0.375	3/8	0.156	WS1018	T15M



SCROR/L

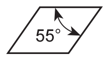
15° Side Cutting, Offset Shank
11° Relief Angle, Screw Down, CPGT

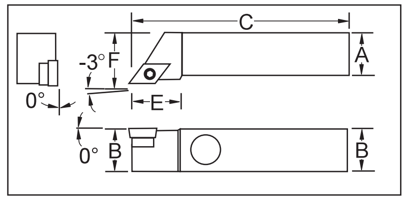
Item Desc.	RH EDP	LH EDP	Dimension A	B	C	E	F	Insert IC	T	Screw	Insert Wrench
SCROR/L 62	074831	074832	0.375	0.375	2.500	0.500	0.439	1/4	0.094	WS1017	T7M
SCROR/L 82	074833	074834	0.500	0.500	3.500	0.500	0.564	1/4	0.094	WS1017	T7M
SCROR/L 102	074835	074836	0.625	0.625	4.000	0.500	0.686	1/4	0.094	WS1017	T7M
SCROR/L 122	074837	074838	0.750	0.750	4.500	0.500	0.813	1/4	0.094	WS1017	T7M
SCROR/L 123	074839	074840	0.750	0.750	4.500	0.562	0.785	3/8	0.156	WS1018	T15M

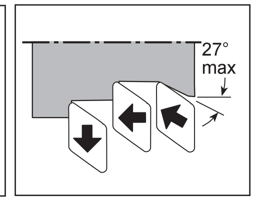
Note: For right/left hand tools, dimensional drawing shows R.H. view, L.H. is opposite.

SDJCR/L

-3° Side Cutting, Offset Shank
7° Relief Angle, S-Lock, DCMT



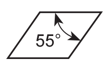


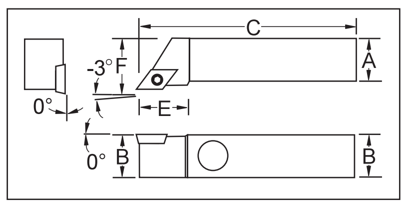


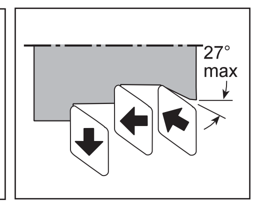
Item Desc.	RH EDP	LH EDP	Dimension A	B	C	E	F	Insert IC	T	Shim	Insert Screw	Wrench	Shim Screw
SDJCR/L 62	096564	096620	0.375	0.375	2.500	0.590	0.500	1/4	3/32	—	TCS-1M-02	T7M	—
SDJCR/L 82	096565	096621	0.500	0.500	3.500	0.590	0.625	1/4	3/32	—	TCS-1M-02	T7M	—
SDJCR/L 102A	096566	096622	0.625	0.625	4.000	0.590	0.750	1/4	3/32	—	TCS-1M-02	T7M	—
SDJCR/L 123B	096567	096623	0.750	0.750	4.500	0.940	1.000	3/8	5/32	SD32	TCS-1M-05	T153	CSS-13M-01
SDJCR/L 163C	096568	096624	1.000	1.000	5.000	0.940	1.250	3/8	5/32	SD32	TCS-1M-05	T153	CSS-13M-01
SDJCR/L 163D	096569	096625	1.000	1.000	6.000	0.940	1.250	3/8	5/32	SD32	TCS-1M-05	T153	CSS-13M-01

SDJOR/L*

-3° Side Cutting, Offset Shank
11° Relief Angle, Screw Down, DPGT





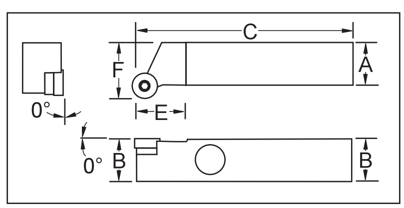


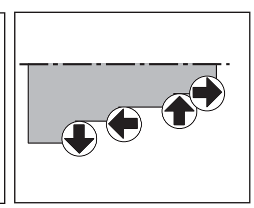
*Not ANSI Code

Item Desc.	RH EDP	LH EDP	Dimension A	B	C	E	F	Insert IC	T	Insert Screw	Wrench
SDJOR/L 62	074841	074842	0.375	0.375	2.500	0.625	0.500	1/4	0.094	WS1017	T7M
SDJOR/L 82	074843	074844	0.500	0.500	3.500	0.625	0.625	1/4	0.094	WS1017	T7M
SDJOR/L 102	074845	074846	0.625	0.625	4.000	0.625	0.750	1/4	0.094	WS1017	T7M
SDJOR/L 122	074847	074848	0.750	0.750	4.500	0.625	0.875	1/4	0.094	WS1017	T7M

SRGCR/L

Side & End Cutting, Offset Shank
7° Relief Angle, S-Lock, RCMT

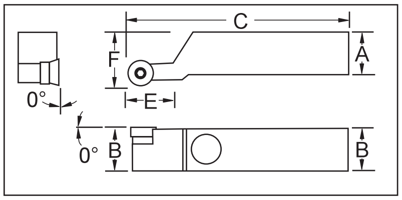


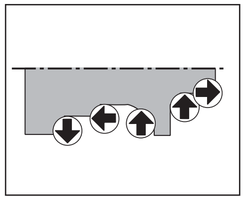


Item Desc.	RH EDP	LH EDP	Dimension A	B	C	E	F	Insert IC	T	Shim	Insert Screw	Wrench
SRGCR/L 123B	096570	096626	0.750	0.750	4.500	—	1.000	3/8	5/32	SR 3	SIS33	T9
SRGCR/L 163C	096571	096627	1.000	1.000	5.000	—	1.250	3/8	5/32	SR 3	SIS33	T9
SRGCR/L 163D	096572	096628	1.000	1.000	6.000	—	1.250	3/8	5/32	SR 3	SIS33	T9
SRGCR/L 164C	096573	096629	1.000	1.000	5.000	—	1.250	1/2	3/16	SR 4	SIS42	T15M
SRGCR/L 164D	096574	096630	1.000	1.000	6.000	—	1.250	1/2	3/16	SR 4	SIS42	T15M
SRGCR/L 204D	096575	096631	1.250	1.250	6.000	—	1.500	1/2	3/16	SR 4	SIS42	T15M

Note: For right/left hand tools, dimensional drawing shows R.H. view, L.H. is opposite.

SRSCR/L

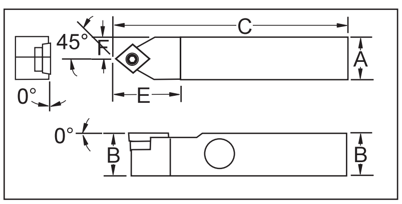


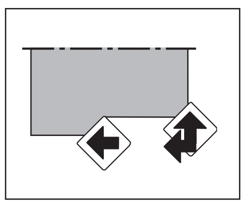


Side & End Cutting, Offset Shank
7° Relief Angle, S-Lock, RCMT

Item Desc.	RH EDP	LH EDP	Dimension A	B	C	E	F	Insert IC	T	Shim	Insert Screw	Wrench
SRSCR/L 123B	096576	096632	0.750	0.750	4.500	0.750	1.000	3/8	5/32	SR 3	SIS33	T9
SRSCR/L 163C	096577	096633	1.000	1.000	5.000	1.000	1.250	3/8	5/32	SR 3	SIS33	T9
SRSCR/L 163D	096578	096634	1.000	1.000	6.000	1.000	1.250	3/8	5/32	SR 3	SIS33	T9
SRSCR/L 164C	096580	096636	1.000	1.000	5.000	1.000	1.250	1/2	3/16	SR 4	SIS42	T15M
SRSCR/L 164D	096581	096637	1.000	1.000	6.000	1.000	1.250	1/2	3/16	SR 4	SIS42	T15M
SRSCR/L 203D	096579	096635	1.250	1.250	6.000	1.000	1.500	3/8	5/32	SR 3	SIS33	T9
SRSCR/L 204D	096582	096638	1.250	1.250	6.000	1.000	1.500	1/2	3/16	SR 4	SIS42	T15M

SSDCN



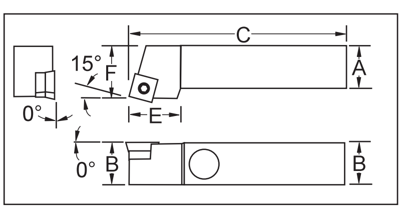


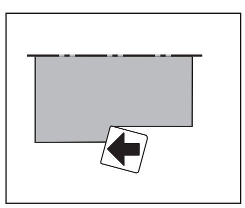
45° Side Cutting, Straight Shank
7° Relief Angle, S-Lock, SCMT

Item Desc.	EDP	Dimension A	B	C	E	F	Insert IC	T	Shim	Insert Screw	Wrench	Shim Screw
SSDCN 83	096588	0.500	0.500	3.500	0.594	0.250	3/8	5/32	—	SIS32	T15M	—
SSDCN 103A	096589	0.625	0.625	4.000	0.594	0.312	3/8	5/32	SS 32	TCS-1M-05	T153	CSS-13M-01
SSDCN 123B	096590	0.750	0.750	4.500	0.594	0.375	3/8	5/32	SS 32	TCS-1M-05	T153	CSS-13M-01
SSDCN 164D	096591	1.000	1.000	6.000	0.781	0.500	1/2	3/16	SS 42	TCS-1M-07	T154	CSS-13M-02
SSDCN 204D	096592	1.250	1.250	6.000	0.781	0.625	1/2	3/16	SS 42	TCS-1M-07	T154	CSS-13M-02

Holders & Swiss Style Tooling

SSRCR/L





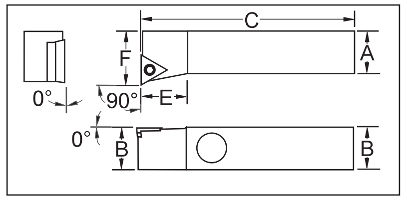
15° Side Cutting, Offset Shank
7° Relief Angle, S-Lock, SCMT

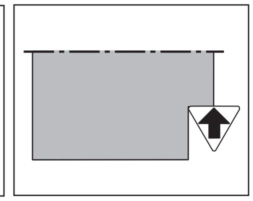
Item Desc.	RH EDP	LH EDP	Dimension A	B	C	E	F	Insert IC	T	Shim	Insert Screw	Wrench	Shim Screw
SSRCR/L 103A	096583	—	0.625	0.625	4.000	0.750	0.785	3/8	5/32	SS 32	TCS-1M-05	T153	CSS-13M-01
SSRCR/L 123B	096584	096640	0.750	0.750	4.500	0.750	0.910	3/8	5/32	SS 32	TCS-1M-05	T153	CSS-13M-01
SSRCR/L 164C	096585	096641	1.000	1.000	5.000	0.875	1.130	1/2	3/16	SS 42	TCS-1M-07	T154	CSS-13M-02
SSRCR/L 164D	096586	096642	1.000	1.000	6.000	0.875	1.130	1/2	3/16	SS 42	TCS-1M-07	T154	CSS-13M-02
SSRCR/L 204D	096587	096643	1.250	1.250	6.000	0.875	1.380	1/2	3/16	SS 42	TCS-1M-07	T154	CSS-13M-02

Note: For right/left hand tools, dimensional drawing shows R.H. view, L.H. is opposite.

STFCR/L

0° End Cutting, Offset Shank
7° Relief Angle, S-Lock, TCMT

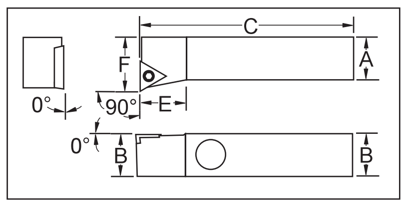


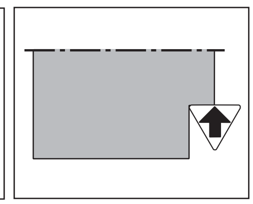


Item Desc.	RH EDP	LH EDP	Dimension A	B	C	E	F	Insert IC	T	Shim	Insert Screw	Wrench	Shim Screw
STFCR/L 62	096601	096657	0.375	0.375	2.500	0.500	0.500	1/4	3/32	—	TCS-1M-02	T7M	—
STFCR/L 82	096602	096658	0.500	0.500	3.500	0.500	0.625	1/4	3/32	—	TCS-1M-02	T7M	—
STFCR/L 103A	096603	096659	0.625	0.625	4.000	0.750	0.750	3/8	5/32	ST 32	TCS-1M-05	T15-3	CSS-13M-01
STFCR/L 123B	096604	096660	0.750	0.750	4.500	0.750	1.000	3/8	5/32	ST 32	TCS-1M-05	T15-3	CSS-13M-01
STFCR/L 163D	096605	096661	1.000	1.000	6.000	0.750	1.250	3/8	5/32	ST 32	TCS-1M-05	T15-3	CSS-13M-01

STFOR/L*

0° End Cutting, Offset Shank
11° Relief Angle, Screw Down, TPGT, TPMT



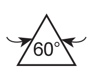


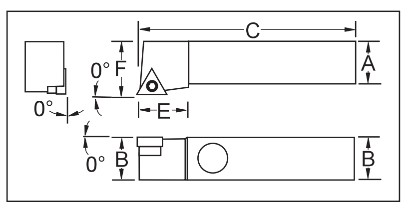
*Not ANSI code

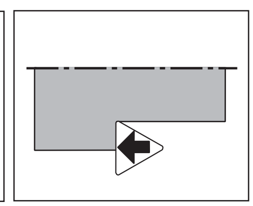
Item Desc.	RH EDP	LH EDP	Dimension A	B	C	E	F	Insert IC	T	Insert Screw	Wrench
STFOR/L 62	074793	074794	0.375	0.375	2.500	0.500	0.500	1/4	0.094	WS1017	T7M
STFOR/L 82	074795	—	0.500	0.500	3.500	0.500	0.625	1/4	0.094	WS1017	T7M
STFOR/L 122	074799	074800	0.750	0.750	4.500	0.500	0.875	1/4	0.094	WS1017	T7M

STGCR/L

0° Side Cutting, Offset Shank
7° Relief Angle, S-Lock, TCMT

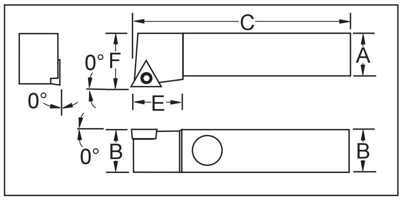


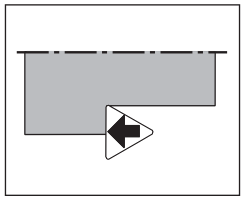


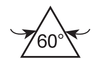


Item Desc.	RH EDP	LH EDP	Dimension A	B	C	E	F	Insert IC	T	Shim	Insert Screw	Wrench	Shim Screw
STGCR/L 62	096593	096649	0.375	0.375	2.500	0.500	0.500	1/4	3/32	—	TCS-1M-02	T7M	—
STGCR/L 82	096594	096650	0.500	0.500	3.500	0.500	0.625	1/4	3/32	—	TCS-1M-02	T7M	—
STGCR/L 103A	096595	096651	0.625	0.625	4.000	0.830	0.750	3/8	5/32	ST 32	TCS-1M-05	T153	CSS-13M-01
STGCR/L 123B	096596	096652	0.750	0.750	4.500	0.830	1.000	3/8	5/32	ST 32	TCS-1M-05	T153	CSS-13M-01
STGCR/L 163D	096597	096653	1.000	1.000	6.000	0.830	1.250	3/8	5/32	ST 32	TCS-1M-05	T153	CSS-13M-01
STGCR/L 164C	096598	096654	1.000	1.000	5.000	1.000	1.250	1/2	3/16	ST 42	TCS-1M-07	T154	CSS-13M-02
STGCR/L 164D	096599	096655	1.000	1.000	6.000	1.000	1.250	1/2	3/16	ST 42	TCS-1M-07	T154	CSS-13M-02
STGCR/L 204D	096600	—	1.250	1.250	6.000	1.000	1.500	1/2	3/16	ST 42	TCS-1M-07	T154	CSS-13M-02

Note: For right/left hand tools, dimensional drawing shows R.H. view, L.H. is opposite.



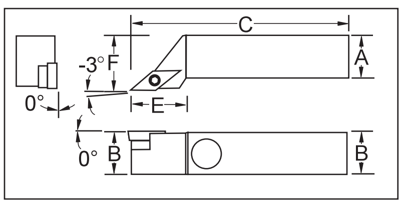


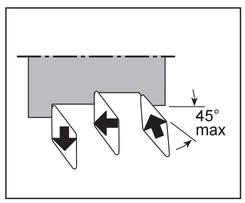


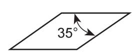
STGOR/L

0° Side Cutting, Offset Shank
11° Relief Angle, Screw Down, TPGT, TPMT

Item Desc.	RH EDP	LH EDP	Dimension A	B	C	E	F	Insert IC	T	Insert Screw	Wrench
STGOR/L 62	074959	074786	0.375	0.375	2.500	0.500	0.500	1/4	0.094	WS1017	T7M
STGOR/L 82	074787	074788	0.500	0.500	3.500	0.500	0.625	1/4	0.094	WS1017	T7M
STGOR/L 102	074789	074790	0.625	0.625	4.000	0.500	0.750	1/4	0.094	WS1017	T7M
STGOR/L 122	074791	074792	0.750	0.750	4.500	0.500	0.875	1/4	0.094	WS1017	T7M



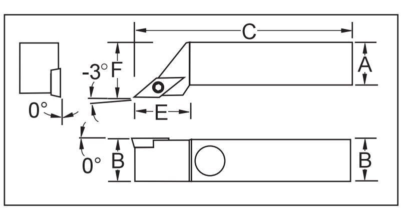


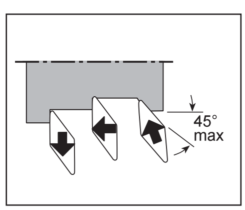


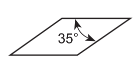
SVJBR/L

-3° Side Cutting, Offset Shank
5° Relief Angle, S-Lock
VBGT, VBMT

Item Desc.	RH EDP	LH EDP	Dimension A	B	C	E	F	Insert IC	T	Shim	Insert Screw	Wrench	Shim Screw
SVJBR/L 62	081184	081179	0.375	0.375	2.500	—	0.500	1/4	3/32	—	TCS-1M-02	T7M	—
SVJBR/L 82	081185	081182	0.500	0.500	3.500	—	0.625	1/4	3/32	—	TCS-1M-02	T7M	—
SVJBR/L 102A	081186	081183	0.625	0.625	4.000	—	0.750	1/4	3/32	—	TCS-1M-02	T7M	—
SVJBR/L 123B	096606	096662	0.750	0.750	4.500	1.594	1.000	3/8	3/16	SV 32	TCS-1M-05	T153	CSS-13M-01
SVJBR/L 163C	096607	096663	1.000	1.000	5.000	1.594	1.250	3/8	3/16	SV 32	TCS-1M-05	T153	CSS-13M-01
SVJBR/L 163D	096608	096664	1.000	1.000	6.000	1.594	1.250	3/8	3/16	SV 32	TCS-1M-05	T153	CSS-13M-01
SVJBR/L 203D	096609	096665	1.250	1.250	6.000	1.594	1.500	3/8	3/16	SV 32	TCS-1M-05	T153	CSS-13M-01







SVJOR/L*

-3° Side Cutting, Offset Shank
11° Relief Angle, Screw Down, VPGT

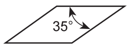
*Not ANSI code

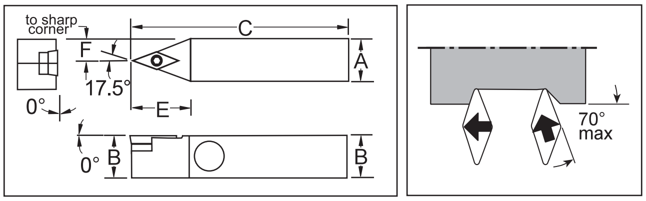
Item Desc.	RH EDP	LH EDP	Dimension A	B	C	E	F	Insert IC	T	Insert Screw	Wrench
SVJOR/L 62	074854	074855	0.375	0.375	3.000	1.000	0.500	1/4	0.125	TCS-1M-02	T7M
SVJOR/L 82	074856	074857	0.500	0.500	3.500	1.000	0.625	1/4	0.125	TCS-1M-02	T7M
SVJOR/L 102	074858	074859	0.625	0.625	4.000	1.000	0.750	1/4	0.125	TCS-1M-02	T7M
SVJOR/L 122	074860	074861	0.750	0.750	4.500	1.000	0.875	1/4	0.125	TCS-1M-02	T7M

Note: For right/left hand tools, dimensional drawing shows R.H. view, L.H. is opposite.

SVVBN

17.5° Side Cutting, Straight Shank
5° Relief Angle, S-Lock
VBMT, VBGT

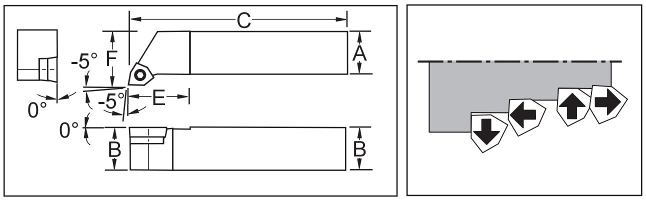




Item Desc.	EDP	Dimension A	B	C	E	F	Insert IC	T	Shim	Insert Screw	Wrench	Shim Screw
SVVBN 062	081189	0.375	0.375	2.500	—	0.500	1/4	3/32	—	TCS-1M-02	—	T7M
SVVBN 082	081190	0.500	0.500	3.500	—	0.625	1/4	3/32	—	TCS-1M-02	—	T7M
SVVBN 102A	081193	0.625	0.625	4.000	—	0.750	1/4	3/32	—	TCS-1M-02	—	T7M
SVVBN 123B	096610	0.750	0.750	4.500	1.594	0.375	3/8	3/16	SV 32	TCS-1M-05	T 153	CSS-13M-01
SVVBN 163C	096611	1.000	1.000	5.000	1.594	0.500	3/8	3/16	SV 32	TCS-1M-05	T 153	CSS-13M-01
SVVBN 163D	096612	1.000	1.000	6.000	1.594	0.500	3/8	3/16	SV 32	TCS-1M-05	T 153	CSS-13M-01
SVVBN 203D	096613	1.250	1.250	6.000	1.594	0.625	3/8	3/16	SV 32	TCS-1M-05	T 153	CSS-13M-01

SWLCR/L

-5° Side & End Cutting, Offset Shank
7° Relief Angle, S-Lock, WCMT



Item Desc.	RH EDP	LH EDP	Dimension A	B	C	E	F	Insert IC	T	Shim	Insert Screw	Wrench	Shim Screw
SWLCR/L 062	081144	081139	0.375	0.375	2.500	0.500	0.500	1/4	3/32	—	TCS-1M-02	T7M	—
SWLCR/L 082	081145	081140	0.500	0.500	3.500	0.500	0.625	1/4	3/32	—	TCS-1M-02	T7M	—
SWLCR/L 103A	081146	081141	0.625	0.625	4.000	0.625	0.750	3/8	5/32	SW32	TSS-1M-05	CSS-13M-01	T153
SWLCR/L 123B	081147	081142	0.750	0.750	4.500	0.625	1.000	3/8	5/32	SW32	TSS-1M-05	CSS-13M-01	T153
SWLCR/L 163D	081148	081143	1.000	1.000	6.000	0.625	1.250	3/8	5/32	SW32	TSS-1M-05	CSS-13M-01	T153

Also available as a boring bar, style SWLCR/L, not shown in this catalog.

Note: For right/left hand tools, dimensional drawing shows R.H. view, L.H. is opposite.

Tool Identification System

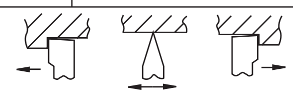
S	C	A	C	R	—
Screw-On Insert Holding	Insert Shape	Tool Style	Insert Clearance Angle	Hand of Tool	

Insert Shape:
- **C = 80° diamond**
- D = 55° diamond
- V = 35° diamond

Tool Style:
- **A = 0° lead**
- L = 5° lead
- J = 3° lead

Insert Clearance Angle:
- **C = 7°**
- B = 5°

Hand of Tool:



INCH

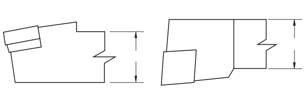
08	3	D
Shank Dimensions	Insert Size	Qualified Surface and Length

Shank Dimensions:

For square shanks: toolholder cross section in 1/16" increments

For rectangular shanks: first digit = number of 1/8" of width

second digit = number of 1/4" of height



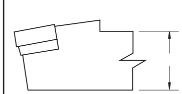
Insert Size: Number of 1/8" of IC

Qualified Surface and Length:
- B = qualified back and end, 4.5" long
- D = qualified back and end, 6" long
- Z = qualified back and end, 3.25" long

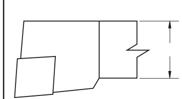
METRIC

12	12	M	09	Q
Shank Height (mm)	Shank Width (mm)	Tool Length (mm)	Insert Size (mm)	Tool Qualification

Shank Height (mm):



Shank Width (mm):



Tool Length (mm):
- F = 80
- H = 100
- K = 125
- M = 150

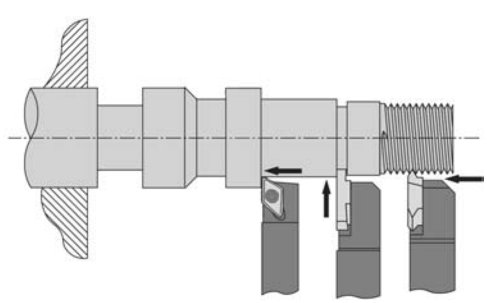
Insert Size (mm): Cutting edge length

Tool Qualification: Q = back and end

Tooling Applications for Swiss Style Lathes

Features:
- Tool shanks are qualified
- Inch and metric sizes available
- Gage ISO/ANSI screw-on inserts

Benefits:
- Accurate set-ups assured
- Wide variety of machine applications
- Industry standard inserts

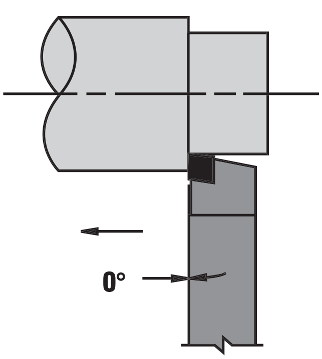


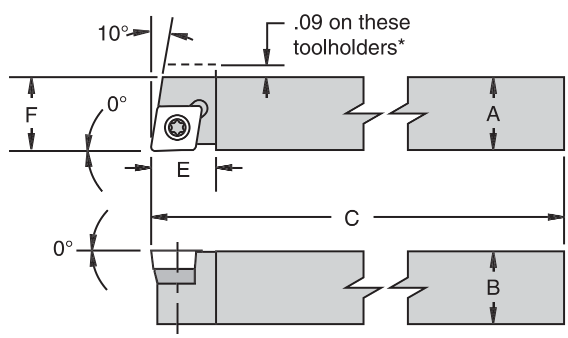
Qualified Small Shank Toolholders

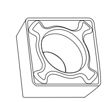
SCAC

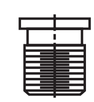
	Catalog No. R.H. and L.H.	EDP No.	Dimensions A	B	C	E	F	Gage Inserts	Shim	Shim Screw	Insert Screw	Wrench
INCH	SCACR-04.52D* SCACL-04.52D*	0730356 0730362	9/32	9/32	6	7/16	.281	CCMT-21.51	—	—	MS-1153	FT-7
INCH	SCACR-052D* SCACL-052D*	0730357 0730363	5/16	5/16	6	7/16	.313	CCMT-21.51	—	—	MS-1153	FT-7
INCH	SCACR-062D SCACL-062D	0730358 0730364	3/8	3/8	6	7/16	.375	CCMT-21.51	—	—	MS-1153	FT-15
INCH	SCACR-083D SCACL-083D	0730359 0730365	1/2	1/2	6	5/8	.500	CCMT-32.52	—	—	MS-1155	FT-7
INCH	SCACR-523Z SCACL-523Z	0730360 0730366	5/8	1/2	3-1/4	5/8	.625	CCMT-32.52	—	—	MS-1155	FT-7
INCH	SCACR-103B SCACL-103B	0730361 0730367	5/8	5/8	4-1/2	1/2	.625	CCMT-32.52	SKCP-343	SRS-3	MS-1156	FT-15-3.5
METRIC	SCACR-1010M06Q	0730368	10	10	150	11	10	CCMT 06 02 04	—	—	MS-1153	FT-7
METRIC	SCACR-1212M06Q	0730369	12	12	150	11	12	CCMT 06 02 04	—	—	MS-1153	FT-7
METRIC	SCACR-1616K09Q	0730370	16	16	125	16	16	CCMT 09 T3 08	SKCP-343	SRS-3	MS-1156	FT-15-3.5

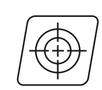
Toolholders ship complete less inserts.

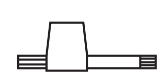


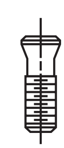



CCMT-GP


Shim Screw


Shim


Wrench


Insert Screw

R.H. shown

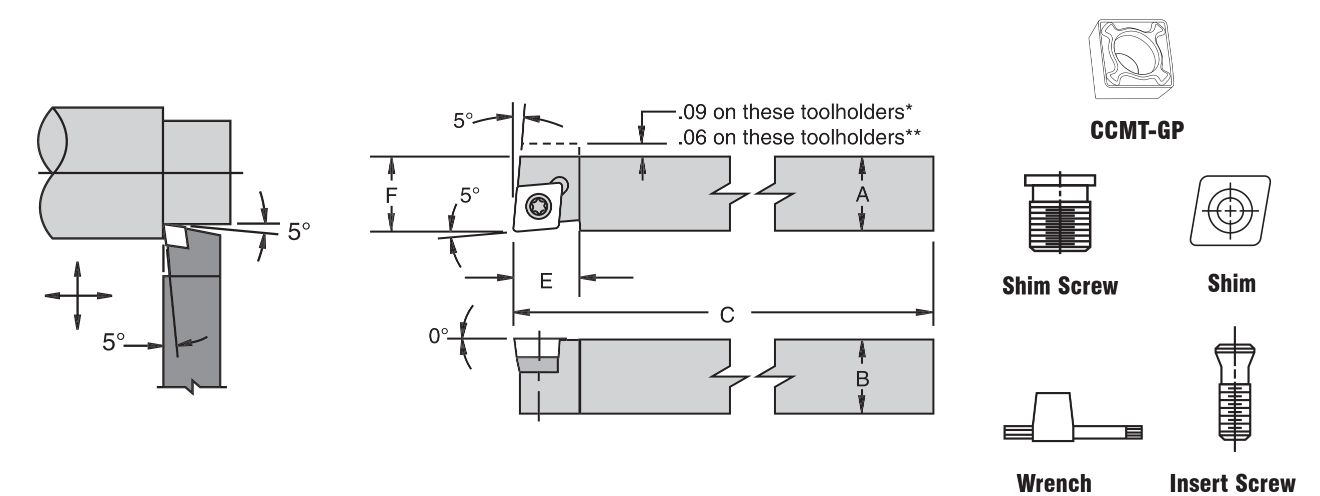
Holders & Swiss Style Tooling

Qualified Small Shank Toolholders

SCLC-F

Catalog No. R.H. and L.H.	EDP No.	Dimensions A	B	C	E	F	Gage Inserts	Shim	Shim Screw	Insert Screw	Wrench	
SCLCRF-04.52D* SCLCLF-04.52D*	0730334 0730341	9/32	9/32	6	1/2	.281	CCMT-21.51	—	—	MS-1153	FT-7	INCH
SCLCRF-052D** SCLCLF-052D**	0730335 0730342	5/16	5/16	6	1/2	.313	CCMT-21.51	—	—	MS-1153	FT-7	INCH
SCLCRF-062D SCLCLF-062D	0730336 0730343	3/8	3/8	6	1/2	.375	CCMT-21.51	—	—	MS-1153	FT-15	INCH
SCLCRF-082D SCLCLF-082D	0730337 0730344	1/2	1/2	6	1/2	.500	CCMT-21.51	—	—	MS-1153	FT-7	INCH
SCLCRF-083D* SCLCLF-083D*	0730338 0730345	1/2	1/2	6	5/8	.500	CCMT-32.52	—	—	MS-1155	FT-7	INCH
SCLCRF-523Z SCLCLF-523Z	0730339 0730346	5/8	1/2	3-1/4	5/8	.625	CCMT-32.52	—	—	MS-1155	FT-7	INCH
SCLCRF-103B SCLCLF-103B	0730340 0730347	5/8	5/8	4-1/2	1/2	.625	CCMT-32.52	SKCP-343	SRS-3	MS-1156	FT-15-3.5	INCH
SCLCRF-1010M06Q	0730348	10	10	150	11	10	CCMT 06 02 04	—	—	MS-1153	FT-7	METRIC
SCLCRF-1212M06Q	0730349	12	12	150	11	12	CCMT 06 02 04	—	—	MS-1153	FT-7	METRIC
SCLCRF-1616K09Q	0730351	16	16	125	16	16	CCMT 09 T3 08	SKCP-343	SRS-3	MS-1156	FT-15-3.5	METRIC

Toolholders ship complete less inserts.



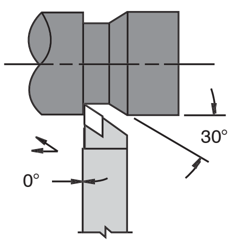
R.H. shown

Qualified Small Shank Toolholders

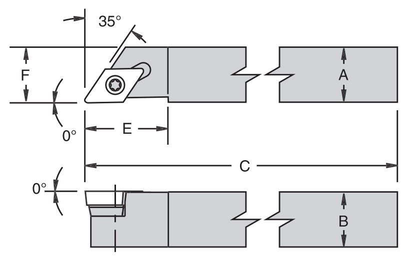
SDAC

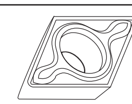
	Catalog No. R.H. and L.H.	EDP No.	Dimensions A	B	C	E	F	Gage Inserts	Shim	Shim Screw	Insert Screw	Wrench
INCH	SDACR-62D SDACL-62D	0730322 0730325	3/8	3/8	6	5/8	.375	DCMT-21.51	—	—	MS-1153	FT-7
INCH	SDACR-082D SDACL-082D	0730323 0730326	1/2	1/2	6	5/8	.500	DCMT-21.51	—	—	MS-1153	FT-7
INCH	SDACR-103B SDACL-103B	0730324 0730327	5/8	5/8	4-1/2	7/8	.625	DCMT-32.52	SKDP-343	SRS-3	MS-1156	FT15-3.5
METRIC	SDACR-1010M07Q	0730328	10	10	150	16	10	DCMT 07 02 04	—	—	MS-1153	FT-7
METRIC	SDACR-1212M07Q	0730329	12	12	150	16	12	DCMT 07 02 04	—	—	MS-1153	FT-7
METRIC	SDACR-1616K11Q	0730330	16	16	125	22	16	DCMT 11 T3 08	SKDP-343	SRS-3	MS-1156	FT15-3.5

Toolholders ship complete less inserts.

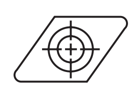


R.H. shown



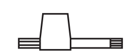


DCMT-GP Insert



Shim

Insert Screw

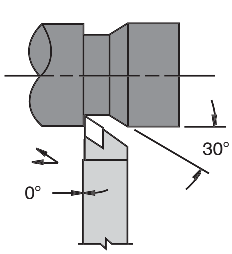


Wrench

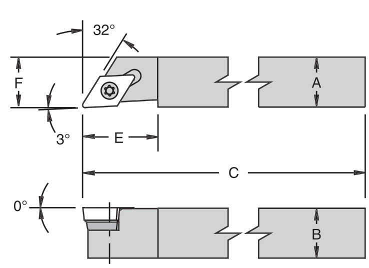
Shim Screw

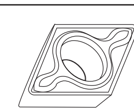
SDJC-F

	Catalog No. R.H. and L.H.	EDP No.	Dimensions A	B	C	E	F	Gage Inserts	Shim	Shim Screw	Insert Screw	Wrench
INCH	SDJCRF-62D SDJCLF-62D	0730310 0730313	3/8	3/8	6	5/8	.375	DCMT-21.51	—	—	MS-1153	FT-7
INCH	SDJCRF-082D SDJCLF-082D	0730311 0730314	1/2	1/2	6	5/8	.500	DCMT-21.51	—	—	MS-1153	FT-7
INCH	SDJCRF-103B SDJCLF-103B	0730312 0730315	5/8	5/8	4-1/2	7/8	.625	DCMT-32.52	SKDP-343	SRS-3	MS-1155	FT-15
METRIC	SDJCRF-1010M07Q SDJCLF-1010M07Q	0730316 0730319	10	10	150	16	10	DCMT 07 02 04	—	—	MS-1153	FT-7
METRIC	SDJCRF-1212M07Q SDJCLF-1212M07Q	0730317 0730320	12	12	150	16	12	DCMT 07 02 04	—	—	MS-1153	FT-7

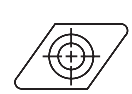


R.H. shown



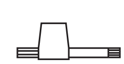


DCMT-GP Insert



Shim

Insert Screw



Wrench

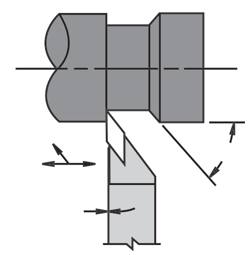
Shim Screw

Qualified Small Shank Toolholders

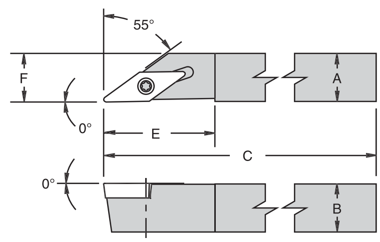
SVAB

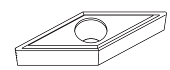
Catalog No. R.H. and L.H.	EDP No.	Dimensions A	B	C	E	F	Gage Inserts	Insert Screw	Wrench	
SVABR-62D SVABL-62D	0730298 0730301	3/8	3/8	6	7/8	.375	VBMT-221	MS-1153	FT-7	INCH
SVABR-082D SVABL-082D	0730299 0730302	1/2	1/2	6	7/8	.500	VBMT-221	MS-1153	FT-7	INCH
SVABR-103B SVABL-103B	0730300 0730303	5/8	5/8	4-1/2	1-3/8	.625	VBMT-332	MS-1155	FT-15	INCH
SVABR-1010M11Q	0730304	10	10	150	22	10	VBMT 11 03 04	MS-1153	FT-7	METRIC
SVABR-1212M11Q	0730305	12	12	150	22	12	VBMT 11 03 04	MS-1153	FT-7	METRIC
SVABR01616K16Q	0730306	16	16	125	27	16	VBMT 16 04 08	MS-1155	FT-15	METRIC

Toolholders ship complete less inserts.



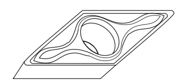
R.H. shown





VBMT-DF Insert

Insert Screw

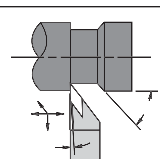


VBMT-GP Insert

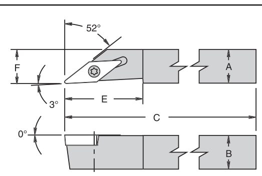
Wrench

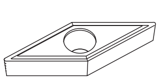
SVJB-F

Catalog No. R.H. and L.H.	EDP No.	Dimensions A	B	C	E	F	Gage Inserts	Insert Screw	Wrench	
SVJBRF-62D SVJBLF-62D	0730286 0730289	3/8	3/8	6	7/8	.375	VBMT-221	MS-1153	FT-7	INCH
SVJBRF-082D SVJBLF-082D	0730287 0730290	1/2	1/2	6	7/8	.500	VBMT-221	MS-1153	FT-7	INCH
SVJBRF-103B SVJBLF-103B	0730288 0730291	5/8	5/8	4-1/2	1-3/8	.625	VBMT-332	MS-1155	FT-15	INCH
SVJBRF-1010M11Q	0730292	10	10	150	22	10	VBMT 11 03 04	MS-1153	FT-7	METRIC
SVJBRF-1212M11Q SVJBLF-1212M11Q	0730293 0730296	12	12	150	22	12	VBMT 11 03 04	MS-1153	FT-7	METRIC
SVJBRF-1616K16Q SVJBLF-1616K16Q	0730294 0730297	16	16	125	27	16	VBMT 16 04 08	MS-1155	FT-15	METRIC

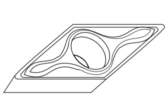


R.H. shown



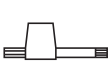


VBMT-DF Insert



VBMT-GP Insert

Insert Screw



Wrench

ANSI Number ISO Number	Coating	Grade	EDP Number	Stock Status
VBMT 220.5 DF	TiN PVD	SP321	0701195	S
VBMT 11 03 02 F	TiN CVD	SA150	0701196	S
VBMT 221 DF	TiN PVD	SP321	0701198	S
VBMT 11 03 04 DF	TiC, N CVD	SN150	0701197	S
	TiN CVD	SA150	0701199	S
VBMT 222 DF	TiN PVD	SP321	0701201	S
VBMT 11 03 08 DF	TiC, N CVD	SN150	0701200	S
	TiN, CVD	SA150	0701202	S

SPE-D-LOK™ Threading and Grooving

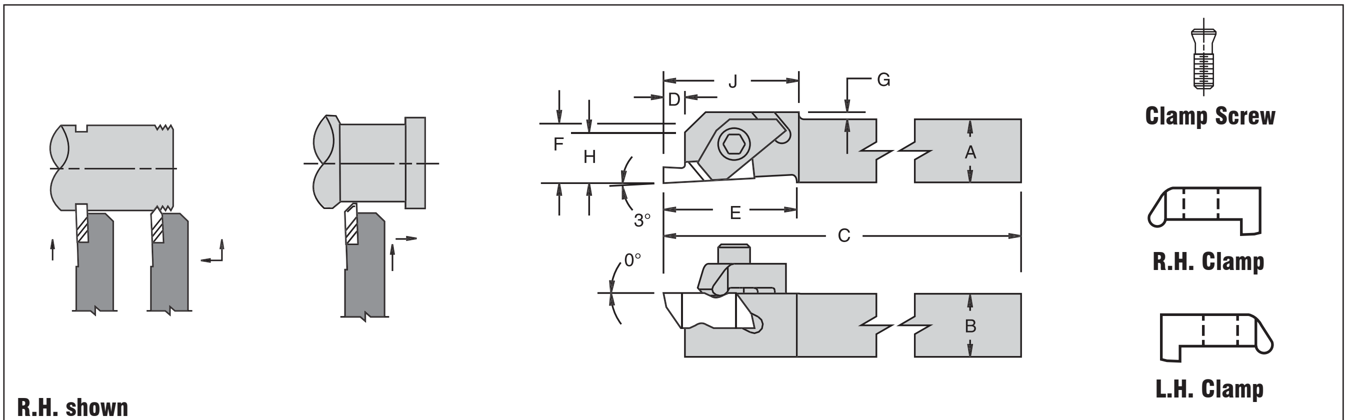
PAS

	Catalog No. R.H. and L.H.	EDP No.	Dimensions A	B	C	D	E	F**	G	H	J	Gage Insert*	Clamp	Clamp Screw
INCH	PASR-062D PASL-062D	094588 094583	3/8	3/8	6	.138	.75	.375	.070	.35	.88	PG-2R PG-2L	CM-182 CM-183	S-310
INCH	PASR-082D PASL-082D	094589 094584	1/2	1/2	6	.138	.75	.500	—	.35	—	PG-2R PG-2L	CM-182 CM-183	S-310
INCH	PASR-103B PASL-103B	094592 094587	3/4	3/8	6	.138	.75	.750	—	.35	—	PG-2R PG-2L	CM-74 CM-75	S-412
METRIC	PASR-1010M2Q PASL-1010M2Q	0730385 0730386	10	10	150	3.51	20	10	1.8	9	22	PG-2R PG-2L	CM-182 CM-183	MS-1025
METRIC	PASR-1020M2Q PASL-1020M2Q	0730387 0730388	20	10	150	3.51	20	20	—	9	—	PG-2R PG-2L	CM-74 CM-75	MS-1025
METRIC	PASR-1212M2Q PASL-1212M2Q	0730399 0730400	12	12	150	3.51	20	12	—	9	—	PG-2R PG-2L	CM-182 CM-183	MS-1025
METRIC	PASR-1616K3Q PASL-1616K3Q	0730401 0730402	16	16	125	5.51	32	16	—	12	—	PG-3R PG-3L	CM-184 CM-185	MS-412

* Gage insert specified; other styles of threading and grooving inserts of the same size may be used in toolholders.

** Over sharp point of grooving insert.

Toolholders ship complete less inserts.



R.H. shown

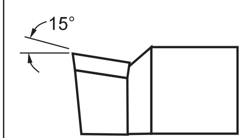
ANSI Nomenclature

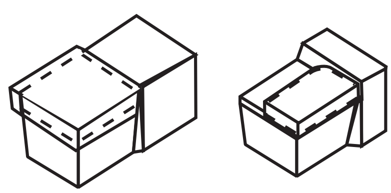
A	R	(M)	(A)	16
Tool Style	Hand	Semi-Finished	High Positive Rake	Shank Size

Hand

R = Right Hand

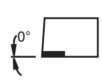
L = Left Hand



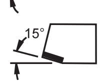


Tool Style

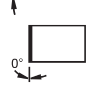
A = 0° Side Cutting, Straight Shank



B = 15° Side Cutting, Straight Shank

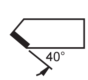


C = 0° End Cutting, Straight Shank

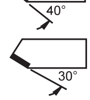


CO = Cutoff

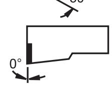
D = 40° Side Cutting, Straight Shank



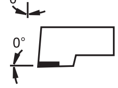
E = 30° Side Cutting, Straight Shank



F = 0° End Cutting, Offset Shank



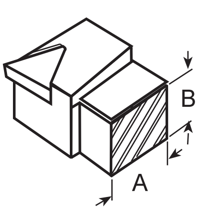
G = 0° Side Cutting, Offset Shank



Shank Size

Square Shanks:

Number indicates the A & B dimensions in 1/16"



Examples:

4 = 1/4" square

8 = 1/2" square

16 = 1" square

Rectangular Shanks:

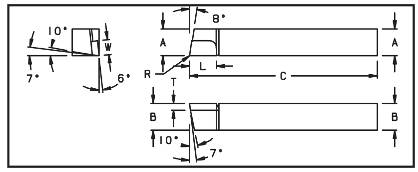
The first digit indicates the A dimension in 1/8". The second digit indicates the B dimension in 1/4".

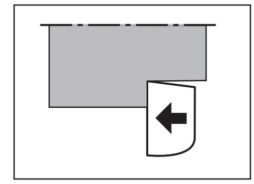
Examples:

44 = A X B

1/2" x 1"

AR/AL

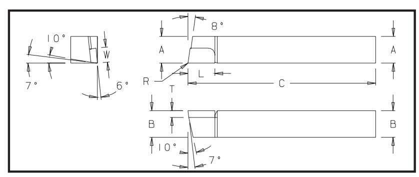


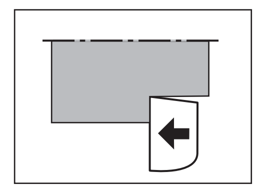


0° Side Cutting, Single Point, Straight Shank. Finish Ground

Dimensions							RH	SC20	SS160	LH	SC20	SS160
A	B	C	R	T	W	L	Style	EDP	EDP	Style	EDP	EDP
.250	.250	2.000	.016	.094	.188	.313	AR4	080877	080882	AL4	080780	080785
.312	.312	2.250	.016	.094	.250	.500	AR5	080883	080888	AL5	080786	080791
.375	.375	2.500	.016	.094	.250	.500	AR6	080889	080895	AL6	080792	080798
.438	.438	3.000	.031	.094	.250	.500	AR7	080896	080901	AL7	080799	080803
.500	.500	3.500	.031	.125	.313	.625	AR8	080902	080908	AL8	080804	080810
.625	.625	4.000	.031	.156	.375	.750	AR10	080909	080915	AL10	080811	080817
.750	.750	4.500	.031	.188	.438	.813	AR12	080916	080922	AL12	080818	080824
1.000	1.000	7.000	.031	.250	.563	1.000	AR16	080923	080929	AL16	080825	080831

ARM/ALM

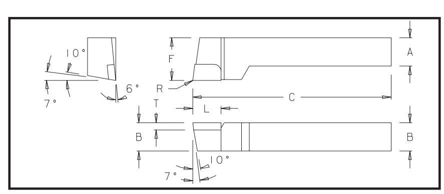


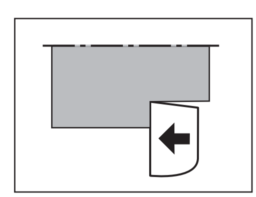


0° Side, Single Point, Straight Shank Semi-Finish Ground

Dimensions							RH	SC20	SS160	LH	SC20	SS160
A	B	C	R	T	W	L	Style	EDP	EDP	Style	EDP	EDP
.250	.250	2.000	.016	.094	.188	.313	ARM4	—	081802	ALM4	081700	081705
.312	.312	2.250	.016	.094	.250	.500	ARM5	—	081808	—	—	—
.375	.375	2.500	.016	.094	.250	.500	ARM6	081809	081815	ALM6	081712	081718
.500	.500	3.500	.031	.125	.313	.625	ARM8	081822	081828	ALM8	081724	081730
.625	.625	4.000	.031	.156	.375	.750	ARM10	—	081835	—	—	—
.750	.750	4.500	.031	.188	.438	.813	—	—	—	ALM12	—	081744

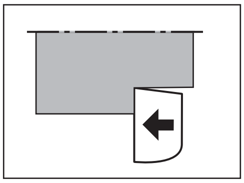
GR/GL

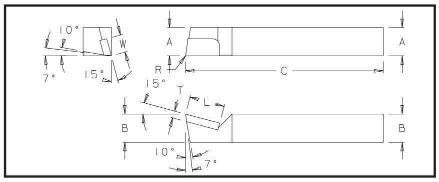




0° Side Cutting, Offset Shank, Single Point. Finish Ground

Dimensions								RH	SC20	SS160	LH	SC20	SS160
A	B	C	F	R	T	W	L	Style	EDP	EDP	Style	EDP	EDP
.500	.500	3.500	.750	.031	.125	.313	.625	GR8	081546	081551	GL8	081489	088248
.625	.625	4.000	1.000	.031	.156	.375	.750	GR10	081552	081557	GL10	081494	081498
.750	.750	4.500	1.125	.031	.188	.438	.813	GR12	081558	081563	GL12	081499	081504
1.000	1.000	7.000	1.500	.031	.250	.563	1.000	GR16	081564	081569	GL16	081505	081509

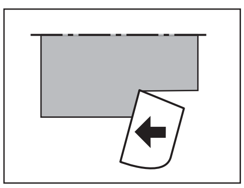


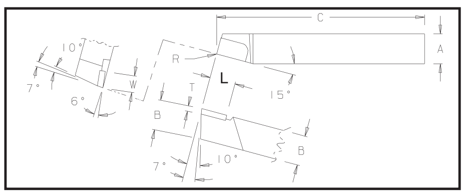


ARA\ALA

0° Side, High Positive Single Point, Straight Shank. Finish Ground

Dimensions							RH Style	SC20 EDP	SS140 EDP	SS160 EDP	LH Style	SC20 EDP	SS160 EDP
A	B	C	R	T	W	L							
.375	.375	2.500	.016	.094	.250	.500	ARA6	082458	082461	—	ALA6	082433	082437
.500	.500	3.500	.031	.125	.313	.625	ARA8	082463	—	082467	ALA8	082438	—

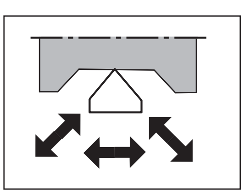


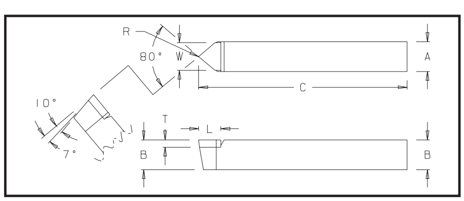


BR/BL

15° Side Cutting, Single Point, Straight Shank

Dimensions							RH Style	SC20 EDP	SS160 EDP	LH Style	SC20 EDP	SS160 EDP
A	B	C	R	T	W	L						
.250	.250	2.000	.016	.063	.156	.250	BR4	081075	081079	BL4	080982	080986
.312	.312	2.250	.016	.094	.188	.313	BR5	081080	081084	BL5	080987	080991
.375	.375	2.500	.016	.094	.250	.500	BR6	081085	081091	BL6	080992	080998
.438	.438	3.000	.031	.094	.250	.500	BR7	—	081097	BL7	080999	081004
.500	.500	3.500	.031	.125	.313	.625	BR8	081098	081104	BL8	081005	081011
.625	.625	4.000	.031	.156	.375	.750	BR10	081105	081111	BL10	081012	081018
.750	.750	4.500	.031	.188	.438	.813	BR12	081112	081118	BL12	081019	081025
1.000	1.000	7.000	.031	.250	.563	1.000	—	—	—	BL16	081026	—





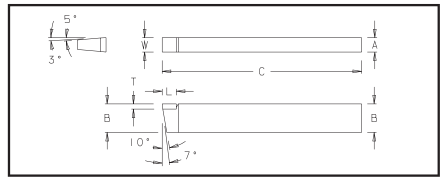
D (neutral hand)

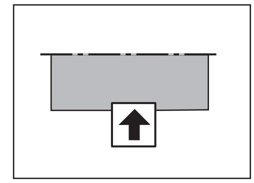
40° Side Cutting, Single Point.

Dimensions							Neutral Style	SC20 EDP	SS160 EDP
A	B	C	R	T	W	L			
.250	.250	2.000	.016	.063	.232	.313	D4	081280	081284
.312	.312	2.250	.016	.094	.294	.375	D5	081285	081289
.375	.375	2.500	.016	.094	.357	.500	D6	081290	081296
.438	.438	3.000	.031	.094	.418	.500	D7	081297	081300
.500	.500	3.500	.031	.125	.480	.500	D8	081301	081307
.625	.625	4.000	.031	.156	.605	.625	D10	081308	081313
.750	.750	4.500	.031	.188	.730	.750	D12	081314	081320
1.000	1.000	7.000	.031	.250	.930	.750	D16	081321	081325

C (neutral hand)

0° End Cutting, Single Point,
Straight Shank. Finish Ground

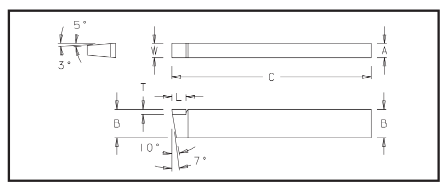


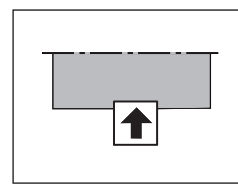


Dimensions						Neutral	SC20	SS160
A	B	C	T	W	L	Style	EDP	EDP
.250	.250	2.000	.063	.250	.313	C4	081169	081174
.312	.312	2.250	.094	.313	.375	C5	081175	081180
.375	.375	2.500	.094	.375	.375	C6	081181	081187
.438	.438	3.000	.094	.438	.500	C7	081188	081191
.500	.500	3.500	.125	.500	.500	C8	081192	081198
.625	.625	4.000	.156	.625	.625	C10	081199	081205
.750	.750	4.500	.188	.750	.750	C12	081206	081212
1.000	1.000	7.000	.250	1.000	.750	C16	081213	081219
1.250	1.250	8.000	.313	1.250	.750	C20	081220	081224
.500	1.000	7.000	.188	.500	.500	C44	081225	081231

CM (neutral hand)

0° End Cutting, Single Point, Straight
Shank. Semi-Finish Ground

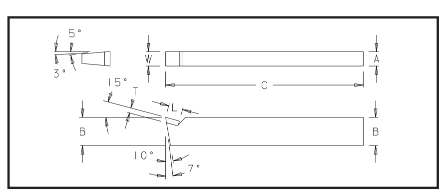


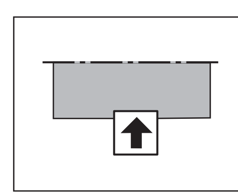


Dimensions						Neutral	SC20	SS160
A	B	C	T	W	L	Style	EDP	EDP
.250	.250	2.000	.063	.250	.313	CM4	082082	082087
.312	.312	2.250	.094	.313	.375	CM5	—	082093
.375	.375	2.500	.094	.375	.375	CM6	082094	082100
.500	.500	3.500	.125	.500	.500	CM8	082105	082111
.625	.625	4.000	.156	.625	.625	CM10	082112	082118
.750	.750	4.500	.188	.750	.750	CM12	082119	—
1.000	1.000	7.000	.250	1.000	.750	CM16	—	082132

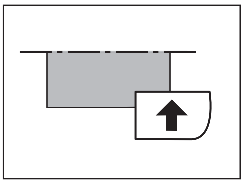
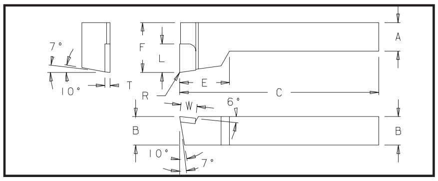
CA (neutral hand)

0° End Cutting, High Positive Single
Point, Straight Shank. Finish Ground





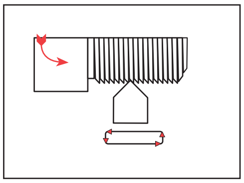
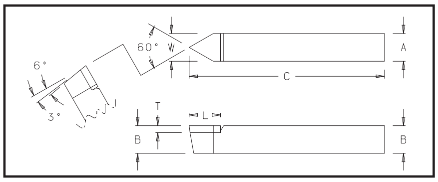
Dimensions						Neutral	SC20	SS160
A	B	C	T	W	L	Style	EDP	EDP
.375	.375	2.500	.094	.375	.375	CA6	082533	082537
.500	.500	3.500	.125	.500	.500	CA8	082538	082542
.625	.625	4.000	.156	.625	.625	CA10	—	082547

FR/FL

0° End Cutting, Offset Shank.
Single Point

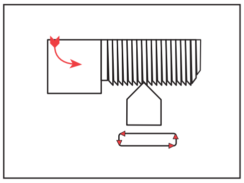
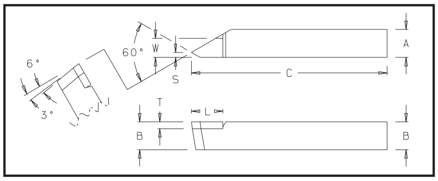
Dimensions								RH	SC20	SS160	LH	SC20	SS160
A	B	C	F	R	T	W	L	Style	EDP	EDP	Style	EDP	EDP
.500	.500	3.500	.750	.031	.125	.313	.625	FR8	081437	081441	FL8	081386	081390
.625	.625	4.000	1.000	.031	.156	.375	.750	FR10	081442	081445	FL10	081391	087327
.750	.750	4.500	1.375	.031	.188	.438	.813	FR12	081446	081450	FL12	081394	081398
1.000	1.000	7.000	1.750	.031	.250	.563	1.000	FR16	081451	081454	FL16	—	081402

E (neutral hand)

Threading, Single Point.

Dimensions						Neutral	SC20	SS160
A	B	C	T	W	L	Style	EDP	EDP
.250	.250	2.000	.063	.250	.313	E4	081326	071126
.312	.312	2.250	.094	.294	.375	E5	—	081331
.375	.375	2.500	.094	.357	.500	E6	081332	081335
.500	.500	3.500	.125	.480	.563	E8	081336	081339
.625	.625	4.000	.156	.605	.625	E10	081340	081343
.750	.750	4.500	.188	.730	.750	E12	081344	081347

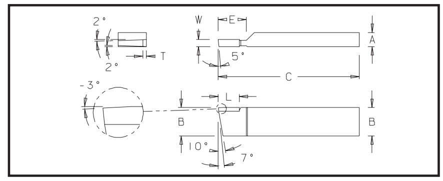
ER/EL

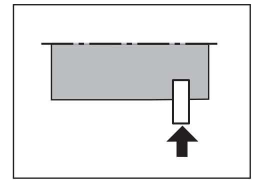
Threading, Single Point

Dimensions							RH	SC20	SS160	LH	SC20	SS160
A	B	C	S	T	W	L	Style	EDP	EDP	Style	EDP	EDP
.250	.250	2.000	.062	.063	.188	.250	ER4	081367	088246	EL4	081348	088244
.312	.312	2.250	.062	.094	.188	.313	ER5	081369	088247	EL5	—	088245
.375	.375	2.500	.062	.094	.250	.375	ER6	081371	081374	EL6	081352	081355
.500	.500	3.500	.094	.125	.313	.625	ER8	081375	081378	EL8	—	081359
.625	.625	4.000	.125	.156	.375	.750	ER10	—	081382	—	—	—

COR (right hand)

Cutt-Off, Grooving & Tube, Single Point

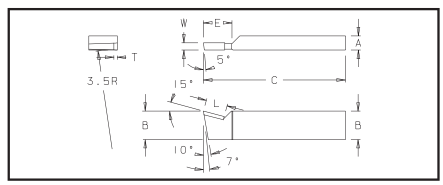


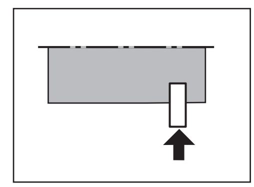


Dimensions							Neutral Style	SC20 EDP	SS160 EDP
A	B	C	E	T	W	L			
.500	1.000	5.000	.813	.125	.188	.750	COR443	081256	081260
.500	1.000	5.000	1.000	.125	.250	.750	COR444	081261	081264
.500	1.000	5.000	1.000	.188	.313	.438	COR445	081265	081268
.625	1.250	5.000	1.250	.188	.375	.500	COR556	—	081271

CTA (right hand)

Cutt-Off, Single Point

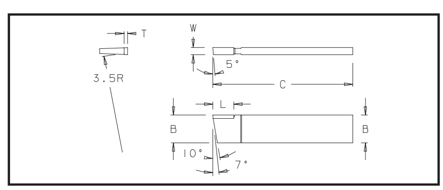


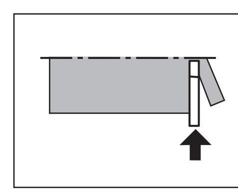


Dimensions							Neutral Style	SC20 EDP	SS160 EDP
A	B	C	T	W	L				
.500	1.000	5.000	.813	.125	.188	.750	CTA26	082558	082562
.500	1.000	5.000	.688	.125	.125	.625	CTA44	082563	082567

NCT (neutral hand)

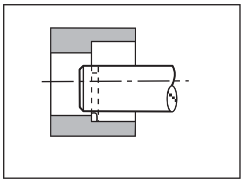
Cut-Off, No Chat

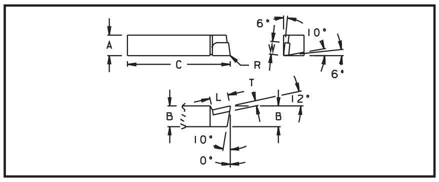




The body is made from a No Chat material which has a dampening effect that reduces chatter.

