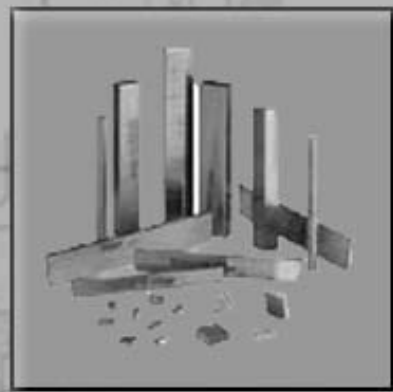




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VR/Wesson



2010 Cutting Tool Catalog



ISO	VRWESSON			ISCAR			SANDVIK			SECO			KENNAMETAL			MITSUBISHI		
	CARBIDE	CARBIDE COATED	CERMET	CARBIDE	CARBIDE COATED	CERMET	CARBIDE	CARBIDE COATED	CERMET	CARBIDE	CARBIDE COATED	CERMET	CARBIDE	CARBIDE COATED	CERMET	CARBIDE	CARBIDE COATED	CERMET
TURNING			VR65			IC20N	S1P	GC4005	CT5005	TTX	TP100	CMP	K45	KC9010	HT2	UE6005	NX1010	SRN5
		VR715		IC70	IC507				CT525						K125			
		* VR732		IC50M	IC9015	IC520N	SMA	GC4015			TTM	TP1000	CM		HTX	ST110T	UC6010	
		VR725																
		* VR772					SM30		CT525					KM	PS5	ST120T	UE6020	AP25N
		VR735		IC30N	IC9025	IC30N	S30T	GC4025	GC1525			TP200	C15M					UP35N
		VR745		IC40T	IC3028	IC40T						TP2000			KT175	UT120T	UC6025	
		VR653				IC530N	S6	GC4035			TTR	TP300		K420				NX335
		VR79	VR745											KC313	K125	HT105T	UC5005	
		VR75	VR680				H13A	GC2015				TP400		K86	PS5	HT110T	GP10H	AP25N
		VR52	VR715		IC08		IC9025	GC2025	CT525	AT10	AT15				KT175	HT120T	UC5015	NX2525
		RAMET1			IC28			GC2035	GC1525		TTR	CP50		K420		HT120T	UP10H	
		VR52	VR715		IC4	IC9015		H1P	GC3005	CT515	890	TX100		K313	KC9315	HT105T	UC5005	NX1010
		VR82	VR310			IC428		H10F	GC3205		HX	CP200		K68		HT110T	GP10H	AP25N
		2A5	VR725		IC20	IC4050		H13A	GC3210		883	TX150		K1	KC9325	HT120T	UC5015	NX2525
	RAMET1	RAMET3		IC28				GC3015			CP250			KC7310	HT120T	UP10H		
								GC3215			CP500			KC7315		UC6010		
								GC3025										
								GC1005						KC5510 KC5525		VP15TF		
ISO	CARBIDE	CARBIDE COATED	CERMET	CARBIDE	COATED	CERMET	CARBIDE	COATED	CERMET	CARBIDE	COATED	CERMET	CARBIDE	COATED	CERMET	CARBIDE	COATED	CERMET
MILLING	VR73	VR680	VR65		IC520M			GC1015			T20M			KT175	F7030	V45N		
					IC635			GC1025			T25M				GP20M	NX2525		
	VR77	*VR772			IC950			GC4020						HT2				
	VR79	VR757			IC908	IC30N		GC4030			T200M			HT5	AP20M	NX55		
	RAMET1	VR653			IC1008			GC1120			CP300			KZ205		NX4545		
	VR82	RAMET3			IC1008			GC4040			CP250			3KT195M				
					IC908			GC1005			CP200			KC9240	VP15TF			
		* VR822								CT520	CP200							
		VR680			IC328			GC2030		CT530	CP50			KC705M	VP20RT			
	RAMET1	* RAMET2			IC928													
		VR653						GC2040							HT7			
		VR52	VR527			IC4050					T15M			KC915M	HT5	F5010		
			* VR522			IC907			GC3020					KC992M				
		VR680			IC910			GC1020						KC709M		AP10H		
		RAMET1	RAMET3					GC3040			CP500							

* = PVD TiN
* = PVD TiAlN



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Turning Grades Overview

2A5 (K15-K20) (C2)

General purpose machining of cast and chilled irons, hardened steels, non-ferrous metals, and non-metallics; 2A5 is the most widely applied grade in this series.

PCD (K10) Tipped / CBN Tipped or Solid (P05)

Specially suitable for machining synthetic materials (glass fiber and carbon fiber composites) as well as aluminum-silicon alloys. Multiple grades to choose from. CBN for cast irons, and finishing of hardened steels.

Ramet-1 (P40-P50 M30-40 K20-30) (C1, C2)

Heavy roughing at low speeds; also recommended for end milling and problem applications where carbides fail by chipping and cast alloys or HSS wear rapidly.

Ramet-2 (K25-K35 M30-M40) (C1, C2)

Coating: TiN

Good for medium to light milling and grooving operations at moderate speeds and feeds. High temp alloys, exotics, low carbon steels and stainless steels.

VR52 (K01-K10 M05-M10) (C3, C4)

High speed finishing and precision boring at light chip loads on cast and chilled irons, hardened steels, composites and plastics.

VR527 (K05-K15 M05-M15) (C3, C4)

Coating: TiAlN

General purpose machining of aerospace materials, hi-temp alloys, 200-300 and PH aluminum, stainless steels, and refractory metals.

VR623 (K30-K40) (C1, C2) (M30-M40 P35-P45) (C5, C6)

Coating: TiN

General purpose milling and turning. Heavy roughing and difficult operating conditions such as interruptions. Medium speed, medium to heavy feed. Steels, hi-temp alloys, cast irons, 200-500 series and PH series stainless steel.



Turning Grades Overview

VR653 (P30-P45 M30-M40 K20-K30) (C5, C6, C1)

Coating: TiC + TiN

Medium to heavy roughing of carbon and alloy steels, 400 and 500 series stainless steels and high alloyed cast irons where greater crater wear resistance and lubricity are required.

VR663 (P10-P35 M15-M30 K15-K25) (C5, C6, C7)

Coating: TiC + TiN

Light roughing to semi-finishing of carbon and alloy steels, 400 and 500 series stainless steels and malleable and nodular irons where greater crater wear resistance and lubricity are required.

VR680 (K01-K20 P01-P30 M10-M25) (C2, C3, C4, C6, C7)

Coating: TiC + Al₂O₃ + TiN

Light roughing to finishing at high speeds on a wide variety of materials, including cast iron, carbon steel, alloy and hardened steels and steel castings; recommended for applications requiring a combination of high edge strength, deformation resistance and wear resistance at high temperatures.

VR715 (P15-K15) ()

Coating: MT - TiCN + TiC + Al₂O₃

(Turbo Turning Grade)

Preferred grade for the highest cutting speeds for light to medium turning work on structural steel, alloyed steel and spheroidal irons, even with occasionally light interrupted cutting. Additional area of application; also suitable for working grey cast iron.

VR725 (P25-M25)

Coating: MT - TiCN + TiC + Al₂O₃ + TiN

(Universal Turning Grade)

Main grade for machining steel materials and easily machinable stainless steels at medium cutting speeds, including interrupted cutting work. This general purpose grade is characterized by the properties of high durability and excellent toughness across a wide range of applications.

VR73 (P10-P30 M20-M30) (C7)

Light roughing, semi-finishing and finishing of all steels; also recommended of machining nodular and malleable irons.



VR735 (P35-M35)

Coating: MT - TiCN + TiC + Al₂O₃ + TiN

(International Turning Grade)

Grade for turning of steel and cast steel under unfavorable conditions and at medium to low cutting speed. Suitable for machining of stainless steels.

VR745 (M35-P35)

Coating: MT - TiCN + Al₂O₃ + TiN

(Universally Tough)

Main grade for turning of austenitic stainless steel at medium to high cutting speed. Applications with interruptions and for roughing austenitic stainless steels. Additional application for super alloys.

VR75 (P25-P35) (C6)

General purpose machining of all steels, including high tensile strength and heat resistant alloys; recommended over a broad range of applications where a combination of shock, wear and crater resistance is required.

VR77 (P30-P40 M25-M35) (C5)

Heavy roughing and interrupted machining of all steels, including high tensile strength and heat resistance alloys.

VR79 (P40-P50 M30-M40) (C5)

Heavy roughing at high chip loads or on heavily scaled materials, or where severe interruptions require high edge strength.

VR772 (P30-P40 M25-M35) (C5)

Coating: PVD TiN

Heavy roughing and interrupted machining of all steels, including high tensile strength and heat resistance alloys.

VR82 (K10)

Classic hard metal grade for turning short-chipping materials, standard grade for drilling, countersinking and reaming steel. Also for channeling chilled cast iron cylinders. Excellent for high temp nickel and cobalt alloys.


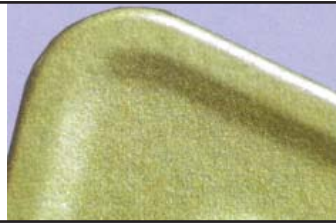
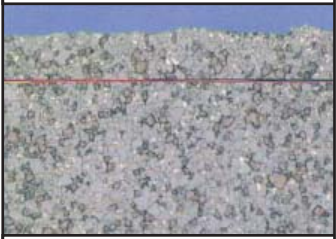

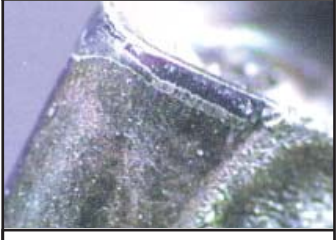

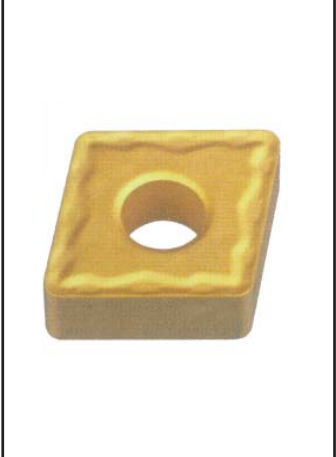

VR827 (K10-K30)

Coating: TiAlN

The ideal grade for machining High Temp Alloys and other exotic alloys. Thanks to a multi-layer plasma PVD TiAlN coating it is also excellent for finish machining of stainless steels and cast irons.

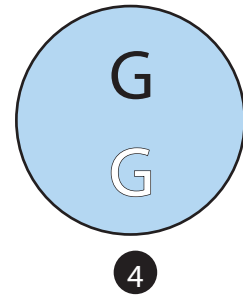
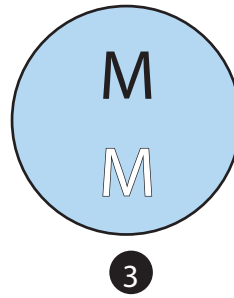
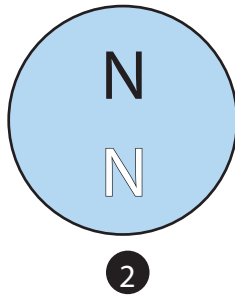
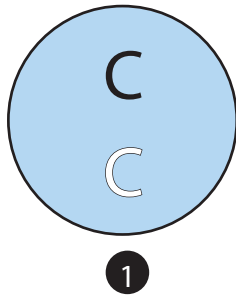


VR715, VR725, VR735, VR745 The New Generation of Turning Grades

Up to now	Features Technological Advantages	VR715 VR725 VR735 VR745	Benefits Advantage for the Customer
	<p>New coating technology results in extremely smooth and wear-resistant layer structure and smooth layer surface</p>		<p>Top cutting speeds. Advanced chip control. Reduction of production costs</p>
	<p>New sinter technology ensures a tough safety zone in the cutting edge areas</p>		<p>Cost of down time improved because of better bond of coating with enriched substrate Reduced tendency to stick during interrupted cutting</p>
	<p>Smooth and golden colored TiN top coat</p>		<p>Simple wear recognition coupled with a reduced tendency of built-up edges</p>
	<p>Modern micro and macro geometry for improved chip control. Heat carry-off zone due to heat transfer into chip.</p>		<p>Safe, vibration-free support with improved dynamic cutting behavior at top speeds Little heat development in the workpiece in dry processing due to higher heat transfer to the tool</p>

Summary:

The combination of new ideas and production technologies makes VR715, VR725, VR735 and VR745 the economical choice for efficient working on an extremely wide range of steel materials in wet and dry machining.



1

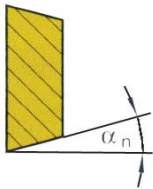
Insert Shape

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

Note 1: In case of more than one angle, always use smallest angle.

2

Clearance Angle



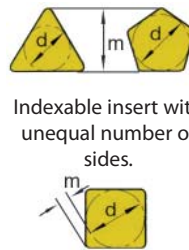
- A α_n 3°
- B 5°
- C 7°
- D 15°
- E 20°
- F 25°
- G 30°
- N 0°
- P 11°

O Normal clearance angles, which require a special description

3

Tolerance (Inches)

	I.C.	T	d
A	±0.0002 ³⁾	±0.001	±0.001
C	±0.0005		
E	±0.001		
F	±0.0002 ³⁾		
G	±0.001	±0.005	±0.001
H	±0.0005	±0.001	±0.0005
J	±0.0002 ³⁾		
K	±0.0005 ³⁾		
L	±0.001		
M	See Table 4	±0.005	See Table 5



Indexable insert with unequal number of sides.

Indexable insert with equal number of sides.

3) generally used for indexable inserts with ground face cutting edges

Table 4-m

d		M	U
Over .154	Up to .394	±0.003	±0.005
.394	.590	±0.005	±0.008
.590	.787	±0.006	±0.011
.787	1.024	±0.007	±0.015
1.024	1.260	±0.008	±0.015

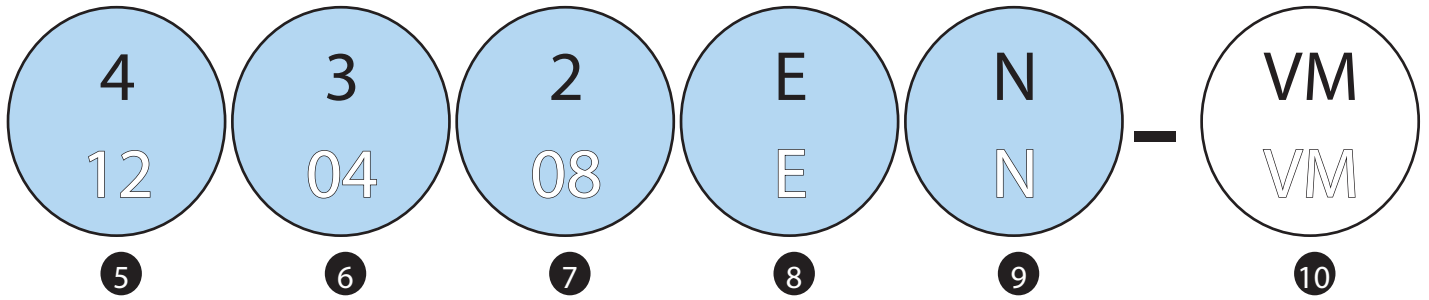
Table 5-d

d		J,K,L,M	U
Over .154	Up to .394	±0.002	±0.003
.394	.590	±0.003	±0.005
.590	.787	±0.004	±0.007
.787	1.024	±0.005	±0.001
1.024	1.260	±0.006	±0.001

4

Cutting Face, Clamp Style

<p>A Without chipbreaker with cylindrical fixation hole.</p> <p>F Chipbreakers at both sides without fixation hole.</p> <p>G Chipbreakers at both sides, with cylindrical fixation hole.</p> <p>M Chipbreaker at one side with cylindrical fixation hole.</p>	<p>N Without chipbreakers without fixation hole.</p> <p>Q Without chipbreakers, with fixation hole, conical from both sides.</p> <p>R Chipbreakers at one side, without fixation hole.</p> <p>T Chipbreakers at one side, with fixation hole.</p>	<p>U Chipbreakers at both sides with fixation hole conical from both sides.</p> <p>W Without chipbreaker with conical fixation hole.</p> <p>X With special feature to approval drawing.</p>
---	---	--



5 Cutting Edge Length
Diameter of Inscribed Circle

Symbol							I.C.	
C	D	S	T	R	V	W		
Metric							Inch	d(Inch)
03	04	03	06	03	-	02	1.2(5)	5/32
04	05	04	08	04	08	S3	1.5(6)	3/16
05	06	05	09	05	09	03	1.8(7)	7/32
-	-	-	-	06	-	-	-	0.236
06	07	06	11	06	11	04	2	1/4
08	09	07	13	07	13	05	2.5	5/16
-	-	-	-	08	-	-	-	0.315
09	11	09	16	09	16	06	3	3/8
-	-	-	-	10	-	-	-	0.394
11	13	11	19	11	19	07	3.5	7/16
-	-	-	-	12	-	-	-	0.472
12	15	12	22	12	22	08	4	1/2
14	17	14	24	14	24	09	4.5	9/16
16	19	15	27	15	27	10	5	5/8
-	-	-	-	16	-	-	-	0.630
17	21	17	30	17	30	11	5.5	11/16
19	23	19	33	19	33	13	6	3/4
-	-	-	-	20	-	-	-	0.787
22	27	22	38	22	38	15	7	7/8
-	-	-	-	25	-	-	-	0.984
25	31	25	44	25	44	17	8	1
32	38	31	54	31	54	21	10	1-1/4
-	-	-	-	32	-	-	-	1.260

6 Thickness

ISO	(Inches)
02	.094
03	.125
T3	.156
04	.187
05	.219
06	.250
07	.312
08	.315
09	.375

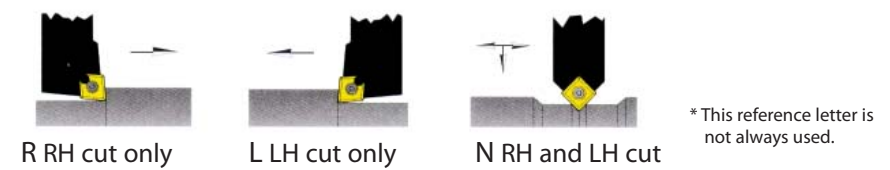
7 Nose Radius

ISO	Radius Inserts Corner radius-r(inches)
00	sharp-edged
02	0.007 (1/128)
04	0.015 (1/64)
08	0.031 (1/32)
12	0.047 (3/64)
16	0.062 (1/16)
20	0.078 (5/64)
24	0.094 (3/32)
28	0.109 (7/64)
32	0.125 (1/8)

8 All inserts are supplied with standard factory hone.
Cutting Edge Corner*

F	Sharp-edged
E	Honed
T	Chamfered
S	Chamfered and Honed
K	Double Chamfered
P	Double Chamfered and Honed

9 Direction of Cut*






10 Chip Breaker

Steel	VF	VM	VR	VP	VXF	VEF
Stainless	VP	VEF			VXF	
Cast Iron	VC	VR				
Non Ferrous	VXF				VXF	VEF





VR725 Our Most Universal Grade supported by VR715, VR735 and VR745

Material Group	Main workpiece material groups and their characteristic letters for using VR725		Brinell hardness HB	Recommended Cutting Speed V_c = SFM when feed = IPR			
				R	M	F	
				.016-.022 	.010-.016 	.002-.010 	
P	Unalloyed steel ¹⁾	≈ 0.15%C annealed	125	490 - 660	690 - 980	840 - 1350	
		≈ 0.45%C annealed	190	430 - 590	620 - 890	750 - 1250	
		≈ 0.45%C hardened and temp.	250	330 - 490	430 - 690	490 - 840	
		≈ 0.75%C annealed	270	390 - 560	560 - 750	690 - 980	
		≈ 0.75%C hardened and temp.	300	300 - 460	360 - 560	490 - 660	
	Low-alloy steel ¹⁾	annealed	180	390 - 560	490 - 750	690 - 1050	
		hardened and temp.	275	300 - 460	430 - 620	490 - 750	
		hardened and temp.	300	280 - 430	390 - 590	460 - 690	
		hardened and temp.	350	260 - 390	360 - 490	430 - 560	
	High-alloy steel and high-alloy tool steel ¹⁾	annealed	200	360 - 490	490 - 660	620 - 980	
		hardened and temp.	325	230 - 360	280 - 430	390 - 490	
	M	Stainless steel ¹⁾	ferritic / martensitic annealed	200	390 - 490	460 - 660	620 - 790
			martensitic hardened and temp.	240	280 - 390	360 - 460	490 - 620
		Stainless steel ¹⁾	austenitic ²⁾ , quenched	180	300 - 360	390 - 520	390 - 620
K	Grey cast iron	pearlitic / ferritic	180				
		pearlitic (martensitic)	260				
	Nodular graphite cast iron	ferritic	160				
		perlitic	250				
	Malleable cast iron	ferritic	130				
		pearlitic	230				

¹⁾ and cast steel

²⁾ and austenitic / ferritic

 = wet machining

 = dry machining

The indicated standard values of cutting data are recommendations for wet machining applications. For dry machining, the cutting speed SFM must be reduced by approx. 20%.

Machining example:

Workpiece: Bushing

Material: X14CrMoS17

Operating Conditions: Wet

Tool: S20U-MCLNL-4

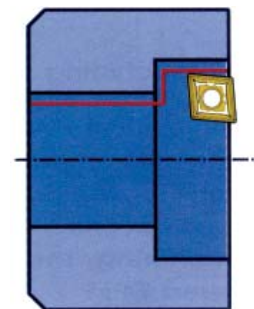
Indexable insert: CNMG 431-VM

VR/Wesson: VR725

Cutting data: SFM = 590


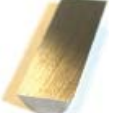
a_p = .039




IPR = .006







Indexable Inserts Overview

	Part Number	ISO Desc.	Length	Thickness	Radius	Reference
ABE 	ABE-2422R	---	1.000	.125	1/32	1/4
	ABE-2.25 422R	---	1.003	.125	1/32	9/32
AFE 	AFE-2322R	---	.750	.125	1/32	1/4
	AFE-2422R	---	1.000	.125	1/32	1/4

	Part Number	ISO Desc.	IC	Thickness	Radius	Hole
CCMT-VF 	CCMT-21.50VF	060202	.250	.094	.008	.107
	CCMT-21.51VF	060204	.250	.094	1/64	.107
	CCMT-21.52VF	060208	.250	.094	1/32	.107
	CCMT-32.50VF	09T302	.375	.156	.008	.178
	CCMT-32.51VF	09T304	.375	.156	1/64	.178
	CCMT-32.52VF	09T308	.375	.156	1/32	.178
	CCMT-431VF	120404	.500	.1875	1/64	.220
	CCMT-432VF	120408	.500	.1875	1/32	.220
	CCMT-433VF	120412	.500	.1875	3/64	.220
CCMT-VM 	CCMT-21.51VM	060204	.250	.094	1/64	.107
	CCMT-21.52VM	060208	.250	.094	1/32	.107
	CCMT-32.51VM	09T304	.375	.156	1/64	.178
	CCMT-32.52VM	09T308	.375	.156	1/32	.178
	CCMT-431VM	120404	.500	.1875	1/64	.220
	CCMT-432VM	120408	.500	.1875	1/32	.220
	CCMT-433VM	120412	.500	.1875	3/64	.220
CCMT-VR 	CCMT-21.51VR	060204	.250	.094	1/64	.107
	CCMT-21.52VR	060208	.250	.094	1/32	.107
	CCMT-32.51VR	09T304	.375	.156	1/64	.178
	CCMT-32.52VR	09T308	.375	.156	1/32	.178
	CCMT-431VR	120404	.500	.1875	1/64	.220
	CCMT-432VR	120408	.500	.1875	1/32	.220
	CCMT-433VR	120412	.500	.1875	3/64	.220




	Part Number	ISO Desc.	IC	Thickness	Radius	Hole
CCMW-VCF 	CCMW-21.52VCF	60208	.250	.094	1/32	.107
	CCMW-32.51VCF	09T304	.375	.156	1/64	.178
	CCMW-32.52VCF	09T308	.375	.156	1/32	.178
	CCMW-431VCF	120404	.500	.187	1/64	.220
	CCMW-432VCF	120408	.500	.187	1/32	.220


	Part Number	Thickness	Radius	Length	Width
CDE 	CDE 212 L02	.150	.030	.375	.312
	CDE 212 L01	.150	.030	.437	.312
	CDE 313 L20	.187	.015	.312	.375
	CDE 313 R20	.187	.015	.312	.375
	CDE 313 L21	.187	.030	.312	.375
	CDE 313 R21	.187	.030	.312	.375
	CDE 313 L22	.187	.060	.312	.375
	CDE 313 R22	.187	.060	.312	.375
	CDE 313 L23	.187	.090	.312	.375
	CDE 313 R23	.187	.090	.312	.375
	CDE 313 L24	.187	.125	.312	.375
	CDE 313 R24	.187	.125	.312	.375
	CDE 313 L30	.187	.015	.375	.437
	CDE 313 R30	.187	.015	.375	.437
	CDE 313 L31	.187	.030	.375	.437
	CDE 313 R31	.187	.030	.375	.437
	CDE 313 L32	.187	.060	.375	.437
	CDE 313 R32	.187	.060	.375	.437
	CDE 313 L33	.187	.090	.375	.437
	CDE 313 R33	.187	.090	.375	.437
CDE 313 L34	.187	.125	.375	.437	
CDE 313 R34	.187	.125	.375	.437	