Dimensions						Neutral Style	SC20 EDP	SS160 EDP
A	B	C	T	W	L			
.063	.500	3.500	.094	.063	.500	NCT23	081621	081623
.094	.500	3.500	.094	.094	.500	NCT24	081624	081626
.125	.750	5.000	.094	.125	.500	NCT25	081627	081629
.156	.750	5.000	.125	.156	.750	NCT25A	081630	—
.188	1.000	5.000	.125	.188	.750	NCT26	—	081635
.250	1.000	6.000	.125	.250	.750	NCT27	081639	—

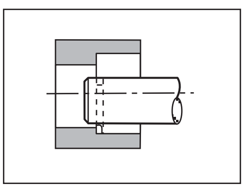


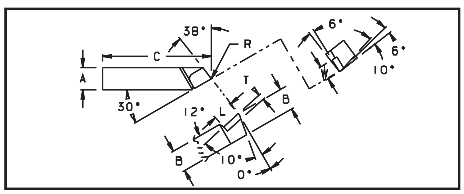


TSA

For Boring Bars, Single Point

Dimensions							RH	SC20	SS140	SS160
A	B	C	R	T	W	L	Style	EDP	EDP	EDP
.250	.250	1.500	.016	.063	.188	.250	TSA4	082828	—	—
.312	.312	1.500	.016	.094	.188	.313	TSA5	—	082832	—
.375	.375	1.750	.016	.094	.188	.313	TSA6	082834	—	082838
.500	.500	2.500	.031	.125	.313	.438	TSA8	082842	—	082846

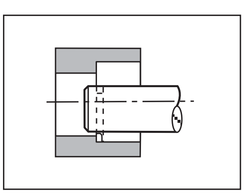


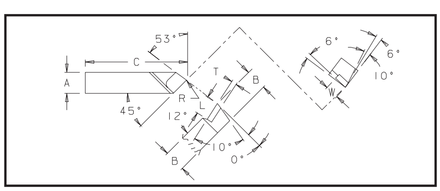


TSC (neutral hand)

For Boring Bars, Single Point

Dimensions							RH	SC20	SS140	SS160
A	B	C	R	T	W	L	Style	EDP	EDP	EDP
.250	.250	1.500	.016	.063	.188	.250	TSC4	082857	—	—
.313	.313	1.500	.016	.094	.188	.313	TSC5	082859	082861	—
.375	.375	1.750	.016	.094	.188	.313	TSC6	082863	—	082867
.500	.500	2.500	.031	.125	.313	.438	TSC8	082871	—	082875
.625	.625	3.000	.031	.156	.375	.563	TSC10	082877	—	082881
.750	.750	3.500	.031	.188	.438	.625	TSC12	—	—	082885



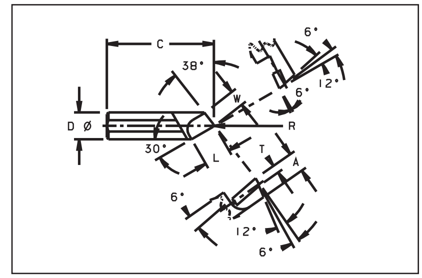


TSE

For Boring Bars, Single Point

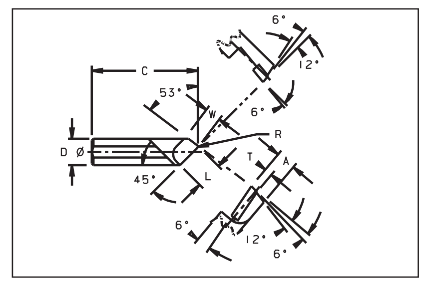
Dimensions							RH	SC20	SS140	SS160
A	B	C	R	T	W	L	Style	EDP	EDP	EDP
.250	.250	1.500	.016	.063	.188	.250	TSE4	082886	—	—
.313	.313	1.500	.016	.094	.188	.313	TSE5	082888	082890	—
.375	.375	1.750	.016	.094	.188	.313	TSE6	082892	082895	082896
.500	.500	2.500	.031	.125	.313	.438	TSE8	082900	082903	082904
.625	.625	3.000	.031	.156	.375	.563	TSE10	082906	—	082910

TRC



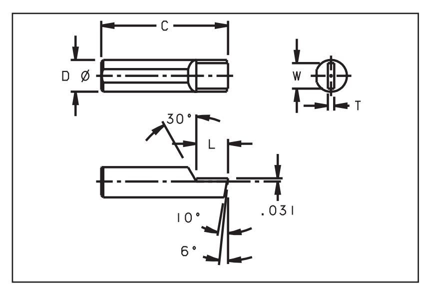
Dimensions							Item	SS140 EDP	SC20 EDP
D	A	C	R	T	W	L			
.3125	.250	1-1/2	1/64	3/32	3/16	5/16	TRC5	—	082763
.3750	.281	1-3/4	1/64	3/32	3/16	5/16	TRC6	082768	082766
.5000	.375	2-1/2	1/32	1/8	5/16	7/16	TRC8	082774	082772

TRE



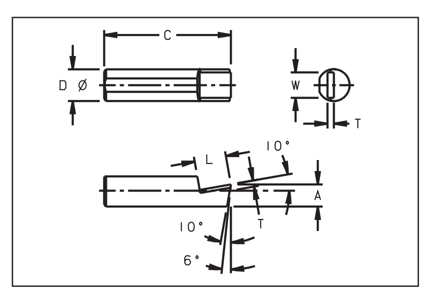
Dimensions							Item	SS140 EDP	SC20 EDP
D	A	C	R	T	W	L			
.3125	.250	1-1/2	1/64	3/32	3/16	3/8	TRE5	—	082776
.3750	.281	1-3/4	1/64	3/32	3/16	3/8	TRE6	082781	082779
.5000	.375	2-1/2	1/32	1/8	5/16	7/16	TRE8	—	082785

TRG



Dimensions					Item	SS160 EDP	SC20 EDP
D	C	T	W	L			
.3125	1-1/2	1-1/16	1/4	5/16	TRG5	—	082789
.3750	1-3/4	1-1/16	5/16	1/4	TRG6	082799	082795
.5000	2-1/2	3/32	3/8	3/8	TRG8	082808	082804

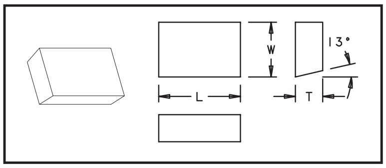
TRH



Dimensions						Item	SS160 EDP	SC20 EDP
D	A	C	T	W	L			
.3125	.218	1-1/2	1/16	1/4	5/16	TRH5	—	082810
.3750	.250	1-3/4	1/16	5/16	1/4	TRH6	—	082815
.5000	.344	2-1/2	3/32	3/8	3/8	TRH8	082826	082823

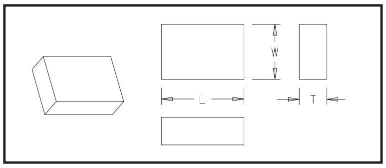
Unground

Style 0000 Unground



Style	Dimensions T	W	L	SC20 EDP Number	Stock Status	SS160 EDP Number	Stock Status
0390	.250	.563	1.000	—	—	079557	S

Style 1000 Unground



Style	Dimensions T	W	L	SC20 EDP Number	Stock Status	SS160 EDP Number	Stock Status
1010	.063	.125	.625	079608	S	079614	S
1020	.063	.188	.250	079615	S	—	—
1030	.063	.250	.313	079624	S	079630	S
1040	.094	.188	.313	079632	S	—	—
1050	.094	.188	.500	079639	S	079644	S
1060	.094	.250	.375	079645	S	079652	S
1070	.094	.250	.500	079654	S	079661	S
1080	.094	.313	.375	079663	S	—	—
1090	.094	.375	.375	079672	S	—	—
1100	.094	.375	.500	079680	S	079685	S
1105	.094	.438	.500	079686	S	—	—
1110	.125	.188	.750	079692	S	079698	S
1120	.125	.250	.500	079699	S	079705	S
1130	.125	.250	.625	079706	S	079712	S
1140	.125	.250	.750	079713	S	—	—
1150	.125	.313	.438	079720	S	—	—
1160	.125	.313	.500	079726	S	079732	S
1170	.125	.313	.625	079733	S	—	—
1180	.125	.375	.500	079739	S	079744	S
1190	.125	.375	.750	079745	S	079751	S
1200	.125	.500	.500	079752	S	079758	S
1210	.125	.500	.750	079760	S	079765	S
1213	.125	.625	.625	079766	S	—	—
1215	.125	.750	.750	079771	S	079775	S
1220	.156	.375	.563	079776	S	—	—
1230	.156	.375	.750	079782	S	—	—
1240	.156	.625	.625	079789	S	—	—
1250	.188	.313	.438	079796	S	079802	S
1260	.188	.313	.625	079803	S	—	—
1270	.188	.375	.500	079810	S	—	—
1280	.188	.375	.625	079816	S	—	—
1290	.188	.375	.750	079823	S	079829	S
1300	.188	.438	.625	079830	S	—	—
1310	.188	.438	.813	079838	S	—	—
1320	.188	.500	.500	079845	S	079851	S
1330	.188	.500	.750	079852	S	079858	S
1340	.188	.750	.750	079859	S	079865	S
1350	.250	.375	.563	079866	S	—	—
1360	.250	.375	.750	079871	S	079876	S
1380	.250	.500	.750	079883	S	079888	S

Unless otherwise specified unground sintered carbide blanks are made to the following tolerances:

Through 3/8"	+.015	-.000
Over 3/8" through 1"	+.020	-.000
Over 1" through 2"	+.040	-.000

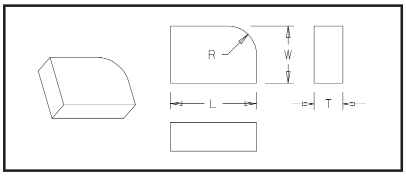
Stock Status: S= Stock Standard

Unground

Style 1000 Unground (continued)

Style	Dimensions T	W	L	SC20 EDP Number	Stock Status	SS160 EDP Number	Stock Status
1390	.250	.563	1.000	079889	S	079894	S
1400	.250	.625	.625	079895	S	—	—
1405	.250	.750	.750	079901	S	—	—
1410	.250	.750	1.000	079907	S	079912	S
1440	.313	.500	.750	079914	S	—	—
1475	.313	.750	1.000	079931	S	—	—
1480	.313	.750	1.250	079936	S	—	—
1490	.375	.500	.750	079939	S	—	—
1500	.375	.500	1.000	079942	S	—	—
1520	.375	.750	1.250	079952	S	—	—
1525	.375	.750	1.500	079955	S	—	—

Style 2000 Unground

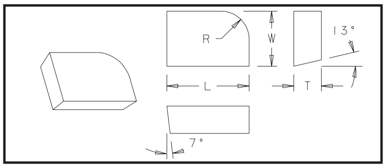


Style	Dimensions T	W	L	R	SC20 EDP Number	Stock Status	SS160 EDP Number	Stock Status
2020	.063	.188	.250	.125	079966	S	—	—
2030	.063	.250	.313	.125	079975	S	—	—
2040	.094	.188	.313	.125	079984	S	—	—
2050	.094	.188	.500	.125	079992	S	—	—
2060	.094	.250	.375	.125	079999	S	—	—
2070	.094	.250	.500	.125	080008	S	—	—
2080	.094	.313	.375	.188	080017	S	—	—
2090	.094	.375	.375	.188	080026	S	—	—
2100	.094	.375	.500	.188	080035	S	—	—
2105	.094	.438	.500	.250	080041	S	—	—
2130	.125	.250	.625	.125	080059	S	—	—
2140	.125	.250	.750	.125	080066	S	—	—
2150	.125	.313	.438	.188	080073	S	—	—
2160	.125	.313	.500	.188	080081	S	—	—
2170	.125	.313	.625	.188	080088	S	—	—
2180	.125	.375	.500	.188	080096	S	—	—
2190	.125	.375	.750	.188	080103	S	—	—
2200	.125	.500	.500	.250	080110	S	—	—
2210	.125	.500	.750	.250	080119	S	080124	S
2215	.125	.750	.750	.250	080129	S	—	—
2230	.156	.375	.750	.188	080139	S	—	—
2240	.156	.625	.625	.250	080147	S	—	—
2260	.188	.313	.625	.188	080157	S	—	—
2280	.188	.375	.625	.188	—	—	080174	S
2330	.188	.500	.750	.250	080200	S	—	—

Unless otherwise specified unground sintered carbide blanks are made to the following tolerances:
Through 3/8" +.015 -.000
Over 3/8" through 1" +.020 -.000
Over 1" through 2" +.040 -.000
Stock Status: S= Stock Standard

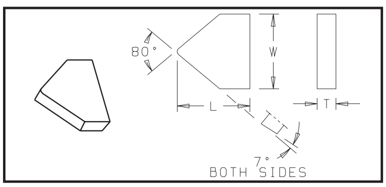
Unground

Style 3000 Unground



Style	Dimensions T	W	L		SC20 EDP Number	Stock Status	SS160 EDP Number	Stock Status
3380	.250	.500	.750	.250	080222	S	—	—
3390	.250	.563	1.000	.250	—	—	080234	S

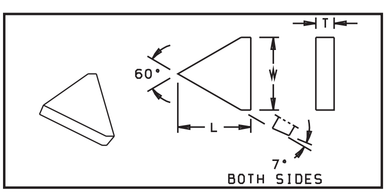
Style P5000 Unground



Style	Dimensions T	W	L	SC20 EDP Number	Stock Status	SS160 EDP Number	Stock Status
P5080	.094	.313	.375	087235	S	—	—
P5105	.094	.438	.500	087244	S	—	—
P5340	.188	.750	.750	—	—	087259	S

Tolerance
"w" dimension is -.007
-.020

Style P6000 Unground



Style	Dimensions T	W	L	SC20 EDP Number	Stock Status
P6100	.094	.375	.500	071161	S
P6205	.125	.500	.563	071164	S
P6340	.188	.750	.750	071170	S

Tolerance
"w" dimension is -.007
-.020

Unless otherwise specified unground sintered carbide blanks are made to the following tolerances:

Through 3/8"	+.015	-.000
Over 3/8" through 1"	+.020	-.000
Over 1" through 2"	+.040	-.000

Stock Status: S= Stock Standard

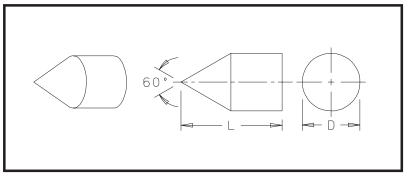
Brazed Tools & Blanks

Unground

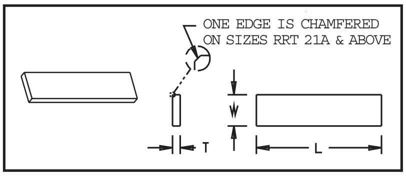
Style	Dimensions D	L	SC120 EDP Number	Stock Status
CT40	.250	.438	080684	S
CT50	.313	.563	080685	S
CT60	.375	.688	080686	S
CT80	.500	.875	080687	S
CT100	.625	1.063	080688	S
CT120	.750	1.250	080689	S
CT140	.875	1.375	080690	S

Style	Dimensions T	W	L	SC20 EDP Number	Stock Status
RRT4	.063	.125	.750	080491	S
RRT9	.063	.313	.750	080501	S
RRT10	.063	.375	.750	080503	S
RRT25	.047	.078	1.000	087082	D
RRT32	.047	.094	2.000	087088	S
RRT46	.063	.188	1.375	087103	S
RRT47	.094	.125	1.750	087104	S
RRT60	.094	.219	1.625	087115	S
RRT67	.125	.250	1.875	087122	S
RRT40A	.063	.125	1.125	087095	S

Style CT Unground Center Tips



Style RRT Unground



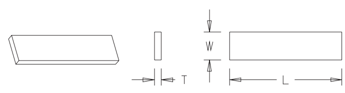
Unless otherwise specified unground sintered carbide blanks are made to the following tolerances:

Through 3/8"	+.015	-.000
Over 3/8" through 1"	+.020	-.000
Over 1" through 2"	+.040	-.000

Stock Status: S= Stock Standard

Unground

Style STB Unground



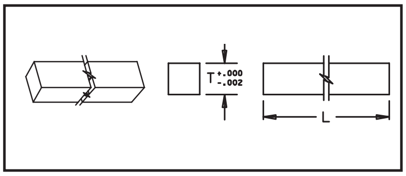
Style	T	Dimensions W	L	SC20 EDP Number	Stock Status	SS160 EDP Number	Stock Status
STB12	.031	.063	1.000	080532	S	—	—
STB13	.047	.094	1.000	080533	S	—	—
STB13A	.047	.094	.813	080534	S	—	—
STB14	.078	.125	1.125	080535	S	—	—
STB24A	.063	.125	1.000	080536	S	—	—
STB24B	.063	.125	3.000	080537	S	—	—
STB24C	.063	.125	1.250	080539	S	—	—
STB26A	.063	.188	1.000	080540	S	—	—
STB26C	.063	.188	3.000	080541	S	—	—
STB28A	.063	.250	1.000	080542	S	—	—
STB28B	.063	.250	1.250	080543	S	—	—
STB28D	.063	.250	3.000	080544	S	080547	S
STB34	.094	.125	5.000	080548	S	—	—
STB36	.094	.188	1.125	080549	S	—	—
STB36A	.094	.188	1.250	080550	S	—	—
STB38A	.094	.250	1.000	080551	S	—	—
STB38B	.094	.250	1.500	080552	S	—	—
STB38D	.094	.250	5.000	080553	S	—	—
STB46	.125	.188	6.000	080563	S	—	—
STB48A	.125	.250	1.000	080565	S	—	—
STB48B	.125	.250	1.250	080566	S	—	—
STB48C	.125	.250	2.250	080567	S	—	—
STB48D	.125	.250	3.000	080568	S	—	—
STB48E	.125	.250	6.000	080569	S	—	—
STB68	.188	.250	6.000	080587	S	—	—
STB68A	.188	.250	3.000	080588	S	—	—
STB310A	.094	.313	2.000	080555	S	—	—
STB310B	.094	.313	3.000	080556	S	—	—
STB312	.094	.375	5.000	080559	S	—	—
STB410	.125	.313	6.000	080571	S	—	—
STB410A	.125	.313	1.500	080573	S	—	—
STB410B	.125	.313	3.000	080574	S	—	—
STB412A	.125	.375	2.000	080575	S	—	—
STB412B	.125	.375	3.000	080576	S	—	—
STB412C	.125	.375	6.000	080577	S	080580	S
STB412D	.125	.375	1.000	080581	S	—	—
STB416	.125	.500	6.000	080582	S	—	—
STB416A	.125	.500	1.000	080584	S	—	—
STB416B	.125	.500	1.500	080585	S	—	—
STB416C	.125	.500	3.000	080586	S	—	—
STB612	.188	.375	6.000	080591	S	—	—
STB616	.188	.500	6.000	080596	S	—	—
STB616A	.188	.500	3.000	080598	S	—	—
STB620	.188	.625	6.000	080599	S	—	—
STB812A	.250	.375	3.000	080604	S	—	—
STB816	.250	.500	6.000	080605	S	080607	S
STB816A	.250	.500	3.000	080608	S	—	—
STB820	.250	.625	6.000	080609	S	—	—
STB824	.250	.750	6.000	080611	S	080613	S
STB824A	.250	.750	3.000	080614	S	—	—

Unless otherwise specified unground sintered carbide blanks are made to the following tolerances:
Through 3/8" +.015 -.000
Over 3/8" through 1" +.020 -.000
Over 1" through 2" +.040 -.000
Stock Status: S= Stock Standard

Unground

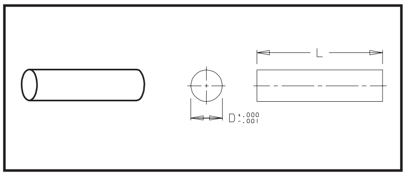
Style	Dimensions T	W	L	SC20 EDP Number	Stock Status
SS610	.187	.187	1.250	080766	S
SS810	.250	.250	1.250	080770	S
SS1012	.312	.312	1.500	080774	S
SS1214	.375	.375	1.750	080777	S

Style SS Unground



Style	Dimensions D	L	SC20 EDP Number	Stock Status	SS160 EDP Number	Stock Status
SR33	.093	.375	080691	S	—	—
SR34	.093	.500	080695	S	—	—
SR44	.125	.500	080699	S	080703	S
SR46	.125	.750	080705	S	—	—
SR48	.125	1.000	080710	S	—	—
SR55	.156	.625	080715	S	—	—
SR64	.187	.500	080720	S	—	–
SR66	.187	.750	080725	S	080729	S
SR69	.187	1.125	080731	S	—	—
SR77	.218	.875	080736	S	—	—
SR88	.250	1.000	080740	S	080744	S
SR810	.250	1.250	080746	S	080750	S
SR812	.250	1.500	080752	S	—	—
SR1010	.312	1.250	080756	S	080760	S

Style SR Ground Cylinders



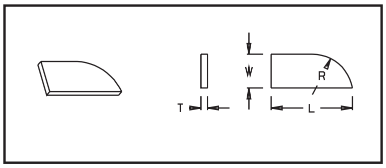
Unless otherwise specified unground sintered carbide blanks are made to the following tolerances:

Through 3/8"	+.015	-.000
Over 3/8" through 1"	+.020	-.000
Over 1" through 2"	+.040	-.000

Stock Status: S= Stock Standard

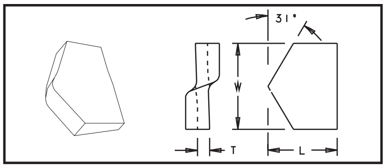
Reamer Blanks —Twist Drill Blanks

Style RT Reamer Blanks



Style	Dimensions T	W	L	R	SC20 EDP Number	Stock Status
RT4	.063	.125	.750	.250	080515	S
RT5	.047	.156	.875	.250	080517	S
RT6	.094	.188	.875	.312	080519	S
RT7	.063	.203	.750	.312	080521	S
RT8	.063	.266	.750	.375	080523	S
RT9	.063	.313	.750	.375	080525	S
RT10	.063	.375	.750	.375	080527	S
RT11	.047	.094	.875	.250	080529	S
RT12	.063	.125	1.000	.250	080531	S

Style TD Twist Drill



Style	Dimensions T	W	L	SC20 EDP Number	Stock Status	SC120 EDP Number	Stock Status
TD5A	.053	.250	.281	080619	S	—	—
TD6	.074	.281	.281	080621	S	—	—
TD7	.074	.312	.281	080622	S	—	—
TD8	.074	.344	.312	080623	S	—	—
TD9	.074	.375	.312	080624	S	—	—
TD10	.091	.406	.375	080625	S	—	—
TD11	.091	.437	.375	080626	S	—	—
TD12	.091	.469	.406	080627	S	—	—
TD13	.091	.500	.406	—	—	080628	S
TD14	.109	.562	.468	—	—	080629	S
TD15	.109	.625	.468	—	—	080630	S
TD16	.126	.688	.562	—	—	080631	S
TD17	.126	.750	.562	—	—	080632	S
TD18	.146	.812	.625	—	—	080633	S
TD19	.146	.875	.625	—	—	080634	S
TD20	.163	.938	.687	—	—	080635	S
TD21	.163	1.000	.687	—	—	080636	S
TD22	.181	1.125	.812	—	—	080637	S
TD23	.181	1.250	.812	—	—	080638	S
TD24	.217	1.375	.969	—	—	080639	S
TD25	.217	1.500	.969	—	—	080640	S

Unless otherwise specified unground sintered carbide blanks are made to the following tolerances:

Through 3/8"	+.015	-.000
Over 3/8" through 1"	+.020	-.000
Over 1" through 2"	+.040	-.000

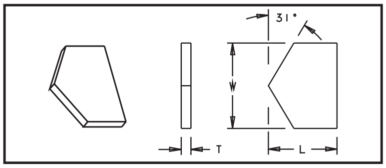
Stock Status: S= Stock Standard

Masonry Drill Blanks—WD Blanks

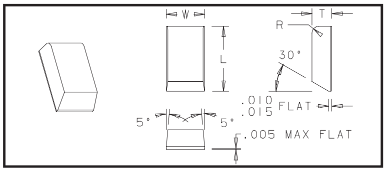
Style	Drill Dia.	T		W		L		SC120 EDP Number	SC20 EDP Number
MD6	.375	.078	±.000 –.003	.398	±.030 – .015	.368	+.015 –.000	—	080462
MD7	.438	.078	±.000 –.003	.468	±.030 –.015	.468	+.015 –.000	080463	—
MD8	.500	.091	±.000 –.004	.530	±.030 –.015	.472	+.015 –.000	080464	—
MD9	.562	.091	±.000 –.004	.592	±.030 –.015	.472	+.015 –.000	080465	—
MD10	.625	.091	±.000 –.004	.660	±.030 ±.015	.598	+.015 –.000	080466	—
MD11	.688	.091	±.000 –.004	.723	±.030 ±.015	.598	+.015 –.000	080467	—
MD12	.750	.091	±.000 –.004	.787	±.030 ±.015	.598	+.015 –.000	080468	—
MD14	.875	.091	±.000 –.004	.915	±.030 ±.015	.728	+.015 –.000	080470	—
MD16	1.000	.122	±.000 –.005	1.040	±.035 ±.015	.728	+.020 –.000	080472	—
MD18	1.125	.122	±.000 –.005	1.170	±.035 ±.015	.858	+.020 –.000	080473	—
MD20	1.250	.122	±.000 –.005	1.295	±.035 ±.015	.858	+.020 –.000	080474	—
MD24	1.500	.122	±.000 –.005	1.545	±.035 ±.015	1.045	+.020 –.000	080475	—

Style	T	W	L	SC20 EDP Number	Stock Status
WD8250	.095	.250	.312	080683	S

Style MD Masonry Drill



Style WD Unground



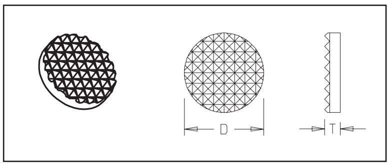
Unless otherwise specified unground sintered carbide blanks are made to the following tolerances:

Through 3/8"	+.015	-.000
Over 3/8" through 1"	+.020	-.000
Over 1" through 2"	+.040	-.000

Stock Status: S= Stock Standard

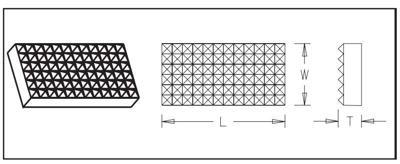
Unground Grippers

Style UC
Unground Grippers



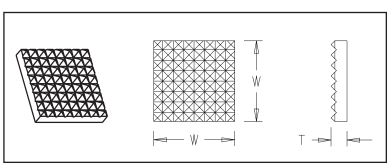
Style	Dimensions T	W	SC20 EDP Number	Stock Status
UC4	.125	.500	080641	S
UC5	.125	.625	080642	S
UC6	.156	.750	080643	S

Style UR
Unground Grippers



Style	T	Dimensions W	L	SC20 EDP Number	Stock Status
UR4	.188	.500	1.000	080645	S
UR6	.250	.750	1.500	080646	S

Style US
Unground Grippers



Style	Dimensions T	W	SC20 EDP Number	Stock Status
US4	.125	.500	080647	S
US5	.125	.625	080648	S
US6	.156	.750	080649	S

Brazed Tools & Blanks

Unless otherwise specified unground sintered carbide blanks are made to the following tolerances:
Through 3/8" +.015 -.000
Over 3/8" through 1" +.020 -.000
Over 1" through 2" +.040 -.000
Stock Status: S= Stock Standard

ANSI MILLING INSERT NOMENCLATURE

This identification system is provided as a general reference. The dimensional tables associated with each insert should be used for specific values. This system is based on the latest ANSI and ISO insert identification guidelines. Dimensions shown in this catalog are prior to supplemental coating and edge modifications.

S E K R 4 2

Insert Shape

A = 85° parallelogram
C = 80° rhomboid
G = 85° parallelogram
L = 90° rectangle
O = 135° octagon
R = round
S = 90° square
T = 60° triangle
X = standard RTW form

Clearance Angle

A = 3°
B = 5°
C = 7°
D = 15°
E = 20°
F = 25°
G = 30°
N = 0°
P = 11°

Geometry and Clamping Type

Hole	Chipbreaker Without	Chipbreaker Single Sided	Chipbreaker Double Sided
None	**N**	**R**	**F**
Cylindrical	**A**	**M**	**G**
Partly cylindrical 40-60° countersink	**W**	**T**	—
40-60° double countersink	**Q**	—	**U**
70-90° countersink	**B**	**H**	—
70-90° double countersink	**G**	—	**J**
Special design		**X**	

Thickness

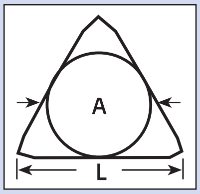
T = insert thickness

T	1/16"
.0938	1.5
.1250	2
.1562	2.5
.1875	3
.2188	3.5
.2500	4
.3125	5

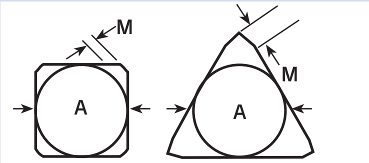
Size

For shape A, L and X see position #1; use length of leading cutting edge

Number	A
2	.250
3	.375
4	.500
5	.625
6	.750
8	1.000



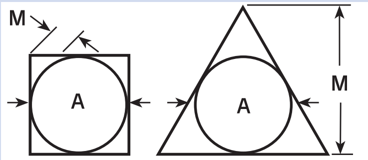
Tolerance Class (+/-)



indexable inserts with facets/wipers

Tolerance on A

A	Class J, K, L, M, N	U
.1875 - .3837	.002	.003
.4375 - .5625	.003	.005
.5906 - .8125	.004	.007
.8661 - 1.188	.005	.010
1.250 - 1.378	.006	.010



indexable inserts with corner radii

Tolerance on A

A	Class M, N	U
.1875 - .3837	.003	.005
.4375 - .5625	.005	.008
.5906 - .8125	.006	.011
.8661 - 1.188	.007	.015
1.250 - 1.378	.008	.015

Class	A	M	T	Class	A	M	T
A	.001	.0002	.001	**J**	*.002-.005	.0002	.001
B	.001	.0002	.005	**K**	*.002-.005	.0005	.001
C	.001	.0005	.001	**L**	*.002-.005	.001	.001
D	.0005	.0005	.005	**M**	*.002-.004	*.002-.010	.005
E	.001	.001	.001	**N**	*.002-.004	*.002-.010	.001
F	.0005	.0002	.001	**P**	.0015	.0015	.0015
G	.001	.001	.005	**U**	*.003-.010	*.005-.012	.005
H	.0005	.0005	.001				

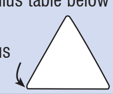
*See table at left for tolerances according to insert size and class.

ANSI MILLING INSERT NOMENCLATURE

A F T N 6 G D ■

Corner Configuration

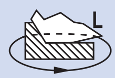
Lead Angle K		Wiper Edge Clearance P	
A	45°	A	3°
D	handed 30°	B	5°
K	neutral 30°	C	7°
E	handed 15°	D	15°
L	neutral 15°	E	20°
P	0°	F	25°
If letter is replaced by number(s) refer to radius table below		G	30°
		N	0°
Radius		P	11°



Symbol	Radius
0	.004
0.5	.008
1	1/64
2	1/32
3	3/64
4	1/16
5	5/64
6	3/32
7	7/64
8	1/8

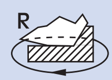
Insert Hand

Direction of cutter rotation



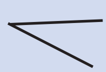
Direction of cutter rotation

Direction of cutter rotation



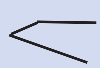
Cutting Edge Form

F = Sharp

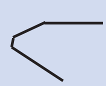


E = Honed

T = T-land



S = Honed T-land



T-P = Discontinuous T-land

Facet Width

.0312	2
.0469	3
.0625	4
.0938	6

Facet width is number of 1/6" (1/32" for old style)

Edge Prep Size

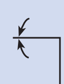
L	Light - sharp or slightly honed and/or T-landed
G	General - medium hone and/or T-land
H	Heavy - large hone and/or T-land

J	“Polished” rake face
P	Partial hand
W	Wiper/ radiused facet

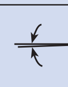
Rake Face Angle

Nominal or average angle of rake on insert face at leading cutting edge before edge prep and before installation

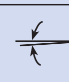
N = 0° or less



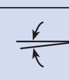
A = 3°



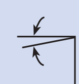
B = 5°



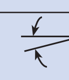
C = 7°



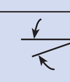
P = 11°



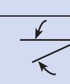
D = 15°



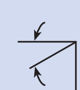
E = 20°



F = 25°



G = 30°



ISO MILLING INSERT NOMENCLATURE

This identification system is provided as a general reference. The dimensional tables associated with each insert should be used for specific values. This system is based on the latest ANSI and ISO insert identification guidelines. Dimensions shown in this catalog are prior to supplemental coating and edge modifications.

S E K R 12 03

Insert Shape

- A = 85° parallelogram
- C = 80° rhomboid
- G = 85° parallelogram
- L = 90° rectangle
- O = 135° octagon
- R = round
- S = 90° square
- T = 60° triangle
- X = standard RTW form

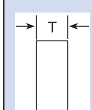
Clearance Angle

- A = 3°
- B = 5°
- C = 7°
- D = 15°
- E = 20°
- F = 25°
- G = 30°
- N = 0°
- P = 11°

Geometry and Clamping Type

Hole	Chipbreaker: Without	Chipbreaker: Single Sided	Chipbreaker: Double Sided
None	**N**	**R**	**F**
Cylindrical	**A**	**M**	**G**
Partly cylindrical 40-60° countersink	**W**	**T**	—
40-60° double countersink	**Q**	—	**U**
70-90° countersink	**B**	**H**	—
70-90° double countersink	**G**	—	**J**
Special design		**X**	

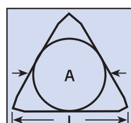
Thickness



T = insert thickness

T	1/16"
2,38	02
3,18	03
3,97	T3
4,76	04
5,56	06
6,35	06
7,94	07

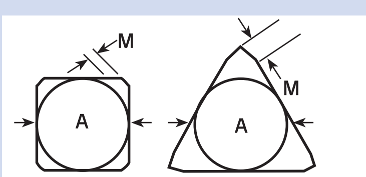
Size



Inscribed circle "A" versus cutting edge length "L". For shapes A, L and X see position #1; use length of leading cutting edge.

A	S	T	R	O	C	H	E
	"L" for shapes						
6,00	—	—	05	—	—	—	—
6,35	06	11	06	02	06	03	06
8,00	—	—	08	—	—	—	—
9,52	09	16	09	04	09	05	09
10,00	—	—	10	—	—	—	—
12,00	—	—	12	—	—	—	—
12,70	12	22	12	05	12	07	13
15,88	15	27	15	06	16	09	15
18,00	—	—	16	—	—	—	—
19,05	19	33	19	07	19	11	19
20,00	—	—	25	—	—	—	—
25,00	—	—	25	—	—	—	—
25,40	25	44	25	10	25	14	25

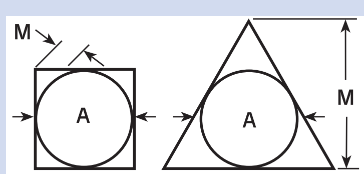
Tolerance Class (+/-)



indexable inserts with facets/wipers

Tolerance on A

A	Class J, K, L, M, N	Class U
4,76 - 10,00	0,051	0,076
11,11 - 14,29	0,078	0,127
15,00 - 20,84	0,102	0,178
22,00 - 31,18	0,127	0,254
31,75 - 35,00	0,152	0,254



indexable inserts with corner radii

Tolerance on A

A	Class M, N	Class U
4,76 - 10,00	0,076	0,127
11,11 - 14,29	0,127	0,203
15,00 - 20,64	0,152	0,279
22,00 - 31,18	0,178	0,381
31,75 - 35,00	0,203	0,381

Class	A	M	T	Class	A	M	T
A	0,025	0,005	0,025	**J**	*0,05-0, 13	0,005	0,025
B	0,025	0,005	0,13	**K**	*0,05-0, 13	0,013	0,025
C	0,025	0,013	0,025	**L**	*0,05-0, 13	0,025	0,025
D	0,025	0,013	0,13	**M**	*0,05-0, 10	*0,05-0, 25	0,013
E	0,025	0,025	0,025	**N**	*0,05-0, 10	*0,05-0, 25	0,025
F	0,013	0,005	0,025	**P**	0,038	0,038	0,038
G	0,025	0,025	0,13	**U**	*0,08-0, 25	*0,13-0, 30.	0,13
H	0,013	0,013	0,025				

*See table at left for tolerances according to insert size and class.

ISO MILLING INSERT NOMENCLATURE

A F T N G D ■

Corner Configuration

Lead Angle K		Wiper Edge Clearance P	
A	45°	A	3°
D	60°	B	5°
E	75°	C	7°
P	90°	D	15°
		E	20°
		F	25°
		G	30°
		N	0°
		P	11°

If letter is replaced by number(s) refer to radius table below

Radius

MO	Round Insert
01	0,1 mm
02	0,2 mm
04	0,4 mm
05	0,5 mm
08	0,8 mm
10	1,0 mm
12	1,2 mm
15	1,5 mm
16	1,8 mm
24	2,4 mm
32	3,2 mm

Cutting Edge Form

F = Sharp

E = Honed

T = T-land

S = Honed T-land

T-P = Discontinuous T-land

Insert Hand

Direction of cutter rotation — L

Direction of cutter rotation — N

Direction of cutter rotation — R

Edge Prep Size

L	Light - sharp or slightly honed and/or T-landed
G	General - medium hone and/or T-land
H	Heavy - large hone and/or T-land

J	"Polished" rake face
P	Partial hand
W	Wiper/ radiused facet

Rake Face Angle

Nominal or average angle of rake on insert face at leading cutting edge before edge prep and before installation

N = 0° or less

A = 3°

B = 5°

C = 7°

P = 11°

D = 15°

E = 20°

F = 25°

G = 30°

Milling Inserts & Cutters

"M" Number - Insert Code Cross Reference

Insert Code	Manufacturer	"M" Number
HNC 532	A.N.S.I. Standard	M003
HNCN 09 04 08	I.S.O. Standard	M003
HPC 633	A.N.S.I. Standard	M007
HPCN 11 04 12	I.S.O. Standard	M007
MEC 632	A.N.S.I. Standard	M008
MEC 662A	VR Wesson	M008
MECN 19 04 08	I.S.O. Standard	M008
MNC 52.52	A.N.S.I. Standard	M010
MNC 552	Industry Standard	M010
MNCN 15 T3 08	I.S.O. Standard	M010
R46P	Seco/Carboloy/Futurmill	M019
R66P	Seco/Carboloy/Futurmill	M020
RPC 43	A.N.S.I. Standard	M019
RPC 46	Index-O-Matic	M019
RPC 63	A.N.S.I. Standard	M020
RPC 66	Index-O-Matic	M020
RPCN 12 04 00	I.S.O. Standard	M019
RPCN 19 04 00	I.S.O. Standard	M020
S46NF4	Seco/Carboloy/Futurmill	M055
S66NR3G	Seco/Carboloy/Futurmill	M079
S66NW15	Seco/Carboloy/Futurmill	M070
S66PJ4	Seco/Carboloy/Futurmill	M172
S66PJ8	Seco/Carboloy/Futurmill	M174
S66PQ8	Seco/Carboloy/Futurmill	M173
S66PR3G	Seco/Carboloy/Futurmill	M118
SDE 422	Lovejoy	M021
SEC 42AF4.5	A.N.S.I. Standard	M259
SEC 42AF6.5	A.N.S.I. Standard	M224
SEC 42AF6.5S	A.N.S.I. Standard	M225
SEC 53AF6.5	A.N.S.I. Standard	M256
SEC 53AF6.5S	A.N.S.I. Standard	M255
SECN 12 03 AFEN	I.S.O. Standard	M224
SECN 12 03 AFSN	I.S.O. Standard	M225
SECN 15 04 AFEN	I.S.O. Standard	M256
SECN 15 04 AFSN	I.S.O. Standard	M255
SEAN 42AFN	Seco/Carboloy/Futurmill	M224
SEAN 42AFTN	Seco/Carboloy/Futurmill	M225
SEAN 53AFN	Seco/Carboloy/Futurmill	M256
SEAN 53AFTN	Seco/Carboloy/Futurmill	M255
SEC 422	A.N.S.I. Standard	M191
SEC 44R2	VR Wesson	M191
SEC 44R2A	VR Wesson	M191
SEC 634	A.N.S.I. Standard	M032
SEC 63AE8	A.N.S.I. Standard	M034
SEC 63KE8	A.N.S.I. Standard	M033
SEC 66A8A	VR Wesson	M034
SEC 66K8A	VR Wesson	M033
SEC 66R4A	VR Wesson	M032
SECN 12 03 08	I.S.O. Standard	M191
SECN 19 04 16	I.S.O. Standard	M032
SECN 19 04 AEEN	I.S.O. Standard	M034
SECN 19 04 DEEN	I.S.O. Standard	M033
SECN 634	Greenleaf	M032
SECN 63A8	Greenleaf	M034
SECN 63K8	Greenleaf	M033
SEK 43A	Sandvik	M257
SEK 53A	Sandvik	M258
SEKN 12 03 AFEN	I.S.O. Standard	M224
SEKN 12 03 AFSN	I.S.O. Standard	M225
SEKN 15 04 AFEN	I.S.O. Standard	M256
SEKN 15 04 AFSN	I.S.O. Standard	M255
SEKN 42AFN	Seco/Carboloy/Futurmill	M224
SEKN 42AFTN	Seco/Carboloy/Futurmill	M225
SEKN 53AFN	Seco/Carboloy/Futurmill	M256
SEKN 53AFTN	Seco/Carboloy/Futurmill	M255
SEKR 1203AFRNW	I.S.O. Standard	M259W
SEKR 1204AFRNW	I.S.O. Standard	M261W
SEKR 1904AFRNW	I.S.O. Standard	M256W
SEKR 53AF6.5NRW	A.N.S.I. Standard	M256W
SEKR 53AF4.5S W	A.N.S.I. Standard	M255W
SEKR 42AF4.5NRW	A.N.S.I. Standard	M259W
SEKR42AF4.5S W	A.N.S.I. Standard	M260W
SEKR43AF4.5NRW	A.N.S.I. Standard	M261W
SEM 43A	Sandvik	M257
SEM 53A	Sandvik	M258
SLB 3	Seco/Carboloy/Futurmill	M197
SLB 7	Seco/Carboloy/Futurmill	M199
SMA 42E2R	Sandvik	M201
SMA 43E2L	Sandvik	M202
SMK 42E2R	Sandvik	M201
SMK 43E2L	Sandvik	M202
SMK 53E3R	Sandvik	M215
SMP 63C8	Greenleaf	M123
SMP 63R3	Greenleaf	M118
SNA 43E2	Sandvik	M219
SNA 43L2	Kennametal	M057
SNC 43AN6	A.N.S.I. Standard	M055
SNC 43L	Valenite	M057
SNC 43L2	Kennametal	M057
SNC 43LN3.5	A.N.S.I. Standard	M219
SNC 43LN4	A.N.S.I. Standard	M057
SNC 534	A.N.S.I. Standard	M078
SNC 633	A.N.S.I. Standard	M079
SNC 63AN12	A.N.S.I. Standard	M064
SNC 63LN8	A.N.S.I. Standard	M070
SNC 63W8	Seco/Carboloy/Futurmill	M070
SNC 63W8	Sumitomo	M070
SNCN 12 04 ANEN	I.S.O. Standard	M055
SNCN 12 04 ENEN	I.S.O. Standard	M057
SNCN 12 04 ENEN	I.S.O. Standard	M219
SNCN 15 04 16	I.S.O. Standard	M078
SNCN 19 04 12	I.S.O. Standard	M079
SNCN 19 04 ANEN	I.S.O. Standard	M064
SNCN 19 04 ENEN	I.S.O. Standard	M070

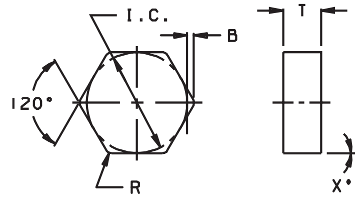
This listing cross references other manufacturers' non-ANSI milling insert codes to Spe-D-Cut "M" Numbers. Double check your insert with the data shown. Spe-D-Cut disclaims any responsibility for this conversion.

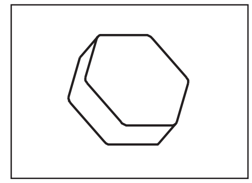
"M" Number - Insert Code Cross Reference

Insert Code	Manufacturer	"M" Number
SNE 534	Valenite	M078
SNE 633	Seco/Carboloy/Futurmill	M079
SNH 43A3	Sandvik	M055
SNH 43L2	Sandvik	M057
SNH 633	Sandvik	M079
SNK 43E2	Sandvik	M219
SOE 422	A.N.S.I. Standard	M021
SOEN 12 03 08	I.S.O. Standard	M021
SPC 422	A.N.S.I. Standard	M100
SPC 424	Valenite	M135
SPC 42A	Valenite	M101
SPC 42AP4	A.N.S.I. Standard	M101
SPC 42	Valenite	M103
SPC 42EP4R	A.N.S.I. Standard	M103
SPC 532	A.N.S.I. Standard	M110
SPC 632	A.N.S.I. Standard	M117
SPC 633	A.N.S.I. Standard	M118
SPC 634	A.N.S.I. Standard	M119
SPC 636	A.N.S.I. Standard	M227
SPC 638	A.N.S.I. Standard	M120
SPC 63AP8	A.N.S.I. Standard	M123
SPC 63EZ4R	A.N.S.I. Standard	M172
SPC 63EZ8L	A.N.S.I. Standard	M173
SPC 63EZ8R	A.N.S.I. Standard	M174
SPC 63G	Valenite	M147
SPC 66A8	Index-O-Matic	M123
SPC 66A8	VR Wesson	M123
SPCN 12 03 08	I.S.O. Standard	M100
SPCN 12 03 APEN	I.S.O. Standard	M101
SPCN 12 03 EPER	I.S.O. Standard	M103
SPCN 19 04 08	I.S.O. Standard	M117
SPCN 19 04 12	I.S.O. Standard	M118
SPCN 19 04 16	I.S.O. Standard	M119
SPCN 19 04 24	I.S.O. Standard	M227
SPCN 19 04 32	I.S.O. Standard	M120
SPCN 19 04 APEN	I.S.O. Standard	M123
SPCN 19 04 EZEL	I.S.O. Standard	M173
SPCN 19 04 EZER	I.S.O. Standard	M174
SPE 422	Lovejoy	M100
SPE 422	Valenite	M100
SPE 424	Lovejoy	M135
SPE 424	Valenite	M135
SPE 42	Valenite	M103
SPE 633	Seco/Carboloy/Futurmill	M118
SPE 634	Lovejoy	M119
SPE 634	Sandvik	M119
SPE 634	Valenite	M119
SPE 636	Industry Standard	M227
SPE 63	Lovejoy	M147
SPE 63EP10R	A.N.S.I. Standard	M147
SPE 66R4A	VR Wesson	M119
SPEN 19 04 EPER	I.S.O. Standard	M147
SPEN 633	Greenleaf	M118
SPEN 63A8	Greenleaf	M123
SPH 422	Sandvik	M100
SPH 424	Sandvik	M135
SPH 424	A.N.S.I. Standard	M135
SPH 42A2	Sandvik	M101
SPH 42E2R	Sandvik	M103
SPH 632	Sandvik	M117
SPH 633	Sandvik	M118
SPH 634	Sandvik	M119
SPHN 12 03 16	I.S.O. Standard	M135
SPK 42ED3.5RS	A.N.S.I. Standard	M201
SPK 43ED3.5LS	A.N.S.I. Standard	M202
SPK 53ED6.5RS	A.N.S.I. Standard	M215
SPKN 12 03 EDSR	I.S.O. Standard	M201
SPKN 12 04 EDSR	I.S.O. Standard	M202
SPKN 15 04 EDSR	I.S.O. Standard	M215
SPKR 42ED3.5SR W	A.N.S.I. Standard	M201W
SRC 63H4R	Seco/Carboloy/Futurmill	M172
SRC 63H4R	Sumitomo	M172
SRC 63H8L	Seco/Carboloy/Futurmill	M173
SRC 63H8L	Sumitomo	M173
SRC 63H8R	Seco/Carboloy/Futurmill	M174
SRC 63H8R	Sumitomo	M174
T46PY4	Seco/Carboloy/Futurmill	M180
T56PY4	Seco/Carboloy/Futurmill	M182
TFA 42P3R	Sandvik	M235
TFCN 22 03 PFER	I.S.O. Standard	M235
TNC 43ZN9.5	A.N.S.I. Standard	M241
TNCN 12 04 ANEN	I.S.O. Standard	M241
TNCN 43ZN9.5	Industry Standard	M241
TNLN 12 04 AN	Sandvik	M241
TOC 42PE6.5RS	A.N.S.I. Standard	M235
TPC 433	Industry Standard	M246
TPC 43PZ4R	A.N.S.I. Standard	M180
TPC 53PZ4R	A.N.S.I. Standard	M182
TPCN 22 04 PZEL	I.S.O. Standard	M180
TPCN 27 04 PZER	I.S.O. Standard	M182
TPH 433	A.N.S.I. Standard	M246
TPHN 22 04 12	I.S.O. Standard	M246
TPK 32P2R	Sandvik	M249
TPK 32PD3RS	A.N.S.I. Standard	M249
TPK 43P2R	Sandvik	M251
TPK 43PD3.5RS	A.N.S.I. Standard	M251
TPKN 22 03 PDER	I.S.O. Standard	M249
TPKN 22 04 PDER	I.S.O. Standard	M251
TPKR 43PD3.5RS W	A.N.S.I. Standard	M251W
TRC 43R4R	Seco/Carboloy/Futurmill	M180

This listing cross references other manufacturers' non-ANSI milling insert codes to Spe-D-Cut "M" Numbers. Double check your insert with the data shown. Spe-D-Cut disclaims any responsibility for this conversion.

HNC/HNCN



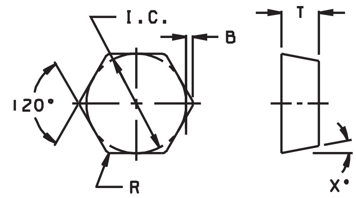


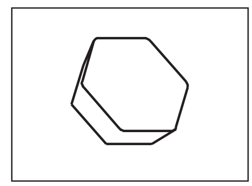
Hexagon, 0° Relief Angle,
Negative Rake.

Angles					ANSI Dimensions					ISO Dimensions			
M	F1	F2	X	Y	IC	T	R/W	B	Z	IC	T	R/W	Z
M003	—	—	0°	—	5/8	3/16	0.031	0.044	—	15,88	4,76	0,79	1,10

ANSI Code ISO Code	"M" No	Uncoated Grade	EDP Number	Stock Status	Coated Grade	EDP Number	Stock Status
HNC 532	M003	—	—	—	—	—	—
HNCN 09 04 08	—	—	—	—	SA180	073118	S

HPC/HPCN



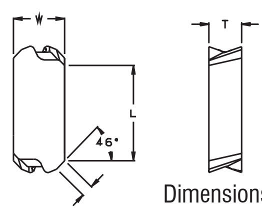


Hexagon, 11° Relief Angle,
Positive Rake.

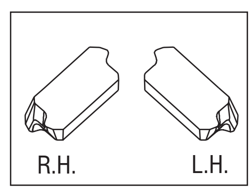
Angles					ANSI Dimensions					ISO Dimensions			
M	F1	F2	X	Y	IC	T	R/W	B	Z	IC	T	R/W	Z
M007	—	—	11°	—	3/4	3/16	0.047	0.051	—	19,05	4,76	1,19	1,29

ANSI Code ISO Code	"M" No	Uncoated Grade	EDP Number	Stock Status	Coated Grade	EDP Number	Stock Status
HPC 633	M007	—	—	—	—	—	—
HPCN 11 04 12	—	—	—	—	SA180	073137	S

LNCX



Dimensions shown on R.H. Insert

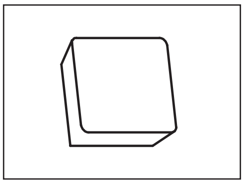


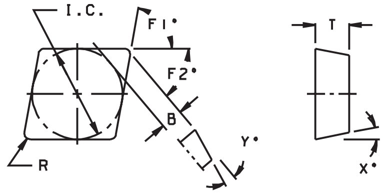
Rectangle, Neutral Hand,
0° Relief Angle, Negative Rake

ANSI Code ISO Code	ANSI Dimensions					ISO Dimensions				
	IC	T	R/W	B	Z	IC	T	R/W	B	Z
LNCX 18 06 AZL-11	—	.25	0.080	0.739	0.394	—	6,35	2,03	18,77	10
LNCX 18 06 AZR-11	—	.25	0.080	0.739	0.394	—	6,35	2,03	18,77	10

Industry Code	Uncoated Grade	EDP Number	Stock Status	Coated Grade	EDP Number	Stock Status
LNCX 18 06A0ZR-11	—	—	—	SN170	080911	—
	SS30	080910	S	—	—	—

Stock Status: **S =** Stock Standard **N =** Nonstock Standard item, 50 piece minimum order. Call for delivery information



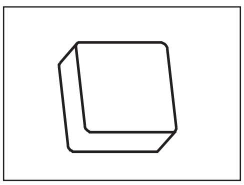


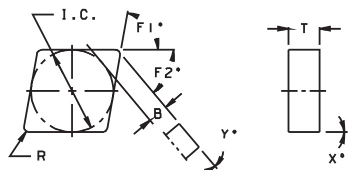
MEC/MECN

86° Diamond, 20° Relief Angle, Positive Rake.

Angles					ANSI Dimensions					ISO Dimensions				
M	F1	F2	X	Y	IC	T	R/W	B	Z	IC	T	R/W	B	Z
M008	86°	47°	20°	20°	3/4	3/16	0.031	0.160	—	19,05	4,76	0,79	4,07	—

ANSI Code ISO Code	"M" No	Uncoated Grade	EDP Number	Stock Status	Coated Grade	EDP Number	Stock Status
MEC 632	M008	—	—	—	—	—	—
MECN 19 04 08	—	—	—	—	—	—	—
		SS70	073139	N	—	—	—



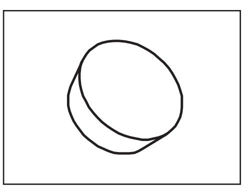


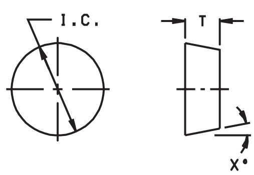
MNC/MNCN

86° Diamond, 0° Relief Angle, Negative Rake.

Angles					ANSI Dimensions					ISO Dimensions				
M	F1	F2	X	Y	IC	T	R/W	B	Z	IC	T	R/W	B	Z
M010	86°	47°	0°	0°	5/8	5/32	0.031	0.131	—	15,88	3,97	0,79	3,32	—

ANSI Code ISO Code	"M" No	Uncoated Grade	EDP Number	Stock Status	Coated Grade	EDP Number	Stock Status
MNC 52.52	M010	—	—	—	—	—	—
MNCN 15 T308		—	—	—	—	—	—
(MNC 552)		SS70	073148	S	—	—	—
		—	—	—	SN550	087789	N





RPC/RPCN

Round, 11° Relief Angle, Positive Rake

Angles					ANSI Dimensions					ISO Dimensions				
M	F1	F2	X	Y	IC	T	R/W	B	Z	IC	T	R/W	B	Z
M019	—	—	11°	—	1/2	3/16	—	—	—	12,70	4,76	—	—	—
M020	—	—	11°	—	3/4	3/16	—	—	—	19,05	4,76	—	—	—

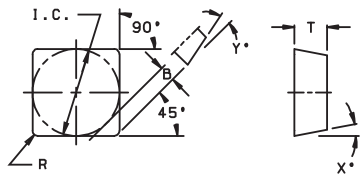
ANSI Code ISO Code	"M" No	Uncoated Grade	EDP Number	Stock Status	Coated Grade	EDP Number	Stock Status
RPC 43	M019	—	—	—	SN550	087798	S
(RPC 46)							
RPCN 12 04 00							
RPC 63	M020	—	—	—	—	—	—
(RPC 66)							
RPCN 19 04 00		SS70	073197	N	—	—	—
		—	—	—	SN550	087799	S

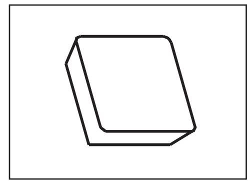
Stock Status: **S =** Stock Standard **N =** Nonstock Standard item, 50 piece minimum order. Call for delivery information

Milling Inserts & Cutters

SEC/SECN

Square, Radius Corner.
20° Relief Angle, Positive Rake



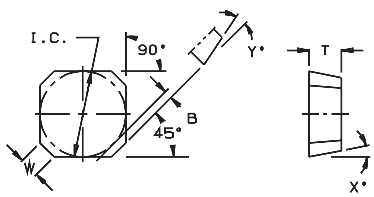


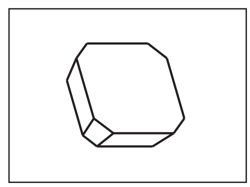
Angles					ANSI Dimensions					ISO Dimensions				
M	F1	F2	X	Y	IC	T	R/W	B	Z	IC	T	R/W	B	Z
M032	—	—	20°	20°	3/4	3/16	0.062	0.129	—	19,05	4,76	1,59	3,28	—
M191	—	—	20°	20°	1/2	1/8	0.031	0.091	—	12,70	3,18	0,79	2,30	—

ANSI Code ISO Code	"M" No	Uncoated Grade	EDP Number	Stock Status	Coated Grade	EDP Number	Stock Status
SEC 422	M191	SC20	088306	N	—	—	—
(SEC 44R2)	—	—	—	—	SN180	088310	N
(SEC 44R2A)	—	SS70	088308	S	—	—	—
SECN 12 03 08	—	SS550	088307	N	SN550	088309	N
SEC 634	M032	—	—	—	—	—	—
SECN 19 04 16	—	—	—	—	—	—	—
		SS550	073258	S	—	—	—

SEC-AE / SECN-AE

Square, 45° Facet, 20° Relief Angle,
Positive Rake



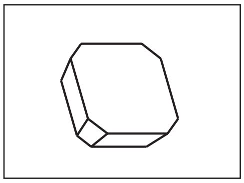


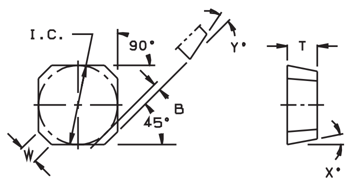
Angles					ANSI Dimensions					ISO Dimensions				
M	F1	F2	X	Y	IC	T	R/W	B	Z	IC	T	R/W	B	Z
M034	—	—	20°	20°	3/4	3/16	0.125	0.093	—	19,05	4,76	3,18	2,35	—

ANSI Code ISO Code	"M" No	Uncoated Grade	EDP Number	Stock Status	Coated Grade	EDP Number	Stock Status
SEC 63AE8	M034	—	—	—	—	—	—
(SEC 66K8)	—	—	—	—	—	—	—
(SECN 63A8)	—	—	—	—	SN550	087813	N
SECN 19 04AEN							

Used in same style cutter as:
SEC-AF, SEK-AF, SEKR-AFW

Stock Status: **S =** Stock Standard **N =** Nonstock Standard item, 50 piece minimum order. Call for delivery information





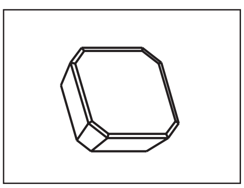
SEC-AF/SECN-AFN

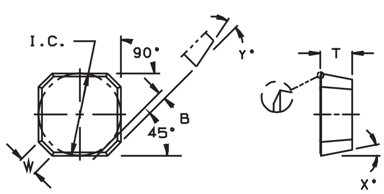
Square, 45° Facet, 20° Relief Angle, Positive Rake

Angles					ANSI Dimensions					ISO Dimensions				
M	F1	F2	X	Y	IC	T	R/W	B	Z	IC	T	R/W	B	Z
M224	—	—	20°	25°	1/2	1/8	0.102	0.053	—	12,70	3,18	2,59	1,33	—
M256	—	—	20°	25°	5/8	3/16	0.102	0.078	—	15,80	4,70	2,59	1,99	—
M259	—	—	20°	25°	1/2	1/8	0.093	0.057	—	12,70	3,10	2,37	1,45	—

Used in same style cutter as: SEC-AE, SEK-AF, SEKR-AFW

ANSI Code ISO Code	"M" No	Uncoated Grade	EDP Number	Stock Status	Coated Grade	EDP Number	Stock Status
SEC 42AF4.5	M259	—	—	—	SN550	081013	N
SECN 12 03AFN		—	—	—	—	—	—
SEC 42AF6.5	M224	SC20	078931	S	—	—	—
(SEAN 42AFN)		—	—	—	SN280	090324	N
(SEKN 42AFN)		—	—	—	—	—	—
SECN 12 03AFN		—	—	—	—	—	—
SEC 53AF6.5	M256	SC20	080282	S	—	—	—
(SEAN 53AFN)		SC280	090571	N	—	—	—
(SEKN53AFN)		—	—	—	—	—	—
SECN 15 04AFN							





SEC-AF/SECN-AFN

Square, 45° Facet, T-Land. 20° Relief Angle, Positive Rake

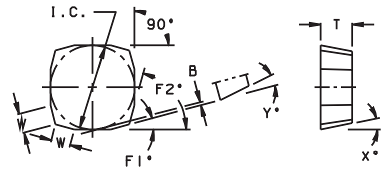
Angles					ANSI Dimensions					ISO Dimensions				
M	F1	F2	X	Y	IC	T	R/W	B	Z	IC	T	R/W	B	Z
M225	—	—	20°	25°	1/2	1/8	0.102	0.053	—	12,70	3,18	2,59	1,33	—
M255	—	—	20°	25°	5/8	3/16	0.102	0.078	—	15,88	4,76	2,59	1,99	—
M260	—	—	20°	25°	1/2	1/8	0.093	0.057	—	12,70	3,18	2,37	1,45	—

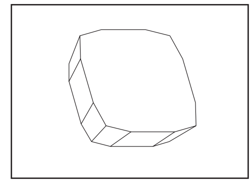
ANSI Code ISO Code	"M" No	Uncoated Grade	EDP Number	Stock Status	Coated Grade	EDP Number	Stock Status
SEC 42AF4.5S	M260	—	—	—	SN550	081016	S
SEC 12 03AFSN	—	—	—	—	—	—	—
SEC 42AF6.5S	M225	—	—	—	—	—	—
(SEAN 42AFTN)	—	—	—	—	—	—	—
(SEAN 42AFTN)	—	—	—	—	SN550	078933	S
SECN 12 03AFSN	—	—	—	—	—	—	—
SEC 53AF6.5S	M255	—	—	—	—	—	—
(SEAN 53AFTN)	—	—	—	—	—	—	—
SEC 53AF6.5S	—	—	—	—	SN550	080283	S

Stock Status: **S =** Stock Standard **N =** Nonstock Standard item, 50 piece minimum order. Call for delivery information

Milling Inserts & Cutters

SEC-KE/SECN-DEN



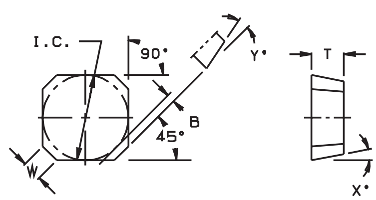


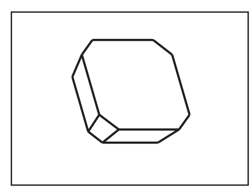
Square, Double facet, Corner Break. Neutral Hand, 20° Relief Angle, Positive Rake

Angles					ANSI Dimensions					ISO Dimensions				
M	F1	F2	X	Y	IC	T	R/W	B	Z	IC	T	R/W	B	Z
M033	30°	60°	20°	20°	3/4	3/16	0.125	0.052	—	19,05	4,76	3,18	1,31	—

ANSI Code ISO Code	"M" No	Uncoated Grade	EDP Number	Stock Status	Coated Grade	EDP Number	Stock Status
SEC 63KE8	M033	SC20	073261	S	—	—	—
(SEC 66K8)	—	—	—	—	—	—	—
(SECN 63K8)	—	—	—	—	—	—	—
SECN 19 04DEN							

SEK-AF/SEKN-AF





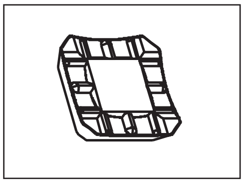
Square, 45° Facet, Neutral Hand
20° Relief Angle, Positive Rake

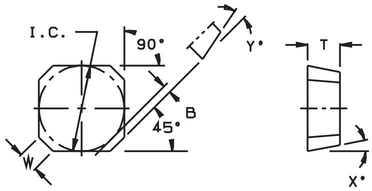
Used in same style cutter as:
SEC-AF, SEC-AE, SEKR-AFW

Angles					ANSI Dimensions					ISO Dimensions				
M	F1	F2	X	Y	IC	T	R/W	B	Z	IC	T	R/W	B	Z
M257	—	—	20°	27°	1/2	3/16	0.079	0.064	—	12,70	4,76	2,00	1,63	—
M258	—	—	20°	27°	5/8	3/16	0.063	0.098	—	15,88	4,76	1,60	2,49	—

ANSI Code ISO Code	"M" No	Uncoated Grade	EDP Number	Stock Status	Coated Grade	EDP Number	Stock Status
SEK 43AF5N	M257	—	—	—	—	—	—
SEKN 12 04AFEN		SS30	080678	N	—	—	—
		—	—	—	SN550	080396	S
SEK 53AF4	M258	—	—	—	—	—	—
SEKN 15 04AFEN		—	—	—	—	—	—
		—	—	—	SN550	080400	N

Stock Status: **S =** Stock Standard **N =** Nonstock Standard item, 50 piece minimum order. Call for delivery information





SEKR-AFW/ SEKRN-AFW

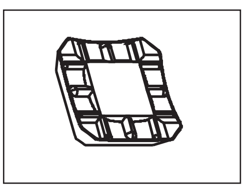
Square, 45° Facet, Neutral Hand
20° Relief Angle, Positive Rake

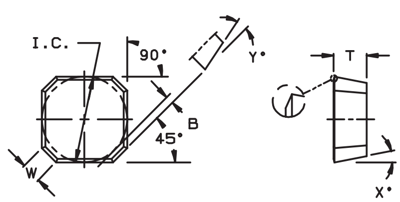
Angles					ANSI Dimensions					ISO Dimensions				
M	F1	F2	X	Y	IC	T	R/W	B	Z	IC	T	R/W	B	Z
M256W	—	—	20°	25°	5/8	3/16	0.092	0.085	—	15,80	4,70	2,33	2,15	—
M259W	—	—	20°	25°	1/2	1/8	0.089	0.058	—	12,70	3,10	2,26	1,48	—
M261W	—	—	20°	25°	1/2	3/16	0.094	0.058	—	12,70	4,70	2,39	1,48	—

Used in same style cutter as:
SEC-AE, SEC-AF, SEK-AF

ANSI Code ISO Code	"M" No	Uncoated Grade	EDP Number	Stock Status	Coated Grade	EDP Number	Stock Status
SEKR 42AF4.5NFW	M259W	SC230	081237	S	SA20	081236	S
(SEKR 42AF4.5NRW - ANSI)		—	—	—	SP221	081238	S
(SEKR 1203AFRNW - ISO)							
SEKR 12 03AFEWN							
SEKR 43AF4.5NFW	M261W	—	—	—	SA20	081239	S
(SEKR 43AF4.5NRW - ANSI)		—	—	—	SP221	081241	S
(SEKR 1204AFRNW - ISO)							
SEKR 12 04AFN							
SEKR 53AF6.5NFW	M256W	—	—	—	—	—	S
(SEKR 53AF6.5NRW - ANSI)		—	—	—	SP221	081235	S
(SEKR 1904AFRNW - ISO)							
SEKR 15 04AFRNW							

SEKR-AFW/ SEKR-AFNW





Square, 45° Facet, T-Land
20° Relief Angle, Positive Rake

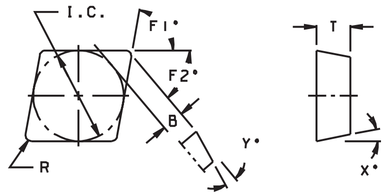
Angles					ANSI Dimensions					ISO Dimensions				
M	F1	F2	X	Y	IC	T	R/W	B	Z	IC	T	R/W	B	Z
M255W	—	—	20°	25°	5/8	3/16	0.092	0.085	—	15,88	4,76	2,33	2,15	—
M260W	—	—	20°	25°	1/2	1/8	0.093	0.055	—	12,70	3,18	2,37	1,40	—

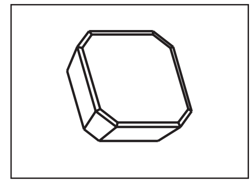
ANSI Code ISO Code	"M" No	Uncoated Grade	EDP Number	Stock Status	Coated Grade	EDP Number	Stock Status
SEKR 42AF4.5SW	M260W	—	—	—	SN550	081020	S
SEKR 12 03AFSN							
SEKR 53AF4.5SW	M255W	—	—	—	—	—	—
SEKR 15 04AFSN		—	—	—	SN550	081009	S

Stock Status: **S =** Stock Standard **N =** Nonstock Standard item, 50 piece minimum order. Call for delivery information

Milling Inserts & Cutters

SLB



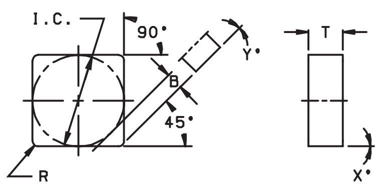


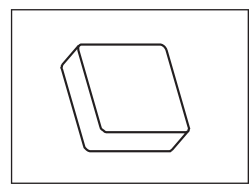
87°/88° Diamond, Radius Corner
11° Relief Angle, Positive Rake

Angles					ANSI Dimensions					ISO Dimensions				
M	F1	F2	X	Y	IC	T	R/W	B	Z	IC	T	R/W	B	Z
M197	88°	50°	11°	11°	.355	5/32	0.025	0.067	—	9,00	3,97	0,64	1,70	—
M199	87°	46.5°	11°	11°	.685	3/16	0.025	0.144	—	17,40	4,76	0,64	3,64	—

ANSI Code ISO Code	"M" No	Uncoated Grade	EDP Number	Stock Status	Coated Grade	EDP Number	Stock Status
SLB 3	M197	SC20	088348	S	—	—	—
		SC280	080500	N	—	—	—
		—	—	—	—	—	—
		—	—	—	—	—	—
SLB 7	M199	—	—	—	SN550	088363	N

SNC/SNCN





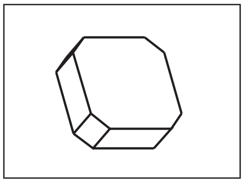
Square, Radius Corner
0° Relief Angle, Negative Rake

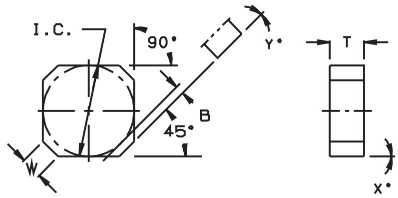
Angles					ANSI Dimensions					ISO Dimensions				
M	F1	F2	X	Y	IC	T	R/W	B	Z	IC	T	R/W	B	Z
M078	—	—	0°	0°	5/8	3/16	0.062	0.104	—	15,88	4,76	1,59	2,62	—
M079	—	—	0°	0°	3/4	3/16	0,047	0,136	—	19,05	4,76	1,19	3,45	—

ANSI Code ISO Code	"M" No	Uncoated Grade	EDP Number	Stock Status	Coated Grade	EDP Number	Stock Status
SNC 534 (SNE 534) SNCN 15 04 16	M078	—	—	—	SN550	087857	N
SNC 633 (S 66NR36) (SNE 633) (SNH 633) SNCN 19 04 12	M079	— — —	— — —	— — —	— — SN550	— — 087858	— — S

Stock Status: **S =** Stock Standard **N =** Nonstock Standard item, 50 piece minimum order. Call for delivery information

SNC-AN/SNCN-ANN



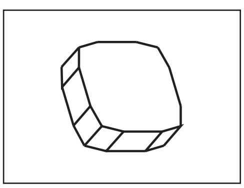


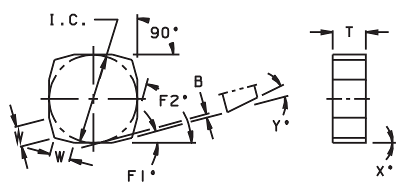
Square, 45° Facet
0° Relief Angle, Negative Rake

Angles					ANSI Dimensions					ISO Dimensions				
M	F1	F2	X	Y	IC	T	R/W	B	Z	IC	T	R/W	B	Z
M055	—	—	0°	0°	1/2	3/16	0.094	0.057	—	12,70	4,76	2,39	1,44	—
M064	—	—	0°	0°	3/4	3/16	0.188	0.062	—	19,05	4,76	4,76	1,56	—

ANSI Code ISO Code	"M" No	Uncoated Grade	EDP Number	Stock Status	Coated Grade	EDP Number	Stock Status
SNC 43AN6	M055	—	—	—	—	—	—
(SS 46NF4E)		—	—	—	—	—	—
(2SNH 43A3)		—	—	—	—	—	—
SNCN 12 04ANEN		—	—	—	—	—	—
		—	—	—	SN550	087834	N
SNC 63AN12	M064	—	—	—	—	—	—
SNCN 19 04ANEN		—	—	—	—	—	—
		—	—	—	SN550	087843	N

SNC-LN/SNCN-ENN





Square, Neutral Hand
15° Double Facet, Corner Break
0° Relief Angle, Negative Rake

Angles					ANSI Dimensions					ISO Dimensions				
M	F1	F2	X	Y	IC	T	R/W	B	Z	IC	T	R/W	B	Z
M057	15°	75°	0°	0°	1/2	3/16	0.062	0.036	—	12,70	4,76	1,59	0,92	—
M219	15°	75°	0°	0°	1/2	3/16	0.055	0.032	0.039	12,70	4,76	1,40	0,80	1

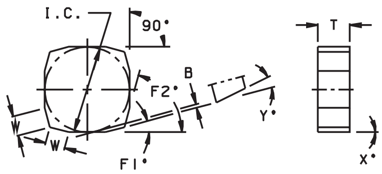
ANSI Code ISO Code	"M" No	Uncoated Grade	EDP Number	Stock Status	Coated Grade	EDP Number	Stock Status
SNC 43LN3.5	M219	SC20	088478	S	—	—	—
(SNA 43E2)		—	—	—	—	—	—
(SNK 43E2)		—	—	—	—	—	—
SNCN 12 04ENEN		—	—	—	—	—	—
		—	—	—	SN550	088481	S
SNC 43LN4	M057	—	—	—	—	—	—
(SNA 43L2)		—	—	—	—	—	—
(SNC 43L)		SS70	073378	N	—	—	—
(SNC 43L2)		—	—	—	—	—	—
(SNH 43L2)		—	—	—	—	—	—
SNCN 12 04ENEN							

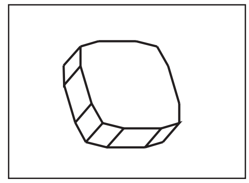
Milling Inserts & Cutters

Stock Status: **S =** Stock Standard **N =** Nonstock Standard item, 50 piece minimum order. Call for delivery information

SNC-LN/SNCN-ENN

Square, Neutral Hand
Double 15° Facet
0° Relief Angle, Negative Rake



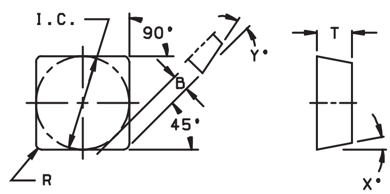


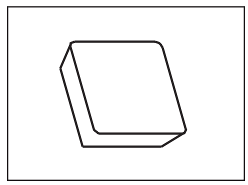
Angles					ANSI Dimensions					ISO Dimensions				
M	F1	F2	X	Y	IC	T	R/W	B	Z	IC	T	R/W	B	Z
M070	15°	75°	0°	0°	3/4	3/16	0.125	0.036	0.047	19,05	4,76	3,18	0,92	1,19

ANSI Code ISO Code	"M" No	Uncoated Grade	EDP Number	Stock Status	Coated Grade	EDP Number	Stock Status
SNC 63LN8	M070	SC20	073442	N	—	—	—
(S 66NW15E)		—	—	—	—	—	—
(SNC 63W8)		—	—	—	—	—	—
SNCN 19 04ENEN							

SOE/SOEN

Square, Radius Corner
16° Relief Angle
Positive Rake



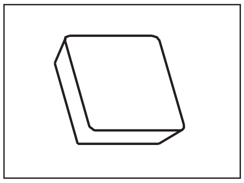


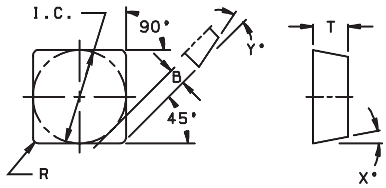
Milling Inserts & Cutters

Angles					ANSI Dimensions					ISO Dimensions				
M	F1	F2	X	Y	IC	T	R/W	B	Z	IC	T	R/W	B	Z
M021	—	—	16°	16°	1/2	1/8	0.031	0.091	—	12,70	3,18	0,79	2,30	—

ANSI Code ISO Code	"M" No	Uncoated Grade	EDP Number	Stock Status	Coated Grade	EDP Number	Stock Status
SOE 422	M021	SC20	073201	N	—	—	—
(SDE 422)		—	—	—	—	—	—
SOEN 12 03 08		—	—	—	—	—	—
		—	—	—	—	—	—
		—	—	—	—	—	—

Stock Status: **S =** Stock Standard **N =** Nonstock Standard item, 50 piece minimum order. Call for delivery information





SPC/SPCN

Square, Radius Corner
11° Relief Angle, Positive Rake

Angles					ANSI Dimensions					ISO Dimensions				
M	**F1**	**F2**	**X**	**Y**	**IC**	**T**	**R/W**	**B**	**Z**	**IC**	**T**	**R/W**	**B**	**Z**
M100	—	—	11°	11°	1/2	1/8	0.031	0.091	—	12,70	3,18	0.79	2,30	—
M110	—	—	11°	11°	5/8	3/16	0.031	0.117	—	15,88	4,76	0,79	2,95	—
M117	—	—	11°	11°	3/4	3/16	0.031	0.142	—	19,05	4,76	0,79	3,61	—
M118	—	—	11°	11°	3/4	3/16	0.047	0.136	—	19,05	4,76	1,19	3,45	—
M119	—	—	11°	11°	3/4	3/16	0.062	0.129	—	19,05	4,76	1,59	3,28	—
M227	—	—	11°	11°	3/4	3/16	0.094	0.117	—	19,05	4,76	2,39	2,95	—
M120	—	—	11°	11°	3/4	3/16	0.125	0.104	—	19,05	4,76	3,10	2,62	—

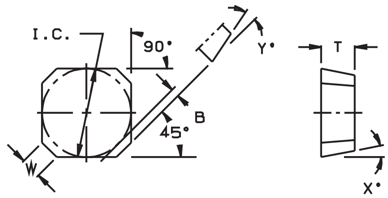
Used in same style cutter as:
SPH, SPE-D

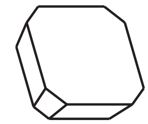
ANSI Code ISO Code	"M" No	Uncoated Grade	EDP Number	Stock Status	Coated Grade	EDP Number	Stock Status
SPC 422	M100	—	—	—	—	—	—
(SPE 422, SPH 422)		—	—	—	—	—	—
SPCN 12 03 08		—	—	—	—	—	—
		—	—	—	—	—	—
		—	—	—	SN550	087879	S
		—	—	—	—	—	—
SPC 532	M110	SC20	073624	N	—	—	—
SPCN 15 04 08		—	—	—	—	—	—
		—	—	—	—	—	—
SPC 632	M117	—	—	—	—	—	—
(SPH 632)		—	—	—	—	—	—
SPCN 19 04 08		—	—	—	—	—	—
		SS550	073662	N	—	—	—
		—	—	—	—	—	—
		—	—	—	—	—	—
SPC 633	M118	—	—	—	—	—	—
(S 66PR3G)		—	—	—	—	—	—
(SMP 63R3)		—	—	—	SA550	075151	S
SPCN 19 04 12		—	—	—	—	—	—
		—	—	—	SN180	073668	N
		—	—	—	SN550	087897	S
SPC 634	M119	—	—	—	—	—	—
(SPE 634, SPE 66R4A)		—	—	—	—	—	—
(SPH 634)		—	—	—	—	—	—
SPCN 19 04 16		—	—	—	—	—	—
		—	—	—	—	—	—
		—	—	—	SN550	087898	S
SPC 636	M227	—	—	—	—	—	—
(SPE 636)		—	—	—	—	—	—
SPCN 19 04 24		—	—	—	—	—	—
		—	—	—	SN180	088530	N
		—	—	—	—	—	—
SPC 638	M120	—	—	—	—	—	—
SPCN 19 04 32		—	—	—	SA180	073679	N
		—	—	—	—	—	—
		—	—	—	—	—	—
		—	—	—	—	—	—

Stock Status: **S =** Stock Standard **N =** Nonstock Standard item, 50 piece minimum order. Call for delivery information

SPC-AP/SPCN-APN

Square, 45° Facet
11° Relief Angle
Positive Rake





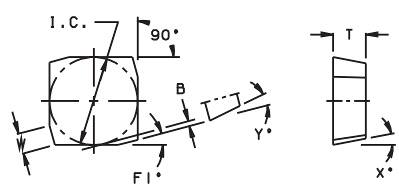
Angles					ANSI Dimensions					ISO Dimensions				
M	F1	F2	X	Y	IC	T	R/W	B	Z	IC	T	R/W	B	Z
M101	—	—	11°	11°	1/2	1/8	0.062	0.072	—	12,70	3,18	1,59	1,83	—
M123	—	—	11°	11°	3/4	3/16	0.125	0.093	—	19,05	4,76	3,18	2,35	—

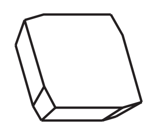
ANSI Code ISO Code	"M" No	Uncoated Grade	EDP Number	Stock Status	Coated Grade	EDP Number	Stock Status
SPC 42AP4	M101	—	—	—	SA280	090456	N
(SPC 42A, SPH 42A2)		—	—	—	—	—	—
SPCN 12 03APN		—	—	—	—	—	—
		—	—	—	—	—	—
		—	—	—	—	—	—
SPC 63AP8	M123	—	—	—	—	—	—
(SMP 63C8, SPC 66A8)		—	—	—	—	—	—
(SPCM 63AP, SPEN 63A8)		—	—	—	—	—	—
SPCN 19 04APN		SS550	073691	N	—	—	—
		—	—	—	—	—	—

Used in same style cutter as:
SPH-AP

SPC-EP-R/SPCN-EPR

Square, 15° RH Facet, Right Hand
11° Relief Angle
Positive Rake





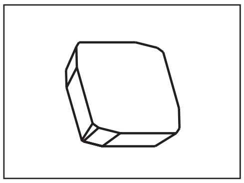
Angles					ANSI Dimensions					ISO Dimensions				
M	F1	F2	X	Y	IC	T	R/W	B	Z	IC	T	R/W	B	Z
M103	15°	—	11°	11°	1/2	1/8	0.062	0.041	—	12,70	3,18	1.59	1,03	—

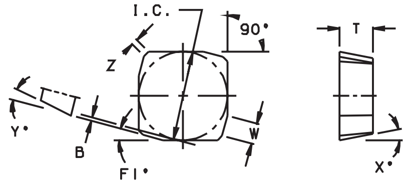
ANSI Code ISO Code	"M" No	Uncoated Grade	EDP Number	Stock Status	Coated Grade	EDP Number	Stock Status
SPC 42EP4R	M103	—	—	—	—	—	—
(SPC 42E, SPE 42E)		—	—	—	—	—	—
(SPH 42E2R)		—	—	—	—	—	—
SPCN 12 03EPER		—	—	—	—	—	—
		—	—	—	SN550	087882	S

Used in same style cutter as:
SPC-EZ-R, SPE-EP-R,
SPKR-ED-RW

Milling Inserts & Cutters

Stock Status: **S** = Stock Standard **N** = Nonstock Standard item, 50 piece minimum order. Call for delivery information





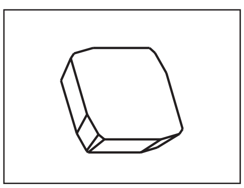
SPC-EZ-L/SPCN-EZL

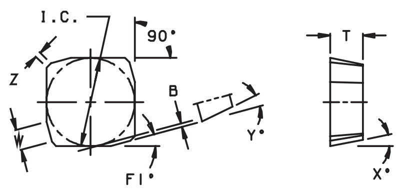
Square, 15° LH Facet, Left Hand
11° Relief Angle, Positive Rake

Angles					ANSI Dimensions					ISO Dimensions				
M	F1	F2	X	Y	IC	T	R/W	B	Z	IC	T	R/W	B	Z
M173	15°	—	11°	17°	3/4	3/16	0.125	0.047	0.031	19,0	4,76	3,18	1,20	0,8

Used in same style cutter as:
SPC-EP-L, SPH-EP-L,
SPE-EP-L

ANSI Code ISO Code	"M" No	Uncoated Grade	EDP Number	Stock Status	Coated Grade	EDP Number	Stock Status
SPC 63EZ8L	M173	SC20	073929	S	—	—	—
(S66PQ8E, SRC 63H8L)		—	—	—	—	—	—
SPCN 19 04EZEL		—	—	—	—	—	—





SPC-EZ-R/SPCN-EZR

Square, 15° RH Facet, Right Hand Corner
Break, 11° Relief Angle
Positive Rake

Angles					ANSI Dimensions					ISO Dimensions				
M	F1	F2	X	Y	IC	T	R/W	B	Z	IC	T	R/W	B	Z
M172	15°	—	11°	17°	3/4	3/16	0.062	0.063	0.031	19,05	4,76	1,59	1,59	0,8
M174	15°	—	11°	17°	3/4	3/16	0.125	0.047	0.031	19,05	4,76	3,18	1,20	0,8

Used in same style cutter as:
SPC-EP-R, SPKR-ED-RW,
SPE-EP-R

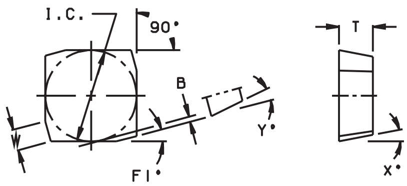
ANSI Code ISO Code	"M" No	Uncoated Grade	EDP Number	Stock Status	Coated Grade	EDP Number	Stock Status
SPC 63EZ4R	M172	SS550	087482	S	—	—	—
(S66PJ4E)		—	—	—	—	—	—
(SRC 63H4R)		—	—	—	—	—	—
SPCN 19 04EZER		—	—	—	—	—	—
SPC 63EZ8R	M174	SC20	087484	S	—	—	—
(S66PJ8E)		—	—	—	—	—	—
(SRC 63H8R)		—	—	—	—	—	—
SPCN 19 04EZER		—	—	—	—	—	—

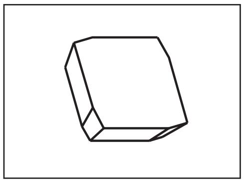
Milling Inserts & Cutters

Stock Status: **S =** Stock Standard **N =** Nonstock Standard item, 50 piece minimum order. Call for delivery information

SPE-EP-R/SPEN-EPR

Square, 15° Facet, Right Hand
11° Relief Angle, Positive Rake





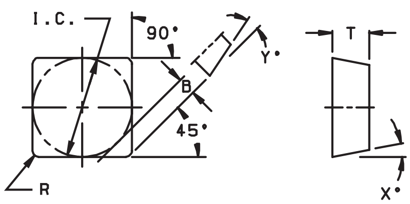
Angles					ANSI Dimensions					ISO Dimensions				
M	F1	F2	X	Y	IC	T	R/W	B	Z	IC	T	R/W	B	Z
M147	15°	—	11°	11°	3/4	3/16	0.155	0.045	—	19,05	4,76	3,94	1,15	—

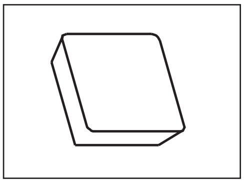
ANSI Code ISO Code	“M” No	Uncoated Grade	EDP Number	Stock Status	Coated Grade	EDP Number	Stock Status
SPE 63EP10R	M147	SC20	073802	S	—	—	—
(SPC 63G)		—	—	—	—	—	—
(SPE 63E)		—	—	—	—	—	—
SPEN 19 04EPER		—	—	—	—	—	—

Used in same style cutter as:
SPC-EP-R, SPC-EZ-R,
SPKR-ED-RW

SPH/SPHN

Square, Radius Corner
11° Relief Angle, Positive Rake



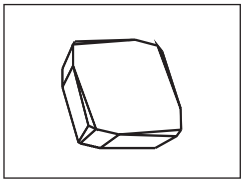


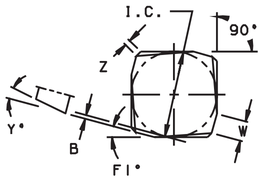
Angles					ANSI Dimensions					ISO Dimensions				
M	F1	F2	X	Y	IC	T	R/W	B	Z	IC	T	R/W	B	Z
M135	-	-	11°	11°	1/2	1/8	0.062	0.078	-	12,70	3,18	1,59	1,97	-

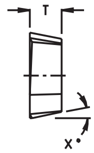
ANSI Code ISO Code	“M” No	Uncoated Grade	EDP Number	Stock Status	Coated Grade	EDP Number	Stock Status
SPH 424	M135	—	—	—	—	—	—
(SPC 424)		—	—	—	—	—	—
(SPE 424)		—	—	—	—	—	—
(SPH 424)		—	—	—	—	—	—
SPHN 12 03 16		—	—	—	SN550	087914	S

Used in same style cutter as:
SPC, SPE-D

Stock Status: **S =** Stock Standard **N =** Nonstock Standard item, 50 piece minimum order. Call for delivery information





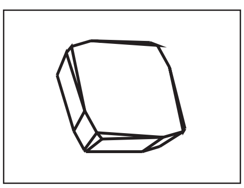


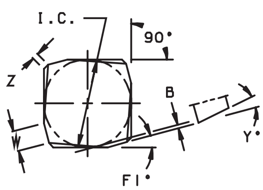
SPK-ED-L/SPKN-EDL

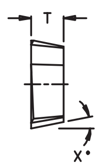
Square, LH Facet, Left Hand
Corner Break, T-Land
11° Relief Angle, Positive Rake

Angles					ANSI Dimensions					ISO Dimensions				
M	F1	F2	X	Y	IC	T	R/W	B	Z	IC	T	R/W	B	Z
M202	15°	—	11°	14°	1/2	3/16	0.055	0.036	0.039	12,70	4,76	1,40	0,92	1

ANSI Code ISO Code	"M" No	Uncoated Grade	EDP Number	Stock Status	Coated Grade	EDP Number	Stock Status
SPK 43ED3.5L	M202	—	—	—	SA280	090487	N
(SMA 43E2L)		—	—	—	—	—	—
(SMK 43E2L)		—	—	—	—	—	—
(SPK 43ED3.5LE)		—	—	—	—	—	—
SPKN 12 04EDEL		—	—	—	—	—	—







SPK-ED-R/SPKN-EDR

Square, RH Facet, Right Hand
Corner Break, T-Land
11° Relief Angle, Positive Rake

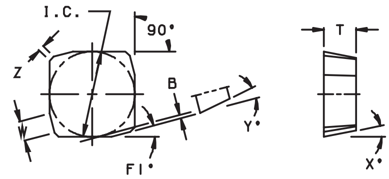
Angles					ANSI Dimensions					ISO Dimensions				
M	F1	F2	X	Y	IC	T	R/W	B	Z	IC	T	R/W	B	Z
M201	15°	—	11°	14°	1/2	1/8	0.055	0.036	0.039	12,70	3,18	1,40	0,92	1
M215	15°	—	11°	14°	5/8	3/16	0.102	0.039	0.039	15,88	4,76	2,59	0,98	1

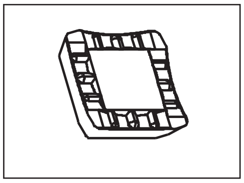
ANSI Code ISO Code	"M" No	Uncoated Grade	EDP Number	Stock Status	Coated Grade	EDP Number	Stock Status
SPK 42ED3.5R	M201	SS550	088373	S	SN550	088375	N
(SMA 42E2R)		—	—	—	—	—	—
(SMK 42E2R)		—	—	—	—	—	—
SPKN 12 03EDER		—	—	—	—	—	—
SPK 53ED6.5R	M215	—	—	—	SN550	088457	S
(SMK 53E3R)		—	—	—	—	—	—
SPKN 15 04EDER		—	—	—	—	—	—

Stock Status: **S =** Stock Standard **N =** Nonstock Standard item, 50 piece minimum order. Call for delivery information

SPKR-ED-RW/SPKR-EFR

Square, 15° Facet, Right Hand
Corner Break, 11° Relief Angle
Positive Rake





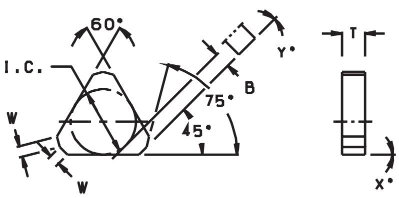
Angles					ANSI Dimensions					ISO Dimensions				
M	F1	F2	X	Y	IC	T	R/W	B	Z	IC	T	R/W	B	Z
M201W	15°	—	11°	14°	1/2	1/8	0.062	0.036	0.039	12,70	3,18	1,40	0,92	1

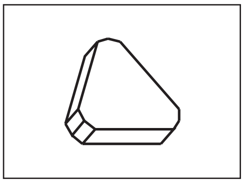
ANSI Code ISO Code	“M” No	Uncoated Grade	EDP Number	Stock Status	Coated Grade	EDP Number	Stock Status
SPKR 42ED3.5SRW SPKR 12 03EDSRW	M201W	—	—	—	SN550	081002	S

Used in same style cutter as:
SPC-EP-R, SPC-EZ-R,
SPE-EP-R

TNC-ZN/TNCN-ZN

Triangle, Neutral Hand
45°RH Facet, 0° Relief Angle
Negative Rake



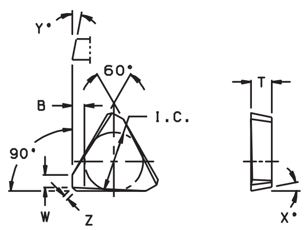


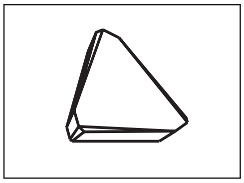
Angles					ANSI Dimensions					ISO Dimensions				
M	F1	F2	X	Y	IC	T	R/W	B	Z	IC	T	R/W	B	Z
M241	45°	75°	0°	0°	1/2	3/16	0.101	0.095	—	12,70	4,76	2,56	2,41	—

ANSI Code ISO Code	“M” No	Uncoated Grade	EDP Number	Stock Status	Coated Grade	EDP Number	Stock Status
TNC 43ZN9.5 TNCN 12 04ANEN	M241	— SC280	— 090154	— N	— SA180	— 088609	— S

TOC-PE-R/TFCN-PR

Triangle, 90° 26° Facet, T-Land, Right Hand,
26° Relief Angle, Positive Rake



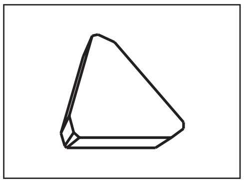


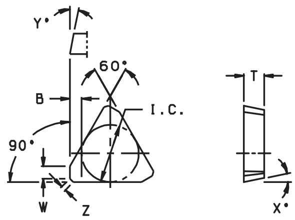
Angles					ANSI Dimensions					ISO Dimensions				
M	F1	F2	X	Y	IC	T	R/W	B	Z	IC	T	R/W	B	Z
M235	90°	—	26°	26°	1/2	3/16	0.098	0.103	—	12,70	4,76	2,50	2,60	—

ANSI Code ISO Code	“M” No	Uncoated Grade	EDP Number	Stock Status	Coated Grade	EDP Number	Stock Status
TOC 42PE6.5R (SFA 42P3R) TFCN 22 04PFER	M235	SC20 — —	088568 — —	N — —	— — —	— — —	— — —

Stock Status: **S =** Stock Standard **N =** Nonstock Standard item, 50 piece minimum order. Call for delivery information

TPC-PZ-R/TPCN-PZR





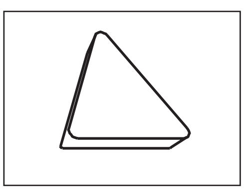
Triangle, 90° RH Facet, Right Hand
11° Relief Angle, Positive Rake

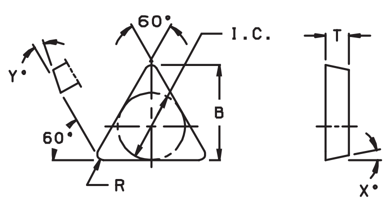
Angles					ANSI Dimensions					ISO Dimensions				
M	F1	F2	X	Y	IC	T	R/W	B	Z	IC	T	R/W	B	Z
M180	90°	—	11°	17°	1/2	3/16	0.062	0.131	0.024	12,70	4,76	1,59	3,31	0,6
M182	90°	—	11°	17°	5/8	3/16	0.062	0.174	0.024	15,88	4,76	1,59	4,42	0,6

Used in same style cutter as:
TPKR=PD=RFW

ANSI Code ISO Code	"M" No	Uncoated Grade	EDP Number	Stock Status	Coated Grade	EDP Number	Stock Status
TPC 43PZ4R	M180	—	—	—	—	—	—
(T46PY4E)		—	—	—	—	—	—
(TRC 43R4R)		SS70	073964	S	—	—	—
TPCN 22 04PZER		—	—	—	SN180	073966	N
TPC 53PZ4R	M182	—	—	—	—	—	—
(T56PY4E)		—	—	—	SA180	073977	N
(TRC 53R4R)		—	—	—	—	—	—
TPCN 27 04PZER		—	—	—	—	—	—

TPH/TPHN





Triangle, Radius Corner
11° Relief Angle, Positive Rake

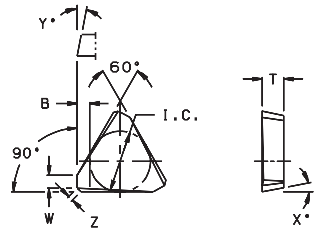
Angles					ANSI Dimensions					ISO Dimensions				
M	F1	F2	X	Y	IC	T	R/W	B	Z	IC	T	R/W	B	Z
M246	—	—	11°	11°	1/2	3/16	0.047	0.703	—	12,70	4,76	1,19	17,85	—

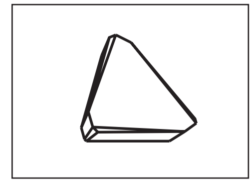
ANSI Code ISO Code	"M" No	Uncoated Grade	EDP Number	Stock Status	Coated Grade	EDP Number	Stock Status
TPH 433	M246	—	—	—	—	—	—
(TPC 433)		—	—	—	SA180	088639	S
TPHN 12 04 12		—	—	—	—	—	—

Milling Inserts & Cutters

Stock Status: **S =** Stock Standard **N =** Nonstock Standard item, 50 piece minimum order. Call for delivery information

TPK-PD-R/TPKN-PDR





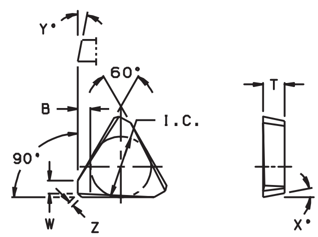
Triangle, 90° RH Facet, T-Land, Right Hand
11° Relief Angle, Positive Rake

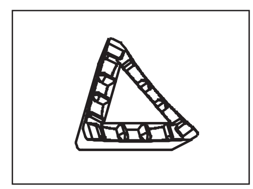
Angles					ANSI Dimensions					ISO Dimensions				
M	F1	F2	X	Y	IC	T	R/W	B	Z	IC	T	R/W	B	Z
M249	90°	—	11°	14°	3/8	1/8	0.047	0.092	0.039	9,52	3,18	1,19	2,34	1
M251	90°	—	11°	14°	1/2	3/16	0.055	0.137	0.027	12,70	4,76	1,40	3,48	0,7

ANSI Code ISO Code	"M" No	Uncoated Grade	EDP Number	Stock Status	Coated Grade	EDP Number	Stock Status
TPK 32PD3RS	M249	SC20	088652	N	SN550	088655	S
TPKN 1603PDER		SS30	080666	S	—	—	—
TPK 43PD3.5RS	M251	SS70	088666	S	SN550	088667	S
TPKN 22 04PDER		—	—	—	—	—	—

Used in same style cutter as:
TPK-PD-RW

TPK-PD-RW/TPKN-PDRW





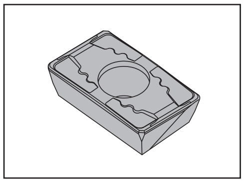
Triangle, 90°RH Facet, T-Land, Right Hand
11° Relief Angle, Positive Rake

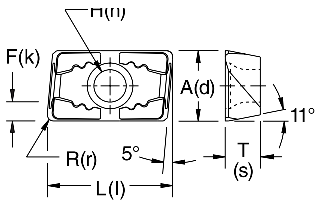
Angles					ANSI Dimensions					ISO Dimensions				
M	F1	F2	X	Y	IC	T	R/W	B	Z	IC	T	R/W	B	Z
M251W	90°	—	11°	14°	1/2	3/16	0.055	0.137	0.027	12,70	4,76	1,40	3,48	0,7

ANSI Code ISO Code	"M" No	Uncoated Grade	EDP Number	Stock Status	Coated Grade	EDP Number	Stock Status
TPKR43PD3.5RSW	M251W	—	—	—	SN550	081006	S
TPKR 22 04 PDERW							

Milling Inserts & Cutters

Stock Status: **S =** Stock Standard **N =** Nonstock Standard item, 50 piece minimum order. Call for delivery information





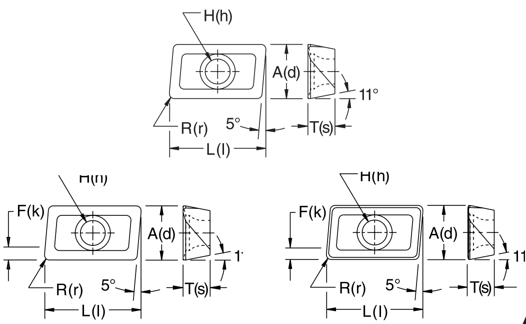
APFT-PDR/APFT-PDTR

85° Parallelogram, 11° Relief Angle,
Positive Rake Screw On

APFT Dimensions

Size	ANSI Dimensions						ISO Dimensions					
	A	L	T	F	R	H	d	l	s	k	r	h
263	3/8	0.669	3/16	0.120	1/32	0.173	9,52	17,00	4,76	3,06	0,8	4,40

ANSI Code	ISO Code	Grade	EDP Number	Stock Status
APFT2.63PDR	APFT 16 04 PDR	SP742	0700302	S
APFT2.63PDTR	APFT 16 04 PDTR	SP742	0700303	S
		SA740	0700304	S

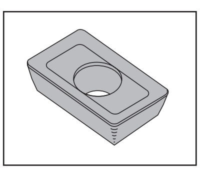


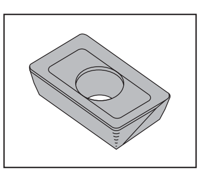
APKT-R/APKT-RT
APKT-PDR/APKT-PDTR

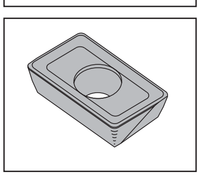
85° Parallelogram, 11° Relief Angle,
Positive Rake Screw On

APKT Dimensions

Size	ANSI Dimensions						ISO Dimensions					
	A	L	T	F	R	H	d	l	s	k	r	h
2634R/RT	3/8	0.669	3/16	—	1/16	0.173	9,52	17,00	4,76	—	1,6	4,40
2636R/RT	3/8	0.669	3/16	—	3/32	0.173	9,52	17,00	4,76	—	2,3	4,40
2638R/RT	3/8	0.669	3/16	—	1/8	0.173	9,52	17,00	4,76	—	3,0	4,40
26316R	3/8	0.669	3/16	—	1/4	0.173	9,52	17,00	4,76	3,06	0,8	4,40
263PDR/PDTR	3/8	0.669	3/16	0.062	1/32	0.173	9,52	17,00	4,76	1,56	0,8	4,40



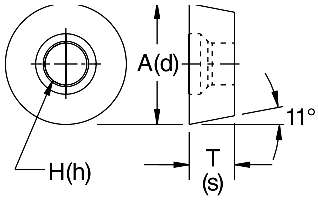


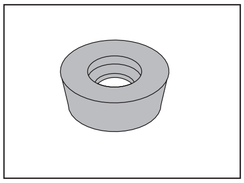


ANSI Code	ISO Code	Grade	EDP Number	Stock Status
APKT2.6316R	APKT 16 04 635 R	SP742	0700308	S
		SA740	0700309	S
APKT2.634R	APKT 16 04 16 R	SP742	0700310	S
		SA740	0700311	S
APKT2.636R	APKT 16 04 24 R	SP742	0700314	S
APKT2.638R	APKT 16 04 32 R	SP742	0700318	S
APKT2.634RT	APKT 16 04 16 RT	SP742	0700312	S
APKT2.636RT	APKT 16 04 24 RT	SP742	0700316	S
APKT2.638RT	APKT 16 04 32 RT	SP742	0700320	S
APKT2.63PDR	APKT 16 04 PDR	SP742	0700305	S
APKT2.63PDTR	APKT 16 04 PDTR	SP742	0700306	S
		SA740	0700307	S

RPGB

Round, 11° Relief Angle
Positive Rake, Screw On Style





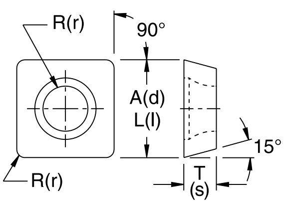
RPGB Dimensions

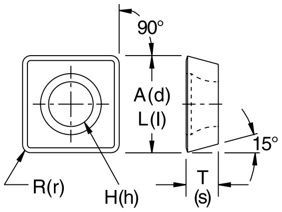
Size	ANSI Dimensions						ISO Dimensions					
	A	L	T	F	R	H	d	l	s	k	r	h
2515	5/16	—	3/32	—	—	0.140	7,94	—	2,38	—	—	3,56
325	3/8	—	5/32	—	—	0.173	9,52	—	3,97	—	—	4,40

ANSI Code	ISO Code	Grade	EDP Number	Stock Status
RPGB2515	RPGB 07 02 00	SP321	0700337	S
		SP742	0700336	S
		SA740	0700338	S
RPGB325	RPGB 09 T3 00	SP742	0700339	S
		SA740	0700340	S

SDCW/SDCW-T

Square, 15° Relief Angle,
Positive Rake, Screw On

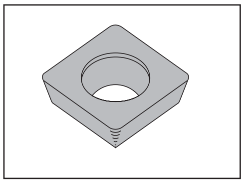


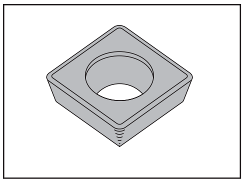


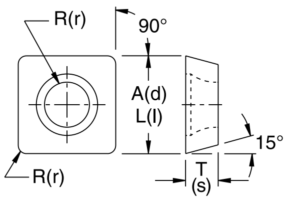
SDCW Dimensions

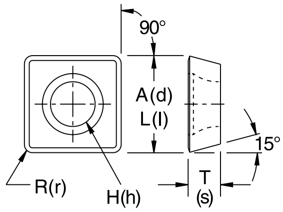
Size	ANSI Dimensions						ISO Dimensions					
	A	L	T	F	R	H	d	l	s	k	r	h
322	3/8	3/8	1/8	—	1/32	0.173	9,52	9,52	3,18	—	0,8	4,40

ANSI Code	ISO Code	Grade	EDP Number	Stock Status
SDCW322	SDCW 09 03 08	SP321	0700342	S
		SP742	0700341	S
		SA740	0700343	S
SDCW322T	SDCW 09 03 08 T	SP742	0700344	S
		SA740	0700345	S







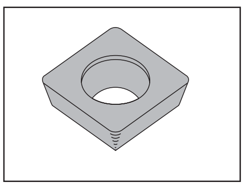


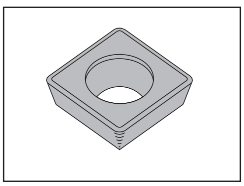
SDEB/SDEB-D

Square, 15° Relief Angle
Positive Rake, Screw On

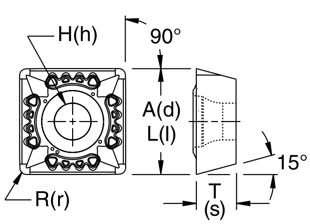
SDEB Dimensions

Size	ANSI Dimensions						ISO Dimensions					
	A	L	T	F	R	H	d	l	s	k	r	h
26150	0.327	0.327	3/32	—	0.004	0.14	8,31	8,31	2,38	—	0,1	3,56
26151	0.327	0.327	3/32	—	1/64	0.14	8,31	8,31	2,38	—	0,4	3,56
26152	0.327	0.327	3/32	—	1/32	0.14	8,31	8,31	2,38	—	0,8	3,56
26152D	0.327	0.327	3/32	0.085	1/32	0.14	8,31	8,31	2,38	2,2	0,8	3,56





ANSI Code	ISO Code	Grade	EDP Number	Stock Status
SDEB2.61.50	SDCB 08 02 01	SP321	0700347	S
		SP742	0700346	S
		SA740	0700348	S
SDEB2.61.51	SDCB 08 02 04	SP321	0700483	S
		SP742	0700349	S
		SA740	0700350	S
SDEB2.61.52	SDCB 08 02 08	SP321	0700352	S
		SP742	0700351	S
		SA740	0700353	S

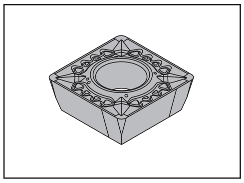


SDET-L/SDET-R

Square, 15° Relief Angle,
Positive Rake, Screw On

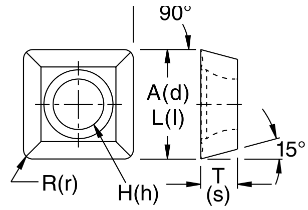
SDET Dimensions

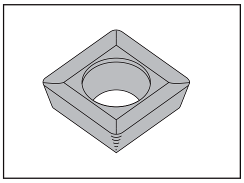
Size	ANSI Dimensions						ISO Dimensions					
	A	L	T	F	R	H	d	l	s	k	r	h
43P8	1/2	1/2	3/16	0.132	1/32	0.173	12,7	12,7	4,76	3,35	0,8	4,40



ANSI Code	ISO Code	Grade	EDP Number	Stock Status
SDET43PDEL8GB	SDET1204PDELGB	SP742	0700354	S
SDET43PDER8GB	SDET1204PDERGB	SP742	0700356	S
		SA740	0700357	S

SDMT





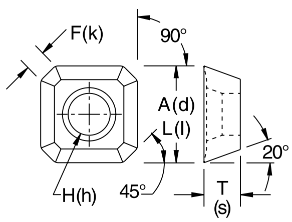
Square, 15° Relief Angle
Positive Rake, Screw On

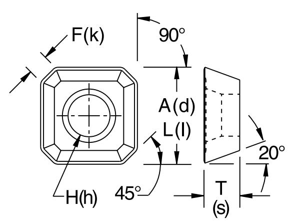
SDMT Dimensions

Size	ANSI Dimensions						ISO Dimensions					
	A	L	T	F	R	H	d	l	s	k	r	h
322	3/8	3/8	1/8	—	1/32	0.173	9,52	9,52	3,18	—	0,8	4,40

ANSI Code	ISO Code	Grade	EDP Number	Stock Status
SDMT322	SDMT 09 03 08	SP321	0700359	S
		SP742	0700358	S

SEHT/SEHT-T



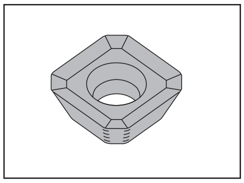


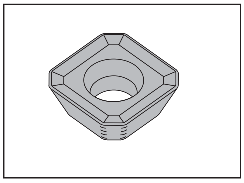
Square, 20° Relief Angle
Positive Rake, Screw On

SEHT Dimensions

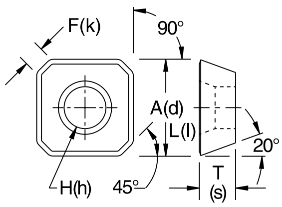
Size	ANSI Dimensions						ISO Dimensions					
	A	L	T	F	R	H	d	l	s	k	r	h
43	1/2	1/2	3/16	0.106	—	0.217	12,70	12,70	4,76	2,70	—	5,50
53	5/8	5/8	3/16	0.106	—	0.217	15,88	15,88	4,76	2,70	—	5,50

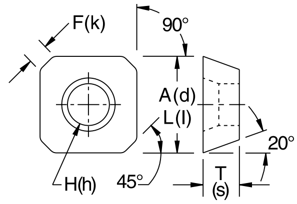
ANSI Code	ISO Code	Grade	EDP Number	Stock Status
SEHT43A6	SEHT 12 04 AFN	SP321	0700378	S
		SP742	0700377	S
SEHT43A6T	SEHT 12 04 AFTN	SP742	0700379	S
		SA740	0700380	S
SEHT53A6	SEHT 15 04 AFN	SP321	0700382	S
		SP742	0700381	S





SEHW/SEHW-T

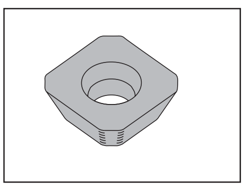


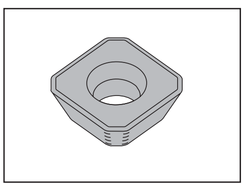


Square, 20° Relief Angle
Positive Rake, Screw On

SEHW Dimensions

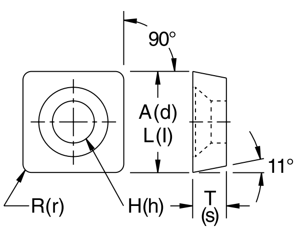
Size	ANSI Dimensions						ISO Dimensions					
	A	L	T	F	R	H	d	l	s	k	r	h
43	1/2	1/2	3/16	0.106	—	0.217	12,70	12,70	4,76	2,70	—	5,50
53	5/8	5/8	3/16	0.106	—	0.217	15,88	15,88	4,76	2,70	—	5,50

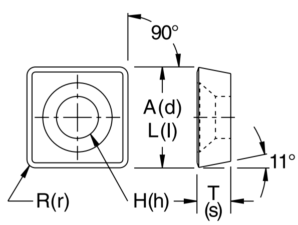




ANSI Code	ISO Code	Grade	EDP Number	Stock Status
SEHW43A6	SEHW 12 04 AFN	SP321	0700384	S
		SP742	0700383	S
		SA740	0700385	S
SEHW53A6	SEHW 15 04 AFN	SP321	0700390	S
		SP742	0700389	S
SEHW43A6T	SEHW 12 04 AFTN	SP321	0700487	S
		SP742	0700386	S
		SA740	0700387	S
SEHW53A6T	SEHW 15 04 AFTN	SP742	0700392	S
		SA740	0700393	S

SPCH/SPCH-T

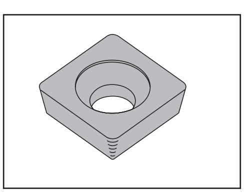


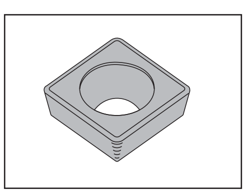


Square, 11° Relief Angle
Positive Rake, Screw On

SPCH Dimensions

Size	ANSI Dimensions						ISO Dimensions					
	A	L	T	F	R	H	d	l	s	k	r	h
322	3/8	3/8	1/8	—	1/32	0.156	9,52	9,52	3,18	—	0,8	3,97

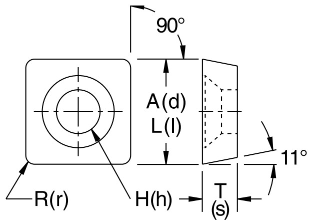


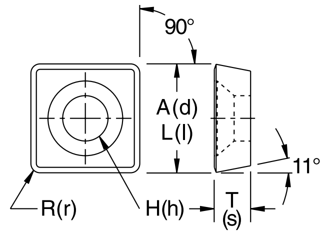


ANSI Code	ISO Code	Grade	EDP Number	Stock Status
SPCH322	SPCH 09 03 08	SP321	0700422	S
		SP742	0700421	S
SPCH322T	SPCH 09 03 08 T	SP742	0700423	S

SPEB/SPEB-T

Square, 11° Relief Angle
Positive Rake, Screw On

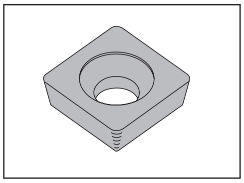


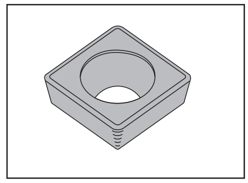


SPEB Dimensions

Size	ANSI Dimensions						ISO Dimensions					
	A	L	T	F	R	H	d	l	s	k	r	h
322	3/8	3/8	1/8	—	1/32	0.156	9,52	9,52	3,18	—	0,8	3,97
422	1/2	1/2	1/8	—	1/32	0.207	12,70	12,70	3,18	—	0,8	5,26

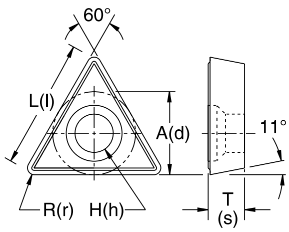
ANSI Code	ISO Code	Grade	EDP Number	Stock Status
SPEB322	SPCB 09 03 08	SP321	0700433	S
		SP742	0700432	S
SPEB422	SPCB 12 03 08	SP321	0700488	S
		SP742	0700436	S
SPEB322T	SPEB 09 03 08 T	SP321	0700435	S
		SP742	0700434	S
SPEB422T	SPEB 12 03 08 T	SP742	0700437	S

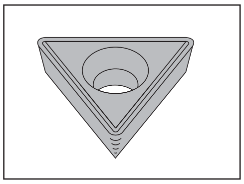




TPGM

Triangle, 11° Relief Angle
Positive Rake, Screw On





TPGM Dimensions

Size	ANSI Dimensions						ISO Dimensions					
	A	L	T	F	R	H	d	l	s	k	r	h
2151	1/4	0.433	3/32	—	1/32	0.110	6,35	11,00	2,38	—	0,8	2,90

ANSI Code	ISO Code	Grade	EDP Number	Stock Status
TPGM21.51	TPGM 11 02 04	SP742	0700458	S

MILLING CUTTER NOMENCLATURE

R F 00 200 S 075 S D 4 3 C

Hand (R)
R = Right
L = Left
N = Neutral

Style (F)
F = Face Mill
G = Groove/Thread
H = Halfside
S = Slotting

Lead Angle (00)
00°
05 = 1/2°
15 = 15°
45 = 45°
60 = 60°

Effective Cut Diameter (200)
(x.xx Inches)

Mounting (S)
A = Arbor
N = Whistle Notch
R = Bridgeport R8 Shank
S = Shell Mount
T = Taper Mount
W = Weldon Shank
WN = Combo Weldon/ Whistle Notch

Bore or Shank Size (075)
(x.xx Inches)
R8 if Bridgeport

Insert Style* (S)
A = Parrallelogram
C = 80 Degree Diamond
G = Special Designation
H = Hexagon
O = Octagon
R = Round
S = Square
T = Triangle
X = Special Designation
P = Power Notch

**Note: Cutters requiring more than one style insert, no insert destination will be given.*

Insert Clearance (D)
D = 15° Positive
E = 20° Positive
F = 25° Positive
G = Grooving
N = 0° Negative
P = 11° Positive

Insert IC (4)
2.6 = .327
3 = 3/8
4 = 1/2
5 = 5/8
6 = 3/4
7 = 7/32
8 = 1

Note: On rectangular or parallelogram inserts, this is equal to the cutting edge length.

Insert Thickness (3)
1.5 = 3/32
2 = 1/8
3 = 3/16
4 = 1/4

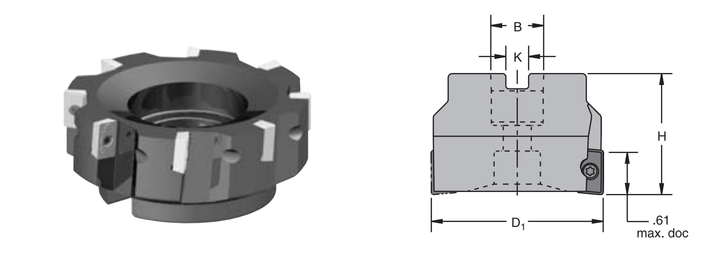
Cutter Pitch (C)
C = Coarse
E = Economy
F = Fine
M = Medium
— = End Mill

0° Lead Angle - Shear Angle Rake

Heavy Duty

- 3/16" thick parallelogram-style inserts with 88° corners offer strong cutting edges, maximum depth of cut and smooth finishes.
- Shear angle geometry delivers free-cutting action on a variety of workpiece materials.
- Generous chip gullets permit higher feed rates.

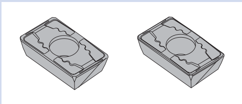
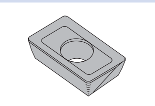
Rake Angles: *rr = -6°*
ar = +5°
tra = -6°



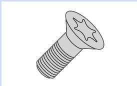
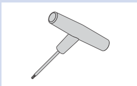
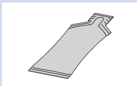
D1 Eff. Cut. Dia.	Catalog Number Right Hand*	EDP Number	No. Of Inserts	H	K	B	Maximum RPM	Cutter Weight (Lbs.)
2.00	RF00200S075AP2.63	0700213	5	1.75	5/16	.75	7,100	<2.0
2.50	RF00250S075AP2.63	0700221	6	1.75	5/16	.75	6,300	<2.0
3.00	RF00300S100AP2.63	0700229	7	1.75	3/8	1.00	5,800	2.6
4.00	RF00400S125AP2.63	0700241	8	1.75	1/2	1.25	5,000	3.5
5.00	RF00500S150AP2.63	0700251	8	1.75	5/8	1.50	4,500	5.7
6.00	RF00600S150AP2.63	0700259	9	1.75	5/8	1.50	4,100	7.8

These cutters are shipped with mounting screws S-445 (3/8" - 24 x 1.00" long socket-head cap screw).
NOTE: These milling cutters are shipped with MS-1184 insert locking screws and KT-15 Torx wrench. Order TT-15 separately.

Inserts

Catalog No.	Grade	EDP No.	S
 APFT			
APFT2.63PDR	SP742	0700302	S
APFT2.63 PDTR	SP742	0700303	S
	SA740	0700304	S
 APKT			
APKT2.6316R	SP742	0700308	S
	SA740	0700309	S
APKT2.634R	SP742	0700310	S
	SA740	0700311	S
APKT2.636R	SP742	0700314	S
APKT2.638R	SP742	0700318	S
APKT2.634RT	SP742	0700312	S
APKT2.636RT	SP742	0700316	S
APKT2.638RT	SP742	0700320	S
APKT2.63PDR	SP742	0700305	S
APKT2.63PDTR	SP742	0700306	S
	SA740	0700307	S

Parts

Part Description	Catalog No.	EDP No.	
Insert locking screw	MS1184PKG	0700552	
T-handle drivers	TT15	0700573	
Anti-seize lubricant	21537	0700500	

Milling Inserts & Cutters

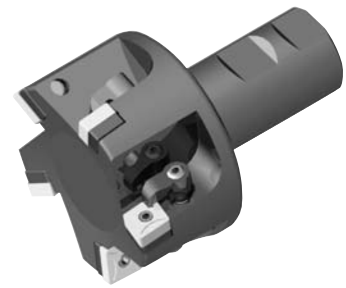
0° Lead Angle - Double Negative Rake

Integral Shank and Bridgeport Shank

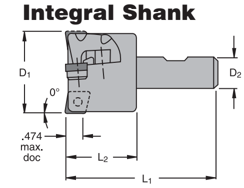
1/2" 80° Diamond Inserts

- Square shoulder milling.
- Cutting geometry variation through insert selection.
- Uses economy inserts

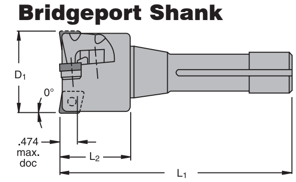
Rake Angles: *rr = -11°*
ar = -5°
tra = -11°



Integral Shank



Bridgeport Shank



Integral Shank

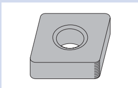
D1 Eff. Cut. Dia.	Catalog Number Right Hand*	EDP Number	Insert Size IC	No. Of Inserts	L1 Length	L2 Head Length	D2 Shank	Maximum RPM
1.50	RF00150W075CN43	0700093	1/2	2	3.78	1.75	3/4	6,300
2.00	RF00200W075CN43	0700094	1/2	3	3.78	1.75	3/4	6,000
3.00	RF00300W125CN43	0700095	1/2	5	4.03	1.75	1-1/4	5,000

Bridgeport Shank

D1 Eff. Cut. Dia.	Catalog Number Right Hand*	EDP Number	Insert Size IC	No. Of Inserts	L1 Length	L2 Head Length	D2 Shank	Maximum RPM
2.00	RF00200R8CN43	0700091	1/2	3	5.78	1.75	R-8	6,000

Inserts

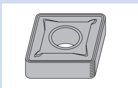
These turning inserts are also used in these milling cutters.



General Purpose

CNMA432
CNMA433

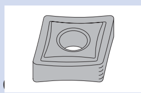
See General Insert Section



Molded Negative

CNMG432
CNMG433

See General Insert Section

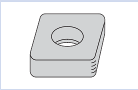
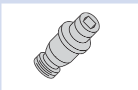
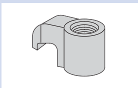
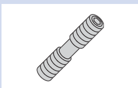
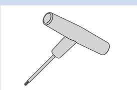


Molded Positive

CNMP432

See General Insert Section

Parts

Part Description	Catalog No.	EDP No.	
Shim	—** ICSN432	— 070472	
Lock Pin	KL44** KL46	0700529 0700530	
Clamp	CK20PKG	0750005	
Clamp Screw	STC36PKG	0700563	
T-handle Driver	TH093	0700534	

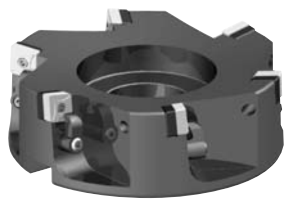
***Hardware for 1.50" diameter cutter.*
Note: T-handle wrench KW-093 not supplied with cutter; order separately.

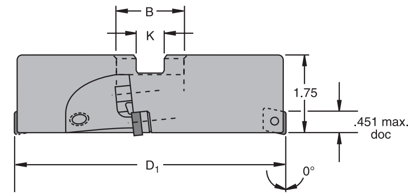
0° Lead Angle - Double Negative Rake

1/2" 80° Diamond Inserts

- Square shoulder milling.
- Cutting geometry variation through insert selection.
- Uses economy inserts
- Also available in 15° lead angle lock pin cutters

Rake Angles: *rr = -8°*
ar = -5°
tra = -8°

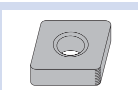




D1 Eff. Cut. Dia.	Catalog Number Right Hand*	EDP Number	Insert Size IC	No. Of Inserts	K Keyway	B Bore	Maximum RPM	Cutter Weight (lbs.)
3.00	RF00300S100CN43	0700096	1/2	5	3/8	1.00	5,000	<2.0
4.00	RF00400S125CN43	0700099	1/2	5	1/2	1.25	4,100	4.2
5.00	RF00500S150CN43	0700102	1/2	6	5/8	1.50	3,400	8.0
6.00	RF00600S200CN43	0700105	1/2	8	3/4	2.00	2,800	12.5

Inserts - 1/2" Screw On

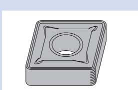
These turning inserts are also used in these milling cutters.



General Purpose

CNMA432
CNMA433

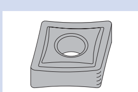
See General Insert Section



Molded Negative

CNMG432
CNMG433

See General Insert Section

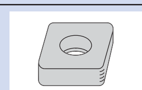
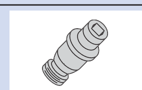
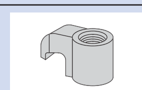
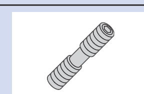
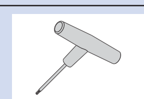


Molded Positive

CNMP432
CNMP433

See General Insert Section

Parts

Part Description	Catalog No.	EDP No.	
Shim	ICSN432	070472	
Lock Pin	KL46	0700530	
Clamp	CK20PKG	0750005	
Clamp Screw	STC36PKG	0700563	
T-handle Driver	TH093	0700534	

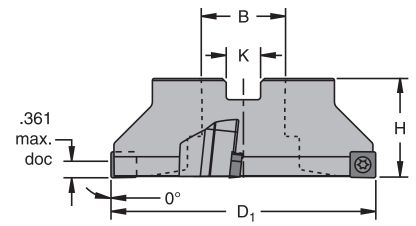
Note: T-handle wrench KW-093 not supplied with cutter; order separately.

0° Lead Angle - Screw On

1/2" Screw Down Inserts

- Square shoulder milling.
- Cutters employ shims to protect cutter body.
- Square inserts use four cutting edges.
- All inserts are faceted style.

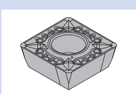
Rake Angles: *rr = -4°*
ar = +10°



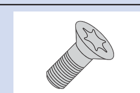
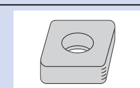
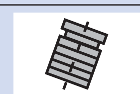
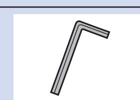
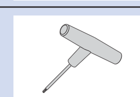
D1 Eff. Cut. Dia.	Catalog Number Right Hand/Left Hand*	EDP Number	Insert Size IC	No. Of Inserts	H Height	K Keyway	B Bore	Bolt Circle	Max. RPM	Cutter Weight (lbs.)
2.00	RF00200S075SD43C	0700153	1/2	3	1.75	5/16	.75	—	20,450	<2.0
2.50	RF00250S100SD43C	0700158	1/2	4	1.75	3/8	1.00	—	18,290	<2.0
3.00	RF00300S100SD43C	0700163	1/2	4	1.75	3/8	1.00	—	16,700	<2.0
4.00	RF00400S125SD43C	0700168	1/2	5	2.00	1/2	1.25	—	14,460	3.2
4.00	RF00400S150SD43C	0700169	1/2	5	2.00	5/8	1.50	—	14,460	3.8
5.00	RF00500S150SD43C	0700178	1/2	6	2.38	5/8	1.50	—	12,940	6.6
6.00	RF00600S150SD43C	0700189	1/2	8	2.38	5/8	1.50	—	11,800	9.6
6.00	RF00600S200SD43C	0700184	1/2	8	2.38	3/4	2.00	—	11,800	8.3
8.00	RF00800S250SD43C	0700193	1/2	10	2.38	1	2.50	4	10,230	16.1
10.00	RF001000S250SD43C	0700146	1/2	12	2.38	1	2.50	4	9,150	26.2

2.00" cutter does not require or use shims. Cutters are shipped with MS-1156 insert locking screws and KT-15 torx wrench. T-handle torx wrench is available separately (see parts offering).

Inserts - 1/2"

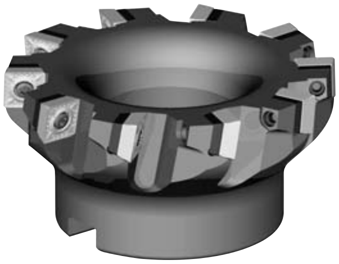
Catalog No.	Grade	EDP No.	S
	General Purpose SDET		
SDET43PDEL8GM	SP742	0700354	S
SDET43PDER8GB	SP742	0700356	S
	SA740	0700357	S

Parts

Part Description	Insert Size	Catalog No.	EDP No.	
Insert Locking Screw	1/2	MS1156PKG	0700547	
Shim	1/2	SM449	0700579	
Shim Screw	1/2	SRS3PKG	0700557	
Shim Screw Wrench	1/2	KAW35M	0700581	
T-handle Driver	1/2	TT15	0700573	

***2" diameter shell mill cutter only.*
Note: T-handle wrench KW-093 not supplied with cutter; order separately.

0° Lead Angle - Screw On



Fine Pitch

D1 Eff. Cut. Dia.	Catalog Number Right Hand/Left Hand*	EDP Number	Insert Size IC	No. Of Inserts	H Height	K Keyway	B Bore	Bolt Circle	Max. RPM	Cutter Weight (lbs.)
2.00	RF00200S075SD43F	0700154	1/2	5	1.75	5/16	.75	—	20,450	<2.0
2.50	RF00250S100SD43F	0700159	1/2	6	1.75	3/8	1.00	—	18,290	<2.0
3.00	RF00300S100SD43F	0700164	1/2	7	1.75	3/8	1.00	—	16,700	<2.0
4.00	RF00400S125SD43F	0700170	1/2	10	2.00	1/2	1.25	—	14,460	2.9
4.00	RF00400S150SD43F	0700171	1/2	10	2.00	5/8	1.50	—	14,460	3.3
5.00	RF00500S150SD43F	0700179	1/2	12	2.38	5/8	1.50	—	12,940	6.5
6.00	RF00600S150SD43F	0700185	1/2	14	2.38	5/8	1.50	—	11,800	9.4
6.00	RF00600S200SD43F	0700186	1/2	14	2.38	3/4	2.00	—	11,800	8.1
8.00	RF00800S250SD43F	0700194	1/2	17	2.38	1	2.50	4	10,230	16.0
10.00	RF001000S250SD43F	0700147	1/2	20	2.38	1	2.50	4	9,150	26.0

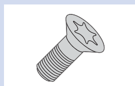
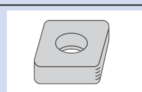
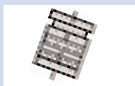
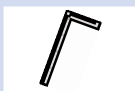
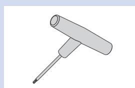
Cutters are shipped with MS-1156 insert locking screws and torx wrench. T-handle torx wrench is available separately (see parts offering).

Milling Inserts & Cutters

Inserts - 1/2"

Catalog No.	Grade	EDP No.	S
	General Purpose SDET		
SDET43PDEL8GM	SP742	0700354	S
SDET43PDER8GB	SP742	0700356	S
	SA740	0700357	S

Parts

Part Description	Insert Size	Catalog No.	EDP No.	
Insert Locking Screw	1/2	MS1156PKG	0700547	
Shim	1/2	SM449	0700579	
Shim Screw	1/2	SRS3PKG	0700557	
Shim Screw Wrench	1/2	KAW35M	0700581	
T-handle Driver	1/2	TT15	0700573	

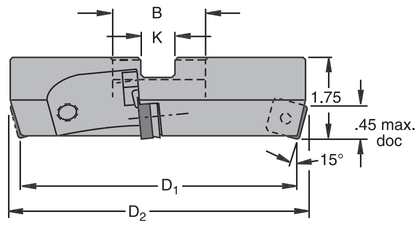
***2" diameter shell mill cutter only.*
Note: T-handle wrench TH-093 not supplied with cutter; order separately.

15° Lead Angle - Negative Rake

1/2" Square Inserts

- Eight cutting edges per insert.
- Cutting geometry variation through insert selection.
- Rugged design.