Indexable Inserts Overview Continued


	Part Number	Thickness	Radius	Length	Width
CDE 	CDE 313 L40	.187	.015	.437	.375
	CDE 313 R40	.187	.015	.437	.375
	CDE 313 RL41	.187	.030	.437	.375
	CDE 313 R41	.187	.030	.437	.375
	CDE 313 L42	.187	.060	.437	.375
	CDE 313 R42	.187	.060	.437	.375
	CDE 313 L43	.187	.090	.437	.375
	CDE 313 R43	.187	.090	.437	.375
	CDE 313 L44	.187	.125	.437	.375
	CDE 313 R44	.187	.125	.437	.375
	CDE 313 L50	.220	.015	.437	.375
	CDE 313 R50	.220	.015	.437	.375
	CDE 313 L51	.220	.030	.437	.375
	CDE 313 R51	.220	.030	.437	.375
	CDE 313 L52	.220	.060	.437	.375
	CDE 313 R52	.220	.060	.437	.375
	CDE 313 L53	.220	.090	.437	.375
	CDE 313 R53	.220	.090	.437	.375
	CDE 313 L54	.220	.125	.437	.375
	CDE 313 R54	.220	.125	.437	.375
	CDE 314 L20	.250	.015	.437	.375
	CDE 314 R20	.250	.015	.437	.375
	CDE 314 L21	.250	.030	.437	.375
	CDE 314 R21	.250	.030	.437	.375
	CDE 314 L22	.250	.060	.437	.375
	CDE 314 R22	.250	.060	.437	.375
	CDE 314 L23	.250	.090	.437	.375
	CDE 314 R23	.250	.090	.437	.375
	CDE 314 L24	.250	.125	.437	.375
	CDE 314 R24	.250	.125	.437	.375
CDE 314 R25	.250	.187	.437	.375	
CDE 314 L25	.250	.187	.437	.375	
CDE 314 R26	.250	.230	.437	.375	
CDE 314 L26	.250	.230	.437	.375	




	Part Number	Thickness	Radius	Length	Width
CDE 	CDE 322 L02	.220	.060	.437	.375
	CDE 322 R02	.220	.060	.437	.375
	CDE 322 L03	.220	.090	.437	.375
	CDE 322 R03	.220	.090	.437	.375
	CDE 322 L04	.220	.125	.437	.375
	CDE 322 R04	.220	.125	.437	.375
	CDE 322 L05	.220	.030	.437	.375
	CDE 322 R05	.220	.030	.437	.375
	CDE 322 L10	.220	.015	.437	.375
	CDE 322 R10	.220	.015	.437	.375
	CDE 322 L14	.150	.031	.550	.375
	CDE 323 L01	.187	.020 x 45°	.500	.375
	CDE 323 R01	.187	.020 x 45°	.500	.375
	CDE 323 L05	.187	.030	.500	.375
	CDE 323 R05	.187	.030	.500	.375
	CDE 323 L09	.187	.015	.500	.375
	CDE 323 R09	.187	.015	.500	.375
	CDE 323 L22	.187	.060	.500	.375
	CDE 323 R22	.187	.060	.500	.375
	CDE 323 L23	.187	.090	.500	.375
	CDE 323 R23	.187	.090	.500	.375
	CDE 323 L24	.187	.125	.500	.375
	CDE 323 R24	.187	.125	.500	.375



Indexable Inserts Overview Continued


	Part Number	Thickness	Radius	Length	Width
CDE 	CDE 323 L30	.187	.015	.687	.375
	CDE 323 R30	.187	.015	.687	.375
	CDE 323 L31	.187	.030	.687	.375
	CDE 323 R31	.187	.030	.687	.375
	CDE 323 L32	.187	.060	.687	.375
	CDE 323 R32	.187	.060	.687	.375
	CDE 323 L33	.187	.090	.687	.375
	CDE 323 R33	.187	.090	.687	.375
	CDE 323 L34	.187	.125	.687	.375
	CDE 323 R34	.187	.125	.687	.375
	CDE 324 L01	.250	.020 x 45°	.375	.437
	CDE 324 R01	.250	.020 x 45°	.375	.437
	CDE 324 L20	.250	.015	.500	.375
	CDE 324 R20	.250	.015	.500	.375
	CDE 324 L21	.250	.030	.500	.375
	CDE 324 R21	.250	.030	.500	.375
	CDE 324 L22	.250	.060	.500	.375
	CDE 324 R22	.250	.060	.500	.375
	CDE 324 L23	.250	.090	.500	.375
	CDE 324 R23	.250	.090	.500	.375
	CDE 324 L24	.250	.125	.500	.375
	CDE 324 R24	.250	.125	.500	.375
	CDE 324 L25	.250	.187	.500	.375
	CDE 324 R25	.250	.187	.500	.375
	CDE 324 L26	.250	.230	.500	.375
	CDE 324 R26	.250	.230	.500	.375
	CDE 324 R64	.250	.060	.375	.437
	CDE 324 R67	.250	.125	.375	.437


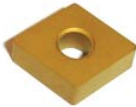



	Part Number	Thickness	Radius	Length	Width
CDE 	CDE 333 R01	.187	.020 x 45°	.687	.437
	CDE 333 R06	.187	.125	.687	.437
	CDE 333 R08	.187	.060	.687	.437
	CDE 334 L09	.250	.030	.750	.375
	CDE 334 R09	.250	.030	.750	.375
	CDE 334 L04	.250	.230	.750	.375
	CDE 334 R04	.250	.230	.750	.375
	CDE 424 L01	.250	.020 x 45°	.500	.562
	CDE 424 R01	.250	.020 x 45°	.500	.562
	CDE 424 L20	.250	.015	.500	.562
	CDE 424 R20	.250	.015	.500	.562
	CDE 424 L21	.250	.030	.500	.562
	CDE 424 R21	.250	.030	.500	.562
	CDE 424 L22	.250	.060	.500	.562
	CDE 424 R22	.250	.060	.500	.562
	CDE 424 L23	.250	.090	.500	.562
	CDE 424 R23	.250	.090	.500	.562
	CDE 424 L24	.250	.125	.500	.562
	CDE 424 R24	.250	.125	.500	.562
	CDE 424 L25	.250	.187	.500	.562
	CDE 424 R25	.250	.187	.500	.562
	CDE 424 L26	.250	.230	.500	.562
	CDE 424 R26	.250	.230	.500	.562



Indexable Inserts Overview Continued

	Part Number	Thickness	Radius	Length	Width
CDE 	CDE 424 L30	.250	.015	.687	.562
	CDE 424 R30	.250	.015	.687	.562
	CDE 424 L31	.250	.030	.687	.562
	CDE 424 R31	.250	.030	.687	.562
	CDE 424 L32	.250	.060	.687	.562
	CDE 424 R32	.250	.060	.687	.562
	CDE 424 L33	.250	.090	.687	.562
	CDE 424 R33	.250	.090	.687	.562
	CDE 424 L34	.250	.125	.687	.562
	CDE 424 R34	.250	.125	.687	.562
	CDE 424 L35	.250	.187	.687	.562
	CDE 424 R35	.250	.187	.687	.562
	CDE 424 L36	.250	.230	.687	.562
	CDE 424 R36	.250	.230	.687	.562
	CDE 434 R01	.250	.020 X 45°	.898	.562
	CDE 434 R12	.250	.060	.898	.562
CDE 434 R15	.250	.125	.898	.562	

	Part Number	ISO Desc.	IC	Thickness	Radius	Hole
CFG 	CFG-4620J	---	.464	.125	.008	---
	CFG-4621J	---	.464	.125	1/64	---
	CFG-4622J	---	.464	.125	1/32	---
	CFG-4623J	---	.464	.125	3/64	---
CNGA 	CNGA-430	120401	.500	.1875	.008	.203
	CNGA-431	120404	.500	.1875	1/64	.203
	CNGA-432	120408	.500	.1875	1/32	.203
CNGP 	CNGP-430	120401	.500	.1875	.008	.203
	CNGP-431	120404	.500	.1875	1/64	.203
	CNGP-432	120408	.500	.1875	1/32	.203



	Part Number	ISO Desc.	IC	Thickness	Radius	Hole
	CNGP-430VXF	120402	.500	.1875	.008	.203
	CNGP-430VEF	120402	.500	.1875	.008	.203
	CNGP-431VXF	120404	.500	.1875	1/64	.203
	CNGP-431VEF	120404	.500	.1875	1/64	.203
	CNGP-432VXF	120408	.500	.1875	1/32	.203
	CNGP-432VEF	120408	.500	.1875	1/32	.203
	CNMA-432E	120408	.500	.1875	1/32	.203
	CNMA-433E	120412	.500	.1875	3/64	.203
	CNMA-543E	160612	.625	.250	3/64	.253
	CNMA-643E	190612	.750	.250	3/64	.313
	CNMA-644E	190616	.750	.250	1/16	.313
	CNMA-432VC	120408	.500	.1875	1/32	.203
	CNMA-433VC	120412	.500	.1875	3/64	.203
	CNMA-543VC	160612	.625	.250	3/64	.250
	CNMA-643VC	190612	.750	.250	3/64	.313
	CNMA-644VC	190616	.750	.250	1/16	.313
	CNMG-431E	120404	.500	.1875	1/64	.203
	CNMG-432E	120403	.500	.1875	1/32	.203
	CNMG-433E	120404	.500	.1875	3/64	.203
	CNMG-542E	160608	.625	.250	1/32	.250
	CNMG-543E	160612	.625	.250	3/64	.250
	CNMG-642E	190608	.750	.250	1/32	.313
	CNMG-643E	190612	.750	.250	3/64	.313
	CNMG-644E	190616	.750	.250	1/16	.313
	CNMG-866E	250924	1.000	.375	3/32	.362
	CNMG-431VF	120404	.500	.1875	1/64	.203
	CNMG-432VF	120408	.500	.1875	1/32	.203
	CNMG-433VF	120412	.500	.1875	3/64	.203



Indexable Inserts Overview Continued

	Part Number	ISO Desc.	IC	Thickness	Radius	Hole
CNMG-VM 	CNMG-321VM	090304	.375	.125	1/64	.150
	CNMG-322VM	090308	.375	.125	1/32	.150
	CNMG-431VM	120404	.500	.1875	1/64	.203
	CNMG-432VM	120408	.500	.1875	1/32	.203
	CNMG-433VM	120412	.500	.1875	3/64	.203
	CNMG-542VM	160608	.625	.250	1/32	.250
	CNMG-543VM	160612	.625	.250	3/64	.250
	CNMG-544VM	160616	.625	.250	1/16	.250
CNMG-VR 	CNMG-432VR	120408	.500	.1875	1/32	.203
	CNMG-433VR	120412	.500	.1875	3/64	.203
	CNMG-542VR	160608	.625	.250	1/32	.250
	CNMG-543VR	160612	.625	.250	3/64	.250
	CNMG-544VR	160616	.625	.250	1/16	.250
	CNMG-642VR	190608	.750	.250	1/32	.313
	CNMG-643VR	190612	.750	.250	3/64	.313
	CNMG-644VR	190616	.750	.250	1/16	.313
CNMG-W 	CNMG-643EW	190612	.750	.250	3/64	.313
	CNMG-644EW	190616	.750	.250	1/16	.313
CNMM 	CNMM-432E	120408	.500	.1875	1/32	.203
	CNMM-433E	120412	.500	.1875	3/64	.203
	CNMM-434E	120416	.500	.1875	1/16	.203
	CNMM-542E	160608	.625	.250	1/32	.250
	CNMM-543E	160612	.625	.250	3/64	.250
	CNMM-544E	160616	.625	.250	1/16	.250
	CNMM-642E	190608	.750	.250	1/32	.313
	CNMM-643E	190612	.750	.250	3/64	.313
CNMM-644E	190616	.750	.250	1/16	.313	





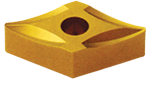

	Part Number	ISO Desc.	IC	Thickness	Radius	Hole
CNMP 	CNMP-432E	120408	.500	.1875	1/32	.203
	CNMP-543E	160612	.625	.250	3/64	.250
	CNMP-642E	190608	.750	.250	1/32	.313
	CNMP-643E	190612	.750	.250	3/64	.313
	CNMP-644E	190616	.750	.250	1/16	.313
CNMP-VP 	CNMP-431VP	120404	.500	.1875	1/64	.203
	CNMP-432VP	120408	.500	.1875	1/32	.203
	CNMP-433VP	120412	.500	.1875	3/64	.203
CNMS 	CNMS-432E	120408	.500	.1875	1/32	.203
	CNMS-643E	190612	.750	.250	3/64	.313
CPG 	CPG-421	120304	.500	.125	1/64	---
	CPG-422	120308	.500	.125	1/32	---
	CPG-423	120312	.500	.125	3/64	---
	CPG-532	160408	.625	.1875	1/32	---
	CPG-533	160412	.625	.1875	3/64	---
	CPG-632	190408	.750	.1875	1/32	---
	CPG-633	190412	.750	.1875	3/64	---
DCMT-VF 	DCMT-21.50VF	070202	.250	.094	.008	.107
	DCMT-21.51VF	070204	.250	.094	1/64	.107
	DCMT-21.52VF	070208	.250	.094	1/32	.107
	DCMT-32.50VF	11T302	.375	.156	.008	.178
	DCMT-32.51VF	11T304	.375	.156	1/64	.178
	DCMT-32.52VF	11T308	.375	.156	1/32	.178
DCMT-VM 	DCMT-21.51VM	070204	.250	.094	1/64	.107
	DCMT-21.52VM	070208	.250	.094	1/32	.107
	DCMT-32.51VM	11T304	.375	.156	1/64	.178
	DCMT-32.52VM	11T308	.375	.156	1/32	.178
DCMT-VR 	DCMT-21.51VR	070204	.250	.094	1/64	.107
	DCMT-21.52VR	070208	.250	.094	1/32	.107
	DCMT-32.51VR	11T304	.375	.156	1/64	.178
	DCMT-32.52VR	11T308	.375	.156	1/32	.178




Indexable Inserts Overview Continued

	Part Number	ISO Desc.	IC	Thickness	Radius	Hole
DCMW-VCF 	DCMW-32.51VCF	11T304	.375	.156	1/64	.178
	DCMW-32.52VCF	11T308	.375	.156	1/32	.178
DNGA 	DNGA-430	150401	.500	.1875	.008	.203
	DNGA-431	150404	.500	.1875	1/64	.203
	DNGA-432	150408	.500	.1875	1/32	.203
	DNGA-433	150412	.500	.1875	3/64	.203
	DNGA-542	190608	.625	.250	1/32	.203
	DNGA-543	190612	.625	.250	3/64	.203
DNGP-VXF/VEF 	DNGP-430VXF	150402	.500	.1875	.008	.203
	DNGP-430VEF	150402	.500	.1875	.008	.203
	DNGP-431VXF	150404	.500	.1875	1/64	.203
	DNGP-431VEF	150404	.500	.1875	1/64	.203
	DNGP-432VXF	150408	.500	.1875	1/32	.203
	DNGP-432VEF	150408	.500	.1875	1/32	.203
DNMA 	DNMA-432VC	150408	.500	.1875	1/32	.203
	DNMA-433VC	150412	.500	.1875	3/64	.203
DNMG 	DNMG-431E	150404	.500	.1875	1/64	.203
	DNMG-432E	150408	.500	.1875	1/32	.203
	DNMG-433E	150412	.500	.1875	3/64	.203
	DNMG-442E	150608	.500	.250	1/32	.203
	DNMG-443E	120612	.500	.250	3/64	.203
	DNMG-532E	190408	.625	.1875	1/32	.250
	DNMG-533E	190412	.625	.1875	3/64	.250
	DNMG-542E	190608	.625	.250	1/32	.250
	DNMG-543E	190612	.625	.250	3/64	.250
DNMG-VF 	DNMG-331VF	110404	.375	.1875	1/64	.150
	DNMG-332VF	110408	.375	.1875	1/32	.150
	DNMG-431VF	150404	.500	.1875	1/64	.203
	DNMG-432VF	150408	.500	.1875	1/32	.203

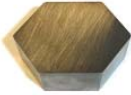




	Part Number	ISO Desc.	IC	Thickness	Radius	Hole
	DNMG-331VM	110404	.375	.1875	1/64	.150
	DNMG-332VM	110408	.375	.1875	1/32	.150
	DNMG-333VM	110412	.375	.1875	3/64	.150
	DNMG-431VM	150404	.500	.1875	1/64	.203
	DNMG-432VM	150408	.500	.1875	1/32	.203
	DNMG-433VM	150412	.500	.1875	3/64	.203
	DNMG-333VR	110412	.375	.1875	3/64	.150
	DNMG-432VR	150408	.500	.1875	1/32	.203
	DNMG-433VR	150412	.500	.1875	3/64	.203
	DNMG-442VR	150608	.500	.250	1/32	.203
	DNMP-432E	150408	.500	.1875	1/32	.203
	DNMP-542E	190608	.625	.250	1/32	.250
	DNMP-543E	190612	.625	.250	3/64	.250
	DNMP-331VP	110404	.375	.1875	1/64	.150
	DNMP-332VP	110408	.375	.1875	1/32	.150
	DNMP-431VP	150404	.500	.1875	1/64	.203
	DNMP-432VP	150408	.500	.1875	1/32	.203
	DNMP-433VP	150412	.500	.1875	3/64	.203

	Part Number	Thickness	Radius	Length	Width
	GDE 222 L02	.150	.130	.540	.312
	GDE 322 L02	.150	.130	.650	.375
	GDE 323 R07	.1875	.030	.500	.375
	GDE 323 R04	.1875	.034	.500	.375
	GDE 323 R05	.1875	.105	.500	.375
	GDE 323 R06	.1875	.141	.500	.375










Indexable Inserts Overview Continued

	Part Number	ISO Desc.	IC	Thickness	Radius
HPC 	HPC-532	150408	.625	.1875	1/32
	HPC-633	190412	.750	.1875	3/64

	Part Number	Thickness	Radius	Length	Width
LNE 	LNE 323-01	.187	.031 X 30°	.625	.375
	LNE 323-02	.187	.031 X 45°	.625	.375
	LNE 323-04	.187	.060	.625	.375
	LNE 324-05	.250	.031 X 45°	.625	.375
	LNE 324-01	.250	.060	.625	.375
	LNE 324-11	.250	.125	.625	.375
	LNE 423-20	.187	.031 X 45°	.625	.500
	LNE 433-20	.187	.031 X 45°	.750	.500
	LNE 443-20	.187	.031 X 45°	1.000	.500
	LNE 424-20	.250	.031 X 45°	.625	.500
	LNE 434-20	.250	.031 X 45°	.750	.500
	LNE 425-20	.312	.031 X 45°	.625	.500
	LNE 425-60	.312	.043 X 45°	.625	.500
	LNE 414-08	.250	.015 X 45°	.435	.562
	LNE 434-02	.250	.030 X 45°	.750	.562
	LNE 434-05	.250	.060	.750	.562
	LNE 443-01	.187	.093	1.000	.562
	LNE 446-01	.375	.062 X 45°	1.125	.562
	LNE 446-03	.375	.250	1.125	.562
	LNE 424-02	.250	.030 X 45°	.500	.625
LNU 	LNU-4442	.250	1/32	1.000	.500
	LNU-4444	.250	1/16	1.000	.500
	LNU-4452	.312	1/32	1.000	.500
	LNU-5444	.250	1/16	1.000	.625
	LNU-5464	.375	1/16	1.000	.625











	Part Number	Thickness	Radius	Length	Width
	LSE 323 L02	.187	.037 X 45°	.625	.375
	LSE 323 R02	.187	.037 X 45°	.625	.375
	LSE 434 R01	.250	.035 X 30°	.750	.562
	LSE 434 R02	.250	.060 X 45°	.750	.562





	Part Number	ISO Desc.	IC	Thickness	Radius	Hole	Reference
	MEC-632	190408	.750	.1875	1/32	---	---
	MEC-63 .010R	190402	.750	.1875	.010	---	---
	MNG-52.52	15T308	.625	.156	1/32	---	---
	MPG-52.52	15T308	.625	.156	1/32	---	---
	RNG-32	0903	.375	.125	---	---	---
	RNG-42	1203	.500	.125	---	---	---
	RNG-43	1204	.500	.1875	---	---	---
	RNMA-32E	0903	.375	.125	---	.150	---
	RNMA-43E	0904	.500	.1875	---	.203	---
	RNMA-54E	1506	.625	.250	---	.253	---
	RNMA-64E	1906	.750	.250	---	.313	---
	RNMA-86E	2509	1.000	.375	---	.362	---
	RNMA-106E	3109	1.250	.375	---	.503	---
	RNMF-55E	1507	.625	.312	---	---	---



Indexable Inserts Overview Continued









	Part Number	ISO Desc.	IC	Thickness	Radius	Hole
	RNMG-32E	0903	.375	.125	---	.150
	RNMG-43E	0904	.500	.1875	---	.203
	RNMG-54E	1506	.625	.250	---	.250
	RNMG-64E	1906	.750	.250	---	.313
	RNMG-86E	2509	1.000	.375	---	.362
	RNMG-106E	3109	1.250	.375	---	.500
	RNMG-43VF	120400	.500	.1875	---	.203
	RNMG-54VF	150600	.625	.250	---	.250
	RNMG-64VF	190600	.750	.250	---	.313
	RNMG-43VM	120400	.500	.1875	---	.203
	RNMG-64VM	190600	.750	.250	---	.313
	RNMG-43VR	120400	.500	.1875	---	.203
	RNMG-64VR	190600	.750	.250	---	.313
	RPG-32	0903	.375	.125	---	---
	RPG-42	1203	.500	.125	---	---
	RPG-43	1204	.500	.1875	---	---
	RPG-53	1504	.625	.1875	---	---
	RPG-63	1904	.750	.1875	---	---
	RPG-83	2504	1.000	.1875	---	---
	SCMT-32.51VF	09T304	.375	.156	1/64	.178
	SCMT-32.52VF	09T308	.375	.156	1/32	.178
	SCMT-431VF	120404	.500	.1875	1/64	.220
	SCMT-432VF	120408	.500	.1875	1/32	.220
	SCMT-32.51VM	09T304	.375	.156	1/64	.178
	SCMT-32.52VM	09T308	.375	.156	1/32	.178
	SCMT-431VM	120404	.500	.1875	1/64	.220
	SCMT-432VM	120408	.500	.1875	1/32	.220
	SCMT-32.51VR	09T304	.375	.156	1/64	.178
	SCMT-32.52VR	09T308	.375	.156	1/32	.178
	SCMT-431VR	120404	.500	.1875	1/64	.220
	SCMT-432VR	120408	.500	.1875	1/32	.220




	Part Number	ISO Desc.	IC	Thickness	Radius	Facet	Reference
SEAN 	SEAN-42AFN	1203	.500	.125	3/32	.062	---
	SEAN-42AFTN	1203	.500	.125	3/32	.062	---
	SEAN-53AFN	1504	.625	.1875	3/32	.062	---
	SEAN-53AFTN	1504	.625	.1875	3/32	.062	---
SEC 	SEC-422	120308	.500	.125	1/32	---	---
	SEC-433	120412	.500	.1875	3/64	---	---
	SEC-533	150412	.625	.1875	3/64	---	---
	SEC-634	190416	.750	.1875	1/16	---	---
SEC-A	SEC-63A8	1904	.750	.1875	1/64	1/8	1/64
SEC-E	SEC-42E4R	1203	.500	.125	1/64	1/16	1/64
SEC-K	SEC-63K8	1904	.750	.1875	1/32	1/8	1/64
SEC-L 	SEC-43L4	1204	.500	.1875	1/32	1/16	---
	SEC-53L4	1504	.625	.1875	1/32	1/16	---
	SEC-63L8	1904	.750	.1875	1/32	1/8	---
SEC-M	SEC-63M8	1904	.750	.1875	1/32	1/8	---
SEKN 	SEKN-42AFN	1203	.500	.125	3/32	.062	---
	SEKN-42AFTN	1203	.500	.125	3/32	.062	---
	SEKN-53AFN	1504	.625	.1875	3/32	.062	---
	SEKN-53AFTN	1504	.625	.1875	3/32	.062	---




Indexable Inserts Overview Continued

	Part Number	ISO Desc.	IC	Thickness	Radius	Facet	Reference
SFG 	SFG-211J	060104	.312	.093	1/64	---	---
	SFG-320J	090301	.375	.125	.005	---	---
	SFG-321J	090304	.375	.125	1/64	---	---
	SFG-322J	090308	.375	.125	1/32	---	---
	SFG-421J	120304	.500	.125	1/64	---	---
	SFG-422J	120308	.500	.125	1/32	---	---
	SFG-423J	120312	.500	.125	3/64	---	---
SHC 	SHC-63D8R	1904	.750	.1875	1/64	1/8	1/64
	SHC-63D8L	1904	.750	.1875	1/64	1/8	1/64
	SHC-63D8TR	1904	.750	.1875	1/64	1/8	1/64
SHX 	SHX-84D5R	2506	1.000	.250	1/64	5/64	1/64
	SHX-84D5L	2506	1.000	.250	1/64	5/64	1/64
SNC 	SNC-433	120412	.500	.1875	3/64	---	3/64
	SNC-634	190416	.750	.1875	1/16	---	1/16
SNC-A 	SNC-63A8	1904	.750	.1875	1/64	1/8	1/64
SNC-K 	SNC-63K8	1904	.750	.1875	1/32	1/8	1/64
SNC-L 	SNC-43L4	1204	.500	.1875	1/32	1/16	---
	SNC-43L6	1204	.500	.1875	1/32	3/32	---
	SNC-63L8	1904	.750	.1875	1/32	1/8	---
	SNC-63L8T	1904	.750	.1875	1/32	1/8	---
SNC-M 	SNC-63M8	1904	.750	.1875	1/32	1/8	---

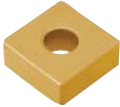
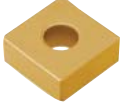


	Part Number	ISO Desc.	IC	Thickness	Radius	Facet	Reference
SNE	SNE-634	190416	.750	.1875	1/16	---	1/16
							