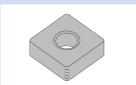
Rake Angles: rr = -9°
ar = -5°
tra = -9.5°



D1 Effec. Cut. Dia.	Catalog Number Right Hand*	EDP Number	IC Insert Size	No. Of Inserts	H Height	D2 Max. Dia.	K Keyway	B Bore	Mount Style	Max. RPM	Cutter Weight (Lbs.)
3.00	RF15300S100SN43	0700098	1/2	5	–	3.26	3/8	1.00	shell mill	5,000	3.4
4.00	RF15400S125SN43	0700101	1/2	5	–	4.25	1/2	1.25	shell mill	4,100	8.5
5.00	RF15500S150SN43	0700104	1/2	6	–	5.24	5/8	1.50	shell mill	3,400	9.7

Inserts — 1/2" Screw On

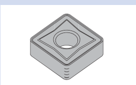
These turning inserts are also used on these milling cutters.



General Purpose

SNMA-432
SNMA-433

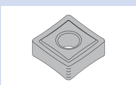
See General Insert Section



Molded Negative

SNMG432
SNMG433

See General Insert Section

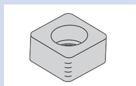
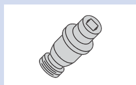
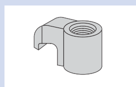
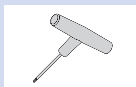


Molded Positive

SNMP432

See General Insert Section

Parts

Part Description	Catalog No.	EDP No.	
Shim	ISSN432	0700578	
Lock Pin	KL46	0700530	
Clamp	CK20PKG	0750005	
Clamp Screw	STC36PKG	0700563	
T-handle Driver	TH093	0700534	

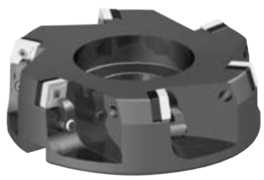
15° Lead Angle - Negative Rake

Integral Shank and Shell Mill

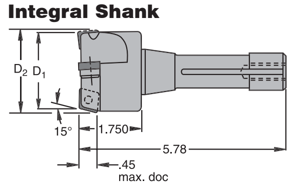
1/2" 80° Diamond Inserts

- This utility cutter system is designed to use economical, molded lock pin style inserts.
- Using the 15° lead angle cutter with the 100° corner of an 80° diamond insert is a very effective way of utilizing the often unused edges of this turning and boring insert.

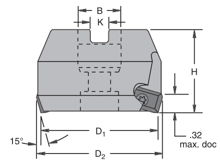
Rake Angles: rr = -9°
ar = -5°
tra = -9.5°



Integral Shank



Shell Mill



Integral Shank

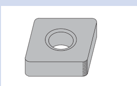
D1 Effec. Cut. Dia.	Catalog Number Right Hand*	EDP Number	IC Insert Size	No. Of Inserts	H Height	D2 Max. Dia.	K Keyway	B Bore	Mount Style	Max. RPM	Cutter Weight (Lbs.)
2.00	RF15200R8CN43	0700092	1/2	3	–	2.25	–	–	R-8	6,000	2.5

Shell Mill

D1 Effec. Cut. Dia.	Catalog Number Right Hand*	EDP Number	IC Insert Size	No. Of Inserts	H Height	D2 Max. Dia.	K Keyway	B Bore	Mount Style	Max. RPM	Cutter Weight (Lbs.)
3.00	RF15300S100CN43	0700097	1/2	5	–	3/8	1.00	3.26	shell mill	5,000	3.4
4.00	RF15400S125CN43	0700100	1/2	5	–	1/2	1.25	4.25	shell mill	4,100	8.5
5.00	RF15500S150CN43	0700103	1/2	6	–	5/8	1.50	5.24	shell mill	3,400	9.7
6.00	RF15600S200CN43	0700106	1/2	8	–	3/4	2.00	6.24	shell mill	2,800	11.0
6.00	RF15600S150CN43	0700107	1/2	8	–	5/8	1.50	6.24	shell mill	2,800	11.8

Inserts

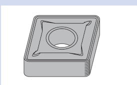
These turning inserts are also used in these milling cutters.



General Purpose

CNMA-432
CNMA-433

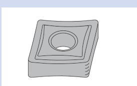
See General Insert Section



Molded Negative

CNMG-432
CNMG-433

See General Insert Section

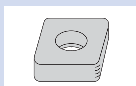
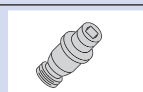
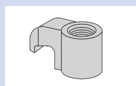
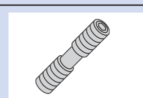
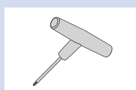


Molded Positive

CNMP-432
CNMP-433

See General Insert Section

Parts

Part Description	Catalog No.	EDP No.	
Shim	ICSN432	070472	
Lock Pin	KL46	0700530	
Clamp	CK20PKG	0750005	
Clamp Screw	STC36PKG	0700563	
T-handle Driver	TH093	0700534	

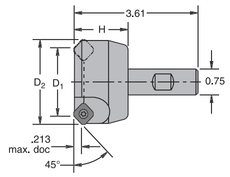
45° Lead Angle - High Shear

1/2" Square Inserts

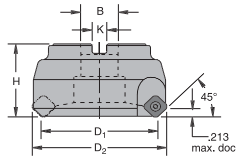
- Low horsepower consumption.
- Rapid insert change.
- Economical.
- Requires only one spare part.
- Mills all materials with a simple insert grade change.
- SEHW faceted style inserts generate superior surface finishes.

Rake Angles: rr = -5° to -11°
ar = +20°
tra = +7° to +11°

Integral Shank



Shell Mill



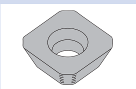
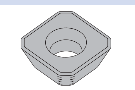
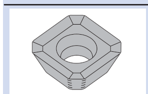
Integral Shank

D1 Effec. Cut. Dia.	Catalog Number Right Hand*	EDP Number	IC Insert Size	No. Of Inserts	H Head Length	D2 Max. Dia.	K Keyway	B Bore	Mount Style	Max. RPM	Cutter Weight (Lbs.)
1.50	RF45150W075SE43	0700082	1/2	3	1.57	2.02	–	–	Weldon	21,700	<2.0
1.97	RF45197W075SE43	0700083	1/2	4	1.57	2.47	–	–	Weldon	19,400	<2.0

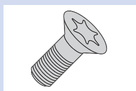
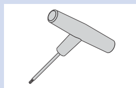
Shell Mill

D1 Effec. Cut. Dia.	Catalog Number Right Hand/Left Hand	EDP Number	IC Insert Size	No. Of Inserts	H Head Length	D2 Max. Dia.	K Keyway	B Bore	Mount Style	Max. RPM	Cutter Weight (Lbs.)
1.97	RF45197S075SE43	0700211	1/2	4	1.57	1.57	5/16	.75	shell mill	19,400	<2.0
3.15	RF45315S100SE43	0700234	1/2	6	1.97	3.61	3/8	1.00	shell mill	15,400	<2.0
3.94	RF45394S125SE43	0700236	1/2	6	1.97	4.48	1/2	1.25	shell mill	13,750	4.0
4.92	RF45492S150SE43	0700246	1/2	7	2.48	5.46	5/8	1.50	shell mill	12,300	9.4
6.30	RF45630S150SE43	0700268	1/2	7	2.48	6.75	5/8	1.50	shell mill	10,870	15.0
6.30	RF45630S200SE43	0700269	1/2	7	2.48	6.75	3/4	2.00	shell mill	10,870	14.0

Inserts — 1/2"

Catalog No.	Grade	EDP No.	S
 SEHW43A6	SP321	0700384	S
	SP742	0700383	S
	SA740	0700385	S
 SEHW43A6T	SP321	0700487	S
	SP742	0700386	S
	SA740	0700387	S
 SEHT43A6	SP321	0700378	S
	SP742	0700377	S
SEHT43A6T	SP742	0700379	S
	SA740	0700380	S

Parts

Part Description	Catalog No.	EDP No.	
Insert Locking Screw**	MS1374PKG	0700554	
	MS1129PKG	0700545	
T-handle Torx Driver	TT15	0700573	

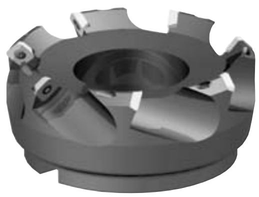
***Either MS1374 or MS1129 can be used with 1.97" diameter cutters and larger to lock insert securely.*

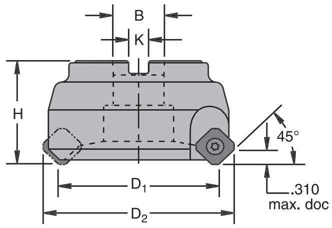
45° Lead Angle - High Shear

5/8" Square Inserts

- Larger 5/8" IC insert provides greater depth of cut.
- Low horsepower consumption.
- Requires only one spare part.
- Mills all materials with a simple insert grade change.
- SEHW faceted style inserts generate superior surface finishes.

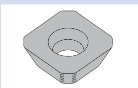
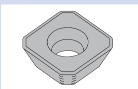
Rake Angles: rr = -5° to -11°
ar = +20°
tra = +7° to +11°



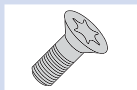
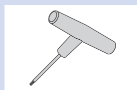


D1 Effec. Cut. Dia.	Catalog Number Right Hand*	EDP Number	IC Insert Size	No. Of Inserts	H Head Length	D2 Max. Dia.	K Keyway	B Bore	Mount Style	Max. RPM	Cutter Weight (Lbs.)
1.97	RF45197S075SE53*	0700212	5/8	4	1.57	2.56	5/16	.75	shell mill	15,520	<2.0
3.15	RF45315S100SE53	0700235	5/8	5	1.97	3.74	3/8	1.00	shell mill	12,300	<2.0
3.94	RF45394S125SE53	0700237	5/8	6	1.97	4.57	1/2	1.25	shell mill	11,000	4.0
4.92	RF45492S150SE53	0700247	5/8	7	2.48	5.55	5/8	1.50	shell mill	9,850	9.4
6.30	RF45630S150SE53	0700270	5/8	9	2.48	6.93	5/8	1.50	shell mill	8,700	15.0
6.30	RF45630S200SE53	0700271	5/8	9	2.48	6.93	3/4	2.00	shell mill	8,700	14.0

Inserts — 5/8"

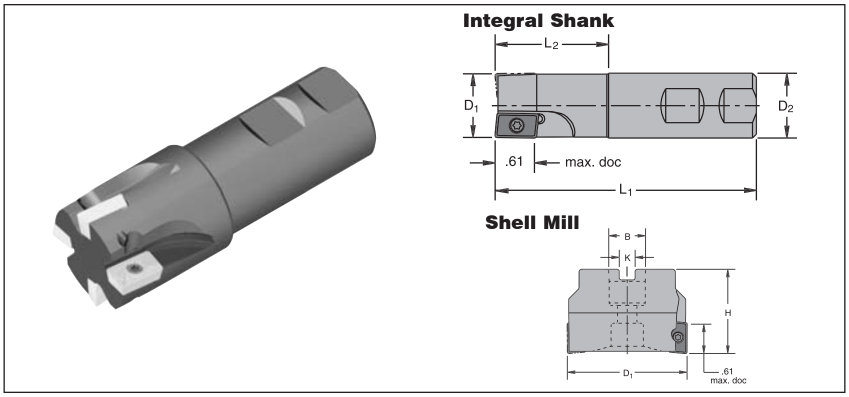
Catalog No.	Grade	EDP No.	S
 SEHW53A6	SP321	0700390	S
	SP742	0700389	S
SEHW53A6T	SP742	0700392	S
	SA740	0700393	S
 SEHT53A6	SP321	0700382	S
	SP742	0700381	S

Parts

Part Description	Catalog No.	EDP No.	
Insert Locking Screw	MS1129PKG	0700545	
T-handle Torx Driver	TT15	0700573	

0° Lead Angle — Heavy Duty Positive Rake

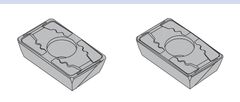
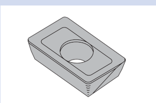
- Excellent for square shoulder milling on a wide variety of milling applications.
- Thicker inserts for heavy duty applications.
- Various insert nose radii are available to meet workpiece requirements.



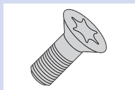
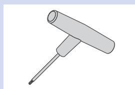
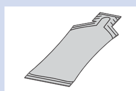
Integral Shank

D1 Effec. Cut. Dia.	Catalog Number Right Hand*	EDP Number	No. Of Inserts	D2 Max. Dia.	K Keyway	B Bore	L1 Overall Length	L2 Head Length	Shank Style	Max. RPM	Cutter Weight (lbs.)
1.00	RE00100W100AP2.63	0700076	2	1.00	-	-	4.03	1.75	Weldon	10,000	<2.0
1.25	RE00125W125AP2.63	0700077	3	1.25	-	-	4.03	1.75	Weldon	9,000	<2.0
1.50	RE00150W125AP2.63	0700081	4	1.25	-	-	4.03	1.75	Weldon	8,200	<2.0

Inserts

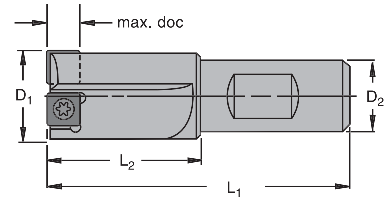
Catalog No.	Grade	EDP No.	S
 APFT			
APFT2.63PDR	SP742	0700302	S
APFT2.63 PDTR	SP742	0700303	S
	SA740	0700304	S
 APKT			
APKT2.6316R	SP742	0700308	S
	SA740	0700309	S
APKT2.634R	SP742	0700310	S
	SA740	0700311	S
APKT2.636R	SP742	0700314	S
APKT2.638R	SP742	0700318	S
APKT2.634RT	SP742	0700312	S
APKT2.636RT	SP742	0700316	S
APKT2.638RT	SP742	0700320	S
APKT2.63PDR	SP742	0700305	S
APKT2.63PDTR	SP742	0700306	S
	SA740	0700307	S

Parts

Part Description	Catalog No.	EDP No.	
Insert Locking Screw	MS1184PKG	0700552	
#15 T-handle Torx Driver	TT15	0700573	
Anti-seize Lubricant	21537	0700500	

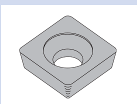
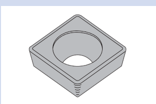
0° Lead Angle - Positive Rake Center Cutting

- Center Cutting.
- Four cutting edges per insert.
- Two cutting edges with the SDEB-D insert.
- Shoulder milling, slotting, contours and facing.
- Shallow hole drilling.



D1 Effec. Cut. Dia.	Catalog Number Right Hand*	EDP Number	IC Insert Size	No. of Inserts	D2 Shank Dia.	L1 Overall Length	L2 Head Length	Max. DOC	Max. RPM
.50	RE00050W050SD2.61.5	0700026	.327	1	.50	3.00	1.22	.28	11,000
.62	RE00062W075SD2.61.5	0700027	.327	1	.75	3.25	1.22	.28	10,750
.75	RE00075W075SD2.61.5	0700056	.327	2	.75	3.25	1.22	.28	10,500
.88	RE00088W075SD2.61.5	0700031	.327	2	.75	3.25	1.22	.28	10,350
1.00	RE00100W075SP32	0700032	3/8	2	.75	3.25	1.22	.34	10,000
1.12	RE00112W075SP32	0700034	3/8	2	.75	3.25	1.22	.34	9,750
1.25	RE00125W075SP32	0700035	3/8	2	.75	3.25	1.22	.34	9,500
1.38	RE00138W125SP42	0700037	1/2	2	1.25	4.03	1.75	.47	9,225
1.50	RE00150W125SP42	0700038	1/2	2	1.25	4.03	1.75	.47	9,000

Inserts

Catalog No.	Grade	EDP No.	S
	General Purpose		
D1 = .50	(RE00050W050SD2.61.5 only)		
SDEB2.61.52	SP321	0700352	S
	SP742	0700351	S
	SA740	0700353	S
D1 = .62-.88	SP321	0700483	S
SDEB2.61.51	SP742	0700349	S
	SA740	0700350	S
D1 = 1.00-1.25	SP321	0700433	S
SPEB322	SP742	0700432	S
SPCH322	SP321	0700422	S
	SP742	0700421	S
D1 = 1.38-1.50	SP321	0700488	S
SPEB422	SP742	0700436	S
	T-land		
D1 = 1.00-1.25			
SPEB322T	SP321	0700435	S
	SP742	0700434	S
SPCH322T	SP742	0700423	S
D1 = 1.38-1.50			
SPEB-422T	SP742	0700437	S

NOTE: SPCH322 insert provides chip forming geometry.

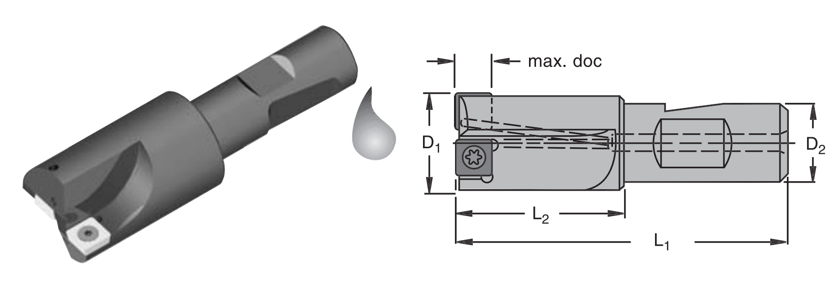
Parts

Effective Cutter Dia.	Torx Screw	Torx Screw EDP	Torx Driver	Torx Driver EDP
0.50-.62	MS1405PKG	0700555	DT-8	0700511
.75-.88	MS1369PKG	0700553	DT-8	0700512
1.00-1.25	S1011PKG	0700566	DT-9	0700512
1.38-1.50	S1012PKG	0700567	TT-20	0700574

***Use with 0.50 diameter cutter only.*

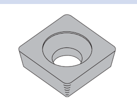
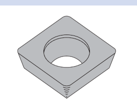
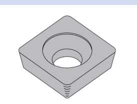
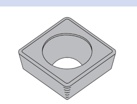
0° Lead - Positive Rake Center Cutting with Internal Coolant Holes for Drilling

- Center Cutting capability —ideal for short hole drilling and end milling.
- Four cutting edges per insert.
- Twin coolant holes.
- All end mills supplied with Weldon shank and whistle notch.

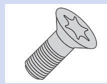
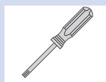
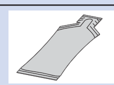


D1 Effec. Cut. Dia.	Catalog Number Right Hand*	EDP Number	IC Insert Size	No. of Inserts	D2 Shank Dia.	L1 Overall Length	L2 Head Length	Max. DOC	Max. RPM
.62	RE00062WN063SD2.61.5-C	0700028	.327	1	.63	3.38	1.47	.28	10,750
.73	RE00073WN075SD32-C	0700029	3/8	1	.75	3.65	1.63	.34	10,500
1.00	RE00100WN075SP32-C	0700033	3/8	2	.75	4.00	1.97	.34	10,000
1.25	RE00125WN075SP32-C	0700036	3/8	2	.75	4.00	1.97	.47	9,500
1.50	RE00150WN125SP42-C	0700039	1/2	2	1.25	4.78	2.50	.47	9,000
1.75	RE00175WN125SP42-C	0700040	1/2	2	1.25	4.78	2.50	.47	8,750

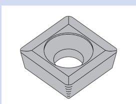
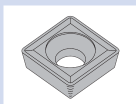
Inserts

Catalog No.	Grade	EDP No.	S
 General Purpose SDEB			
D1 = .62			
SDEB2.61.51	SP321	0700483	S
	SP742	0700349	S
	SA740	0700350	S
 General Purpose SDCW			
D1 = .73			
SDCW322	SP321	0700342	S
	SP742	0700341	S
	SA740	0700343	S
 General Purpose SPEB			
D1 = 1.00-1.25			
SPEB322	SP321	0700433	S
	SP742	0700432	S
D1 = 1.50-1.75	SP321	0700488	S
SPEB422	SP742	0700436	S
 T-land SPEB			
D1 = 1.00-1.25			
SPEB322T	SP321	0700435	S
	SP742	0700434	S

Parts

Part Description	D1	Catalog No.	EDP No.	
Torx Screw	SDEB2.61.51	MS1405PKG	0700555	
	SDCW322, SDMT322	MS1168PKG	0700550	
	SPEB322, SPCH322	S1011PKG	0700566	
	SPEB422	S1012PKG	0700567	
Torx Driver	SDEB2.61.51	DT-08	0700511	
	SDCW322, SDMT322	DT-15	0700509	
	SPEB322, SPCH322	DT-09	0700512	
	SPEB422	DT-09	0700512	
Anti-seize Lubricant	All	21537	0700500	

Inserts (continued)

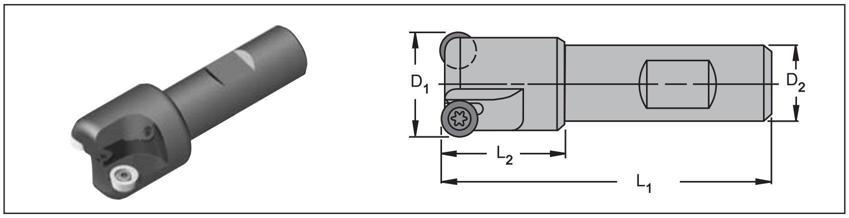
Catalog No.	Grade	EDP No.	S
D1 = 1.50-1.75			
SPEB422T	SP742	0700437	S
 with Chip Form  and T-land			
D1 = .73			
SDMT322	SP321	0700359	S
	SP742	0700358	S
D1 = 1.00-1.25			
SPCH322	SP321	0700422	S
	SP742	0700421	S
SPCH322T	SP742	0700423	S

Milling Inserts & Cutters

0° Lead — Positive Rake — Mini

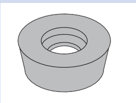
Round Insert

- Strongest insert shape.
- Radius blending capability.

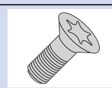
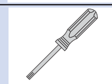
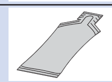


D1 Effec. Cut. Dia.	Catalog Number Right Hand*	EDP Number	IC Insert Size	No. of Inserts	D2 Shank Dia.	L1 Overall Length	L2 Head Length	Max. RPM
.50	RE00050W075RP2.5	0700052	5/16	1	.75	3.25	1.22	11,000
.75	RE00075W075RP2.5	0700055	5/16	2	.75	3.25	1.22	10,500
1.25	RE00125W075RP32.5	0700070	3/8	2	.75	3.25	1.22	9,500
1.50	RE00150W125RP32.5	0700074	3/8	2	1.25	4.03	1.75	9,000

Inserts

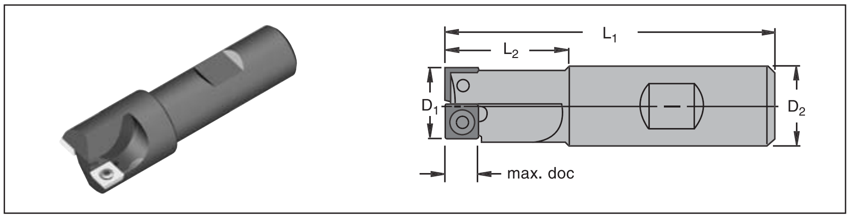
Catalog No.	Grade	EDP No.	S
 General Purpose			
RPGB2515	SP321	0700337	S
	SP742	0700336	S
	SA740	0700338	S
RPGB325	SP742	0700339	S
	SA740	0700340	S

Parts

Part Description	Insert	Catalog No.	EDP No.	
Torx Screw	RPGB2515, SDEB	MS1369PKG	0700553	
	RPGB325, SPEB	MS1027PKG	0700544	
Torx Driver	RPGB2515	DT-08	0700511	
	RPGB325, SPEB	DT-09	0700512	
Anti-seize Lubricant	All	21537	0700500	

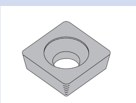
Square Inserts

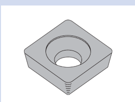
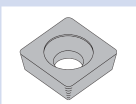
- Square shoulder milling.
- Four cutting edges per insert.
- Generous chip clearance.
- Two insert effective cutting.

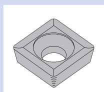
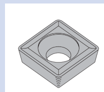


D1 Effec. Cut. Dia.	Catalog Number Right Hand*	EDP Number	IC Insert Size	No. of Inserts	D2 Shank Dia.	L1 Overall Length	L2 Head Length	Max. DOC	Max. RPM
.75	RE00075W075SD2.61.5	0700056	.327	2	.75	3.25	1.22	.28	10,500
1.00	RE00100W075SD2.61.5	0700062	.327	2	.75	3.25	1.22	.28	10,000
1.25	RE00125W075SP32	0700071	3/8	2	.75	3.25	1.22	.34	9,500

Inserts

Catalog No.	Grade	EDP No.	S
 General Purpose SDEB			
D1 = .75 SDEB2.61.50	SP321	0700347	S
	SP742	0700346	S
	SA740	0700348	S
D1 = .75 or 1.00 SDEB2.61.51	SP321	0700483	S
	SP742	0700349	S
	SA740	0700350	S
D1 = 1.00 SDEB2.61.52	SP321	0700352	S
	SP742	0700351	S
	SA740	0700353	S

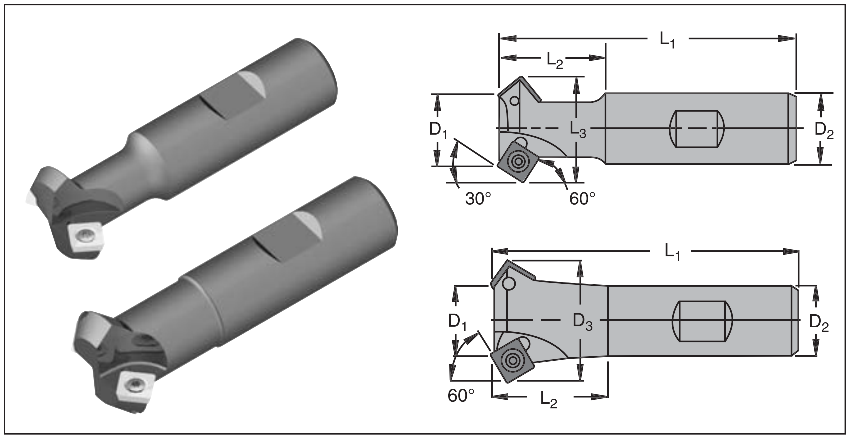
Catalog No.	Grade	EDP No.	S
 General Purpose SPEB			
D1 = 1.25 SPEB322	SP321	0700433	S
	SP742	0700432	S
 T-land SPEB			
D1 = 1.25 SPEB322T	SP321	0700435	S
	SP742	0700434	S

Catalog No.	Grade	EDP No.	S
 with Chip Form  and T-land			
D1 = 1.25			
SPCH322	SP321	0700422	S
	SP742	0700421	S
SPCH322T	SP742	0700423	S

Milling Inserts & Cutters

30° / 60° Lead — Positive Rake Mini

- Countersinking—chamfering front and back.
- Four cutting edges per insert.
- Generous chip clearance.
- Smooth, quiet cutting.



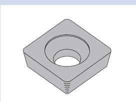
30°

D1 Effec. Cut. Dia.	Catalog Number Right Hand*	EDP Number	IC Insert Size	No. of Inserts	D2 Shank Dia.	D3 Max. Dia.	L1 Overall Length	L2 Head Length	Max. RPM
.46	RE30046W050SD2.61.5	0700049	.327	1	.50	.787	3.00	1.22	11,000
.75	RE30075W075SD2.61.5	0700057	.327	2	.75	1.077	3.25	1.22	10,500

60°

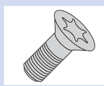
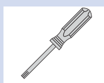
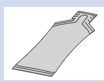
D1 Effec. Cut. Dia.	Catalog Number Right Hand*	EDP Number	IC Insert Size	No. of Inserts	D2 Shank Dia.	D3 Max. Dia.	L1 Overall Length	L2 Head Length	Max. RPM
.46	RE60046W050SD2.61.5	0700051	.327	1	.50	.981	3.00	1.22	11,000
.75	RE60075W075SD2.61.5	0700058	.327	2	.75	1.271	3.25	1.22	10,500

Inserts



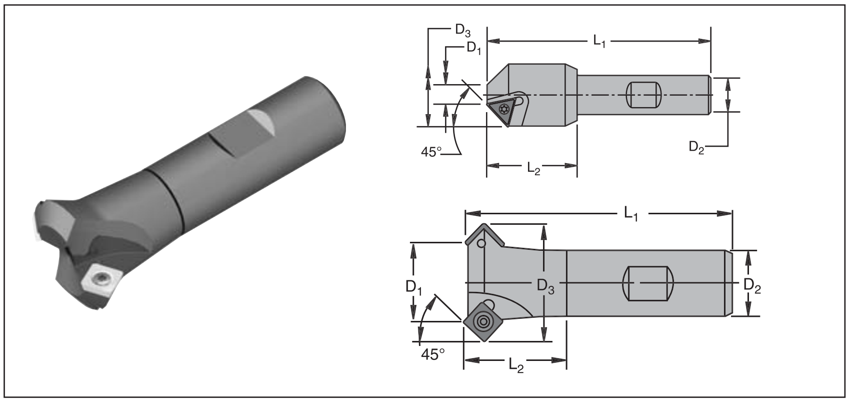
Catalog No.	Grade	EDP No.	S
General Purpose SDEB			
D1 = .75			
SDEB2.61.50	SP321	0700347	S
	SP742	0700346	S
	SA740	0700348	S
D1 = .75 or 1.00			
SDEB2.61.51	SP321	0700483	S
	SP742	0700349	S
	SA740	0700350	S
D1 = 1.00			
SDEB2.61.52	SP321	0700352	S
	SP742	0700351	S
	SA740	0700353	S

Parts

Part Description	D1	Catalog No.	EDP No.	
Torx Screw	.75-1.00	MS1369PKG	0700553	
Torx Driver	.75-1.00	DT-08	0700511	
Anti-seize Lubricant	All	21537	0700500	

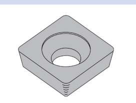
45° Lead — Positive Rake Mini

- Countersinking—chamfering front and back.
- Three cutting edges per triangular insert.
- Four cutting edges per square insert.
- Smooth, quiet cutting.



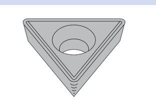
D1 Effec. Cut. Dia.	Catalog Number Right Hand*	EDP Number	IC Insert Size	No. of Inserts	D2 Shank Dia.	D3 Max. Dia.	L1 Overall Length	L2 Head Length	Max. RPM
.27	RE45025W050TP21.51	0700048	.25	1	.50	.825	3.00	.75	33,600
.46	RE45046W050SD2.61.5	0700050	.327	1	.50	.897	3.00	1.22	11,000
.70	RE45070W075SD2.61.5	0700054	.327	2	.75	1.137	3.25	1.22	10,500
.95	RE45095W075SD2.61.5	0700061	.327	2	.75	1.387	3.25	1.22	10,000
1.20	RE45120W075SD2.61.5	0700069	.327	2	.75	1.636	3.25	1.22	9,750

Inserts



General Purpose SDEB

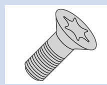
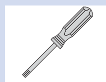
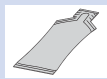
Catalog No.	Grade	EDP No.	S
D1 = .75 SDEB2.61.50	SP321	0700347	S
	SP742	0700346	S
	SA740	0700348	S
D1 = .75 or 1.00 SDEB2.61.51	SP321	0700483	S
	SP742	0700349	S
	SA740	0700350	S
D1 = 1.00 SDEB2.61.52	SP321	0700352	S
	SP742	0700351	S
	SA740	0700353	S



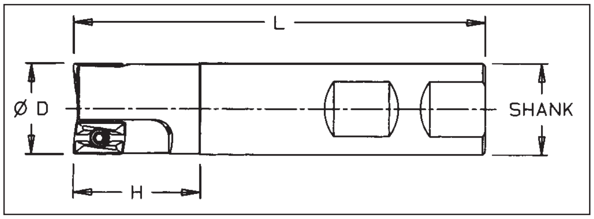
General Purpose TPGM

Catalog No.	Grade	EDP No.	S
TPGM21.51	SP742	0700458	S

Parts

Part Description	Insert Shape	Catalog No.	EDP No.	
Torx Screw	Square	MS1369PKG	0700553	
	Triangle	MS1153PKG	0700546	
Torx Driver	Square	DT-08	0700511	
	Triangle	DT-07	0700510	
Anti-seize Lubricant	All	21537	0700500	

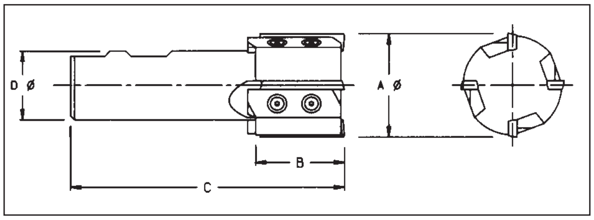
Milling Inserts & Cutters



Positive Rake Indexable End Mills

Uses insert APKT 10MRE; see next page.

Description	No. of Inserts	D	L	H	Shank	EDP No.	Wrench	Screw
REMS 90D038 W-10	1	0.375	3.000	0.800	1/2" Weldon	080890	T7S	TCS-1M-02
REMS 90D050 W-10	1	0.500	3.250	1.030	5/8" Weldon	080891	T7S	TCS-1M-02
REMS 90D062 W-10	2	0.625	3.250	1.030	5/8" Weldon	080892	T7S	TCS-1M-02
REMS 90D075 W-10	2	0.750	3.375	1.110	3/4" Weldon	080893	T7S	TCS-1M-02
REMS 90D100 W-10	3	1.000	3.375	1.110	3/4" Weldon	080894	T7S	TCS-1M-02
REMS 90D125 W-10	4	1.250	4.000	1.330	1" Weldon	080897	T7S	TCS-1M-02
REMS 90D150 W-10	5	1.500	4.000	1.330	1" Weldon	080898	T7S	TCS-1M-02

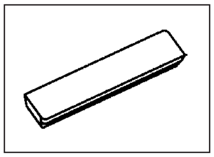


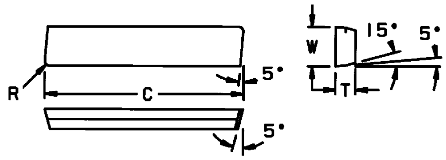
IEM Indexable End Mills

Uses ABL Inserts; see next page.

Description	A	D	C	B	Insert No.	No. of Inserts	EDP No.	Wedge Clamp	Clamp Screw
IEM 750	0.75	0.75	3.313	0.980	ABL2422	2	079297	W82A	S81
IEM 875	0.875	0.75	3.313	0.980	ABL2422	2	079298	W82A	S81
IEM 1000	1	0.75	3.313	0.980	ABL2422	3	079299	W82A	S82
IEM 1125	1.125	1	4.000	0.980	ABL2422	3	079300	W82A	S82
IEM 1250	1.25	1	4.000	0.980	ABL2422	4	079301	W82A	S82
IEM 1375	1.375	1	4.000	1.230	ABL2522	4	079302	W102	S102
IEM 1500	1.5	1	4.000	1.230	ABL2522	4	079303	W102	S102
IEM 1750	1.75	1.25	4.250	1.230	ABL2522	4	079304	W102	S102
IEM 2000	2	1.25	4.250	1.230	ABL2522	6	079305	W102	S102
IEM 2500	2.5	1.25	4.250	1.230	ABL2522	6	079306	W102	S102

ABL/ABLN



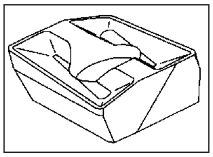


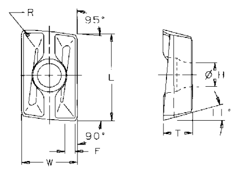
85° Parallelogram, 5° Relief Angle
Positive Rake

	Angles				ANSI Dimensions				ISO Dimensions				
	F 1	F 2	X	Y	T	R	L	W	T	T	R	L	W
ABL 242	—	—	95°	—	.125	0.031	1	.250	—	3,18	0,79	12,706	6,35
ABL 252	—	—	95°	—	.125	0.031	1.25	.250	—	3,18	0,79	31,75	6,35

ANSI Code ISO Code	Description	Uncoated Grade	EDP Number	Stock Status	Coated Grade	EDP Number	Stock Status
ABL 2422RE	ABL 2422	SC20	083004	S	—	—	—
ABLN 25 03 12ER		SS160	083005	S	SN160	088209	S
ABL 2522RE	ABL 2522	SC20	083006	S	—	—	—
ABLN 31 03 12ER		SS160	083007	S	—	—	—

APKT



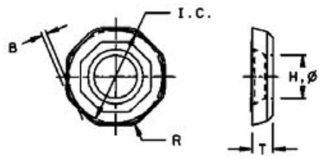


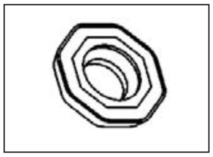
85° Parallelogram
11° Relief Angle, Positive Rake

	Angles				ANSI Dimensions					ISO Dimensions				
M	F 1	F 2	X	Y	IC	T	R/W	B	Z	IC	T	R/W	B	Z
APKT 10	95°	90°	11	15	.263	.138	0.048	0.413	0.413	6,68	3,5	1,22	10,5	10,5

ANSI Code ISO Code	Description	Uncoated Grade	EDP Number	Stock Status	Coated Grade	EDP Number	Stock Status
APKT 10MRE	APKT 10MRE	SC20	080905	S	SN550	080903	S
APKT 1003PDR		SS30	080904	S	—	—	—

Inserts for Other Indexable Drills



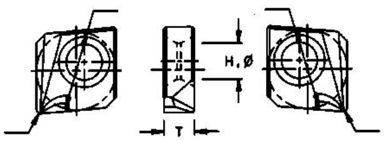


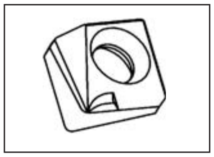
OPGT

For use in Mini Mach Drills

Description	Uncoated Grade	EDP No.	SS	Coated Grade	EDP No.	SS
OPGT 2E	SS70	074064	S	SN550	088260	S
OPGT 3E	SS70	074063	S	SN550	088261	S

Insert Size	IC	T	R	B	H
2E	1/4	.056	.0469	.0064	.110
3E	5/16	.056	.0469	.0090	.110





MI

For use in Mach 6 Drills

Description	Coated Grade	R.H. EDP	SS	L.H. EDP	SS
MI332R/L	SN160	070866	S	071041	S
MI432R/L	SN160	070867	S	071042	S
MI542R	SN160	071748	S	—	—
MI642R/L	SN160	070868	S	071043	S
MI853R/L	SN160	070869	S	071044	S

Insert Size	IC	T	R	H
332	3 / 8	.187	.032	.170
432	1 / 2	.187	.032	.226
542	5/ 8	.250	.032	.226
642	3/ 4	.250	.032	.285
853	1	.312	.047	.285

Pipe Plugs for Mach 6 Drills

Description	Size	EDP No.
NPTF	1/4 Plug	071036
PTF	1/8 Plug	071045

Mini Mach Indexable Drills

Appication Data

Coolant should always be applied through the drill when using the Mini Mach for both static and rotating set-ups. A water soluble type coolant mixed in a 25:1 ratio provides a suitable working mixture.

Recommened drilling depth differs with Mini Mach sizes. When drilling harder materials, such as 18-32 R "C" steels, the depth may be increased with improved chip formation.

Rotating- in a rotating mode, hole size cannot be guaranteed due to tool alignment with spindle/arbor combination will either add or subtract to the hole size, depending on the axial location of the cutting edge in relation to the concentricity of the collet or arbor hole the drill is fixed in.

Static - The Mini Mach is manufactured to produce a hole tolerance of +.000"/-.005" for all 11 drill sizes.

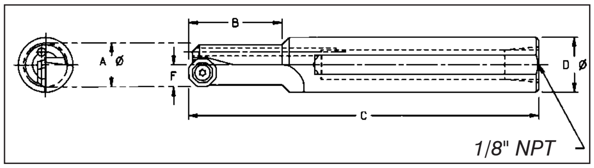
Caution: In a non-rotating static mode, care should be taken to avoid positioning the drill off work center by more than 0.005". A greater offset may cause interference with flute body resulting in possible damage to the drill or in some cases, catastrophic failure.

See "Technical Data" section for speed and feed data.

Mini Mach Indexable Drills

Single Flute

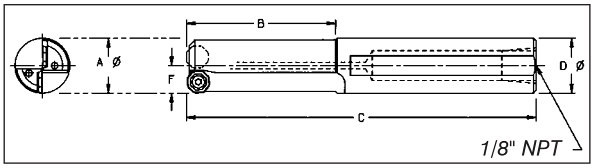
Use with OPGT inserts; see "Drilling Inserts" section



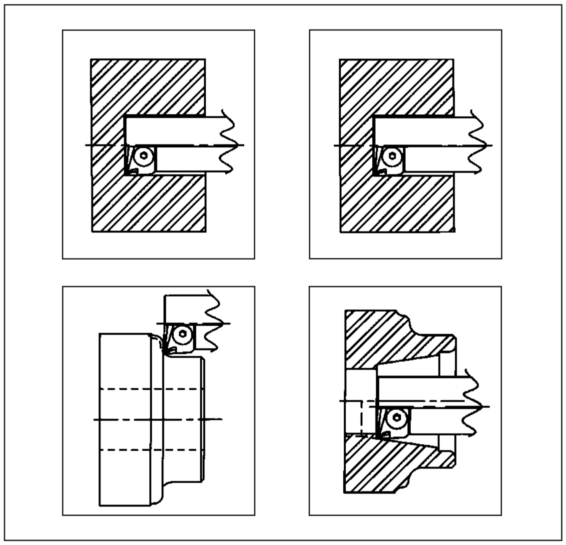
Mini Mach	EDP#	A	B	C	D	F	Insert	Insert Screw	Wrench
Mini Mach 3750	074049	.3750	.812	3.000	.6250	.1875	OPGT 2E	WS1017-1	T7M
Mini Mach 4062	074051	.4062	.875	3.000	.6250	.2031	OPGT 2E	WS1017-1	T7M
Mini Mach 4531	074054	.4531	.968	3.000	.6250	.2265	OPGT 2E	WS1017-1	T7M
Mini Mach 4688	074055	.4688	1.000	4.000	.6250	.2344	OPGT 3E	WS1017	T7M
Mini Mach 5000	074056	.5000	1.062	4.000	.6250	.2500	OPGT 3E	WS1017	T7M
Mini Mach 5312	074057	.5312	1.125	4.000	.6250	.2656	OPGT 3E	WS1017	T7M
Mini Mach 5625	074058	.5625	1.187	4.000	.6250	.2812	OPGT 3E	WS1017	T7M

Double Flute

Use with OPGT inserts; see "Drilling Inserts" section



Mini Mach	EDP#	A	B	C	D	F	Insert	Insert Screw	Wrench
Mini Mach 6250	074059	.6250	1.706	4.000	.6250	.3205	OPGT 2E	WS1017	T7M

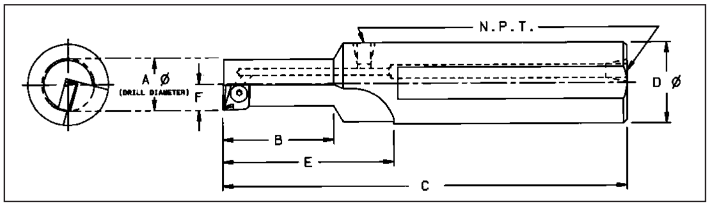


Mach 6 Application Data

The cutting diameter of the Mach 6 is .030" under nominal diameter, allowing user to finish hole. Mach 6 must be mounted concentric with spindle center line with +.003. Flats on body are to be aligned precisely. If tip of insert is off-center, insert breakage will occur.

See "Technical Data" section for machining recommendations.

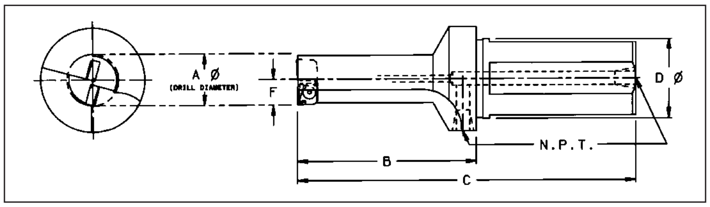
Mach 6 Indexable Drills



Single Flute Static

Use MI inserts, one included with drill; see "Drilling Inserts" section

Ordering Code	RH EDP#	LH EDP#	A	B	C	D	F	NPT	Insert	Screw
Mach 6-750R/L	070870	071037	.720	1.562	6.500	1.500	.360	1/8	MI 332R/L	MS3
Mach 6-1000R/L	070871	071038	.970	2.062	7.500	1.500	.479	1/8	MI 432R/L	MS4
Mach 6-1500R/L	070872	071039	1.470	3.125	9.500	2.000	.729	1/4	MI 642R/L	MS6
Mach 6-2000R/L	070873	071040	1.970	4.125	10.500	2.000	.980	1/4	MI 853R/L	MS6

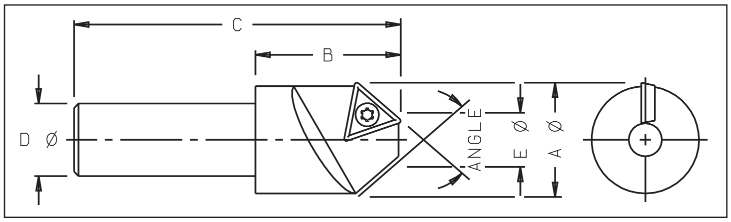


Double Flute Static or Rotating

Use MI inserts, two included with drill; see "Drilling Inserts" section

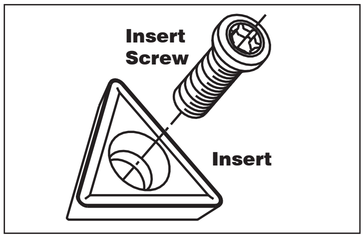
Ordering Code	EDP No.	A	Max. Depth	C	D	F	B	NPT	Outside Insert	Screw	Center Insert	Screw
R/Mach 6-100	071741	.970	2.500	6.380	1.500	.485	3.380	1/8	MI 332R	MS3	MI 332R	MS3L
R/Mach 6-125	071742	1.220	3.125	7.120	1.500	.610	4.120	1/8	MI 332R	MS3L	MI 432R	MS4L
R/Mach 6-150	071743	1.470	3.750	7.880	1.500	.735	4.880	1/8	MI 332R	MS3L	MI 542R	MS4L
R/Mach 6-175	071744	1.720	4.375	8.620	1.500	.860	5.620	1/8	MI 432R	MS4L	MI 542R	MS4L
R/Mach 6-200	071745	1.970	5.000	9.250	1.500	.985	6.250	1/8	MI 432R	MS4L	MI 642R	MS6
R/Mach 6-225	071746	2.220	5.625	10.370	2.000	1.110	7.120	1/8	MI 542R	MS4L	MI 642R	MS6

ICS



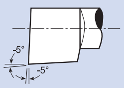
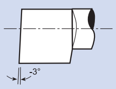
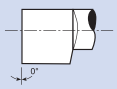
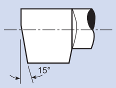
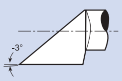
Item	Angle	A	D	C	B	E	RH No.
ICS 500/60	60°	.500	.375	2.25	1.00	.156	074986
ICS 750/60	60°	.790	.500	2.25	1.00	.437	074987
ICS 500/82	82°	.540	.375	2.25	1.00	.125	074988
ICS 750/82	82°	.790	.500	2.25	1.00	.375	074989
ICS 500/90	90°	.582	.375	2.25	1.00	.125	074990
ICS 750/90	90°	.832	.500	2.25	1.00	.375	074991
ICS 500/100	100°	.630	.375	2.25	1.00	.125	075865

Spare Parts



Item	Use Insert	Screw	Wrench
ICS	TPGT 21.51E	WS1017	T7M

Lead Angle Reference

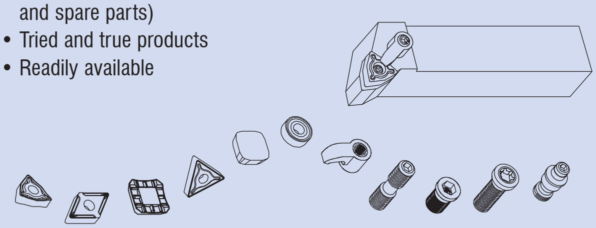
Lead Angle		Insert Shape	Negative Rake Inserts	5°/7° Relief Angle Inserts	11° Relief Angle Inserts Top Clamp/Center Screw		25° Angle Inserts
-5°		80° Diamond	MCLNR/L	SCLCR/L	CCLPR	SCLOR	CCLFR/L
		Trigon	MWLNR/L	—	—	—	—
-3°		55° Diamond	MDUNR/L	SDUCR/L	—	SDUOR/L	—
		35° Diamond	MVUNR/L	SVUBR/L	—	—	—
		Triangle	—	—	—	STUNR, STUOR	—
0°		Triangle	MTFNR/L	STFCR/L	CTFPR/L	STFPR/L STFNR/L STFOR/L	
15°		Square	MSKNR/L	SSKCR/L	CSKPR	—	—
-3°		35° Diamond	—	—	—	SVJPR/L	—

When Possible Use:

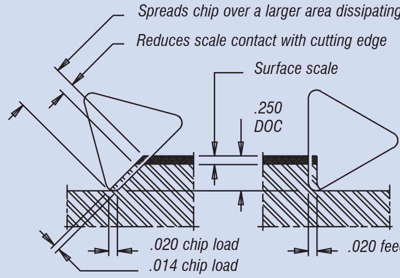
Standard Tooling

Standards are

- Interchangeable within suppliers (most standard inserts and spare parts)
- Tried and true products
- Readily available

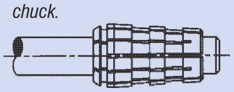


The Largest Lead Angle Possible

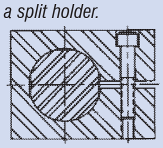


Best Method for Holding the Boring Bar For the Lowest Risk of Vibration

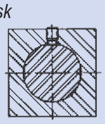
For bars 1.00" and smaller, use a collet and straight shank collet chuck.



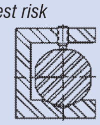
For bars 1.00" and larger use a split holder.



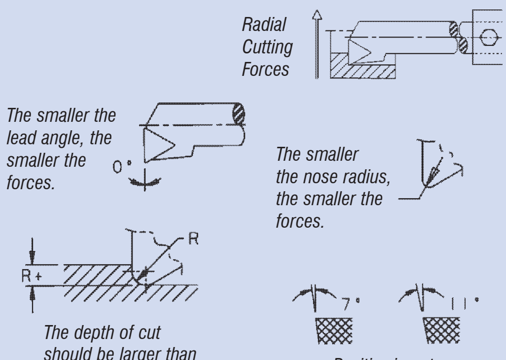
Good—slight risk of vibration.



Poor—highest risk of vibration.



Smaller Radial Cutting Forces For Less Chance of Vibration



Nomenclature

S	16	S	C	C
Boring Bar Type	Boring Bar Diameter	Boring Bar Length	Insert Holding	Insert Shape

Boring Bar Type

S = Solid Steel Bar

A = Solid Steel Bar with Coolant Hole

B = Solid Steel Bar with Anti-vibration Device

D = Solid Steel Bar with Anti-vibration Device and Coolant Hole

C = Carbide Bar with Fixed Steel Head

E = Carbide Bar with Fixed Steel Head and Coolant Hole

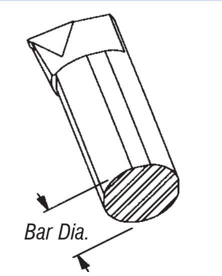
F = Carbide Bar with Fixed Steel Head and Anti-Vibration Device

G = Carbide Bar with Fixed Steel Head, Anti-vibration Device and Coolant Hole

H = Heavy Metal Bar

J = Heavy Metal Bar with Coolant Hole

Boring Bar Diameter



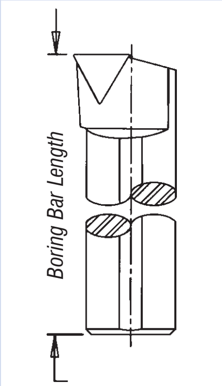
This indicates D dimensions in 1/16"

For example
08 = 8/16
= 1/2" diameter

16 = 16/16
= 1.0" diameter

24 = 24/16
= 1-1/2" diameter

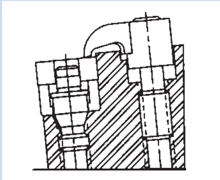
Boring Bar Length



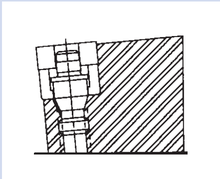
F = 3.00
G = 3.50
H = 4.00
J = 4.50
K = 5.00
L = 5.50
M = 6.00
N = 6.50
P = 6.75
Q = 7.00
R = 8.00
S = 10.00
T = 12.00
U = 14.00
V = 16.00
W = 18.00
Y = 20.00
Z = Special to be specified

Insert Holding

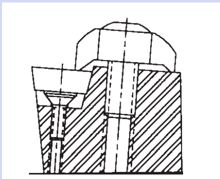
M = Clamp and Lock Pin



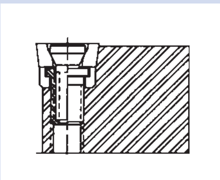
P = Lock Pin Only



C = Clamp Only



S = Screw Lock Only



Insert Shape

A *Parallelogram* 85°

B *Parallelogram* 82°

C *Diamond* 80°

D *Diamond* 55°

E *Diamond* 75°

H *Hexagon* 120°

K *Parallelogram* 55°

L *Rectangle* 90°

M *Diamond* 86°

O *Octagon* 135°

P *Pentagon* 108°

R *Round* 360°

S *Square* 90°

T *Triangle* 60°

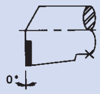
V *Diamond* 35°

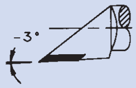
W *Trigon* 80°

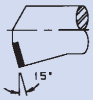
ANSI Nomenclature

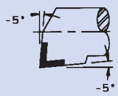
L	F	R	4
Boring Bar Style	Insert Relief Angle	Hand	Insert Size

Boring Bar Style

F

0° End Cutting

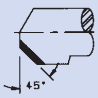
J

-3° Side Cutting

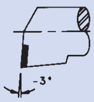
K

15° End Cutting

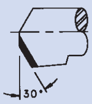
L

-5° Side & End Cutting

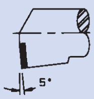
Q

-17.5° End Cutting

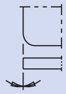
S

45° End Cutting

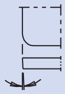
U

-3° End Cutting

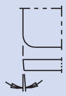
W

-30° End Cutting

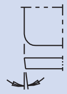
Y

5° End Cutting

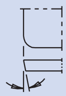
Insert Relief Angle

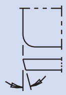
N
0°


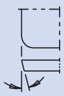
A
3°


B
5°


C
7°


P
11°


D
15°


E
20°


F
25°

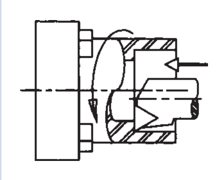

G
30°


O *Other*

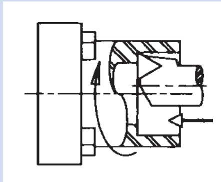
Hand

Hand

R = Right Hand

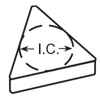


L = Left Hand



Insert Size

Hand



For equal sided inserts this indicates the inscribed circle (I.C.) in 1/8".
For example:

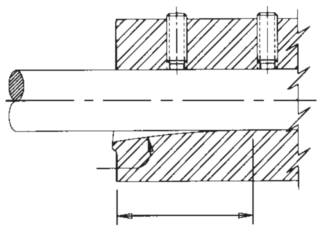
6 = 6/8 = 3/4" I.C.

4 = 4/8 = 1/2" I.C.

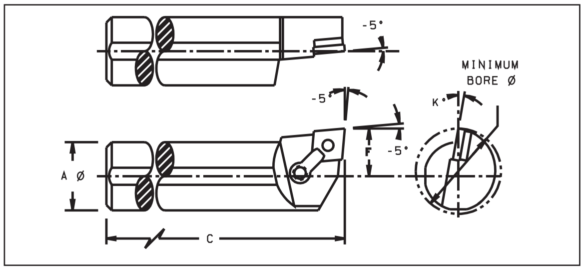
2.5 = 5.5/8 = 5/16" I.C.

Check the Boring Bar Holder for deformation

This creates a decrease in rigidity and a major increase in the risk of vibration.



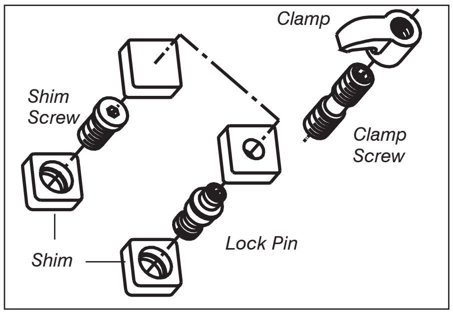
For Negative Rake Inserts



MCLNR/L

Item	A	Min. Bore	C	F	K°	IC	T	RH No.	LH No.
A16T-MCLNR/L4	1.000	1.22	12.000	.640	-14	1/2	3/16	0730157	0730158
A20U-MCLNR/L4	1.250	1.47	14.000	.765	-14	1/2	3/16	0730053	0730047
A24U-MCLNR/L4	1.500	1.76	14.000	.890	-12	1/2	3/16	0730054	0730048
A28U-MCLNR/L4	1.750	2.01	14.000	1.015	-12	1/2	3/16	0730055	0730049
A32V-MCLNR/L6	2.000	2.4	16.000	1.276	-12	3/4	1/4	0730056	0730050
A36V-MCLNR/L6	2.250	2.65	16.000	1.401	-10	3/4	1/4	0730057	0730051
A40V-MCLNR/L6	2.500	3.03	16.000	1.526	-10	3/4	1/4	0730058	0730052
S32U-MCLNR/L6	2.000	2.562	14.000	1.281	-12	3/4	1/4	—	072764*

Spare Parts

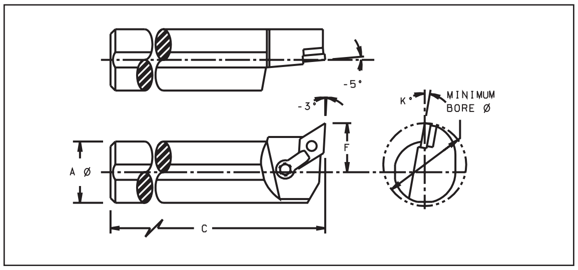


Item	Shim	Lock Pin	Clamp	Clamp Screw	Shim Screw
A16T-MCLNR/L4	—	NL44	CK20	STC-11	—
A20T-MCLNR/L4	ICSN 433	NL46	CK20	STC-20	KAS-4
A24U-MCLNR/L4	ICSN 433	NL46	CK20	STC-20	KAS-4
A28U-MCLNR/L4	ICSN 433	NL46	CK20	STC-20	KAS-4
A32U-MCLNR/L6	ICSN 633	NL68	CK12	STC-4	KAS-6
A36V-MCLNR/L6	ICSN 633	NL68	CK12	STC-4	KAS-6
A40V-MCLNR/L6	ICSN 633	NL68	CK12	STC-4	KAS-6
*S32U-MCLNL6	ICSN 633	NL68	CL20	XNS510	S68

**Denotes deleted item, available until depletion of inventory.*
***Available only upon depletion of non-coolant hole inventory.*

NOTE: For right hand/left hand tools, dimensional drawing shows R.H. view, L.H. is opposite.

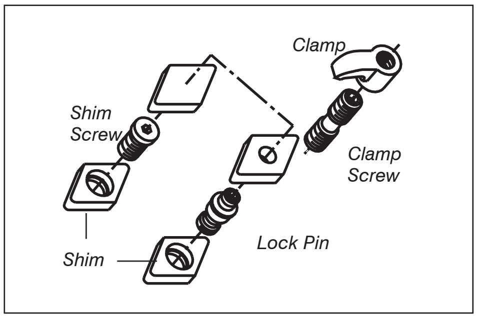
For Negative Rake Inserts



MDUNR/L

Item	A	Min. Bore	C	F	K°	Insert IC	Insert T	RH No.	LH No.
A20U-MDUNR/L4	1.250	1.705	14.000	1.000	-10	1/2	3/16	0730067	0730059
A24U-MDUNR/L4	1.500	2.000	14.000	1.125	-10	1/2	3/16	0730068	0730060
A28U-MDUNR/L4	1.750	2.250	14.000	1.250	-10	1/2	3/16	0730069	0730061
A28U-MDUNR/L5	1.750	2.250	14.000	1.375	-10	5/8	1/4	0730071	0730063
A32V-MDUNR/L4	2.000	2.500	16.000	1.375	-10	1/2	3/16	0730070	0730062
A32V-MDUNR/L5	2.000	2.500	16.000	1.500	-10	5/8	1/4	0730072	0730064
A36V-MDUNR/L5	2.250	2.870	16.000	1.625	-10	5/8	1/4	0730073	0730065
A40V-MDUNR/L5	2.500	3.250	16.000	1.750	-10	5/8	1/4	0730074	0730066
S28U-MDUNR/L4	1.750	2.500	14.000	1.250	-10	1/2	3/16	072783*	072775*
S28U-MDUNL5	1.750	2.750	14.000	1.375	-10	5/8	1/4	—	072777*
S32U-MDUNL4	2.000	2.750	14.000	1.375	-10	1/2	3/16	—	072776*
S36V-MDUNL5	2.250	3.250	16.000	1.625	-10	5/8	1/4	—	072779*
S40V-MDUNR5	2.500	3.500	16.000	1.750	-10	5/8	1/4	—	072788*

Spare Parts



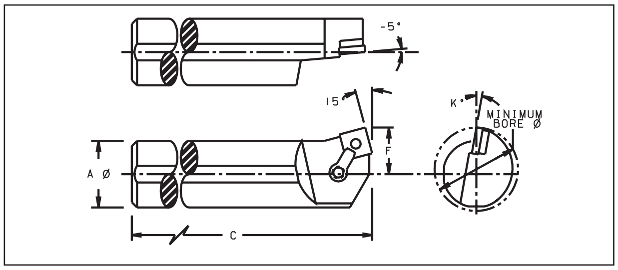
Item	Shim	Lock Pin	Clamp	Clamp Screw	Shim Screw
A20U-MDUNR/L4	IDSN 443	NL46L	CK12	STC-4	KAS-4
A24U-MDUNR/L4	IDSN 443	NL46L	CK12	STC-4	KAS-4
A28U-MDUNR/L4	IDSN 443	NL46L	CK12	STC-4	KAS-4
A28U-MDUNR/L5	IDSN 533	NL58	CK30	STC-4	KAS-5
A32V-MDUNR/L4	IDSN 443	NL46L	CK12	STC-4	KAS-4
A32V-MDUNR/L5	IDSN 533	NL58	CK30	STC-4	KAS-5
A36V-MDUNR/L5	IDSN 533	NL58	CK30	STC-4	KAS-5
A40V-MDUNR/L5	IDSN 533	NL58	CK30	STC-4	KAS-5
*S28U-MDUNL4	IDSN 433	NL46	CL12	XNS59	S46
*S28U-MDUNL5	IDSN 533	NL58	CL30	XNS510	S58
*S32U-MDUNL4	IDSN 433	NL46	CL12	XNS59	S46
*S32U-MDUNL5	IDSN 533	NL58	CL30	XNS510	S58
*S40V-MDUNR5	IDSN 533	NL58	CL30	XNS510	S58

**Denotes deleted item, available until depletion of inventory.*
***Available only upon depletion of non-coolant hole inventory.*

NOTE: For right hand/left hand tools, dimensional drawing shows R.H. view, L.H. is opposite.

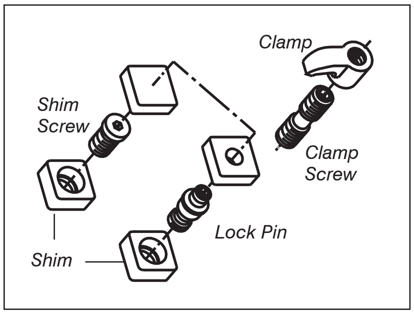
For Negative Rake Inserts

MSKNR/L



Item	A	Min. Bore	C	F	K°	IC	T	RH No.	LH No.
A20U-MSKNR/L 4	1.250	1.470	14.000	.765	-14	1/2	3/16	0730041	0730035
A24U-MSKNR/L 4	1.500	1.760	14.000	.890	-10	1/2	3/16	0730042	0730036
A28U-MSKNR/L 4	1.750	2.010	14.000	1.015	-10	1/2	3/16	0730043	0730037
A32V-MSKNR/L 6	2.000	2.400	16.000	1.281	-12	3/4	1/4	0730044	0730038
A36V-MSKNR/L 6	2.250	2.650	16.000	1.406	-10	3/4	1/4	0730045	0730039
A40V-MSKNR/L 6	2.500	3.030	16.000	1.531	-10	3/4	1/4	0730046	0730040
S28U-MSKNR/L 4	1.750	2.030	14.000	1.015	-12	1/2	3/16	072757*	072751*
S32U-MSKNR/L 6	2.000	2.562	14.000	1.281	-12	3/4	1/4	072758*	072752*
S36V-MSKNR 6	2.250	2.812	16.000	1.406	-10	3/4	1/4	072759*	—

Spare Parts

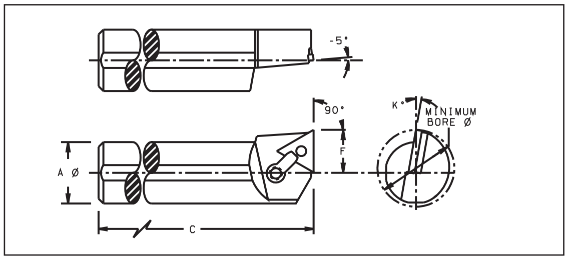


Item	Shim	Lock Pin	Clamp	Clamp Screw	Shim Screw
A20U-MSKNR/L 4	—	NL46	CK9	STC-4	—
A24U-MSKNR/L 4	ISSN 433	NL46	CK9	STC-4	KAS-4
A28U-MSKNR/L 4	ISSN 433	NL46	CK9	STC-4	KAS-4
A32V-MSKNR/L 6	ISSN 633	NL68	CK12	STC-4	KAS-6
A36V-MSKNR/L 6	ISSN 633	NL68	CK12	STC-4	KAS-6
A40V-MSKNR/L 6	ISSN 633	NL68	CK12	STC-4	KAS-6
*S28U MSKNR/L 4	ISSN 433	NL46	CL9	XNS59	S46
*S32U MSKNR/L 6	ISSN 633	NL68	CL12	XNS58	S68
*S36V MSKNR 6	ISSN 633	NL68	CL12	XNS58	S68

**Denotes deleted item, available until depletion of inventory.*
***Available only upon depletion of non-coolant hole inventory.*

NOTE: For right hand/left hand tools, dimensional drawing shows R.H. view, L.H. is opposite.

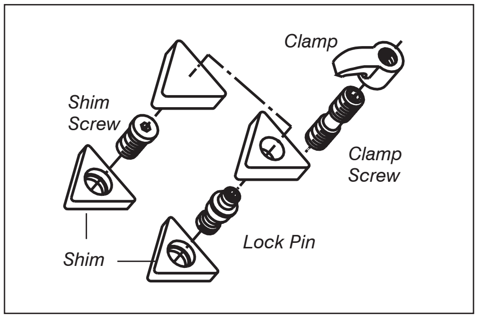
For Negative Rake Inserts



MTFNR/L

Item	A	Min. Bore	C	F	K°	Insert IC	Insert T	RH No.	LH No.
A16T-MTFNR/L 3	1.000	1.22	12.000	.640	-12	3/8	1/8	0730026	0730017
A20U-MTFNR/L 3	1.250	1.47	14.000	.765	-12	3/8	1/8	0730027	0730018
A24U-MTFNR/L 3	1.500	1.76	14.000	.890	-10	3/8	1/8	0730028	0730019
A24U-MTFNR/L 4	1.500	1.76	14.000	.890	-10	1/2	3/16	0730030	0730021
A28U-MTFNR/L 3	1.750	2.01	14.000	1.015	-10	3/8	1/8	0730029	0730020
A28U-MTFNR/L 4	1.750	2.01	14.000	1.015	-10	1/2	3/16	0730031	0730022
A32V-MTFNR/L 4	2.000	2.4	16.000	1.281	-8	1/2	3/16	0730032	0730023
A36V-MTFNR/L 4	2.250	2.65	16.000	1.406	-8	1/2	3/16	0730033	0730024
A40V-MTFNR/L 4	2.500	3.03	16.000	1.531	-8	1/2	3/16	0730034	0730025
S20T-MTFNL 3	1.250	1.530	12.000	.765	-12	3/8	1/8	—	072732*
S28U-MTFNL 3	1.750	2.030	14.000	1.015	-10	3/8	1/8	—	072734*
S28U-MTFNR 4	1.750	2.312	14.000	1.156	-8	1/2	3/16	072745*	—
S32U-MTFNR 4	2.000	2.562	14.000	1.281	-8	1/2	3/16	072746*	—

Spare Parts



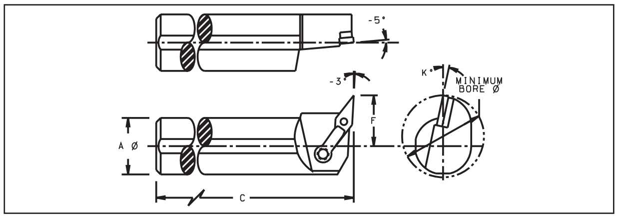
Item	Shim	Lock Pin	Clamp	Clamp Screw	Shim Screw
A16T-MTFNR/L 3	—	NL33L	CK7	STC-9	—
A20U-MTFNR/L 3	—	NL33L	CK7	STC-9	—
A24U-MTFNR/L 3	ITSN 323	NL34L	CK7	STC-9	KAS-3
A24U-MTFNR/L 4	ITSN 433	NL46	CK9	STC-4	KAS-4
A28U-MTFNR/L 3	ITSN 323	NL34L	CK7	STC-9	KAS-3
A28U-MTFNR/L 4	ITSN 433	NL46	CK9	STC-4	KAS-4
A32V-MTFNR/L 4	ITSN 433	NL46	CK9	STC-4	KAS-4
A36V-MTFNR/L 4	ITSN 433	NL46	CK9	STC-4	KAS-4
A40V-MTFNR/L 4	ITSN 433	NL46	CK9	STC-4	KAS-4
*S20T-MTFNL 3	ITSN 333	NL34L	CL7	XNS35	S34
*S28U-MTFNL 3	ITSN 333	NL34L	CL7	XNS35	S34
*S28U-MTFNR 4	ITSN 432	NL46	CL9	XNS59	S46
*S32U-MTFNR 4	ITSN 432	NL46	CL9	XNS59	S46

*Denotes deleted item, available until depletion of inventory.
**Available only upon depletion of non-coolant hole inventory.

NOTE: For right hand/left hand tools, dimensional drawing shows R.H. view, L.H. is opposite.

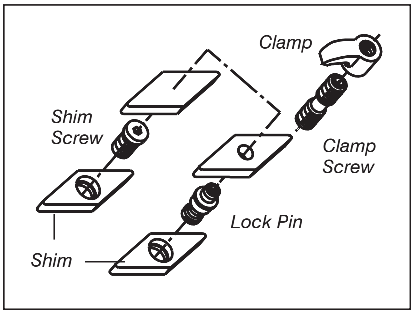
For Negative Rake Inserts

MVUNR



Item	A	Min. Bore	C	F	K°	Insert IC	Insert T	RH No.
A20U-MVUNR 3	1.250	1.705	14.000	1.000	-10	3/8	3/16	0730075
A24U-MVUNR 3	1.500	2.000	14.000	1.125	-8	3/8	3/16	0730076
A28U-MVUNR 4	1.750	2.250	14.000	1.250	-10	1/2	3/16	0730077
A32V-MVUNR 4	2.000	2.500	16.000	1.325	-10	1/2	3/16	0730078
S28U-MVUNR 4	1.750	3.000	13.750	1.500	-12	1/2	3/16	072791*

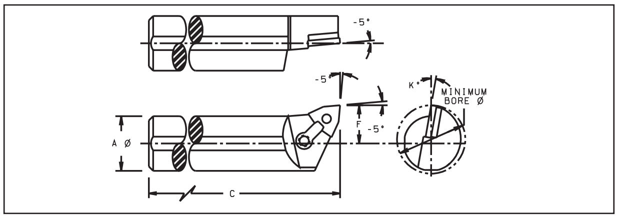
Spare Parts



Item	Shim	Lock Pin	Clamp	Clamp Screw	Shim Screw
A20U-MVUNR 3	IVSN 322	NL34L	CK43	STC-4	KAS-3
A24U-MVUNR 3	IVSN 322	NL34L	CK43	STC-4	KAS-3
A28U-MVUNR 4	IVSN 433	NL46	CK43	STC-4	KAS-4
A32V-MVUNR 4	IVSN 433	NL46	CK43	STC-4	KAS-4
S28U-MVUNR 4	IVSN 433	NL46	CL30	XNS510	S46

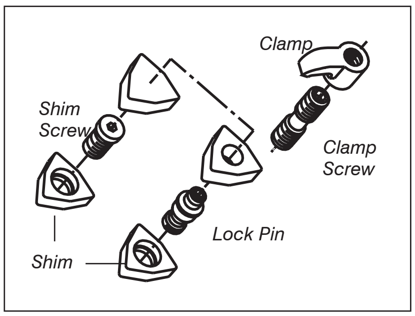
*Denotes deleted item, available until depletion of inventory.
**Available only upon depletion of non-coolant hole inventory.

MWLNR/L



Item	A	Min. Bore	C	F	K°	Insert IC	Insert T	RH No.	LH No.
A16T-MWLNR/L 4	1.000	1.22	12.000	.640	-12	1/2	3/16	0730217	0730220
A20U-MWLNR/L 4	1.250	1.47	14.000	.765	-14	1/2	3/16	0730218	0730221
A24U-MWLNR/L 4	1.500	1.76	14.000	.890	-14	1/2	3//16	0730219	0730222
A12S-MWLNR/L 3	.750	.93	10.000	.500	-14	3/8	1/8	0730225	0730226
A16T-MWLNR/L 3	1.000	1.22	12.000	.640	-10	3/8	1/8	0730223	0730224
S16S-MWLNL 3	1.000	1.280	10.000	.640	-14	3/8	3/16	—	091157*

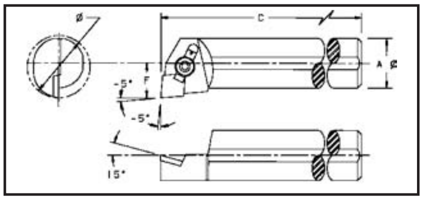
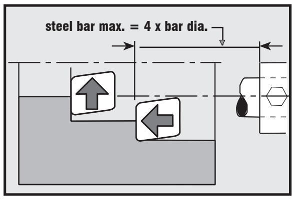
Spare Parts

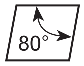


Item	Shim	Lock Pin	Clamp	Clamp Screw
A16T-MWLNR/L 4	—	NL44	CK20	STC-11
A20U-MWLNR/L 4	IWSN433	NL46	CK20	STC-20
A24U-MWLNR/L 4	IWSN433	NL46	CK20	STC-20
A12S-MWLNR/L 3	—	NL33	CK-6	STC-5
A16T-MWLNR/L 3	—	NL33	CK-6	STC-5
S16S-MWLNL 3	—	NL33	CL-6	XNS-36

*Denotes deleted item, available until depletion of inventory.
**Available only upon depletion of non-coolant hole inventory.

NOTE: For right hand/left hand tools, dimensional drawing shows R.H. view, L.H. is opposite.

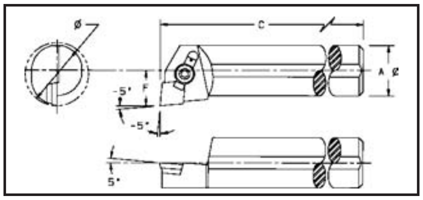
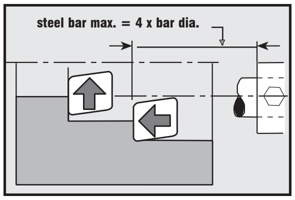


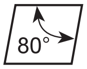
CFG

CCLFR/L

-5° Side & End Cutting, Steel Shanks.
Hi Positive Rake, 25° Relief Angle Inserts.

Boring Bar Number	RH EDP	LH EDP	Shank Mat'l.	A	Min. Bore	C	F	K°	Insert IC	Insert T	Clamp	Clamp Screw	Clamp Clip
A12S-CCLFR/L4	0730145	0730146	steel	.75	.93	10.0	.500	-	.464	1/8	HC9L	CS94	CLP9
S16T-CCLFR/L4	076922	076923	steel	1.00	1.156	12.0	.578	-	.464	1/8	HC9L	CS94	CLP9
S20U-CCLFR/L4	076924	076925	steel	1.25	1.531	14.0	.765	-	.464	1/8	HC9L	CS94	CLP9

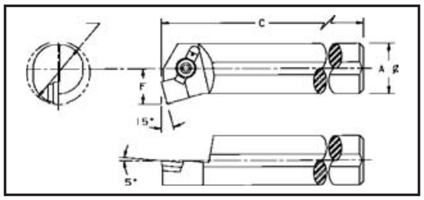
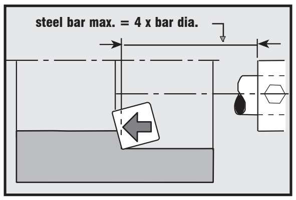


CPG, CPGR

CCLPR/L

-5° Side & End Cutting, Steel Shanks.
Positive Rake, 11° Relief Angle Inserts,
Top Clamp

Boring Bar Number	RH EDP	LH EDP	Shank Mat'l.	A	Min. Bore	C	F	K°	Insert IC	Insert T	Shim	Clamp Clip	Clamp	Clamp Screw	Shim Screw
A16T-CCLPR4	073009	-	steel	1.00	1.20	12.0	.640	-3	1/2	1/8	SM-369	CLP12	HC12	CS126	S-19
S20T-CCLPR4	070554	-	steel	1.25	1.530	12.0	.765	-	1/2	1/8	-	CLP12	HC12	CS126	-
S24U-CCLPR4	070555*	-	steel	1.50	1.780	14.0	.890	-	1/2	1/8	CSP432	CLP12	HC12	CS126	S440
S28U-CCLPR4	070556*	-	steel	1.75	2.030	14.0	1.015	-	1/2	1/8	CSP432	CLP12	HC12	CS126	S440
A24U-CCLPR4	0730011	-	steel	1.50	1.760	14.0	.890	-	1/2	1/8	SM-369	CLP12	HC12	CS126	S-19
A28U-CCLPR4	0730012**	-	steel	1.75	2.010	14.0	1.015	-	1/2	1/8	SM-369	CLP12	HC12	CS126	S-19

SPG, SPGR, SPU

CSKPR

15° End Cutting, Steel Shanks, Positive Rake,
11° Relief Angle Inserts, Top Clamp

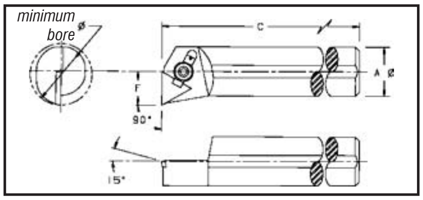
Boring Bar Number	RH EDP	LH EDP	Shank Mat'l.	A	Min. Bore	C	F	K°	Insert IC	Insert T	Shim	Clamp Clip	Clamp	Clamp Screw	Shim Screw
S16T-CSKPR4	085041*	-	steel	1.00	1.180	12.0	.578	-	1/2	1/8	PSQ3S	CLP12	HC12	CS126	S440S
A20U-CSKPR4	0730200	-	steel	1.25	1.47	14.0	.765	-	1/2	1/8	SM-40	CLP12	HC12	CS126	S-19
A24U-CSKPR4	0730201	-	steel	1.50	1.800	14.0	.890	-	1/2	1/8	PSQ3S	CLP12	HC12	CS126	S440
A24U-CSKPR6	0730202	-	steel	1.50	1.760	14.0	.890	-	3/4	3/16	SM-40	-	CK-10	STC-8	S-19
A28U-CSKPR4	0730203	-	steel	1.75	2.010	14.0	1.015	-	1/2	1/8	SM-40	-	CK-10	STC-8	S-19
S28U-CSKPR6	085046	-	steel	1.75	2.340	14.0	1.156	-	3/4	3/16	PSQ4S	CLP12	HC12	CS126	S832
S32V-CSKPR6	085047*	-	steel	2.00	2.580	16.0	1.281	-	3/4	3/16	PSQ4S	CLP12	HC12	CS126	S832
S40V-CSKPR6	085049	-	steel	2.50	3.080	16.0	1.531	-	3/4	3/16	PSQ4S	CLP12	HC12	CS126	S832
A16T-CSKPR4	0730199	-	steel	1.00	1.200	12.0	.690	-	1/2	1/8	SM-40	CLP12	HC12	CS126	S-19
A32V-CSKPR6	0730205	-	steel	2.00	2.400	16.0	1.281	-	3/4	3/16	SM-36	CLP12	HC12	CS126	S-125

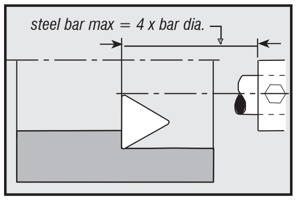
**Denotes deleted item, available until depletion of inventory.*
***Available only upon depletion of non-coolant hole inventory.*

NOTE: For right hand/left hand tools, dimensional drawing shows R.H. view, L.H. is opposite.

CTFFR/L

TFG



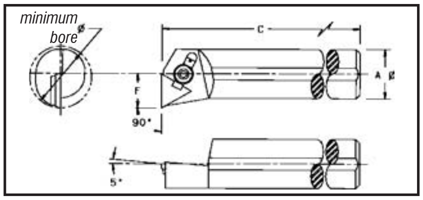


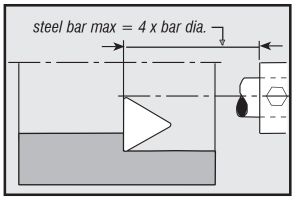
0° End Cutting, Steel Shanks,
Hi Positive Rake, 25° Relief Angle Inserts.

Boring Bar Number	RH EDP	LH EDP	Shank Mat'l.	A	Min. Bore	C	F	K°	Insert IC	Insert T	Clamp	Clamp Screw	Clamp Clip
S12S-CTFFR/L3	076926	076928	steel	.75	1.000	10.0	.500	-	3/8	1/8	HC9	CS94	CLP9
S16T-CTFFR/L3	076929	076930	steel	1.00	1.156	12.0	.578	-	3/8	1/8	HC9	CS94	CLP9
S20U-CTFFR/L3	076932	076933	steel	1.25	1.531	14.0	.765	-	3/8	1/8	HC9	CS94	CLP9

CTFPR

**TPG,
TPU,
TPGR**



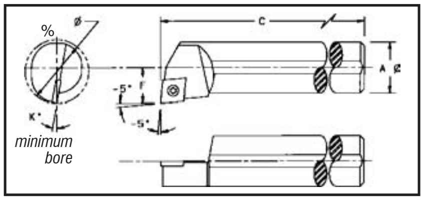


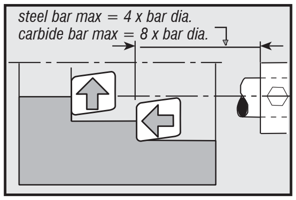
0° End Cutting, Steel Shanks, Positive Rake,
25° Relief Angle Inserts.

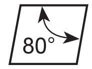
Boring Bar Number	RH EDP	LH EDP	Shank Mat'l.	A	Min. Bore	C	F	K°	Insert IC	Insert T	Shim	Clamp Clip	Clamp	Clamp Screw	Shim Screw
A16T-CTFPR3	0730208	-	steel	1.00	1.2	12.0	.64	-	3/8	1/8	-	CLP12	HC12	CS126	-
A20U-CTFPR3	0730209	-	steel	1.25	1.47	14.0	.765	-3	3/8	1/8	SM-41	CLP12	HC12	CS126	S-19
A24U-CTFPR3	0730210	-	steel	1.50	1.76	14.0	.890	-3	3/8	1/8	SM-41	CLP12	HC12	CS126	S-19
A24U-CTFPR4	0730211	-	steel	1.50	1.76	14.0	.89	-3	1/2	3/16	SM-37	CLP12	HC12	CS126	S-125
A28U-CTFPR3	0730212	-	steel	1.75	2.01	14.0	1.015	-3	3/8	1/8	SM-41	CLP12	HC12	CS126	S-19
A28U-CTFPR4	0730213	-	steel	1.75	2.01	14.0	1.015	-3	1/2	3/16	SM-37	CLP12	HC12	CS126	S-125
A32V-CTFPR4	0730214	-	steel	2.00	2.40	16.0	1.281	-3	1/2	3/16	SM-37	CLP12	HC12	CS126	S-125
A40V-CTFPR4	0730216**	-	steel	2.50	3.03	16.0	1.531	-3	1/2	3/16	SM-37	CLP12	HC12	CS126	S-125
S28U-CTFPR4	085055*	-	steel	1.75	2.380	14.0	1.156	-	1/2	3/16	PTP-4S	CLP12	HC12	CS126	S-832
S36V-CTFPR4	085057	-	steel	2.25	2.880	16.0	1.406	-	1/2	3/16	PTP-4S	CLP12	HC12	CS126	S-832
S40V-CTFPR4	085058*	-	steel	2.50	3.120	16.0	1.531	-	1/2	3/16	PTP-4S	CLP12	HC12	CS126	S-832

**Denotes deleted item, available until depletion of inventory.*
***Available only upon depletion of non-coolant hole inventory.*

Note: For right hand/left hand tools, dimensional drawing shows R.H. view, L.H. is opposite.





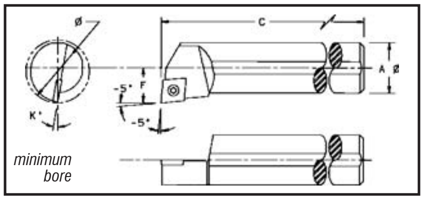


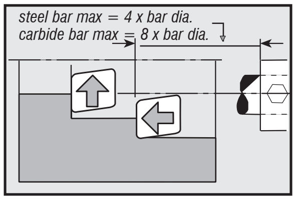
CCMT

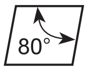
SCLCR/L

-5° Side & End Cutting, Steel and Carbide Shanks, S-Lock, Hi Positive Rake, 7° Relief Angle Inserts.

Boring Bar Number	RH EDP	LH EDP	Shank Mat'l.	A	Min. Bore	C	F	K°	Insert IC	Insert T	Insert Screw	Wrench
A06M-SCLCR/L2	0730227	0730256	steel	.375	.480	6.0	.250	-8	1/4	3/32	MS-1153	FT-07
C06M-SCLCR2	080723	-	carbide	.375	.500	6.0	.250	-12	1/4	3/32	TCS-1M-02	LT-07
A08R-SCLCR/L2	0730228	0730257	steel	.500	.600	8.0	.312	-7	1/4	3/32	MS-1153	FT-07
C08M-SCLCR2	080724	-	carbide	.500	.625	6.0	.312	-10	1/4	3/32	TCS-1M-02	LT-07
A10S-SCLCR/L2	0730229	0730258	steel	.625	.770	10.0	.406	-5	1/4	3/32	MS-1153	FT-07
C10R-SCLCR2	080726	-	carbide	.625	.812	8.0	.406	-8	1/4	3/32	TCS-1M-02	LT-07
A12S-SCLCR/L3	0730230	0730259	steel	.750	.93	10.0	.500	-5	3/8	5/32	MS-1155	FT-15
C12S-SCLCR3	080727	-	carbide	.750	1.000	10.0	.500	-8	3/8	5/32	TCS-1M-04	LT-15
A16T-SCLCR/L3	0730231	0730260	steel	1.000	1.20	12.0	.640	-4	3/8	5/32	MS-1155	FT-15
C16T-SCLCR/3	080728	-	carbide	1.000	1.280	12.0	.640	-6	3/8	5/32	SIS32	LT-15
A16T-SCLCR/L4	0730232	0730261	steel	1.000	1.20	12.0	.640	-6	1/2	3/16	MS-1157	FT-15
A20U-SCLCR/L4	0730233	0730262	steel	1.250	1.47	14.0	.765	-5	1/2	3/16	MS-1157	FT-15
A24U-SCLCR/L4	0730234	0730263	steel	1.500	1.76	14.0	.890	-4	1/2	3/16	MS-1157	FT-15
S16T-SCLCL4	-	096534*	steel	1.000	1.280	12.0	.640	-6	1/2	3/16	TCS-IM-07	LT-15
S20U-SCLCL4	-	096535*	steel	1.250	1.530	14.0	.765	-5	1/2	3/16	TCS-IM-07	LT-15







CPGT

SCLPR/L

-5° Side & End Cutting, Steel and Carbide Shanks, Positive Rake, 11° Relief Angle Inserts

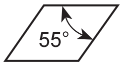
Boring Bar Number	RH EDP	LH EDP	Shank Mat'l.	A	Min. Bore	C	F	K°	Insert IC	Insert T	Insert Screw	Wrench
A06M-SCLPR/L2	0730135	0730136	steel	.375	.48	6.0	.250	-6	1/4	3/32	MS-1153	FT-07
C06M-SCLPR/L2	074862	074863	carbide	.375	.468	6.0	.250	-5	1/4	3/32	WS1017	LT-07
A08R-SCLPR/L2	0730137	0730138	steel	.500	.600	8.0	.312	-3	1/4	3/32	MS-1153	FT-07
C08R-SCLPR/L2	074864	074865	carbide	.500	.593	8.0	.312	-5	1/4	3/32	WS1017	LT-07
A10S-SCLPR/L2	0730139	0730140	steel	.625	.770	10.0	.406	-2	1/4	3/32	MS-1153	FT-07
C10S-SCLPR/L2	074866	074867	carbide	.625	.718	10.0	.375	-5	1/4	3/32	WS1017	LT-07
A12S-SCLPR/L2	0730141	0730142	steel	.750	.930	10.0	.500	0	1/4	3/32	MS-1153	FT-07
C12S-SCLPR/L2	074868	074869	carbide	.750	.843	10.0	.437	0	1/4	3/32	WS1017	LT-07
A12S-SCLPR/L3	0730143	0730144	steel	.750	.930	10.0	.500	-2	3/8	5/32	MS-1155	FT-15
C12S-SCLPR/L3	074870	074871	carbide	.750	.843	10.0	.437	-5	3/8	5/32	WS1018	LT-15
S10S-SCLPR/L2	-	074931*	steel	.625	.780	10.0	.375	-5	1/4	3/32	WS1017	LT-07

**Denotes deleted item, available until depletion of inventory.*
***Available only upon depletion of non-coolant hole inventory.*

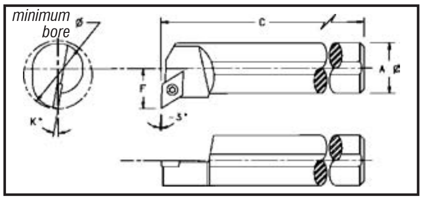
Drills, Counterbores & Boring Bars

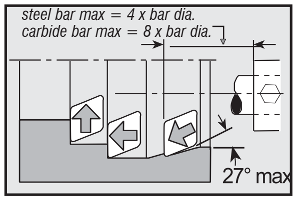
Note: For right hand/left hand tools, dimensional drawing shows R.H. view, L.H. is opposite.

SDUCR/L



DCMT

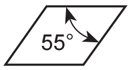




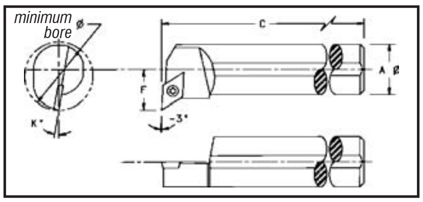
-3° End Cutting, Steel and Carbide Shank, S-Lock, Positive Rake, 7° Relief Angle.

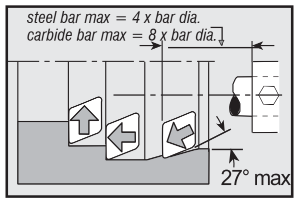
Boring Bar Number	RH EDP	LH EDP	Shank Mat'l.	A	Min. Bore	C	F	K°	Insert IC	Insert T	Insert Screw	Wrench
A06M-SDUCR/L2	0730235	0730264**	steel	.375	.600	6.0	.375	-7	1/4	3/32	MS-1153	FT-07
C06M-SDUCR/L2	080730	-	carbide	.375	.750	6.0	.375	-10	1/4	3/32	TCS-1M-02	LT-07
A08R-SDUCR/L2	0730236	0730265	steel	.500	.730	8.0	.437	-5	1/4	3/32	MS-1153	FT-07
C08M-SDUCR/L2	080732	-	carbide	.500	.875	6.0	.438	-8	1/4	3/32	TCS-1M-02	LT-07
A10S-SDUCR/L2	0730237	0730266	steel	.625	.850	10.0	.500	-4	1/4	3/32	MS-1153	FT-07
C10R-SDUCR/L2	080733	-	carbide	.625	1.000	8.0	.500	-6	1/4	3/32	TCS-1M-02	LT-07
A12S-SDUCR/L3	0730238	0730267	steel	.750	.980	10.0	.562	-5	3/8	5/32	MS-1155	FT-15
C12S-SDUCR/L3	080734	-	carbide	.750	1.250	10.0	.625	-6	3/8	5/32	TCS-1M-4	LT-15
A16T-SDUCR/L3	0730239	0730268	steel	1.000	1.30	12.0	.750	-3	3/8	5/32	MS-1155	FT-15
C16T-SDUCR/L3	080735	-	carbide	1.000	1.500	12.0	.750	-5	3/8	5/32	SIS32	LT-15
S20U-SDUCR/L3	096513	096542	steel	1.250	1.750	14.0	.875	-4	3/8	5/32	SIS32	LT-15
S06M-SDUCR/L2	-	096537*	steel	.375	.750	6.0	.375	-10	1/4	3/32	TCS-IM-02	LT-07

SDUPR/L



DPGT



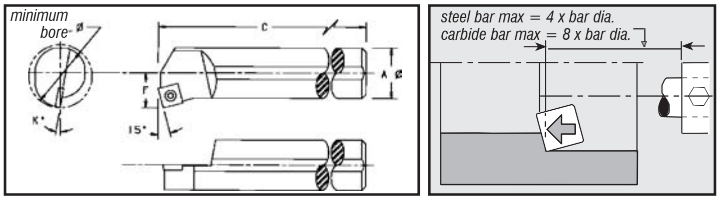


-3° End Cutting, Steel and Carbide Shanks, Positive Rake, 11° Relief Angle Screw Down Inserts.

Boring Bar Number	RH EDP	LH EDP	Shank Mat'l.	A	Min. Bore	C	F	K°	Insert IC	Insert T	Insert Screw	Wrench
A06M-SDUPR/L2	0730107	0730108	steel	.375	.600	6.0	.375	-3	1/4	.094	MS-1153	FT-07
C06M-SDUPR/L2	074872	074873	carbide	.375	.593	6.0	.375	-5	1/4	.094	WS1017	LT-07
A08R-SDUPR/L2	0730109	0730110	steel	.500	.730	8.0	.437	0	1/4	.094	MS-1153	FT-07
C08R-SDUPR/L2	074874	074875	carbide	.500	.781	8.0	.437	0	1/4	.094	WS1017	LT-07
A10S-SDUPR/L2	0730111	0730112	steel	.625	.850	10.0	.500	0	1/4	.094	MS-1153	FT-07
C10S-SDUPR/L2	074876	074877	carbide	.625	.844	10.0	.500	0	1/4	.094	WS1017	LT-07
A12S-SDUPR/L2	0730113	0730114	steel	.750	.980	10.0	.562	0	1/4	.094	MS-1153	FT-07
C12S-SDUPR/L2	074878	074879	carbide	.750	.968	10.0	.562	0	1/4	.094	WS1017	LT-07
S10S-SDUPR/L2	074892*	074893*	steel	.625	.844	10.0	.500	0	1/4	.094	WS1017	LT-07
S06M-SDUPL2	—	074889*		.375	.593	6.0	.375	-5	1/4	.094	WS-1017	LT-07
S08R-SDUPR/L2	074890*	074891*		.500	.781	8.0	.437	0	1/4	.094	WS1017	LT-07
S12S-SDUPR/L2	074894*	074895*		.750	.968	10.0	.562	0	1/4	.094	WS1017	LT-07

**Denotes deleted item, available until depletion of inventory.*
***Available only upon depletion of non-coolant hole inventory.*

Note: For right hand/left hand tools, dimensional drawing shows R.H. view, L.H. is opposite.

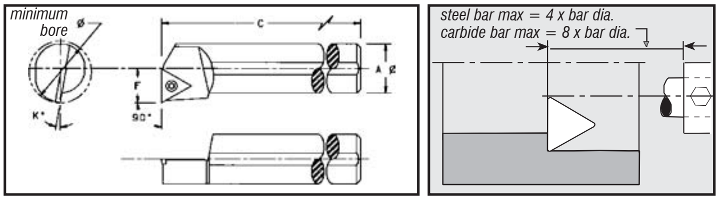


SCMT

SSKCR/L

15° End Cutting, Steel and Carbide Shanks, S-Lock, Positive Rake, 7° Relief Angle Inserts.

Boring Bar Number	RH EDP	LH EDP	Shank Mat'l.	A	Min. Bore	C	F	K°	Insert IC	Insert T	Insert Screw	Wrench
S10R-SSKCR/L3	096514	096543	steel	.625	.812	8.0	.406	-10	3/8	5/32	SIS32	LT-15
C10R-SSKCR3	080737	-	carbide	.625	.812	8.0	.406	-10	3/8	5/32	SIS32	LT-15
S12S-SSKCR/L3	096515	096544	steel	.750	1.000	10.0	.500	-8	3/8	5/32	SIS32	LT-15
C12S-SSKCR3	080738	-	carbide	.750	1.000	10.0	.500	-8	3/8	5/32	SIS32	LT-15
S16T-SSKCR/L4	096516	096545	steel	1.000	1.280	12.0	.640	-6	1/2	3/16	TCS-1M-07	LT-15
C16T-SSKCR4	080739	-	carbide	1.000	1.280	12.0	.640	-6	1/2	3/16	TCS-1M-07	LT-15
S20U-SSKCR/L4	096517	096546	steel	1.250	1.530	14.0	.765	-5	1/2	3/16	TCS-1M-07	LT-15
S24V-SSKCR/L4	096518	096547	steel	1.500	1.780	15.750	.890	-4	1/2	3/16	TCS-1M-07	LT-15

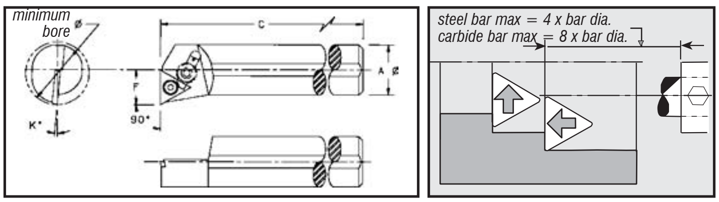


TCMT

STFCR/L

0° End Cutting, Steel and Carbide Shanks, S-Lock, Positive Rake, 7° Relief Angle Inserts.

Boring Bar Number	RH EDP	LH EDP	Shank Mat'l.	A	Min. Bore	C	F	K°	Insert IC	Insert T	Insert Screw	Wrench
A06M-STFCR/L2	0730246	0730275	steel	.375	.480	6.0	.250	-8	1/4	3/32	MS-1153	FT-07
C06M-STFCR2	080741	-	carbide	.375	.500	6.0	.250	-10	1/4	3/32	TCS-1M-02	LT-07
A08R-STFCR/L2	0730247	0730276	steel	.500	.600	8.0	.312	-7	1/4	3/32	MS-1153	FT-07
C08M-STFCR2	080742	-	carbide	.500	.675	6.0	.312	-8	1/4	3/32	TCS-1M-02	LT-07
A10S-STFCR/L2	0730248	0730277**	steel	.625	.770	10.0	.406	-5	1/4	3/32	MS-1153	FT-07
C10R-STFCR2	080743	-	carbide	.625	.812	8.0	.406	-6	1/4	3/32	TCS-1M-02	LT-07
A12S-STFCR/L2	0730249	0730278	steel	.750	.930	10.0	.500	-5	1/4	3/32	MS-1153	FT-07
C12S-STFCR2	080745	-	carbide	.750	1.000	10.0	.500	-4	1/4	3/32	TCS-1M-02	LT-07
A16T-STFCR/L3	0730250	0730279	steel	1.000	1.200	12.0	.640	-4	3/8	5/32	MS-1155	FT-07
C16T-STFCR3	080747	-	carbide	1.000	1.280	12.0	.640	-6	3/8	5/32	SIS32	LT-07
S20U-STFCR/L3	096524	096553	steel	1.250	1.530	14.0	.765	-5	3/8	5/32	SIS32	LT-15
S24V-STFCR/L3	096525	096554	steel	1.500	1.780	15.750	.890	-4	3/8	5/32	SIS32	LT-15
S08M-STFCR/L2	-	096549*	steel	.500	.675	6.0	.312	-8	1/4	3/32	TCS-IM-02	LT-07
S10R-STFCR/L2	-	096550*	steel	.625	.812	8.0	.406	-6	1/4	3/32	TCS-IM-02	LT-07
S16T-STFCR/L3	096523*	-	steel	1.000	1.280	12.0	.640	-6	3/8	5/32	SIS32	LT-15



TP,
TPG,
TPGB

STFNR/L

0° End Cutting, Steel Shanks, Positive Rake, 11° Relief Angle Screw Down Inserts..

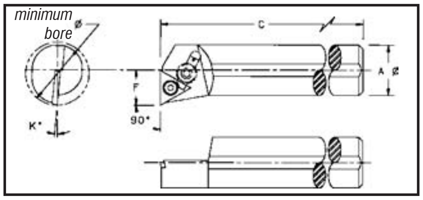
Boring Bar Number	RH EDP	LH EDP	Shank Mat'l.	A	Min. Bore	C	F	K°	Insert IC	Insert T	Insert Screw	Wrench
A06M-STFNR/L12	0730003	0730001	steel	.375	.480	6.0	.250	-7	1/4	3/32	IS22G	-
A08R-STFNR/L12	0730004	0730002	steel	.500	.600	8.0	.312	-5	1/4	3/32	IS23G	-

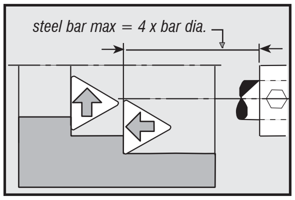
*Denotes deleted item, available until depletion of inventory.
**Available only upon depletion of non-coolant hole inventory.

Note: For right hand/left hand tools, dimensional drawing shows R.H. view, L.H. is opposite.

STFOR/L

TP, TPG, TPGB



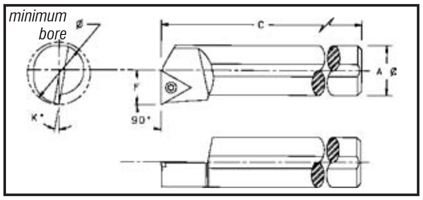


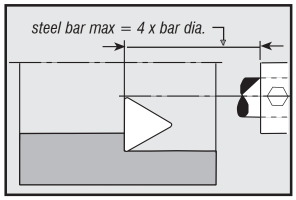
0° End Cutting, Steel Shanks, Positive Rake, 11° Relief Angle Screw, Down Inserts.

Boring Bar Number	RH EDP	LH EDP	Shank Mat'l.	A	Min. Bore	C	F	K°	Insert IC	Insert T	Insert Screw	Bridge Clamp	Clamp Screw	Clamp Clip
A10S-STFOR/L2	0730007	0730005	steel	.625	.770	10.0	.406	0	1/4	3/32	S-32	-	-	-
A12S-STFOR/L3	0730008	-	steel	.750	.930	10.0	.500	0	3/8	1/8	S-14	HC9	CS94	CLP9
S10S-STFOR/L2	070531*	-	steel	.625	.812	10.0	.406	0	1/4	3/32	IS22G	-	-	-
S12SSTFOR/L3	-	070530	steel	.750	1.000	10.0	.500	0	3/8	1/8	S440S	HC9	CS94	CLP9

STFPR/L

TPGT

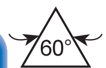




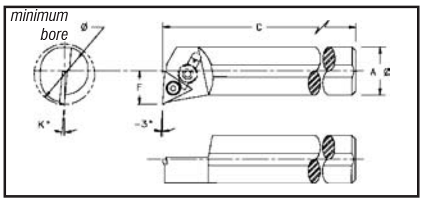
0° End Cutting, Steel and Carbide Shanks, Positive Rake, 11° Relief Angle Screw, Down Inserts.

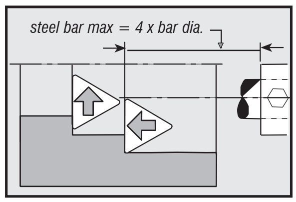
Boring Bar Number	RH EDP	LH EDP	Shank Mat'l.	A	Min. Bore	C	F	K°	Insert IC	Insert T	Insert Screw	Wrench
A06M-STFPR/L2	0730127	0730128	steel	.375	.480	6.0	.250	-4	1/4	.094	MS-1153	FT-07
C06M-STFPR/L2	074880	074881	carbide	.375	.468	6.0	.250	-5	1/4	.094	WS1017	LT-07
A08R-STFPR/L2	0730129	0730130	steel	.500	.600	8.0	.312	-2	1/4	.094	MS-1153	FT-07
C08R-STFPR/L2	074882	074883	carbide	.500	.593	8.0	.312	-5	1/4	.094	WS1017	LT-07
A10S-STFPR/L2	0730131	0730132	steel	.625	.770	10.0	.406	0	1/4	.094	MS-1153	FT-07
C10S-STFPR/L2	074884	074885	carbide	.625	.718	10.0	.375	-5	1/4	.094	WS1017	LT-07
A12S-STFPR/L2	0730133	0730134	steel	.750	.930	10.0	.500	0	1/4	.094	MS-1153	FT-07
C12S-STFPR/L2	074886	074887	carbide	.750	.843	10.0	.437	0	1/4	.094	WS1017	LT-07
S10S-STFPR/L2	-	074923*	steel	.625	.718	10.0	.375	-5	1/4	.094	WS1017	LT-07

STUNR*/STUOR*



TP, TPG, TPGB





-3° End Cutting, Steel Shanks, Positive Rake, 11° Relief Angle Screw, Down Inserts.

Boring Bar Number	RH EDP	LH EDP	Shank Mat'l.	A	Min. Bore	C	F	K°	Insert IC	Insert T	Insert Screw	Clamp	Clamp Screw	Clamp Clip
A06M-STUNR2	0730013	-	steel	.375	.480	6.0	.250	-7	1/4	3/32	IS22G	-	-	-
A08R-STUNR2	0730014	-	steel	.500	.600	8.0	.312	-5	1/4	3/32	IS23G	-	-	-
A10S-STUOR2	0730015	-	steel	.625	.770	10.0	.406	0	1/4	3/32	IS23G	-	-	-
A12S-STUOR3	0730016	-	steel	.750	.930	10.0	.500	0	3/8	1/8	S440	HC9	CS94	CLP9

Not ANSI code

**Denotes deleted item, available until depletion of inventory.*
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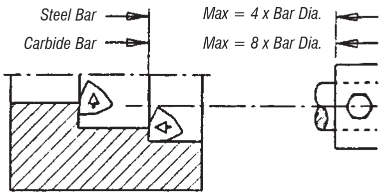
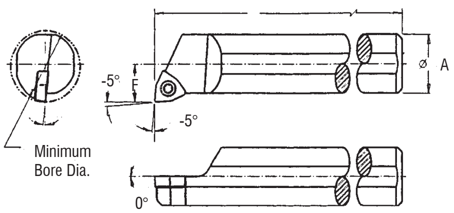
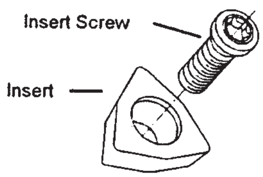
Note: For right hand/left hand tools, dimensional drawing shows R.H. view, L.H. is opposite.



SWLCR/SWLCL

-5° Side and End Cutting, Steel and Carbide Shanks Trigon. S-LOK Use Trigon Inserts WCMT.





Boring Bar Number	EDP	Shank Mat'l.	A	Min. Bore	C	F	K°	Insert IC	Insert T	Insert Screw	Wrench
C05F-SWLCR 2	081161	carbide	0.312	0.433	3.000	0.236	-12	1/4	3/32	TCS-1M-02	LT-07
S05F-SWLCR 2	081150	steel	0.312	0.433	3.000	0.236	-12	1/4	3/32	TCS-1M-02	LT-07
S05F-SWLCL 2	081149	steel	0.312	0.433	3.000	0.236	-12	1/4	3/32	TCS-1M-02	LT-07
C06M-SWLCR 2	081162	carbide	0.375	0.500	6.000	0.250	-12	1/4	3/32	TCS-1M-02	LT-07
S06M-SWLCR 2	081152*	steel	0.375	0.500	6.000	0.250	-12	1/4	3/32	TCS-1M-02	LT-07
S06M-SWLCL 2	081151*	steel	0.375	0.500	6.000	0.250	-12	1/4	3/32	TCS-1M-02	LT-07
A06M-SWLCR 2	0730180**	steel	0.375	.480	6.000	0.250	-8	1/4	3/32	MS-1153	FT-07
A06M-SWLCL 2	0730179**	steel	0.375	.480	6.000	0.250	-8	1/4	3/32	MS-1153	FT-07
C08M-SWLCR 2	081163	carbide	0.500	0.625	6.000	0.312	-10	1/4	3/32	TCS-1M-02	LT-07
S08M-SWLCR 2	081154*	steel	0.500	0.625	6.000	0.312	-10	1/4	3/32	TCS-1M-02	LT-07
S08M-SWLCL 2	081153*	steel	0.500	0.625	6.000	0.312	-10	1/4	3/32	TCS-1M-02	LT-07
A08R-SWLCR 2	0730182	steel	0.500	.600	8.000	0.312	-6	1/4	3/32	MS-1153	FT-07
A08R-SWLCL 2	0730181**	steel	0.500	.600	8.000	0.312	-6	1/4	3/32	MS-1153	FT-07
C10R-SWLCR 2	081164	carbide	0.625	0.812	8.000	0.406	-10	1/4	3/32	TCS-1M-02	LT-07
S10R-SWLCL 2	081156	steel	0.625	0.812	8.000	0.406	-8	1/4	3/32	TCS-1M-02	LT-07
S10R-SWLCL 2	081155	steel	0.625	0.812	8.000	0.406	-8	1/4	3/32	TCS-1M-02	LT-15
C12S-SWLCR 3	081165	carbide	0.750	1.000	10.000	0.500	-8	3/8	5/32	TCS-1M-04	LT-15
S12S-SWLCR 3	081158*	steel	0.750	1.000	10.000	0.500	-8	3/8	5/32	TCS-1M-04	LT-15
S12S-SWLCL 3	081157*	steel	0.750	1.000	10.000	0.500	-6	3/8	5/32	TCS-1M-04	LT-15
A12S-SWLCR 3	0730186	steel	0.750	.930	10.000	0.500	-5	3/8	5/32	MS-1155	FT-15
A12S-SWLCL 3	0730185**	steel	0.750	.930	10.000	0.500	-5	3/8	5/32	MS-1155	FT-15
C16T-SWLCR 3	081166	carbide	1.000	1.280	12.000	0.640	-6	3/8	5/32	SIS-32	LT-15
S16T-SWLCR 3	081160	steel	1.000	1.280	12.000	0.640	-6	3/8	5/32	SIS-32	LT-15
S16T-SWLCL 3	081159	steel	1.000	1.280	12.000	0.640	-6	3/8	5/32	SIS-32	LT-15

**Denotes deleted item, available until depletion of inventory.*
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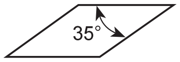
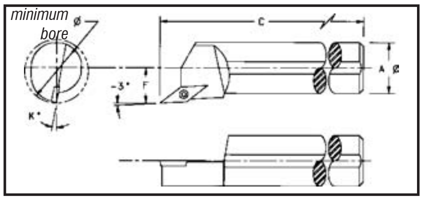
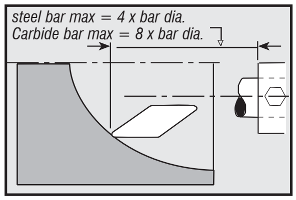
SVJPR/L



VBMT

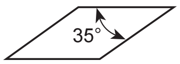




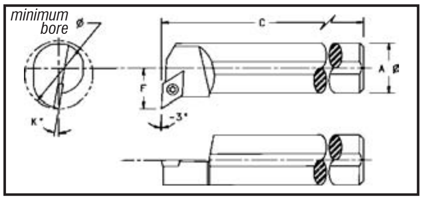
-3° Side Cutting, Steel and Carbide Shanks, Screw Down, Positive Rake, 11° Relief Angle Inserts.

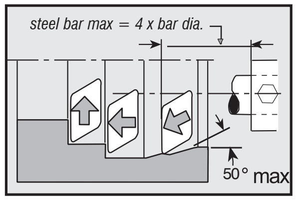
Boring Bar Number	RH EDP	LH EDP	Shank Mat'l.	A	Min. Bore	C	F	K°	Insert IC	Insert T	Insert Screw	Wrench
A08R-SVJPR/L2	0730115	0730116	steel	.500	.600	8.0	.312	-5	1/4	.125	MS-1153	FT-07
C08R-SVJPR/L2	074912	074913	carbide	.500	.493	8.0	.312	-5	1/4	.125	TCS-1M-02	LT-07
A10S-SVJPR/L2	0730117	0730118	steel	.625	.770	10.0	.406	-2	1/4	.125	MS-1153	FT-07
C10S-SVJPR/L2	074914	074915	carbide	.625	.718	10.0	.375	-5	1/4	.125	TCS-1M-02	LT-07
A12S-SVJPR/L2	0730119	0730120	steel	.750	.930	10.0	.500	0	1/4	.125	MS-1153	FT-07
C12S-SVJPR/L2	074916	074917	carbide	.750	.843	10.0	.437	-5	1/4	.125	TCS-1M-02	LT-07

SVUBR/L



VBMT



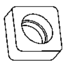
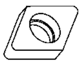
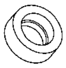
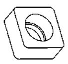
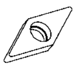
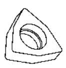


-3° End Cutting, Steel Shanks, S-Lock, Positive Rake, 7° Relief Angle Inserts.

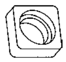
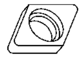
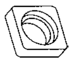
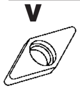
Boring Bar Number	RH EDP	LH EDP	Shank Mat'l.	A	Min. Bore	C	F	K°	Insert IC	Insert T	Insert Screw	Wrench
S20U-SVUBR/L3	096526	096555	steel	1.250	2.000	14.0	1.000	-6	3/8	3/16	SIS32	T15M
S24V-SVUBR/L3	096527	096556	steel	1.500	2.250	15.750	1.125	-5	3/8	3/16	SIS32	T15M
S32V-SVUBR/L3	096528	096557	steel	2.000	2.750	15.750	1.375	-4	3/8	3/16	SIS32	T15M
A10S-SVUBR/L2	0730196	0730195	steel	.625	.770	10.00	.406	-2	1/4	3/16	MS-1153	FT-07
C10R-SVUBR/L2	081210	-	carbide	.625	.867	8.00	.500	0	1/4	3/16	TCS-1M-02	LT-07
A12S-SVUBR/L2	0730198	0730197	steel	.750	.930	10.00	.500	0	1/4	3/16	MS-1153	FT-07
C12S-SVUBR/L2	081214	-	carbide	.750	.843	10.00	.437	-5	1/4	3/16	TCS-1M-02	LT-07
A20U-SVUBR/L2	0730253	-	steel	1.250	2.000	14.00	1.000	-6	1/4	3/16	MS-1155	FT-15
S10R-SVUBR/L2	-	081200*	steel	.625	.867	8.00	.500	0	1/4	3/16	TCS-1M-02	LT-07
S12S-SVUBR/L2	081207*	081204*	steel	.750	.843	10.00	.437	-5	1/4	3/16	TCS-1M-02	LT-07

**Denotes deleted item, available until depletion of inventory.*
***Available only upon depletion of non-coolant hole inventory.*

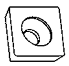
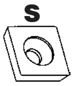
Shims for Negative Rake Inserts

Shim Style	Shim No.	EDP No.	IC	Shim T	R	Insert IC
C	**Use With 80° Diamond Inserts**					
	ICSN432	070472	.490	.188	.031	.500
	ICSN433	070473	.490	.188	.047	.500
	ICSN533	070474	.615	.188	.047	.625
	ICSN633	070865	.740	.188	.047	.750
	ICSN643	0750036	.740	.250	.047	.750
D	**Use With 55° Diamond Inserts**					
	IDSN322	0750056	.365	.125	.031	.375
	IDSN443	070475	.490	.250	.047	.500
	IDSN433	070476	.490	.188	.047	.500
	IDSN533	070477	.610	.188	.047	.625
	IDSN543	070479	.610	.250	.047	.625
R	**Use With Round Inserts**					
	IRSN32	070480	.365	.125	-	.375
	IRSN42	096852	.490	.125	-	.500
	IRSN43	070481	.490	.188	-	.500
	IRSN44	070482	.490	.250	-	.500
	IRSN63	070483	.740	.188	-	.750
	IRSN84	070484	.990	.250	-	1.000
S	**Use With Square Inserts**					
	ISSN322	070461	.365	.125	.031	.375
	ISSN323	070462	.365	.125	.047	.375
	ISSN432	0700578	.490	.188	.031	.500
	ISSN433	070463	.490	.188	.047	.500
	ISSN434	070464	.490	.188	.062	.500
	ISSN443	070465	.490	.250	.047	.500
	ISSN533	070466	.615	.188	.047	.625
	ISSN543	0750041	.615	.250	.047	.625
	ISSN633	070467	.740	.188	.047	.750
	ISSN634	070468	.740	.188	.062	.750
	ISSN643	070469	.740	.250	.047	.750
	ISSN644	070470	.740	.250	.062	.750
	ISSN846	070471	.990	.250	.093	1.000
T	**Use With Triangle Inserts**					
	ITSN322	070535	.365	.125	.031	.375
	ITSN323	070450	.365	.125	.047	.375
	ITSN324	070451	.365	.125	.062	.375
	ITSN332	070536	.365	.188	.031	.375
	ITSN333	070452	.365	.188	.047	.375
	ITSN334	070453	.365	.188	.062	.375
	ITSN423	0750045	.490	.125	.047	.500
	ITSN432	070454	.490	.188	.031	.500
	ITSN433	078396	.490	.188	.047	.500
	ITSN434	070455	.490	.188	.062	.500
	ITSN438	070456	.490	.188	.125	.500
	ITSN533	070457	.615	.188	.047	.625
	ITSN534	070458	.615	.188	.062	.625
	ITSN633	070459	.740	.188	.047	.750
	ITSN636	070460	.740	.188	.093	.750
V	**Use With 35° Diamond Inserts**					
	IVSN322	070487	.365	.125	.031	.375
	IVSN432	070485	.490	.188	.031	.500
	IVSN433	070486	.490	.188	.047	.500
W	**Use With Trigon Inserts**					
	IWSN32.52	091151	.365	.156	.031	.375
	IWSN322	091150	.365	.125	.031	.375
	IWSN332	0750032	.365	.188	.031	.375
	IWSN433	0750035	.490	.188	.047	.500
	SW32	081138	.335	.125	.031	.365
	IWSN432	080281	.490	.188	.031	.500
	IWSN533	080554	.615	.188	.047	.625

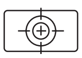
Shims for 5°/7° Relief Angle Inserts

Shim Style	Shim No.	EDP No.	IC	Shim T	R	Insert IC
C	**Use With 80° Diamond Inserts**					
	SC42	096678	.454	.156	.031	.500
	SM417	0700824	.318	.125	.300	.375
D	**Use With 55° Diamond Inserts**					
	SD32	096679	.335	.125	.016	.375
R	**Use With Round Inserts**					
	SR3	096680	.302	.125	-	.375
	SR4	096681	.419	.156	-	.500
	SKRN34	0750062	.340	.125	-	.375
S	**Use With Square Inserts**					
	SS3	084047	.490	.125	.031	.500
	SS3A	084048	.490	.188	.031	.500
	SS32	096682	.335	.125	.031	.375
	SS4	084049	.740	.125	.047	.750
	SS42	096683	.451	.156	.031	.500
T	**Use With Triangle Inserts**					
	ST32	096684	.335	.125	.031	.375
	ST42	096685	.451	.156	.031	.400
V	**Use With 35° Diamond Inserts**					
	SV32	096686	.335	.125	.016	.375
	SV33	096687	.335	.125	.031	.375
	SKVN343	0750061	.336	.125	.016	.375

Shims for 11° Relief Angle Inserts

Shim Style	Shim No.	EDP No.	IC	Shim T	R	Insert IC
C	**Use With 55°* & 80° Diamond Inserts**					
	CSP432	070557	.450	.188	.031	.500
	CSP532	070558	.572	.188	.031	.625
	CSP632	070559	.694	.188	.031	.750
	SKDP343*	0750077	.336	.125	.031	.375
	SKCP343	0750059	.336	.125	.031	.375
R	**Use With Round Inserts**					
	PRS3	084032	.321	.125	-	.375
	PRS4	084033	.446	.125	-	.500
S	**Use With Square Inserts**					
	PSQ3	084036	.450	.125	.016	.500
	PSQ3S	084037	.442	.125	.016	.500
	(PSQ4)SM36	0750069	.694	.125	.047	.625
	PSQ4S	084039	.672	.125	.016	.625
	SM120	0750066	.320	.094	.031	.375
	SM40	0750064	.450	.125	.031	.500
T	**Use With Triangle Inserts**					
	(PTP3) SM41	0750065	.332	.125	.016	.375
	PTP3S	084041	.320	.125	.016	.375
	(PTP4)SM37	0750063	.452	.125	.047	.500
	PTP4S	084043	.422	.125	.031	.500
	PTP5	085381	.548	.188	.031	.625
	SKTP343	0750057	.336	.125	.031	.375

Shim for Spe-D-Lok Toolholder

	Shim Description	EDP No.
	SM420	094698
	SM414	0700832

Hardware & Spare Parts

API Ring Shims

Shim Style	Shim No.	EDP No.	IC	Shim T	R	Insert IC
	FGS1A	084025	.401	.188	46.000	.475
	FGS2A	084026	.499	.188	46.000	.573

Pully/Groove Shims

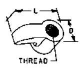
Shim Style	Shim No.	EDP No.	IC	Shim T	R	Insert IC
	PGS2	084059	.496	.188	34.000	.510
	PGS3	084060	.504	.188	38.000	.519
	PGS4	084061	.634	.188	34.000	.648
	PGS5	084062	.643	.188	38.000	.658
	PGS6	084063	.875	.188	34.000	.889
	PGS7	084064	.881	.188	36.000	.895
	PGS8	084065	.885	.188	38.000	.900
	PGS9	071784	.616	.188	34.000	.628
	PGS10	071785	.626	.188	38.000	.638

Lock Pin for Pulley/Sheave

	Lock Pin Number	EDP No.
	GPL1	084143
	OR3	084172

Finger Clamps for Negative Rake Toolholders

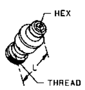
CL



	Clamp Number	EDP No.	L	D	LH Thread
CL	CL6	072825	.580	.310	10-32 UNF
	CL7	072826	.640	.310	10-32 UNF
	CL9	072827	.750	.430	5/16-24 UNF
	CL12	072828	.880	.430	5/16-24 UNF
	CL19	072829	.550	.310	10-32 UNF
	CL20	072830	.730	.375	1/4-28 UNF
	CL24	072831	1.000	.491	3/8-24 UNF
	CL30	072832	1.000	.430	5/16-24 UNF
CK	CK6PKG	0750000	.516	.310	10-32
	CK7PKG	0750001	.640	.310	10-32
	CK9PKG	0750002	.750	.428	5/16-24
	CK12PKG	0750003	.875	.428	5/16-24
	CK19PKG	0750004	.547	.310	10-32
	CK20PKG	0750005	.730	.373	1/4-28
	CK24	0750008	1.000	.493	3/8-24
	CK21PKG	096864	.730	.373	1/4-28
	CK23	0750007	.850	.373	1/4-28
	CK43	0750009	1.000	.428	5/16-24

Lock Pin for Negative Rake Toolholders

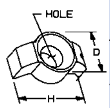
**Use when a shim is not used*



Lock Pin Number	EDP No.	L	Thread	Hex	Insert I.C.
NL23*	070488	.322	8-32 UNS	1/16	.250
NL33*	071092	.347	10-32 UNS	5/64	.375
NL33L*	070902	.410	10-32 UNS	5/64	.375
NL34	070489	.453	10-32 UNS	5/64	.375
NL34L	070490	.513	10-32 UNS	5/64	.375
NL43*	071125	.425	10-32 UNS	5/64	.500
NL44*	080329	.520	1/4-28 UNS	3/32	.500
NL46	070491	.676	1/4-28 UNS	3/32	.500
NL56*	070903	.701	5/16-24 UNS	1/8	.625
NL58	070492	.857	5/16-24 UNS	1/8	.625
NL68	070493	.857	3/8-24 UNS	9/64	.750
NL68L	070494	.947	3/8-24 UNS	9/64	.750
NL810	070495	1.167	7/16-20 UNS	5/32	1.000
NL46L	0750076				

Bridge Clamp

1. Place the notched end on the insert when using a mechanical chipbreaker.
2. Place the plain end on the insert when not using a mechanical chipbreaker

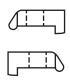


Clamp Number	EDP No.	L	D	Hole
HC7	084092	.469	.313	.172
HC9	084094	.625	.375	.203
HC9L	087778	.750	.375	.234
HC12	084095	.812	.500	.266
HC12L	085383	.938	.500	.266
HC8	084093	1.250	.500	.191
HC13	084096			
HC15	084098			
CV-8V-XX DB	090815			

Wedge Clamp

Clamp Description	EDP No.
W82A	074112
W102	084101

Clamp for Spe-D-Lok Toolholders & Bars



Clamp Description	EDP No.
CM72	094685
CM73	094686
CM74	094687
CM75	094688
CM146	094689
CM147	094690
CM182	094691
CM183	094692
CM184	094693
CM185	094694
CM-116	0700829
CM-117	0700830

Clamps for Grooving Toolholders

Clamp Description	EDP No.
CSP16	099770
CSP22	099771
CSP27	099772

CLP Clamp Clip for HC Clamp Assembly

Clamp Description	EDP No.	L
CLP9	084102	.312
CLP12	084103	.422

Torx Wrench

Wrench Number	EDP No.	Torx
LT-07(T7M)	074957	T7
FT-09(T9)	096689	T9
LT-15(T15M)	074958	T15
FT-07(T7S)	056-2017T7	T7

Hex/Torx Wrench

Wrench Number	EDP No.	Hex	Torx
FTH-15-35(T153)	096690	3.5mm	T15
FTH-15-156(T154)	096691	4mm	T15
LT-25(T25)	072894		

Wrench

	Clamp Description	EDP No.
	LT-10(T10)	072895
	LT-20(T20)	072893
	LT-30(T30)	088243

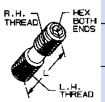
Torx Wrench for Positive Rake Indexable Drills

	Inch Drill Diameter	Metric Drill Diameter	EDP No.	Wrench No.
	.5000-.6875	13-18	056-2026 T6	FT-06
	.7188-.9688	19-24	056-2017 T7	FT-07
	1.000-1.1875	25-30	056-2028 T8	FT-08
	1.250-1.5625	31-39	056-2033 T10	FT-10
	1.6250-1.9375	40-49	056-2015 T15	FT-15
	2.000-2.500	50-63	056-2020 T20	FT-20

Hex Driver Handles

	Handle Description	Size	EDP No.
	DH-.125	1/8	087076
	DH-.078	5/64	087077

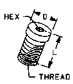
Differential Screws for Finger Clamps & Wedges



Screw No.	EDP No.	L	Thread	Hex
XNS35	072834	.590	10-32 UNF	3/32
XNS36	072835	.750	10-32 UNF	3/32
XNS37	071195	.840	10-32 UNF	3/32
XNS38	072837	1.000	10-32 UNF	3/32
XNS46	072841	.750	1/4-28 UNF	1/8
XNS47	072842	.810	1/4-28 UNF	1/8
XNS48	072843	1.000	1/4-28 UNF	1/8
XNS58	072839	1.000	5/16-24 UNF	5/32
XNS59	072838	1.120	5/16-24 UNF	5/32
XNS510	072840	1.250	5/16-24 UNF	5/32
XNS610	072844	1.250	3/8-24 UNF	3/16
STC11PKG(pkg/10)	0750054	.810	1/4-28	.125
STC19PKG(pkg/10)	0750010	1.380	3/8-24	.188
STC20PKG(pkg/10)	096868	1.160	1/4-28	.125
STC4PKG(pkg/10)	0750051	1.156	5/16-24	.156
STC5PKG(pkg/10)	0750052	.844	10-32	.094

Catalog No.	EDP No.	Hex Drive	Thread Size	A	B	C
STC8PKG(pkg/10)	0700564	5/32	5/16-24	1.00	0.50	0.25
STC9PKG(pkg/10)	0700565	3/32	#10-32	0.59	0.19	0.19
STC32PKG(pkg/10)	0700560	1/8	1/4-28	0.69	0.28	0.28
STC34PKG(pkg/10)	0700561	3/32	#10-32	0.49	0.19	0.19
STC35PKG(pkg/10)	0700562	1/8	1/4-28	0.78	0.40	0.28
STC36PKG(pkg/10)	0700563	3/32	1/4-28	0.81	0.28	0.28
STCM35PKG(pkg/5)	0700559	T-15	M6,0 x 1,00	19,00	10,00	6,00

Miscellaneous Screws



Screw Number	EDP No.	L	D	Thread	Hex
S34	070496	.312	.245	10-32 UNF	5/64
S46	070497	.599	.305	1/4-28 UNF	3/32
S58	070498	.625	.406	5/16-24 UNF	1/8
S68	070499	625	.468	3/8-24 UNF	9/64
S81	074113	.250	.203	6-32 UNC	5/64
S82	084121	.375	.203	6-32 UNC	5/64
S102	084123	.500	.250	8-32 UNC	3/32
S810	070500	.625	.594	7/16-20 UNF	5/32
S111PKG(pkg/10)	0700831	.458	.237	4-40	.062
S1605PKG(pkg/10)	096828	.625	.354	10-32	.125
S19PKG(pkg/10)	0750068	.333	.237	4-40	.062
S3007	080939	-	-	-	-
S318 (pkg/10)	0701189	.625	.266	8-32	.141
S337(pkg/10)	096848	.750	.370	1/4-20	.188
S410(pkg/10)	096840	.500	.308	10-32	.156
S413(pkg/10)	0701192	.880	.308	10-32	.156
S515PKG(pkg/10)	096824	.500	256	6-32	.078
S532PKG(pkg/10)	0700828	.750	.428	1/4-20	.094

Miscellaneous Screws (Cont.)