	Part Number	ISO Desc.	IC	Thickness	Radius	Hole	Reference
SNG	SNG-320	090301	.375	.125	.005	---	---
	SNG-321	090404	.375	.125	1/64	---	---
	SNG-322	090408	.375	.125	1/32	---	---
	SNG-324	090416	.375	.125	1/16	---	---
	SNG-420	120301	.500	.125	.005	---	---
	SNG-421	120304	.500	.125	1/64	---	---
	SNG-422	120308	.500	.125	1/32	---	---
	SNG-423	120312	.500	.125	3/64	---	---
	SNG-424	120316	.500	.125	1/16	---	---
	SNG-430	120401	.500	.1875	.005	---	---
	SNG-431	120404	.500	.1875	1/64	---	---
	SNG-432	120408	.500	.1875	1/32	---	---
	SNG-433	120412	.500	.1875	3/64	---	---
	SNG-434	120416	.500	.1875	1/16	---	---
	SNG-438	120432	.500	.1875	1/8	---	---
	SNG-630	190401	.750	.1875	.005	---	---
	SNG-632	190408	.750	.1875	1/32	---	---
	SNG-633	190412	.750	.1875	3/64	---	---
	SNG-634	190416	.750	.1875	1/16	---	---
	SNG-638	190432	.750	.1875	1/8	---	---



Indexable Inserts Overview Continued

	Part Number	ISO Desc.	IC	Thickness	Radius	Hole
SNMA 	SNMA-322E	090308	.375	.125	1/32	.150
	SNMA-432E	120408	.500	.1875	1/32	.203
	SNMA-433E	120412	.500	.1875	3/64	.203
	SNMA-434E	120416	.500	.1875	1/16	.203
	SNMA-543E	150612	.625	.250	3/64	.250
	SNMA-643E	190612	.750	.250	3/64	.313
	SNMA-644E	190616	.750	.250	1/16	.313
	SNMA-644T	190616	.750	.250	1/16	.313
	SNMA-866E	250924	1.000	.375	3/32	.362
	SNMA-866T	250924	1.000	.375	3/32	.362
SNMA-VC 	SNMA-431VC	120404	.500	.187	1/64	.203
	SNMA-432VC	120408	.500	.187	1/32	.203
	SNMA-433VC	120412	.500	.187	3/64	.203
	SNMA-543VC	150612	.625	.250	3/64	.250
	SNMA-643VC	190612	.750	.250	3/64	.313
	SNMA-644VC	190616	.750	.250	1/16	.313



	Part Number	ISO Desc.	IC	Thickness	Radius	Hole
SNMG 	SNMG-321E	090304	.375	.125	1/64	.150
	SNMG-322E	090308	.375	.125	1/32	.150
	SNMG-323E	090312	.375	.125	3/64	.150
	SNMG-432E	120408	.500	.1875	1/32	.203
	SNMG-433E	120412	.500	.1875	3/64	.203
	SNMG-434E	120416	.500	.1875	1/16	.203
	SNMG-543E	150612	.625	.250	3/64	.250
	SNMG-544E	150616	.625	.250	1/16	.250
	SNMG-642E	190608	.750	.250	1/32	.313
	SNMG-643E	190604	.750	.250	3/64	.313
	SNMG-644E	190606	.750	.250	1/16	.313
	SNMG-866E	250924	1.000	.375	2/32	.362
SNMG-VF 	SNMG-431VF	120404	.500	.1875	1/64	.203
	SNMG-432VF	120408	.500	.1875	1/32	.203
	SNMG-433VF	120412	.500	.1875	3/64	.203
SNMG-VM 	SNMG-431VM	120404	.500	.1875	1/64	.203
	SNMG-432VM	120408	.500	.1875	1/32	.203
	SNMG-433VM	120412	.500	.1875	3/64	.203
	SNMG-543VM	150612	.625	.250	3/64	.250
	SNMG-544VM	150616	.625	.250	1/16	.250
SNMG-VR 	SNMG-432VR	120408	.500	.1875	1/32	.203
	SNMG-433VR	120412	.500	.1875	3/64	.203
	SNMG-542VR	150608	.625	.250	1/32	.250
	SNMG-543VR	150612	.625	.250	3/64	.250
	SNMG-544VR	150616	.625	.250	1/16	.250
	SNMG-642VR	190608	.750	.250	1/32	.313
	SNMG-643VR	190612	.750	.250	3/64	.313
	SNMG-644VR	190616	.750	.250	1/16	.313



Indexable Inserts Overview Continued

	Part Number	ISO Desc.	IC	Thickness	Radius	Hole
SNMM 	SNMM-432E	120408	.500	.1875	1/32	.203
	SNMM-433E	120412	.500	.1875	3/64	.203
	SNMM-434E	120416	.500	.1875	1/16	.203
	SNMM-543E	150612	.625	.250	3/64	.250
	SNMM-544E	150616	.625	.250	1/16	.250
	SNMM-643E	190612	.750	.250	3/64	.313
	SNMM-644E	190616	.750	.250	1/16	.313
SNMP 	SNMP-431E	120404	.500	.1875	1/64	.203
	SNMP-432E	120408	.500	.1875	1/32	.203
	SNMP-433E	120412	.500	.1875	3/64	.203
	SNMP-434E	120416	.500	.1875	1/16	.203
	SNMP-543E	150612	.625	.250	3/64	.250
	SNMP-643E	190612	.750	.250	3/64	.313
SNMP-VP 	SNMP-432VP	120408	.500	.1875	1/32	.203
SNU 	SNU-321	090304	.375	.125	1/64	---
	SNU-322	090308	.375	.125	1/32	---
	SNU-324	090316	.375	.125	1/16	---
	SNU-422	120308	.500	.125	1/32	---
	SNU-423	120312	.500	.125	3/64	---
	SNU-424	120316	.500	.125	1/16	---
	SNU-432	120408	.500	.1875	1/32	---
	SNU-433	120412	.500	.1875	3/64	---
	SNU-438	120432	.500	.1875	1/8	---
	SNU-533	150412	.625	.1875	3/64	---
	SNU-632	190408	.750	.1875	1/32	---
	SNU-633	190412	.750	.1875	3/64	---
	SNU-634	190416	.750	.1875	1/16	---







	Part Number	ISO Desc.	IC	Thickness	Radius	Facet	Reference
SPC-A 	SPC-63A8	1904A8	.750	.1875	1/8	1/8	1/64
SPC-K 	SPC-63K8	1904K8	.750	.1875	1/8	1/8	1/64
SPC-L 	SPC-43L4	1204L4	.500	.1875	1/32	1/16	---
	SPC-43L6	1204L6	.500	.1875	1/32	3/32	---
	SPC-63L8	1904L8	.750	.1875	1/32	1/8	---
SPC-M 	SPC-63M8	1904M8	.750	.1875	1/8	1/8	---
SPE 	SPE-433	120412	.500	.1875	3/64	---	---
	SPE-533	150412	.625	.1875	3/64	---	---
	SPE-533T	150412	.625	.1875	3/64	---	---
	SPE-633	190412	.750	.1875	3/64	---	---
	SPE-633T	190412	.750	.1875	3/64	---	---
	SPE-634	190416	.750	.1875	1/16	---	---
	SPE-634T	190416	.750	.1875	1/16	---	---








Indexable Inserts Overview Continued




	Part Number	ISO Desc.	IC	Thickness	Radius	Facet	Reference
SPG 	SPG-320	090301	.375	.125	.008	---	---
	SPG-321	090304	.375	.125	1/64	---	---
	SPG-322	090308	.375	.125	1/32	---	---
	SPG-323	090312	.375	.125	3/64	---	---
	SPG-420	120301	.500	.125	.008	---	---
	SPG-421	120304	.500	.125	1/64	---	---
	SPG-422	120308	.500	.125	1/32	---	---
	SPG-423	120312	.500	.125	3/64	---	---
	SPG-424	120316	.500	.125	1/16	---	---
	SPG-432	120408	.500	.1875	1/32	---	---
	SPG-433	120412	.500	.1875	3/64	---	---
	SPG-434	120416	.500	.1875	1/16	---	---
	SPG-630	190401	.750	.1875	.008	---	---
	SPG-632	190408	.750	.1875	1/32	---	---
	SPG-633	190412	.750	.1875	3/64	---	---
	SPG-634	190416	.750	.1875	1/16	---	---
	SPG-638	190432	.750	.1875	1/8	---	---
SPU 	SPU-322	090308	.375	.125	1/32	---	---
	SPU-421	120304	.500	.125	1/64	---	---
	SPU-422	120308	.500	.125	1/32	---	---
	SPU-423	120312	.500	.125	3/64	---	---
	SPU-633	190412	.750	.1875	3/64	---	---
	SPU-634	190416	.750	.1875	1/16	---	---
SRC 	SRC-63H4R	1904H4R	.750	.1875	1/64	1/16	1/64
	SRC-63H4L	1904H4L	.750	.1875	1/64	1/16	1/64
	SRC-63H8R	1904H8R	.750	.1875	1/64	1/8	1/64
	SRC-63H8L	1904H8L	.750	.1875	1/64	1/8	1/64
SXC 	SXC-533J	150412	.625	.1875	3/64	---	---





	Part Number	ISO Desc.	IC	Thickness	Radius	Facet	Hole
TCMT-VF 	TCMT-21.50VF	110202	.250	.094	.008	---	.107
	TCMT-21.51VF	110204	.250	.094	1/64	---	.107
	TCMT-21.52VF	110208	.250	.094	1/32	---	.107
	TCMT-32.50VF	16T302	.375	.156	.008	---	.178
	TCMT-32.51VF	16T304	.375	.156	1/64	---	.178
	TCMT-32.52VF	16T308	.375	.156	1/32	---	.178
TCMT-VM 	TCMT-21.51VM	110204	.250	.094	1/64	---	.107
	TCMT-21.52VM	110208	.250	.094	1/32	---	.107
	TCMT-32.51VM	16T304	.375	.156	1/64	---	.178
	TCMT-32.52VM	16T308	.375	.156	1/32	---	.178
TCMT-VR 	TCMT-21.51VR	110304	.250	.094	1/64	---	.107
	TCMT-21.52VR	110308	.250	.094	1/32	---	.107
	TCMT-32.51VR	160404	.375	.156	1/64	---	.178
	TCMT-32.52VR	160408	.375	.156	1/32	---	.178
TFG 	TFG-320J	160301	.375	.125	.008	---	---
	TFG-321J	160304	.375	.125	1/64	---	---
	TFG-322J	160308	.375	.125	1/32	---	---
	TFG-323J	160312	.375	.125	3/64	---	---
TNC-X 	TNC-43X6.5	2204X6.5	.500	.1875	---	.101	---



Indexable Inserts Overview Continued




	Part Number	ISO Desc.	IC	Thickness	Radius	Facet	Hole
TNG 	TNG-220	110301	.250	.125	.008	---	---
	TNG-221	110304	.250	.125	1/64	---	---
	TNG-222	110308	.250	.125	1/32	---	---
	TNG-320	110301	.375	.125	.008	---	---
	TNG-321	110304	.375	.125	1/64	---	---
	TNG-322	110308	.375	.125	1/32	---	---
	TNG-323	110312	.375	.125	3/64	---	---
	TNG-331	110404	.375	.1875	1/64	---	---
	TNG-332	110408	.375	.1875	1/32	---	---
	TNG-333	110412	.375	.1875	3/64	---	---
	TNG-334	110416	.375	.1875	1/16	---	---
	TNG-430	220401	.500	.1875	.008	---	---
	TNG-431	220404	.500	.1875	1/64	---	---
	TNG-432	220408	.500	.1875	1/32	---	---
	TNG-433	220412	.500	.1875	3/64	---	---
	TNG-434	220416	.500	.1875	1/16	---	---
	TNG-436	220424	.500	.1875	3/32	---	---
	TNG-438	220432	.500	.1875	1/8	---	---
	TNG-440	220601	.500	.250	.008	---	---
	TNG-442	220608	.500	.250	1/32	---	---
	TNG-443	220612	.500	.250	3/64	---	---
	TNG-444	220616	.500	.250	1/16	---	---
	TNG-540	270601	.625	.250	.008	---	---
	TNG-542	270605	.625	.250	1/32	---	---
	TNG-544	270616	.625	.250	1/16	---	---
	TNG-546	270624	.625	.250	3/32	---	---
	TNG-548	270632	.625	.250	1/8	---	---







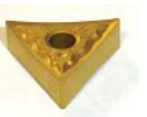
	Part Number	ISO Desc.	IC	Thickness	Radius	Facet	Hole
TNMA 	TNMA-222E	110308	.250	.125	1/32	---	.090
	TNMA-321E	160304	.375	.125	1/64	---	.150
	TNMA-322E	160308	.375	.125	1/32	---	.150
	TNMA-323E	160312	.375	.125	3/64	---	.150
	TNMA-324E	160316	.375	.125	1/16	---	.150
	TNMA-332E	160308	.375	.1875	1/32	---	.150
	TNMA-333E	160312	.375	.1875	3/64	---	.150
	TNMA-431E	220404	.500	.1875	1/64	---	.203
	TNMA-432E	220408	.500	.1875	1/32	---	.203
	TNMA-433E	220412	.500	.1875	3/64	---	.203
	TNMA-434E	220416	.500	.1875	1/16	---	.203
	TNMA-438E	220432	.500	.1875	1/8	---	.203
	TNMA-542E	270608	.625	.250	1/32	---	.250
	TNMA-543E	270612	.625	.250	3/64	---	.250
	TNMA-544E	270616	.625	.250	1/16	---	.250
TNMA-666E	330924	.750	.375	3/32	---	.313	
TNMA-VC 	TNMA-332VC	160408	.375	.1875	1/32	---	.150
	TNMA-333VC	160412	.375	.1875	3/64	---	.150
	TNMA-432VC	220408	.500	.1875	1/32	---	.203
	TNMA-433VC	220412	.500	.1875	3/64	---	.203
	TNMA-434VC	220416	.500	.1875	1/16	---	.203



Indexable Inserts Overview Continued



	Part Number	ISO Desc.	IC	Thickness	Radius	Facet	Hole
TNMG 	TNMG-221E	110304	.250	.125	1/64	---	.090
	TNMG-222E	110308	.250	.125	1/32	---	.090
	TNMG-321E	160304	.375	.125	1/64	---	.150
	TNMG-322E	160308	.375	.125	1/32	---	.150
	TNMG-323E	160312	.375	.125	3/64	---	.150
	TNMG-324E	160316	.375	.125	1/16	---	.150
	TNMG-326E	160324	.375	.125	3/32	---	.150
	TNMG-332E	160408	.375	.1875	1/32	---	.150
	TNMG-333E	160412	.375	.1875	3/64	---	.150
	TNMG-431E	220404	.500	.1875	1/64	---	.203
	TNMG-432E	220408	.500	.1875	1/32	---	.203
	TNMG-433E	220412	.500	.1875	3/64	---	.203
	TNMG-434E	220416	.500	.1875	1/16	---	.203
	TNMG-436E	220424	.500	.1875	3/32	---	.203
	TNMG-438E	220432	.500	.1875	1/8	---	.203
	TNMG-542E	270608	.625	.250	1/32	---	.250
	TNMG-543E	270612	.625	.250	3/64	---	.250
	TNMG-544E	270616	.625	.250	1/16	---	.250
	TNMG-546E	270624	.625	.250	3/32	---	.250
	TNMG-548E	270632	.625	.250	1/8	---	.250
TNMG-666E	330924	.750	.375	3/32	---	.313	
TNMG-VF 	TNMG-331VF	160404	.375	.1875	1/64	---	.150
	TNMG-332VF	160408	.375	.1875	1/32	---	.150
	TNMG-431VF	220404	.500	.1875	1/64	---	.203
	TNMG-432VF	220408	.500	.1875	1/32	---	.203
TNMG-VM 	TNMG-331VM	160404	.375	.1875	1/64	---	.150
	TNMG-332VM	160408	.375	.1875	1/32	---	.150
	TNMG-333VM	160412	.375	.1875	3/64	---	.150
	TNMG-431VM	220404	.500	.1875	1/64	---	.203
	TNMG-432VM	220408	.500	.1875	1/32	---	.203




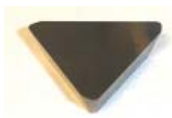

	Part Number	ISO Desc.	IC	Thickness	Radius	Facet	Hole
TNMG-VR 	TNMG-332VR	160408	.375	.1875	1/32	---	.150
	TNMG-333VR	160412	.375	.1875	3/64	---	.150
	TNMG-432VR	220408	.500	.1875	1/32	---	.203
	TNMG-433VR	220412	.500	.1875	3/64	---	.203
TNMG-W 	TNMG-543EW	270612	.625	.250	3/64	---	.250
	TNMG-544EW	270616	.625	.250	1/16	---	.250
	TNMG-666EW	330924	.750	.375	3/32	---	.313
TNMM 	TNMM-322E	160308	.375	.1875	1/32	---	.150
	TNMM-333E	160312	.375	.1875	3/64	---	.150
	TNMM-432E	220408	.500	.1875	1/32	---	.203
	TNMM-433E	220412	.500	.1875	3/64	---	.203
	TNMM-434E	220416	.500	.1875	1/16	---	.203
	TNMM-542E	270608	.625	.250	1/32	---	.250
	TNMM-543E	270612	.625	.250	3/64	---	.250
	TNMM-544E	270616	.625	.250	1/16	---	.250
	TNMM-666E	330924	.750	.375	3/32	---	.313
TNMP 	TNMP-331E	160404	.375	.1875	1/64	---	.150
	TNMP-332E	160408	.375	.1875	1/32	---	.150
	TNMP-333E	160412	.375	.1875	3/64	---	.150
	TNMP-334E	160416	.375	.1875	1/16	---	.150
	TNMP-431E	220404	.500	.1875	1/64	---	.203
	TNMP-432E	220408	.500	.1875	1/32	---	.203
	TNMP-433E	220412	.500	.1875	3/64	---	.203
	TNMP-434E	220416	.500	.1875	1/16	---	.203
	TNMP-542E	270608	.625	.250	1/32	---	.250
	TNMP-543E	270612	.625	.250	3/64	---	.250
	TNMP-544E	270616	.625	.250	1/16	---	.250
TNMP-VP 	TNMP-331VP	160404	.375	.1875	1/64	---	.150
	TNMP-332VP	160408	.375	.1875	1/32	---	.150
	TNMP-431VP	220404	.500	.1875	1/64	---	.203
	TNMP-432VP	220408	.500	.1875	1/32	---	.203



Indexable Inserts Overview Continued






	Part Number	ISO Desc.	IC	Thickness	Radius	Facet	Hole
TNMS 	TNMS-331E	160304	.375	.1875	1/64	---	.150
	TNMS-332E	160308	.375	.1875	1/32	---	.150
	TNMS-432E	220408	.500	.1875	1/32	---	.203
	TNMS-433E	220412	.500	.1875	3/64	---	.203
	TNMS-542E	270608	.625	.250	1/32	---	.250
	TNMS-543E	220712	.625	.250	3/64	---	.250
	TNMS-544E	270616	.625	.250	1/16	---	.250
TNU 	TNU-222	110308	.250	.125	1/32	---	---
	TNU-322	160308	.375	.125	1/32	---	---
	TNU-323	160312	.375	.125	3/64	---	---
	TNU-332	160408	.375	.1875	1/32	---	---
	TNU-333	160412	.375	.1875	3/64	---	---
	TNU-334	160416	.375	.1875	1/16	---	---
	TNU-432	220408	.500	.1875	1/32	---	---
	TNU-433	220412	.500	.1875	3/64	---	---
	TNU-434	120416	.500	.1875	1/16	---	---
	TNU-438	120432	.500	.1875	1/8	---	---
	TNU-444	120616	.500	.250	1/16	---	---
	TNU-542	270608	.625	.250	1/32	---	---
	TNU-544	270616	.625	.250	1/16	---	---
	TNU-546	270624	.625	.250	3/32	---	---











	Part Number	ISO Desc.	IC	Thickness	Radius	Facet	Hole
	TPC-322	160308	.375	.125	1/32	---	---
	TPC-322T	160308	.375	.125	1/32	---	---
	TPC-432	220408	.500	.1875	1/32	---	---
	TPC-432T	220408	.500	.1875	1/32	---	---
	TPC-32P8R	1603P8R	.375	.125	1/8	1/8	---
	TPC-32P8L	1603P8L	.375	.125	1/8	1/8	---
	TPC-43P8R	2204P8R	.500	.1875	1/8	1/8	---
	TPC-43P8L	2204P8L	.500	.1875	1/8	1/8	---
	TPG-220	110301	.250	.125	.008	---	---
	TPG-221	110304	.250	.125	1/64	---	---
	TPG-222	110308	.250	.125	1/32	---	---
	TPG-320	160301	.375	.125	.008	---	---
	TPG-321	160304	.375	.125	1/64	---	---
	TPG-322	160308	.375	.125	1/32	---	---
	TPG-323	160312	.375	.125	3/64	---	---
	TPG-324	160316	.375	.125	1/16	---	---
	TPG-326	160324	.375	.125	3/32	---	---
	TPG-328	160332	.375	.125	1/8	---	---
	TPG-430	220401	.500	.1875	.008	---	---
	TPG-431	220404	.500	.1875	1/64	---	---
	TPG-432	220408	.500	.1875	1/32	---	---
	TPG-433	220412	.500	.1875	3/64	---	---
	TPG-434	220416	.500	.1875	1/16	---	---
	TPG-435	220420	.500	.1875	5/64	---	---
	TPG-438	220432	.500	.1875	1/8	---	---
	TPG-542	270608	.625	.250	1/32	---	---
TPG-544	270616	.625	.250	1/16	---	---	
TPG-546	270624	.625	.250	3/32	---	---	



Indexable Inserts Overview Continued





	Part Number	ISO Desc.	IC	Thickness	Radius	Facet	Hole
TPK 	TPK-32PPR	1603PPR	.375	.125	1/32	.040	---
	TPK-32PPL	1603PPL	.375	.125	1/32	.040	---
	TPK-32PDTR	1603PDTR	.375	.125	1/32	.040	---
	TPK-32PDTL	1603PDTL	.375	.125	1/32	.040	---
	TPK-43PPR	2204PPR	.500	.1875	1/32	.060	---
	TPK-43PPL	2204PPL	.500	.1875	1/32	.060	---
	TPK-43PDTR	2204PDTR	.500	.1875	1/32	.060	---
	TPK-43PDL	2204PDL	.500	.1875	1/32	.060	---
TPU 	TPU-222	110308	.250	.125	1/32	---	---
	TPU-321	160304	.375	.125	1/64	---	---
	TPU-322	160308	.375	.125	1/32	---	---
	TPU-323	160312	.375	.125	3/64	---	---
	TPU-432	220408	.500	.1875	1/32	---	---
	TPU-433	220412	.500	.1875	3/64	---	---
	TPU-434	220416	.500	.1875	1/16	---	---
	TPU-438	220432	.500	.1875	1/8	---	---
VCMT-VF 	VCMT-220VF	110301	.250	.125	.008	---	.107
	VCMT-221VF	110304	.250	.125	1/64	---	.107
	VCMT-222VF	110308	.250	.125	1/32	---	.107
	VCMT-331VF	160404	.375	.1875	1/64	---	.178
	VCMT-332VF	160408	.375	.1875	1/32	---	.178
VCMT-VM 	VCMT-220VM	110301	.250	.125	.008	---	.107
	VCMT-221VM	110304	.250	.125	1/64	---	.107
	VCMT-222VM	110308	.375	.1875	1/32	---	.178
	VCMT-331VM	160404	.375	.1875	1/64	---	.178
	VCMT-332VM	160408	.375	.1875	1/32	---	.178
VCMT-VR 	VCMT-221VR	110304	.250	.125	1/64	---	.107
	VCMT-222VR	110308	.250	.125	1/32	---	.107
	VCMT-331VR	160404	.375	.1875	1/64	---	.178
	VCMT-332VR	160408	.375	.1875	1/32	---	.178
	VCMT-333VR	160412	.375	.1875	3/64	---	.178





	Part Number	ISO Desc.	IC	Thickness	Radius	Facet	Hole
	VNGP-330VXF	160402	.375	.1875	.008	---	.150
	VNGP-330VEF	160402	.375	.1875	.008	---	.150
	VNGP-331VXF	160404	.375	.1875	1/64	---	.150
	VNGP-331VEF	160404	.375	.1875	1/64	---	.150
	VNGP-332VXF	160408	.375	.1875	1/32	---	.150
	VNGP-332VEF	160408	.375	.1875	1/32	---	.150
	VNMA-432E	220408	.500	.1875	1/32	---	.231
	VNMA-433E	220412	.500	.1875	3/64	---	.231
	VNMG-332E	160408	.375	.1875	1/32	---	.150
	VNMG-432E	220408	.500	.1875	1/32	---	.231
	VNMG-433E	220412	.500	.1875	3/64	---	.231
	VNMG-434E	220416	.500	.1875	1/16	---	.231
	VNMG-331VF	160404	.375	.187	1/64	---	.150
	VNMG-332VF	160408	.375	.187	1/32	---	.150
	VNMG-331VM	160404	.375	.187	1/64	---	.150
	VNMG-332VM	160408	.375	.187	1/32	---	.150
	VNMG-331VR	160404	.375	.187	1/64	---	.150
	VNMG-332VR	160408	.375	.187	1/32	---	.150
	VNMP-332E	160408	.375	.1875	1/32	---	.150
	VNMP-331VP	160404	.375	.187	1/64	---	.150
	VNMP-332VP	160408	.375	.187	1/32	---	.150








Indexable Inserts Overview Continued

	Part Number	ISO Desc.	IC	Thickness	Radius	Hole	Reference
VNMS 	VNMS-332E	160408	.375	.1875	1/32	.150	---
WC-HPE 	WC-HPE-633	190412	.750	.1875	3/64	---	3/64
WCMT-VF 	WCMT-21.51VF	040204	.250	.094	1/64	.107	---
	WCMT-21.52VF	040208	.250	.094	1/32	.107	---
	WCMT-32.51VF	06T304	.375	.156	1/64	.178	---
	WCMT-32.52VF	06T308	.375	.156	1/32	.178	---
	WCMT-431VF	080404	.500	.1875	1/64	.220	---
	WCMT-432VF	080408	.500	.1875	1/32	.220	---
WCMT-VR 	WCMT-21.51VR	040204	.250	.094	1/64	.107	---
	WCMT-21.52VR	040208	.250	.094	1/32	.107	---
	WCMT-32.51VR	06T304	.375	.156	1/64	.178	---
	WCMT-32.52VR	06T308	.375	.156	1/32	.178	---
	WCMT-431VR	080404	.500	.1875	1/64	.220	---
	WCMT-432VR	080408	.500	.1875	1/32	.220	---

	Part Number	Thickness	Angle	Radius	Length	Width
WF-SNC 	WF45-SNC-634	.1875	90°	1/16	1.07	.750
WF-SPC 	WF3-SPC-634	.1875	174°	1/16	.768	.750
	WF15-SPC-634	.1875	150°	1/16	.836	.750
	WF30-SPC-634	.1875	120°	1/16	.933	.750
	WF45-SPC-634	.1875	90°	1/16	1.07	.750

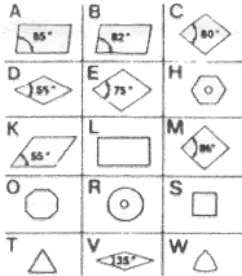


	Part Number	ISO Desc.	IC	Thickness	Radius	Hole	Reference
WNMA-VC 	WNMA-432VC	080408	.500	.1875	1/32	.203	---
	WNMA-433VC	080412	.500	.1875	3/64	.203	---
WNMG-VF 	WNMG-331VF	060404	.375	.1875	1/64	.150	---
	WNMG-332VF	060408	.375	.1875	1/32	.150	---
	WNMG-431VF	080404	.500	.1875	1/64	.203	---
	WNMG-432VF	080408	.500	.1875	1/32	.203	---
	WNMG-433VF	080412	.500	.1875	3/64	.203	---
WNMG-VM 	WNMG-331VM	060404	.375	.1875	1/64	.150	---
	WNMG-332VM	060408	.375	.1875	1/32	.150	---
	WNMG-333VM	060412	.375	.1875	3/64	.150	---
	WNMG-431VM	080404	.500	.1875	1/64	.203	---
	WNMG-432VM	080408	.500	.1875	1/32	.203	---
	WNMG-433VM	080412	.500	.1875	3/64	.203	---
WNMG-VR 	WNMG-332VR	060408	.375	.1875	1/32	.150	---
	WNMG-333VR	060412	.375	.1875	3/64	.150	---
	WNMG-432VR	080408	.500	.1875	1/32	.203	---
	WNMG-433VR	080412	.500	.1875	3/64	.203	---
	WNMG-434VR	080416	.500	.1875	1/16	.203	---
WNMP-VP 	WNMP-331VP	060404	.375	.1875	1/64	.150	---
	WNMP-332VP	060408	.375	.1875	1/32	.150	---
	WNMP-431VP	080404	.500	.1875	1/64	.203	---
	WNMP-432VP	080408	.500	.1875	1/32	.203	---

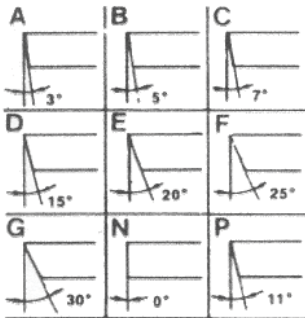


Designation of indexable inserts – metric series

1 SHAPE



2 CLEARANCE ANGLE



3 TOLERANCES, ±

Tol. class	m	s	l for shape C, S r for shape P, R, T
A	0,005	0,025	0,025
E	0,025	0,025	0,025
F	0,005	0,025	0,013
G	0,025	0,13	0,025
H	0,013	0,025	0,013
J	0,005	0,025	0,05-0,13*
K	0,013	0,025	0,05-0,13*
M	0,8-0,27*	0,013	0,05-0,18*
U	0,13-0,49*	0,13	0,08-0,32*

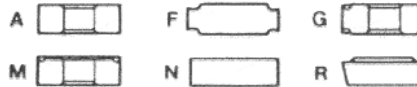
* Varies with the size of insert.