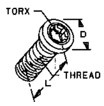
Screw Number	EDP No.	L	D	Thread	Hex
KAS3PKG(pkg/5)	0750047	.310	.245	10-32	.078
KAS4PKG(pkg/5)	096856	.500	.307	1/4-28	.094
KAS5PKG(pkg/5)	0750049	.620	.406	5/16-24	.125
KAS6PKG(pkg/5)	0750050	.620	.468	3/8-24	.141
1/4-20 x 1 SHSCREW	090816				
5/16-24 x 1 SOCS	085742				
8-32 x 1/2 RADAJSC	084114				
8-32 x 5/8 SOSS	087009				
IS63GX 6-32 FLAT HD SC	073063				

M/S Flat Head Cap Screw

	Screw Number	EDP No.	L	D	Thread	Hex
Missing Pic	MS3 △	070874	.375	.231	6-32 UNC	5/64
	MS3L △	072005	.500	.231	6-32 UNC	5/64
	MS4 △	070875	.500	.300	10-32 UNF	3/32
	MS4L △	072006	.625	.300	10-32 UNF	3/32
	MS6 △	070876	.750	.387	1/4-28 UNF	1/8
	S440 ■	084125	.375	.255	4-40 UNC	1/16
	S440S ■	085384	.250	.255	4-40 UNC	1/16
	S632 ■	085385	.375	.307	6-32 UNC	5/64
	S632S *	085715	.375	.189	6-32 UNC	5/64
	S832 ■	084129	.375	.359	8-32 UNC	3/32
	S1024 ■	085386	.500	.411	10-24 UNF	1/8

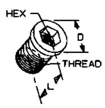
△ *60° INCL*, * *30° INCL*, ■ *82° INCL*

TCS/SIS/WS Insert Screws



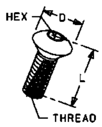
Screw Number	EDP No.	L	D	Thread	Hex
TCS-1M-02	096670	.256	.126	M2.5	T7
TCS-1M-05	096671	.472	.209	M3.5	T15
SIS32	096672	.394	.209	M3.5	T15
SIS33	096673	.433	.189	M3.5	T9
TCS-1M-04	096688	.315	.209	M3.5	T15
TCS-1M-07	096674	.551	.272	M4	T15
SA16	098469				T153
SA22	098470				T154
SS27	099782				
SIS42	096675	.531	.216	M4	T15
WS1017	074955	.223	.138	M2.5	T7
WS1017-1	074060	.171	.138	M2.5	T7
WS1018	074956	.317	.216	M4	T15

CSS Style Screw



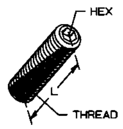
Screw Number	EDP No.	L	D	Thread	Hex
CSS-13M-01	096676	.335	.248	M5 X 0.5	3.5mm
CSS-13M-02	096677	.394	.307	M6 X 0.75	4mm
MS1028PKG	0700823	.490	.238	M5 X 0.8	.093

SH/CS Clamp Screw



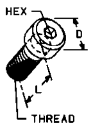
Screw Number	EDP No.	L	D	Thread	Hex
SHC7	084124	.375	.312	8-32 UNF	3/32
CS94	084116	.500	.375	10-32 UNF	1/8
CS96	084118	.750	.375	10-32 UNF	1/8
CS126	084107	.750	.492	1/4-28 UNF	5/32
CS98	084119				

S Socket Head Set Screw



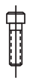
Screw No.	EDP No.	L	Thread	Hex
S55	085387			
S106	075919	.500	8-32 UNC	5/64
S107	084138	.375	8-32 UNC	5/64
S108	084139	.500	10-32 UNF	3/32
S109	084140	.750	10-32 UNF	3/32
1/4-28x 3/4	085388	.750	1/4-28 UNF	1/8

IS/S Socket Head Cap Screw



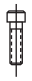
Screw No.	EDP No.	L	D	Thread	Hex
IS22G	074496	.188	.180	4-40 UNC	3/32
IS23G	070533	.250	.180	4-40 UNC	3/32
S86	084122	.750	.270	8-32 UN	9/64

Clamp Screws for Spe-D-Lok Toolholders & Bars



Screw Description	EDP No.
S39PKG	094695
S310PKG	094696
S412PKG	094697

Shim Screw for Spe-D-Lok Toolholders

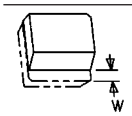


Screw Description	EDP No.
SL344PKG	094699

Insert Screw for Grooving Bars & Toolholders

Screw Description	EDP No.	IC
GTS1	088086	3/8
GTS2	088087	1/2
GTS3	088088	5/8
GTS4	088089	3/4

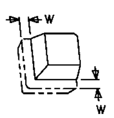
C use with 80° Diamond Inserts



RH Chip-breaker	RH EDP	W	Insert IC
C43DC	070560	.060	1/2
C43DE	070561	.093	1/2
C63DD	070570	.078	3/4
C63DF	070571	.109	3/4

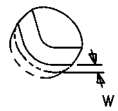
RH shown; LH opposite

LH Chip-breaker	LH EDP	W	Insert IC
C43CC	070564	.060	1/2
C43CE	070565	.093	1/2
C53CC	070566	.060	5/8
C53CE	070567	.093	5/8
C63CD	070568	.078	3/4
C63CF	070569	.109	3/4



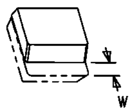
Chip-breaker	EDP No.	W	Insert IC
DLC80	083987	.073	.464

R use with Round Inserts

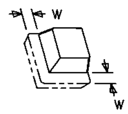


Chip-breaker	EDP No.	W	Insert IC
R32AD	084001	.065	3/8
R32AE	083999	.081	3/8
R43AE	084002	.081	1/2
R43AH	084000	.144	1/2

S use with Square Inserts

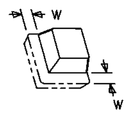


Chip-breaker	EDP No.	W	Insert IC
S32AC	084006	.050	3/8
S32AD	084003	.078	3/8
S43AD	084007	.078	1/2
S43AG	084009	.124	1/2
S43AI	084004	.171	1/2
S63AD	084008	.078	3/4
S63AG	084010	.140	3/4
S63AK	084005	.203	3/4

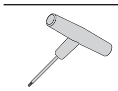


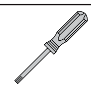
Chip-breaker	EDP No.	W	Insert IC
S32BC	085376	.060	3/8
S32BD	085373	.078	3/8
S43BD	085377	.078	1/2
S43BG	085379	.124	1/2
S43BI	085374	.171	1/2
S63BD	085378	.078	3/4
S63BG	085380	.140	3/4
S63BK	085375	.203	3/4

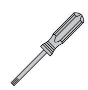
T use with Triangle Inserts

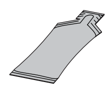


Chip-breaker	EDP No.	W	Insert IC
T22AD	084015	.076	1/4
T22AE	084011	.093	1/4
T33AD	084016	.076	3/8
T33AF	084018	.108	3/8
T33AH	084012	.155	3/8
T43AE	084017	.093	1/2
T43AG	084019	.130	1/2
T43AK	084013	.217	1/2
T53AG	084020	.123	5/8
T53AH	084021	.150	5/8
T53AK	084014	.217	5/8

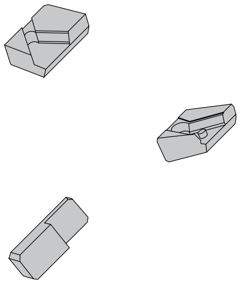
Driver, T-Handle	Catalog No.	EDP No.
	TT-15	0700573
	TT-20	0700574

Driver	Catalog No.	EDP No.
	TH-093(KW093)	0700534
	TH-125(KW125)	0700535
	TH-156(KW156)	0700536

Driver, Torx Screw	Catalog No.	EDP No.
	DT-15	0700509
	DT-07	0700510
	DT-08	0700511
	DT-09	0700512

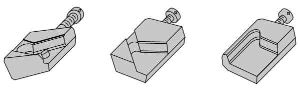
Lubricant, Anti-Seize	Catalog No.	EDP No.
	21537	0700500

Nest, Insert



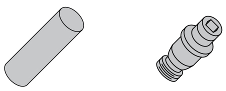
Catalog No.	EDP No.
EMN32PT	0700513
EMN32PTL	0700514
EMN42PS	0700517
EMN43PT	0700519
EMN43PTL	0700520
EMN43PTLW	0700521
EMN43PTW	0700522
HVN32T	0700524
KFWP43	0700527
KNWR1	0700532
MCFN42	0700538
MCFN43	0700539
MCFN43RW	0700540
MCFN53	0700541
MCFNOR53	0700537

Nest, Wiper



Catalog No.	EDP No.
EMN32PTLW	0700515
EMN32PTW	0700516
EMN42PSW	0700518
HVN32TW	0700525

Pin, Insert Lock Pin

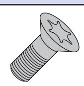


Catalog No.	EDP No.
CFP1PKG	700501
CFP3PKG	700502
CFP4PKG	700503
KL44	700529
KL46	700530

Ring, Retaining

Catalog No.	EDP No.
TA510337PKG (pkg/10)	700572

Screw, Insert Locking



Catalog No.	EDP No.	Torx Drive	Thread Size	Length	Head Dia.	Head Angle
CFS5125PKG(pkg/10)	0700504	T-20	M5,0 x 0,80	6,22	6,40	44°
MS1017(pkg/10)	0700543	T-7	M2,5 x 0,45	5,50	3,23	60°
MS1027PKG(pkg/10)	0700544	T-9	M3,0 x 0,50	7,49	4,83	100°
MS1129PKG(pkg/10)	0700545	T-15	M4,5 x 0,75	11,80	6,80	56°
MS1153PKG(pkg/10)	0700546	T-7	M2,5 x 0,45	6,50	3,45	60°
MS1156PKG(pkg/10)	0700547	—	—	—	—	—
MS1158PKG(pkg/10)	0700548	—	—	—	—	—
MS1168	0700549	T-15	M4,0 x 0,70	5,50	5,45	60°
MS1168PKG(pkg/10)	0700550	T-15	M4,0 x 0,70	5,50	5,45	60°
MS1184	0700551	T-15	M4,0 x 0,70	5,50	5,45	60°
MS1184PKG(pkg/10)	0700552	T-15	M4,0 x 0,70	5,50	5,45	60°
MS1369PKG(pkg/10)	0700553	T-8	M2,5 x 0,45	11,80	4,50	60°
MS1374PKG(pkg/5)	0700554	T-15	M4,5 x 0,75	9,20	6,80	56°
MS1405PKG(pkg/5)	0700555	T-8	M2,5 x 0,45	13,00	4,50	60°
S1011PKG(pkg/10)	0700566	T-9	#4-40	0.235	0.24	40°
S1012PKG(pkg/10)	0700567	T-20	#8-32	0.350	0.34	60°
S1960PKG(pkg/10)	0700568	—	—	—	—	—
MS1025PKG(pkg/10)	0701193	Hex2.5mm	M3.5 x 0.6	12mm	5.9mm	—
MS1155PKG(pkg/10)	0750071	T-15	M3.5 x 0.6	.315	.209	60°
MS1595	094986	T-30	M6 x 1.0	16mm	10mm	—
MS318PKG	0701190	Hex 3mm	M4 x 0.70	12mm	7mm	—
MS412PKG	0701184	Hex 4mm	M5 x 0.80	20mm	8.5mm	—

Screw, Shim Screw

Catalog No.	EDP No.	Torx Drive
SRS3PKG (pkg/10)	0700557	35mm
SRS4PKG (pkg/10)	0700558	

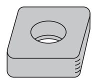
Screw, Socket-Head Mounting

Catalog No.	EDP No.	Hex Drive	Thread Size	Screw Length	Head Dia.	Head Ht.
S445PKG (pkg/10)	0700569					
S446PKG (pkg/10)	0700575					
S458	0700570	3/8	1/2-20	1.00	0.742	0.496
S997	0700571	5/8	3/4-16	1.25	1.116	0.745

Screw, Axial Adjusting

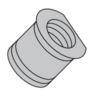
Catalog No.	EDP No.	Thread Size
KUA14PKG (pkg/5)	0700533	#8-32
KUA1	226203	#10-32

Shim, Insert



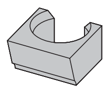
Catalog No.	EDP No.
SM449	0700579

Wedge Barrel



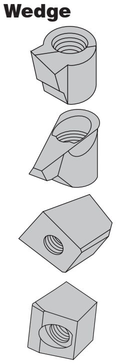
Catalog No.	EDP No.
KBFW4	0700526

Wedge Body



Catalog No.	EDP No.
KIFW4	0700528

Wedge



Catalog No.	EDP No.
CK12M	0700505
CK6M	0700507
CK6ML	0700508
GW1	0700523
MW4H	0700556
KNFW4 solid block	0700531

Wrench, Shim

Catalog No.	EDP No.
LH-3.5 (KAW35M)	0700581

Hex Driver Handles

Catalog No.	EDP No.
DH-.125, 1/8" Hex Driver	087076
DH-.078, 5/64" Hex Driver	087077

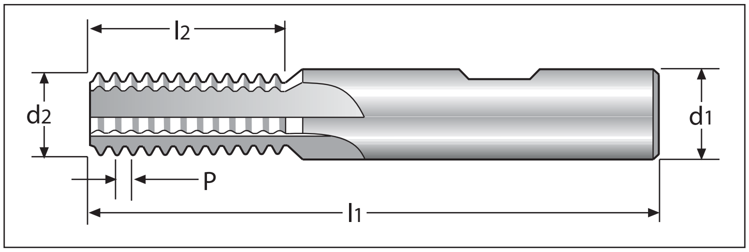
Solid Carbide Thread Mills

Solid Carbide Thread Mill Nomenclature

TM E 1/2 x .470 - 16 UN

- **TM** — Thread Mill
- **E** — E = External Thread; N = Internal Thread; X = Both Internal and External
- **1/2** — Shank Diameter (D1) given in common fraction of an inch
- **.470** — Tool Head Diameter in inches
- **16** — Pitch in threads per inch or millimeters per pitch for Metric ISO threads
- **UN** — Thread Form Type

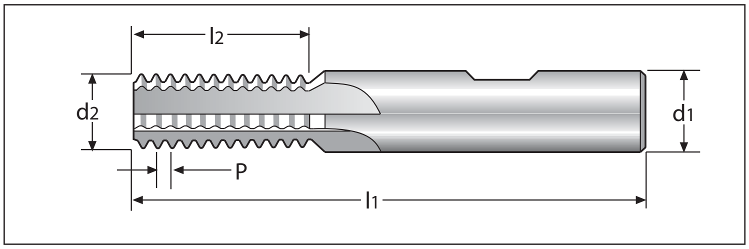
The new solid carbide design features as many as six flutes in the 5/8" and 3/4" styles. With our new advanced flute design there is an increase in the carbide body's core diameter. The concentric thread grind provides a free cutting tool even under maximum operating conditions. And you can thread mill holes as small as #2-64UN with consistent 3B class fits.



External UN

All External Threads	Tool Style	TPI	No. of Flutes	L1	L2	D1	D2	Grade SP321
32 UN	TME 1/4 x .240 - 32UN	32	5	2.2500	0.5625	0.2500	0.2400	090683
28 UN	TME 5/16 x .310 - 28UN	28	5	2.4800	0.7857	0.3125	0.3100	090686
20 UN	TME 3/8 x .370 - 20UN	20	5	2.8400	0.9000	0.3750	0.3700	090690
18 UN	TME 3/8 x .370 - 18UN	18	5	2.8400	0.9444	0.3750	0.3700	090693
16 UN	TME 1/2 x .470 - 16UN	16	5	3.2700	1.1250	0.5000	0.4700	090696
12 UN	TME 1/2 x .470 - 12UN	12	5	3.2700	1.1666	0.5000	0.4700	090700
8 UN	TME 5/8 x .620 - 8UN	8	6	3.6200	1.5000	0.6250	0.6200	090705

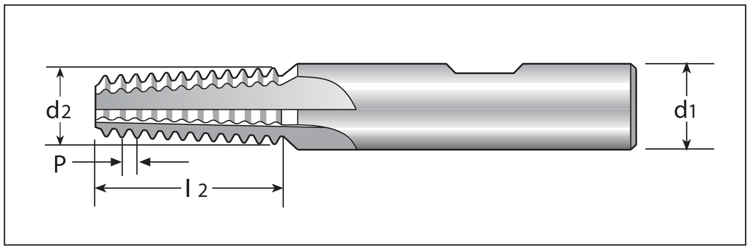
Solid Carbide Thread Mills



Internal UN

Internal Threads	Tool Style	TPI	No. of Flutes	L1	L2	D1	D2	Grade SP321
#12-28 5/16-28 7/16-28	TMN 3/16 x .145 - 28UN	28	3	1.6500	0.3214	0.1875	0.1450	090684
#12-24 3/8-24	TMN 3/16 x .160 - 24UN	24	3	1.6500	0.3333	0.1875	0.1600	090687
1/4-20 5/16-20 3/8-20	TMN 3/16 x .160 - 20UN	20	3	1.6500	0.4000	0.1875	0.1600	090688
3/8-32 7/16-32 1/2-32	TMN 1/4 x .240 - 32UN	32	5	2.2500	0.5625	0.2500	0.2400	090682
5/16-24 3/8-24 9/16-24 5/8-24	TMN 1/4 x .200 - 24UN	24	3	2.2500	0.5000	0.2500	0.2000	094151
5/16-18 9/16-18	TMN 1/4 x .200 - 18UN	18	3	2.2500	0.5000	0.2500	0.2000	090691
3/8-16 7/16-16 1/2-16 3/4-16	TMN 1/4 x .240 - 16UN	16	5	2.2500	0.5625	0.2500	0.2400	090694
7/16-28 1/2-28 9/16-28 5/8-28	TMN 5/16 x .310 - 28UN	28	5	2.4800	0.7857	0.3125	0.3100	090685
7/16-20 1/2-20	TMN 5/16 x .310 - 20UN	20	5	2.4800	0.7500	0.3125	0.3100	094152
7/8-14	TMN 5/16 x .310 - 14UN	14	5	2.4800	0.6429	0.3125	0.3100	090697
1/2-13	TMN 5/16 x .310 - 13UN	13	5	2.4800	0.7692	0.3125	0.3100	090704
9/16-20 5/8-20 11/16-20	TMN 3/8 x .370 - 20UN	20	5	2.8400	0.9000	0.3750	0.3700	090689
9/16-18	TMN 3/8 x .370 - 18UN	18	5	2.8400	0.9444	0.3750	0.3700	090692
9/16-12 5/8-12	TMN 3/8 x .370 - 12UN	12	5	2.8400	0.9167	0.3750	0.3700	090698
5/8-18	TMN 1/2 x .437 - 18UN	18	5	3.2700	1.1111	0.5000	0.4370	094153
11/16-16 3/4-16 13/16-16	TMN 1/2 x .470 - 16UN	16	5	3.2700	1.1250	0.5000	0.4700	090695
7/8-14	TMN 1/2 x .470 - 14UN	14	5	3.2700	1.1424	0.5000	0.4700	094154
11/16-12 3/4-12 7/8-12	TMN 1/2 x .470 - 12UN	12	5	3.2700	1.1666	0.5000	0.4700	090699
5/8-11	TMN 1/2 x .437 - 11UN	11	5	3.2700	1.0910	0.5000	0.4370	090701
3/4-10	TMN 1/2 x .470 - 10UN	10	5	3.2700	1.1000	0.5000	0.4700	090702
7/8-9	TMN 5/8 x .620 - 9UN	9	6	3.6200	1.3330	0.6250	0.6200	098806
1-8 1-1/16"-8 1-1/8"-8	TMN 5/8 x .620 - 8UN	8	6	3.6200	1.5000	0.6250	0.6200	090703
1-1/8"-7 1-1/4"-7	TMN 5/8 x .620 - 7UN	7	6	3.6200	1.4286	0.6250	0.6200	090706

Solid Carbide Thread Mills



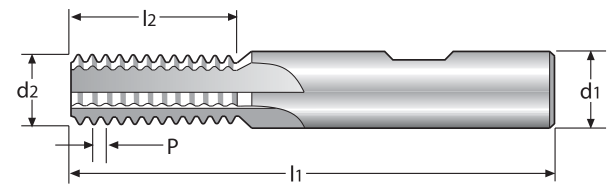
Internal or External NPT - National Pipe

Thread	Tool Style	TPI	No. of Flutes	L1	L2	D1	D2	Grade SP321
1/16-27 NPT 1/8-27 NPT	TMX 1/4 x .240 - 27NPT	27	5	2.2500	0.3704	0.2500	0.2400	090711
1/4-18 NPT 3/8-18 NPT	TMX 5/16 x .310 - 18NPT	18	5	2.4800	0.5555	0.3125	0.3100	090712
1/2-14 NPT 3/4-14 NPT	TMX 1/2 x .470 - 14NPT	14	5	3.2700	0.7857	0.5000	0.4700	090713
1"-11.5 NPT to 2-11.5 NPT	TMX 5/8 x .620 - 11.5NPT	11.5	6	3.6200	1.0434	0.6250	0.6200	090714
2-1/2"-8 NPT	TMX 5/8 x .620 - 8NPT	8	6	3.6200	1.2500	0.6250	0.6200	090715
3"-8 NPT to 6"-8 NPT	TMX 3/4 x .745 - 8NPT	8	6	4.1000	1.5000	0.7500	0.7450	098808

Internal or External NPTF - National Pipe (Dryseal)

Thread	Tool Style	TPI	No. of Flutes	L1	L2	D1	D2	Grade SP321
1/16-27 NPTF 1/8-27 NPTF	TMX 1/4 x .240 - 27NPTF	27	5	2.2500	0.3704	0.2500	0.2400	090716
1/4-18 NPTF 3/8-18 NPTF	TMX 5/16 x .310 - 18NPTF	18	5	2.4800	0.5555	0.3125	0.3100	090717
1/2-14 NPTF 3/4-14 NPTF	TMX 1/2 x .470 - 14NPTF	14	5	3.2700	0.7857	0.5000	0.4700	090718
1"-11.5 NPTF to 2"-11.5 NPTF	TMX 5/8 x .620 - 11.5NPTF	11.5	6	3.6200	1.0434	0.6250	0.6200	090719
2-1/2"-8 NPTF	TMX 5/8 x .620 - 8NPTF	8	6	3.6200	1.2500	0.6250	0.6200	090720
3"-8 NPTF to 6"-8 NPTF	TMX 3/4 x .745 - 8NPTF	8	6	4.1000	1.5000	0.7500	0.7450	098809

Solid Carbide Thread Mills



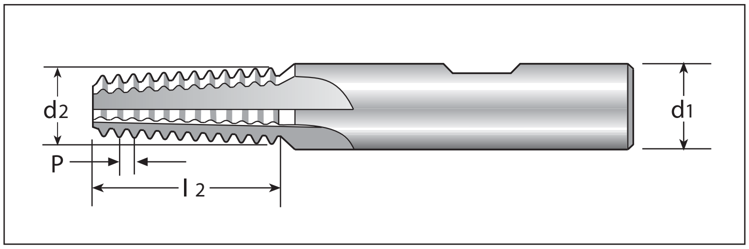
Internal NPSM - National Pipe Straight (Mechanical Seal)

Thread	Tool Style	TPI	No. of Flutes	L1	L2	D1	D2	Grade SP321
1/16-27 NPSM 1/8-27 NPSM	TMN 1/4 x .240 - 27NPSM	27	5	2.2500	0.3704	0.2500	0.2400	090721
1/4-18 NPSM 3/8-18 NPSM	TMN 5/16 x .310 - 18NPSM	18	5	2.4800	0.5555	0.3120	0.3100	090722
1/2-14 NPSM 3/4-14 NPSM	TMN 1/2 x .470 - 14NPSM	14	5	3.2700	0.7857	0.5000	0.4700	090723
1"-11.5 NPSM to 2"-11.5 NPSM	TMN 5/8 x .620 - 11.5NPSM	11.5	6	3.6200	1.0434	0.6250	0.6200	090724

Internal or External NPSF - National Pipe Straight (Dryseal)

Thread	Tool Style	TPI	No. of Flutes	L1	L2	D1	D2	Grade SP321
1/16-27 NPSF 1/8-27 NPSF	TMX 1/4 x .240 - 27NPSF	27	5	2.2500	0.3704	0.2500	0.2400	098811
1/4-18 NPSF 3/8-18 NPSF	TMX 5/16 x .310 - 18NPSF	18	5	2.4800	0.5555	0.3120	0.3100	098812
1/2-14 NPSF 3/4-14 NPSF	TMX 1/2 x .470 - 14NPSF	14	5	3.2700	0.7857	0.5000	0.4700	098813
1"-11.5 NPSF to 2"-11.5 NPSF	TMX 5/8 x .620 - 11.5NPSF	11.5	6	3.6200	1.0434	0.6250	0.6200	098814
2-1/2"-8 NPSF to 6"-8 NPSF	TMX 3/4 x .745 - 8NPSF	8	6	4.1000	1.5000	0.7500	0.7450	098815

Solid Carbide Thread Mills



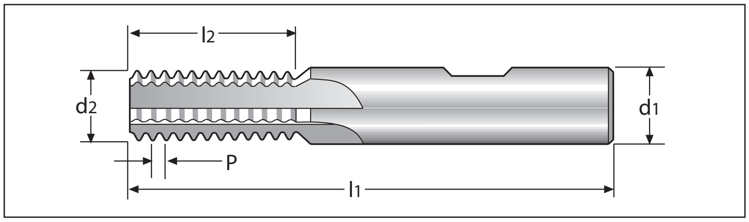
Internal or External BSP - British Standard Pipe (BSW)

Thread	Tool Style	TPI	No. of Flutes	L1	L2	D1	D2	Grade SP321
G-1/16-28 BSP G-1/8-28 BSP	TMX 1/4 x .240 - 28BSP	28	5	2.2500	0.5710	0.2500	0.2400	098851
G-1/4-19 BSP G-3/8-19 BSP	TMX 5/16 x .310 - 19BSP	19	5	2.4800	0.7370	0.3120	0.3100	098852
G-1/2-14 BSP G-3/4-14 BSP	TMX 1/2 x .470 - 14BSP	14	5	3.2700	1.1430	0.5000	0.4700	098853
G-1"-11 BSP to G-2"-11 BSP	TMX 5/8 x .620 - 11BSP	11	6	3.6200	1.3640	0.6250	0.6200	098854

Internal or External BSPT - British Standard Pipe Taper

Thread	Tool Style	TPI	No. of Flutes	L1	L2	D1	D2	Grade SP321
R-1/16-28 BSPT R-1/8-28 BSPT	TMX 1/4 x .240 - 28BSPT	28	5	2.2500	0.3930	0.2500	0.2400	098855
R-1/4-19 BSPT R-3/8-19 BSPT	TMX 5/16 x .310 - 19BSPT	19	5	2.4800	0.5790	0.3120	0.3100	098856
R-1/2-14 BSPT R-3/4-14 BSPT	TMX 1/2 x .470 - 14BSPT	14	5	3.2700	0.7850	0.5000	0.4700	098857
R-1"-11 BSPT to R-2"-11 BSPT	TMX 5/8 x .620 - 11BSPT	11	6	3.6200	1.5450	0.6250	0.6200	098858

Solid Carbide Thread Mills



External ISO (Metric)

All External Threads	Tool Style	Pitch (mm)	No. of Flutes	L1	L2	D1	D2	Grade SP321
0,75 ISO	TME 5/16 x .310 - 0.75ISO	0,75	5	2.4800	0.6102	0.3120	0.3100	090727
1,00 ISO	TME 3/8 x .370 - 1.00ISO	1,0	5	2.8400	0.9449	0.3750	0.3700	090730
1,50 ISO	TME 1/2 x .470 - 1.50ISO	1,5	5	3.2700	1.1811	0.5000	0.4700	090735
2,00 ISO	TME 1/2 x .470 - 2.00ISO	2,0	5	3.2700	1.1811	0.5000	0.4700	090739
3,00 ISO	TME 5/8 x .620 - 3.00ISO	3,0	6	3.6200	1.4173	0.6250	0.6200	090743
6,00 ISO	TME 3/4 x .745 - 6.00ISO	6,0	6	4.1000	1.4173	0.7500	0.7450	090747

Internal ISO (Metric)

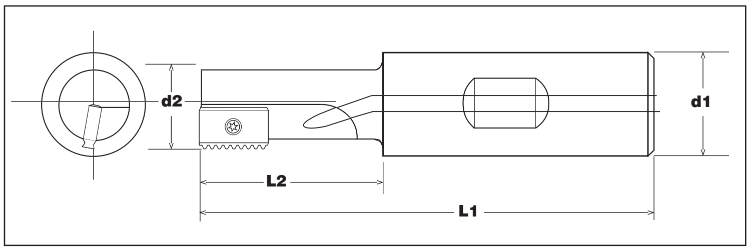
Internal Thread	Tool Style	Pitch (mm)	No. of Flutes	L1	L2	D1	D2	Grade SP321
M6 x 1,00 ISO M7 x 1,00 ISO	TMN 3/16 x .160 - 1.00ISO	1,0	3	1.6500	0.3543	0.1870	0.1600	090728
M8 x 0,75 ISO M11 x 0,75 ISO	TMN 1/4 x .240 - 0.75ISO	0,75	5	2.2500	0.5906	0.2500	0.2400	090726
M8 x 1,25 ISO	TMN 1/4 x .200 - 1.25ISO	1,25	3	2.2500	0.4921	0.2500	0.2000	090731
M10 x 1,50 ISO	TMN 1/4 x .240 - 1.50ISO	1,5	5	2.2500	0.5906	0.2500	0.2400	090732
M12 x 1,00 ISO	TMN 5/16 x .310 - 1.00ISO	1,0	5	2.4800	0.7874	0.3120	0.3100	090729
M12 x 1,75 ISO	TMN 5/16 x .310 - 1.75ISO	1,75	5	2.4800	0.7579	0.3120	0.3100	090736
M14 x 1,50 ISO to M80 x 1,50 ISO	TMN 3/8 x .370 - 1.50ISO	1,5	5	2.8400	0.9449	0.3750	0.3700	090733
M16 x 2,00 ISO	TMN 3/8 x .370 - 2.00ISO	2,0	5	2.8400	0.9449	0.3750	0.3700	090737
M18 x 1,50 ISO to M80 x 1,50 ISO	TMN 1/2 x .470 - 1.50ISO	1,5	5	3.2700	1.1811	0.5000	0.4700	090734
M18 x 2,00 ISO to M150 x 2,00 ISO	TMN 1/2 x .470 - 2.00ISO	2,0	5	3.2700	1.1811	0.5000	0.4700	090738
M20 x 2,50 ISO	TMN 1/2 x .470 - 2.50ISO	2,5	5	3.2700	1.1811	0.5000	0.4700	090740
M24 x 3,00 ISO to M250 x 3,00 ISO	TMN 5/8 x .620 - 3.00ISO	3,0	6	3.6200	1.4173	0.6250	0.6200	090741

Thread Mill Tool Nomenclature

TM X - 0075 - 79 - 2 - 14

TM	X	0075	79	2	14
Thread Mill	X = Use for Both Internal and External	Shank Diameter (D1) in hundreths of an inch (0075= .750")	Tool Head Diameter in hundreths of an inch (79 = .790")	Number of flutes. For single flute styles, this position is omitted.	Insert Length in mm

The new invertable insert tool holders and carbide inserts feature an advanced pocket design that provides secure locking of every insert style no matter how coarse the thread pitch. Now with our single, double or four-flute styles you can utilize any one of four insert length options to precisely mill unified threads from three to forty threads per inch.

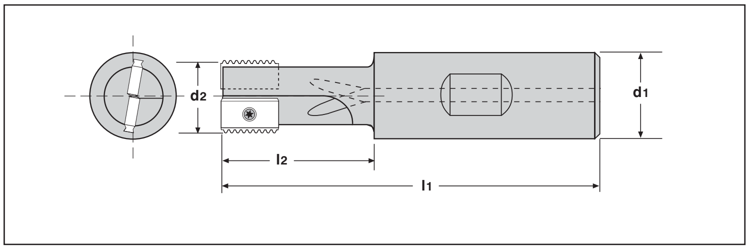


Single Flute Indexable Thread Mill Holder

Holder Style	Insert Size	D1	D2	L1	L2	No. of Flutes	Screw	EDP Number
TMX 0075-50-14*	14 mm	0.750	0.500	3.000	0.800	1	T7 x M2.5	094000
TMX 0075-50-14 HM*	14 mm	0.750	0.500	3.350	1.000	1	T7 x M2.5	094001
TMX 0075-67-14	14 mm	0.750	0.670	3.390	1.180	1	T7 x M2.5	094002
TMX 0075-75-21	21 mm	0.750	0.750	3.750	1.575	1	T20 x M4	094003
TMX 0100-114-30	30 mm	1.000	1.140	4.370	1.968	1	T20 x M5	094004
TMX 0150-173-40	40 mm	1.500	1.730	6.000	3.070	1	T20 x M5	094005

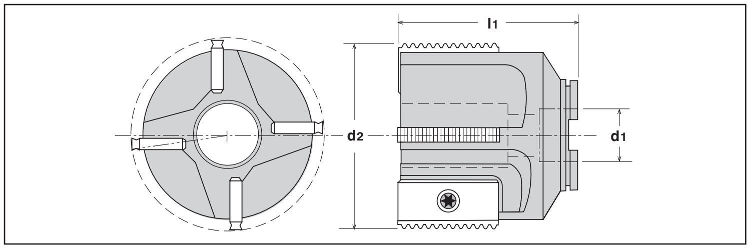
* These holders do not have through hole coolant.

Tool Holders



Two Flute Indexable Thread Mill Holder

Holder Style	Insert Size	D1	D2	L1	L2	No. of Flutes	Screw	EDP Number
TMX 0075-79-2-14	14 mm	0.750	0.790	3.750	1.630	2	T7 x M2.5	094006
TMX 0100-118-2-21	21 mm	1.000	1.180	4.250	2.000	2	T20 x M4	094007
TMX 0125-158-2-30	30 mm	1.250	1.580	5.120	2.850	2	T20 x M5	094008
TMX 0150-197-2-40	40 mm	1.500	1.970	6.000	3.250	2	T20 x M5	094009



Four Flute Indexable Thread Shell Mill Holder

Holder Style	Insert Size	D1	D2	L1	No. of Flutes	Screw	EDP Number
TMX 0075-248-4-30	30 mm	0.750	2.480	1.968	4	T20 x M5	094010
TMX 0100-315-4-30	30 mm	1.000	3.150	2.165	4	T20 x M5	094011
TMX 0100-315-4-40	40 mm	1.000	3.150	2.560	4	T20 x M5	094012

Insert Screw Hardware

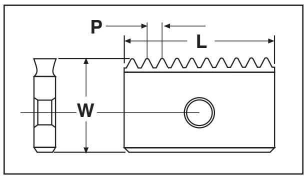
Style	Description	EDP
T7 X M2,5	M2.5 x 0,45 ISO x 6.35 OAL	094148
T20 X M4	M4 x 0,7 ISO x 10.15 OAL	094149
T20 X M5	M5 x 0,8 ISO x 12.25	094150

Thread Mill Insert Nomenclature

14 N - TM - 18 - UN - S

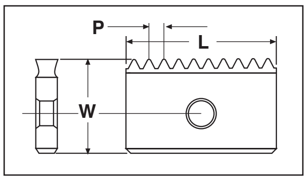
- **14** — Insert Size
- **N** — N = Internal, E = External, X = Either Internal or External
- **TM** — Thread Mill
- **18** — Pitch in Threads per Inch. ISO Pitch in Millimeters.
- **UN** — Thread Form Type
- **S** — Single Sided Insert. Position omitted for invertable edge styles.

14mm UN Inserts



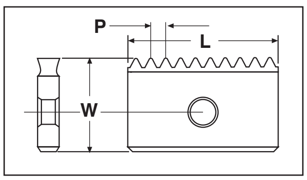
External Insert Style	Size L (mm)	TPI	Grade SP321	Internal Insert Style	Size L (mm)	TPI	Grade SP321
14ETM - 40UN	14	40	094013	14NTM - 40UN	14	40	094023
14ETM - 32UN	14	32	094014	14NTM - 32UN	14	32	094024
14ETM - 28UN	14	29	094015	14NTM - 28UN	14	28	094025
14ETM - 27UN	14	27	094016	14NTM - 27UN	14	27	094026
14ETM - 24UN	14	24	094017	14NTM - 24UN	14	24	094027
14ETM - 20UN	14	20	094018	14NTM - 20UN	14	20	094028
14ETM - 18UN	14	19	094019	14NTM -18UN	14	18	094029
14ETM - 16UN	14	16	094020	14NTM - 16UN	14	16	094030
14ETM - 14UN	14	14	094021	14NTM - 14UN	14	14	094031
14ETM - 12UN	14	12	094022	14NTM - 12UN	14	12	094032

21mm UN Inserts



External Insert Style	Size L (mm)	TPI	Grade SP321	Internal Insert Style	Size L (mm)	TPI	Grade SP321
21ETM - 20UN	21	20	094033	21NTM - 20UN	21	20	094040
21ETM - 18UN	21	18	094034	21NTM - 18UN	21	18	094041
21ETM - 16UN	21	16	094035	21NTM - 16UN	21	16	094042
21ETM - 14UN	21	14	094036	21NTM - 14UN	21	14	094043
21ETM - 12UN	21	12	094037	21NTM - 12UN	21	12	094044
21ETM - 10UN	21	10	094038	21NTM - 10UN	21	10	094045
21ETM - 8UN-S†	21	8	094039	21NTM - 8UN-S†	21	8	094046

30mm UN Inserts

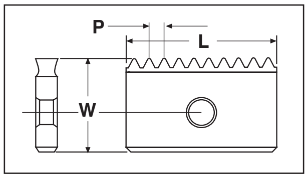


External Insert Style	Size L (mm)	TPI	Grade SP321	Internal Insert Style	Size L (mm)	TPI	Grade SP321
30ETM - 18UN	30	18	094047	30NTM - 18UN	30	18	094056
30ETM - 16UN	30	16	094048	30NTM - 16UN	30	16	094057
30ETM - 14UN	30	14	094049	30NTM - 14UN	30	14	094058
30ETM - 12UN	30	12	094050	30NTM - 12UN	30	12	094059
30ETM - 10UN	30	10	094051	30NTM - 10UN	30	10	094060
30ETM - 8UN	30	8	094052	30NTM - 8UN	30	8	094061
30ETM - 7UN	30	7	094053	30NTM - 7UN	30	7	094062
30ETM - 6UN-S†	30	6	094054	30NTM - 6UN-S†	30	6	094063
30ETM - 5UN-S†	30	5	094055	30NTM - 5UN-S†	30	5	094064

Notes: † Single sided inserts have a single cutting edge and are not invertable.

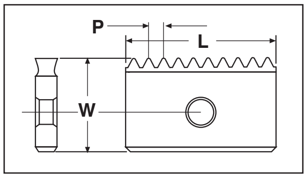
Inserts

40mm UN Inserts



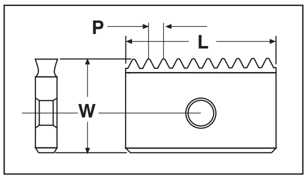
External				Internal			
Insert Style	Size L (mm)	TPI	Grade SP321	Insert Style	Size L (mm)	TPI	Grade SP321
40ETM - 18UN	40	18	094065	40NTM - 18UN	40	18	094076
40ETM - 16UN	40	16	094066	40NTM - 16UN	40	16	094077
40ETM - 12UN	40	12	094067	40NTM - 12UN	40	12	094078
40ETM - 10UN	40	10	094068	40NTM - 10UN	40	10	094079
40ETM - 8UN	40	8	094069	40NTM - 8UN	40	8	094080
40ETM - 7UN	40	7	094070	40NTM - 7UN	40	7	094081
40ETM - 6UN	40	6	094071	40NTM - 6UN	40	6	094082
40ETM - 5UN	40	5	094072	40NTM - 5UN	40	5	094083
40ETM - 4.5UN	40	4	094073	40NTM - 4.5UN	40	4.5	094084
40ETM - 4UN-S†	40	4	094074	40NTM - 4UN-S †	40	4	094085
40ETM - 3UN-S†	40	3	094075	40NTM - 3UN-S †	40	3	094086

14mm ISO Inserts



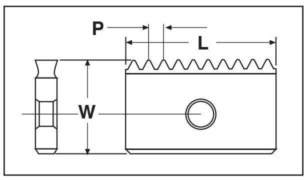
External				Internal			
Insert Style	Size L (mm)	TPI	Grade SP321	Insert Style	Size L (mm)	TPI	Grade SP321
14ETM - 1.0 ISO	14	1	094087	14NTM - 1.0 ISO	14	1	094090
14ETM - 1.5 ISO	14	1.5	094088	14NTM - 1.5 ISO	14	1.5	094091
14ETM - 2.0 ISO-S†	14	2	094089	14NTM - 2.0 ISO-S†	14	2	094092

21mm ISO Inserts



External				Internal			
Insert Style	Size L (mm)	TPI	Grade SP321	Insert Style	Size L (mm)	TPI	Grade SP321
21ETM - 1.0 ISO	21	1	094093	21NTM - 1.0 ISO	21	1	094099
21ETM - 1.5 ISO	21	1.5	094094	21NTM - 1.5 ISO	21	1.5	094100
21ETM - 2.0 ISO	21	2	094095	21NTM - 2.0 ISO	21	2	094101
21ETM - 2.5 ISO	21	2.5	094096	21NTM - 2.5 ISO	21	2.5	094102
21ETM - 3.0 ISO-S†	21	3	094097	21NTM - 3.0 ISO-S†	21	3	094103
21ETM - 3.5 ISO-S†	21	3.5	094098	21NTM - 3.5 ISO-S†	21	3.5	094104

30mm ISO Inserts

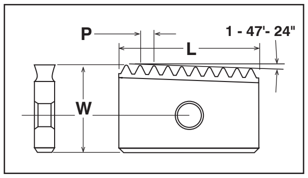


External				Internal			
Insert Style	Size L (mm)	TPI	Grade SP321	Insert Style	Size L (mm)	TPI	Grade SP321
30ETM - 1.5 ISO	30	1.5	094105	30NTM - 1.5 ISO	30	1.5	094111
30ETM - 2.0 ISO	30	2	094106	30NTM - 2.0 ISO	30	2	094112
30ETM - 2.5 ISO	30	2.5	094107	30NTM - 2.5 ISO	30	2.5	094113
30ETM - 3.0 ISO	30	3	094108	30NTM - 3.0 ISO	30	3	094114
30ETM - 3.5 ISO	30	3.5	094109	30NTM - 3.5 ISO	30	3.5	094115
30ETM - 4.0 ISO-S†	30	4	094110	30NTM - 4.0 ISO-S†	30	4	094116
				30NTM - 4.5 ISO-S†	30	4.5	094117
				30NTM - 5.0 ISO-S†	30	5	094118
				30NTM - 5.5 ISO-S†	30	5.5	094119

Notes: † Single sided inserts have a single cutting edge and are not invertable.

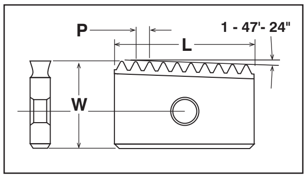
Inserts for Tool Holders

NPT Inserts Internal & External



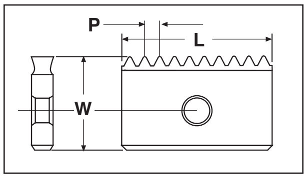
Insert Style	Size L (mm)	TPI	L	W	Grade SP321
14XTM - 18NPT-S† [1]	14	18	.551	.295	094120
14XTM - 14NPT-S†	14	14	.551	.295	094121
21XTM - 18 NPT-S† [1]	21	18	.827	.472	094122
21XTM - 14 NPT-S† [2]	21	14	.827	.472	094123
21XTM - 11.5 NPT-S†	21	11.5	.827	.472	094124
30XTM - 11.5 NPT-S†	30	11.5	1.181	.630	094125
30XTM - 8 NPT-S †	30	8	1.181	.630	094126
40XTM - 11.5 NPT-S†	40	11.5	1.575	.787	094127
40XTM - 8 NPT-S†	40	8	1.575	.787	094128

NPTF (Dryseal) Inserts Internal & External



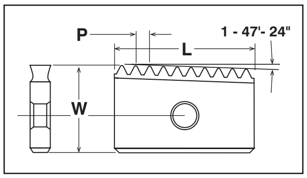
Insert Style	Size L (mm)	TPI	L	W	Grade SP321
14XTM - 18NPTF-S†	14	18	.551	.295	094129
14XTM - 14NPTF-S†	14	14	.551	.295	094130
21XTM - 18 NPTF-S†	21	18	.827	.472	094131
21XTM - 14 NPTF-S †	21	14	.827	.472	094132
21XTM - 11.5 NPTF-S	21	11.5	.827	.472	094133
30XTM - 11.5 NPTF-S	30	11.5	1.181	.630	094134
30XTM - 8 NPTF-S †	30	8	1.181	.630	094135
40XTM - 11.5 NPTF-S	40	11.5	1.575	.787	094136
40XTM - 8 NPTF-S †	40	8	1.575	.787	094137

NPSM Internal Inserts



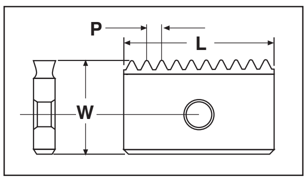
Insert Style	Size L (mm)	TPI	L	W	Grade SP321
21NTM - 14 NPSM	21	14	.827	.472	094138
21NTM - 11.5 NPSM	21	11.5	.827	.472	094139
30NTM - 11.5 NPSM	30	11.5	1.181	.630	094140
30NTM - 8 NPSM	30	8	1.181	.630	094141

BPST Taper Inserts Internal & External



Insert Style	Size L (mm)	TPI	L	W	Grade SP321
21XTM - 14 BSPT-S †	21	14	.827	.472	094142
21XTM - 11 BPST-S †	21	11	.827	.472	094143

Whitworth (BSW) & BSP Inserts



Insert Style	Size L (mm)	TPI	L	W	Grade SP321
14XTM - 19 W	14	19	.551	.295	094144
14XTM - 14 W	14	14	.551	.295	094145
21XTM - 11 W	21	11	.827	.472	094146
30XTM - 11 W	30	11	1.181	.630	094147

Notes: *† Single sided inserts have a single cutting edge and are not invertable.*
[1] These inserts are for use on external 1/4" and 3/8" NPT & NPTF applications only.
[2] For internal 1/2"-14 NPTF threads bore must be tapered 1/16" before milling.

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Turning Insert Cutting Data Conventional Materials

Low Carbon Steels & Free Machining Steels — 1018-1025 — 100-150 HB

Operation			Inserts				
Heavy Roughing	.024 & up IPR	.2 & up DOC	xNMM-HR				
Roughing	.010-.030 IPR	.10-.40 DOC	xNMG -PH/-GR	xNMX	xNMG		
General	.008-.020 IPR	.05-.15 DOC	xNMG -PG/-GA	xNMP	xNMG	xNGG	xCMT-GP
Finishing	.003-.010 IPR	.02-.10 DOC	xNMG -PL/-FF	xNMG-S	xNGG	xCMT-GP	xPGR

Machining Conditions	Carbide Grade	Speed SFM	Carbide Grade	Speed SFM	Carbide Grade	Speed SFM	Carbide Grade	Speed SFM	Carbide Grade	Speed SFM
Excellent	SA210▼	1000-1450	SA210▼ SA200*						SS140	900
Good	SA210▼ SA200*	800-900	SA220▼ SA150●	700-800			SS140	700	SS160	600
Poor	SA550●	400-600	SN550▲	300-500	SS550	300-400				

Medium Carbon Steels — 1040-1045 — 175-325 HB

Operation			Inserts				
Heavy Roughing	.024 & up IPR	.2 & up DOC	xNMM-HR				
Roughing	.010-.030 IPR	.10-.40 DOC	xNMG -PH/-GR	xNMX	xNMG		
General	.008-.020 IPR	.05-.15 DOC	xNMG -PG/-GA	xNMG	xNGG	xCMT-GP	
Finishing	.003-.010 IPR	.02-.10 DOC	xNMG -PL/-FF	xNMG-S	xNGG	xCMT-GP	xPGR

Machining Conditions	Carbide Grade	Speed SFM	Carbide Grade	Speed SFM	Carbide Grade	Speed SFM	Carbide Grade	Speed SFM	Carbide Grade	Speed SFM
Excellent	SA210▼	700-1300	SA210▼ SA200*	550-950					SS140	550-650
Good	SA210▼ SA200*	500-950	SA220▼ SA150●	500-725			SS140	450-550	SS160	350-450
Poor	SA550●		SN550▲	250-450	SS160	250-350	SS550	150-300		

High Carbon Steels — 1060-1586 — 175-325 HB

Operation			Inserts				
Heavy Roughing	.024 & up IPR	.2 & up DOC	xNMM-HR				
Roughing	.010-.030 IPR	.10-.40 DOC	xNMG -PH/-GR	xNMX	xNMG		
General	.008-.020 IPR	.05-.15 DOC	xNMG -PG/-GA	xNMG	xNGG	xCMT-GP	
Finishing	.003-.010 IPR	.02-.10 DOC	xNMG -PL/-FF	xNMG-S	xNGG	xCMT-GP	xPGR

Machining Conditions	Carbide Grade	Speed SFM	Carbide Grade	Speed SFM	Carbide Grade	Speed SFM	Carbide Grade	Speed SFM	Carbide Grade	Speed SFM
Excellent	SA210▼	750-950	SA210▼ SA200*	650-800					SS140	350-450
Good	SA210▼ SA180●	500-700	SA220▼ SA150●	400-600			SS140	350-450	SS160	250-350
Poor	SA550●		SA550●	250-350	SN550	200-300	SS160	300-400	SS550	200-300

▼ **Primary Grades** ▲ **TiN /Coated** ● **Oxide Coated Carbide** * **Multi-Coat**

The recommended cutting speed is shown as a range due to the variable hardness of the workpiece material. Use the lower end of the cutting speed range for harder materials and the higher end for softer materials.

Machining conditions:
Excellent: continuous cutting, premachined surface, no hard spots, no interruptions.
Good: continuous cutting, clean surface, moderate shock.
Poor: interruptions, scale, hard spots, etc.

Turning Insert Cutting Data Conventional Materials

Medium Carbon Alloy Steels, Free Machining 4140-4150 150-425 HB

Operation			Inserts				
Heavy Roughing	.024 & up IPR	.2 & up DOC	xNMM-HR				
Roughing	.010-.030 IPR	.10-.40 DOC	xNMG -PH/-GR	xNMX	xNMG		
General	.008-.020 IPR	.05-.15 DOC	xNMG -PG/-GA	xNMG	xNGG	xCMT-GP	
Finishing	.003-.010 IPR	.02-.10 DOC	xNMG -PL/-FF	xNMG-S	xNGG	xCMT-GP	xPGR

Machining Conditions	Carbide Grade	Speed SFM	Carbide Grade	Speed SFM	Carbide Grade	Speed SFM	Carbide Grade	Speed SFM	Carbide Grade	Speed SFM
Excellent	SA210▼	600-900	SA210▼ SA200*	450-850					SS140	300-600
Good	SA210▼ SA200*	400-700	SA220 SA150●	350-600			SS140	350-500	SS160	200-350
Poor	SA550●	300-500	SA550▲	300-400	SN550	250-350	SS160	250-500	SS550	150-250

Low Carbon Alloy Steels 4012, 9310 125-425 HB

Operation			Inserts				
Heavy Roughing	.024 & up IPR	.2 & up DOC	xNMM-HR				
Roughing	.010-.030 IPR	.10-.40 DOC	xNMG -PH/-GR	xNMX	xNMG		
General	.008-.020 IPR	.05-.15 DOC	xNMG -PG/-GA	xNMP	xNMG	xNGG	xCMT-GP
Finishing	.003-.010 IPR	.02-.10 DOC	xNMG -PL/-FF	xNMG-S	xNGG	xCMT-GP	xPGR

Machining Conditions	Carbide Grade	Speed SFM	Carbide Grade	Speed SFM	Carbide Grade	Speed SFM	Carbide Grade	Speed SFM	Carbide Grade	Speed SFM
Excellent	SA210▼	500-850	SA210▼ SA200*	500-850					SS140	300-500
Good	SA210▼ SA200*	400-700	SA220▼ SA150●	300-600			SS140	300-400	SS160	250-400
Poor	SA550●	300-400	SN550▲	150-250	SS160	150-250	SS550	100-200		

Medium Carbon Alloy Steels 1330, 8625 175-425 HB

Operation			Inserts				
Heavy Roughing	.024 & up IPR	.2 & up DOC	xNMM-HR				
Roughing	.010-.030 IPR	.10-.40 DOC	xNMG -PH/-GR	xNMX	xNMG		
General	.008-.020 IPR	.05-.15 DOC	xNMG -PG/-GA	xNMG	xNGG	xCMT-GP	
Finishing	.003-.010 IPR	.02-.10 DOC	xNMG -PL/-FF	xNMG-S	xNGG	xCMT-GP	xPGR

Machining Conditions	Carbide Grade	Speed SFM	Carbide Grade	Speed SFM	Carbide Grade	Speed SFM	Carbide Grade	Speed SFM	Carbide Grade	Speed SFM
Excellent	SA210▼	500-850	SA210▼ SA200*	400-750					SS140	300-550
Good	SA210▼ SA200*	350-600	SA220▼ SA150●	300-500			SS140	300-400	SS160	200-300
Poor	SA550●	300-400	SA550●	250-300	SN550▲	150-250	SS160	150-250	SS550	100-200

▼ Primary Grades **▲ TiN /Coated** **● Oxide Coated Carbide** *** Multi-Coat**

The recommended cutting speed is shown as a range due to the variable hardness of the workpiece material. Use the lower end of the cutting speed range for harder materials and the higher end for softer materials.

Machining conditions:
Excellent: continuous cutting, premachined surface, no hard spots, no interruptions.
Good: continuous cutting, clean surface, moderate shock.
Poor: interruptions, scale, hard spots, etc.

Turning Insert Cutting Data Conventional Materials

High Carbon Alloy Steels — 3140, 4145, 8620 — 175-425 HB

Operation			Inserts				
Heavy Roughing	.024 & up IPR	.2 & up DOC	xNMM-HR				
Roughing	.010-.030 IPR	.10-.40 DOC	xNMG -PH/-GR	xNMX	xNMG		
General	.008-.020 IPR	.05-.15 DOC	xNMG -PG/-GA	xNMG	xNGG	xCMT-GP	
Finishing	.003-.010 IPR	.02-.10 DOC	xNMG -PL/-FF	xNMG-S	xNGG	xCMT-GP	xPGR

Machining Conditions	Carbide Grade	Speed SFM	Carbide Grade	Speed SFM	Carbide Grade	Speed SFM	Carbide Grade	Speed SFM	Carbide Grade	Speed SFM
Excellent	SA210▼	500-950	SA210▼ SA200*	400-750					SS140	250-450
Good	SA210▼ SA200*	350-650	SA220▼ SA150●	300-500			SS140	250-400	SS160	200-350
Poor	SA550●	250-400	SA550●	200-300	SN550▲	200-300	SS160	150-250	SS550	100-200

High Speed Tool Steels (Annealed) — M3, M34, T4 — 225-250 HB

Operation			Inserts				
Heavy Roughing	.024 & up IPR	.2 & up DOC	—				
Roughing	.010-.030 IPR	.10-.40 DOC	xNMG -PH/-GR	xNMX	xNMG		
General	.008-.020 IPR	.05-.15 DOC	xNMG -PG/-GA	xNMG	xNGG	xCMT -PG/-GA	
Finishing	.003-.010 IPR	.02-.10 DOC	xNMG -PL/-FF	xNMG-S	xNGG	xCMT -PG/-GA	xPGR

Machining Conditions	Carbide Grade	Speed SFM	Carbide Grade	Speed SFM	Carbide Grade	Speed SFM	Carbide Grade	Speed SFM	Carbide Grade	Speed SFM
Excellent	SA210▼	550-650	SA210▼ SA200*	540-550					SS140	350-400
Good	SA210▼ SA200*	400-450	SA220▼ SA150●	350-400			SS140	300-350	SS160	200-250
Poor	—	—								

Hot Work Tool Steels (Annealed) — H10-H13 — 225-250 HB

Operation			Inserts				
Heavy Roughing	.024 & up IPR	.2 & up DOC	—				
Roughing	.010-.030 IPR	.10-.40 DOC	xNMG -PH/-GR	xNMX	xNMG		
General	.008-.020 IPR	.05-.15 DOC	xNMG -PG/-GA	xNMG	xNGG	xCMT -PG/-GA	
Finishing	.003-.010 IPR	.02-.10 DOC	xNMG -PL/-FF	xNMG-S	xNGG	xCMT -PG/-GA	xPGR

Machining Conditions	Carbide Grade	Speed SFM	Carbide Grade	Speed SFM	Carbide Grade	Speed SFM	Carbide Grade	Speed SFM	Carbide Grade	Speed SFM
Excellent	SA210▼	550-650	SA210▼ SA200*	450-550					SS140	350-400
Good	SA210▼ SA200*	400-450	SA220▼ SA150●	350-400			SS140	300-350	SS160	200-250
Poor	—	—								

▼ Primary Grades **▲ TiN /Coated** **● Oxide Coated Carbide** *** Multi-Coat**

The recommended cutting speed is shown as a range due to the variable hardness of the workpiece material. Use the lower end of the cutting speed range for harder materials and the higher end for softer materials.

Machining conditions: Excellent: continuous cutting, premachined surface, no hard spots, no interruptions.
Good: continuous cutting, clean surface, moderate shock.
Poor: interruptions, scale, hard spots, etc.

Turning Insert Cutting Data Conventional Materials

Cold Work Tool Steels (Annealed) — A7-03 — 200-250 HB

Operation			Inserts				
Heavy Roughing	.024 & up IPR	.2 & up DOC	—				
Roughing	.010-.030 IPR	.10-.40 DOC	xNMG -PH/-GR	xNMX	xNMG		
General	.008-.020 IPR	.05-.15 DOC	xNMG -PG/-GA	xNMG	xNGG	xCMT-GP	
Finishing	.003-.010 IPR	.02-.10 DOC	xNMG -PL/-FF	xNMG-S	xNGG	xCMT-GP	xPGR

Machining Conditions	Carbide Grade	Speed SFM	Carbide Grade	Speed SFM	Carbide Grade	Speed SFM	Carbide Grade	Speed SFM	Carbide Grade	Speed SFM
Excellent	SA210▼	375-425	SA210▼ SA200*	350-375					SS140	225-275
Good	SA210▼ SA200*	275-300	SA220▼ SA150●	250-275			SS140	175-225		
Poor	—	—	—							

Water Hardening Tool Steels (Annealed) — W1, W5 — 150-200 HB

Operation			Inserts				
Heavy Roughing	.024 & up IPR	.2 & up DOC	—				
Roughing	.010-.030 IPR	.10-.40 DOC	xNMG -PH/-GR	xNMX	xNMG		
General	.008-.020 IPR	.05-.15 DOC	xNMG -PG/-GA	xNMG	xNGG	xCMT -PG/-GA	
Finishing	.003-.010 IPR	.02-.10 DOC	xNMG -PL/-FF	xNMG-S	xNGG	xCMT -PG/-GA	xPGR

Machining Conditions	Carbide Grade	Speed SFM	Carbide Grade	Speed SFM	Carbide Grade	Speed SFM	Carbide Grade	Speed SFM	Carbide Grade	Speed SFM
Excellent	SA210▼	700-800	SA210▼ SA200*	600-700					SS140	450-500
Good	SA210▼ SA200*	500-550	SA220▼ SA150●	450-500			SS140	400-450	SS160	350-400
Poor	—	—	—							

High Strength Steels — 4340, 300M — 225-400 HB

Operation			Inserts				
Heavy Roughing	.024 & up IPR	.2 & up DOC	xNMM-HR				
Roughing	.010-.030 IPR	.10-.40 DOC	xNMG -PH/-GR	xNMX	xNMG		
General	.008-.020 IPR	.05-.15 DOC	xNMG -PG/-GA	xNMG	xNGG	xCMT -PG/-GA	
Finishing	.003-.010 IPR	.02-.10 DOC	xNMG -PL/-FF	xNMG-S	xNGG	xCMT -PG/-GA	xPGR

Machining Conditions	Carbide Grade	Speed SFM	Carbide Grade	Speed SFM	Carbide Grade	Speed SFM	Carbide Grade	Speed SFM	Carbide Grade	Speed SFM
Excellent	SA210▼	600-750	SA210▼ SA200*	450-650					SS140	250-450
Good	SA210▼ SA200*	350-500	SA220▼ SA150●	300-400			SS140	250-350	SS160	200-300
Poor	SA550●	300-400	SN550	200-300	SA550●	200-300	SS160	175-275	SS550	150-200

▼ **Primary Grades** ▲ **TiN /Coated** ● **Oxide Coated Carbide** * **Multi-Coat**

The recommended cutting speed is shown as a range due to the variable hardness of the workpiece material. Use the lower end of the cutting speed range for harder materials and the higher end for softer materials.

Machining conditions: Excellent: continuous cutting, premachined surface, no hard spots, no interruptions.
Good: continuous cutting, clean surface, moderate shock.
Poor: interruptions, scale, hard spots, etc.

Turning Insert Cutting Data Conventional Materials

Armor Plate HY100 200-300 HB

Operation			Inserts				
Heavy Roughing	.024 & up IPR	.2 & up DOC	—				
Roughing	.010-.030 IPR	.10-.40 DOC	xNMG -PH/-GR	xNMX	xNMG		
General	.008-.020 IPR	.05-.15 DOC	xNMG -PG/-GA	xNMG	xNGG	xCMT-GP	
Finishing	.003-.010 IPR	.02-.10 DOC	xNMG -PL/-FF	xNMG-S	xNGG	xCMT-GP	xPGR

Machining Conditions	Carbide Grade	Speed SFM	Carbide Grade	Speed SFM	Carbide Grade	Speed SFM	Carbide Grade	Speed SFM	Carbide Grade	Speed SFM
Excellent	SA210▼	650-750	SA210▼ SA200*	550-650					SS140	350-450
Good	SA210▼ SA200*	400-500	SA220▼ SA150●	300-400			SS140	325-375	SS160	275-325
Poor	—	—	—							

Stainless Steels, Free Machining, Ferritic, Martensitic, Annealed 400 & 500 Series 135-185 HB

Operation			Inserts			
Heavy Roughing	.024 & up IPR	.2 & up DOC	xNMM-HR			
Roughing	.010-.030 IPR	.10-.40 DOC	xNMG -PH/-GA	xNMG-GR	xNMG	
General	.008-.020 IPR	.05-.15 DOC	xNMG -PG/-GA	xNMZ	xNMP	
Finishing	.003-.010 IPR	.02-.10 DOC	xNMG -PL/-FF	xNMG-S	xCMT -PG/-GA	xPGR

Machining Conditions	Carbide Grade	Speed SFM	Carbide Grade	Speed SFM	Carbide Grade	Speed SFM	Carbide Grade	Speed SFM	Carbide Grade	Speed SFM
Excellent	SA210▼	900-1000	SA210▼ SA200*	800-900			SC20	650-700	SS140	600-675
Good	SA210▼ SA200*	750-800	SA220▼ SN150●	650-750	SN250▲	650-750			SS160	550-600
Poor	SN550▲	350-450	SS160	325-425	SS550	300-400				

Stainless Steels, Free Machining, Austenitic, Annealed 200 & 300 Series 135-185 HB

Operation			Inserts			
Heavy Roughing	.024 & up IPR	.2 & up DOC	xNMM-HR			
Roughing	.010-.030 IPR	.10-.40 DOC	xNMG -PH/-GA	xNMG-GR	xNMG	
General	.008-.020 IPR	.05-.15 DOC	xNMG -PG/-GP	xNMZ	xNMP	
Finishing	.003-.010 IPR	.02-.10 DOC	xNGG -PL/-DP	xNMG-S	xCMT -PG/-GA	xPGR

Machining Conditions	Carbide Grade	Speed SFM	Carbide Grade	Speed SFM	Carbide Grade	Speed SFM	Carbide Grade	Speed SFM	Carbide Grade	Speed SFM
Excellent	SP321▲	650-750	SP201▲	600-700			SC230	500-550	SC20	450-500
Good	SP201▲	550-625	SA210▼ SA200*	500-550			SC20	425-475		
Poor	SN550▲	275-325	SS550	200-275						

▼ Primary Grades **▲ TiN /Coated** **● Oxide Coated Carbide** *** Multi-Coat**

The recommended cutting speed is shown as a range due to the variable hardness of the workpiece material. Use the lower end of the cutting speed range for harder materials and the higher end for softer materials.

Machining conditions: Excellent: continuous cutting, premachined surface, no hard spots, no interruptions.
Good: continuous cutting, clean surface, moderate shock.
Poor: interruptions, scale, hard spots, etc.

Turning Insert Cutting Data Conventional Materials

Stainless Steels, Precipitation Hardening (PH Series) 17-4 PH 150-440 HB

Operation			Inserts			
Heavy Roughing	.024 & up IPR	.2 & up DOC	xNMM-HR			
Roughing	.010-.030 IPR	.10-.40 DOC	xNMG -PG/-GA	xNMG -PH/-GR	xNMG	
General	.008-.020 IPR	.05-.15 DOC	xNMG-GP	xNMZ	xNMP	
Finishing	.003-.010 IPR	.02-.10 DOC	xNMG -PL/-FF	xNMG-S	xCMT-GP	xPGR

Machining Conditions	Carbide Grade	Speed SFM	Carbide Grade	Speed SFM	Carbide Grade	Speed SFM	Carbide Grade	Speed SFM	Carbide Grade	Speed SFM
Excellent	SP321 ▲	350-550	SP201 ▲	325-525			SC230	300-400	SC20	200-350
Good	SA200*	325-475	SN150 ●	250-400			SC20	200-375	SS160	150-300
Poor	SN150 ▲	275-350	SN550 ▲	250-300	SS160	225-325	SS550	175-225	SS550	175

Grey Cast Irons, Ferritic, Annealed ASTM A48 Class 20 120-150 HB

Operation			Inserts			
Heavy Roughing	.024 & up IPR	.2 & up DOC	xNMA	xNMM-HR		
Roughing	.010-.030 IPR	.10-.40 DOC	xNMA	xNMG -PH/-GR	xNMX	
General	.008-.020 IPR	.05-.15 DOC	xNMG -PH/-GR	xNMA	xNMP	
Finishing	.003-.010 IPR	.02-.10 DOC	xNMZ	zNMP	xCMT	xPG

Machining Conditions	Carbide Grade	Speed SFM	Carbide Grade	Speed SFM	Carbide Grade	Speed SFM	Carbide Grade	Speed SFM	Carbide Grade	Speed SFM
Excellent	SA280 ●	900-1200	SA210 ▼ SA200*	800-1000					SC230	650-750
Good	SA210 ▼ SA200*	650-800	SA20	600-700	SA220 ▼	500-600			SC20	500-550
Poor	SA550 ●	450-550	SA550 ●	350-450	SC20	325-450				

Grey Cast Irons, Pearlitic-Ferritic ASTM A48 Class 25 160-200 HB

Operation			Inserts			
Heavy Roughing	.024 & up IPR	.2 & up DOC	xNMA	xNMM-HR		
Roughing	.010-.030 IPR	.10-.40 DOC	xNMA	xNMG -PH/-GR	xNMX	
General	.008-.020 IPR	.05-.15 DOC	xNMG PH/-GR	xNMA	xNMP	
Finishing	.003-.010 IPR	.02-.10 DOC	xNMZ	zNMP	xCMT	xPG

Machining Conditions	Carbide Grade	Speed SFM	Carbide Grade	Speed SFM	Carbide Grade	Speed SFM	Carbide Grade	Speed SFM	Carbide Grade	Speed SFM
Excellent	SA280 ●	650-800	SA210 ▼ SA200*	625-675					SC230	450-550
Good	SA210 ▼ SA200*	500-700	SA20 ●	450-550	SA220	400-500			SC20	350-450
Poor	SA550	350-450	SA550 ●	300-400	SC20	250-350				

▼ Primary Grades **▲ TiN /Coated** **● Oxide Coated Carbide** *** Multi-Coat**

The recommended cutting speed is shown as a range due to the variable hardness of the workpiece material. Use the lower end of the cutting speed range for harder materials and the higher end for softer materials.

Machining conditions: Excellent: continuous cutting, premachined surface, no hard spots, no interruptions.
Good: continuous cutting, clean surface, moderate shock.
Poor: interruptions, scale, hard spots, etc.

Turning Insert Cutting Data Conventional Materials

Grey Cast Irons, Pearlitic, AS Cast 190-220 HB

Operation			Inserts				
Heavy Roughing	.024 & up IPR	.2 & up DOC	xNMA	xNMM-HR			
Roughing	.010-.030 IPR	.10-.40 DOC	xNMA	xNMG -PH/-GR	xNMX		
General	.008-.020 IPR	.05-.15 DOC	xNMG -PH/-GR	xNMA		xNMP	
Finishing	.003-.010 IPR	.02-.10 DOC	xNMZ	zNMP		xCMT	xPG

Machining Conditions	Carbide Grade	Speed SFM	Carbide Grade	Speed SFM	Carbide Grade	Speed SFM	Carbide Grade	Speed SFM	Carbide Grade	Speed SFM
Excellent	SA280●	550-650	SA210▼ SA200*	500-550					SC230	375-450
Good	SA210▼ SA200*	450-550	SA220▼ SA150●	425-525	SA250●	400-500			SC20	300-375
Poor	SA550▼	350-450	SA550●	300-400	SC20	200-300				

Grey Cast Irons, Austenitic Ni-RESIST-type 1 215 HB

Operation			Inserts				
Heavy Roughing	.024 & up IPR	.2 & up DOC					
Roughing	.010-.030 IPR	.10-.40 DOC	xNMA	xNMG -PH/-GR	xNMX		
General	.008-.020 IPR	.05-.15 DOC	xNMG -PH/-GR	xNMA		xNMP	
Finishing	.003-.010 IPR	.02-.10 DOC	xNMZ	zNMP		xCMT	xPG

Machining Conditions	Carbide Grade	Speed SFM	Carbide Grade	Speed SFM	Carbide Grade	Speed SFM	Carbide Grade	Speed SFM	Carbide Grade	Speed SFM
Excellent	SA280●	625-725	SA210▼ SA200*	650-750	SC230	400-500	SC20	300-400	SC20	350
Good	SA210▼ SA200*	550-650	SA220▼ SA150●	500-600	SA250●	400-500	SC20	200-250	SC20	350
Poor	—	—								

Chilled Cast Irons 40-60 RC

Operation			Inserts
Heavy Roughing	.024 & up IPR	.2 & up DOC	
Roughing	.010-.030 IPR	.10-.40 DOC	
General	.008-.020 IPR	.05-.15 DOC	xNMA
Finishing	.003-.010 IPR	.02-.10 DOC	xNMA

Machining Conditions	Carbide Grade	Speed SFM	Carbide Grade	Speed SFM	Carbide Grade	Speed SFM	Carbide Grade	Speed SFM	Carbide Grade	Speed SFM
Excellent			SA280	100-300	SA210▼ SA200*	90-200	SC230	60-80	SC20	50-60
Good			SA20	90-200	SA210▼ SA200*	80-150	SC20	30-50		
Poor	—	—								

▼ **Primary Grades** ▲ **TiN /Coated** ● **Oxide Coated Carbide** * **Multi-Coat**

The recommended cutting speed is shown as a range due to the variable hardness of the workpiece material. Use the lower end of the cutting speed range for harder materials and the higher end for softer materials.

Machining conditions: Excellent: continuous cutting, premachined surface, no hard spots, no interruptions.
Good: continuous cutting, clean surface, moderate shock.
Poor: interruptions, scale, hard spots, etc.

Turning Insert Cutting Data Conventional Materials

Aluminum, Copper, Brass, Bronze, Plastics

Operation			Inserts
Heavy Roughing	.024 & up IPR	.2 & up DOC	xPG
Roughing	.010-.030 IPR	.10-.40 DOC	xPG xNMG -PG/-GA
General	.008-.020 IPR	.05-.15 DOC	xFG xPG xNMG -PG/-GA
Finishing	.003-.010 IPR	.02-.10 DOC	xFG xPGR xPG xNMG -PL/-FF

Machining Conditions	Carbide Grade	Speed SFM	Carbide Grade	Speed SFM	Carbide Grade	Speed SFM	Carbide Grade	Speed SFM	Carbide Grade	Speed SFM
Excellent	SC230	MAX	SC20	MAX						
Good	SC230	MAX	SC20	MAX						
Poor	SC20	MAX								

Titanium, Alpha & Alpha Beta Alloys, Annealed Ti-8Mn 300-340 HB

Operation			Inserts
Heavy Roughing	.024 & up IPR	.2 & up DOC	-
Roughing	.010-.030 IPR	.10-.40 DOC	-
General	.008-.020 IPR	.05-.15 DOC	xPG xPGR xNMZ
Finishing	.003-.010 IPR	.02-.10 DOC	xCMT xPGR xPG xNMG-S

Machining Conditions	Carbide Grade	Speed SFM	Carbide Grade	Speed SFM	Carbide Grade	Speed SFM	Carbide Grade	Speed SFM	Carbide Grade	Speed SFM
Excellent	SC230	225-275	SC20	200-250						
Good	SC230	175-200	SC20	150-175						
Poor	-									

Titanium, Alphs & Alpha Beta Alloys, Solution Treated & Aged Ti-6A1-4V 320-440 HB

Operation			Inserts
Heavy Roughing	.024 & up IPR	.2 & up DOC	-
Roughing	.010-.030 IPR	.10-.40 DOC	-
General	.008-.020 IPR	.05-.15 DOC	xPG xPGR xNMZ
Finishing	.003-.010 IPR	.02-.10 DOC	xCMT xPGR xPG xNMG-S

Machining Conditions	Carbide Grade	Speed SFM	Carbide Grade	Speed SFM	Carbide Grade	Speed SFM	Carbide Grade	Speed SFM	Carbide Grade	Speed SFM
Excellent	SC230	130-190	SC20	110-160						
Good	SC230	110-160	SC20	100-130						
Poor	-									

▾ Primary Grades ▴ TiN /Coated ● Oxide Coated Carbide * Multi-Coat

The recommended cutting speed is shown as a range due to the variable hardness of the workpiece material.
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Machining conditions: Excellent: continuous cutting, premachined surface, no hard spots, no interruptions.
Good: continuous cutting, clean surface, moderate shock.
Poor: interruptions, scale, hard spots, etc.

Turning Insert Cutting Data High Temp Alloys

Operation			Inserts				
Roughing	.010-.030 IPR	.10-.40 DOC	xNMM-HR	xNMG -PH/-GR			
General	.008-.020 IPR	.05-.20 DOC	xNMZ	xCMT	xNMG-GP	xNGG-DP	
Finishing	.003-.010 IPR	.03-.10 DOC	xNGG-DP	xCMT	xNMG-S	xPGR	xPG

Astroloy

Machining Conditions	Carbide Grade	Speed SFM	Carbide Grade	Speed SFM	Carbide Grade	Speed SFM
Good	SP321 ▲ SP201 ▲	100-150	SC230	75-100	-	-
Poor	SC20	50-75	SC220	25-50	-	-

Hastelloy, B, G & N

Machining Conditions	Carbide Grade	Speed SFM	Carbide Grade	Speed SFM	Carbide Grade	Speed SFM
Good	SP321 ▲ SP201 ▲	100-150	SC230	75-100	-	-
Poor	SC20	50-75	SC220	25-50	-	-

Hastelloy, C & D

Machining Conditions	Carbide Grade	Speed SFM	Carbide Grade	Speed SFM	Carbide Grade	Speed SFM
Good	SP321 ▲ SP201 ▲	130-150	SC230	110-130	-	-
Poor	SC20	80-100	SC220	65-86	-	-

Hastelloy X & R235

Machining Conditions	Carbide Grade	Speed SFM	Carbide Grade	Speed SFM	Carbide Grade	Speed SFM
Good	SP321 ▲ SP201 ▲	55-75	SC230	45-65	-	-
Poor	SC20	25-45	SC220	15-35	-	-

Incoloy

Machining Conditions	Carbide Grade	Speed SFM	Carbide Grade	Speed SFM	Carbide Grade	Speed SFM
Good	SP321 ▲ SP201 ▲	120-140	SC230	100-120	-	-
Poor	SC20	60-90	SC220	50-80	-	-

▼ Primary Grades **▲ TiN /Coated** **● Oxide Coated Carbide** *** Multi-Coat**

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Good: continuous cutting, clean surface, moderate shock.
Poor: interruptions, scale, hard spots, etc.

Turning Insert Cutting Data High Temp Alloys

Operation			**Inserts**				
Roughing	.010-.030 IPR	.10-.40 DOC	xNMM-HR	xNMG -PH/-GR			
General	.008-.020 IPR	.05-.20 DOC	xNMZ	xCMT	xNMG-GP	xNGG -PH/-GR	
Finishing	.003-.010 IPR	.03-.10 DOC	xNGG-DP	xCMT	xNMG-S	xPGR	xPG

Inconel 600

Machining Conditions	Carbide Grade	Speed SFM	Carbide Grade	Speed SFM
Good	SP321 ▲ SP201 ▲	140-160	SC230	110-150
Poor	SC20	80-120	SC220	50-90

Inconel 601, 617, 625, 721, 722 & 751

Machining Conditions	Carbide Grade	Speed SFM	Carbide Grade	Speed SFM
Good	SP321 ▲ SP201 ▲	110-130	SC230	95-115
Poor	SC20	75-95	SC220	65-85

Inconel 702 & x-706

Machining Conditions	Carbide Grade	Speed SFM	Carbide Grade	Speed SFM
Good	SP321 ▲ SP201 ▲	120-140	SC230	110-130
Poor	SC20	90-110	SC220	80-100

Inconel 700 & x-750

Machining Conditions	Carbide Grade	Speed SFM	Carbide Grade	Speed SFM
Good	SP321 ▲ SP201 ▲	80-95	SC230	70-85
Poor	SC20	45-60	SC220	35-50

Inconel 713 & 718

Machining Conditions	Carbide Grade	Speed SFM	Carbide Grade	Speed SFM
Good	SP321 ▲ SP201 ▲	60-75	SC230	50-65
Poor	SC20	35-50	SC220	25-40

Monel

Machining Conditions	Carbide Grade	Speed SFM	Carbide Grade	Speed SFM	Carbide Grade	Speed SFM
Good	SA210 ▼ SA200*	225-300	SP321 ▲ SP201 ▲	220-250	SC230	210-230
Poor	SA220 ▼ SA150 ●	200-250	SC20	190-220	SC220	170-200

▼ **Primary Grades** ▲ **TiN /Coated** ● **Oxide Coated Carbide** *** Multi-Coat**

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Machining conditions:
Excellent: continuous cutting, premachined surface, no hard spots, no interruptions.
Good: continuous cutting, clean surface, moderate shock.
Poor: interruptions, scale, hard spots, etc.

Turning Insert Cutting Data High Temp Alloys

Operation			Inserts				
Roughing	.010-.030 IPR	.10-.40 DOC	xNMM-HR	xNMG -PH/-GR			
General	.008-.020 IPR	.05-.20 DOC	xNMZ	xCMT	xNMG-GP	xNGG -PH/-GR	
Finishing	.003-.010 IPR	.03-.10 DOC	xNGG-DP	xCMT	xNMG-S	xPGR	xPG

Nimonic 75, 80A, PE13, PK25, PK33 & C263

Machining Conditions	Carbide Grade	Speed SFM	Carbide Grade	Speed SFM
	SP321▲			
Good	SP201▲	160-190	SC230	135-165
Poor	SC20	85-115	SC220	65-95

Nimonic 90, 95, 105 & 115

Machining Conditions	Carbide Grade	Speed SFM	Carbide Grade	Speed SFM
	SP321▲			
Good	SP201▲	85-110	SC230	70-95
Poor	SC20	35-65	SC220	15-45

Nimonic PE16

Machining Conditions	Carbide Grade	Speed SFM	Carbide Grade	Speed SFM
	SP321▲			
Good	SP201▲	250-300	SC230	200-250
Poor	SC20	125-175	SC220	100-150

Rene

Machining Conditions	Carbide Grade	Speed SFM	Carbide Grade	Speed SFM
	SP321▲			
Good	SP201▲	90-115	SC230	75-100
Poor	SC20	35-60	SC220	20-45

Waspaloy

Machining Conditions	Carbide Grade	Speed SFM	Carbide Grade	Speed SFM
	SP321▲			
Good	SP201▲	120-140	SC230	105-125
Poor	SC20	70-90	SC220	55-75

▼ Primary Grades **▲ TiN /Coated** **● Oxide Coated Carbide** *** Multi-Coat**

The recommended cutting speed is shown as a range due to the variable hardness of the workpiece material.
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Good: continuous cutting, clean surface, moderate shock.
Poor: interruptions, scale, hard spots, etc.

Cutting Data for Milling Inserts

Steel

Material	Brinell Hardness HB	Cutting Speeds (SFM) for Grades: SN180	SN550	SS30	SS160
Low Carbon Steel	85-175	900-500	500-350	800-450	700-350
Low Carbon Steel	175-275	700-450	400-250	600-400	500-300
Medium Carbon Steel	125-275	800-400	450-250	700-350	600-250
Medium Carbon Steel	275-325	600-300	400-200	500-250	450-200
Medium Carbon Steel	325-425	500-250	300-200	400-200	375-150
High Carbon Steel	175-325	650-300	400-200	550-250	500-200
High Carbon Steel	325-425	400-200	250-150	350-150	300-150
Free Machining Alloy Steel	150-250	600-350	450-250	550-300	500-250
Free Machining Alloy Steel	250-375	550-350	300-200	500-300	450-250
Free Machining Alloy Steel	375-425	350-200	250-150	300-150	300-150
Alloy Steel, low carbon	125-275	800-400	500-200	700-300	600-250
Alloy Steel, low carbon	275-375	550-300	400-200	500-250	450-200
Alloy Steel, low carbon	375-425	325-175	-	300-150	275-125
Alloy Steel, medium carbon	175-275	550-350	400-200	500-300	450-250
Alloy Steel, medium carbon	275-375	450-300	300-200	400-250	350-200
Alloy Steel, medium carbon	375-425	350-250	-	300-200	250-150
Alloy Steel, high carbon	175-275	550-350	350-250	500-300	400-250
Alloy Steel, high carbon	275-375	500-250	300-200	400-200	350-200
Alloy Steel, high carbon	375-425	300-175	-	250-150	225-125
Tool Steel	200-250	400-275	300-150	350-200	325-175
HSS, annealed	225-250	50-275	300-150	400-250	350-200
HSS, annealed	325-375	350-225	-	300-200	275-175

Iron

Material	Brinell Hardness HB	Cutting Speeds (SFM) for Grades: SA280/SA20	SN280/SN027	SC280/SC20
Grey Cast Iron, Ferritic	120-150	1000-500	800-400	650-350
Grey Cast Iron, Pearlitic-Ferritic	160-200	900-450	750-400	600-350
Grey Cast Iron, Pearlitic	190-260	800-350	600-250	450-200
Grey Cast Iron, Austenitic	100-250	500-200	400-175	350-150
Ductile Cast Iron, Ferritic	140-190	1100-600	900-550	750-450
Ductile Cast Iron, Ferritic-Pearlitic	190-260	800-300	650-250	500-250
Ductile Cast Iron, Pearlitic-Martensitic	240-300	550-250	450-200	325-175
Ductile Cast Iron, Martensitic	270-330	300-150	-	200-125
Ductile Cast Iron, Martensitic	330-400	200-100	-	100-50
Malleable Cast Iron, Ferritic	110-160	1300-700	1100-650	900-550
Malleable Cast Iron, Pearlitic	160-240	850-450	600-500	350-550
Malleable Cast Iron, Tempered Martensite	200-250	650-350	550-300	450-250
Malleable Cast Iron, Tempered Martensite	250-320	500-200	400-175	350-150
Nodular Cast Iron	160-250	600-300	500-250	400-200
Chilled Cast Iron	380-620	-	-	80-30

Other

Material	Brinell Hardness HB	Cutting Speeds (SFM) for Grades: SP201/SP221	SC230	SC20
Aluminum Alloys, Wrought	-	-	Max	Max
Aluminum Alloys, Cast	-	-	2500-1300	2000-1000
Aluminum Alloys, Die Cast	-	-	1800-1400	1500-1100
Stainless Steel, Free Machining, Ferritic, Martensitic	135-325	600-350	400-300	300-200
Stainless Steel, Free Machining, Ferritic, Martensitic	375-425	300-150	200-150	150-125
Stainless Steel, Free Machining, Austenitic	140-210	600-300	400-300	250-200
Stainless Steel, Work Hardening & PH	325-375	500-300	325-275	275-225
Stainless Steel, Work Hardening & PH	375-450	325-200	225-200	200-150
High Temperature Alloys, Nickel Based	140-310	100-80	80-65	75-60
High Temperature Alloys, Cobalt Based, Wrought	180-320	90-70	70-60	65-55
High Temperature Alloys, Cobalt Based, Cast	220-425	60-45	50-35	45-25
High Temperature Alloys, Iron Based, Wrought	180-240	120-80	100-80	80-60
High Temperature Alloys, Iron Based, Wrought	240-320	80-50	70-55	55-40
Titanium	-		300-150	200-80

Insert Variable Table

Tool Life

To Improve Performance, Consider:

Key:

"+" = Increase, Plus, Positive, Harder, Use

"-" = Decrease, Minus, Negative, Tougher, Avoid

Termination Cause ▶

Performance Variables ▼

		Failure Mode											Part Condition							Operating Condition				
													Surface Integrity											
		Failure-Cracking or Breaking	Chipping	Crater-Fracture	Welding-Adhesion BLUE-Fracture	Plastic Deformation	Thermal Fatigue	Flank Abrasion Land	Diffusion	Oxidation	Inadequate Operating Time	Inadequate Production Rate	Torn	Rough	Vibration	Chatter Marks	Work Hardening	Uniformity (Straightness)	Tolerance	Vibration	Chatter	Interruptions	Chip Control - Inadequate	Chip Control - Excessive
Operation	Speed	+	+	-	±	-	-	-	-	-	-	±	+	+	±	+	+	±	±	±	+	-	-	+
	Feed	-	-	-	±	-	-	+	+	+	-	+	+	-		-	+	-	-	+	-	-	+	-
	Depth of Cut	-						+	+	+	-	+				+	-	-	-	+	-	±	+	-
Carbide Grade Selection	Hardness	-	-		+	+	+	+	+	+	+	+							+		-	-		
	Crater Resistance			+	+	+		-	±	±	±	+		+					+					+
	Impact Resistance	+	+			-	-	-			-	-									+	+		
	Al_2O_3 Coated	-	-	+	+	+	+	+	±	±	+	+	+	+					+		-	-	-	+
	TiN Coated	-	-	+	+	+	+	+	±	±	+	+	+	+					+		-	-	-	+
Tool Design	Finished Cutting Edge	+	+	+	+	+	+	+			+	+	+	+				+	+					
	Edge Hone	+	+			-	-	-			-	±	+	-	+	+	-	-	-	+	-	+		
	Lead Angle/SCEA	+	+	+	±	+	+	+	+	+	+	+		+		±	+		+	+	±	+	-	+
	Nose Radius	+	+	+	+	+	+	+	+	+	+	+	+	+		±	+	-	+	+	±	+	-	+
	End Angle/ECEA	-	-				±	±					-	-		-		+	±	-	-	-		
	Cutting	-	+	±	+	+	+	+			+	±	±	+		-		+	+	-	-	-	+	-
	Control	-	-		+						±	-	+	+	-	-	+	+	-	-	-	-	-	
	Relief	-	-	-		+	+	+	+	+	+	±	+	+		+	+	+	+	+	+	-		
	Clearance	-	-		±											+				±	-	-		
	Chip Control	-	-								-	±				-					-			
Tool Selection	Tool Size	+	+			+	+	+			+	+		+	+	+		+	+	+	+	+		
	Tip Thickness	+	+			+	+	+	+	+	+	+		+	+	+			+	+	+	+		
Work Material	Hardness	-	-	-	±	-	+	-	-	-	-	-	+	+				±	-		-	-	+	-
	Roughness	-	-			-		-	-	-	-	-	-	-	-	-		-	-	+	-	-		
	Interruptions	-	-	-		-		-			-	-		-	-	-		-	-		-			
	Scale	-	-					-			-	-		-				-			-	-		
	Support	+	+					+			+	+		+	+	+		+	+	+	+	+		
Machine & Tool Mount	Condition	+	+					+			+	+		+	+	+		+	+	+	+	+		
	Rigidity	+	+	+				+			+	+		+	+	+		+	+	+	+	+		
	Play	-	-	+				-			-	-		-	-	-		-	-	-	-	-		
	Tool Overhang	-	-	-				-			-	-		-	-	-		-	-	-	-	-		
Tool Environment	Lubrication	+	+		+	+		+	+	+	+	+		+		+	+	+	+	+	+	+		+
	Volume	+	+	+	+	+	+	+	+	+	+	+	+	+		+	+	+	+		+	-		+
	Penetration	+	+	+	+	+	+	+	+	+	+	+	+	+		+	+	+	+		+	+		+

ISO - ANSI Cross Reference

ISO	ANSI
APGN 16 04 08	APG 3232
BNUN 26 06 08	BNU 4442
BNUN 26 06 16	BNU 4444
CCMT 06 02 02	CCMT 21.50.5
CCMT 06 02 04	CCMT 21.51
CCMT 06 02 08	CCMT 21.52
CCMT 09 T3 04	CCMT 32.51
CCMT 09 T3 08	CCMT 32.52
CCMT 12 04 04	CCMT 431
CCMT 12 04 12	CCMT 433
CCMT 21 04 08	CCMT 432
CDH 32 19 00	CDH 53
CFGN 11 03 00	CFG 4620
CFGN 11 03 04	CFG 4621
CFGN 11 03 08	CFG 4622
CFGN 11 03 12	CFG 4623
CNGA 12 04 08	CNGA 432
CNGA 12 04 12	CNGA 433
CNGA 19 06 12	CNGA 643
CNGA 19 06 16	CNGA 644
CNGG 12 04 04	CNGG 431
CNGG 12 04 08	CNGG 432
CNGN 11 03 08	CNG 4622
CNGN 12 04 08	CNG 432
CNGN 12 04 16	CNG 434
CNGN 19 04 12	CNG 633
CNMA 12 04 04	CNMA 431
CNMA 12 04 08	CNMA 432
CNMA 12 04 12	CNMA 433
CNMA 12 04 16	CNMA 434
CNMA 15 06 12	CNMA 543
CNMA 15 06 16	CNMA 544
CNMA 19 06 12	CNMA 643
CNMA 19 06 16	CNMA 644
CNMG 12 03 08	CNMG 4622
CNMG 12 04 04	CNMG 431
CNMG 12 04 08	CNMG 432
CNMG 12 04 12	CNMG 433
CNMG 12 04 16	CNMG 434
CNMG 15 06 08	CNMG 542
CNMG 15 06 12	CNMG 543
CNMG 15 06 16	CNMG 544
CNMG 19 06 04	CNMG 641
CNMG 19 06 08	CNMG 642
CNMG 19 06 12	CNMG 643
CNMG 19 06 16	CNMG 644
CNMM 12 04 08	CNMM 432
CNMM 12 04 12	CNMM 433
CNMM 15 06 12	CNMM 543
CNMM 19 06 12	CNMM 643
CNMM 19 06 16	CNMM 644
CNMP 12 03 08	CNMP 422
CNMP 12 04 04	CNMP 431
CNMP 12 04 08	CNMP 432
CNMP 12 04 12	CNMP 433
CNMP 15 06 12	CNMP 543
CNMP 19 06 08	CNMP 642
CNMP 19 06 12	CNMP 643
CNMX 12 04 08	CNMX 432
CNMX 12 04 12	CNMX 433
CNMX 15 06 12	CNMX 543
CNMX 15 06 16	CNMX 544
CNMX 19 06 12	CNMX 643
CNMX 19 06 16	CNMX 644
CNMX 25 09 24	CNMX 866
CNMZ 12 04 08	CNMZ 432

ISO	ANSI
CNMZ 12 04 12	CNMZ 433
CPCN 12 03 08	CPC 422
CPCN 12 03 12	CPC 423
CPGN 12 03 04	CPG 4621
CPGN 12 03 08	CPG 4622
CPGN 19 04 08	CPG 632
CPGN 19 04 12	CPG 633
CPGR 12 03 04	CPGR 421
CPGR 12 03 08	CPGR 422
CPGT 06 03 00	CPGT 21.50
CPGT 06 03 04	CPGT 21.51
CPGT 06 03 08	CPGT 21.52
CPGT 09 04 04	CPGT 32.51
CPGT 09 04 08	CPGT 32.52
DCMT 07 02 02	DCMT 21.50.5
DCMT 07 02 04	DCMT 21.51
DCMT 07 02 08	DCMT 21.52
DCMT 11 T3 04	DCMT 32.51
DCMT 11 T3 08	DCMT 32.52
DNGA 15 04 04	DNGA 431
DNGA 15 04 08	DNGA 432
DNGA 15 04 12	DNGA 433
DNGA 15 04 16	DNGA 434
DNGA 19 04 12	DNGA 533
DNGA 19 06 12	DNGA 543
DNGA 19 06 16	DNGA 544
DNGG 15 04 04	DNGG 431
DNGG 15 04 08	DNGG 432
DNGN 15 04 08	DNG 432
DNMA 15 04 04	DNMA 431
DNMA 15 04 08	DNMA 432
DNMA 15 04 12	DNMA 433
DNMA 19 06 08	DNMA 542
DNMA 19 06 12	DNMA 543
DNMG 11 03 08	DNMG 322
DNMG 11 04 08	DNMG 332
DNMG 15 04 04	DNMG 431
DNMG 15 04 08	DNGA 432
DNMG 15 04 12	DNMG 433
DNMG 15 06 08	DNMG 442
DNMG 15 06 12	DNMG 443
DNMG 19 04 12	DNMG 533
DNMG 19 06 08	DNMG 542
DNMG 19 06 12	DNMG 543
DNMM 15 04 08	DNMM 432
DNMP 15 04 04	DNMP 431
DNMP 15 04 08	DNMP 432
DNMP 19 06 08	DNMP 542
DNMP 19 06 12	DNMP 543
DNMZ 15 04 04	DNMZ 431
DNMZ 15 04 08	DNMZ 432
DNMZ 15 04 12	DNMZ 433
DNMZ 19 04 12	DNMZ 533
DPGT 07 02 00	DPGT 21.50
DPGT 07 02 04	DPGT 21.51
FDH 19 09 00	FDH 33
HNCN 09 04 08	HNC 532
HNCN 09 04 12	HNC 533
HNCN 11 04 12	HNC 633
HPCN 09 04 08	HPC 532
HPCN 11 04 12	HPC 633
LNUN 25 06 12	LNU 4444
LNUN 25 09 12	LNU 5464
LNUN 38 12 32	LNU 6688
MECN 19 04 08	MEC 632
MECN 19 04 12	MEC 633J

ISO	ANSI
MECN 19 04 24	MEC 636
MECN 19 04 32	MEC 638
MNCN 15 T3 08	MNC 52.52
MPCN 15 04 08	MPC 532
MPCN 15 T3 08	MPC 52.52
OPGT 02 01 12	OPGT 2
OPGT 03 02 12	OPGT 3
RCMT 09 T3 00	RCMT 32.5
RCMT 12 04 00	RCMT 43
RFGN 07 02 00	RFG 21
RNCN 12 04 00	RNC 43
RNCN 19 04 00	RNC 63
RNGN 09 03 00	RNG 32
RNGN 09 38 00	SC 12
RNGN 12 03 00	RNG 42
RNGN 12 04 00	RNG 43
RNGN 12 07 00	RNG 45
RNGN 12 38 00	SC 16
RNMA 09 03 00	RNMA 32
RNMA 12 04 00	RNMA 43
RNMA 19 06 00	RNMA 64
RNMA 25 09 00	RNMA 86
RNMG 09 03 00	RNMG 32
RNMG 12 04 00	RNMG 43
RNMG 15 06 00	RNMG 54
RNMG 19 06 00	RNMG 64
RNMG 25 09 00	RNMG 86
RNMG 31 09 00	RNMG 106
RNMP 12 04 00	RNMP 43
ROEN 12 04 00	ROE 84
ROEN 25 06 00	ROE 43
RPCN 12 04 00	RPC 43
RPCN 19 04 00	RPC 63
RPGN 09 03 00	RPG 32
RPGN 12 03 00	RPG 42
RXGB 12 03 00	RD 8P
RXGB 15 03 00	RD 10P
RXGB 19 04 00	RD 12P
RXGB 25 06 00	RD 16P
SCMT 09 T3 04	SCMT 32.51
SCMT 09 T3 08	SCMT 32.52
SCMT 12 04 04	SCMT 431
SCMT 12 04 08	SCMT 432
SCMT 12 04 12	SCMT 433
SEAN 12 03 AFN	SEA 42A6.5
SEAN 12 03 AFTN	SEA 42A6.5S
SEAN 12 O4 AFN	SEA 43A5E
SEAN 15 04 AFEN	SEA 53A6.5
SEAN 15 04 AFSN	SEA 53A6.5S
SEAN 16 04 AFN	SEA 53A4E
SECN 12 03 08	SEC 422
SECN 12 03 12	SEC 423
SECN 12 03 16	SEC 424
SECN 19 04 12	SEC 633
SECN 19 04 16	SEC 634
SECN 19 04 AE	SEC 63A8
SECN 19 04 DE	SEC 63K8
SECN 19 04 EE	SEC 63L8
SECN 19 04 ZE	SEC 63M8
SECN 19 04 ZEL	SEC 63Z10L
SEKN 12 O4 AFN	SEK 43A5E
SEKN 16 04 AFN	SEK 53A4E
SEMN 12 O4 AFN	SEM 43A5E
SEMN 16 04 AFN	SEM 53A4E
SFGN 06 02 04	SFG 211
SFGN 09 03 00	SFG 320

ISO	ANSI
SFGN 09 03 04	SFG 321
SFGN 09 03 08	SFG 322
SFGN 12 03 04	SFG 421
SFGN 12 03 08	SFG 422
SFGN 12 03 12	SFG 423
SHXN 12 04 DPR	SHX 43D5R
SNCN 10 04 DZL	SHC 63D6.8L
SNCN 10 04 ENN	SNC 63L8
SNCN 12 03 08	SNC 422
SNCN 12 03 12	SNC 423
SNCN 12 03 16	SNC 424
SNCN 12 03 ANN	SNC 43A2
SNCN 12 03 EN	SNC 42L4
SNCN 12 04 08	SNC 432
SNCN 12 04 12	SNC 433
SNCN 12 04 16	SNC 434
SNCN 12 04 AN	SNC 43A3
SNCN 12 04 AN	SNC 43A4
SNCN 12 04 AN	SNC 43A6
SNCN 12 04 DN	SNC 43K4
SNCN 12 04 DPL	SHC 43D5L
SNCN 12 04 DPR	SHC 43D5R
SNCN 12 04 EN	SNC 43L4
SNCN 12 04 ENN	SNC 43L3.5
SNCN 15 04 16	SNC 534
SNCN 15 04 AN	SNC 53A6
SNCN 15 04 DN	SNC 63K8
SNCN 15 04 ENN	SNC 53L3.5
SNCN 19 04 08	SNC 632
SNCN 19 04 12	SNC 633
SNCN 19 04 16	SNC 634
SNCN 19 04 24	SNC 636
SNCN 19 04 32	SNC 638
SNCN 19 04 AD	SJC 63A12
SNCN 19 04 ANN	SNC 63A12
SNCN 19 04 ANN	SNC 63A2
SNCN 19 04 ANN	SNC 63A3
SNCN 19 04 ANN	SNC 63A4
SNCN 19 04 ANN	SNC 63A6
SNCN 19 04 ANN	SNC 63A8
SNCN 19 04 ANN	SNC 63L6
SNCN 19 04 AP	SHC 63A8
SNCN 19 04 AZN	SHC 63A6.8
SNCN 19 04 DNN	SNC 63K6
SNCN 19 04 DNN	SNC 63K8
SNCN 19 04 DNR	SNC 63D6R
SNCN 19 04 DPL	SHC 63D6L
SNCN 19 04 DPL	SHC 63D8L
SNCN 19 04 DPL	SHC 63D9L
SNCN 19 04 DPR	SHC 63D10R
SNCN 19 04 DPR	SHC 63D6R
SNCN 19 04 DPR	SHC 63D8R
SNCN 19 04 DPR	SHC 63D9R
SNCN 19 04 DZR	SHC 63D6.8R
SNCN 19 04 DZR	SHC 63E6.8L
SNCN 19 04 DZR	SHC 63E6.8R
SNCN 19 04 ENN	SNC 63L6
SNCN 19 04 ENN	SNC 63L8
SNCN 19 04 ENN	SNC 63L8
SNCN 19 04 ENR	SNC 63E6R
SNCN 19 04 ZNN	SMC 63M8
SNCN 19 04 ZNN	SNC 63M8
SNCN 19 06 12	SNC 643
SNCN 19 06 16	SNC 644
SNCN 19 06 DZL	SHC 64D6.8L
SNCN 19 06 DZR	SHC 64D6.8R

ISO - ANSI Cross Reference

ISO	ANSI
SNCN 25 06 12	SNC 843
SNCN 25 06 ANN	SNC 84A3
SNCN 25 06 ENN	SNC 84L8
SNGG 12 04 08	SNGG 432
SNGN 09 03 04	SNG 321
SNGN 09 03 08	SNG 322
SNGN 09 03 12	SNG 323
SNGN 12 03 00	SNG 420
SNGN 12 03 08	SNG 422
SNGN 12 03 12	SNG 423
SNGN 12 03 16	SNG 424
SNGN 12 04 08	SNG 432
SNGN 12 04 12	SNG 433
SNGN 12 04 16	SNG 434
SNGN 19 04 00	SNG 630
SNGN 19 04 08	SNG 632
SNGN 19 04 12	SNG 633
SNGN 19 04 16	SNG 634
SNMA 09 03 08	SNMA 322
SNMA 12 04 08	SNMA 432
SNMA 12 04 12	SNMA 433
SNMA 12 04 16	SNMA 434
SNMA 15 06 12	SNMA 543
SNMA 15 06 16	SNMA 544
SNMA 19 04 16	SNMA 634
SNMA 19 06 12	SNMA 643
SNMA 19 06 16	SNMA 644
SNMG 09 03 08	SNMG 322
SNMG 09 03 12	SNMG 323
SNMG 09 04 08	SNMG 332
SNMG 12 04 08	SNMG 432
SNMG 12 04 12	SNMG 433
SNMG 12 04 16	SNMG 434
SNMG 15 06 08	SNMG 542
SNMG 15 06 12	SNMG 543
SNMG 15 06 16	SNMG 544
SNMG 19 04 12	SNMG 633
SNMG 19 04 16	SNMG 634
SNMG 19 06 08	SNMG 642
SNMG 19 06 12	SNMG 643
SNMG 19 06 16	SNMG 644
SNMG 25 09 24	SNMG 866
SNMM 12 04 08	SNMM 432
SNMM 19 06 12	SNMM 643
SNMM 19 06 16	SNMM 644
SNMM 25 09 24	SNMM 866
SNMP 12 04 08	SNMP 432
SNMP 12 04 12	SNMP 433
SNMP 19 06 12	SNMP 643
SNMR 15 06 16	SNMR 544
SNMR 19 06 16	SNMR 644
SNMX 12 04 08	SNMX 432
SNMX 12 04 12	SNMX 433
SNMX 15 06 12	SNMX 543
SNMX 15 06 16	SNMX 544
SNMX 19 06 12	SNMX 643
SNMX 19 06 16	SNMX 644
SNMX 25 09 24	SNMX 866
SNMZ 09 03 08	SNMZ 322
SNMZ 12 04 08	SNMZ 432
SNMZ 19 06 12	SNMZ 643
SNUN 09 03 04	SNU 321
SNUN 09 03 08	SNU 322
SNUN 12 03 08	SNU 422
SNUN 12 03 12	SNU 423
SNUN 12 04 08	SNU 433
SNUN 12 04 16	SNU 434
SNUN 19 04 12	SNU 633
SNUN 19 04 16	SNU 634
SNXN 12 04 DPL	SHX 43D5L
SNXN 19 04 DPL	SHX 63D5L
SNXN 19 04 DPR	SHX 63D5R
SOAN 12 03 EZR	SOA 42E6.3R
SOEN 12 03 08E	SOE 422
SOEN 12 03 EZL	SOE 42E6.6L
SOEN 12 03 EZR	SOE 42E6.6R
SOEN 12 03 ZZL	SOE 42Z6.4L
SOEN 12 03 ZZR	SOE 42Z6.4R
SOEN 19 04 16	SOE 634
SOEN 19 04 EZL	SOE 63E7.4L
SOEN 19 04 EZR	SOE 63E7.4R
SOEN 19 04 ZZL	SOE 63Z9.6L
SOEN 19 04 ZZR	SOE 63Z9.6R
SPCB 25 06 AF	SPCB 84A21
SPCN 12 03 08	SPC 422
SPCN 12 03 APN	SPC 42A4
SPCN 12 03 DPL	SPC 42D4L
SPCN 12 03 DPR	SPC 42D4R
SPCN 12 03 EPL	SPC 42E4L
SPCN 12 03 EPR	SPC 42E4R
SPCN 12 04 APN	SPC 43A3
SPCN 12 04 EPL	SPC 43E4L
SPCN 12 04 EPR	SPC 43E4R
SPCN 12 04 EZL	SRC 43E1.8L
SPCN 12 04 EZL	SRC 43E4L
SPCN 12 04 EZR	SRC 43E1.8R
SPCN 12 04 EZR	SRC 43E4R
SPCN 15 04 08	SPC 532
SPCN 15 04 12	SPC 533
SPCN 15 04 APN	SPC 53A6
SPCN 15 04 DPL	SPC 53D6L
SPCN 15 04 DPR	SPC 53D6R
SPCN 15 04 EPL	SPC 53E6L
SPCN 15 04 EPR	SPC 53E6R
SPCN 19 04 08	SPC 632
SPCN 19 04 12	SPC 633
SPCN 19 04 16	SPC 634
SPCN 19 04 24	SPC 636
SPCN 19 04 32	SPC 638
SPCN 19 04 48	SPC 6312
SPCN 19 04 AP	SPC 63A12
SPCN 19 04 AP	SPC 63A3
SPCN 19 04 AP	SPC 63A6
SPCN 19 04 AP	SPC 63A8
SPCN 19 04 APN	SPC 43A6
SPCN 19 04 APN	SPC 63A2
SPCN 19 04 DPL	SPC 63D6L
SPCN 19 04 DPR	SPC 63D6R
SPCN 19 04 EPL	SPC 63E6L
SPCN 19 04 EPR	SPC 63E6R
SPCN 19 04 EZL	SRC 63E4L
SPCN 19 04 EZL	SRC 63E8L
SPCN 19 04 EZR	SRC 63E4R
SPCN 19 04 EZR	SRC 63E8R
SPCN 19 04 KPN	SPC 63K8
SPCN 19 04 LPN	SPC 63L8
SPCN 19 04 ZPN	SPC 63M8
SPEN 12 03 EPR	SPE 42E6.6R
SPEN 12 03 ZPL	SPE 42Z6.4L
SPEN 12 03 ZPR	SPE 42Z6.4R
SPEN 12 04 EPL	SPE 43E6.6L
SPEN 12 04 EPR	SPE 43E6.6R
SPEN 12 04 ZPR	SPE 43Z6.4L
SPEN 12 04 ZPR	SPE 43Z6.4R
SPEN 15 06 DPL	SPE 54D6L
SPEN 15 06 DPR	SPE 54D6R
SPEN 19 04 16D	SME 634
SPEN 19 04 EPL	SPE 63E10L
SPEN 19 04 EPR	SPE 63E10R
SPEN 19 04 EPR	SPE 63E12.8R
SPEN 19 04 EPR	SPE 63ER8R
SPEN 19 04 EPR	SPE 63Z9.6R
SPEN 19 04 ZDL	SPE 63Z9.6L
SPEN 19 06 DPL	SPE 64D6L
SPGB 11 03 08	SD 7P
SPGB 12 03 08	SD 8P
SPGB 13 03 08	SD 9P
SPGB 19 04 12	SD 12P
SPGN 09 03 04	SPG 321
SPGN 09 03 08	SPG 322
SPGN 09 03 12	SPG 323
SPGN 12 03 00	SPG 420
SPGN 12 03 04	SPG 421
SPGN 12 03 08	SPG 422
SPGN 12 03 12	SPG 423
SPGN 12 03 16	SPG 424
SPGN 12 04 08	SPG 432
SPGN 12 04 12	SPG 433
SPGN 19 04 08	SPG 632
SPGN 19 04 12	SPG 633
SPGN 19 04 16	SPG 634
SPGR 09 03 04	SPGR 321
SPGR 09 03 08	SPGR 322
SPGR 12 03 04	SPGR 421
SPGR 12 03 08	SPGR 422
SPGR 12 03 12	SPGR 423
SPHN 12 03 08	SPH 423
SPHN 12 03 16	SPH 424
SPHN 12 03 APN	SPH 42A2
SPHN 12 04 08	SPH 432
SPHN 12 04 12	SPH 433
SPHN 12 04 16	SPH 434
SPHN 15 04 16	SPH 534
SPHN 19 03 EPN	SPH 42L4
SPHN 19 04 APN	SPH 63A4
SPHN 19 04 EPL	SPH 63E4L
SPHN 19 04 EPL	SPH 63E8L
SPHN 19 04 EPL	SPH 63E9L
SPHN 19 04 EPN	SPH 63L6
SPHN 19 04 EPR	SPH 63E4R
SPHN 19 04 EPR	SPH 63E8R
SPHN 19 04 EPR	SPH 63E9R
SPKN 12 03 EDL	SMK 42E3.5L
SPKN 12 03 EDR	SMK 42E3.5R
SPKN 12 04 EDR	SMK 43E3.5L
SPKN 12 04 EDR	SMK 43E3.5R
SPKN 15 04 EDL	SMK 53E3.5L
SPKN 15 04 EDL	SMK 53E6.5L
SPKN 15 04 EDR	SMK 53E3.5R
SPKN 15 04 EDR	SMK 53E6.5R
SPKN 19 04 EDL	SMK 63E6.5L
SPKN 19 04 EDR	SMK 63E6.5R
SPMR 09 03 04	SPMR 321
SPMR 09 03 08	SPMR 322
SPMR 12 03 04	SPMR 421
SPMR 12 03 08	SPMR 422
SPMR 12 03 12	SPMR 423
SPUN 09 03 04	SPU 321
SPUN 12 03 08	SPU 422
SPUN 19 04 12	SPU 633
TCMT 11 02 02	TCMT 21.50.5
TCMT 11 02 04	TCMT 21.51
TCMT 11 02 08	TCMT 21.52
TCMT 16 T3 04	TCMT 32.51
TCMT 16 T3 08	TCMT 32.52
TCMT 22 04 08	TCMT 432
TEGE 11 04 00	TEGE 730
TEGE 11 04 04	TEGE 731
TFAN 12 03 PFL	TOC 42P6.3L
TFAN 22 03 PFR	TOC 42P6.3R
TFGN 16 03 00	TFG 320
TFGN 16 03 04	TFG 321
TFGN 16 03 08	TFG 322
TFGN 16 03 12	TFG 323
TNCB 16 02 PPR	THCB 31.5P3.5R
TNCB 19 03 PPR	THCB 3.52P3.5R
TNCN 12 04 16	TNC 434
TNCN 16 03 08	TNC 322
TNCN 16 04 08	TNC 332
TNCN 22 04 08	TNC 432
TNCN 22 04 12	TNC 433
TNCN 22 04 PNR	TNC 43P4R
TNCN 27 04 08	TNC 532
TNCN 27 04 PNR	TNC 53P4R
TNGA 16 04 08	TNGA 332
TNGG 16 04 04	TNGG 331
TNGG 16 04 08	TNGG 332
TNGG 22 04 04	TNGG 431
TNGG 22 04 08	TNGG 432
TNGN 11 03 04	TNG 221
TNGN 11 03 08	TNG 222
TNGN 11 38 08	TB 8
TNGN 16 03 00	TNG 320
TNGN 16 03 04	TNG 321
TNGN 16 03 08	TNG 322
TNGN 16 03 12	TNG 323
TNGN 16 03 16	TNG 324
TNGN 16 04 04	TNG 331
TNGN 16 04 08	TNG 332
TNGN 16 04 12	TNG 333
TNGN 16 04 16	TNG 334
TNGN 22 04 04	TNG 431
TNGN 22 04 08	TNG 432
TNGN 22 04 12	TNG 433
TNGN 22 04 16	TNG 434
TNGN 22 12 32	TNG 438
TNGN 27 06 16	TNG 544
TNMA 11 03 08	TNMA 222
TNMA 16 03 04	TNMA 321
TNMA 16 03 08	TNMA 322
TNMA 16 03 12	TNMA 323
TNMA 16 03 16	TNMA 324
TNMA 16 04 08	TNMA 332
TNMA 16 04 12	TNMA 333
TNMA 22 04 04	TNMA 431
TNMA 22 04 08	TNMA 432
TNMA 22 04 12	TNMA 433
TNMA 22 04 16	TNMA 434
TNMA 22 04 32	TNMA 438
TNMA 27 06 08	TNMA 542
TNMA 27 06 12	TNMA 543
TNMA 27 06 16	TNMA 544
TNMA 32 09 24	TNMA 666
TNMG 11 03 04	TNMG 221

Technical Data

ISO - ANSI Cross Reference

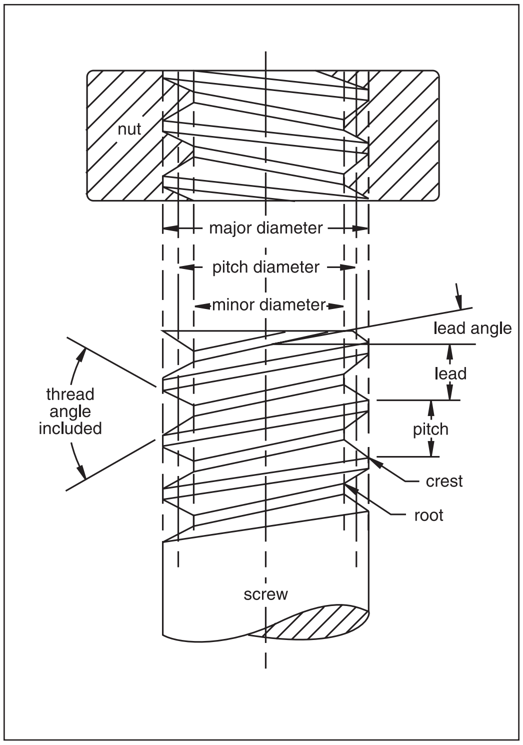
ISO	ANSI
TNMG 11 03 08	TNMG 222
TNMG 6 03 04	TNMG 321
TNMG 16 03 08	TNMG 322
TNMG 16 03 12	TNMG 323
TNMG 16 03 16	TNMG 324
TNMG 16 03 24	TNMG 326
TNMG 16 04 04	TNMG 331
TNMG 16 04 08	TNMG 332
TNMG 16 04 12	TNMG 333
TNMG 16 04 16	TNMG 334
TNMG 16 08 08	TNMG 332
TNMG 22 04 04	TNMG 431
TNMG 22 04 08	TNMG 432
TNMG 22 04 12	TNMG 433
TNMG 22 04 16	TNMG 434
TNMG 22 04 24	TNMG 436
TNMG 22 04 32	TNMG 438
TNMG 22 06 12	TNMG 443
TNMG 27 06 08	TNMG 542
TNMG 27 06 12	TNMG 543
TNMG 27 06 16	TNMG 544
TNMG 27 06 32	TNMG 548
TNMG 27 08 24	TNMG 566
TNMG 32 09 24	TNMG 666
TNMM 16 04 08	TNMM 332
TNMM 22 04 04	TNMM 431
TNMM 22 04 08	TNMM 432
TNMM 24 06 12	TNMM 543
TNMM 24 06 16	TNMM 544
TNMP 16 03 04	TNMP 321
TNMP 16 03 08	TNMP 322
TNMP 16 04 08	TNMP 332
TNMP 22 04 04	TNMP 431
TNMP 22 04 08	TNMP 432
TNMP 22 04 12	TNMP 433
TNMP 22 04 16	TNMP 434
TNMP 27 06 08	TNMP 542
TNMP 27 06 12	TNMP 543
TNMP 27 06 16	TNMP 544
TNMR 22 04 16	TNMR 434
TNMX 22 04 08	TNMX 432
TNMX 22 04 12	TNMX 433
TNMX 27 06 08	TNMX 542
TNMX 27 06 12	TNMX 543
TNMX 27 06 16	TNMX 544
TNMX 33 08 24	TNMX 666
TNMZ 16 03 04	TNMZ 321
TNMZ 16 04 04	TNMZ 331
TNMZ 16 04 08	TNMZ 332
TNMZ 16 04 16	TNMZ 334
TNMZ 22 04 08	TNMZ 432
TNMZ 22 04 12	TNMZ 433
TNUN 11 03 04	TNU 221
TNUN 11 03 08	TNU 222
TNUN 16 03 08	TNU 322
TNUN 16 03 12	TNU 323
TNUN 16 04 08	TNU 332
TNUN 16 04 12	TNU 333
TNUN 16 04 16	TNU 334
TNUN 22 04 08	TNU 432
TNUN 22 04 12	TNU 433
TNUN 22 04 16	TNU 434
TNUN 27 06 16	TNU 544
TNUN 32 09 24	TNU 666
TOCN 27 04 PEL	TOC 53P4L
TOCN 27 04 PER	TOC 53P4R

ISO	ANSI
TOHN 16 03 08	TPH 322
TPAN 16 03 PPN	TPA 32P3
TPCN 22 04 FZL	TRC 43P4L
TPCN 22 04 PZL	TRC 43P4R
TPCN 27 04 DPN	TPC 53N9
TPCN 27 04 PZL	TRC 53P4L
TPCN 27 04 PZL	TRC 53P4R
TPGA 11 02 00	TP 40
TPGA 11 02 04	TP 41
TPGA 11 02 08	TP 42
TPGA 16 03 08	TP 62
TPGB 19 03 08	TPGB 3.522
TPGB 22 04 08	TPGB 432
TPGB 27 04 16	TPGB 534
TPGN 11 03 04	TPG 221
TPGN 11 03 08	TPG 222
TPGN 16 03 00	TPG 320
TPGN 16 03 04	TPG 321
TPGN 16 03 08	TPG 322
TPGN 16 03 12	TPG 323
TPGN 16 03 16	TPG 324
TPGN 22 04 00	TPG 430
TPGN 22 04 04	TPG 431
TPGN 22 04 08	TPG 432
TPGN 22 04 12	TPG 433
TPGN 22 04 16	TPG 434
TPGN 22 04 24	TPG 436
TPGN 27 06 12	TPG 543
TPGN 27 06 16	TPG 544
TPGR 09 02 00	TPGR 730
TPGR 09 02 04	TPGR 731
TPGR 11 03 04	TPGR 221
TPGR 11 03 08	TPGR 222
TPGR 16 03 04	TPGR 321
TPGR 16 03 08	TPGR 322
TPGR 22 04 08	TPGR 432
TPGR 22 04 12	TPGR 433
TPGT 11 03 00	TPGT 21.50
TPGT 11 03 04	TPGT 21.51
TPGT 11 03 08	TPGT 21.52
TPHN 12 04 08	TPH 332
TPHN 22 04 08	TPH 432
TPHN 22 04 12	TPH 433
TPHN 22 04 16	TPH 434
TPKN 22 03 PDR	TMK 32P3R
TPKN 22 04 PDL	TMK 43P3.5L
TPKN 22 04 PDR	TMK 43P3.5R
TPMR 11 03 04	TPMR 221
TPMR 11 03 08	TPMR 222
TPMR 16 03 04	TPMR 321
TPMR 16 03 08	TPMR 322
TPMR 22 04 08	TPMR 432
TPMR 22 04 12	TPMR 433
TPMT 16 03 04	TPMT 321
TPMT 16 03 08	TPMT 322
TPUN 11 03 04	TPU 221
TPUN 11 03 08	TPU 222
TPUN 16 03 04	TPU 321
TPUN 16 03 08	TPU 322
TPUN 22 04 04	TPU 431
TPUN 22 04 08	TPU 432
TPUN 22 04 12	TPU 433
VBMT 16 04 04	VBMT 331
VBMT 16 04 08	VBMT 332
VBMT 16 04 12	VBMT 333
VNGA 16 04 04	VNGA 331

ISO	ANSI
VNGA 16 04 08	VNGA 332
VNMA 16 04 08	VNMA 332
VNMA 22 06 04	VNMA 441
VNMG 16 04 04	VNMG 331
VNMG 16 04 08	VNMG 332
VNMG 16 04 12	VNMG 333
VNMG 22 04 04	VNMG 431
VNMG 22 04 08	VNMG 432
VNMG 22 04 12	VNMG 433
VNMP 16 04 04	VNMP 431
VNMP 16 04 08	VNMP 432
VNMZ 16 04 08	VNMZ 332
VNMZ 22 04 04	VNMZ 431
VNMZ 22 04 08	VNMZ 432
VPGT 12 03 04	VPGT 221
VPGT 12 03 08	VPGT 222
WNMA 08 04 08	WNMA 432
WNMA 08 04 12	WNMA 433
WNMA 10 06 12	WNMA 543
WNMA 10 06 12	WNMA 543
WNMA 10 06 16	WNMA 544
WNMA 10 06 16	WNMA 544
WNMG 08 04 04	WNMG 431
WNMG 08 04 08	WNMG 432
WNMG 08 04 12	WNMG 433
WNMG 10 06 08	WNMG 542
WNMG 10 06 12	WNMG 543
WNMG 10 06 16	WNMG 544

Technical Data

Screw Thread Definitions



1. **Major Diameter:** The largest diameter of a straight screw thread. This applies to both internal and external threads.
2. **Minor Diameter:** The smallest diameter of a straight screw thread. This applies to both internal and external threads.
3. **Pitch Diameter:** On a straight thread, it is the diameter which passes through the thread profiles at such points which make the thread width of the groove equal to one-half of the basic pitch. On a "perfect thread," this occurs at the point where the widths of the thread and groove are equal.
4. **Pitch:** The distance from a point on a screw thread to a corresponding point on the next thread measured parallel to the thread axis.
5. **Lead:** The distance a screw thread advances axially in one revolution. On a single start, the pitch and lead are identical. The lead is equal to the pitch, times the number of starts.
6. **Lead Angle:** On a straight thread, the lead angle is the angle created by the helix of the thread at the pitch diameter with a plane perpendicular to the axis. The helix angle is the complement of the lead angle.
7. **Crest:** The outer most surface of the thread form which joins the flanks.
8. **Root:** The inner most surface of the thread form which joins the flanks.
9. **Thread Angle** (included): The included angle between the individual flanks of the thread form.
10. **Threads Per Inch - TPI** (not shown): The number of threads per inch measured axially. The terms pitch and tpi are often used interchangeably.

Formulas

To Find	Given	Use Formula
sfm	D rpm	sfm $= \left(\frac{\pi \times D}{12"}\right) \times$ rpm
rpm	D sfm	rpm $= \frac{\text{sfm} \times 12"}{D \times \pi}$

Where:
sfm = surface feet per minute — *D = part diameter*
rpm = revolutions per minute — *π = 3.1416*

Maximum Cutting Speeds

Maximum cutting speed is often limited by the maximum travel speed (ipm) of the tool, allowed by the machine. Check your maximum speed with the following formulas.

Inch formula:

Maximum Cutting Speed (sfm) =

$$\text{part diameter (inch)} \times 3.14 \times \text{tpi} \times \frac{\text{max ipm (inch/min.)}}{12"}$$

Metric formula:

Maximum Cutting Speed (m/min.) =

$$\text{part diameter (mm)} \times 3.14 \times (1/\text{pitch}) \times \frac{\text{max ipm (mm/min)}}{1000\ \text{mm}}$$

Technical Data

SPE-D-LOK Grade Selection Chart

Suggested Grades and Speeds for Threading Various Workpiece Materials

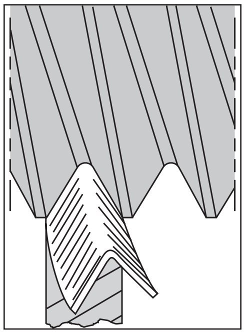
Workpiece Group	Workpiece Material	Recommeded Surface Speed (SFM)		
		PVD Coated		CVD Coated
		SP541	SP321	SN150
Free-machining Carbon Steel	10L18, 10L45, 1213, 12L14, 1140, 1141, 11L44, 1151, 10L50	150-500	300-500	500-800
Plain Carbon Steel	1006, 1008, 1010, 1015, 1018, 1020, 1025, 1026, 1108, 1117	125-400	250-500	400-700
Alloy Steels, Tool Steels 150-325 BHN up to 35 Rc	1042, 1045, 1070, 1080, 1085, 1090, 1095, 1541, 1561, 1572, 5140, 8620, W1, O1, S1, P20, H13, D2, A6, H13, L6	125-350	250-500	350-600
Alloy Steels, Tool Steels 330-450 BHN 36HRc to 47 HRc		-	200-400	-
Gray Cast Iron 135-270 BHN	Class 20, 30, 35, 45	75-300	200-600	-
Gray Cast Iron 275-450 BHN	Class 50, 55, 60	50-200	150-450	-
Alloy/Ductile Iron	A536, J434C, 60-40-18, 80-55-06, 100-70-03	100-400	150-500	300-600
Austenitic Stainless Steel	201, 202, 301, 302, 303, 304, 305, 321, 347, 348, 310, 314, 316, 316L, 330	125-350	200-500	400-650
Martensitic/Ferritic Stainless/Precipitation Hardening	416, 420F, 440F, 405, 409, 429, 430, 434, 436, 442, PH	100-300	150-400	300-500
High-temperature Alloys 125-269 BHN (up to 27 HRc)	Nickel 200, Monel, R405, Monel K500, Inconel 600, Inconel 625/901/750/718, Waspalloy, Hastelloy C	40-175	80-300	-
High-temperature Alloys 260-450 BHN (26HRc to 47HRc)	Rene 95, Waspalloy, A286, Incoloy 800, Haynes 188, Stellite F, Haynes 25	20-125	100-200	-
Titanium Alloys	Ti-6Al-4V, TI-5Al-2.5Sn	-	110-250	-
Free-machining Aluminum Alloys	2024-T4, 2014-T6, 6061-T6, 2011-T3, 3003-H18, A2, Alcan, Alcoa 510, Duralumin	-	400-1000	-
Copper/Zinc/Brass		150-600	250-800	-
Nonmetallics	Graphite, Nylon, Plastics, Rubbers, Phenolics, Carbon	150-800	400-1500	-

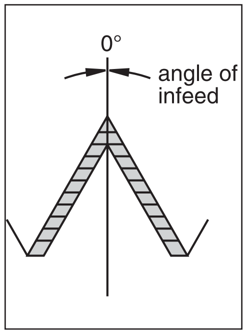
Notes: When workpiece hardness levels are at the top of a range, starting SFM should be at the lower end. Regularly inspect insert clamps for worn flats.

Edge preparation:
PVD coated = light hone except positive top rake, top rake sharp
CVD coated = moderate hone

Infeed Angle Selection and Chip Formation

Radial - 0° Angle of Infeed

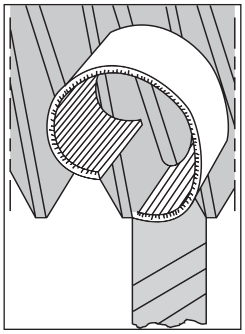


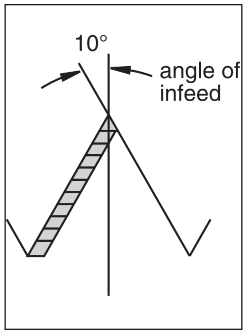


Advantage–
- Cutting on both sides of the thread form places all of the cutting edge in the cut and protects edge from chipping.

Disadvantage–
- Tool develops a channel chip which may be difficult to handle.
- Tip chipping occurs when cutting high-tensile materials.
- Burr condition is increased.
- Entire cutting edge is engaged at finish of thread, causing increased tendency to chatter.

Flank - 29-1/2° angle of Infeed

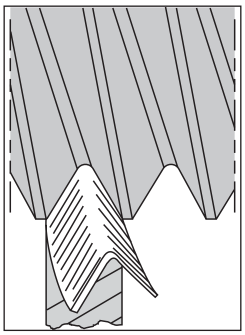


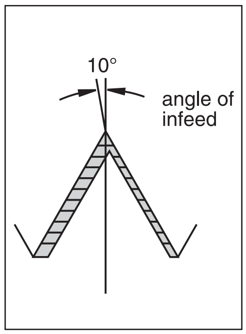


Advantage–
- Cutting with the leading edge of the threading tool gives the chip a definite flow out of the thread form area. This reduces the burr problem on the trailing edge of the tool.
  To avoid bad surface finish, chipping, or excessive flank wear due to rubbing of the trailing edge, the infeed angle should be 3° to 5° smaller than the angle of the thread. This is a type of modified flank.

Disadvantage–
- Trailing edge of threading insert may drag or rub, and tends to chip.
- Torn or poor surface finish threads result when cutting soft, gummy materials like low carbon steels, aluminum and stainless steels.

Modified Flank - 10° Angle of Infeed

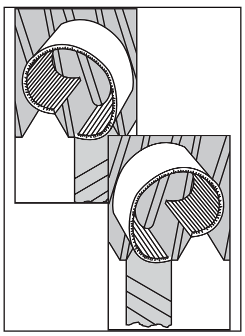


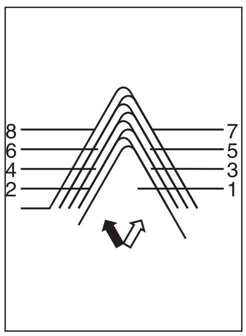


Advantage–
- Tool cuts both sides of thread form and, therefore, is pro-tected from chipping similar to 0° infeed. Channel-type chip develops but uneven chip thickness helps remove the chip similar to flank infeed.

Disadvantage–
- Similar Disadvantages as with 0° infeed, although reduced somewhat in magnitude as cutting forces are better equalized and chip flow is much less of a problem.

Alternating Flank





Advantage–
- Increased tool life because both edges are used equally. NOTE: Some machine tools may require special programming techniques to achieve this method of infeed.

Disadvantage–
- Difficult to cut on conventional machinery.

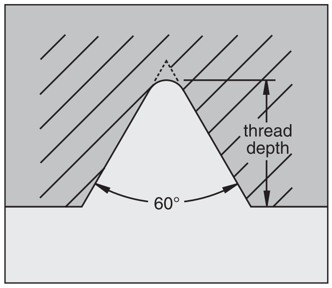
Technical Data

Infeed Values for Threading Operations

External UN Threads
Recommendations for Steel Workpieces (<300 BHN)

Number of Passes

TPI	4	5	6	7	8	9	10	11	12	13	14	16	18	20	24	28	32	36	40	44	48
Thread Depth	.1578	.1262	.1052	.0902	.0789	.0701	.0631	.0574	.0526	.0485	.0451	.0394	.0350	.0315	.0263	.0225	.0197	.0175	.0157	.0143	.0131
1	.0353	.0298	.0248	.0213	.0197	.0175	.0169	.0157	.0152	.0142	.0136	.0125	.0124	.0119	.0118	.0112	.0098	.0087	.0078	.0073	.0065
2	.0146	.0122	.0105	.0088	.0082	.0073	.0070	.0066	.0064	.0057	.0059	.0054	.0053	.0049	.0048	.0046	.0042	.0036	.0032	.0028	.0027
3	.0113	.0094	.0078	.0077	.0063	.0056	.0053	.0048	.0048	.0044	.0043	.0039	.0039	.0039	.0039	.0036	.0031	.0028	.0024	.0022	.0020
4	.0095	.0079	.0067	.0059	.0053	.0047	.0045	.0041	.0042	.0037	.0036	.0034	.0033	.0032	.0031	.0031	.0026	.0024	.0020	.0020	.0019
5	.0084	.0070	.0058	.0050	.0047	.0042	.0039	.0036	.0036	.0033	.0032	.0029	.0029	.0028	.0027						
6	.0076	.0063	.0052	.0045	.0043	.0037	.0036	.0031	.0032	.0030	.0029	.0026	.0026	.0025							
7	.0070	.0058	.0048	.0041	.0039	.0034	.0031	.0028	.0029	.0027	.0026	.0024	.0024	.0023							
8	.0065	.0054	.0045	.0038	.0036	.0032	.0030	.0026	.0027	.0025	.0024	.0022	.0022								
9	.0061	.0051	.0042	.0036	.0034	.0030	.0029	.0025	.0026	.0024	.0023	.0021									
10	.0057	.0048	.0040	.0034	.0032	.0028	.0028	.0024	.0025	.0023	.0022	.0020									
11	.0054	.0045	.0038	.0032	.0031	.0027	.0027	.0023	.0023	.0022	.0021										
12	.0052	.0043	.0036	.0031	.0029	.0026	.0026	.0022	.0022	.0021											
13	.0049	.0042	.0035	.0030	.0027	.0025	.0025	.0021													
14	.0048	.0041	.0034	.0029	.0026	.0024	.0024	.0020													
15	.0046	.0040	.0033	.0028	.0025	.0023															
16	.0044	.0039	.0032	.0027	.0025	.0022															
17	.0043	.0038	.0031	.0026																	
18	.0042	.0037	.0030	.0025																	
19	.0041																				
20	.0039																				



External Thread Form

Note: These are nominal thread depths for full profile inserts. When using partial profile inserts, reduce the initial doc and increase the number of passes. When threading work-hardening materials, e.g. stainless austenitic steel, the infeed should not be less than .003 of an inch.

Example:

Infeed per pass formula:
accumulated depth = initial doc x square root of #pass.

For example, an 8 pitch external thread has a depth of .0789.
25% of .0789 = approx. .0197 (infeed/doc for the 1st pass.)