Insert d	Tolerances, ±			
	Class M		Class U	
mm	m	d, l	m	d, l
6,35	0,08	0,05	0,13	0,08
9,52	0,08	0,05	0,13	0,08
12,70	0,13	0,08	0,20	0,13
15,88	0,15	0,10	0,27	0,18
19,05	0,15	0,10	0,27	0,18
25,40	0,18	0,13	0,38	0,25
31,75	0,18	0,13	0,38	0,25
38,10	0,27	0,18	0,49	0,32

5 CUTTING EDGE LENGTH, l

d	Cutting edge length				
	C	D	S R	T	V
5,56					
6,35	06	07	06	11	16
9,52	09	11	09	16	
12,70	12	15	12	22	
15,88	16	19	15	27	
19,05	19	23	19	33	
25,40	25	31	25	44	
31,75			31		
38,10			36		

4 TYPE OF INSERT



6 THICKNESS, s

- 02 s=2,38 mm
- 03 s=3,18 mm
- T3 s=3,97 mm
- 04 s=4,76 mm
- 05 s=5,56 mm
- 06 s=6,35 mm
- 07 s=7,94 mm
- 08 s=8,00 mm
- 09 s=9,52 mm

S **E** **A** **N** **12** **03** **08** **T** **N**
 1 2 3 4 5 6 7A 8 9
AF
 7B

7A RADIUS, r

- M0 round inserts*, millimeter
- 00 round inserts*, inches
- 00 sharp corner
- 01 r=0,1 mm
- 02 r=0,2 mm
- 04 r=0,4 mm
- 08 r=0,8 mm
- 12 r=1,2 mm
- etc.



* only together with "R" in pos. 1

7B INSERTS WITH SECONDARY EDGES

For inserts having secondary edges two digits are used:
 1st digit =secondary edge
 2nd digit =secondary relief angle

- | | | |
|---------|---------|---------|
| A = 45° | A = 3° | G = 30° |
| D = 60° | B = 5° | N = 0° |
| E = 75° | C = 7° | P = 11° |
| F = 85° | D = 15° | |
| P = 90° | E = 20° | |
| | F = 25° | |

8 CUTTING EDGE CONDITION



9 HAND OF CUTTING

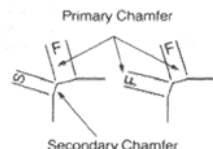
RIGHT LEFT EITHER
R **L** **N**



Milling Cutter Insert Identification Chart

Wiper Inserts Only	Clearance	Size	Radius of Chamfer	Edge Condition
WF - Wiper Flat WC - Wiper Crown Numbers indicate cutter lead in degrees	Side Chamfer N --- 0° --- A --- 3° --- B --- 5° --- C --- 7° --- P --- 11° --- D --- 15° --- E --- 20° --- F --- 25° --- G --- 30° --- H --- 0° 11° J --- 0° 15° K --- 0° 17° L --- 0° 20° M --- 11° 15° R --- 11° 17° S --- 11° 20° X --- 27°	Number of 1/8ths of an inch in IC when IC is 1/4 inch and over. For IC of less than 1/4 inch, the number of 1.32nds inch in IC. Rectangles and parallelograms use 2 digits to size: 1st Digit---Number of 1/8ths inch in width. 2nd Digit---Number of 1/4ths inch in length.	0 --- Sharp Corner 1 --- 1/64 Radius 2 --- 1/32 Radius 3 --- 3/64 Radius 4 --- 1/16 Radius 6 --- 3/16 Radius 8 --- 1/8 Radius A --- 45° Chamfer D --- 30° Chamfer E --- 15° Chamfer F --- 3° Chamfer G --- 7-1/2° Double Chamfer H --- 15° Chamfer with secondary facet K --- 30° Double Chamfer L --- 15° Double Chamfer M --- 3° Double Chamfer N --- Truncated P --- Flatted corner R --- Flatted corner with secondary chamfer X --- 45° Double Chamfer	J --- Polished (4 Micro Inch AA) (Rake Surface Only) T --- K-Land Cutting edge W --- Serrated edge

WF 15-SEC-63L8TR

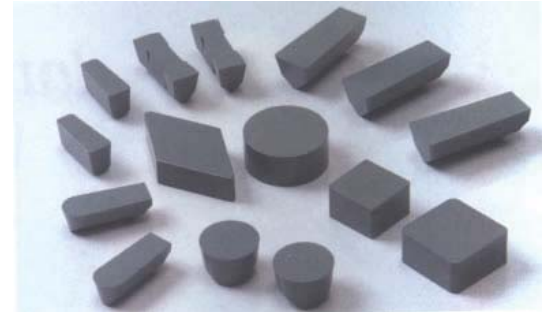
Shape	Tolerances	Thickness	Chamfer Size	Hand of Cut
A --- Parallelogram 85° B --- Parallelogram 82° C --- Diamond 80° H --- Hexagon L --- Rectangle M --- Diamond 86° N --- Diamond 87° O --- Octagon P --- Pentagon R --- Round S --- Square T --- Triangle	Cutting Point Thickness A ± .0002 ± .001 B ± .0002 ± .005 C ± .0005 ± .001 D ± .0005 ± .005 E ± .001 ± .001 G ± .001 ± .005 X ± .003 ± .001	Regular Polygons and Diamonds: Number of 1/6ths of an inch in thickness for IC of 1/4 inch and over. For less than 1/4 inch IC, the number of 1/32nds inch. Rectangles and Parallelograms use width dimensions in place of IC	Only appears following a letter in sixth position. Number of 1/64ths of an inch in primary chamfered edge. Primary chamfers are "F" in catalog illustrations. 	R --- Right L --- Left



VR300 Whisker-Reinforced Ceramics

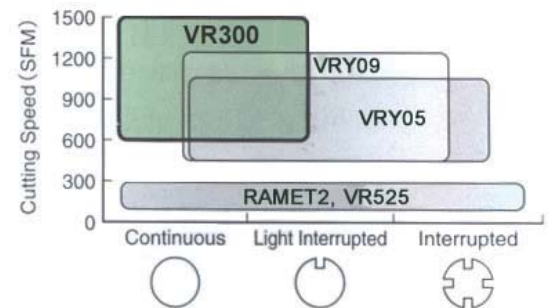
Composition & Properties

VR300 is a whisker-reinforced ceramic material with silicon-carbide whiskers added to alumina. The main component alumina ceramic offers the best wear resistance at high cutting speeds but lacks toughness. Toughness and notch wear resistance dramatically increases when alumina ceramic is combined with silicon-carbide (SiC) “whisker”. The end result is whisker-reinforced ceramic “VR300”. VR300 has been used widely for machining high temperature alloys at high cutting speeds. VR300 has a higher (SiC) content than other competitor’s whisker-reinforced ceramics. The resulting material, VR300, shows increased productivity and extended reliability in applications where roughness and notching resistance are needed. VR300 is an excellent choice for finish and semi-finish applications of high nickel based alloys where SiAlON ceramics may have excessive flank wear. VR300 also excels in long continuous profile cuts and grooving applications when more wear resistance is needed.



VR300 Features

- Best flank wear resistance at high speed
- Best notch wear resistance compared with competitor’s whisker reinforced ceramics
- Higher toughness compared with competitor’s whisker reinforced ceramics



Recommended work materials

- High temperature alloys (Nickel based alloys, Cobalt based alloys, Titanium alloys etc.)
- Stellite
- Hardened stainless
- Hardened steel with interrupted cut



VR300 Whisker-Reinforced Ceramics

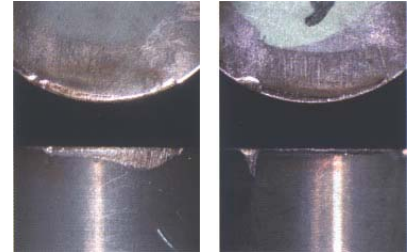
Rough turning of Inco718

Insert Material	Competitor's silicon nitride	VR300
Shape	RNG45	←
Cutting Speed	700 SFM	1000 SFM
Feed Rate	.010 IPR	←
D.O.C.	.080 inch	←
Coolant	WET	←
Tool Life	8 inserts/part	←

The competitor's silicon nitride caused bad surface finish and chatter due to its excessive flank wear. VR300 showed better flank wear resistance at higher speed. VR300 needed (6) inserts to finish the part. The competitor's silicon nitride used (8) inserts. VR300 showed high productivity and cost reduction.

Part	Aircraft parts
Material	Inco718 no scale

Competitor's silicon nitride



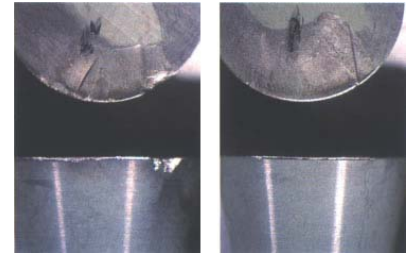
Profiling of Inco625

Insert Material	Competitor's silicon nitride	VR300
Shape	RPGX35	←
Cutting Speed	900 SFM	←
Feed Rate	.006 IPR	←
D.O.C.	.020 - .030 inch	←
Coolant	WET	←
Tool Life	3 passes/edge	3 passes/edge

The competitor's whisker ceramic was chipped due to its increased depth of cut notch wear. VR300 showed better wear resistance compared with the competitor's whisker ceramic.

Part	Aircraft parts
Material	Inco625 (HRC28)

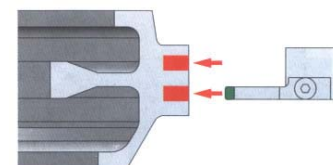
Competitor's whisker ceramic



Grooving of Inco718

Insert Material	Competitor's silicon nitride	VR300
Shape	VGW8375-2	←
Cutting Speed	800 SFM	←
Feed Rate	.004 IPR	←
D.O.C.	-	←
Coolant	WET	←
Tool Life	4.0 min	5.0 min

Part	Aircraft parts
Material	Inco718



VR300 showed better tool life compared with the competitor's whisker ceramic.



Edge Preparations and Application Guide

Edge Prep	Hone	Primary Land	Primary Angle	Secondary Land	Secondary Angle	Application
A	.0005 - .001" R.					For light finishing and grooving also added to designated negative lands (i.e. T1, T2, T9)
B	.001 - .002" R.					Used in addition to heavy machining chamfers and designated negative lands (i.e. T4, T10)
T1		.002 - .004"	20°			General purpose for turning and light milling in clean high-temp. alloys and materials <50R/C
T1A	.0005 - .001" R.	.002 - .004"	20°			Used where more protection is needed than T1 such as in scale and light interruptions, hard turning.
T2		.006 - .008"	20°			General purpose chamfer for light to medium feed rates, cast-iron machining.
T2A	.0005 - .001" R.	.006 - .008"	20°			Scale applications, light interruptions, weld overlays, finish turning and milling of hardened materials.
T3		.013 - .015"	30°			Used on smaller IC inserts as an alternative to T7.
T3A	.0005 - .001" R.	.013 - .015"	30°			Used on smaller IC inserts as an alternative to T7A.
T4B	.001 - .002" R.	.075"	10°	.006 - .008"	25°	Heavy machining <3/4"IC - Roll turning, 3V, 4V, CDH-22, CDH-33.
T5B	.001 - .002" R.	.060"	15°	.006 - .008"	30°	Heavy machining - alternative to T4B.
T7		.015 - .020"	20°			For use in similar applications as T2 - use in heavier feed areas.
T7A	.0005 - .001" R.	.015 - .020"	20°			For use in similar applications as T2A - use in heavier feed areas.
T9		.006 - .008"	30°			General purpose chamfer for medium to heavy feed rates, milling, cast-iron machining <5/8" IC.
T9A	.0005 - .001" R.	.006 - .008"	30°			For medium to heavy feed rates, milling, cast-iron machining for heavier interruptions <5/8" IC.
T10A	.0005 - .001" R.	.090 - .100"	15°	.006 - .008"	30°	Heavy machining, iron and steel roll turning >3/4"IC, CDH-43, CDH-53
T10B	.001 - .002" R.	.090 - .100"	15°	.008 - .008"	30°	Heavy machining, iron and steel roll turning >3/4"IC, CDH-43, CDH-53

Composition & Properties

VR300 is a whisker-reinforced ceramic material with silicon-carbide whiskers added to alumina. The main component alumina ceramic offers the best wear resistance at high cutting speeds but lacks roughness. Toughness and notch wear resistance dramatically increases when alumina ceramic is combined with silicon-carbide (SiC) "whisker". The end result is whisker-reinforced ceramic "VR300". VR300 has been used widely for machining high temperature alloys at high cutting speeds. VR300 has a high (SiC) content than other competitor's whisker-reinforced ceramics. The resulting material, VR300, shows increased productivity and extended reliability in applications where toughness and notching resistance are needed. VR300 is an excellent flank wear. VR300 also excels in long continuous profile cuts and grooving applications when more wear resistance is needed.

Features

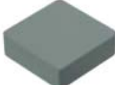
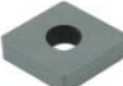

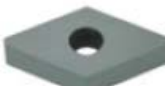
- Best flank wear resistance at high speed
- Best notch wear resistance compared with competitor's whisker reinforced ceramics
- Higher toughness compared with competitor's whisker reinforced ceramics.

Recommended work materials

- High temperature alloys (Nickel based alloys, Cobalt based alloys, Titanium alloys etc.)
- Stellite
- Hardened stainless
- Hardened steel with interrupted cut





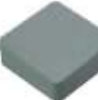


VR300 Whisker-Reinforced Ceramics Overview







	Metric	Inch	IC	T	R	
CNG 	CNGN-120408T00520	CNG-432T0220	1/2	3/16	1/32	
	CNGN-120408T01020	CNG-432T0420			3/64	
	CNGN-120412T00520	CNG-433T0220			1/16	
	CNGN-120412T01020	CNG-433T0420		5/16	1/32	
	CNGN-120416T00520	CNG-434T0220			3/64	
	CNGN-120708T00520	CNG-452T0220			1/16	
	CNGN-120712T00520	CNG-453T0220		3/4	1/4	3/32
	CNGN-120716T00520	CNG-454T0220				
	CNGN-190724T00520	CNG-656T0220				
CNGA 	CNGA-120408T00520	CNGA-432T0220	1/2	3/16	1/32	
	CNGA-120408T01020	CNGA-432T0420			3/64	
	CNGA-120412T00520	CNGA-433T0220			1/16	
	CNGA-120412T01020	CNGA-433T0420		5/8	1/4	3/64
	CNGA-120416T00520	CNGA-434T0220				1/16
	CNGA-120416T01020	CNGA-434T0420			3/8	3/64
	CNGA-160612T00520	CNGA-543T0220	1/16			
	CNGA-160616T00520	CNGA-544T0220	3/8	1/4	3/64	
	CNGA-190612T00520	CNGA-643T0220			1/16	
	CNGA-190612T01020	CNGA-643T0420				
	CNGA-190616T00520	CNGA-644T0220				
DNG 	DNGN-150408T00520	DNG-432T0220	1/2	3/16	1/32	
	DNGN-150408T01020	DNG-432T0420			3/64	
	DNGN-150412T00520	DNG-433T0220			1/16	
	DNGN-150412T01020	DNG-433T0420		1/2	3/16	1/32
	DNGN-150416T00520	DNG-434T0220				3/64
	DNGN-150416T01020	DNG-434T0420				1/16
DNGA 	DNGA-150408T00520	DNGA-432T0220	1/2	3/16	1/32	
	DNGA-150408T01020	DNGA-432T0420			3/64	
	DNGA-150412T00520	DNGA-433T0220			1/16	
	DNGA-150412T01020	DNGA-433T0420			1/32	
	DNGA-150416T00520	DNGA-434T0220		1/2	3/16	1/32
	DNGA-150416T01020	DNGA-434T0420				3/64
	DNGA-150708T00520	DNGA-452T0220				1/16
	DNGA-150708T02020	DNGA-452T0820				1/32



VR300 Whisker-Reinforced Ceramics Overview





	Metric	Inch	IC	T	R	
RCGX 	RCGX-060400T00520	RCGX-23T0220	1/4	3/16	---	
	RCGX-060700T00520	RCGX-25T0220				
	RCGX-090700T00520	RCGX-35T0220	3/8	5/16		
	RCGX-090700T01020	RCGX-35T0420				
	RCGX-120700T00520	RCGX-45T0220	1/2			
	RCGX-120700T01020	RCGX-45T0420				
	RCGX-120700Z01520	RCGX-45Z0620				
RNG 	RNGN-120400T00520	RNG-43T0220	1/2	3/16	---	
	RNGN-120400T01020	RNG-43T0420				
	RNGN-120700E002	RNG-45E01		5/16		
	RNGN-120700T00520	RNG-45T0220				
	RNGN-120700T01020	RNG-45T0420				
	RNGN-120700Z01520	RNG-45Z0620				
RPG 	RPGN-060200T00520	RPG-21.5T0220	1/4	3/32	---	
	RPGN-090300T00520	RPG-32T0220	3/8	1/8		
	RPGN-120400T00520	RPG-43T0220	1/2	3/16		
	RPGN-120400T01020	RPG-43T0420				
RPGX 	RPGX-060400T00520	RPGX-23T0220	1/4	3/16	---	
	RPGX-090700T00520	RPGX-35T0220	3/8	5/16		
	RPGX-120700T00520	RPGX-45T0220	1/2			
	RPGX-120700T01020	RPGX-45T0420				
SNG 	SNGN-120408T00520	SNG-432T0220	1/2	3/16	1/32	
	SNGN-120408T01020	SNG-432T0420			3/64	
	SNGN-120412T00520	SNG-433T0220			1/16	
	SNGN-120412T01020	SNG-433T0420				
	SNGN-120416T00520	SNG-434T0220		5/16	1/32	
	SNGN-120416T01020	SNG-434T0420			3/64	
	SNGN-120708T00520	SNG-452T0220			1/16	
	SNGN-120712T00520	SNG-453T0220		5/8	1/4	1/32
	SNGN-120716T00520	SNG-454T0220				3/64
	SNGN-120716Z01520	SNG-454Z0620				1/16
	SNGN-150716T02020	SNG-554T0820		3/4	5/16	1/16
	SNGN-190616T00520	SNG-644T0220				
	SNGN-190616Z01520	SNG-644Z0620				
	SNGN-190712T02020	SNG-653T0820				3/64



	Metric	Inch	IC	T	R	
SNGA 	SNGA-120408T00520	SNGA-432T0220	1/2	3/16	1/32	
	SNGA-120408T01020	SNGA-432T0420				
	SNGA-120412T00520	SNGA-433T0220				
	SNGA-120412T01020	SNGA-433T0420				
	SNGA-150612T00520	SNGA-543T0220	5/8	1/4	3/64	
TNG 	TNGN-160408T01020	TNG-332T0420	3/8	3/16	1/32	
	TNGN-160412T01020	TNG-333T0420				
	TNGN-220408T00520	TNG-432T0220	1/2		1/32	
	TNGN-220408T01020	TNG-432T0420				
	TNGN-220412T00520	TNG-433T0220				
	TNGN-220412T00520	TNG-434T0220				
	TNGN-220712T00520	TNG-453T0220			5/16	3/64
	TNGN-220716T00520	TNG-454T0220				
	TNGN-270616T00520	TNG-544T0220	5/8	1/4	1/16	
TNGA 	TNGA-220408T00520	TNGA-432T0220	1/2	3/16	1/32	
TPG 	TPGN-160308T00520	TPG-322T0220	3/8	1/8	1/32	
	TPGN-160312T00520	TPG-323T0220				
VNGA 	VNGA-160408T00520	VNGA-332T0220	3/8	3/16	1/32	
	VNGA-160412T00520	VNGA-333T0220				
	VNGA-220424T01020	VNGA-436T0420	1/2	3/16	3/32	
WNGA 	WNGA-080408T00520	WNGA-432T0220	1/2	3/16	1/32	
	WNGA-080412T00520	WNGA-433T0220				



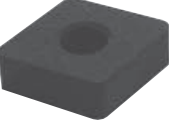
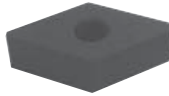

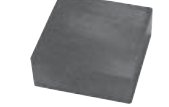


VR300 Whisker-Reinforced Ceramics Overview

	Metric	Inch	W	R	T	L
VDB 	VDB-250B031	VDB-250B031	.250	.031	.337	1.125
	VDB-312B031	VDB-312B031	.312	.031		
	VDB-312B062	VDB-312B062		.062		
	VDB-375B031	VDB-375B031	.375	.031		
	VDB-375B062	VDB-375B062		.062		
VDB 	VDB-250RB	VDB-250RB	.250	.125	.337	1.125
VGW 	VGW-4125-1	VGW-4125-1	.125	.015	.187	.500
	VGW-4125-2	VGW-4125-2		.031		
	VGW-4156-1	VGW-4156-1	.156	.015	.187	.500
	VGW-4156-2	VGW-4156-2		.031		
	VGW-4187-1	VGW-4187-1	.187	.015	.187	.500
	VGW-4187-2	VGW-4187-2		.031		
	VGW-6250-1	VGW-6250-1	.250	.015	.250	.750
	VGW-6250-1T00520	VGW-6250-1T0220		.015		
	VGW-6250-1T01020	VGW-6250-1T0420		.015		
	VGW-6250-1Z00520	VGW-6250-1Z0220		.015		
	VGW-6250-1Z01020	VGW-6250-1Z0420		.015		
	VGW-6250-2	VGW-6250-2		.031		
	VGW-6250-3	VGW-6250-3	.046	.337	1.000	
	VGW-6281-4	VGW-6281-4	.062			
	VGW-8312-2	VGW-8312-2	.312			.031
	VGW-8312-4	VGW-8312-4				.062
	VGW-8375-2	VGW-8375-2	.375	.031	.337	1.000
	VGW-8375-4	VGW-8375-4		.062		
	VGW-8375-4T00520	VGW-8375-4T0220				
	VGW 	VGW-4125-R	VGW-4125-R	.125	.063	.187
VGW-4156-R		VGW-4156-R	.156	.078		
VGW-4187-R		VGW-4187-R	.187	.094		
VGW-6218-R		VGW-6218-R	.218	.109	.250	.750
VGW-6250-R		VGW-6250-R	.250	.125		
VGW-6281-R		VGW-6281-R	.281	.141		
VGW-8312-R		VGW-8312-R	.312	.156	.337	1.000
VGW-8344-R		VGW-8344-R	.344	.172		
VGW-8375-R		VGW-8375-R	.375	.188		



High Speed Machining Applications for Hardened Steels and Cast Irons.

Black Ceramics are hot pressed with Titanium Carbide for materials less than 65 HC for finish, semi-finishing of cast iron, chilled iron or turning of nickel and cobalt base alloys. White Ceramics are Hipped for use in machining cast irons, carbon and alloy steels and Martensitic Stainless steels.

	White Ceramic VR97	Black Ceramic VR100	IC	Thick	Radius	Hole	K-Land
	CNG-432T	21000	21001	0.500	0.188	0.032	.004x30
	CNG-433T	21005	21002	0.500	0.188	0.047	.004x30
	CNG-434T	21007	21003	0.500	0.188	0.062	.004x30
	CNG-454T	21013	21010	0.500	0.312	0.062	.004x30
	CNG-642T	21019	21016	0.750	0.250	0.032	.006x30
	CNG-643T	21021	21018	0.750	0.250	0.047	.006x30
	CNG-644T	21023	21020	0.750	0.250	0.062	.006x30
	CNGA-432T	21029	21026	0.500	0.188	0.032	0.203 .004x30
	CNGA-433T	21031	21028	0.500	0.188	0.047	0.203 .004x30
	CNGA-542T	21039	21036	0.625	0.250	0.032	0.253 .006x30
	CNGA-543T	21041	21038	0.625	0.250	0.047	0.253 .006x30
	CNGA-643T	21043	21040	0.500	0.250	0.047	0.313 .006x30
	DNG-432T	21047	21044	0.500	0.188	0.032	.004x30
	DNG-433T	21049	21046	0.500	0.188	0.047	.004x30
	DNGA-432T	21065	21062	0.500	0.188	0.032	0.203 .004x30
	DNGA-433T	21067	21064	0.500	0.188	0.047	0.203 .004x30
	RNG-32T	21081	21078	0.375	0.125	0.188	.004x30
	RNG-43T	21083	21080	0.500	0.188	0.250	.004x30
	RNG-45T	21085	21082	0.500	0.313	0.250	.004x30
	SNG-332T	21095	21092	0.375	0.188	0.032	.004x30
	SNG-333T	21097	21094	0.375	0.188	0.047	.004x30
	SNG-432T	21099	21096	0.500	0.188	0.032	.004x30
	SNG-454T	21111	21108	0.625	0.313	0.062	.004x30
	SNG-633T	21113	21110	0.750	0.188	0.047	.006x30
	SNGA-432T	21127	21122	0.500	0.188	0.032	.004x30
	SNGA-434T	21129	21124	0.500	0.188	0.062	.004x30
	TNG-332T	21139	21134	0.375	0.188	0.032	.004x30
	TNG-432T	21145	21140	0.500	0.188	0.032	.004x30
	TNG-433T	21147	21142	0.500	0.188	0.047	.004x30
	TNG-434T	21149	21144	0.500	0.188	0.062	.004x30
	TNG-453T	21159	21154	0.500	0.313	0.047	.004x30
	TNG-454T	21161	21156	0.500	0.313	0.062	.004x30
	TNGA-322T	21163	21158	0.375	0.125	0.032	0.150 .004x30
	TNGA-332T	21165	21160	0.375	0.188	0.032	0.150 .004x30
	TNGA-432T	21167	21162	0.500	0.188	0.032	0.203 .004x30
	TNGA-434T	21169	21164	0.500	0.188	0.062	0.203 .004x30
	VNGA-332T	21171	21166	0.500	0.188	0.032	0.150 .004x30
	VNGA-432T	21173	21168	0.500	0.188	0.032	0.150 .004x30



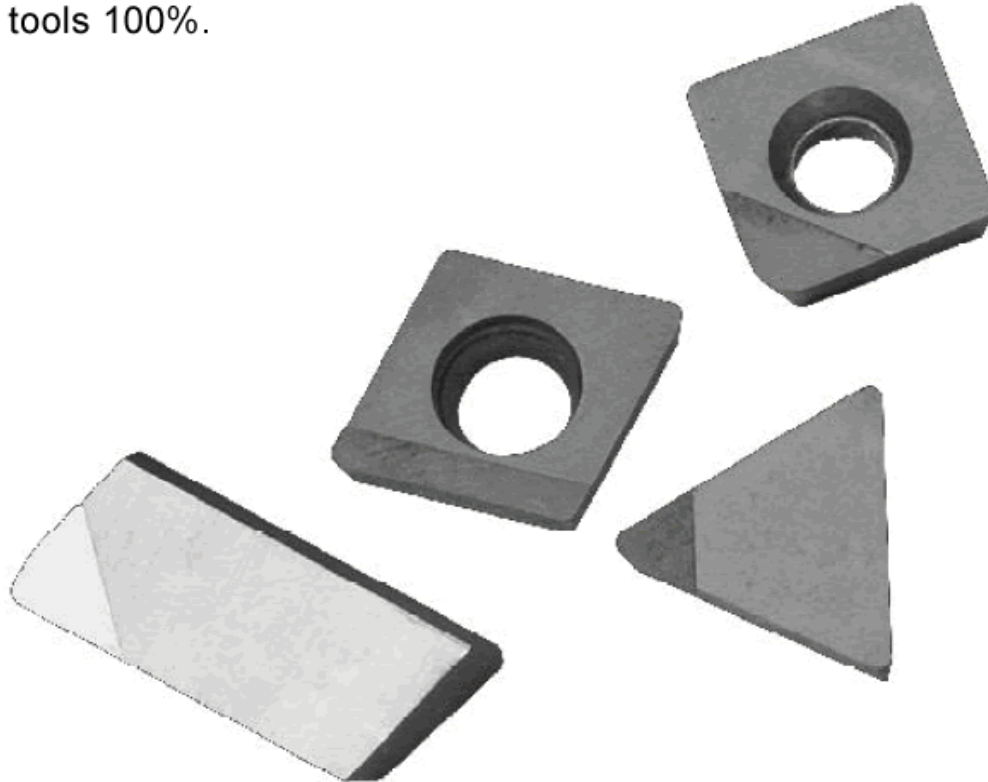
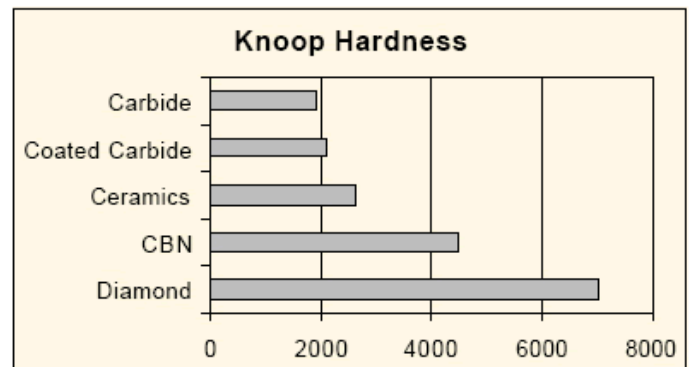
Polycrystalline Diamond (PCD) & Polycrystalline Cubic Boron Nitride (PCBN)



VR/Wesson uses only the highest quality Diamond and PCBN based products in their cutting tools.

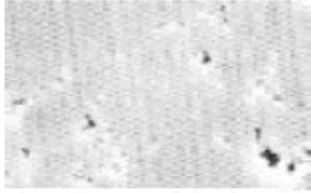
VR/Wesson performs all grinding and inspection on the latest and most technologically advanced equipment.

VR/Wesson stands behind the quality and performance of its cutting tools 100%.

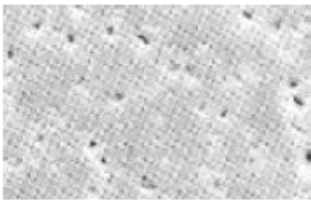




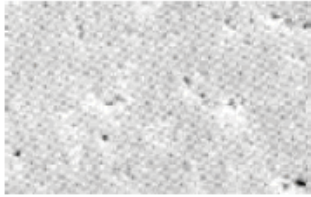
Polycrystalline Diamond (PCD) Grades - VR/Wesson PCD tipped tools offer the hardness, strength and abrasion resistance of single crystal diamond without the susceptibility of fracturing. Our PCD tipped tools are capable of high material removal rates with very high thermal conductivity allowing greater heat dissipation in roughing and finishing operations. Additional benefits including long tool life in highly abrasive aluminum/silicon alloys, reinforced composites and plastics.



VRS-5D - A coarse diamond grain size designed for severe interrupted cuts, rough machining and the most highly abrasive aluminum/silicon alloys, metal composites and where finish is not critical.



VRS-6D - A fine diamond grain size designed for less abrasive materials such as low silicon aluminum alloys and graphite composites where a fine finish is required.

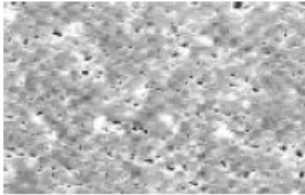


VRS-8D - An extremely fine diamond grain size designed for less abrasive materials such as copper and zinc alloys and wood, and where a very fine surface finish is required.

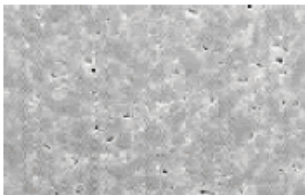
Material	Operation	Recommended Grade	Cutting Speed (SFPM)	Depth of Cut	Feed Rate IPR for Turning FPT for Milling
Aluminum Alloys	<12% Si Rough Turning	VRS-5D	3000-10000	.004-.125	.004-.015 IPR
	>12% Si Turning		1000-3000	.004-.125	.004-.015 IPR
	<12% Si Finish Turning	VRS-6D	3000-10000	.004-.040	.004-.008 IPR
	>12% Si Turning		1000-3000	.004-.040	.004-.008 IPR
	<12% Si Milling	VRS-5D	5000-12000	.004-.125	.004-.012 FPT
	>12% Si Milling		1250-3000	.004-.125	.004-.012 FPT
Copper, Zinc & Brass	Rough Turning	VRS-5D	2000-3000	.020-.080	.004-.012 IPR
	Finish Turning	VRS-6D	2250-4000	.004-.020	.004-.012 IPR
	Milling	VRS-5D	2250-4000	.004-.125	.004-.012 IPR
Reinforced Plastics	Rough Turning	VRS-5D	500-2500	.040-.080	.004-.015 IPR
	Finish Turning	VRS-6D	1000-5000	.004-.040	.004-.015 IPR
	Milling	VRS-5D	1000-5000	.004-.125	.004-.012 FPT
Sintered Tungsten Carbide	Rough Turning	VRS-5D	65-130	.004-.020	.004-.012 IPR
	Finish Turning	VRS-6D		.004-.008	.004-.012 IPR
Manufactured Wood	Sawing	VRS-8D	6500-16500	n/a	.020-.060 FPT
	Routing			n/a	.020-.060 FPT



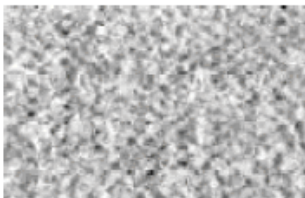
Polycrystalline Cubic Boron Nitride (PCBN or CBN) Grades - VR/Wesson CBN consists of fine particles of CBN crystals, randomly oriented and strongly bonded together and to a ceramic matrix. This combination provides a uniform high hardness and wear resistance in all directions, resulting in high fracture and wear resistance as well as excellent thermal and chemical stability. CBN is specifically designed for machining ferrous materials for the automotive, aerospace and heavy machining industries.



VRS-1C - Average particle size of 2 um, with metal ceramic binder phase. VRS-1C is designed for rough and semi-finish machining of pearlitic grey cast iron, hardened ferrous metals (>45Rc) and can withstand severe interrupted cuts.



VRS-4C - Average grain size of 15 um, with pure ceramic binder phase. The coarse grain high CBN content provides high fracture toughness, superb wear resistance and excellent chemical stability. VRS-4C is designed for machining Ni-hard cast iron, high chrome alloy steels and powder metal alloys.





VRS-2C - Average grain size of 2 um, with a higher volume of TiN ceramic binder phase providing a strong chemical wear resistance. is designed for finish machining of hardened steels (>45Rc), and can replace conventional grinding with metal removal rates up to 10 times greater than that of grinding.


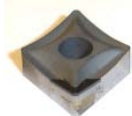



Material	Operation	Recommended Grade (* First choice)	Cutting Speed (SFPM)	Depth of Cut	Feed Rate (IPR)
Pearlitic Grey Cast Iron	Rough/Finish	VRS-1C VRS-4C*	1950-3950	.004-.100	.006-.023
Hard Cast Iron (>45Rc)	Rough/Finish	VRS-4C	250-495	.008-.100	.005-.025
Hardened Steels (>45Rc)	Rough/Finish	VRS-1C VRS-4C*	215-395	.020-.100	.004-.020
Alloy Steels	Finishing	VRS-2C	325-495	.004-.020	.004-.006
Tool and Die Steels	Finishing	VRS-2C	295-360	.004-.020	.004-.006
Hard Facing Alloys	Rough/Finish	VRS-1C	985-2300	.004-.060	.004-.010
Powder Metals	Rough/Finish	VRS-1C	295-590	.004-.050	.004-.010
Super Alloys	Finishing	VRS-1C	495-820	.004-.100	.004-.012



PCD/CBN Inserts Overview


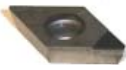

	Part Number	IC	Thickness	Radius	Hole
	CCGW-21.50	0.250	0.094	0.004	0.110
	CCGW-21.51	0.250	0.094	0.016	0.110
	CCGW-21.52	0.250	0.094	0.031	0.110
	CCGW-32.50	0.375	0.156	0.004	0.173
	CCGW-32.51	0.375	0.156	0.016	0.173
	CCGW-32.52	0.375	0.156	0.031	0.173


	Part Number	Length	Thickness	Radius	Hole
	CDE-322-R07	0.375	0.125	0.031	0.172




	Part Number	IC	Thickness	Radius	Hole
	CNGA-431	0.500	0.188	0.016	0.203
	CNGA-432	0.500	0.188	0.031	0.203
	CNGA-433	0.500	0.188	0.047	0.203
	CNMS-432	0.500	0.188	0.031	0.172
	CPEW-32.52	0.375	0.156	0.031	0.202
	CPG-421	0.500	0.125	0.016	---
	CPG-422	0.500	0.125	0.031	---
	CPG-423	0.500	0.125	0.047	---
	CPGW-21.50	0.250	0.094	0.004	0.110
	CPGW-21.51	0.250	0.094	0.016	0.110
	CPGW-21.52	0.250	0.094	0.031	0.110
	CPGW-32.50	0.375	0.156	0.004	0.173
	CPGW-32.51	0.375	0.156	0.016	0.173
	CPGW-32.52	0.375	0.156	0.031	0.173



PCD/CBN Inserts Overview Continued

	Part Number	IC	Thickness	Radius	Hole
CPMW 	CPMW-1.81.51	0.219	0.094	0.016	0.098
DCGW 	DCGW-21.50	0.250	0.094	0.004	0.110
	DCGW-21.51	0.250	0.094	0.016	0.110
	DCGW-21.52	0.250	0.094	0.031	0.110
	DCGW-32.50	0.375	0.156	0.004	0.173
	DCGW-32.51	0.375	0.156	0.016	0.173
	DCGW-32.52	0.375	0.156	0.031	0.173
DNGA 	DNGA-431	0.500	0.188	0.016	0.203
	DNGA-432	0.500	0.188	0.031	0.203
	DNGA-433	0.500	0.188	0.047	0.203

	Part Number	Length	Thickness	Radius	Hole
DNMS 	DNMS-432	0.500	0.188	0.031	0.205


	Part Number	IC	Thickness	Radius	Hole
DPGW 	DPGW-21.50	0.250	0.094	0.004	0.110
	DPGW-21.51	0.250	0.094	0.016	0.110
	DPGW-21.52	0.250	0.094	0.031	0.110
	DPGW-32.50	0.375	0.156	0.004	0.173
	DPGW-32.51	0.375	0.156	0.016	0.173
	DPGW-32.52	0.375	0.156	0.031	0.173
RNG 	RNG-32	0.375	0.125	0.188	---
	RNG-42	0.500	0.125	0.250	---
	RNG-43	0.500	0.188	0.250	---
EDR 	EDR-100-031-E1	---	---	0.031	---










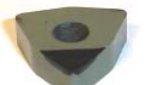
	Part Number	IC	Thickness	Radius	Hole	
SCGW		SCGW-32.51	0.500	0.188	0.016	0.215
		SCGW-32.52	0.500	0.188	0.031	0.215
SCR		SCR-100-093-E1	---	---	0.093	---
		SCL-200-093-E1	---	---	0.093	---
SDR		SDR-100-031-E1	---	---	0.031	---
		SDR-100-093-E1	---	---	0.093	---
		SDL-200-093-E1	---	---	0.093	---
SEC		SEC-421	0.500	0.125	0.016	---
		SEC-422	0.500	0.125	0.031	---
		SEC-432	0.500	0.188	0.031	---
		SEC-433	0.500	0.188	0.047	---
		SEC-434	0.500	0.188	0.062	---
SNGA		SNGA-431	0.500	0.188	0.016	0.203
		SNGA-432	0.500	0.188	0.031	0.203
		SNGA-433	0.500	0.188	0.047	0.203
SPCE		SPCE-731	0.219	0.094	0.016	---
		SPCE-732	0.219	0.094	0.031	---
SPCN		SPCN-120304	0.5	0.125	0.015	---
SPG		SPG-321	0.375	0.125	0.016	---
		SPG-322	0.375	0.125	0.031	---
		SPG-323	0.375	0.125	0.047	---
		SPG-324	0.375	0.125	0.062	---
		SPG-421	0.500	0.125	0.016	---
		SPG-422	0.500	0.125	0.031	---
		SPG-423	0.500	0.125	0.047	---
		SPG-424	0.500	0.125	0.062	---
		SPG-432	0.500	0.125	0.031	---
		SPG-433	0.500	0.125	0.047	---
		SPG-434	0.500	0.125	0.062	---



PCD/CBN Inserts Overview Continued

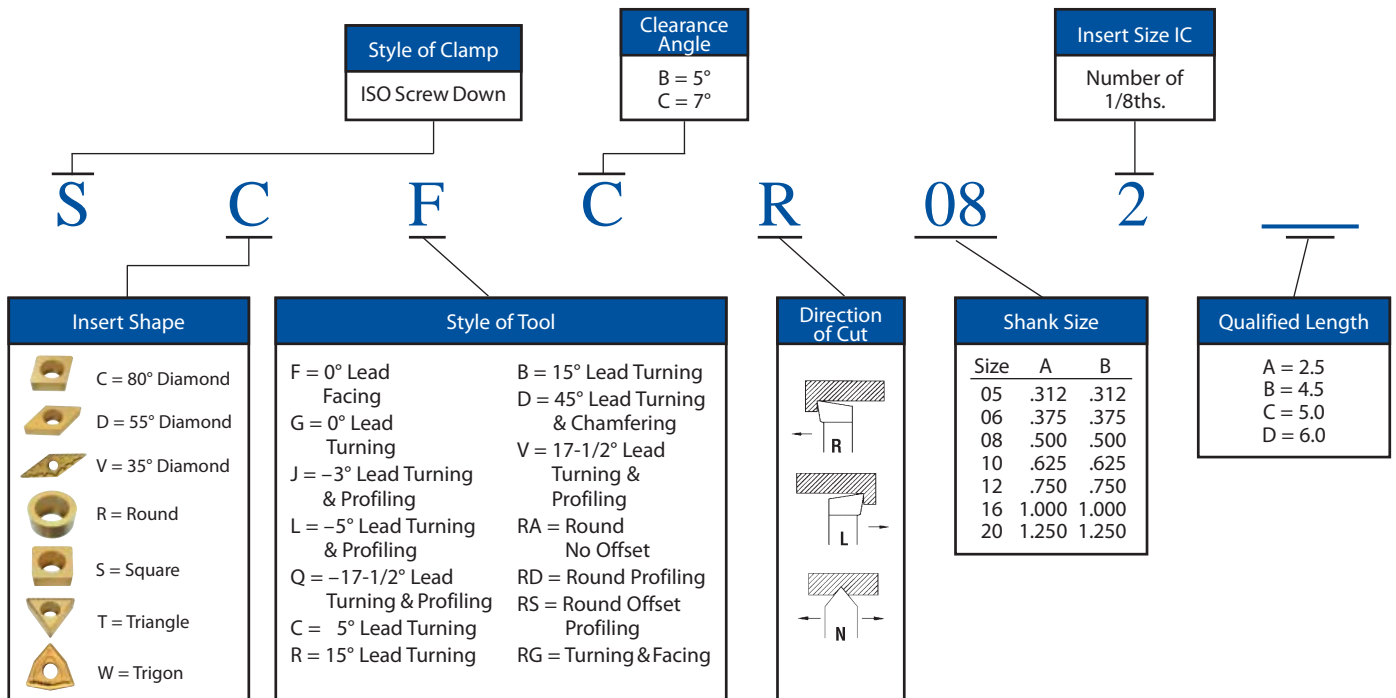
	Part Number	IC	Thickness	Radius	Hole
	SPGW-25.22	0.312	0.125	0.031	0.177
	SPGW-25.21	0.312	0.125	0.016	0.177
	SPGW-32.51	0.375	0.156	0.016	0.215
	SPGW-32.52	0.375	0.156	0.031	0.215
TCGW	TCGW-21.50	0.250	0.094	0.004	0.110
	TCGW-21.51	0.250	0.094	0.016	0.110
	TCGW-21.52	0.250	0.094	0.031	0.110
	TCGW-32.50	0.375	0.156	0.004	0.173
	TCGW-32.51	0.375	0.156	0.016	0.173
	TCGW-32.52	0.375	0.156	0.031	0.173
TD	TD-6P	0.375	0.125	0.031	0.125
	TD-7P	0.438	0.125	0.031	0.125
TEC	TEC-25.21	0.312	0.125	0.016	---
	TEC-25.22	0.312	0.125	0.031	---
	TEC-321	0.375	0.125	0.016	---
	TEC-322	0.375	0.125	0.031	---
TNGA	TNGA-431	0.500	0.188	0.016	0.203
	TNGA-432	0.500	0.188	0.031	0.203
	TNGA-433	0.500	0.188	0.047	0.203
TP	TP-41	0.250	0.094	0.016	0.137
	TP-61	0.375	0.125	0.031	0.163
TPEE	TPEE-521	0.156	0.063	0.016	---
	TPEE-631	0.188	0.094	0.016	---
	TPEE-731	0.219	0.094	0.016	---
	TPEE-732	0.219	0.094	0.031	---



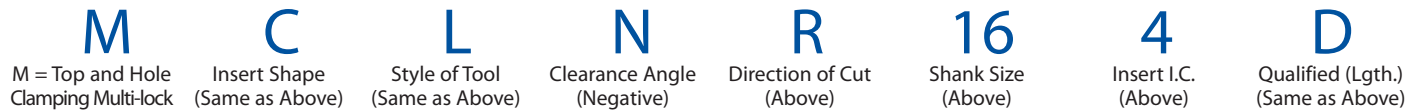
		Part Number	IC	Thickness	Radius	Hole
TPG		TPG-321	0.375	0.125	0.016	---
		TPG-322	0.375	0.125	0.031	---
		TPG-323	0.375	0.125	0.047	---
		TPG-324	0.375	0.125	0.062	---
		TPG-421	0.500	0.125	0.016	---
		TPG-422	0.500	0.125	0.031	---
		TPG-423	0.500	0.125	0.047	---
		TPG-424	0.500	0.125	0.062	---
		TPG-432	0.500	0.188	0.031	---
		TPG-433	0.500	0.188	0.047	---
		TPG-434	0.500	0.188	0.062	---
TPHB		TPHB-090204	0.219	0.094	0.016	0.112
		TPHB-110208	0.250	0.094	0.031	0.112
TPGW		TPGW-21.50	0.250	0.094	0.004	---
		TPGW-21.51	0.250	0.094	0.015	---
		TPGW-21.52	0.250	0.094	0.031	---
		TPGW-32.50	0.375	0.156	0.004	---
		TPGW-32.51	0.375	0.156	0.015	---
		TPGW-32.52	0.375	0.156	0.031	---
VCMA		VCMA-331	0.375	0.188	0.016	0.170
		VCMA-332	0.375	0.188	0.031	0.170
		VCMA-333	0.375	0.188	0.047	0.170
VNGA		VNGA-331	0.375	0.188	0.016	0.150
		VNGA-332	0.375	0.188	0.031	0.150
		VNGA-333	0.375	0.188	0.047	0.150
VNMS		VNMS-331	0.375	0.188	0.015	0.150
		VNMS-332	0.375	0.188	0.031	0.150
VPGR		VPGR-332	0.375	0.188	0.031	---
		VPGR-333	0.375	0.188	0.047	---
WNMA		WNMA-431	0.500	0.188	0.016	0.203
		WNMA-432	0.500	0.188	0.031	0.203
		WNMA-433	0.500	0.188	0.047	0.203



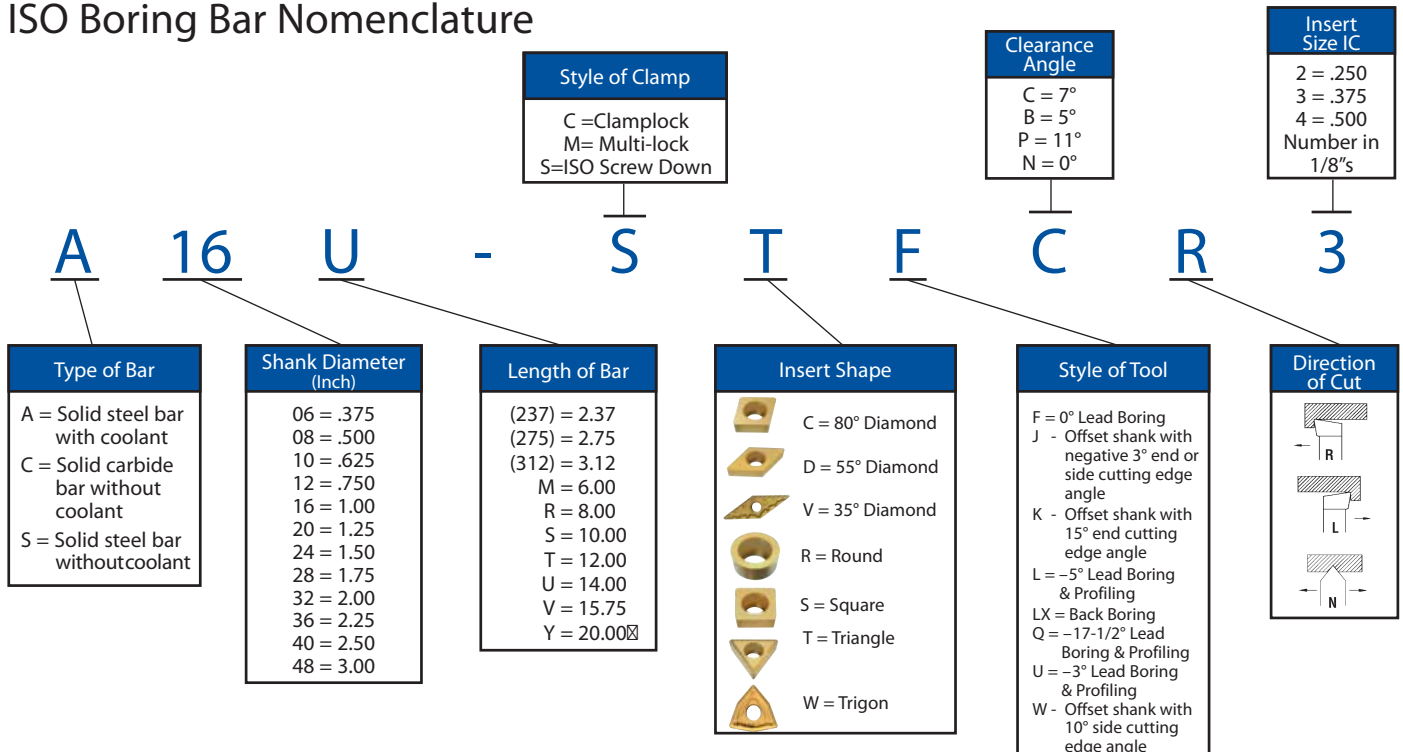
ISO Toolholder Nomenclature



Toolholder Nomenclature

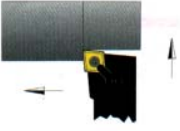




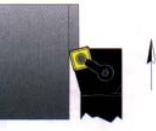



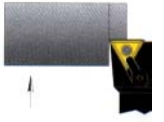




ISO Boring Bar Nomenclature

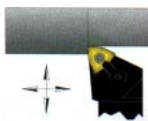
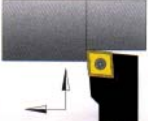








Most Popular Indexable Insert External Toolholders

Tool Holder	MCLN R/L	MCRN R/L	MDJN R/L	MDPNN N	MSDNN N	MSKN R/L
Setting Angle	5° end or side	15° side	-3° side	27.5° side	45° side	15° end
Cutting Direction						
Indexable Inserts	CNMA... CNMG... CNMM... CNMX...	CNMA... CNMG... CNMM... CNMX...	DNMA... DNMG... DNMM...	DNMA... DNMG... DNMM...	SNMA... SNMG... SNMM... SNMX...	SNMA... SNMG... SNMM... SNMX...