.0197 x square root 2 = .0278
.0278 - .0197 = .0082 (infeed/doc for the 2nd pass)

.0197 x square root 3 = .0341
.0341 - .0278 = .0063 (infeed/doc for the 3rd pass)

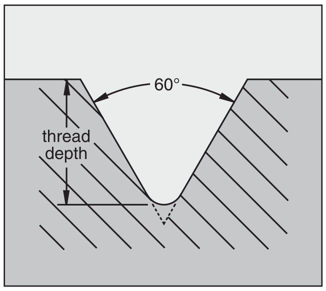
.0197 x square root 4 = .0394
.0394 - .03341 = .0053 (infeed/doc for the 4th pass.)

Infeed Values for Threading Operations

Internal UN Threads
Recommendations for Steel Workpieces (<300 BHN)

Number of Passes

TPI	4	5	6	7	8	9	10	11	12	13	14	16	18	20	24	28	32	36	40	44	48
Thread Depth	.1353	.1082	.0902	.0773	.0676	.0601	.0541	.0492	.0451	.0416	.0386	.0338	.0300	.0270	.0225	.0193	.0169	.0150	.0135	.0123	.0112
1	.0303	.0255	.0213	.0183	.0169	.0150	.0145	.0132	.0131	.0120	.0117	.0107	.0106	.0102	.0101	.0096	.0084	.0075	.0067	.0061	.0056
2	.0125	.0105	.0090	.0076	.0073	.0062	.0064	.0055	.0054	.0050	.0048	.0043	.0044	.0042	.0042	.0039	.0035	.0031	.0029	.0025	.0023
3	.0096	.0083	.0069	.0058	.0053	.0047	.0046	.0044	.0041	.0038	.0037	.0034	.0033	.0032	.0032	.0033	.0027	.0023	.0021	.0019	.0017
4	.0081	.0068	.0057	.0049	.0047	.0040	.0038	.0035	.0035	.0032	.0031	.0028	.0028	.0027	.0027	.0025	.0023	.0021	.0018	.0018	.0011
5	.0071	.0060	.0050	.0043	.0041	.0035	.0034	.0031	.0031	.0028	.0027	.0025	.0025	.0024	.0023						
6	.0064	.0054	.0045	.0039	.0036	.0032	.0031	.0028	.0028	.0025	.0025	.0029	.0023	.0022							
7	.0059	.0050	.0041	.0036	.0033	.0029	.0028	.0026	.0026	.0023	.0023	.0021	.0021	.0021							
8	.0055	.0046	.0038	.0033	.0030	.0027	.0026	.0024	.0024	.0022	.0021	.0020	.0029								
9	.0052	.0043	.0036	.0031	.0028	.0025	.0024	.0022	.0022	.0021	.0020	.0019									
10	.0049	.0041	.0034	.0029	.0027	.0024	.0023	.0021	.0021	.0020	.0019	.0018									
11	.0046	.0039	.0032	.0028	.0026	.0023	.0022	.0020	.0020	.0019	.0018										
12	.0044	.0037	.0031	.0027	.0025	.0022	.0021	.0019	.0019	.0018											
13	.0042	.0036	.0030	.0026	.0024	.0021	.0020	.0018													
14	.0041	.0035	.0029	.0025	.0023	.0020	.0019	.0017													
15	.0040	.0034	.0028	.0024	.0022	.0019															
16	.0039	.0033	.0027	.0023	.0021	.0019															
17	.0038	.0032	.0026	.0022																	
18	.0037	.0031	.0025	.0021																	
19	.0036																				
20	.0035																				



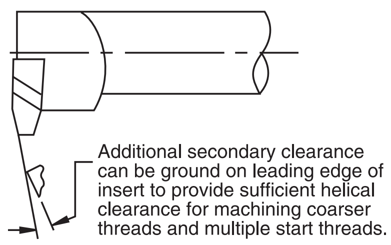
Internal Thread Form

Note: These are nominal thread depths for full profile inserts. When using partial profile inserts, reduce the initial doc and increase the number of passes. When threading work-hardening materials, e.g. stainless austenitic steel, the infeed should not be less than .003 of an inch.

Technical Data

Threading Limits with Standard Inserts

The following charts list the largest thread pitch that can be applied on internal applications for Acme threads using threading insert size 3 and V-threading using insert sizes 2, 3 and 4.



Modified standard inserts may be furnished for machining threads not listed in the "Internal Threading Limitations" charts shown on this page.

60° V-Threading Limits

Internal Threading Limitations
PT-2 V-Threading Inserts

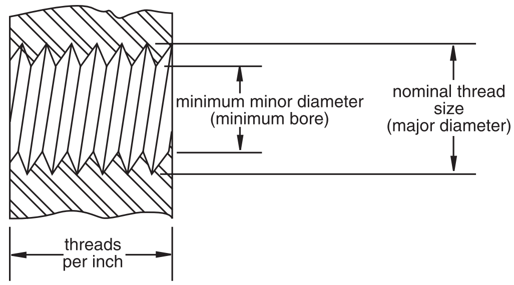
Threads Per Inch	Nominal Thread Size	Minimum Minor Diameter
	PT-2	PT-2
6	1-7/8	1.695
7	1-3/4	1.595
8	1-5/8	1.490
9	1-9/16	1.442
10	1-1/2	1.392
11	1-7/16	1.339
11-1/2	1-3/8	1.281
12	1-3/8	1.285
13	1-5/16	1.229
14	1-1/4	1.173
16	1-1/4	1.182
18	1-1/8	1.065
20	1-1/8	1.071
24*	1-1/16	1.017

**Twenty-four threads per inch and finer can be cut with an PT-2 insert providing the minor diameter is 1.000 or larger.*

Internal Threading Limitations
PT-3 & 4 V-Threading Inserts

Threads Per Inch	Nominal Thread Size	Minimum Minor Diameter
4**	3	2.729
4-1/2**	2-7/8	2.634
5	2-3/4	2.534
6	2-1/2	2.320
7	2-1/4	2.095
8	2	1.865
9	1-15/16	1.817
10	1-7/8	1.767
11	1-13/16	1.714
11-1/2	1-3/4	1.656
12	1-3/4	1.660
13	1-5/8	1.542
14	1-9/16	1.485
16*	1-7/16	1.370

** Sixteen threads per inch and finer can be cut providing minor diameter is 1.370 or larger.*
*** PT-4 insert only.*

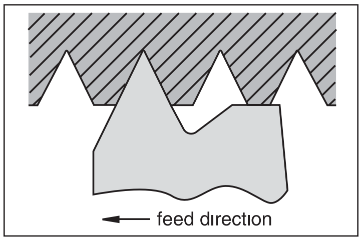


Internal Threading Limitations
PA-3 Acme Threading Inserts

Threads Per Inch	Nominal Thread Size	Minimum Minor Diameter
4	3-1/2	3.250
5	3	2.800
6	2-1/2	2.333
8	2-1/4	2.125
10	2	1.900

Threading Limits with Standard Inserts

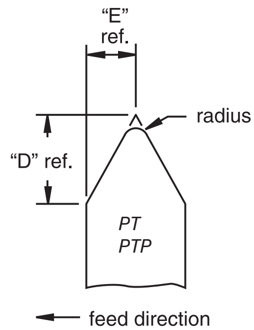
60° V-Thread Crest Turning Application Data

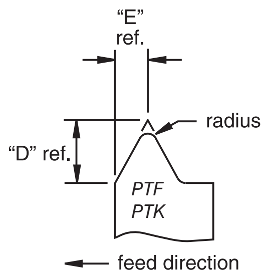


PTC crest turning insert for 12 threads per inch and finer

NOTE: PTC inserts automatically control root to crest dimensions. Therefore, in setting up threading operations with PTC inserts, one need only check ODs or IDs at the thread crest for correct dimensions.

Insert Description





60° V-Thread Application Data

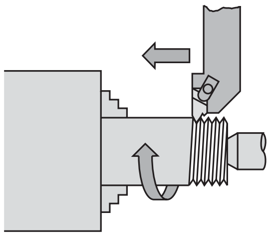
Insert	D Reference	E Reference	Recommended threads Per Inch (TPI)		Recommended Thread Pitch - Metric	
			External (TPI)	Internal (TPI)	External	Internal
PT-2	.113	.075	36 to 8	20 to 7	0,70 to 3,00	1,25 to 3,50
PTF-2	.062	.040	44 to 14	24 to 12	0,60 to 1,75	1,00 to 2,00
PTK-2	.062	.040	44 to 14	24 to 12	0,60 to 1,75	1,00 to 2,00
PTP-2	.113	.075	36 to 8	20 to 7	0,70 to 3,00	1,25 to 3,50
PT-3	.148	.097	20 to 6	12 to 5	1,25 to 4,00	2,00 to 5,00
PTF-3	.083	.054	44 to 10	24 to 9	0,60 to 2,50	1,00 to 2,50
PTP-3	.148	.097	20 to 6	12 to 5	1,25 to 4,00	2,00 to 5,00
PT-4	.196	.127	20 to 4	12 to 4	1,25 to 6,25	2,00 to 6,25

Threading Rotation/Feed Direction

Feed Direction Towards the Chuck

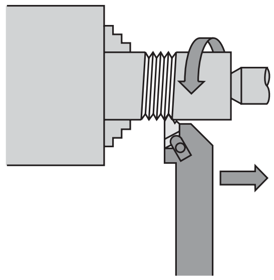
External left hand thread

- Clockwise rotation
- Left hand toolholder
- Left hand insert and clamp



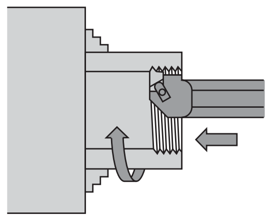
External right hand thread

- Counterclockwise rotation
- Right hand toolholder
- Right hand insert and clamp



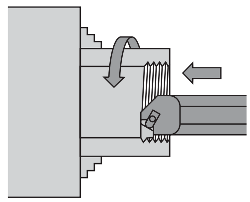
Internal left hand thread

- Clockwise rotation
- Left hand bar
- Righthand insert and clamp



Internal right hand thread

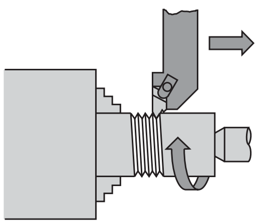
- Counterclockwise rotation
- Left hand bar
- Left hand insert and clamp



Feed Direction Away From the Chuck

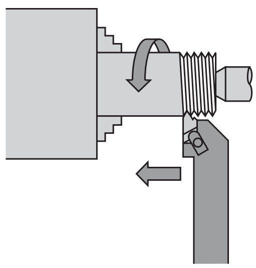
External left hand thread

- Clockwise rotation
- Left hand toolholder
- Left hand insert and clamp



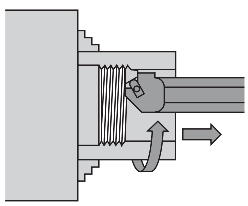
External right hand thread

- Counterclockwise rotation
- Right hand toolholder
- Right hand insert and clamp



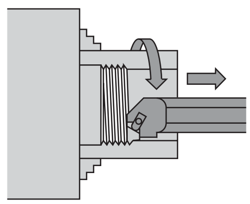
Internal left hand thread

- Clockwise rotation
- Left hand bar
- Right hand insert and clamp



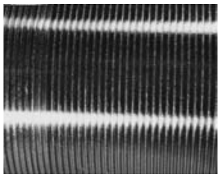
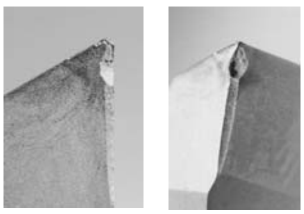
Internal right hand thread

- Counterclockwise rotation
- Right hand bar
- Left hand insert and clamp



Notes: Threading bars require opposite hand insert and clamp: right hand bar required left hand insert and clamp; left hand bar requires right hand insert and clamp.

Troubleshooting

Problem	Cause	Possible Solution
Thread with torn finish 	Burrs Torn finish Steps	Use positive rake or full profile insert. Increase coolant concentration. Alter infeed. Use PVD grades. Use positive rake inserts. Increase SFM. Check machine Z travel axis. Check insert form. Avoid recutting chips. Check for correct shim in laydown system.
Chatter 	Poor rigidity Incorrect speed Wrong edge prep Insert movement Improper infeed Off centerline	Minimize tool overhang. Check for workpiece deflection. Adjust SFM. Adjust hone level. Check insert and clamp. Use modified feed angle. Verify that tool cutting position is at workpiece centerline
Built-up edge 	Speed to low Insufficient coolant Wrong edge prep Chip load	Increase SFM. Increase coolant concentration and/or flow. Adjust hone size. Adjust infeed angle. Adjust depth of cut per pass.
Deformation 	Speed too high Incorrect grade Improper infeed angle	Reduce SFM. Use grade with a higher hot hardness. Alter infeed angle.
Chipping 	Light chip load Wrong grade Improper infeed Incorrect speed Wrong edge prep Poor rigidity	Adjust chip load. Increase or decrease number of passes. Use tougher grade. Alter infeed to modified flank. Increase SFM if chipping on trailing edge. Decrease SFM if chipping on leading edge. Increase hone size. Minimize tool overhang. Check for insert movement/check clamp. Check for possible part deflection.
Broken nose 	Heavy chip load Small nose radius Wrong grade Wrong edge prep	Decrease chip load. Use large nose radius if allowable. Use tougher grade. Increase hone size.
Flank wear 	Wrong grade Insufficient coolant Off centerline	Use a more wear-resistant grade. Increase coolant flow. Check the centerline height of the tool (the smaller the diameter, the more critical the need for centerline accuracy).

Troubleshooting Matrix

Problem	Increase SFM	Reduce SFM	Increase Chip Load	Decrease Chip Load	Use Tougher Carbide Grade	Use Harder Carbide Grade	Apply Coolant	Use Coated Carbide	Use Topping Insert	Check for Insert Movement and Reseat	Change Infeed Angle	Reduce Tool Overhang	Reselect Shim (laydown style)	Reduce DOC	Adjust Center Height	Begin Cutting Threads 1/2" Before Workpiece
Chatter	•			•							•	•			•	
Burr on Crest	•								•							
Short Tool Life		•	•	•		•		•								
Chipped Leading Edge			•	•	•											
Chipped Trailing Edge					•					•						
Broken Nose (first pass)	•													•	•	
Broken Nose (after first pass)				•	•					•			•			
Build-up on Cutting Edge	•		•				•	•								
Premature Topping													•			
Splitting Threads																•

SPE-D-CUT Grade Selection Chart

Suggested Grades and Speeds for Threading Various Workpiece Materials

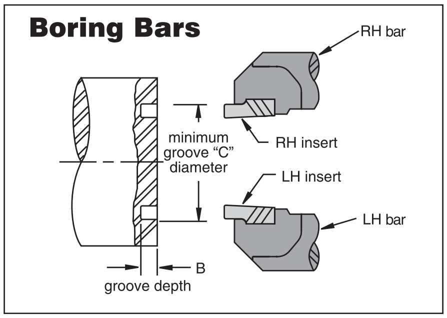
Workpiece Group	Recommended Surface Speed (SFM)		Feed Rates (Ipr)
	PVD Coated SP321	CVD Coated SN150	
Free-machining Carbon Steel	300-650	550-900	.005-.011
Plain Carbon Steel	250-600	475-800	.005-.011
Alloy Steels 190-330 BHN	250-500	325-700	.005-.011
Alloy Steels 330-450 BHN	200-400	-	.003-.009
Gray Cast Iron 190-330 BHN	250-650	-	.005-.011
Gray Cast Iron 330-450 BHN	200-500	-	.003-.009
Alloy/Ductile Irons	175-500	250-500	.005-.011
Austenitic Stainless Steel*	225-550	300-600	.003-.008
Martensitic/Ferritic Stainless/Precipitation Hardening	150-500	250-575	.005-.011
High-temperature Alloys** 200-260 BHN	80-350	-	.003-.008
High-temperature Alloys 260-450 BHN	30-175	-	.003-.008
Titanium Alloys	90-250	-	.003-.008
Free-machining Aluminum Alloys	500-3000	-	.005-.012
Copper/Zinc/Brass	250-900	-	.005-.012
Nonmetallics	400-1500	-	.005-.012

** Example: 316 stainless steel*
*** Example: Inconel 718*

Edge preparation:

PVD coated = light hone except positive top rake, top rake sharp
CVD coated = moderate hone

Machining Guidlines for External Face Grooving Operations



Standard PG/PGD Inserts

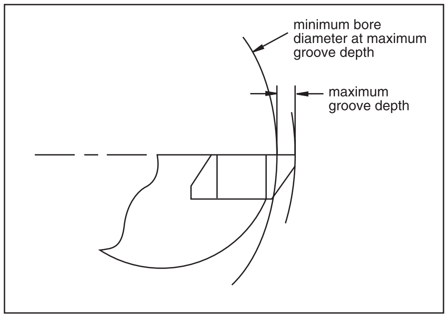
Insert Family	Maximum Groove Depth B	Minimum Groove Diameter C
PG-2	.050	2.125
PG-2	.110	3.500
PG-3	.094	4.000
PG-3	.125	5.000
PG-3	.150	5.500
PGD-3	.250	6.875
PG-4	.150	6.000
PG-4	.250	8.250
PGD-4	.375	8.750
PGD-4	.500	8.750

Groove Limits

Maximum Internal Groove Depth Versus Minimum Bore Diameter

Insert	Maximum Groove Depth	Minimum Bore Diameter
PG-2031R/L PG-2041R/L PG-2047R/L PG-2058R/L	.050	1.000
PG-2062R/L PG-2094R/L PG-2125R/L	.110 .102 .098 .080	2.500 1.750 1.500 1.000
PG-3047R/L PG-3062R/L PG-3072R/L PG-3078R/L PG-3088R/L	.094 .090 .075	1.750 1.625 1.375
PG-3094R/L PG-3125R/L PG-3156R/L PG-3189R/L	.150 .138 .125 .110	2.375 1.875 1.625 1.375
PG-4125R/L	.150	2.750
PG-4189R/L PG-4213R/L PG-4250R/L	.250 .245 .240 .200	5.750 5.000 4.500 2.500

Internal Groove Depth Versus Bar Interference



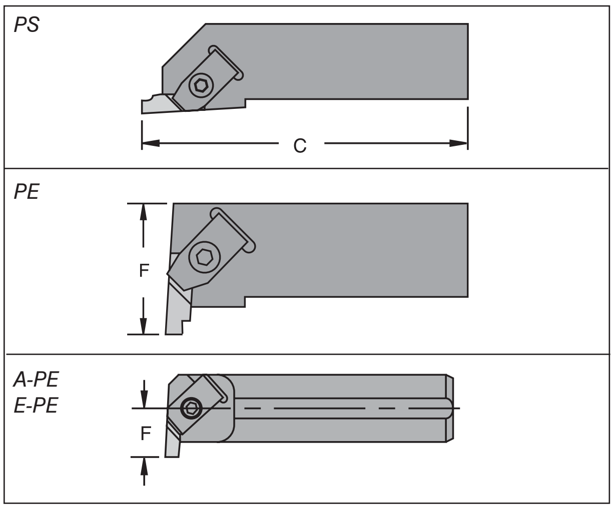
Note: *Internal grooving depth limits are a function of bar clearance versus bore diameters.*

Machining Guidelines for Using PowrNotch Deep Grooving Inserts

Typically, the PRD style inserts with two cutting edges require no machine offset changes. However, those inserts with only one cutting edge do require offset changes. Refer to the chart below to ensure proper offset adjustments.

Machine Offset Charts

Insert Catalog	Add to C Dimension	Add to F Dimension
PRD-3031 PRD-3062	.000 .100	.000 .000.



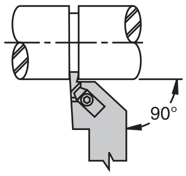
Technical Data

Grooving Tool Detective

Practical solutions to some common grooving problems

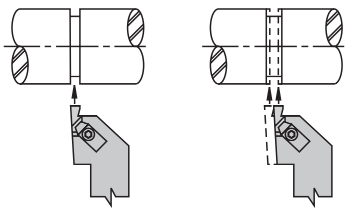
Problem	Remedy
Burr	1. Assure tool center height. 2. Use sharp tool (index more often). 3. Use positive rake pvd coated insert. 4. Use correct grade for workpiece material. 5. Use correct geometry (e.g. positive rake for workhardening material). 6. Chamfer before grooving. 7. Change tool path.
Poor surface finish	1. Increase speed. 2. Use sharp tool (index more often). 3. Dwell tool in bottom 1-3 revolutions (max.). 4. Use proper chip control geometry. 5. Increase coolant flow/concentration. 6. Assure proper setup (overhang, shank size). 7. Use correct geometry (e.g. positive rake for workhardening material).
Groove bottom not flat	1. Use sharp tool (index more often). 2. Dwell tool in bottom 1-3 revolutions (max.). 3. Reduce tool overhang (increase rigidity). 4. Assure correct tool alignment (see illustration at right). 5. Reduce feed rate at groove bottom. 6. Use a wider insert. 7. Assure tool center height.
Poor chip control	1. Use "C" chip control geometry insert. 2. Use sharp tool (index more often). 3. Increase coolant concentration. 4. Adjust feed rate (usually increase first).
Chatter	1. Reduce tool and workpiece overhang. 2. Adjust speed (usually increase first). 3. Adjust feed (usually increase first). 4. Assure center height.
Insert chipping	1. Use correct grade for workpiece material. 2. Increase speed. 3. Reduce feed. 4. Use a stronger grade. 5. Increase tool and setup rigidity.
Built-up edge	1. Use positive rake pvd coated insert. 2. Increase speed. 3. Reduce feed. 4. Increase coolant flow/concentration.
Side walls not straight	1. Check tool alignment for square. 2. Use correct insert hand. 3. Reduce workpiece and tool overhang. 4. Use sharp insert (index more often).

Holder Position for Grooving Operation



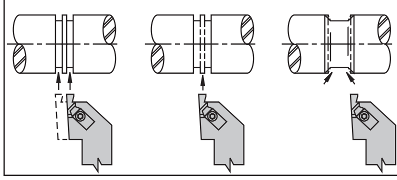
How to Cut a Groove Slightly Wider Than the Groove Tool

1. Plunge the center of the groove.
2. Plunge each side of the groove to get the specified width.
Use a slower feed rate when cutting groove sides.



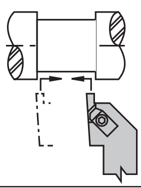
How to Cut Wider Grooves

1. Plunge out both sides of groove width.
2. Plunge center area to remove web of material remaining.
3. Plunge both sides of groove at the required angle, using approximately one-half the width of the grooving tool for maximum width of cut.



Finish Turning the Groove

1. Follow recommendations explained above.
2. To avoid insert chipping and to achieve groove wall perpendicularity, follow the tool path outlined here.
3. Use the lightest depth of cut that still allows good chip breaking, tool life, and surface finishing.



Technical Data

Indexable Rotary Tools

Mini Mach Indexable Drills

Coolant should always be applied through the drill when using the Mini Mach for both static and rotating set-ups. A water soluble type coolant mixed in a 25:1 ratio provides a suitable working mixture.

Recommended drilling depth differs with Mini Mach sizes. When drilling harder materials, such as 18-32 R "C" steels, the depth may be increased with improved chip formation.

Rotating- In a rotating mode, hole size cannot be guaranteed due to tool alignment with spindle centerline. Total indicated runout of the drill in the spindle/arbor combination will either add or subtract to the hole size, depending on the axial location of the cutting edge in relation to the concentricity of the collet or arbor hole the drill is fixed in.

Static - The Mini Mach is manufactured to produce a hole tolerance of +.000"/-.005" for all 11 drill sizes.

Caution: In a non-rotating static mode, care should be taken to avoid positioning the drill off work center by more than 0.005". A greater offset may cause interference with flute body resulting in possible damage to the drill or in some cases, catastrophic failure.

Recommended Speeds, Feeds and Drilling Depths

Not Recommended for Aluminum or Nickel Based Alloys

Materials													
	Drill Diameter		3/8	25/64	13/32	27/64	7/16	29/64	15/32	1/2	17/32	9/16	5/8
	Decimal Equivalent		.3750	.3906	.4063	.4219	.4375	.4531	.4688	.5000	.5313	.5625	.6250
Free Machining Carbon Steels & Low Carbon Steels	**Hardness R/C 8-15**												
	Speed	SFPM	490	490	490	490	400	400	400	400	400	400	400
		RPM	5000	4804	4612	4438	3494	3373	3260	3057	2877	2718	2445
	Feed	IPR	.0008	.0008	.001	.001	.001	.001	.001	.001	.001	.001	.002
		IPM	4.0	3.8	4.6	4.4	3.5	3.3	3.3	3.0	2.9	2.7	4.9
	Maximum Drill Depth		.566	.600	.600	.630	.660	.680	.700	.750	.800	.840	.940
Medium Carbon Steel, Low and Medium Carbon Alloy Steel	**Hardness R/C 12-28**												
	Speed	SFPM	294	307	318	331	343	474	490	440	490	368	490
		RPM	3000	3000	3000	3000	3000	4000	4000	3745	3527	2500	3000
	Feed	IPR	.001	.001	.001	.001	.0016	.0016	.0016	.0016	.0016	.0018	.003
		IPM	3.0	3.0	3.0	3.0	4.8	6.4	6.4	6.0	5.6	4.5	9.0
	Maximum Drill Depth		.750	.780	.810	.840	.880	.910	.940	1.000	1.060	1.120	1.250
High Carbon & High Strength Alloy Steels	**Hardness R/C 28-32**												
	Speed	SFPM	325	325	325	350	350	350	375	375	375	375	350
		RPM	3312	3180	3060	3170	3061	2953	3057	2866	2698	2550	2140
	Feed	IPR	.001	.001	.001	.001	.001	.001	.001	.0015	.0015	.0015	.002
		IPM	3.3	3.1	3.1	3.1	3.0	2.9	3.0	4.3	4.0	3.8	4.2
	Maximum Drill Depth		.750	.780	.810	.840	.880	.910	.940	1.000	1.060	1.120	1.250
Copper Alloys	**Hardness R/C 10-20**												
	Speed	SFPM	490	510	530	550	570	593	610	655	695	735	820
		RPM	5000	5000	5000	5000	5000	5000	5000	5000	5000	5000	5000
	Feed	IPR	.0015	.0015	.0015	.0015	.0015	.0015	.0015	.0015	.0015	.0015	.003
		IPM	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	15.0
	Maximum Drill Depth		.750	.780	.810	.840	.880	.910	.940	1.000	1.060	1.120	1.25
Titanium Alloy (Ti6Al4V)	**Hardness R/C 31-40**												
	Speed	SFPM	400	400	400	400	400	400	400	400	417	441	492
		RPM	4081	3921	3774	3636	3509	3375	3278	3053	3000	3000	3000
	Feed	IPR	.0015	.0015	.0015	.0015	.0015	.0015	.0015	.0015	.001	.001	.002
		IPM	6.1	5.9	5.7	5.5	5.3	5.1	4.9	4.6	4.5	3.0	6.0
	Maximum Drill Depth		.750	.780	.810	.840	.880	.910	.940	1.000	1.060	1.120	1.250

Indexable Rotary Tools

Mach 6 Indexable Drills

Single Flute - Static

The Single Flute Mach 6 is delivered with one insert.

Maximum drilling depth is two diameters.

Water soluble coolant is recommended with a minimum pressure of 10 PSI.

Machining Recommendations

(See chart on right)

	(Steel) 10-25 R/C			(Cast Iron) 5-15 R/C (No Alloy)		
	Drill	Bore/Turn	Face	Drill	Bore/Turn	Face
Mach 6 .750						
SFM	450-550	350-400	350-400	250-300	250-300	250-300
IPR	.0015-.002	.008-.010	.006-.008	.006-.008	.010-.012	.008-.010
Depth of Cut	1.500	.060-.090	.030-.060	1.5000	.090-.125	.060-.090
Mach 6 1.000						
SFM	450-550	350-400	350-400	250-300	250-300	250-300
IPR	.002-.003	.008-.010	.006-.008	.008-.010	.010-.012	.008-.010
Depth of Cut	2.000	.090-.125	.060-.090	2.000	.090-.125	.060-.090
Mach 6 1.500						
SFM	450-550	350-400	350-400	250-300	250-300	250-300
IPR	.0035-.004	.010-.012	.008-.010	.010-.012	.012-.015	.010-.012
Depth of Cut	3.000	.125-.187	.090-.125	3.000	.125-.187	.090-.125
Mach 6 2.000						
SFM	450-550	350-400	350-400	250-300	250-300	250-300
IPR	.004-.005	.012-.015	.010-.012	.012-.015	.015-.018	.012-.015
Depth of Cut	4.000	.187-.250	.125-.187	4.000	.187-.250	.125-.187

Double Flute - Static/Rotating

The Double Flute Mach 6 is delivered with 2 inserts.

Maximum Drilling depth is 2.5 diameters.

Water soluble coolant is recommended with a minimum pressure of 30 PSI. for horizontal operation and higher pressure for vertical position to flush chips properly.

Machining Recommendations
(See chart on right)

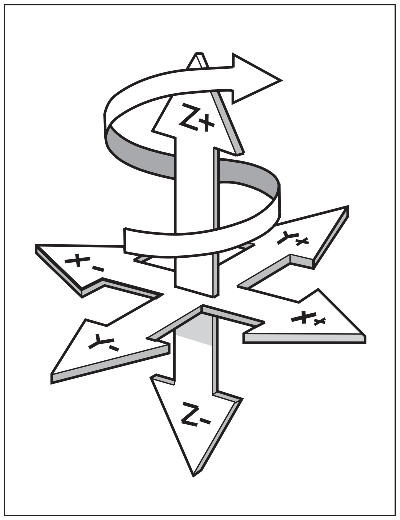
Drill Diameter		1.000 IPR	1.125 IPR	1.250 IPR	1.500 IPR	1.750 IPR	2.000 IPR	2.250 IPR	2.500 IPR
Material	SFM								
Cast Iron									
Gray Iron	400	.006	.006	.008	.010	.010	.010	.010	.010
No Alloy	800	.010	.010	.012	.014	.016	.016	.018	.020
(100-300 BHN)									
Free Machining	450								
Steels Stainless	550	.002	.002	.002	.003	.003	.003	.004	.004
(150-250 BHN)									
Alloy Steels									
41XX-43XX	350	.002	.002	.002	.002	.003	.003	.004	.004
86XX	500	.004	.004	.006	.006	.008	.012	.012	.012
(200-300BHN)									

Thread Milling - Technical Data

Introduction

Thread milling is a method of producing a thread using basic milling fundamentals on CNC machining centers capable of helical interpolation.

Helical interpolation describes the movement of a tool axis at a constant distance from the thread axis along the helical path of a thread. It requires that all three axes are constantly in motion, two of them at constantly changing rates. This capability is a standard feature on most new machines.



A thread mill has annular teeth, and the speed of its rotation is independent of movement in the three machine axes. Helix, feed and directional rotation are controlled by the CNC program which is interrelationally variable.

For example, a thread mill can be used to produce a 60° serration on a flat surface if only one feed axis was put in motion.

Three axis lathes having powered turret spindles can also produce threads by thread milling. The overall setup of the job to be done will dictate the feasibility of this machine tool.

Other three axis machines retrofitted with helical interpolation such as Bridgeports, transfer line equipment or milling machines with sufficient speed, rigidity and power might also be utilized. Before considering use, these machines should be carefully evaluated for suitability. Spe-D-Cut will help determine the best method to produce a lower cost per threaded hole in your production environment.

How thread milling works

In a typical internal thread milling cycle, the rotating thread mill is lowered into the hole (Z- axis) that has been previously sized to the minor diameter of the given thread in a rapid traverse movement equivalent to the length of full thread required plus one eighth pitch, provided this does not exceed the cutting head length of the mill.

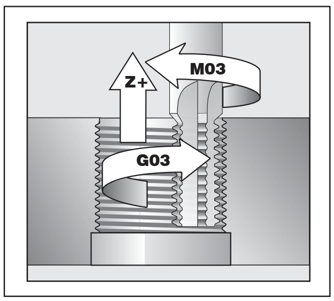
At the next line in the program, the tool is positioned an equal distance in X & Y ensuring the tool does not interfere with the minor bored diameter. The tool is then fed into the workpiece tangentially using X, Y & Z coordinates for entry to the part (referred to as "arcing in"). The tool is fed to full thread height while simultaneously compensating the Z axis for the helix angle. This 3 axis move is programmed to avoid "thinning" of the thread flanks at the beginning of the 360° internal milling rotation.

Once to full thread depth, the program directs the cutter to traverse in one complete 360° helical rotation generating the complete thread form, while retracting one pitch (Z+). The cutter is then disengaged from the thread by helically arcing out of the thread, avoiding thinning. After the program returns the cutter to hole center, it can safely be retracted in rapid traverse from the hole.

Cycle time is based upon the completion of the thread in one rotation, however, there are certain applications that may require more than one rotation. When using an insert style thread mill, two rotations may be necessary when the length of full thread dimension is too long to produce the desired length of full thread in one pass.

If a coarse pitch thread is called for, i.e.: 4-40UNC, 1/4-20UNC etc., two rotations will be required to produce the thread with a solid carbide thread mill due to increased thread depth. Multiple rotations should also be considered when machining difficult to machine materials such as stainless steels or nickel base alloys.

If an invertible insert style thread mill is applied in an application requiring a length of thread that is greater than the insert length, multiple rotations will be required. In this instance, the first interpolation is made with the tool set at the bottom of the hole. After completing one helical interpolation the tool must be disengaged from the work in an arc (as previously explained). After disengagement, the tool must be repositioned to insure the full length of the thread can be generated. This requires a reduction in the Z axis position by an amount equal to or greater than ($\geq$) the difference between the thread length and the cutting edge length of the insert, but exactly divisible by the pitch. This repositioning must be less than the width of the insert for the thread generated to be continuous. The operation is then completed using a second rotation.



Climb milling is the preferred milling technique using M03, G03 and Z+ commands which will provide internal right hand threads. Left hand threads are produced by changing the Z move to the minus direction. Double lead threads are produced with the

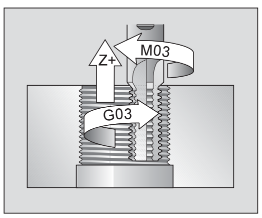
Thread Milling - Technical Data

same tool by increasing the Z move equivalent to two pitches for each 360° rotation.

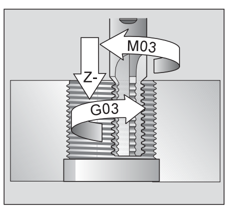
The resultant thread is determined by the accuracy of the machine and control. Most CNC controls today can control thread pitch diameter to a radial accuracy of 0.0001". Spe-D-Thread tools are capable of producing class “H” limit threads including oversize internal diameters required for subsequent plating.

Benefits of Thread Milling

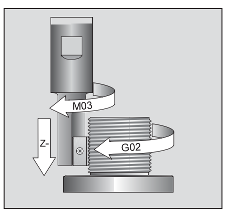
1. Allows essentially bur free production of 100% thread height.
2. Permits full thread form to within one pitch of a counterbored hole.
3. Eliminates secondary threading operations, completes threads in the same set up.
4. Minimal horsepower is required even with large diameter, coarse pitch threads.
5. Provide superior flank finish and thread quality.
6. Cuts consistent, predictable threads even in exotic materials.
7. The same tool holder generates left or right hand threads, external or internal threads.
   Please note: Internal and external UN and ISO thread forms differ, so solid carbide tools or thread mill inserts will produce only internal or external threads. *However the same holder can produce left or right hand, external or internal threads by merely changing the insert and programming the machine tool paths as shown below:*
8. Allows reduced cycle times vs. tapping on high spindle speed machining centers.



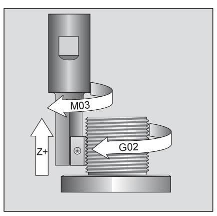
Internal Right Hand Thread



Internal Left Hand Thread



External Right Hand Thread



External Left Hand Thread

   If sufficient RPM and accurate control of machine movement is available for smaller diameter thread production, cycle time can be reduced. Materials such as 6061-T6 aluminum, free machining brass and low carbon steel can be run at higher cutting speeds. For example, a 1/4-28UNF requires a thread mill having a rotational diameter of 0.145". To achieve a starting speed of 1000 SFM, the tool would need to rotate at 26,344 RPM. The tool has three flutes and,if applied at 0.0004" per flute, the effective feed would be 31.61 IPM. ***A 1/4"diameter has a circumference of 0.7854” and the tool will take 1.49 seconds to mill the 360° rotation.***
9. Small diameter threads are possible with standard thread mills available as small as 0.060" cutting diameter.

Tool selection

The tool selection process for any thread milling application carries differing parameters than those related to tool selection for conventional machining methods. Certain guidelines will dictate the ideal thread mill for a given application. Correct tool selection is vital if consistent results are to be expected. Before any selection process can begin, four parameters must be known:

1. Major thread diameter
2. Pitch of thread
3. Length of full thread
4. Material to be machined

Other factors need consideration before optimum tool selection can be determined. For production applications, cycle time is usually of prime importance, especially if batch quantities are high. Four parameters dictate cycle time.

1. Cutter diameter
2. Number of cutting flutes
3. Feed advance per revolution
4. Cutter revolutions per minute

Obviously, the goal is to produce the thread in one rotation and the optimal tool size should always be one that will achieve this. The number of flutes will be determined by tool size and, in some cases, machine capability. The cutter diameter depends on the thread diameter, length of full thread, pitch, and to some extent, material to be machined. The feed rate in inches per minute results from the spindle revolutions per minute, feed per flute, number of flutes and the diameter of the mill selected.

Thread mills are of annular ring design resulting in minimal side clearance. Cutting relief results primarily from the difference in the diameter of the milling cutter and diameter of the thread being generated. If there is insufficient, re-

Thread Milling - Technical Data

sultant threads are deformed, flute heels chip, and in extreme cases, the tool can break.

The maximum cutter diameter that can be used to generate internal threads depends on these factors. The cutter diameter must be smaller than the minor diameter of the thread to a degree that permits the perimeter of the cutter to exit the thread form without secondary cutting contact. The difference necessary is dependent on the angles of thread form, depth and helix of the thread.
The formula and chart in the box below suggest the maximum thread milling cutter diameter for these larger size 60° threads.

IMPORTANT RULE IN THREAD MILLING TOOL SELECTION:
When all parameters have been taken into full consideration, the smallest diameter tool should be selected.

In thread milling, bigger is not always better. (A larger thread mill diameter increases the strength of the mill with respect to the thread to be generated. It also increases the radial milling force required by the cut and lengthens the cycle time if surface feet per minute is kept constant and an equivalent number of flutes are involved). Therefore 1) cycle time may be improved by using smaller diameter thread mills and 2) cutting pressure will be reduced.

Cycle Time
The cutting portion of cycle time is proportional to the effective feed. Feed is equal to RPM x Feed per flute x Number of flutes. At the same surface velocity (SFM) a smaller tool must rotate at a higher RPM. On some free machining materials where machine RPM is limited, selecting a smaller tool may not afford an improved cut time.

The feed rate of the machine is based on the centerline of rotation of the thread mill. The circumference a smaller tool must travel is greater than a larger one, but the effective feed is what must be considered and selected. Consequently, the difference between the effective feed and the machine feed is less when a smaller tool is employed on internal threads.

Maximum thread mill cutter diameter:
For pitches up to 14 T.P.I. = Major Thread Diameter x 0.75
For coarser pitches (13,12,11 T.P.I.) = Major Diameter x 0.70

Maximum Allowable Thread Mill Cutting Diameter
Threads Per Inch (TPI)

Thread Diameter	3	4	5	6	8	12	14	16	20	24
4.500	3.350	3.650	3.700	3.800	3.965					
4.250	3.300	3.400	3.450	3.550	3.715	3.845				
4.000	3.050	3.150	3.200	3.300	3.465	3.595	3.675			
3.750	2.800	2.975	3.050	3.150	3.315	3.445	3.525	3.600		
3.500	2.550	2.725	2.850	2.935	3.100	3.225	3.300	3.750	3.550	
3.250	2.300	2.450	2.560	2.625	2.750	2.835	2.900	2.975	3.050	3.135
3.000	2.050	2.175	2.275	2.325	2.425	2.550	2.600	2.660	2.710	2.785
2.750	1.750	1.860	1.965	2.005	2.090	2.180	2.225	2.260	2.300	2.350
2.500	1.490	1.590	1.695	1.730	1.810	1.890	1.935	1.965	2.000	2.045
2.250	1.230	1.335	1.440	1.470	1.550	1.630	1.675	1.700	1.730	1.775
2.000	1.050	1.150	1.250	1.275	1.350	1.425	1.470	1.495	1.525	1.565
1.750		0.990	1.060	1.100	1.165	1.235	1.270	1.295	1.325	1.365
1.500				0.925	0.985	1.045	1.090	1.105	1.130	1.165
1.250				0.525	0.800	0.860	0.900	0.915	0.935	0.965
1.000					0.063	0.675	0.700	0.715	0.740	0.775
0.750						0.490	5.150	0.525	0.545	0.560

Thread Milling - Technical Data

Thread Mill Holder vs Solid Carbide:

Machining Data/Parameters – Tool Holder Style:

- Thread Specification: 2" Diameter - 12UN Internal
- Tool Specification: 1.00" d2 (Head Diameter), 2 Flutes
- Cutting Speed: 650 Surface Feet Per Minute (SFM)
- Feed: 0.0025" Per Flute x 2 = 0.005" Per Rev

RPM = (SFM x 3.82) ÷ d2 (Head Diameter) or:
(650 x 3.82) ÷ 1.00 = 2,483 RPM

IPM = RPM x Feed Per Flute x Number Flutes or:
2,483 x 0.0025" x 2 = 12.42 IPM at cutting edge

Program Feed Rate = IPM x (Maj. Thread Dia. — d2)
÷ Major Thread Dia. or:
12.42 x (2.00 — 1.00) ÷ 2.00 = 6.21 Programmed IPM

Tool Centerline Circumference
= Major Thread Dia. — d2 x π (3.1416) or:
2.00 — 1.00 x 3.1416 = 3.1416"

Cycle Time, Secs. = Tool Centerline Circumference ÷
Program IPM x 60 or:
3.1416 ÷ 6.21 x 60 = 30.35 Seconds In Cut

Machining Data/Parameters - Solid Carbide Style

- Thread Specification: 2" Diameter - 12UN Internal
- Tool Specification: 0.500" d2 (Head Diameter), 5 Flutes
- Cutting Speed: 650 Surface Feet Per Minute (SFM)
- Feed: 0.001" Per Flute x 5 = 0.005" Per Rev

RPM = (SFM x 3.82) ÷ d2 (Head Diameter) or:
(650 x 3.82) ÷ 0.500 = 4,966 RPM

IPM = RPM x Feed Per Flute x Number Flutes or:
4,966 x 0.001" x 5 = 24.83 IPM at cutting edge

Program Feed Rate = IPM x (Major Thread Dia. - d2)
÷ Major Thread Dia. or:
24.83 x (2.00 - 0.500) ÷ 2.00 = 18.62 Programmed IPM

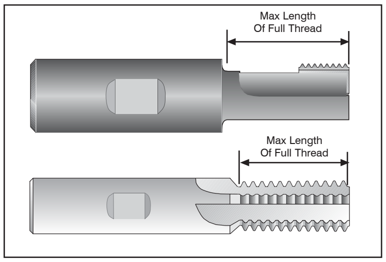
Tool Centerline Circumference =
Major Thread Dia. - d2 x π (3.1416) or:
2.00 - 0.500 x 3.1416 = 4.71"

Cycle Time in Secs. = Tool Centerline Circumference
÷ Program IPM x 60 or:
4.71 ÷ 18.61 x 60 = 15.19 Seconds In Cut

The formula showed that even though the feed per tooth was less for the solid carbide end mill, the increased number of flutes and higher rotational velocity halved the cutting time. Using a smaller diameter tool reduces the arc of chip cutting engagement, lowering the maximum temperatures the tool will reach during each cutting engagement, increasing tool life.

Replaceable Insert Style

Consequently, the insert style thread mill is popular.
Machining costs depend on tool cost, production rate and tool life. Justification of solid carbide mills versus insert type mills in the size range where both are available generally favors the tool that produces increased production.
Changing inserts to generate various threads is often advantageous on short run jobs.
Although the number of rotations are controlled by the length and pitch of an insert, the actual length of thread possible is controlled by the l2 dimension of the holder. It is quite common to perform two, three or even four rotations to achieve the desired length of thread.
Modification of the Z axis move is necessary between each rotation and machining time is proportionate to the number of rotations taken. The use of the invertible insert style is often preferred by smaller shops because of the added flexibility, as more than one thread form can be produced by simply changing inserts.



Holders

The Spe-D-Cut range of thread milling holders are designed to satisfy the size and maximum pitch offered with the insert series (14, 21, 30 and 40 mm length of thread). Again, because of the related tool pressure and deflection problems, the length of thread for which a specific holder is designed (l2 dimension) is generally based upon the maximum length of overhang allowable for that given rotational diameter of the mill.
As with any standard tooling, there are occasions when a particular application demands additional tool specifications not available on standard tools. With thread milling, this is often required on length of thread.
Unfortunately, if the l2 length is increased by modification to give extra clearance for longer or deeper threads without due consideration to loading stresses at which the tool will be used, ***a dangerous operating condition might be created that could result in injury. Spe-D-Cut does not recommend modification of any Spe-D-Thread product.***

Thread Milling - Technical Data

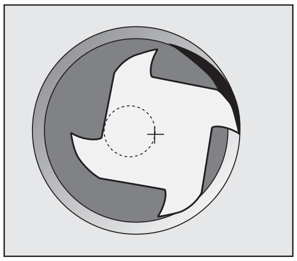
Even without modification cutting tools may break and shatter, therefore the wearing of safety apparel and adequate safeguards in the vicinity of their use is strongly recommended.

Select the right diameter tool

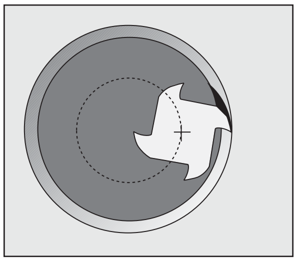
As previously shown, the cycle time for the smaller cutter is half that of the larger size. Just as significant, however, is the difference in chip configuration. The cutting pressure generated during a thread milling operation is extremely high.

Although the full tool diameter is not in contact with the workpiece, the entire tool length, multiplied by the full thread form, is engaged into the workpiece material, thus generating exceptional pressure. This is "enemy number one" for any and all thread milling applications and any method available to reduce this pressure will have significant positive results.

The diagram below reflects a benefit of using a smaller tool diameter having a smaller rotational diameter generates a much shorter chip, reducing deflection and decreasing tool pressure.



A larger tool produces a longer chip and is in the cut for a longer period of time.



A smaller tool produces a shorter chip and is in the cut for a short period of time thus generating less heat and side pressure.

Feed rate calculation

Most process engineers program tool movements to the centerline of the spindle. A common practice, using ASCII format or "G" code programming is to use "macros" included with most CAD systems today. These programs include "canned cycle" thread milling subprograms.

Unfortunately, some machine controls "void" or cancel out all these macros when a helical move is made.

A true helical move takes all the processing power of the machine control to ensure accuracy of machine movement. Newer high performance mills have this option built into these controls, but with existing equipment, a compensated feed rate in the program must be used.

Regardless of the machine brand or control, ***internal*** thread milling applications need feed rate compensation, especially when helical interpolation is applied.

Correct feed rate programming is an essential element in thread milling applications. Most CNC machining centers are programmed in inches per minute (IPM), which is applied at the centerline of the spindle (C/L). *In internal applications, the larger the cutting tool diameter, the faster the effective feed at the major thread diameter becomes.*

The major thread diameter circumference that the cutting edge must traverse in an internal application is larger than that which the axis of the cutter travels. Therefore, the normal feed rate calculation for inches per minute (RPM x feed per tooth x number of flutes) must be modified.

This is standard procedure for normal milling applications but is often neglected with thread milling. The proper compensation for the feed rate of the centerline of the tool would be as shown below.

Feed Rate Compensation Formula
for Internal Thread Milling

$$f1 = \frac{f2 \times (d - d2)}{d}$$

f1 = feed at axis of cutter in IPM
f2 = effective feed at major thread diameter in IPM
d = diameter of thread
d2 = diameter of cutter.

Feed rate calculation (internal thread) example:
- Thread diameter = 2.500"
- Tool diameter = 1.180
- RPM = 1850
- Feed/flute = 0.0025
- Number of flutes = 2
- 1850 x 0.0025 x 2 = 9.25 inches per min. actual feed rate at cutting edge
- $f2 = \frac{9.25 \text{ IPM} \times (2.500 - 1.180)}{2.500"}$ or

  4.88 compensated IPM feed rate.

Thread Milling - Technical Data

Feed Rate Compensation for External Thread Milling

$$f1 = \frac{f2 \times (d + d2)}{d}$$

f1 = feed at axis of cutter in IPM
f2 = effective feed at major thread diameter in IPM
d = diameter of thread.
d2 diameter of cutter.

Feed rate calculation (external thread) example:

- Thread diameter = 2.500"
- Tool diameter = 1.180
- RPM = 1850
- Feed/flute = 0.0025
- Number of flutes = 2
- 1850 x 0.0025 x 2 = 9.25 inches per min. actual feed rate at cutting edge
- f2 = $\frac{9.25 \text{ IPM} \times (2.500 + 1.180)}{2.500"}$ or

13.61 compensated IPM feed rate.

Feed selection

Feed per tooth will vary depending upon tool configuration (indexable or solid carbide) tool size, thread profile, material to be machined, flank finish requirements, machine capability (spindle speed) and machine / component rigidity.

When using very small diameter mills, (0.060" - 0.200" cutting dia.) feed can often be as low as 0.0003" per flute. Feed rates per tooth are usually kept low when using solid carbide styles to provide optimum tool life between re-sharpening. Feed per flute can range from 0.0003" to 0.002" per flute. Suggested feed and speed parameters are provided on later in this section.

0.004" is the maximum rate recommended because beyond this rate, feed marks become noticeable. Feed marks become more conspicuous as feed is increased and look much like chatter. Feed marks directly correlate with the distance traveled by the thread mill between last contact of successive flutes with the work.

Even though feed marks at the higher feeds may be visible, they do not normally affect the thread's function or tolerance. It could affect finish quality specifications, however. For this reason a maximum feed rate per flute of 0.004" is recommended.

Feed marks are more obvious on certain materials such as brass and other nonferrous metals where a tendency to apply heavy feed rates is common. Feed marks can be easily distinguished from chatter by the audible sound produced during the cut. Chatter produced by cutting tools produce a distinct high frequency squeal or irregular frequency sound. The preferred sound resembles a buzz which is normally prduced when an appropriate feed is applied to the tool in a climb milling mode.

Note: Consideration must be given to the thread profile when selecting both feed and surface speed, particularly on more difficult to machine materials. Large root radii, as found on coarse pitch UN & ISO thread forms, will allow a higher feed resulting in a predictable wear rate. NPT and NPTF thread forms, which have much smaller crest and root radii, require lower feed rates to insure optimum life of the tool before resharpening.

Tool holding and tool path parameters

Programming a thread milling operation is not as difficult as It appears. The essential aspect of a thread milling operation is to ensure that certain guide lines are followed.

1. Correct tool selection cannot be over emphasized.
2. Speed and feed selection is important. Err on the high side of speed, (spindle RPM), and low with feed (compensated inches per minute).
3. Tool holding method is relevant, particularly with the solid carbide styles and the multi-flute holders. Holding method must ensure concentricity to within 0.0003" TIR and elimination of any possible rotational slipping.
4. Workpiece holding must be secure.
5. Climb milling mode should always be used initially.
6. Tangential infeed (arc in) should always be used.

NPT and NPTF applications

The most frequent (or popular) conversion from taps to threadmills is on tapered threads. Regardless of material, the tapered thread continually presents problems for a tap. Elimination of stop marks and torn flanks is sometimes impossible.

Achieving the desired projection (the length of thread engagement) can sometimes be difficult. It often requires the use of special taps while controlling the machine tool to give the desired results.

Edge chipping and breakage is very common. In an attempt to alleviate these problems, various tap configurations are offered to help prevent some of these occurrences (interrupted threads, spiral flutes etc.)

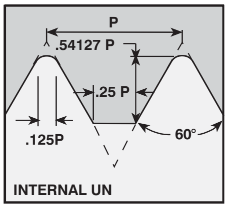
These potential problems can be eliminated by changing the operation to thread milling. The results are almost always striking, and the quality difference between a tapped pipe thread and a milled thread is significant.

Thread Milling - Technical Data

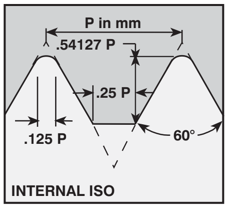
Two questions often asked regarding thread milling tapered threads.

1. Do we still need to taper ream the hole prior to thread milling?
2. Is it necessary to accommodate the taper in the CNC Program?

The answer to both questions is yes. With certain softer nonferrous materials it is not necessary to taper ream the hole but with tougher materials, a simple reply would be, why use a precision tool to perform a rough milling operation?
Even though the thread mill has the correct taper (1°-47'-24") ground into the periphery of the tool, the tool path centerline should be compensated outward for each 90° quadrant move as the tool moves up in the Z axis. If this compensation is not written in the program, the tool will leave a radius shelf or stop line at the point of entry and exit of the cut.



UN Internal Thread Form Profile



ISO Metric Internal Thread Form Profile

Determine the right drill size for 100% thread height.

To determine the proper drill size to achieve full profile threads and utilize the debur feature of the thread mill, the drill size should be slightly undersize of the finished minor diameter of the threaded hole.

To calculate this exact dimension, the following formula can be used:

For 5/8-11UN Thread

Thread Height = Pitch x 0.54127
Thread Height = 0.0909 x .54127 = .04921
Minor diameter of thread
= Major thread diameter (2 x thread height)
Minor diameter of thread
= .625 - (2 x 0.04921") = .5266" minor diameter

The nearest common drill size to the minor thread diameter would be a 33/64" drill (0.5156"). This is 0.011" smaller than the minimum bore, requiring the thread mill to remove 0.0055" more than it should have to. The alternative would be to size the hole to a 0.5246" diameter with a reamer, only 0.002" from minor thread diameter.

Spe-D-Cut provides free programming assistance to any customer buying a thread mill. A copy of a programming request is provided later in this section. Copy it, fill out the information and fax it to the number on the form. A program will be prepared and returned by fax.

Taper pipe thread

The major difference between taper and straight threads is that the tool path must include X & Y correction to allow for the taper as the tool moves up and around the 360° rotation. Even though the tool has the 3/4" taper per foot ground into its periphery, the tool must move out from the center of the hole as it progresses around each 90° of arc move.

This taper compensation must be made precisely to properly blend the start and stop points at the beginning and end of the 360° rotation. If this compensation does not take place, a shelf will be created at the point of exit from the work piece and the thread will be out of specification. See chart on the next page for details on all popular NPT sizes.

NPT and especially NPTF threads have very tight thread form tolerances and thread lead allowances. Let us examine a popular pipe thread, 1" - 11.5 NPT. The crest and root radius allowance for this thread is 0.0029" minimum to 0.0063" maximum, an allowance of 0.0046" . An NPTF dryseal has even tighter tolerance because the thread is an interference crest and root thread form.

NPT Taper Compensation Per Quadrant	
27 TPI	0.0003"
18 NPT	0.0004"
14 NPT	0.0006"
11.5 NPT	0.0007"
8 NPT	0.0010"

Taper reaming prior to milling tapered threads

Should the bore of an NPT thread be reamed prior to thread milling an NPT or NPTF thread? The answer is yes for sizes 1/2" and larger. However, if the material is difficult to machine or has work hardening characteristics such as 300 series stainless steel, Spe-D-Cut recommends using a tapered end mill to circle interpolate the bore.

The included taper per foot of an NPT thread is 3° 34' 34.8". This would be the ideal angle of an end mill to generate such a thread. A more readily available 4° end mill works better than expecting the thread mill to develop the bore taper as well as generate the thread. Alternatively, an appropriately tapered reamer could be used. Economics dictate the bore be tapered before thread milling. In the case of a large 8 pitch NPT thread, it is very important to remove as much material as possible in advance of generating the thread, otherwise three rotations will be required in the thread milling operation to prevent excessive deflection pressure.

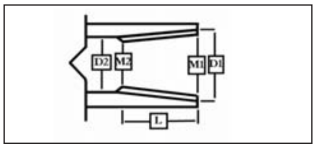
Thread Milling - Technical Data

In cases where batch quantities are low, many customers have found three or two rotations adequate to satisfy their cycle time and avoid the increased wear per thread an additional pass would consume.

With large quantity production lots, adding a taper reaming operation or a helically interpolated taper milling operation will more than offset the cost of shorter thread milling life.

This chart details all popular NPT sizes and will be used to determine programming coordinates for the taper program example to follow:

L = Length of full thread
D1 = Major thread diameter, large end
D2 = Major thread diameter, small end
M1 = Minor thread diameter, large end
M2 = Minor thread diameter, small end



NPT & NPTF Thread Dimensional Data

Nominal Size	Pitch	D1	D2	L	M1	M2
1/16-27	0.03704	0.308	0.292	0.271	0.252	0.236
1/8-27	0.03704	0.400	0.384	0.273	0.344	0.328
1/4-18	0.05556	0.533	0.508	0.395	0.448	0.424
38-18	0.05556	0.668	0.643	0.407	0.584	0.559
1/2-14	0.07143	0.832	0.799	0.534	0.723	0.690
3/4-14	0.07143	1.043	1.008	0.553	0.934	0.899
1"-11.5	0.08696	1.305	1.263	0.661	1.173	1.131
1-1/4"-11.5	0.08696	1.650	1.607	0.681	1.518	1.475
1-1/2"-11.5	0.08696	1.888	1.846	0.681	1.756	1.714
2"-11.5	0.08696	2.362	2.319	0.697	2.230	2.187
2-1/2"-8	0.12500	2.859	2.973	1.057	2.669	2.603
3"-8	0.12500	3.485	3.414	1.141	3.295	3.224
3-1/2"-8	0.12500	3.985	3.907	1.250	3.795	3.717
4"-8	0.12500	4.484	4.402	1.300	4.294	4.212
5"-8	0.12500	5.546	5.458	1.406	5.356	5.268

Threading Formulas

MTD = Major Thread Diameter
P = Pitch
EF = Effective Feed, inches per flute
EFM = Effective Feed, inches per minute
PF = Program Feed, inches per flute
$\tan^{-1}$ = arc tangent

Approximate formula to calculate helix angle:
Tangent of Internal Thread Helix = (0.3183 x P) ÷ MTD
Helix angle of Internal Thread = tan-1 [(0.3183 x P) ÷ MTD]
ΔZ = .125 x Tangent of Internal Thread Helix x MTD

Calculating RPM from SFM:
PRM = 3.82 x SFM ÷ Thread Mill Diameter

Calculating SFM from RPM:
SFM = 0.2618 x RPM x Thread Mill Diameter

Calculating Actual EFM:
EFM = EF x Number of flutes x RPM

Program Feed per Minute for Internal Thread Milling:
Internal Threads =
EFM x (MTD - Thread Mill Diameter) ÷ MTD

Program Feed per Minute for External Thread Milling:
External Threads =
EFM x (MTD + Thread Mill Diameter) ÷ MTD

Z Axis for Arc On or Arc Off:
= (Pitch x Arc°) ÷ 360

Cutting Time, in seconds, of one 360° rotation
Internal Thread = (188.5 x MTD) ÷ EFM
External Thread = (188.5 x MTD) ÷ EFM

Centerline X & Y Axis Coordinates for Absolute Position (internal threads):
Absolute Position =
(Major Thread Dia. — Thread Mill Diameter) ÷ 2

Centerline X & Y Axis Coordinates
for Absolute Position, Internal Threads:
Absolute Position = (MTD – Thread Mill Diameter) ÷ 2

Centerline X & Y Axis Coordinates
for Incremental Position, Internal Threads:
Incremental Position = (MTD + Thread Mill Diameter) ÷ 4

3/4" Per Foot Taper X & Y Compensation for each 90° of Arc Move:
27 TPI = 0.0003", 18 TPI = 0.0004", 14 TPI = 0.0006"
11.5 TPI = 0.0007", 8 TPI = 0.0010"

Thread Milling - Technical Data

Speed & Feed Program Parameters

The speed and feed chart below provides valuable information for the application of solid carbide thread mills based on the shank diameter of the tool. For insert mills, use the suggested starting speed for a given material and an effective feed per flute of .001" to .003", depending on the head diameter of the tool and the machinability of the material to be milled. Then calculate a program feed based on formulas on the previous page.

Coarse pitch threads having a high ratio of material to be removed for the specified thread diameter will require multiple passes to reduce tool side loading. For example, a 1/4"-20 UN internal thread will require two rotations in any material. The first pass should remove 70% of the required thread height and the last pass should remove the remaining 30% to final diameter. A 70/30 ratio will remove an equal volume of material on each pass.

This chart provides a range of speeds and feeds suggested as initial starting conditions. Many factors will affect results. Feed per flute selected may vary depending on material condition, part fixturing, machine rigidity, spindle wear, tool overhang and cutting fluid employed. More efficient or optimum results such as minimum machining costs or maximum production of a specific thread mill are determined by adjusting the operating parameters.

Material to be Machined	Brinell (Bhn) Rockwell	Speed in Surface Feet per Minute	Shank Diameter of Solid Carbide Thread Mill Starting Feed in Inches per Flute per Revolution 1/8" & 3/16"	1/4" & 5/16"	3/8"	1/2" & 5/8"	3/4"
Free Machining Steels Plain & Low Carbon	100 - 220 Bhn 76 - 96 Rb	550 650	0.0003"	0.0005"	0.0007"	0.0010"	0.0015"
Heat Treatable Medium Carbon, Annealed Alloy Steel	220 - 260 Bhn 20 - 27 Rc	500 575	0.0003"	0.0005"	0.0006"	0.0008"	0.0011"
Medium Carbon, Alloy Steels	270 - 353 Bhn 26 - 36 Rc	400 525	0.0003"	0.0004"	0.0006"	0.0008"	0.0010"
Heat Treated Alloy & Carbon Steels	353 - 464 Bhn 36 - 48 Rc	200 400	0.0003"	0.0004"	0.0006"	0.0008"	0.0010"
Austenitic Stainless 200 & 300 Series, Annealed	150 - 180 Bhn 76 - 89 Rb	475 525	0.0003"	0.0005"	0.0008"	0.0010"	0.0014"
Martensitic Stainless 400 - 500 Series, Annealed	150 - 240 76 - 99 Rb	400 525	0.0003"	0.0004"	0.0007"	0.0008"	0.0012"
Precipitating Hardness SS 15-5PH, 17-4PH, PH-13-Mo	240 - 353 Bhn 24 - 38 Rc	200 300	0.0003"	0.0004"	0.0007"	0.0008"	0.0012"
Nickel Based Alloys, Inconel 700, 600, 400 Series & K-Monel	70 - 140 ksi Tensil Strength	85 120	0.0003"	0.0004"	0.0007"	0.0008"	0.0012"
Titanium Alloys, Alpha Beta Alloys (i.e. Ti-6Al-4V)	-	90 100	0.0003"	0.0004"	0.0007"	0.0010"	0.0012"
Cast Iron, Ductile, Gray, Malleable	-	500 625	0.0004"	0.0006"	0.0010"	0.0014"	0.0018"
Nonferrous Aluminum Wrought Lo Si Cast, Brass	-	1,250 3,000	0.0004"	0.0006"	0.0010"	0.0015"	0.0020"
Graphite Composites, Fiberglass, Kevlar, Resin Laminates	-	150 250	0.0003"	0.0004"	0.0007"	0.0008"	0.0012"
Plastics, PVC Cast	-	700 - 1,300	0.0003"	0.0005"	0.0008"	0.0010"	0.0014"

Copy this form, fill in the information then fax it to: 1-850-236-2425

Programming Request Form

Company Name: ______________________ Date: ______________________

Contact: ______________________ Telephone: ______________________

Tooling Purchase From: ______________________ Fax Number: ______________________

Machine Information:

Brand Make: ______________________

Model: ______________________

Spindle Taper: ❑ 35 Cat ❑ 40 Cat ❑ 50 Cat

Max RPM: ______________________

CNC Controller Information:

Brand Make: ______________________

Model: ______________________

ISO - ASCII Compatible: ❑ Yes ❑ No ❑ Don't Know

Is Helical Option Available: ❑ Yes ❑ No ❑ Don't Know

Thread Specification To Be Produced:

Thread Specification: ______________________

Length Of Full Thread: ______________________

Thread Form: ❑ 100% ❑ 75% Other__________%

Thread: ❑ Internal ❑ External

Drill Size:__________" ❑ Thru ❑ Blind ❑ Counterbored

Material To Be Machined:

Material: ______________________

Hardness: ______________________

Condition: ❑ Annealed ❑ Normalized ❑ Heat Treated

❑ Cast ❑ Forged ❑ Rolled ❑ Plate ❑ Bar

❑ Pre-Machined ❑ Flame Cut ❑ Scale ❑ Sand

Thread Mill Selected: ❑ Solid Carbide ❑ Indexable

Tool Description: ______________________

Insert Selected (If Indexable): ______________________

Tool Purchased From: ______________________

If you are not sure what tool to select, check one of the following and we will recommend a tool for you:

❑ **Shortest Cycle Time** ❑ **Lowest Tooling Cost**

Tool Recommended: ______________________

Distributor you purchased tool from must be filled in to receive a program for your application, otherwise a tool recommendation will be faxed back with approximate cycle time given.

Programming Data:

Dimentions: ❑ Inch ❑ Metric

Program Values: ❑ Absolute (G90) ❑ Incremental (G91)

Arc Center: ❑ I & J ❑ R (Radius)

Tool Path: ❑ Offset ❑ No Offset

Arc Limitations: ❑ Full Circle ❑ Quadrant

K Value: ❑ Not Required ❑ Required

If Required: ❑ In Radians ❑ Per Revolution

Feed Direction: ❑ Climb Mill ❑ Conventional

Note: Climb Milling is always recommended for carbide tooling. In some cases where thin wall parts, long extensions or worn spindle bearings are encountered, conventional milling may be an option to production of a given thread.

A-C

C-D

D-M

M-P

P-S

S

S-T

T-Z

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