Tool Holder	MTEN NS	MTFN R/L	MTGN R/L	MTJN R/L	MVJN R/L	MVVN
Setting Angle	30° side	0° end	0° side	3° side	-3° side	17.5° side
Cutting Direction						
Indexable Inserts	TNMA... TNMG... TNMM... TNMX...	TNMA... TNMG... TNMM... TNMX...	TNMA... TNMG... TNMM... TNMX...	TNMA... TNMG... TNMM... TNMX...	VNMG...	VNMG...

Tool Holder	MWLN R/L	SCLC R/L	SDJC R/L	SSDCN N	SVJC R/L	SWLC R/L
Setting Angle	-5° end or side	-5° end or side	-3° side	45° side	-3° side	-5° end or side
Cutting Direction						
Indexable Inserts	WNMG...	CCGT... CCMT... CCMW...	DCGT... DCMT... DCMW...	SCGT... SCMT... SCMW...	VCGT... VCMT... VCMN...	WCGT... WCMT...

Other products
available from VR/Wesson
PCD / CBN / Cartridges
Tantung "G"
Milling Inserts



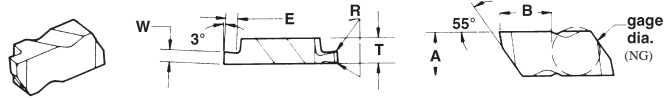
Most Popular Indexable Insert **Internal** Boring Bars


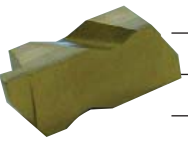
Tool Holder	S-MCLN R/L	S-MDUN R/L	S-MTFN R/L	S-MTUN R/L	S-MVUN R/L
Setting Angle	-5° end or side	-3° end	-0° end	-3° end	-3° end
Cutting Direction					
Indexable Inserts	CNMA... CNMG... CNMM... CNMX...	DNMA... DNMG... DNMM...	TNMA... TNMG... TNMM... TNMX...	TNMA... TNMG... TNMM... TNMX...	VNMG...

Tool Holder	S-MWLN R/L	S-SCLC R/L	S-SDUC R/L	S-STFC R/L	S-SVUC R/L
Setting Angle	-5° end or side	-5° end or side	-3° end	0° end	-3° end
Cutting Direction					
Indexable Inserts	WNMG...	CCGT... CCMT... CCMN...	DCGT... DCMT... DCMW...	TCGT... TCMT...	VCGT... VCMT... VCMM...



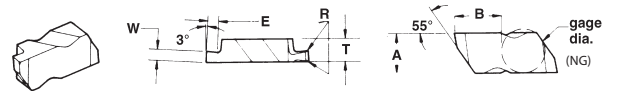
VR Notch VRG Grooving Inserts

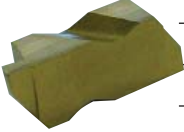
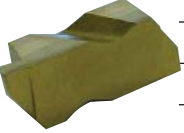



	Part Number	VR527	VR772	Gage Dia.	A	B	R	T	E	Width
	VRG-2031R	68272	68270	0.187	0.219	0.270	.002--.003	0.150	0.050	0.031
	VRG-2031L	68276	68274	0.187	0.219	0.270	.002--.003	0.150	0.050	0.031
	VRG-2041R	68280	68278	0.187	0.219	0.270	.002--.003	0.150	0.050	0.041
	VRG-2041L	68584	68282	0.187	0.219	0.270	.002--.003	0.150	0.050	0.041
	VRG-2047R	68288	68286	0.187	0.219	0.270	.002--.003	0.150	0.050	0.047
	VRG-2047L	68292	68290	0.187	0.219	0.270	.002--.003	0.150	0.050	0.047
	VRG-2062R	68304	68302	0.187	0.219	0.270	.005--.010	0.150	0.110	0.062
	VRG-2062L	68309	68306	0.187	0.219	0.270	.005--.010	0.150	0.110	0.062
	VRG-2094R	68311	68310	0.187	0.219	0.270	.005--.010	0.150	0.110	0.094
	VRG-2094L	68329	68312	0.187	0.219	0.270	.005--.010	0.150	0.110	0.094
	VRG-2125R	68319	68314	0.187	0.219	0.270	.005--.010	0.150	0.110	0.125
	VRG-2125L	68318	68316	0.187	0.219	0.270	.005--.010	0.150	0.110	0.125
	VRG-3031R	68323	68332	0.375	0.344	0.405	.005--.010	0.195	0.075	0.031
	VRG-3031L	68325	68624	0.375	0.344	0.405	.005--.010	0.195	0.075	0.031
	VRG-3047R	68328	68326	0.375	0.344	0.405	.005--.010	0.195	0.075	0.047
	VRG-3047L	68331	68330	0.375	0.344	0.405	.005--.010	0.195	0.075	0.047
	VRG-3062R	68336	68334	0.375	0.344	0.405	.005--.010	0.195	0.094	0.062
	VRG-3062L	68340	68338	0.375	0.344	0.405	.005--.010	0.195	0.094	0.062
	VRG-3072R	68344	68342	0.375	0.344	0.405	.005--.010	0.195	0.094	0.072
	VRG-3072L	68348	68346	0.375	0.344	0.405	.005--.010	0.195	0.094	0.072
	VRG-3078R	68388	68387	0.375	0.344	0.405	.005--.010	0.195	0.094	0.078
	VRG-3078L	68356	68354	0.375	0.344	0.405	.005--.010	0.195	0.094	0.078
	VRG-3094R	68368	68366	0.375	0.344	0.405	.005--.010	0.195	0.150	0.094
	VRG-3094L	68372	68370	0.375	0.344	0.405	.005--.010	0.195	0.150	0.094
VRG-3105R	68384	68382	0.375	0.344	0.405	.005--.010	0.195	0.150	0.105	
VRG-3105L	68383	68386	0.375	0.344	0.405	.005--.010	0.195	0.150	0.105	



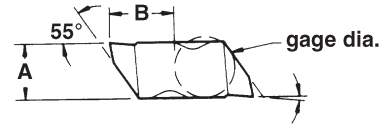
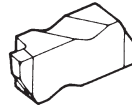
VR Notch VRG Grooving Inserts

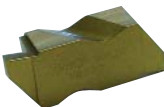
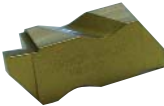


Part Number	VR527	VR772	Gage Dia.	A	B	R	T	E	Width
 VRG-3110R	68392	68390	0.375	0.344	0.405	.010--.015	0.195	0.150	0.110
VRG-3110L	68396	68394	0.375	0.344	0.405	.010--.015	0.195	0.150	0.110
VRG-3125R	68408	68406	0.375	0.344	0.405	.005--.010	0.195	0.150	0.125
VRG-3125L	68412	68410	0.375	0.344	0.405	.005--.010	0.195	0.150	0.125
VRG-3156R	68424	68422	0.375	0.344	0.405	.005--.010	0.195	0.150	0.156
VRG-3156L	68428	68426	0.375	0.344	0.405	.005--.010	0.195	0.150	0.156
VRG-3178R	68432	68430	0.375	0.344	0.405	.005--.010	0.195	0.150	0.178
VRG-3178L	68436	68434	0.375	0.344	0.405	.005--.010	0.195	0.150	0.178
VRG-3189R	68448	68446	0.375	0.344	0.405	.005--.010	0.195	0.150	0.188
VRG-3189L	68452	68450	0.375	0.344	0.405	.005--.010	0.195	0.150	0.188
 VRG-4125R	68456	68454	0.375	0.453	0.636	.005--.010	0.255	0.150	0.125
VRG-4125L	68460	68458	0.375	0.453	0.636	.005--.010	0.255	0.150	0.125
VRG-4189R	68464	68462	0.375	0.453	0.636	.005--.010	0.255	0.250	0.189
VRG-4189L	68468	68466	0.375	0.453	0.636	.005--.010	0.255	0.250	0.189
VRG-4250R	68488	68486	0.375	0.453	0.636	.005--.010	0.255	0.250	0.250
VRG-4250L	68492	68490	0.375	0.453	0.636	.005--.010	0.255	0.250	0.250
 VRG-6312R	68526	68541	0.375	0.453	0.636	.030--.035	0.383	0.250	0.312
VRG-6312L	68527	68528	0.375	0.453	0.636	.030--.035	0.383	0.250	0.312
VRG-6375R	68532	68531	0.375	0.453	0.636	.030--.035	0.383	0.250	0.375
VRG-6375L	68533	68534	0.375	0.453	0.636	.030--.035	0.383	0.250	0.375



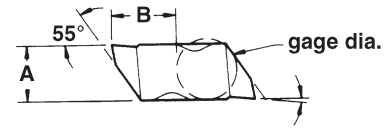
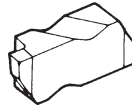
VR Notch VRGP Grooving Inserts



	Part Number	VR527	VR772	Gage Dia.	A	B	R	T	E	Width
	VRGP-2031R	68802	68800	0.187	0.219	0.270	.002--.003	0.150	0.050	0.031
	VRGP-2031L	68806	68804	0.187	0.219	0.270	.002--.003	0.150	0.050	0.031
	VRGP-2047R	68818	68816	0.187	0.219	0.270	.002--.003	0.150	0.050	0.047
	VRGP-2047L	68822	68820	0.187	0.219	0.270	.002--.003	0.150	0.050	0.047
	VRGP-2058R	68826	68824	0.187	0.219	0.270	.005--.010	0.150	0.050	0.058
	VRGP-2058L	68830	68828	0.187	0.219	0.270	.005--.010	0.150	0.050	0.058
	VRGP-2062R	68834	68832	0.187	0.219	0.270	.005--.010	0.150	0.110	0.062
	VRGP-2062L	68838	68836	0.187	0.219	0.270	.005--.010	0.150	0.110	0.062
	VRGP-2094R	68842	68840	0.187	0.219	0.270	.005--.010	0.150	0.110	0.094
	VRGP-2094L	68846	68844	0.187	0.219	0.270	.005--.010	0.150	0.110	0.094
	VRGP-2125R	68850	68848	0.187	0.219	0.270	.005--.010	0.150	0.110	0.125
VRGP-2125L	68854	68852	0.187	0.219	0.270	.005--.010	0.150	0.110	0.125	
	VRGP-3031R	68858	68856	0.375	0.344	0.405	.005--.010	0.195	0.110	0.031
	VRGP-3031L	68862	68860	0.375	0.344	0.405	.005--.010	0.195	0.110	0.031
	VRGP-3047R	68866	68864	0.375	0.344	0.405	.005--.010	0.195	0.075	0.047
	VRGP-3047L	68870	68868	0.375	0.344	0.405	.005--.010	0.195	0.075	0.047
	VRGP-3062R	68874	68872	0.375	0.344	0.405	.005--.010	0.195	0.094	0.062
	VRGP-3062L	68878	68876	0.375	0.344	0.405	.005--.010	0.195	0.094	0.062
	VRGP-3078R	68890	68888	0.375	0.344	0.405	.005--.010	0.195	0.094	0.094
	VRGP-3078L	68894	68892	0.375	0.344	0.405	.005--.010	0.195	0.094	0.094
	VRGP-3088R	68898	68896	0.375	0.344	0.405	.005--.010	0.195	0.094	0.088
	VRGP-3088L	68902	68900	0.375	0.344	0.405	.005--.010	0.195	0.094	0.088
	VRGP-3094R	68906	68904	0.375	0.344	0.405	.005--.010	0.195	0.150	0.094
	VRGP-3094L	68910	68908	0.375	0.344	0.405	.005--.010	0.195	0.150	0.094
	VRGP-3097R	68914	68912	0.375	0.344	0.405	.005--.010	0.195	0.150	0.097
	VRGP-3097L	68918	68916	0.375	0.344	0.405	.005--.010	0.195	0.150	0.097
	VRGP-3105R	68922	68920	0.375	0.344	0.405	.005--.010	0.195	0.150	0.105
	VRGP-3105L	68926	68924	0.375	0.344	0.405	.005--.010	0.195	0.150	0.105
	VRGP-3110R	68930	68928	0.375	0.344	0.405	.005--.010	0.195	0.150	0.110
VRGP-3110L	68934	68932	0.375	0.344	0.405	.005--.010	0.195	0.150	0.110	



VR Notch VRGP Grooving Inserts



	Part Number	VR527	VR772	Gage Dia.	A	B	R	T	E	Width
	VRGP-3125R	68946	68944	0.375	0.344	0.405	.005--.010	0.195	0.150	0.125
	VRGP-3125L	68950	68948	0.375	0.344	0.405	.005--.010	0.195	0.150	0.125
	VRGP-3156R	68962	68960	0.375	0.344	0.405	.002--.005	0.195	0.150	0.156
	VRGP-3156L	68966	68964	0.375	0.344	0.405	.020--.025	0.195	0.150	0.156
	VRGP-3178R	68970	68968	0.375	0.344	0.405	.020--.025	0.195	0.150	0.178
	VRGP-3178L	68974	68972	0.375	0.344	0.405	.005--.010	0.195	0.150	0.178
	VRGP-3189R	68986	68984	0.375	0.344	0.405	.005--.010	0.195	0.150	0.189
	VRGP-3189L	68990	68988	0.375	0.344	0.405	.005--.010	0.195	0.150	0.189
	VRGP-4125R	68994	68992	0.375	0.344	0.636	.005--.010	0.195	0.150	0.125
	VRGP-4125L	68998	68996	0.375	0.344	0.636	.005--.010	0.195	0.150	0.125
	VRGP-4189R	69002	69000	0.375	0.344	0.636	.020--.025	0.195	0.250	0.189
	VRGP-4189L	69006	69004	0.375	0.344	0.636	.020--.025	0.195	0.250	0.189
	VRGP-4219R	69018	69016	0.375	0.453	0.636	.020--.025	0.255	0.250	0.219
	VRGP-4219L	69022	69020	0.375	0.453	0.636	.020--.025	0.255	0.250	0.219
	VRGP-4250R	69026	69024	0.375	0.453	0.636	.020--.025	0.255	0.250	0.250
	VRGP-4250L	69030	69028	0.375	0.453	0.636	.020--.025	0.255	0.250	0.250

View our web page www.vrwesson.com

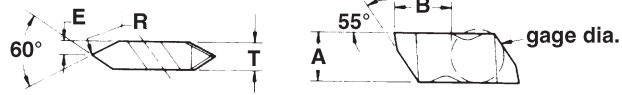
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See our PCD, PCBN and Ceramic Selection

Need holders? See our Toolholder & Boring Bar Selection

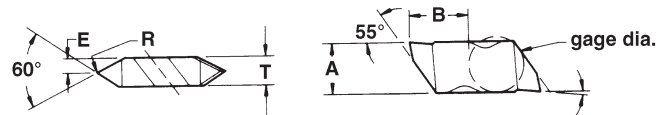



VR Notch VRT Threading



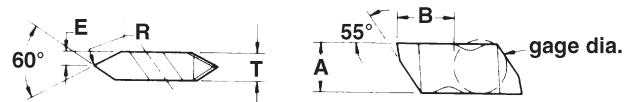
	Part Number	VR527	VR772	Gage Dia.	A	B	T	E
	VRT-2R	68104	68102	0.187	0.219	0.266	0.150	0.075
	VRT-2L	68108	68106	0.187	0.219	0.266	0.150	0.075
	VRT-3R	68112	68110	0.375	0.344	0.399	0.195	0.098
	VRT-3L	68116	68114	0.375	0.344	0.399	0.195	0.098
	VRT-4R	68120	68118	0.375	0.453	0.629	0.255	0.128
	VRT-4L	68124	68122	0.375	0.453	0.629	0.255	0.128


VR Notch VRTP Positive Threading



	Part Number	VR527	VR772	Gage Dia.	A	B	T	E
	VRTP-2R	68602	68600	0.187	0.219	0.266	0.150	0.075
	VRTP-2L	68606	68604	0.187	0.219	0.266	0.150	0.075
	VRTP-3R	68610	68608	0.375	0.344	0.399	0.195	0.098
	VRTP-3L	68614	68612	0.375	0.344	0.399	0.195	0.098
	VRTP-4R	69618	68616	0.375	0.453	0.629	0.255	0.128
	VRTP-4L	68622	68620	0.375	0.453	0.629	0.255	0.128

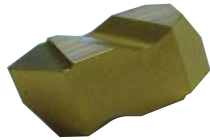
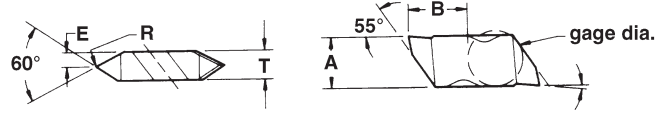
VR Notch VRTF Fine V Threading



	Part Number	VR527	VR772	Gage Dia.	A	B	T	E
	VRTF-2R	68128	68126	0.187	0.219	0.266	0.150	0.075
	VRTF-2L	68132	68130	0.187	0.219	0.266	0.150	0.075
	VRTF-3R	68136	68134	0.375	0.344	0.399	0.195	0.098
	VRTF-3L	68140	68138	0.375	0.344	0.399	0.195	0.098
	VRTF-4R	68144	68142	0.375	0.453	0.629	0.255	0.128
	VRTF-4L	68148	68146	0.375	0.453	0.629	0.255	0.128

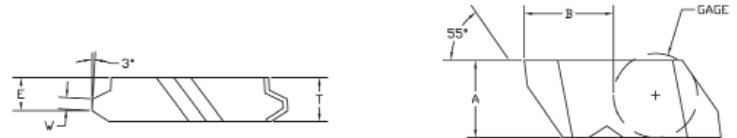


VR Notch VRTK 60° Positive Fine Thread

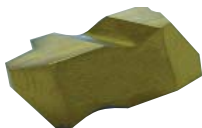


Part Number	VR527	VR772	Gage Dia.	A	B	T	E
VRTK-2R	68632	68630	0.187	0.219	0.266	0.150	0.075
VRTK-2L	68636	68634	0.187	0.219	0.266	0.150	0.075
VRTK-3R	68640	68638	0.375	0.344	0.399	0.195	0.098
VRTK-3L	68644	68642	0.375	0.344	0.399	0.195	0.098
VRTK-4R	68648	68646	0.375	0.453	0.629	0.255	0.128
VRTK-4L	68652	68650	0.375	0.453	0.629	0.255	0.128

VR Notch VRA 29° ACME Threading

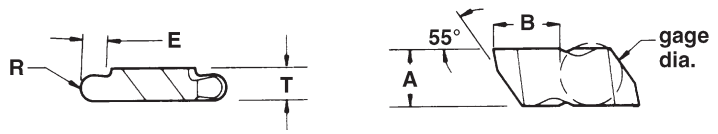



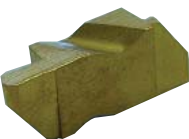
Part Number	VR527	VR772	Gage Dia.	A	B	T	E	TPI
VRA-3R12	68152	68150	0.375	0.344	0.4026	0.195	0.149	12
VRA-3L12	68156	68154	0.375	0.344	0.4026	0.195	0.149	12
VRA-3R10	68160	68158	0.375	0.344	0.4026	0.195	0.149	10
VRA-3L10	68164	68162	0.375	0.344	0.4026	0.195	0.149	10
VRA-3R8	68168	68166	0.375	0.344	0.4026	0.195	0.149	8
VRA-3L8	68172	68170	0.375	0.344	0.4026	0.195	0.149	8
VRA-3R6	68176	68174	0.375	0.344	0.4026	0.195	0.149	6
VRA-3L6	68180	68178	0.375	0.344	0.4026	0.195	0.149	6
VRA-3R5	68184	68182	0.375	0.344	0.4026	0.195	0.149	5
VRA-3L5	68188	68186	0.375	0.344	0.4026	0.195	0.149	5
VRA-3R4	68192	68190	0.375	0.344	0.4018	0.195	0.149	4
VRA-3L4	68196	68194	0.375	0.344	0.4018	0.195	0.149	4
VRA-4R8	68200	68198	0.500	.0453	0.6332	0.255	0.202	8
VRA-4L8	68204	68202	0.500	.0453	0.6332	0.255	0.202	8
VRA-4R6	68208	68206	0.500	.0453	0.6332	0.255	0.202	6
VRA-4L6	68212	68210	0.500	.0453	0.6332	0.255	0.202	6
VRA-4R5	68216	68214	0.500	.0453	0.6332	0.255	0.202	5
VRA-4L5	68220	68218	0.500	.0453	0.6332	0.255	0.202	5
VRA-4R4	68224	68222	0.500	.0453	0.6332	0.255	0.202	4
VRA-4L4	68228	68226	0.500	.0453	0.6332	0.255	0.202	4



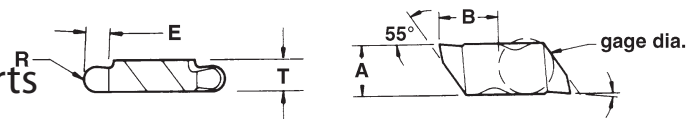



VR Notch VRR Radius Grooving Inserts



	Part Number	VR527	VR772	Gage Dia.	A	R	T	E
	VRR-3031R	68502	68500	0.375	0.344	0.031	0.195	0.094
	VRR-3031L	68508	68506	0.375	0.344	0.031	0.195	0.094
	VRR-3047R	68510	68509	0.375	0.344	0.047	0.195	0.150
	VRR-3047L	68514	68512	0.375	0.344	0.047	0.195	0.150
	VRR-3062R	68518	68516	0.375	0.344	0.062	0.195	0.150
	VRR-3062L	68524	68522	0.375	0.344	0.062	0.195	0.150
	VRR-3078R	68526	69099	0.375	0.344	0.078	0.195	0.150
	VRR-3078L	69074	68530	0.375	0.344	0.078	0.195	0.150
	VRR-3094R	68536	68534	0.375	0.344	0.094	0.195	0.150
VRR-3094L	68538	68537	0.375	0.344	0.094	0.195	0.150	
	VRR-4062R	69081	69082	0.375	0.453	0.062	0.255	0.150
	VRR-4062L	69086	69085	0.375	0.453	0.062	0.255	0.150
	VRR-4094R	69087	69088	0.375	0.453	0.094	0.255	0.250
	VRR-4094L	69092	69091	0.375	0.453	0.094	0.255	0.250
	VRR-4125R	69093	69094	0.375	0.453	0.125	0.255	0.250
	VRR-4125L	69098	69097	0.375	0.453	0.125	0.255	0.250

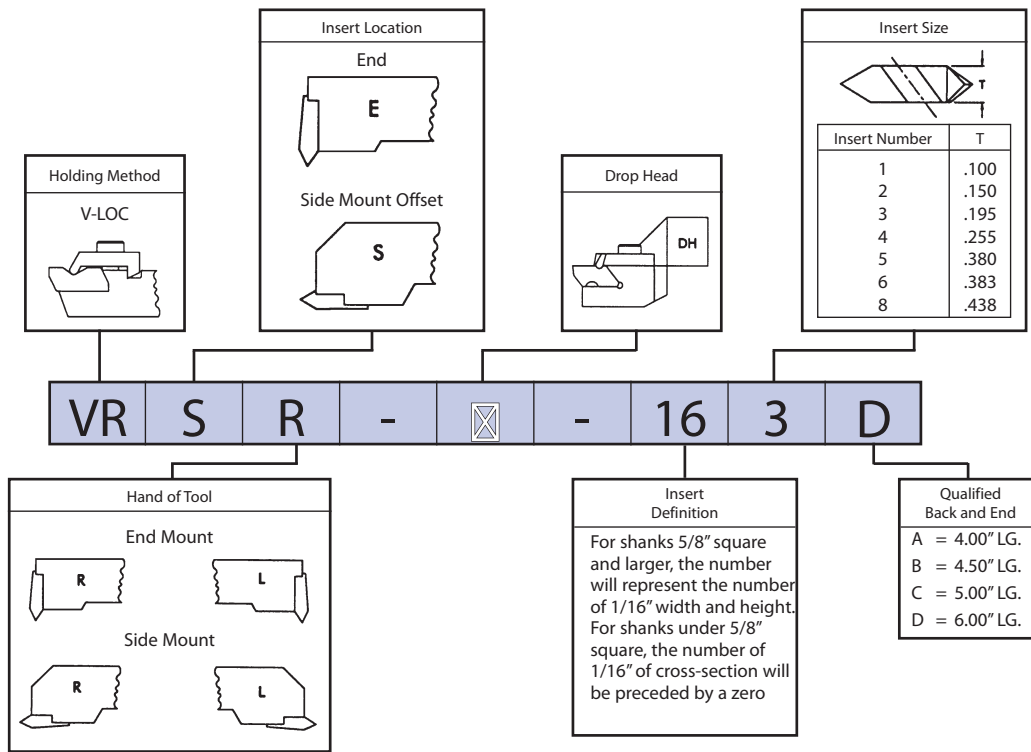
VR Notch VRRP Positive Radius Grooving Inserts



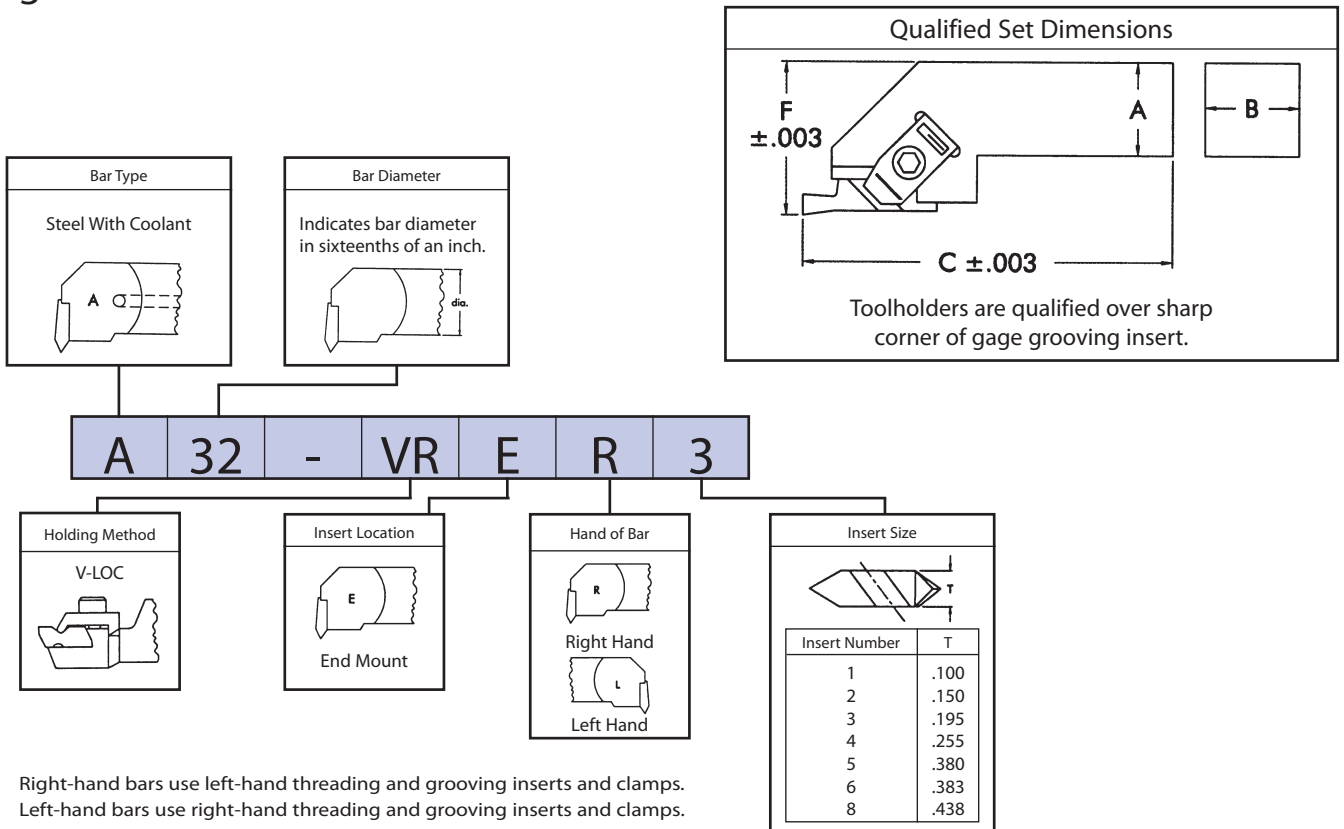
	Part Number	VR527	VR772	Gage Dia.	A	R	T	E
	VRRP-3031R	66003	66004	0.375	0.344	0.0310	0.195	0.094
	VRRP-3031L	66005	66006	0.375	0.344	0.0310	0.195	0.094
	VRRP-3047R	66007	66008	0.375	0.344	0.0470	0.195	0.150
	VRRP-3047L	66009	66010	0.375	0.344	0.0470	0.195	0.150
	VRRP-3062R	66013	66012	0.375	0.344	0.0620	0.195	0.150
	VRRP-3062L	66015	66016	0.375	0.344	0.0620	0.195	0.150
	VRRP-3078R	66017	66018	0.375	0.344	0.0780	0.195	0.150
	VRRP-3078L	66019	66022	0.375	0.344	0.0780	0.195	0.150
	VRRP-3094R	66021	66024	0.375	0.344	0.0940	0.195	0.150
VRRP-3094L	66023	66028	0.375	0.344	0.0940	0.195	0.150	
	VRRP-4062R	66027	66030	0.375	0.453	0.0620	0.255	0.150
	VRRP-4062L	66029	66032	0.375	0.453	0.0620	0.255	0.150
	VRRP-4094R	66031	66034	0.375	0.453	0.0940	0.255	0.250
	VRRP-4094L	66033	66036	0.375	0.453	0.0940	0.255	0.250
	VRRP-4125R	66035	66038	0.375	0.453	0.1250	0.255	0.250
	VRRP-4125L	66037	66042	0.375	0.453	0.1250	0.255	0.250



Threading & Grooving Toolholder Nomenclature



Boring Bar Nomenclature





VRS R/L Threading & Grooving Toolholder

EDP	Part Number	Description
71650	VRSR12-2B	Threading Toolholder RH
71652	VRSL12-2B	Threading Toolholder LH
71658	VRSR16-2D	Threading Toolholder RH
71660	VRSL16-2D	Threading Toolholder LH
71654	VRSR12-3B	Threading Toolholder RH
71656	VRSL12-3B	Threading Toolholder LH
71653	VRSR16-3C	Threading Toolholder RH
71655	VRSL16-3C	Threading Toolholder LH
71662	VRSR16-3D	Threading Toolholder RH
71664	VRSL16-3D	Threading Toolholder LH
71666	VRSR20-3D	Threading Toolholder RH
71668	VRSL20-3D	Threading Toolholder LH
71669	VRSR16-4D	Threading Toolholder RH
71670	VRSL16-4D	Threading Toolholder LH
71667	VRSR20-4D	Threading Toolholder RH
71665	VRSL20-4D	Threading Toolholder LH

A-VRE R/L Threading & Grooving Boring Bar

EDP	Part Number	Description
71706	A16T-VRER-3	Thread Boring Bar RH
71705	A16T-VREL-3	Thread Boring Bar LH
71710	A20U-VRER-3	Thread Boring Bar RH
71709	A20U-VREL-3	Thread Boring Bar LH
71712	A24U-VRER-3	Thread Boring Bar RH
71711	A24U-VREL-3	Thread Boring Bar LH
71716	A28U-VRER-3	Thread Boring Bar RH
71713	A28U-VREL-3	Thread Boring Bar LH
71715	A28U-VRER-4	Thread Boring Bar RH
71714	A28U-VREL-4	Thread Boring Bar LH
71722	A32V-VRER-4	Thread Boring Bar RH
71718	A32V-VREL-4	Thread Boring Bar LH

Spare Parts

VR Notch Clamp

EDP	Part Number	Description
50692	CM-74	Clamp for VR-2R Insert
50693	CM-75	Clamp for VR-2L Insert
50694	CM-72	Clamp for VR-3R Insert
50695	CM-73	Clamp for VR-3L Insert

VR Notch Seat Screw

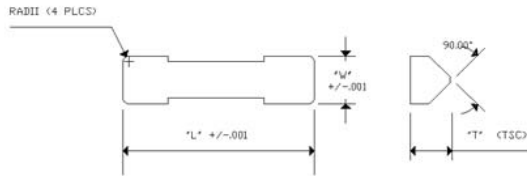
EDP	Part Number	Description
51010	S-112	Seat Screw

VR Notch Clamp Screw

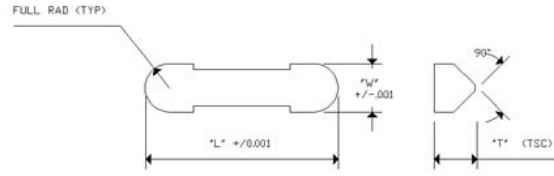
EDP	Part Number	Description
50701	1297	Clamp Screw



Threading and Grooving Inserts

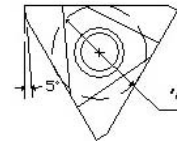
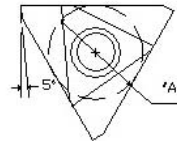
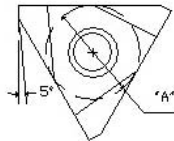
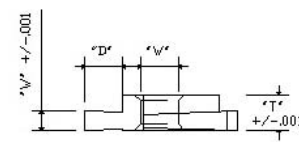
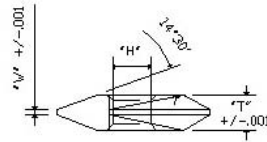
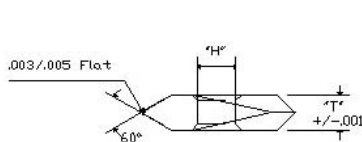


"T" DIM.
A = .250
B = .337
C = .187



SHAPE - WIDTH - HEIGHT - RADII - LENGTH
VRDB 187 A 015 1

SHAPE - WIDTH - HEIGHT - LENGTH
VRDB 375 RA 1.5



TOLERANCE CLASS

M Cutting Point $\pm .001$
 Thickness $\pm .001$

SHAPE
T Triangle

SIZE
 Number of 1/8ths of an inch in I.C.

INSERT FORM
NV 60° V Thread
NT Acme Thread
NG Grooving

Width of Cut

TNMC

43

NGL-XXX

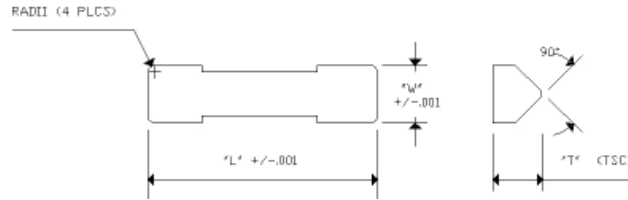
TOP RAKE
N Neutral
P Positive

THICKNESS
 Number of 1/16ths of an inch in thickness

HAND
R Right
L Left

TYPE
C With Hole and Two Countersinks
A With Hole

DOG-BONE



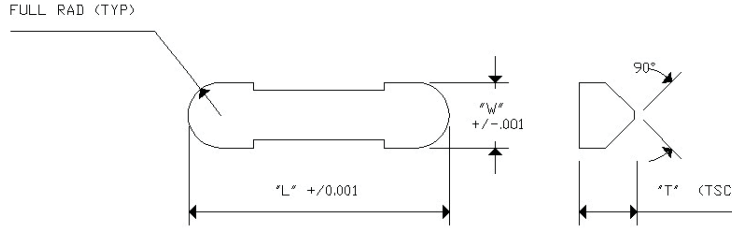
W Range	R	T	L	Web	Ordering Number
0.125	0.015	0.25	1.125	0.106	VRDB-125-A-015
0.156	0.015	0.25	1.125	0.106	VRDB-156-A-015
0.125 0.187	XXX	0.25	1.125	0.106	VRDB-XXX-A-XXX*
0.188	0.015	0.25	1.125	0.106	VRDB-188-A-015
0.188	0.031	0.25	1.125	0.144	VRDB-188-A-031
0.218	0.015	0.25	1.125	0.144	VRDB-218-A-015
0.218	0.031	0.25	1.125	0.144	VRDB-218-A-031
0.25	0.015	0.25	1.125	0.144	VRDB-215-A-015
0.25	0.031	0.25	1.125	0.144	VRDB-215-A-031
0.188 0.25	XXX	0.25	1.125	0.144	VRDB-XXX-A-XXX*
0.25	0.015	0.337	1.125	0.144	VRDB-250-B-015
0.25	0.031	0.337	1.125	0.144	VRDB-250-B-031
0.281	0.015	0.337	1.125	0.202	VRDB-281-B-015
0.281	0.031	0.337	1.125	0.202	VRDB-281-B-031
0.312	0.015	0.337	1.125	0.202	VRDB-312-B-015
0.312	0.031	0.337	1.125	0.202	VRDB-312-B-031
0.281 0.312	XXX	0.337	1.125	0.202	VRDB-XXX-B-XXX*
0.344	0.015	0.337	1.125	0.276	VRDB-344-B-015
0.344	0.031	0.337	1.125	0.276	VRDB-344-B-031
0.375	0.015	0.337	1.125	0.276	VRDB-375-B-015
0.375	0.031	0.337	1.125	0.276	VRDB-375-B-031
0.344 0.375	XXX	0.337	1.125	0.276	VRDB-XXX-B-XXX*
0.188	0.015	0.187	1.5	0.106	VRDB-188-C-015-1.5
0.125 0.188	XXX	0.187	1.5	0.106	VRDB-XXX-C-XXX-1.5*
0.25	0.015	0.15	1.5	0.144	VRDB-250-A-015-1.5
0.188 0.25	XXX	0.15	1.5	0.144	VRDB-XXX-A-XXX-1.5*
0.312	0.015	0.337	1.5	0.202	VRDB-312-B-015-1.5
0.251 0.344	XXX	0.337	1.5	0.202	VRDB-XXX-B-XXX-1.5*
0.375	0.015	0.337	1.5	0.276	VRDB-375-B-015-1.5
0.345 0.375	XXX	0.337	1.5	0.276	VRDB-XXX-B-XXX-1.5*

* PLEASE SPECIFY "W" DIM. & RADii WHEN ORDERING A NON-STOCKED SIZE INSERT.

EXAMPLE: VRDB-290-B-.025



DOG-BONE



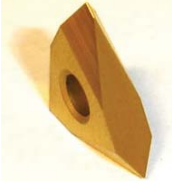
W Range		R	T	L	Web	Ordering Number
0.125		0.063	0.25	1.125	0.106	VRDB-125-RA
0.126		0.078	0.25	1.125	0.106	VRDB-156-RA
0.1	0.156	XXX	0.25	1.125	0.103	VRDB-XXX-RA*
0.188		0.094	0.25	1.125	0.144	VRDB-188-RA
0.218		0.109	0.25	1.125	0.144	VRDB-218-RA
0.25		0.125	0.25	1.125	0.144	VRDB-250-RA
0.156	0.25	XXX	0.25	1.125	0.144	VRDB-XXX-RA*
0.25		0.125	0.337	1.125	0.144	VRDB-250-RB
0.281		0.141	0.337	1.125	0.202	VRDB-281-RB
0.312		0.156	0.337	1.125	0.202	VRDB-312-RB
0.281	0.312	XXX	0.337	1.125	0.202	VRDB-XXX-RB*
0.344		0.172	0.337	1.125	0.276	VRDB-344-RB
0.375		0.188	0.337	1.125	0.276	VRDB-375-RB
0.344	0.375	XXX	0.337	1.125	0.276	VRDB-XXX-RB*
0.188		0.094	0.188	1.5	0.106	VRDB-188-RC-1.5
0.125	0.188	XXX	0.188	1.5	0.106	VRDB-XXX-RC-1.5*
0.25		0.125	0.25	1.5	0.144	VRDB-250-RA-1.5
0.189	0.25	XXX	0.25	1.5	0.144	VRDB-XXX-RA-1.5*
0.312		0.156	0.337	1.5	0.202	VRDB-312-RB-1.5
0.25	0.344	XXX	0.337	1.5	0.202	VRDB-XXX-RB-1.5*
0.375		0.188	0.337	1.5	0.276	VRDB-375-RB-1.5
0.344	0.375	XXX	0.337	1.5	0.276	VRDB-XXX-RB-1.5*

* PLEASE SPECIFY "W" DIM. WHEN ORDERING A NON-STOCKED SIZE INSERT.


EXAMPLE: VRDB-292-RB

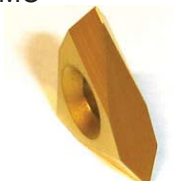


On Edge

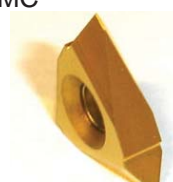
	I.C.	T	H	B	Ordering Number
	.375	.125	.150	.306	TNMA-32-NV
	.500	.188	.203	.415	TNMA-43-NV
	.625	.250	.253	.522	TNMA-54-NV
	.750	.250	.313	.631	TNMA-64-NV
	.750	.375	.313	.631	TNMA-66-NV

5° POSITIVE RAKE

	.375	.125	.150	.306	TPMA-32-NV
	.500	.187	.203	.415	TPMA-43-NV
	.625	.250	.253	.522	TPMA-54-NV
	.750	.250	.313	.631	TPMA-64-NV
	.750	.370	.313	.631	TPMA-66-NV

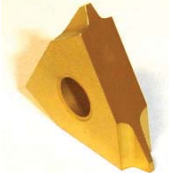
	.375	.125	.150	.306	TNMC-32-NV
	.500	.187	.203	.415	TNMC-43-NV
	.625	.250	.253	.522	TNMC-54-NV
	.750	.250	.313	.631	TNMC-64-NV
	.750	.375	.313	.631	TNMC-66-NV

5° POSITIVE RAKE


	.375	.125	.150	.306	TPMC-32-NV
	.500	.187	.203	.415	TPMC-43-NV
	.625	.250	.253	.522	TPMC-54-NV
	.750	.250	.313	.631	TPMC-64-NV
	.750	.375	.313	.631	TPMC-66-NV



On Edge

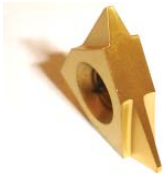
	I.C.	T	H	B	Ordering Number
TNMA 	.375	.125	.150	.306	TNMA-32-NT-6P
	.375	.125	.150	.306	TNMA-32-NT-8P
	.375	.125	.150	.306	TNMA-32-NT-10P
	.375	.125	.150	.306	TNMA-32-NT-12P
	.500	.187	.203	.415	TNMA-43-NT-4P
	.500	.187	.203	.415	TNMA-43-NT-5P
	.500	.187	.203	.415	TNMA-43-NT-6P
	.625	.250	.253	.522	TNMA-54-NT-3P
	.750	.250	.313	.631	TNMA-64-NT-3P
	.750	.375	.313	.631	TNMA-66-NT-2P

5° POSITIVE RAKE


TPMA 	.375	.125	.150	.306	TPMA-32-NT-6P
	.375	.125	.150	.306	TPMA-32-NT-8P
	.375	.125	.150	.306	TPMA-32-NT-10P
	.375	.125	.150	.306	TPMA-32-NT-12P
	.500	.187	.203	.415	TPMA-43-NT-4P
	.500	.187	.203	.415	TPMA-43-NT-5P
	.500	.187	.203	.415	TPMA-43-NT-6P
	.125	.250	.253	.522	TPMA-54-NT-3P
	.750	.250	.313	.631	TPMA-64-NT-3P
	.750	.375	.313	.631	TPMA-66-NT-2P



On Edge


	I.C.	T	H	B	Ordering Number
	.375	.125	.150	.306	TNMC-32-NT-6P
	.375	.125	.150	.306	TNMC-32-NT-8P
	.375	.125	.150	.306	TNMC-32-NT-10P
	.375	.125	.150	.306	TNMC-32-NT-12P
	.500	.187	.203	.415	TNMC-43-NT-4P
	.500	.187	.203	.415	TNMC-43-NT-5P
	.500	.187	.203	.415	TNMC-43-NT-6P
	.625	.250	.253	.522	TNMC-54-NT-3P
	.750	.250	.313	.631	TNMC-64-NT-3P
	.750	.375	.313	.631	TNMC-66-NT-2P

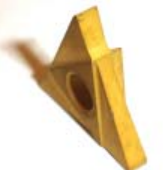
5° POSITIVE RAKE

	.375	.125	.150	.306	TPMC-32-NT-6P
	.375	.125	.150	.306	TPMC-32-NT-8P
	.375	.125	.150	.306	TPMC-32-NT-10P
	.375	.125	.150	.306	TPMC-32-NT-12P
	.500	.187	.203	.415	TPMC-43-NT-4P
	.500	.187	.203	.415	TPMC-43-NT-5P
	.500	.187	.203	.415	TPMC-43-NT-6P
	.625	.250	.253	.522	TPMC-54-NT-3P
	.750	.250	.313	.631	TPMC-64-NT-3P
	.750	.375	.313	.631	TPMC-66-NT-2P



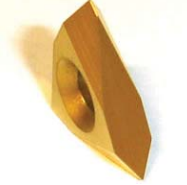
On Edge


	I.C.	T	H	B	D	W Range	Ordering Number
TNMA 	.375	.125	.150	.306	.078	.062	TNMA-32-NGR-062
					.078	.062	TNMA-32-NGL-062
					.160	.094	TNMA-32-NGR-094
					.160	.094	TNMA-32-NGL-094
					.160	.125	TNMA-32-NGR-125
					.160	.125	TNMA-32-NGL-125
	.500	.187	.203	.415	.230	.125	TNMA-43-NGR-125
					.230	.125	TNMA-43-NGL-125
					.230	.156	TNMA-43-NGR-156
					.230	.156	TNMA-43-NGL-156
					.230	.187	TNMA-43-NGR-187
					.230	.187	TNMA-43-NGL-187
	.625	.250	.253	.522	.300	.187	TNMA-54-NGR-187
					.300	.187	TNMA-54-NGL-187
					.300	.250	TNMA-54-NGR-250
					.300	.250	TNMA-54-NGL-250

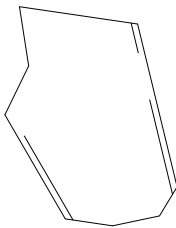
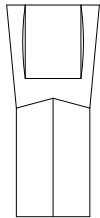
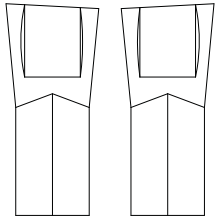
	I.C.	T	H	B	D	W Range	Ordering Number
TPMA 	.375	.125	.150	.306	.078	.062	TPMA-32-NGR-062
					.078	.062	TPMA-32-NGL-062
					.160	.094	TPMA-32-NGR-094
					.160	.094	TPMA-32-NGL-094
					.160	.125	TPMA-32-NGR-125
					.160	.125	TPMA-32-NGL-125
	.500	.187	.203	.415	.230	.125	TPMA-43-NGR-125
					.230	.125	TPMA-43-NGL-125
					.230	.156	TPMA-43-NGR-156
					.230	.156	TPMA-43-NGL-156
					.230	.187	TPMA-43-NGR-187
					.230	.187	TPMA-43-NGL-187
	.625	.250	.253	.522	.300	.187	TPMA-54-NGR-187
					.300	.187	TPMA-54-NGL-187
					.300	.250	TPMA-54-NGR-250
					.300	.250	TPMA-54-NGL-250



On Edge

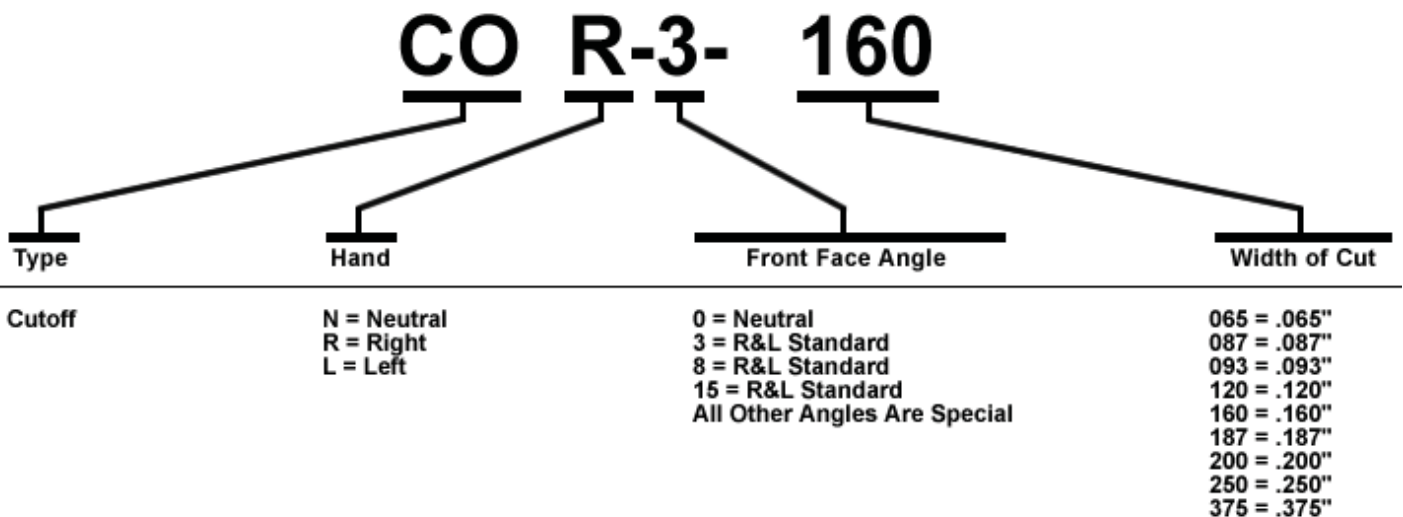
	I.C.	T	H	B	D	W Range	Ordering Number
TNMC 	.375	.125	.150	.306	.078	.062	TNMC-32-NGR-062
					.078	.062	TNMC-32-NGL-062
					.160	.094	TNMC-32-NGR-094
					.160	.094	TNMC-32-NGL-094
					.160	.125	TNMC-32-NGR-125
					.160	.125	TNMC-32-NGL-125
	.500	.187	.203	.415	.230	.125	TNMC-43-NGR-125
					.230	.125	TNMC-43-NGL-125
					.230	.156	TNMC-43-NGR-156
					.230	.156	TNMC-43-NGL-156
					.230	.187	TNMC-43-NGR-187
					.230	.187	TNMC-43-NGL-187
	.625	.250	.253	.522	.300	.187	TNMC-54-NGR-187
					.300	.187	TNMC-54-NGL-187
					.300	.250	TNMC-54-NGR-250
					.300	.250	TNMC-54-NGL-250

	I.C.	T	H	B	D	W Range	Ordering Number
TPMC 	.375	.125	.150	.306	.078	.062	TPMC-32-NGR-062
					.078	.062	TPMC-32-NGL-062
					.160	.094	TPMC-32-NGR-094
					.160	.094	TPMC-32-NGL-094
					.160	.125	TPMC-32-NGR-125
					.160	.125	TPMC-32-NGL-125
	.500	.187	.203	.415	.230	.125	TPMC-43-NGR-125
					.230	.125	TPMC-43-NGL-125
					.230	.156	TPMC-43-NGR-156
					.230	.156	TPMC-43-NGL-156
					.230	.187	TPMC-43-NGR-187
					.230	.187	TPMC-43-NGL-187
	.625	.250	.253	.522	.300	.187	TPMC-54-NGR-187
					.300	.187	TPMC-54-NGL-187
					.300	.250	TPMC-54-NGR-250
					.300	.250	TPMC-54-NGL-250



VR/Wesson	Equivalent	Insert Width	Hand	Face Angle
CON-087	GTN-2		N	0°
COR3-087	GTR-2-4D	.087"	R	3°
COL3-087	GTL-2-4D		L	3°
CON-093	GTN-3		N	0°
COR3-093	GTR-2.4-4D	.093"	R	3°
COL3-093	GTL-2.4-4D		L	3°
CON-120	GTN-3		N	0°
COR3-120	GTR-3-4D	.120"	R	3°
COL3-120	GTL-3-4D		L	3°
CON-160	GTN-4		N	0°
COR3-160	GTR-4-4D	.160"	R	3°
COL3-160	GTL-4-4D		L	3°
CON-187	GTN-4.8-4D		N	0°
COR3-187	GTR-4.8-4D	.187"	R	3°
COL3-187	GTL-4.8-4D		L	3°
CON-200	GTN-5		N	0°
COR3-200	GTR-5-4D	.200"	R	3°
COL3-200	GTL-5-4D		L	3°
CON-250	GTN-6		N	0°
COR3-250	GTR-6-4D	.250"	R	3°
COL3-250	GTL-6-4D		L	3°
CON-375	GTN-9		N	0°
COR3-375	GTR-9-4D	.375"	R	3°
COL3-375	GTL-9-4D		L	3°

Insert Identification System

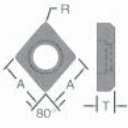




Spare Parts and Accessories

Shim Seat

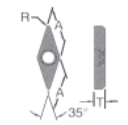
Sold in pkgs. of 10



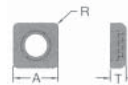
Desc.	EDP No.	A	T	R
Neg. 80° Diamond Shim Seat				
ICSN-432	30813	.500	.1875	.0312
ICSN-433	30814	.500	.1875	.0469
ICSN-533	30815	.625	.1875	.0469
ICSN-633	30816	.625	.1875	.0469



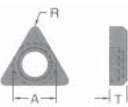
Desc.	EDP No.	A	T	R
Neg. 55° Diamond Shim Seat				
IDSN-423	30817	.500	.1250	.0469
IDSN-432	30818	.500	.1875	.0312
IDSN-433	30819	.500	.1875	.0469



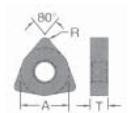
Desc.	EDP No.	A	T	R
Neg. 35° Diamond Shim Seat				
IVSN-322	30820	.375	.1250	.0312
IVSN-324	30821	.375	.1250	.0625



Desc.	EDP No.	A	T	R
Neg. Square Shim Seat				
ISSN-322	30822	.375	.1250	.0312
ISSN-323	30823	.375	.1250	.0469
ISSN-423	30824	.500	.1250	.0469
ISSN-432	30825	.500	.1875	.0312
ISSN-433	30826	.500	.1875	.0469
ISSN-633	30827	.500	.1875	.0469



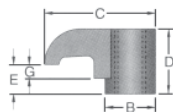
Desc.	EDP No.	A	T	R
Neg. Triangle Shim Seat				
ITSN-322	30828	.375	.1250	.0312
ITSN-323	30829	.375	.1250	.0469
ITSN-332	30830	.375	.1875	.0312
ITSN-333	30831	.375	.1875	.0469
ITSN-432	30832	.500	.1875	.0312
ITSN-433	30833	.500	.1875	.0469



Desc.	EDP No.	A	T	R
Neg. 80° Trigon Shim Seat				
IWSN-322	30834	.375	.1250	.0312
IWSN-432	30835	.500	.1875	.0312
IWSN-433	30836	.500	.1875	.0469

Finger Clamp

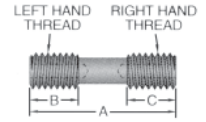
Sold in pkgs. of 10



Desc.	EDP No.	B	C	D	E	G	Thread
CL-5	30837	.280	.52	.350	.102	—	10-32
CL-6	30838	.310	.58	.440	.187	.094	10-32
CL-7	30839	.310	.64	.310	.082	—	10-32
CL-9	30840	.430	.75	.660	.344	.125	5/16-24
CL-12	30841	.430	.88	.660	.344	.125	5/16-24
CL-20	30842	.375	.73	.380	.125	—	1/4-28
CL-30	30843	.430	1.0	.660	.344	.125	5/16-24

Finger Clamp Screw

Sold in pkgs. of 10



Desc.	EDP No.	A	B	C	Thread	Hex Size
XNS-35	30851	0.625	.22	.22	10-32	3/32
XNS-36	30852	0.750	.25	.25	10-32	3/32
XNS-37	10011	0.840	.31	.31	10-32	3/32
XNS-47	30853	0.875	.28	.28	1/4-28	1/8
XNS-48	10013	1.000	.37	.37	1/4-28	1/8
XNS-58	30855	1.000	.50	.28	5/16-24	5/32
XNS-59	30856	1.125	.47	.41	5/16-24	5/32
XNS-510	30857	1.250	.50	.50	5/16-24	5/32

Multi-Lock Seat Screw

Sold in pkgs. of 10



Desc.	EDP No.	Insert I.C.	Thread	Hex Size
S-34	30858	.375	10-32	5/64
S-46	30859	.500	1/4-28	3/32
S-58	30860	.625	5/16-24	1/8

Insert Torx Screw

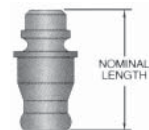
Sold in pkgs. of 10



Description	EDP No.	Insert I.C.	Torx Key
Insert Torx Screw			
TS-06	30863	.156	T-6
TS-25.45-6M1	30861	.250	T-7
TS-4.7-8M1	30864	.375	T-15
TS-4.7-10M1	30862	.375	T-15
TS-44-3	30865	.375	T-10
TS-103-4M1	59785	.500	T-120
TS-3.5-7M1	59779	.315	T-8
TS-35.6-9M1	59778	.394	T-15

Negative Lock Pin

Sold in pkgs. of 10

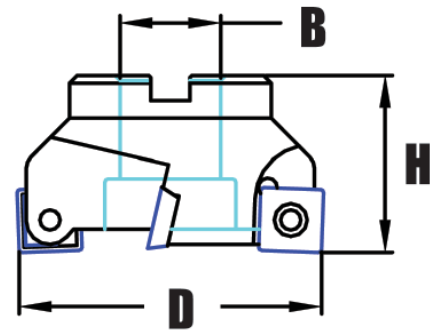


Desc.	EDP No.	Insert I.C.	Nominal Length	Thread	Hex Size
NL-33	30844	.375	.344	10-32	5/64
NL-33L	30845	.375	.406	10-32	5/64
NL-34	30846	.375	.453	10-32	5/64
NL-34L	30847	.375	.516	10-32	5/64
NL-44	30848	.500	.516	1/4-28	3/32
NL-46	30849	.500	.672	1/4-28	3/32
NL-58	30850	.625	.859	5/16-24	1/8



NEW VROOM Milling Cutter

Nickel Plated High Velocity Cutters
Accepts all inserts listed below!



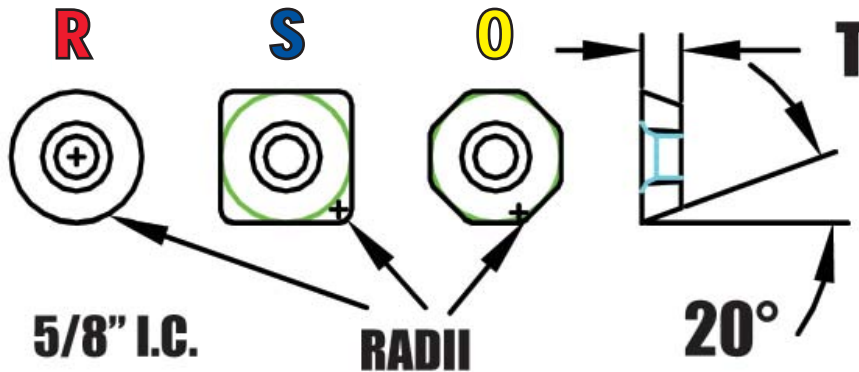
VRM5 Style Cutters

Cutter Number	EDP	w/ square insert D*	H	B	N	Insert Style
VRM5-2-3-750	35020	2"	1.725	.750	3	VRM5
VRM5-3-5-100	35030	3"	1.875	1.000	5	
VRM5-4-6-150	35040	4"	1.875	1.500	6	

* D for octagons subtract 3/8"; D for rounds subtract 5/8"

VRS-1032 SCREW PACK (10 PC) USE EDP-35001

Other cutter sizes available for this system by special order



Edge Styles



VRM5 Style Inserts

Insert Number	Radii	Ramet2 EDP	VR777 EDP	Ramet EDP	Face Grind - Shape
VRM5-HS-O	.062	35100	35101	35102	Hi Shear - Octagon
VRM5-NP-O	.062	35104	35105	35106	Neg/Pos - Octagon
VRM5-HS-R	.312	35108	35109	35110	Hi Shear - Round
VRM5-NP-R	.312	35112	35113	35114	Neg/Pos - Round
VRM5-HS-S-032	.032	35116	35117		Hi Shear - Square
VRM5-HS-S-062	.062	35120	35121		Hi Shear - Square
VRM5-HS-S-125	.125	35124	35125		Hi Shear - Square
VRM5-NP-S-062	.062		35129		Neg/Pos - Square
VRM5-NP-S-125	.125		35133		Neg/Pos - Square

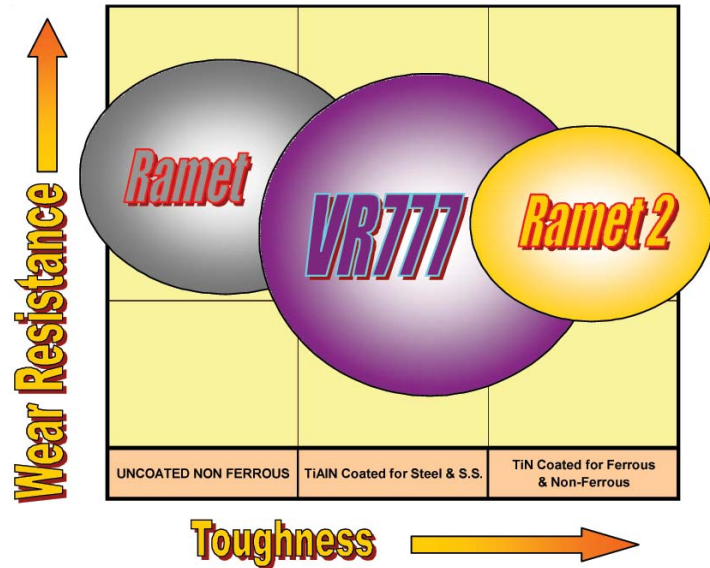
Other insert styles available for this system by special order



VRROOM Insert Selection or Recommendation

Carbide Grades

RAMET2	K20-K30 TiN Coating enhances next generation ferrous and non-ferrous machining
VR777	P25-P30 Ultra dense multi-layer TiAlN for machining stainless & other steels
RAMET	Uncoated 10% Cobalt Submicron WC for a variety of materials



Application Information

1st Choice	2nd Choice	Material Classification	SFPM	Feed per Tooth	
				Hi-Pos	Neg/Pos
VR777	RAMET2	Stainless Steel	600-1800	.002" - .007"	.004" - .012"
RAMET2	VR777	Cast Iron	350-1200	.003" - .007"	.004" - .016"
VR777		Low Carbon Steels	500-1800	.003" - .008"	.004" - .012"
VR777		Medium to High Carbon Steels	450-1200	.002" - .007"	.004" - .012"
RAMET2		High Nickel - High Temperature	200-600	.001" - .004"	.002" - .009"
RAMET2	RAMET	Non-ferrous, Aluminum	2500-12000	.004" - .022"	N/R
RAMET		Titanium	125-500	.001" - .004"	N/R

Cutter diameter is based on using a square insert. Octagon styles produce a slightly smaller effective diameter but provide a 45° lead angle and 8 edges, making it and the round style inserts the most popular. Using .032 radius square inserts are not intended for roughing steels and other hard and tough materials, but work well in aluminum and plastics.

Feeds and Speeds Calculations:

To calculate RPM: SFPM (from chart) x 3.82 divided by the cutter diameter equals RPM.

To calculate the feed rate: Feed per tooth (FPT) x number of teeth (inserts) in cutter x RPM equals feed in inches per minute.

Start in the middle of figures provided. Feeds and speeds assume an octagon insert (reduce feed by 20% for square insert to start), also assumes a rigid setup, part properly held, basic knowledge and experience of cutting, etc. Depth of cut will be appropriate to the horsepower available. Always start with a light depth of cut (.015-.025) if the horsepower is low or unknown, increasing as power is available. Always use proper safety gear and procedures.

General Application Tips:

1. Climb mill whenever possible. 2. Width of cut (WOC) should be 60%-70% diameter of cutter when soft milling; WOC for hard milling should be 30%. 3. Always use the shortest reach toolholders possible for the application. 4. Use light depth of cut and higher feeds and speeds when finishing.



Tantung

Tantung is a cast alloy cutting tool material composed principally of chromium, tungsten, columbium and carbon in a cobalt matrix. These elements combined in the proper proportions and cast in chill molds give Tantung its most important characteristic -- the ability to retain its cutting hardness at red heat temperatures up to 1500°F. It is neither high speed steel nor carbide. It is unique.

Tantung has a high transverse rupture strength, low coefficient of friction and excellent resistance to corrosion. It is tough, readily absorbs shock and impact and is non-magnetic... it likes to work.

As a cutting tool, it is ideal for all turning, facing, boring, milling and cut-off applications on nearly every type of metal and non-metallics. Tantung performs best at speeds of 100-250 SFPM and can be used to excellent advantage on machines where speed, power and rigidity are limited. In addition, it will not anneal or lose its cutting edge as will H.S.S. when subjected to high-red heats generated during the cutting cycle.

Tantung G is recommended for general purpose machining for both ferrous and non-ferrous metals and general woodworking operations. For catalog items, Tantung G Hardness is 60 to 63 Rockwell C and Transverse Rupture Strength is 300,000 psi minimum.

Still cuts at 1500°

- Tantung blades will not anneal at 1500°F.
- Maintains cutting edge hardness throughout tool life.
- Longer tool life than HSS.

Broad operating speeds

- Tantung works at speeds of up to 450 SFPM.
- Operates at speeds where HSS fails.
- Effective at speeds where cemented carbides load-up.
- Won't chip like carbides at lower speeds.

New life for older machines

- Tantung can be used on machines where speeds and rigidity are limited.
- With tantung tools, older machines can handle increased production loads and help reduce costs.
- Performs interrupted cuts significantly better than carbides.

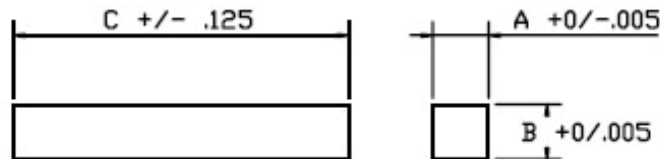
Chemical Composition + Manufacturing Process = TANTUNG

<p>Corrosion resistant non-magnetic alloys.</p> <ul style="list-style-type: none"> • Cobalt • Chromium • Tungsten • Columbium • Carbon 	<p>Melted in electric furnaces and cast in chill molds imparts:</p> <ul style="list-style-type: none"> • Rapid solidification for very fine grain structure • High hardness • Maximum strength 	<ul style="list-style-type: none"> • Mass characteristics Density (72°F) 8.3³g/cm • Thermal Properties Melting range: 2100-2200°F Thermal Conductivity: 0.064 Cal/cm²/cm/K/sec Co-efficient of linear thermal expansion: (100-1200°F) 4.2 x 10⁶ in/in/K <p>Mechanical Properties Rockwell C hardness 60.0-63.0 Brinell hardness: 479 at 1200°F Transverse Rupture Strength 300 x 10³ psi (almost twice that of other cast alloys) Compressive strength: 400 x 10³ psi Youngs' Modulus: 41 x 10⁶ psi</p> <p>Tantungs* low co-efficient of friction makes it an ideal cutting/slicing material.</p>
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Tantung

SOLID SQUARE TOOL BITS

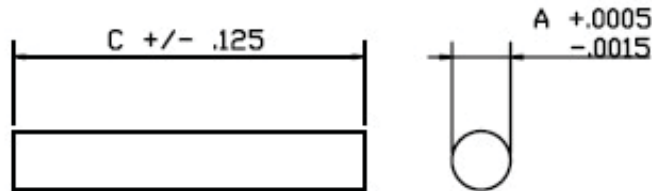


DIMENSIONS			DIMENSIONS			DIMENSIONS		
A Width	B Height	C Length	A Width	B Height	C Length	A Width	B Height	C Length
3/16	3/16	1	3/8	3/8	2	5/8	5/8	3
		2			2-1/2			3-1/2
		2-1/2			2-3/4			4
		3			3			4-1/2
		2-1/8			3-1/2			5
1/4	1/4	2-1/2	7/16	7/16	4	3/4	3/4	6
		3			6			3
		3-1/2			2-1/2			4
		4			3			4-1/2
		6			3-1/2			5
5/16	5/16	2-1/4	1/2	1/2	4	7/8	7/8	6
		2-1/2			6			5
		3			2-1/2			5
		3-1/2			3			6
		4			3-1/2			5
		5			4			6
6	4-1/2	6						
					5	1	1	6



Tantung

SOLID ROUND TOOL BITS



DIMENSIONS	
A Diameter	B Length
1/8	3
	4
3/16	3
	4
1/4	1
	2
	3
	4

DIMENSIONS	
A Diameter	B Length
5/16	1
	2
	3
	4
3/8	1
	2
	3
	4
	5
7/16	4
	5
	6

DIMENSIONS	
A Diameter	B Length
1/2	2
	3
	4
	5
	6
9/16	6
5/8	3
	4
	5
	6

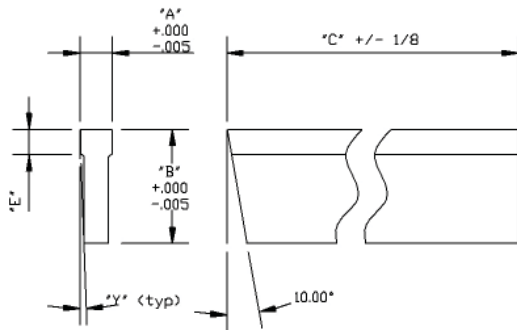
DIMENSIONS	
A Diameter	B Length
11/16	6
3/4	3
	4
	5
	6
7/8	4
1	4
	6



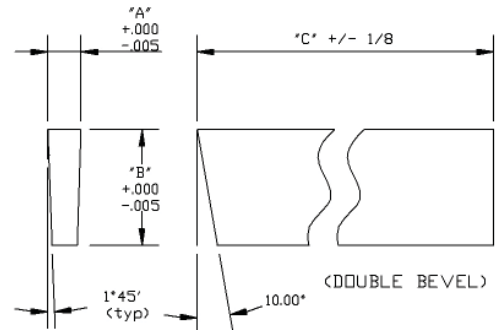
Tantung

CUTT-OFF BLADES

TAN - 7000



TAN - 8000



TAN-7000 - TANTUNG G					
BLADE DIMENSIONS					BLADE NUMBER
A Width	B Height	C Length	E	Angle Y	
3/32	0.476	4-1/2	0.095	3°	TAN-7000
	0.676	5	0.123	2°	TAN-7001
1/8	0.476	4-1/2	0.145	4°	TAN-7002
	0.676	5	0.123	3°	TAN-7003
	0.749	5	0.167	3°	TAN-7004
	0.874	6	0.195	2°	TAN-7005
	1.123	6-1/2	0.195	2°	TAN-7006
5/32	0.676	5	0.123	2°	TAN-7007
	0.874	6	0.195	3°	TAN-7009
	0.676	5-1/4	0.123	4°	TAN-7010
	0.874	6	0.195	4°	TAN-7012
	1.123	6-1/2	0.195	4°	TAN-7013
	1/4	1.123	6-1/2	0.195	4°

TAN-8000 - TANTUNG G			
BLADE DIMENSIONS			BLADE NUMBER
A Width	B Height	C Length	
3/32	1/2	4-1/2	TAN-8005
	5/8	4-1/2	TAN-8006
1/8	5/8	4-1/2	TAN-8009
	3/4	6	TAN-8000
	7/8	6	TAN-8001
5/32	5/8	6	TAN-8010
	3/4	6	TAN-8011
	7/8	6	TAN-8012
3/16	3/4	6	TAN-8013
	7/8	6	TAN-8014
	1	6	TAN-8002
	1-1/8	6	TAN-8003
1/4	1	6	TAN-8016
	1-1/4	6	TAN-8004
5/16	1-1/4	6	TAN-8018



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VR WESSON COMPANY POLICIES

CONDITIONS OF THE SALE

All prices are quoted in US dollars and subject to change without notice. Sales are made in accordance with our standard conditions of sale at the time of shipment.

MINIMUM ORDER

The minimum order value on package quantities is \$50.00 on standard items and \$200.00 for specials.

QUOTATIONS

Quotes are valid for 15 days from the date of quotation unless otherwise agreed upon in writing. Estimated lead-times and deliveries are based on capacity at the time of quotation and is subject to change.

TERMS OF PAYMENT

Visa, MasterCard, C.O.D. or net 30 days with approved credit. VR Wesson reserves the right to place accounts on hold or stop ship status if the terms of payment are not met.

DELIVERY

All orders are shipped F.O.B. Cape Coral, FL by UPS ground unless otherwise specified in writing. C.O.D. drop ships will be made, pending account status.

WARRANTY

VR Wesson will replace any material that is proven to be defective within 30 days from the date of shipment to the customer. No claim for labor costs or other damage will be accepted. Claims for errors must be made upon receipt of material. Claims for loss in transit must be made against the transportation company. VR Wesson will make every effort to assist in any loss in transit claims.

RETURN POLICY

Returned stock items are subject to a 25% restocking charge. There are no returns on special orders except for manufacturing or material defects. Any returns must include a returned goods authorization (RGA) number, issued by customer service at VR Wesson. Returns received without an RGA number visible on the package labeling will be returned to sender.

If the material being returned is for a warranty claim, disposition will be determined only after the material is returned and sufficient time has been allowed to analyze the subject item. Credit to the account of the company returning the item will be issued only after the subject item has been found to be defective. Returning any product does not relieve the customer from payment obligations of the original order.

OVER/ UNDER SHIPMENTS

All stock catalog items will be shipped in exact quantities unless otherwise specified and agreed upon in writing. VR Wesson reserves the right to over/under ship by 10% any made to order (MTO) items.

TOOLING

All tooling for product is the sole property of VR Wesson. Any fees paid by the customer in connection with tooling are considered as initial design and engineering cost and future normal maintenance.

BLANKET ORDER POLICY

VR Wesson allows customers to take advantage of additional discounts through our blanket order system. A blanket order allows the customer to essentially freeze the price of an item in a volatile materials market. Release dates and quantities are required to qualify for blanket pricing. Programs are available for 6 and 12 month pricing. Blanket orders once initiated cannot be cancelled. If part of a release order is cancelled and the price is based on a volume discount, pricing and invoicing will be adjusted accordingly. Call for specific details on your requirements 800-243-4385 or e-mail sales@vrwesson.com. Blanket release dates can only be pushed back 1 month.

AGI/VRWesson reserves the right to substitute chipbreaker styles. Not all items exactly as pictured.

